# CALENDAR FOR WATER YEAR 2003

## 2002

### OCTOBER

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 | | |

### NOVEMBER

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### DECEMBER

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## 2003

### JANUARY

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### FEBRUARY

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| 23 | 24 | 25 | 26 | 27 | 28 | |

### MARCH

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### APRIL

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| 27 | 28 | 29 | 30 | | | |

### MAY

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### JUNE

| S | M | T | W | T | F | S |
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| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | | | | | |

### JULY

| S | M | T | W | T | F | S |
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| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 | | |

### AUGUST

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| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | | | | | | |

### SEPTEMBER

| S | M | T | W | T | F | S |
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| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | | | | |

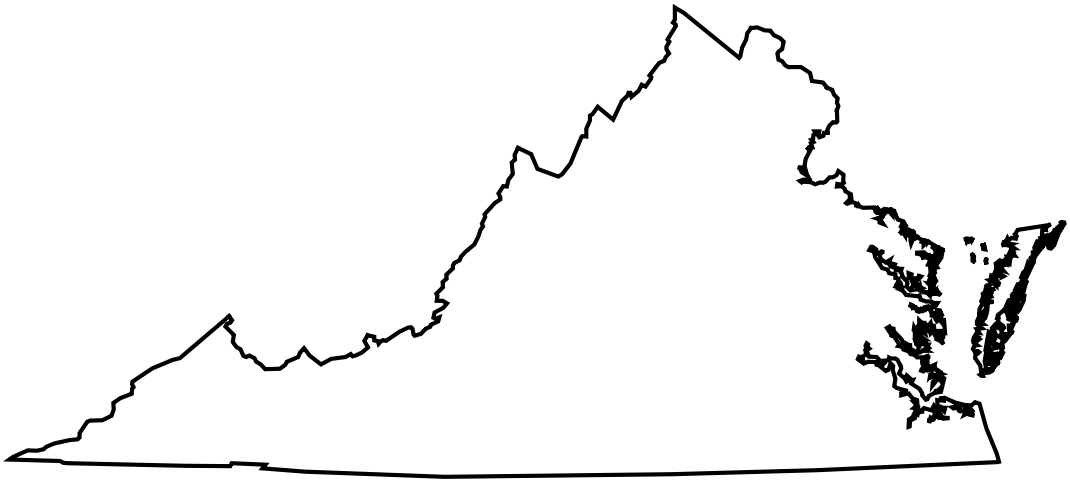
U.S. Department of the Interior
U.S. Geological Survey

# Water Resources Data Virginia Water Year 2003

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

By Roger K. White, Donald C. Hayes, Joel R. Guyer, and Eugene D. Powell

Water-Data Report VA-03-1



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

U.S. DEPARTMENT OF THE INTERIOR

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2004

# 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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Water-resources data for the 2003 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 178 gaging stations; stage only at 2 gaging stations; stage and contents at 11 lakes and reservoirs; and water quality at 16 gaging stations. Also included are data for 49 crest-stage partial-record stations. Locations of these sites are shown on figures 4 and 5. Miscellaneous hydrologic data were collected at 149 measuring sites and 6 water-quality sampling sites not involved in the systematic data-collection program. The data in this report represent that part of the National Water Data System collected by the U.S. Geological Survey and cooperating State and Federal agencies in Virginia.

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*Virginia, *Hydrologic data, *Surface water, *Water quality
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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]


| | Station number | Page |
|---|---|---|
| NORTH ATLANTIC SLOPE BASINS | | |
| POTOMAC RIVER BASIN | | |
| Potomac River: | | |
| Back Creek: | | |
| Hogue Creek near Hayfield (d) | 01613900 | 48 |
| Opequon Creek near Stephens City (d) | 01614830 | 50 |
| Opequon Creek near Berryville (d) | 01615000 | 52 |
| Dry Marsh Run near Berryville (d) | 01616100 | 54 |
| North River (head of Shenandoah River) near Stokesville (d) | 01620500 | 58 |
| Dry River: | | |
| Muddy Creek at Mount Clinton (d,c,t) | 01621050 | 60 |
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| Potomac River near Washington, DC (d,c,t) | 01646500 | 152 |

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]


| | Station number | Page |
|---|---|---|
| NORTH ATLANTIC SLOPE BASINS--Continued | | |
| POTOMAC RIVER BASIN--Continued | | |
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SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED IN THIS VOLUME

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| | Station number | Page |
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SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED IN THIS VOLUME

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| | Station number | Page |
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| JAMES RIVER BASIN--Continued | | |
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SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED IN THIS VOLUME

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| | Station number | Page |
|---|---|---|
| SOUTH ATLANTIC SLOPE BASINS--Continued | | |
| ROANOKE RIVER BASIN--Continued | | |
| Smith River at Smith River Church near Woolwine (d). | 02071530 | 436 |
| Philpott Lake near Philpott (e) | 02071900 | 438 |
| Smith River near Philpott (d). | 02072000 | 440 |
| Smith River at Bassett (d) | 02072500 | 442 |
| Smith River at Martinsville (d) | 02073000 | 444 |
| Smith River at Eden, NC (d) | 02074000 | 446 |
| Sandy River near Danville (d) | 02074500 | 448 |
| Dan River at Sewage Treatment Plant, near Danville (d) | 02075045 | 450 |
| Dan River at Paces (d). | 02075500 | 452 |
| Dan River at South Boston (e) | 02076000 | 454 |
| Banister River: | | |
| Banister River at Halifax (d) | 02077000 | 456 |
| Hyco River near Denniston (d). | 02077500 | 458 |
| John H. Kerr Reservoir near Boydton (e). | 02079490 | 460 |
| Roanoke River at Buggs Island (e) | 02079500 | 462 |
| Allen Creek near Boydton (d) | 02079640 | 464 |
| OHIO RIVER BASIN | | |
| Ohio River: | | |
| KANAWHA RIVER BASIN | | |
| South Fork New River (head of Kanawha River) near Jefferson, NC (d) | 03161000 | 466 |
| New River near Galax (d) | 03164000 | 468 |
| Chestnut Creek at Galax (d) | 03165000 | 470 |
| New River at Ivanhoe(d). | 03165500 | 472 |
| Reed Creek at Grahams Forge (d) | 03167000 | 474 |
| New River at Allisonia (d) | 03168000 | 476 |
| Claytor Reservoir near Radford (e) | 03169000 | 478 |
| Little River at Graysontown (d) | 03170000 | 480 |
| Little River Reservoir near Radford (e) | 03170500 | 482 |
| New River at Radford (d). | 03171000 | 484 |
| Walker Creek at Bane (d) | 03173000 | 486 |
| Wolf Creek near Narrows (d) | 03175500 | 488 |
| New River at Glen Lyn (d) | 03176500 | 490 |
| BIG SANDY RIVER BASIN | | |
| Levisa Fork at Big Rock (d) | 03207800 | 492 |
| Russell Fork at Haysi (d) | 03208500 | 494 |
| North Fork of Pound Lake at Pound (e) | 03208680 | 496 |
| Cranes Nest River near Clintwood (d) | 03208950 | 498 |
| John W. Flannagan Reservoir near Haysi (e) | 03208990 | 500 |
| Pound River below Flannagan Dam, near Haysi (d) | 03209000 | 502 |
| Levisa Fork at Pikeville, KY (d) | 03209500 | 504 |

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]


| | Station number | Page |
|---|---|---|
| TENNESSEE RIVER BASIN | | |
| French Broad River (head of Tennessee River): | | |
| South Fork Holston River at Riverside, near Chilhowie (d) | 03471500 | 506 |
| South Fork Holston River near Damascus (d) | 03473000 | 508 |
| Middle Fork Holston River at Seven Mile Ford (d) | 03474000 | 510 |
| Middle Fork Holston River near Meadowview (d) | 03475000 | 512 |
| Beaver Creek at Bristol (d) | 03478400 | 514 |
| North Fork Holston River near Saltville (d) | 03488000 | 516 |
| Tennessee River: | | |
| Clinch River at Cleveland (d) | 03524000 | 518 |
| Clinch River at Speers Ferry (d) | 03527000 | 520 |
| Clinch River above Tazewell, TN (d) | 03528000 | 522 |
| Powell River: | | |
| Powell River at Big Stone Gap (d) | 03529500 | 524 |
| Powell River near Jonesville (d) | 03531500 | 526 |
| Discharge at partial-record stations and miscellaneous sites | | 528 |
| Crest-stage partial-record stations | | 528 |
| Special study and miscellaneous sites | | 538 |
| Analyses of samples collected at partial-record, special study, and miscellaneous sites | | 553 |

## 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]

| Station name | Station number | Drainage area (mi2) | 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** | | | |
| 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 |
| Blacks Run at Rt 726 at Harrisonburg (d) | 01621410 | 11.2 | 2000-02 |
| Blacks Run at Rt 704 near Mt. Crawford (d) | 01621470 | 19.4 | 1999-01 |
| 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 |
| 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 |

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

| Station name | Station number | Drainage area (mi2) | Period of record (water years) |
|---|---|---|---|
| **POTOMAC RIVER BASIN--Continued** | | | |
| Cedar Run near Aden (d) | 01656100 | 155 | 1973-87, 1996-99 |
| Cedar Run at Route 646 near Aden | 01656120 | - | 1996-2000 |
| 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 |
| Little Creek at Mockingbird Road at Triangle (d) | 01658698 | - | 1999-2001 |
| Little Creek at Geiger Road at Quantico (d) | 01658705 | - | 1999-2001 |
| Chopawamsic Creek at Russell Road near Joplin (d) | 01660100 | - | 1996-2002 |
| Cannon Creek near Garrisonville, Va. (d) | 01660380 | 10.2 | 1994-96 |
| 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 |
| **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 |
| 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 |
| Cat Point Creek near Montross (d) | 01668500 | 45.6 | 1944-99 |
| 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 |

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

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

| Station name | Station number | Drainage area (mi2) | Period of record (water years) |
|---|---|---|---|
| **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 |
| 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 |
| 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 Arvonia (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, |

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

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

| Station name | Station number | Drainage area (mi2) | Period of record (water years) |
|---|---|---|---|
| **JAMES RIVER BASIN--Continued** | | | |
| 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 |
| 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 |
| Upham Brook near Richmond, Va. (d) | 02042426 | 37.6 | 1989-94 |
| **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 |
| Lake Drummond in Great Dismal Swamp (e) | 02043600 | - | 1926-2002 |
| **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 |
| Roanoke River near Wabun | 02054510 | 273 | 1994-99 |
| 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 |
| Falling River at Spring Mills, Va. (d) | 02063500 | 52.2 | 1954-60 |
| Little Falling River at Hat Creek, Va. (d) | 02064500 | 43 | 1929-36 |

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

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

| Station name | Station number | Drainage area (mi2) | Period of record (water years) |
|---|---|---|---|
| ROANOKE RIVER BASIN--Continued | | | |
| 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 |
| Georges Creek near Gretna, Va. (d) | 02076500 | 9.24 | 1949-97 |
| Hyco 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 |
| 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<br>60.9 | 1927-33, 1951-57 |
| Little River near Copper Va.lley, 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 |
| 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 |
| 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 |

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

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

| Station name | Station number | Drainage area (mi2) | Period of record (water years) |
|---|---|---|---|
| TENNESSEE RIVER BASIN | | | |
| 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 |
| 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 |
| North Fork Clinch River at Duffield, Va. (d) | 03527500 | 23.1 | 1953-59 |
| 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.

## 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.

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

| Station name | Station number | Drainage area ($mi^2$) | Type of record | Period of record (water years) |
|---|---|---|---|---|
| **POTOMAC RIVER BASIN** | | | | |
| Blacks Run at Rt 704 near Mt. Crawford | 01621470 | 19.4 | C,T,SC | 1999-01 |
| 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 | 1949 |
| | | | C,T,SC | 1994 |
| South Fork Shenandoah River near Luray, Va. | 01629500 | 1,377 | SC | 1949 |
| | | | C,T,SC | 1994 |
| South Fork Shenandoah River at Front Royal | 01631000 | 1,642 | C,SED | 1996-02 |
| North Fork Shenandoah River near Strasburg | 01634000 | 768 | C,SED | 1996-02 |
| Catoctin Creek at Taylorstown, Va. | 01638480 | 89.6 | C | 1993-95 |
| 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 |
| Cedar Run near Aden, Va. | 01656100 | 155 | SED | 1996-99 |
| 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,T,SC,SED | 1995-96 |
| Quantico Creek near Dumfries, Va. | 01658480 | 6.90 | C | 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 |
| Little Creek at Mockingbird Road at Triangle | 01658698 | - | C | 1999-01 |
| Little Creek at Geiger Road at Quantico | 01658705 | - | C | 1999-01 |
| Chopawamsic Creek at I-95 near Joplin | 01660100 | | C | 1996-02 |
| Beaverdam Run near Garrisonville, Va. | 01660500 | 12.7 | C,M,SED | 1997-01 |
| **RAPPAHANNOCK RIVER BASIN** | | | | |
| Carter Run near Marshall, Va. | 01661900 | 19.5 | SED | 1977-78 |
| Hazel River at Rixeyville, Va. | 01663500 | 287 | T | 1951-55 |
| | | | SC | 1953-55 |
| | | | SED | 1952-55 |
| Rappahannock River at Remington, Va. | 01664000 | 620 | SC,T | 1951-56, 1965-86 |
| | | | SED | 1951-93 |
| Rapidan River near Culpeper, Va. | 01667500 | 472 | T | 1946,1951-56 |
| | | | SC | 1953-56 |
| | | | SED | 1951-56 |
| Mountain Run near Burr Hill, Va. | 01667870 | 28.8 | C,T,SC | 1990-92 |
| Rappahannock River at VEPCO Dam, at Fredericksburg, Va. | 01668020 | - | T,SC | 1971-72 |

DISCONTINUED SURFACE-WATER-QUALITY STATIONS--Continued

| Station name | Station number | Drainage area ($mi^2$) | Type of record | Period of record (water years) |
|---|---|---|---|---|
| **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 |
| Mattaponi River near Bowling Green, Va. | 01674000 | 257 | 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 | 1969-86 |
| | | | C | 1930,1948, 1968-86 |
| James River at Buchanan, Va. | 02019500 | 2,075 | T | 1948,1951-56, 1968-86 |
| | | | SC | 1953-56, 1968-86 |
| | | | SED | 1951-56 |
| | | | C | 1930,1948, 1951-56, 1968-86 |
| James River at Bent Creek, Va. | 02026000 | 3,683 | T | 1948 |
| James River at Scottsville, Va. | 02029000 | 4,584 | T,SC | 1951-56,1987 |
| | | | SED | 1951-56 |
| 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,T,SC,SED | 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 | 1984,1987-91 |
| | | | SED | 1988-91 |
| Chickahominy River near Providence Forge, Va. | 02042500 | 248 | C,T,SC | 1969-70, 1972-91 1995-98 |
| | | | SED | 1990-91 |
| Chickahominy River above Walkers Dam, at Walkers, Va. | 02042720 | 301 | C,T,SC | 1983-91 |
| | | | SED | 1990-91 |

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

DISCONTINUED SURFACE-WATER-QUALITY STATIONS--Continued

| Station name | Station number | Drainage area ($mi^2$) | Type of record | Period of record (water years) |
|---|---|---|---|---|
| **JAMES RIVER BASIN--Continued** | | | | |
| Diascund Creek at Rt. 628, near New Kent, Va. | 02042726 | 9.25 | C,T,SC | 1986-91 |
| | | | SED | 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 | 1986-91 |
| | | | SED | 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 | 1947 |
| | | | C,T,SC,SED | 1978-96 |
| Blackwater River at Zuni, Va. | 02048000 | 456 | T | 1947 |
| Blackwater River near Franklin, Va. | 02049500 | 617 | C,T,SC,SED | 1947, 1952, 1975-96 |
| North Meherrin River near Lunenburg, Va. | 02051000 | 55.6 | T | 1947 |
| Meherrin River at Emporia, Va. | 02052000 | 747 | T,SC | 1968-80 |
| | | | C | 1968-93 |
| **ROANOKE RIVER BASIN** | | | | |
| Roanoke River at Lafayette, Va. | 02054500 | 257 | T,SC | 1951 |
| Roanoke River at Altavista, Va. | 02060500 | 1,789 | T | 1951,1953-56, 1968-86 |
| | | | SC | 1953-56, 1968-86 |
| | | | SED | 1953-56 |
| | | | C | 1951,1953-56, 1968-86 |
| Roanoke River at Randolph, Va. | 02066000 | 2,977 | T,SC | 1951-56, 1968-62 |
| | | | SED | 1954-81 |
| | | | C | 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 |

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

DISCONTINUED SURFACE-WATER-QUALITY STATIONS--Continued

| Station name | Station number | Drainage area ($mi^2$) | Type of record | Period of record (water years) |
|---|---|---|---|---|
| **ROANOKE RIVER BASIN--Continued** | | | | |
| 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 | 1954-56 |
| | | | SED | 1954-81 |
| | | | C | 1954-93 |
| Dan River at South Boston, Va. | 02076000 | 2,730 | T | 1952 |
| | | | SC | 1951-52 |
| Roanoke River at Clarksville, Va. | 02079000 | 7,320 | C | 1987-91 |
| Lake Gaston near Elams, N.C. | 02079785 | - | T,SC | 1988 |
| | | | SED | 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 |
| 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, N.C. | 0207988490 | - | C,T,SC | 1989-90 |
| Lake Gaston tributary near Tillans Chapel, near Elams, N.C. | 0207988510 | - | C,T,SC | 1989-90 |
| Pea Hill Creek tributary No. 5, near Henrico, N.C. | 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 | 1950,1968-83 |
| | | | C | 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 | 1968-88 |
| | | | T | 1964-88 |
| | | | C,T,SC,SED | 1931,1950, 1952,1955-56, 1965-95 |

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

DISCONTINUED SURFACE-WATER-QUALITY STATIONS--Continued

| Station name | Station number | Drainage area ($mi^2$) | Type of record | Period of record (water years) |
|---|---|---|---|---|
| **BIG SANDY RIVER BASIN** | | | | |
| Levisa Fork near Grundy, Va. | 03207500 | 235 | T,SC | 1950 |
| | | | SED | 1986 |
| Levisa Fork at Big Rock, Va. | 03207800 | 297 | T,SC | 1970-81 |
| | | | SED | 1970-81 |
| Grissom Creek near Council, Va. | 03208034 | 2.82 | C,T,SC,SED | 1982-83 |
| Barton Fork near Council, Va. | 03208036 | 10.2 | C,T,SC,SED | 1981-83 |
| Russell Fork at Council, Va. | 03208040 | 1.23 | T,SC | 1981-83 |
| | | | C | 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 | 1950,1968-73 |
| | | | SC | 1950 |
| | | | C | 1950,1952, 1968-86 |
| Middle Fork Holston River at Seven Mile Ford,Va. | 03474000 | 132 | C,T,SC,SED | 1997-98 |
| 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 |
| North Fork Holston River near Gate City, Va. | 03490000 | 672 | T | 1950-51, 1968-78 |
| | | | SC | 1950-51 |
| | | | SED | 1935-38, 1963-65 |
| Guest River near Miller Yard,Va. | 03524550 | 100 | C,T,SC,SED | 1997-98 |
| Copper Creek near Gate City, Va. | 03526000 | 106 | C,T,SC,SED | 1997-98 |
| Clinch River at Speers Ferry, Va. | 03527000 | 1,126 | T | 1950,1965-67 |
| | | | SC | 1950 |
| | | | SED | 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)

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

## INTRODUCTION

The Water Resources Division of the U.S. Geological Survey (USGS), 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 178 gaging stations; stage only at 2 gaging stations; stage and contents at 10 lakes and reservoirs; and water quality at 16 gaging stations. Also included are data for 49 crest-stage partial-record stations. Locations of these sites are shown on figures 4 and 5. Miscellaneous hydrologic data were collected at 149 measuring sites and 5 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 l975 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-01-1." For archiving and general distribution, the reports for l971-74 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.water.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, Robert G. Burnley, 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 REGIONAL 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.

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 67 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 Robert G. Burnley, director. Published material for the gaging-station records is supplied through the Division of Water Resource Management, Larry G. Lawson, P.E., director.

## SUMMARY OF HYDROLOGIC CONDITIONS

### Surface-Water Discharge

Statewide, annual mean discharges for the 2003 water year were above the normal range of flow (above the 75th percentile of annual mean flows) based on streamflow data at the farthest downstream gaged locations in the Shenandoah, Potomac, Rappahannock, York, James, Roanoke, Kanawha, Big Sandy, and Tennessee River Basins. Annual mean discharges were at record high levels at 105 of 153 streamflow gages with more than 5 years of record. These levels of streamflow also are unusual in that 68 of the 153 streamflow gages set record low levels for annual mean discharge in the 2002 water year. Figure 1 shows annual mean discharges with the long-term mean discharges at four selected streamflow gages throughout the State.

Monthly average precipitation was well below average through August 2002, but increased in September 2002 and remained above average for the 2003 water year, except for January and February 2003, when precipitation was below average. Statewide, monthly mean discharges (based on monthly mean streamflow statistics) followed a similar pattern. Monthly mean discharges were above the normal range of flow for much of the water year. About a third of the streamflow gages were below the normal range of flow (below the 25th percentile of monthly mean flows) in October 2002, as soil moisture was replenished and ponds and reservoirs filled. Streamflows increased into the normal range (above the 25th percentile and below the 75th percentile of monthly mean flows) or above-normal range of flow in November and December 2002. In January and February 2003, streamflows declined to the below-normal to normal range of flow, but increased to the above-normal range of flows by the March-April time frame. From April through September, streamflow remained in the above-normal range of flows at almost all streamflow gages throughout the State. Figure 2 shows the distribution of monthly and annual mean discharges for four selected streamflow gages throughout the State.

Very few floods occurred during the 2003 water year. Of 153 streamflow gages with more than 5 years of record, new maximum instantaneous flows were recorded at only 4 gages. Table 1 lists the gaging stations and their peak flows for the 2003 water year, associated recurrence intervals, and period of records. Three of the four streamflow gages have period of records less than 12 years.

Precipitation on February 22-23, 2003, combined with accumulated sleet and snow, caused heavy localized flooding in the mountain regions of Virginia and minor to moderate flooding elsewhere. Recurrence intervals of flood discharges at streamgages ranged from less than 2 years across most of the State to 25 years in the upper James River Basin.

Precipitation on March 20-21, 2003, caused heavy localized flooding in the south-central portions of Virginia and minor flooding elsewhere. Recurrence intervals of flood discharges at streamgages ranged from less than 2 years across most of the State, to 5 years in the Potomac River Basin (Fairfax County), and greater than 10 years in the Roanoke River Basin. The greatest flooding in Virginia was in the Dan River, Banister River, and Hyco River.

On September 18, 2003, at approximately noon, Hurricane Isabel made landfall on the outer banks of North Carolina. The 600-mile-wide storm, previously a class 5 hurricane with 160-mile-per-hour winds, made landfall as a class 2 hurricane and 110-mile-per-hour winds. The leading edge of the storm crossed into southeast Virginia with 100 mile-per-hour winds before being downgraded to a tropical storm. The storm tracked from the outer banks of North Carolina to Richmond, Va., across the Blue Ridge into eastern West Virginia and western Maryland. The storm brought heavy rains and winds to already saturated soils. The Virginia Beach area received approximately 4 inches of rain, while most of central Virginia received 5 to 8 inches. Peak rainfall amounts were in the Blue Ridge Mountains south and west of Charlottesville with as much as 20 inches of rain (Upper Sherando rain gage). The worst flooding occurred in central Virginia where the discharge in the South River near Harriston, Va., approached a 50-year recurrence interval, and the discharge in the South River near Buena Vista, Va., had a recurrence interval in excess of 100 years.

Table 1: Maximum, period of record, instantaneous peak discharges recorded during 2003 water year [--; not computed]

| Gaging Station | Maximum instantaneous discharge, in cubic feet per second | Recurrence interval, in years | Length of record, in years |
|---|---|---|---|
| North Branch Chopawamsic Creek near Independent Hill, Va. | 415 | -- | 11 |
| Middle Branch Chopawamsic Creek near Garisonville, Va. | 512 | -- | 8 |
| Smith River near Woolwine, Va. | 1,480 | -- | 8 |
| Allen Creek near Boydton, Va. | 7,380 | 70 | 39 |

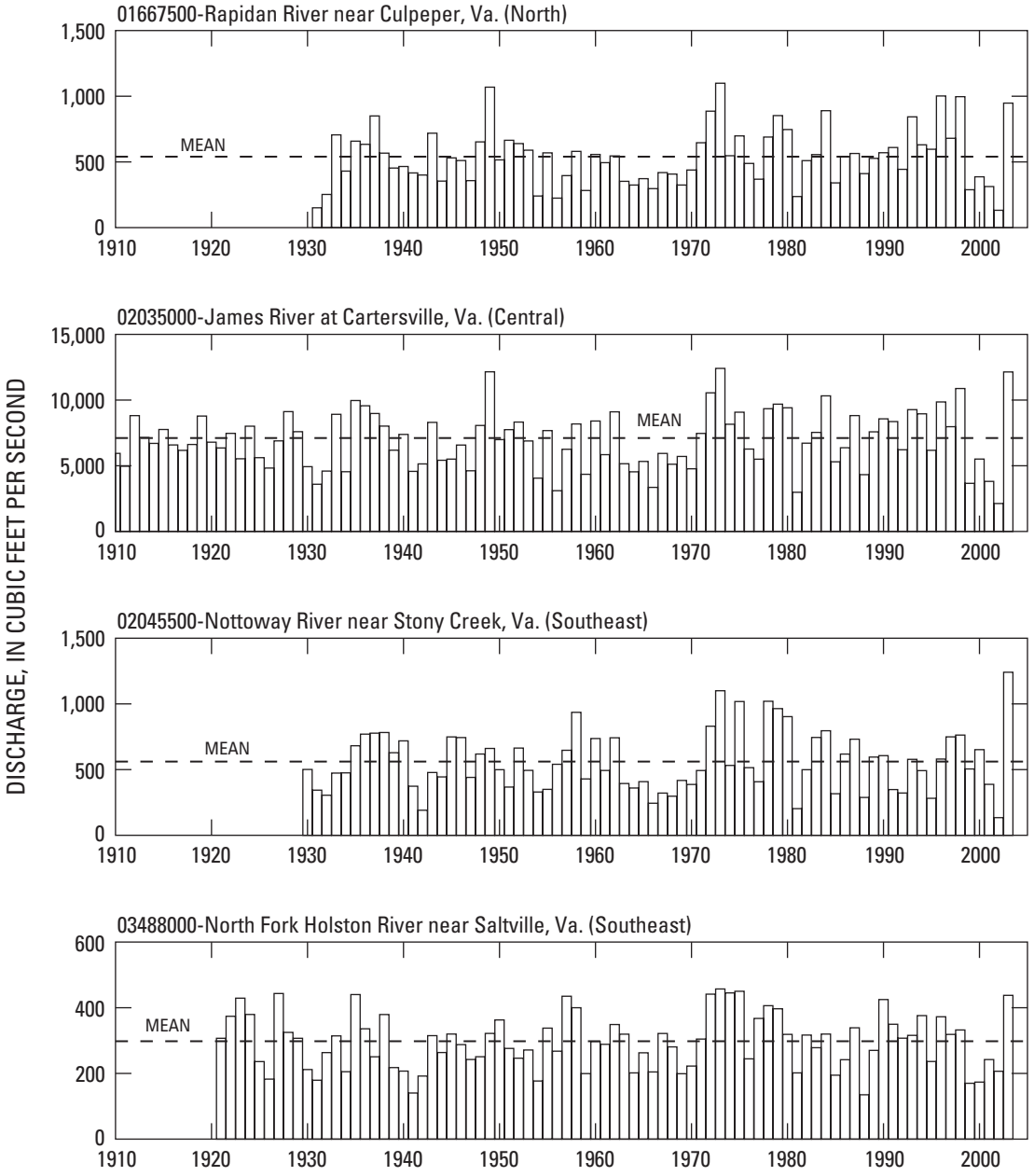



**Figure1.** Annual mean discharge at four selected stream-gaging stations

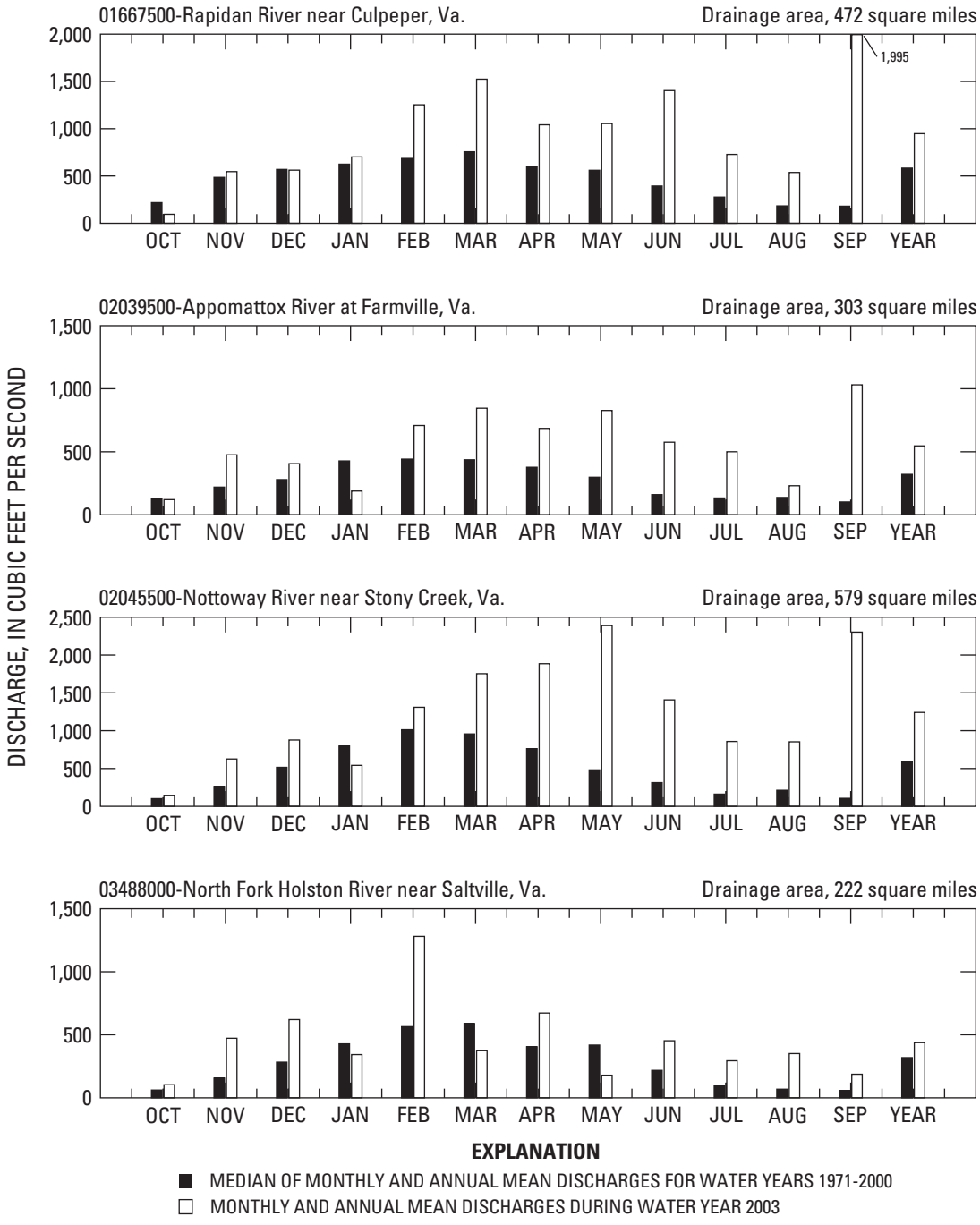



**Figure 2.** Monthly and annual mean discharges during 2003 water year and median of monthly and annual mean discharges for 1971-2000 water years at four representative stream-gaging stations.

## DOWNSTREAM ORDER AND STATION NUMBER

Since October 1, 1950, hydrologic-station records in USGS reports have been listed in order of downstream direction along the main stream. All stations on a tributary entering upstream from a main-stream station are listed before that station. A station on a tributary entering between two main-stream stations is listed between those stations. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. The rank of any tributary on which a station is located with respect to the stream to which it is immediately tributary is indicated by an indention in that list of stations in the front of this report. Each indentation represents one rank. This downstream order and system of indentation indicates which stations are on tributaries between any two stations and the rank of the tributary on which each station is located.

As an added means of identification, each hydrologic station and partial-record station has been assigned a station number. These station numbers are in the same downstream order used in this report. In assigning a station number, 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 composed of both types of stations. Gaps are consecutive. The complete 8-digit (or 10-digit) number for each station such as 09004100, which appears just to the left of the station name, includes a 2-digit part number “09” plus the 6-digit (or 8-digit) downstream order number “004100.” In areas of high station density, an additional two digits may be added to the station identification number to yield a 10-digit number. The stations are numbered in downstream order as described above between stations of consecutive 8-digit numbers.

## NUMBERING SYSTEM FOR WELLS AND MISCELLANEOUS SITES

The USGS well and miscellaneous site-numbering system is based on the grid system of latitude and longitude. The system provides the geographic location of the well or miscellaneous site and a unique number for each site. The number consists of 15 digits. The first 6 digits denote the degrees, minutes, and seconds of latitude, and the next 7 digits denote degrees, minutes, and seconds of longitude; the last 2 digits are a sequential number for wells within a 1-second grid. In the event that the latitude-longitude coordinates for a well and miscellaneous site are the same, a sequential number such as “01,” “02,” and so forth, would be assigned as one would for wells (see fig. 3). The 8-digit, downstream order station numbers are not assigned to wells and miscellaneous sites where only random water-quality samples or discharge measurements are taken.

### 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 indention in the "List of Stations" in the front of this report. Each indention represents one rank. This downstream order and system of indention 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-identfication 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.

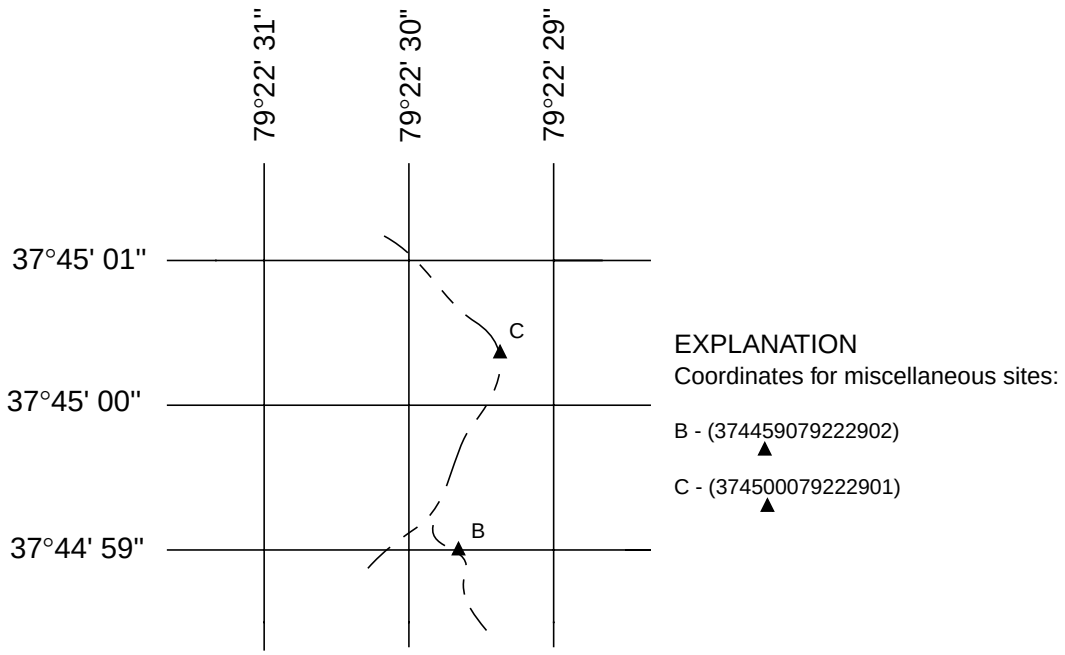



**Figure 3.** System for numbering selected miscellaneous sites.

## SPECIAL NETWORKS AND PROGRAMS

**Hydrologic Benchmark Network** is a network of 61 sites in small drainage basins in 39 States that was established in 1963 to provide consistent streamflow data representative of undeveloped watersheds nationwide, and from which data could be analyzed on a continuing basis for use in comparison and contrast with conditions observed in basins more obviously affected by human activities. At selected sites, water-quality information is being gathered on major ions and nutrients, primarily to assess the effects of acid deposition on stream chemistry. Additional information on the Hydrologic Benchmark Program may be accessed from *http://water.usgs.gov/hbn/*.

**National Stream-Quality Accounting Network** (NASQAN) is a network of sites used to monitor the water quality of large rivers within the Nation's largest river basins. From 1995 through 1999, a network of approximately 40 stations was operated in the Mississippi, Columbia, Colorado, and Rio Grande River basins. For the period 2000 through 2004, sampling was reduced to a few index stations on the Colorado and Columbia Rivers so that a network of 5 stations could be implemented on the Yukon River. 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 (NAWQA) Program; (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. Additional information about the NASQAN Program may be accessed from *http://water.usgs.gov/nasqan/*.

**The National Atmospheric Deposition Program/National Trends Network** (NADP/NTN) is a network of monitoring sites that provide continuous measurement and assessment of the chemical constituents in precipitation throughout the United States. As the lead Federal agency, the USGS works together with over 100 organizations to provide a long-term, spatial and temporal record of atmospheric deposition generated from this network of 250 precipitation-chemistry monitoring sites. The USGS supports 74 of these 250 sites. This long-term, nationally consistent monitoring program, coupled with ecosystem research, provides critical information toward a national scorecard to evaluate the effectiveness of ongoing and future regulations intended to reduce atmospheric emissions and subsequent impacts to the Nation's land and water resources. Reports and other information on the NADP/NTN Program, as well as data from the individual sites, may be accessed from *http://bqs.usgs.gov/acidrain/*.

**The USGS National Water-Quality Assessment (NAWQA) Program** 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; to provide an improved understanding of the primary natural and human factors affecting these observed conditions and trends; and to provide information that supports development and evaluation of management, regulatory, and monitoring decisions by other agencies.

Assessment activities are being conducted in 42 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 is 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 water-resources managers to use in making decisions 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 may be accessed from *http://water.usgs.gov/nawqa/*.

**The USGS National Streamflow Information Program (NSIP)** is a long-term program with goals to provide framework streamflow data across the Nation. Included in the program are creation of a permanent Federally funded streamflow network, research on the nature of streamflow, regional assessments of streamflow data and databases, and upgrades in the streamflow information delivery systems. Additional information about NSIP may be accessed from *http://water.usgs.gov/nsip/*.

## EXPLANATION OF STAGE AND WATER-DISCHARGE RECORDS

### Data Collection and Computation

The base data collected at gaging stations (fig. 4) consist of records of stage and measurements of discharge of streams or canals, and stage, surface area, and volume of lakes or reservoirs. In addition, observations of factors affecting the stage-discharge relation or the stage-capacity relation, weather records, and other information are used to supplement base data in determining the daily flow or volume of water in storage. Records of stage are obtained from a water-stage recorder that is either downloaded electronically in the field to a laptop computer or similar device or is transmitted using telemetry such as GOES satellite, land-line or cellular-phone modems, or by radio transmission. Measurements of discharge are made with a current meter or acoustic Doppler current profiler, using the general methods adopted by the USGS. These methods are described in standard textbooks, USGS Water-Supply Paper 2175, and the Techniques of Water-Resources Investigations of the United States Geological Survey (TWRIs), Book 3, Chapters A1 through A19 and Book 8, Chapters A2 and 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).

For stream-gaging stations, discharge-rating tables for any stage are prepared from stage-discharge curves. If extensions to the rating curves are necessary to express discharge greater than measured, the extensions are made on the basis of indirect measurements of peak discharge (such as slope-area or contracted-opening measurements, or computation of flow over dams and weirs), step-backwater techniques, velocity-area studies, and logarithmic plotting. The daily mean discharge is computed from gage heights and rating tables, then the monthly and yearly mean discharges are computed from the daily values. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features of the stream channel, the daily mean discharge is computed by the shifting-control method in which correction factors based on individual discharge measurements and notes by engineers and observers are used when applying the gage heights to the rating tables. If the stage-discharge relation for a station is temporarily changed by the presence of aquatic growth or debris on the controlling section, the daily mean discharge is computed by the shifting-control method.

The stage-discharge relation at some stream-gaging stations is affected by backwater from reservoirs, tributary streams, or other sources. Such an occurrence 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 at some distance from the base gage.

An index velocity is measured using ultrasonic or acoustic instruments at some stream-gaging stations and this index velocity is used to calculate an average velocity for the flow in the stream. This average velocity along with a stage-area relation is then used to calculate average discharge.

At some stations, 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.

At some stream-gaging stations in the northern United States, the stage-discharge relation is affected by ice in the winter; therefore, computation of the discharge in the usual manner is impossible. Discharge for periods of ice effect is computed on the basis of gage-height record and occasional winter-discharge measurements. Consideration is given to the available information on temperature and precipitation, notes by gage observers and hydrologists, and comparable records of discharge from other stations in the same or nearby basins.

For a lake or reservoir station, capacity tables giving the volume or contents for any stage are prepared from stage-area relation curves defined by surveys. The application of the stage to the capacity table gives the contents, from which the daily, monthly, or yearly changes are computed.

If the stage-capacity curve is subject to changes because of deposition of sediment in the reservoir, periodic resurveys of the reservoir are necessary to define new stage-capacity curves. During the period between reservoir surveys, the computed contents may be increasingly in error due to the gradual accumulation of sediment.

For some stream-gaging stations, periods of time occur when no gage-height record is obtained or the recorded gage height is faulty and cannot be used to compute daily discharge or contents. Such a situation can happen when the recorder stops or otherwise fails to operate properly, the intakes are plugged, the float is frozen in the well, or for various other reasons. For such periods, the daily discharges are estimated on the basis of recorded range in stage, prior and subsequent records, discharge measurements, weather records, and comparison with records from other stations in the same or nearby basins. Likewise, lake or reservoir volumes may be estimated on the basis of operator’s log, prior and subsequent records, inflow-outflow studies, and other information.

## Data Presentation

The records published for each continuous-record surface-water discharge station (stream-gaging station) consist of five parts: (1) the station manuscript or description; (2) the data table of daily mean values of discharge for the current water year with summary data; (3) a tabular statistical summary of monthly mean flow data for a designated period, by water year; (4) 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; and (5) a hydrograph of discharge.

### Station Manuscript

The manuscript provides, under various headings, descriptive information, such as station location; period of record; historical extremes outside the period of record; 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 follow that clarify information presented under the various headings of the station description.

LOCATION.—Location information 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.

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 term indicates the time 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 its flow reasonably can be considered equivalent to flow at the present station.

REVISED RECORDS.—If a critical error in published records is discovered, a revision is included in the first report published following discovery of the error.

GAGE.—The type of gage in current use, the datum of the current gage referred to a standard datum, 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 either will be identified by date in this paragraph of the station description for water-discharge stations or flagged in the daily discharge table. (See section titled Identifying Estimated Daily Discharge.) Information is presented 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, the outlet works and spillway, and the purpose and use of the reservoir.

COOPERATION.—Records provided by a cooperating organization or obtained for the USGS by a cooperating organization are identified here.

EXTREMES OUTSIDE PERIOD OF RECORD.—Information here documents 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 USGS.

REVISIONS.—Records are revised if errors in published records are discovered. Appropriate updates are made in the USGS distributed data system, NWIS, and subsequently to its Web-based National data system, NWISWeb (*http://water.usgs.gov/nwis/nwis*). Users are encouraged to obtain all required data from NWIS or NWISWeb to ensure that they have the most recent data updates. Updates to NWISWeb are made on an annual basis.

Although rare, occasionally the records of a discontinued gaging station may need revision. Because no current or, possibly, future station manuscript would be published for these stations 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 revised after the station was

discontinued. If, however, the data for a discontinued station were obtained by computer retrieval, the data would be current. 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 stage-capacity table when daily volumes are given.

### Peak Discharge Greater than Base Discharge

Tables of peak discharge above base discharge are included for some stations where secondary instantaneous peak discharge data are used in flood-frequency studies of highway and bridge design, flood-control structures, and other flood-related projects. The base discharge value is selected so an average of three peaks a year will be reported. This base discharge value has a recurrence interval of approximately 1.1 years or a 91-percent chance of exceedence in any 1 year.

### 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 arithmetic 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 is 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). Values for cubic feet per second per square mile and runoff in inches or in acre-feet may be omitted if extensive regulation or diversion is in effect 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 volumes are given. These values are identified by a symbol and a corresponding footnote.

### Statistics of Monthly Mean Data

A tabular summary of the mean (line headed MEAN), maximum (MAX), and minimum (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 values. 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. The designated period will consist of all of the station record within the specified water years, including complete months of record for partial water years, and may coincide with the period of record for the station. The water years for which the statistics are computed are 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 records within the specified water years, including complete months of record for partial water years, and may coincide with the period of record for the station. The water years for which the statistics are computed are 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 the dates of occurrence do not fall within the selected water years listed in the heading, it will be noted in the REMARKS paragraph or in footnotes. Selected streamflow duration-curve statistics and runoff data also are given. Runoff data may be omitted if extensive regulation or diversion of flow is in effect in the drainage basin.

The following summary statistics data are provided with each continuous record of discharge. Comments that 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.

ANNUAL MEAN.—The arithmetic mean for the individual daily mean discharges for the year noted or for the designated period.

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.

MAXIMUM PEAK FLOW.—The maximum instantaneous peak discharge occurring for the water year or designated period. Occasionally the maximum flow for a year may occur at midnight at the beginning or end of the year, on a recession from or rise toward a higher peak in the adjoining year. In this case, the maximum peak flow is given in the table and the maximum flow may be reported in a footnote or in the REMARKS paragraph in the manuscript.

MAXIMUM PEAK STAGE.—The maximum instantaneous peak stage occurring for the water year or designated period. Occasionally the maximum stage for a year may occur at midnight at the beginning or end of the year, on a recession from or rise toward a higher peak in the adjoining year. In this case, the maximum peak stage is given in the table and the maximum stage may be reported in the REMARKS paragraph in the manuscript or in a footnote. If the dates of occurrence of the maximum peak stage and maximum peak flow are different, 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 equivalent to 43,560 cubic feet or about 326,000 gallons or 1,233 cubic meters.
>
> Cubic feet per square mile (CFSM) is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming the runoff is distributed uniformly in time and area.
>
> Inches (INCHES) indicate 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.

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 table lists annual maximum stage and discharge at crest-stage stations, and the second table lists 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 often made in times of drought or flood to give better areal coverage to those events. Those measurements and others collected for a 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. This identification is shown either by flagging individual daily values with the letter "e" and noting in a table footnote, "e–Estimated," or by listing the dates of the estimated record in the REMARKS paragraph of the station description.

## Accuracy of Field Data and Computed Results

The accuracy of streamflow data 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 observations of stage, measurements of discharge, and interpretations of records.

The degree of accuracy of the records is stated in the REMARKS in the station description. "Excellent" indicates that about 95 percent of the daily discharges are within 5 percent of the true value; "good" within 10 percent; and "fair," within 15 percent. "Poor" indicates that daily discharges have less than "fair" accuracy. Different accuracies may be attributed to different parts of a given record.

Values of daily mean discharge in this report are shown to the nearest hundredth of a cubic foot per second for discharges of less than 1 $ft^3/s$; to the nearest tenths between 1.0 and 10 $ft^3/s$; to whole numbers between 10 and 1,000 $ft^3/s$; and to 3 significant figures above 1,000 $ft^3/s$. The number of significant figures used is based solely on the magnitude of the discharge value. The same rounding rules apply to discharge values listed for partial-record stations.

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, values 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 Data Records Available

Information of a more detailed nature than that published for most of the stream-gaging stations such as discharge measurements, gage-height records, and rating tables is available from the District office. Also, most stream-gaging station records are available in computer-usable form and many statistical analyses have been made.

Information on the availability of unpublished data or statistical analyses may be obtained from the District office (see address that is shown on the back of the title page of this report).

The following information is provided with each precipitation station. Comments that follow clarify information presented under the various headings of the station description.

LOCATION.—See Data Presentation in the EXPLANATION OF STAGE- AND WATER-DISCHARGE RECORDS section of this report (same comments apply).

PERIOD OF RECORD.—See Data Presentation in the EXPLANATION OF STAGE- AND WATER-DISCHARGE RECORDS section of this report (same comments apply).

INSTRUMENTATION.—Information on the type of rainfall collection system is given.

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

## EXPLANATION OF WATER-QUALITY RECORDS

### Collection and Examination of Data

Surface-water samples for analysis usually are collected at or near stream-gaging stations. The quality-of-water records are given immediately following the discharge records at these stations.

The descriptive heading for water-quality records gives the period of record for all water-quality data; the period of daily record for parameters that are measured on a daily basis (specific conductance, water temperature, sediment discharge, and so forth); extremes for the current year; and general remarks.

For ground-water records, no descriptive statements are given; however, the well number, depth of well, sampling date, or other pertinent data are given in the table containing the chemical analyses of the ground water.

### Water Analysis

Most of the methods used for collecting and analyzing water samples are described in the TWRIs. A list of TWRIs is provided in this report.

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 at several verticals to obtain a representative sample needed for an accurate mean concentration and for use in calculating load.

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 and minimum values (and sometimes mean or median values) for each constituent measured, and are based on 15-minute or 1-hour intervals of recorded data beginning at 0000 hours and ending at 2400 hours for the day of record.

## SURFACE-WATER-QUALITY RECORDS

Records of surface-water quality ordinarily are obtained at or near stream-gaging stations because discharge data is useful in the interpretation of surface-water quality. Records of surface-water quality in this report 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 *continuous-record station* is a site where data are collected on a regularly scheduled basis. Frequency may be one 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 continuous- or partial-record station, where 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 *continuous records* as used in this report and *continuous recordings* that refer to a continuous graph or a series of discrete values recorded at short intervals. 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 4.

## Accuracy of the Records

One of four accuracy classifications is applied for measured physical properties at continuous-record stations on a scale ranging from poor to excellent. The accuracy rating is based on data values recorded before any shifts or corrections are made. Additional consideration also is given to the amount of publishable record and to the amount of data that have been corrected or shifted.

Rating classifications for continuous water-quality records

[≤, less than or equal to; ±, plus or minus value shown; °C, degree Celsius; >, greater than; %, percent; mg/L, milligram per liter; pH unit, standard pH unit]

| Measured physical property | Rating | | | |
|---|---|---|---|---|
| | Excellent | Good | Fair | Poor |
| Water temperature | ≤ ±0.2 °C | > ±0.2 to 0.5 °C | > ±0.5 to 0.8 °C | > ±0.8 °C |
| Specific conductance | ≤ ±3% | > ±3 to 10% | > ±10 to 15% | > ±15% |
| Dissolved oxygen | ≤ ±0.3 mg/L | > ±0.3 to 0.5 mg/L | > ±0.5 to 0.8 mg/L | > ±0.8 mg/L |
| pH | ≤ ±0.2 unit | > ±0.2 to 0.5 unit | > ±0.5 to 0.8 unit | > ±0.8 unit |
| Turbidity | ≤ ±5% | > ±5 to 10% | > ±10 to 15% | > ±15% |

## 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 is assuring that the data obtained represent the naturally occurring quality of the water. To ensure this, certain measurements, such as water temperature, pH, and dissolved oxygen, must be made on site when the samples are taken. To assure that measurements made in the laboratory also represent the naturally occurring water, carefully prescribed procedures must 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 on-site measurements and for collecting, treating, and shipping samples are given in TWRIs Book 1, Chapter D2; Book 3, Chapters A1, A3, and A4; and Book 9, Chapters A1-A9. These TWRIs are listed in this report. Also, detailed information on collecting, treating, and shipping samples can be obtained from the USGS District office (see address that is shown on the back of title page in 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 District office.

## 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 section.

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

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

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

## Laboratory Measurements

Samples for biochemical oxygen demand (BOD) and indicator bacteria are analyzed locally. All other samples are analyzed in the USGS laboratory in Lakewood, Colorado, unless otherwise noted. Methods used in analyzing sediment samples and computing sediment records are given in TWRI, Book 5, Chapter C1. Methods used by the USGS laboratories are given in the TWRIs, Book 1, Chapter D2; Book 3, Chapter C2; and Book 5, Chapters A1, A3, and A4. These methods are consistent with ASTM standards and generally follow ISO standards.

## 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 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 information in the EXPLANATION OF STAGE- AND WATER-DISCHARGE RECORDS section of this report (same comments apply).

DRAINAGE AREA.—See Data Presentation information in the EXPLANATION OF STAGE- AND WATER-DISCHARGE RECORDS section of this report (same comments apply).

PERIOD OF RECORD.—This indicates the time periods for which published water-quality records for the station are available. 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 USGS by a cooperating organization are identified here.

EXTREMES.—Maximums and minimums are given only for parameters measured daily or more frequently. For parameters measured weekly or less frequently, true maximums or minimums may not have been obtained. Extremes, when given, are provided for both the period of record and for the current water year.

REVISIONS.—Records are revised if errors in published water-quality records are discovered. Appropriate updates are made in the USGS distributed data system, NWIS, and subsequently to its Web-based National data system, NWISWeb (*http://waterdata.usgs.gov/nwis*). Users of USGS water-quality data are encouraged to obtain all required data from NWIS or NWISWeb to ensure that they have the most recent updates. Updates to the NWISWeb are made on an annual basis.

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 section:

| Printed Output | Remark |
|---|---|
| E or 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. |

## Water-Quality Control Data

The USGS National Water Quality Laboratory collects quality-control data on a continuing basis to evaluate selected analytical methods to determine long-term method detection levels (LT-MDLs) and laboratory reporting levels (LRLs). These values are re-evaluated each year on the basis of the most recent quality-control data and, consequently, may change from year to year.

This reporting procedure limits the occurrence of false positive error. Falsely reporting a concentration greater than the LT-MDL for a sample in which the analyte is not present is 1 percent or less. Application of the LRL limits the occurrence of false negative error. The chance of falsely reporting a non-detection for a sample in which the analyte is present at a concentration equal to or greater than the LRL is 1 percent or less.

Accordingly, concentrations are reported as less than LRL for samples in which the analyte was either not detected or did not pass identification. Analytes detected at concentrations between the LT-MDL and the LRL and that pass identification criteria are estimated. Estimated concentrations will be noted with a remark code of “E.” These data should be used with the understanding that their uncertainty is greater than that of data reported without the E remark code.

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 office 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. These data are not presented in this report but are available from the District office.

## Blank Samples

Blank samples are collected and analyzed to ensure that environmental samples have not been contaminated in 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. Many types of blank samples are possible; each is designed to segregate a different part of the overall data-collection process. The types of blank samples collected 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. The reference material 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. Many types of replicate samples are 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:

**Concurrent samples—**A type of replicate sample in which the samples are collected simultaneously with two or more samplers or by using one sampler and alternating the collection of samples into two or more compositing containers.

**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, each subsample 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.

## 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 from http://water.usgs.gov.

Water-quality data and ground-water data also are available through the WWW. In addition, data can be provided in various machine-readable formats on various media. Information about the availability of specific types of data or products, and user charges, can be obtained locally from each Water Discipline District Office (See address that is shown on the back of the title page of this report.)

## DEFINITION OF TERMS

Specialized technical terms related to streamflow, water-quality, and other hydrologic data, as used in this report, are defined below. Terms such as algae, water level, and precipitation are used in their common everyday meanings, definitions of which are given in standard dictionaries. Not all terms defined in this alphabetical list apply to every State. See also table for converting English units to International System (SI) Units.

Other glossaries that also define water-related terms are accessible from *http://water.usgs.gov/glossaries.html*.

**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. This term designates titration of an "unfiltered" sample (formerly reported as alkalinity).

**Acre-foot** (AC-FT, acre-ft) is a unit of volume, commonly used to measure quantities of water used or stored, equivalent to the volume of water required to cover 1 acre to a depth of 1 foot and equivalent to 43,560 cubic feet, 325,851 gallons, or 1,233 cubic meters. (See also "Annual runoff")

**Adenosine triphosphate** (ATP) is an organic, phosphate-rich compound important in the transfer of energy in organisms. Its central role in living cells makes ATP 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.

**Adjusted discharge** is discharge data that have been mathematically adjusted (for example, to remove the effects of a daily tide cycle or reservoir storage).

**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. (See also "Biomass" and "Dry weight")

**Alkalinity** is the capacity of solutes in an aqueous system to neutralize acid. This term designates titration of a "filtered" sample.

**Annual runoff** is the total quantity of water that is discharged ("runs off") from a drainage basin in a year. Data reports may present annual runoff data as volumes in acre-feet, as discharges per unit of drainage area in cubic feet per second per square mile, or as depths of water on the drainage basin in inches.

**Annual 7-day minimum** is the lowest mean value for any 7-consecutive-day period in a year. Annual 7-day minimum values are reported herein for the calendar year and the water year (October 1 through September 30). Most low-flow frequency analyses use a climatic year (April 1-March 31), which tends to prevent the low-flow period from being artificially split between adjacent years. 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.)

**Aroclor** is the registered trademark for a group of poly-chlorinated biphenyls that were manufactured by the Monsanto Company prior to 1976. Aroclors are assigned specific 4-digit reference numbers dependent upon molecular type and degree of substitution of the biphenyl ring hydrogen atoms by chlorine atoms. The first two digits of a numbered aroclor represent the molecular type, and the last two digits represent the percentage weight of the hydrogen-substituted chlorine.

**Artificial substrate** is a device that purposely is placed in a stream or lake for colonization of organisms. The artificial substrate simplifies the community structure by standardizing the substrate from which each sample is collected. 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. (See also "Substrate")

**Ash mass** is the mass or amount of residue present after the residue from a dry-mass determination has been ashed in a muffle furnace at a temperature of 500 °C for 1 hour. Ash mass of zooplankton and phytoplankton is expressed in grams per cubic meter ($g/m^3$), and periphyton and benthic organisms in grams per square meter ($g/m^2$). (See also "Biomass" and "Dry mass")

**Aspect** is the direction toward which a slope faces with respect to the compass.

**Bacteria** are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, whereas 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.

**Bankfull stage,** as used in this report, is the stage at which a stream first overflows its natural banks formed by floods with 1- to 3-year recurrence intervals.

**Base discharge** (for peak discharge) is a discharge value, determined for selected stations, above which peak discharge data are published. The base discharge at each station is selected so that an average of about three peak flows per year will be published. (See also "Peak flow")

**Base flow** is sustained flow of a stream in the absence of direct runoff. It includes natural and human-induced streamflows. Natural base flow is sustained largely by ground-water discharge.

**Bed material** is the sediment mixture of which a stream-bed, lake, pond, reservoir, or estuary bottom is composed. (See also "Bedload" and "Sediment")

**Bedload** is material in transport that primarily is supported by the streambed. In this report, bedload is considered to consist of particles in transit from the bed to the top of the bedload sampler nozzle (an elevation ranging from 0.25 to 0.5 foot). These particles are retained in the bedload sampler. A sample collected with a pressure-differential bedload sampler also may contain a component of the suspended load.

**Bedload discharge** (tons per day) is the rate of sediment moving as bedload, reported as dry weight, that passes through a cross section in a given time. NOTE: Bedload discharge values in this report may include a component of the suspended-sediment discharge. A correction may be necessary when computing the total sediment discharge by summing the bedload discharge and the suspended-sediment discharge. (See also "Bedload," "Dry weight," "Sediment," and "Suspended-sediment discharge")

**Benthic organisms** are the group of organisms inhabiting the bottom of an aquatic environment. They include a number of types of organisms, such as bacteria, fungi, insect larvae and nymphs, snails, clams, and crayfish. 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 microorganisms, such as bacteria.

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

**Biomass pigment ratio** is an indicator of the total proportion of periphyton that are autotrophic (plants). This also is called the Autotrophic Index.

**Blue-green algae** (*Cyanophyta*) are a group of phytoplankton and periphyton organisms with a blue pigment in addition to a green pigment called chlorophyll. Blue-green algae can cause nuisance water-quality conditions in lakes and slow-flowing rivers; however, they are found commonly in streams throughout the year. The abundance of blue-green algae in phytoplankton samples is expressed as the number of cells per milliliter (cells/mL) or biovolume in cubic micrometers per milliliter ($\mu m^3$/mL). The abundance of blue-green algae in periphyton samples is given in cells per square centimeter (cells/$cm^2$) or biovolume per square centimeter ($\mu m^3/cm^2$). (See also "Phytoplankton"and "Periphyton")

**Bottom material** (See "Bed material")

**Bulk electrical conductivity** is the combined electrical conductivity of all material within a doughnut-shaped volume surrounding an induction probe. Bulk conductivity is affected by different physical and chemical properties of the material including the dissolved-solids content of the pore water, and the lithology and porosity of the rock.

**Canadian Geodetic Vertical Datum 1928** is a geodetic datum derived from a general adjustment of Canada's first order level network in 1928.

**Cell volume** (biovolume) determination is one of several common methods used to estimate biomass of algae in aquatic systems. Cell members of algae are used frequently in aquatic surveys as an indicator of algal production. However, cell numbers alone cannot represent true biomass because of considerable cell-size variation among the algal species. Cell volume ($\mu m^3$) is determined by obtaining critical cell measurements or cell dimensions (for example, length, width, height, or radius) for 20 to 50 cells of each important species to obtain an average biovolume per cell. Cells are categorized according to the correspondence of their cellular shape to the nearest geometric solid or combinations of simple solids (for example, spheres, cones, or cylinders). Representative formulae used to compute biovolume are as follows:

$$\text{sphere } 4/3\ \pi r^3 \quad \text{cone } 1/3\ \pi r^2 h \quad \text{cylinder } \pi r^2 h.$$

pi ($\pi$) is the ratio of the circumference to the diameter of a circle; pi = 3.14159….

From cell volume, total algal biomass expressed as biovolume ($\mu m^3/mL$) is thus determined by multiplying the number of cells of a given species by its average cell volume and then summing these volumes for all species.

**Cells/volume** refers to the number of cells of any organism that 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 volume, and generally are reported as cells or units per milliliter (mL) or liter (L).

**Cfs-day** (See "Cubic foot per second-day")

**Channel bars**, as used in this report, are the lowest prominent geomorphic features higher than the channel bed.

**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. [See also "Biochemical oxygen demand (BOD)"]

***Clostridium perfringens*** *(C. perfringens)* is a spore-forming bacterium that is common in the feces of human and other warmblooded animals. Clostridial spores are being used experimentally as an indicator of past fecal contamination and the presence of microorganisms that are resistant to disinfection and environmental stresses. (See also "Bacteria")

**Coliphages** are viruses that infect and replicate in coliform bacteria. They are indicative of sewage contamination of water and of the survival and transport of viruses in the environment.

**Color unit** is produced by 1 milligram per liter of platinum in the form of the chloroplatinate ion. Color is expressed in units of the platinum-cobalt scale.

**Confined aquifer** is a term used to describe an aquifer containing water between two relatively impermeable bound-aries. The water level in a well tapping a confined aquifer stands above the top of the confined aquifer and can be higher or lower than the water table that may be present in the material above it. In some cases, the water level can rise above the ground surface, yielding a flowing well.

**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.

**Continuous-record station** is a site where data are collected with sufficient frequency to define daily mean values and variations within a day.

**Control** designates a feature in the channel that physically affects the water-surface elevation and thereby determines the stage-discharge relation at the gage. This feature may be a constriction of the channel, a bedrock outcrop, a gravel bar, an artificial structure, or a uniform cross section over a long reach of the channel.

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

**Cubic foot per second** (CFS, $ft^3/s$) is the rate of discharge representing a volume of 1 cubic foot passing a given point in 1 second. It is equivalent to approximately 7.48 gallons per second or approximately 449 gallons per minute, or 0.02832 cubic meters per second. The term "second-foot" sometimes is used synonymously with "cubic foot per second" but is now obsolete.

**Cubic foot per second-day** (CFS-DAY, Cfs-day, [$(ft^3/s)/d$]) 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, 1.98347 acre-feet, 646,317 gallons, or 2,446.6 cubic meters. The daily mean discharges reported in the daily value data tables numerically are equal to the daily volumes in cfs-days, and the totals also represent volumes in cfs-days.

**Cubic foot per second per square mile** [CFSM, $(ft^3/s)/mi^2$] is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming the runoff is distributed uniformly in time and area. (See also "Annual runoff")

**Daily mean suspended-sediment concentration** is the time-weighted mean concentration of suspended sediment passing a stream cross section during a 24-hour day. (See also "Sediment" and "Suspended-sediment concentration")

**Daily record station** is a site where data are collected with sufficient frequency to develop a record of one or more data values per day. The frequency of data collection can range from continuous recording to data collection on a daily or near-daily basis.

**Data collection platform** (DCP) is an electronic instrument that collects, processes, and stores data from various sensors, and transmits the data by satellite data relay, line-of-sight radio, and/or landline telemetry.

**Data logger** is a microprocessor-based data acquisition system designed specifically to acquire, process, and store data. Data usually are downloaded from onsite data loggers for entry into office data systems.

**Datum** is a surface or point relative to which measurements of height and/or horizontal position are reported. A vertical datum is a horizontal surface used as the zero point for measurements of gage height, stage, or elevation; a horizontal datum is a reference for positions given in terms of latitude-longitude, State Plane coordinates, or Universal Transverse Mercator (UTM) coordinates. (See also "Gage datum," "Land-surface datum," "National Geodetic Vertical Datum of 1929," and "North American Vertical Datum of 1988")

**Diatoms** *(Bacillariophyta)* are unicellular or colonial algae with a siliceous cell wall. The abundance of diatoms in phytoplankton samples is expressed as the number of cells per milliliter (cells/mL) or biovolume in cubic micrometers per milliliter ($\mu m^3$/mL). The abundance of diatoms in periphyton samples is given in cells per square centimeter (cells/$cm^2$) or biovolume per square centimeter ($\mu m^3/cm^2$). (See also "Phytoplankton" and "Periphyton")

**Diel** is of or pertaining to a 24-hour period of time; a regular daily cycle.

**Discharge**, or **flow**, is the rate that matter passes through a cross section of a stream channel or other water body per unit of time. The term commonly refers to the volume of water (including, unless otherwise stated, any sediment or other constituents suspended or dissolved in the water) that passes a cross section in a stream channel, canal, pipeline, and so forth, within a given period of time (cubic feet per second). Discharge also can apply to the rate at which constituents, such as suspended sediment, bedload, and dissolved or suspended chemicals, pass through a cross section, in which cases the quantity is expressed as the mass of constituent that passes the cross section in a given period of time (tons per day).

**Dissolved** refers to that material in a representative water sample that passes through a 0.45-micrometer membrane filter. This is a convenient operational definition used by Federal and State agencies that collect water-quality data. Determinations of "dissolved" constituent concentrations are made on sample water that has been filtered.

**Dissolved oxygen** (DO) is the molecular oxygen (oxygen gas) dissolved in water. The concentration in water is a function of atmospheric pressure, temperature, and dissolved-solids concentration of the water. The ability of water to retain oxygen decreases with increasing temperature or dissolved-solids concentration. Photosynthesis and respiration by plants commonly cause diurnal variations in dissolved-oxygen concentration in water from some streams.

**Dissolved solids concentration** in water is the quantity of dissolved material in a sample of water. It 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, the bicarbonate (generally a major dissolved component of water) is converted to carbonate. In the mathematical calculation, the bicarbonate value, in milligrams per liter, is multiplied by 0.4926 to convert it to carbonate. Alternatively, alkalinity concentration (as mg/L $CaCO_3$) can be converted to carbonate concentration by multiplying by 0.60.

**Diversity index** (H) (Shannon index) is a numerical expression of evenness of distribution of aquatic organisms. The formula for diversity index is:

$$\bar{d} = -\sum_{i \approx 1}^{s} \frac{n_i}{n} \log_2 \frac{n_i}{n},$$

where $n_i$ is the number of individuals per taxon, $n$ is the total number of individuals, and $s$ is the total number of taxa in the sample of the community. Index values range from zero, when all the organisms in the sample are the same, to some positive number, when some or all of the organisms in the sample are different.

**Drainage area** of a stream at a specific location is that area upstream from the location, measured in a horizontal plane, that has a common outlet at the site for its surface runoff from precipitation that normally drains by gravity into a stream. Drainage areas given herein include all closed basins, or noncontributing areas, within the area unless otherwise specified.

**Drainage basin** is a part of the Earth's surface that contains a drainage system with a common outlet for its surface runoff. (See "Drainage area")

**Dry mass** refers to the mass of residue present after drying in an oven at 105 °C, 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. (See also "Ash mass," "Biomass," and "Wet mass")

**Dry weight** refers to the weight of animal tissue after it has been dried in an oven at 65 ˚C until a constant weight is achieved. Dry weight represents total organic and inorganic matter in the tissue. (See also "Wet weight")

**Embeddedness** is the degree to which gravel-sized and larger particles are surrounded or enclosed by finer-sized particles. (See also "Substrate embeddedness class")

**Enterococcus bacteria** commonly are found in the feces of humans and other warmblooded 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 that produce pink to red colonies with black or reddish-brown precipitate after incubation at 41 °C on mE agar (nutrient medium for bacterial growth) and subsequent transfer to EIA medium. Enterococci include *Streptococcus feacalis, Streptococcus feacium, Streptococcus avium,* and their variants. (See also "Bacteria")

**EPT Index** is the total number of distinct taxa within the insect orders Ephemeroptera, Plecoptera, and Trichoptera. This index summarizes the taxa richness within the aquatic insects that generally are considered pollution sensitive; the index usually decreases with pollution.

***Escherichia coli*** *(E. coli)* are bacteria present in the intestine and feces of warmblooded animals. *E. coli* are a member species of the fecal coliform group of indicator bacteria. In the laboratory, they are defined as those bacteria that produce yellow or yellow-brown colonies on a filter pad saturated with urea substrate broth after primary culturing for 22 to 24 hours at 44.5 ˚C on mTEC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample. (See also "Bacteria")

**Estimated (E) value** of a concentration is reported when an analyte is detected and all criteria for a positive result are met. If the concentration is less than the method detection limit (MDL), an E code will be reported with the value. If the analyte is identified qualitatively as present, but the quantitative determination is substantially more uncertain, the National Water Quality Laboratory will identify the result with an E code even though the measured value is greater than the MDL. A value reported with an E code should be used with caution. When no analyte is detected in a sample, the default reporting value is the MDL preceded by a less than sign (<). For bacteriological data, concentrations are reported as estimated when results are based on non-ideal colony counts.

**Euglenoids** (*Euglenophyta*) are a group of algae that usually are free-swimming and rarely creeping. They have the ability to grow either photosynthetically in the light or heterotrophically in the dark. (See also "Phytoplankton")

**Extractable organic halides** (EOX) are organic compounds that contain halogen atoms such as chlorine. These organic compounds are semivolatile and extractable by ethyl acetate from air-dried streambed sediment. 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 streambed sediment.

**Fecal coliform bacteria** are present in the intestines or feces of warmblooded animals. They often are 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. (See also "Bacteria")

**Fecal streptococcal bacteria** are present in the intestines of warmblooded animals and are ubiquitous in the environment. They are characterized as gram-positive, cocci bacteria that are capable of growth in brain-heart infusion broth. In the laboratory, they are defined as all the organisms that 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. (See also "Bacteria")

**Fire algae** (*Pyrrhophyta*) are free-swimming unicells characterized by a red pigment spot. (See also "Phytoplankton")

**Flow-duration percentiles** are values on a scale of 100 that indicate the percentage of time for which a flow is not exceeded. For example, the 90th percentile of river flow is greater than or equal to 90 percent of all recorded flow rates.

**Gage datum** is a horizontal surface used as a zero point for measurement of stage or gage height. This surface usually is located slightly below the lowest point of the stream bottom such that the gage height is usually slightly greater than the maximum depth of water. Because the gage datum is not an actual physical object, the datum is usually defined by specifying the elevations of permanent reference marks such as bridge abutments and survey monuments, and the gage is set to agree with the reference marks. Gage datum is a local datum that is maintained independently of any national geodetic datum. However, if the elevation of the gage datum relative to the national datum (North American Vertical Datum of 1988 or National Geodetic Vertical Datum of 1929) has been determined, then the gage readings can be converted to elevations above the national datum by adding the elevation of the gage datum to the gage reading.

**Gage height** (G.H.) is the water-surface elevation, in feet above the gage datum. If the water surface is below the gage datum, the gage height is negative. Gage height often is used interchangeably with the more general term "stage," although gage height is more appropriate when used in reference to a reading on a gage.

**Gage values** are values that are recorded, transmitted, and/or computed from a gaging station. Gage values typically are collected at 5-, 15-, or 30-minute intervals.

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

**Gas chromatography/flame ionization detector** (GC/FID) is a laboratory analytical method used as a screening technique for semivolatile organic compounds that are extractable from water in methylene chloride.

**Geomorphic channel units**, as used in this report, are fluvial geomorphic descriptors of channel shape and stream velocity. Pools, riffles, and runs are types of geomorphic channel units considered for National Water-Quality Assessment (NAWQA) Program habitat sampling.

**Green algae** *(Chlorophyta)* are unicellular or colonial algae with chlorophyll pigments similar to those in terrestrial green plants. Some forms of green algae produce mats or floating "moss" in lakes. The abundance of green algae in phytoplankton samples is expressed as the number of cells per milliliter (cells/mL) or biovolume in cubic micrometers per milliliter ($\mu m^3$/mL). The abundance of green algae in periphyton samples is given in cells per square centimeter (cells/$cm^2$) or biovolume per square centimeter ($\mu m^3/cm^2$). (See also "Phytoplankton" and "Periphyton")

**Habitat**, as used in this report, includes all nonliving (physical) aspects of the aquatic ecosystem, although living components like aquatic macrophytes and riparian vegetation also are usually included. Measurements of habitat typically are made over a wider geographic scale than are measurements of species distribution.

**Habitat quality index** is the qualitative description (level 1) of instream habitat and riparian conditions surrounding the reach sampled. Scores range from 0 to 100 percent with higher scores indicative of desirable habitat conditions for aquatic life. Index only applicable to wadable streams.

**Hardness** of water is a physical-chemical characteristic that commonly is recognized by the increased quantity of soap required to produce lather. It is computed as the sum of equivalents of polyvalent cations (primarily calcium and magnesium) and is expressed as the equivalent concentration of calcium carbonate ($CaCO_3$).

**High tide** is the maximum height reached by each rising tide. The high-high and low-high tides are the higher and lower of the two high tides, respectively, of each tidal day. *See NOAA Web site: http://www.co-ops.nos.noaa.gov/tideglos.html*

**Hilsenhoff's Biotic Index** (HBI) is an indicator of organic pollution that uses tolerance values to weight taxa abundances; usually increases with pollution. It is calculated as follows:

$$HBI = sum\frac{(n)(a)}{N},$$

where *n* is the number of individuals of each taxon, *a* is the tolerance value of each taxon, and *N* is the total number of organisms in the sample.

**Horizontal datum** (See "Datum")

**Hydrologic index stations** referred to in this report are continuous-record gaging stations that have been selected as representative of streamflow patterns for their respective regions. Station locations are shown on index maps.

**Hydrologic unit** is a geographic area representing part or all of a surface drainage basin or distinct hydrologic feature as defined by the former Office of Water Data Coordination and delineated on the State Hydrologic Unit Maps by the USGS. Each hydrologic unit is identified by an 8-digit number.

**Inch** (IN., in.), in reference to streamflow, as used in this report, refers to the depth to which the drainage area would be covered with water if all of the runoff for a given time period were distributed uniformly on it. (See also "Annual runoff")

**Instantaneous discharge** is the discharge at a particular instant of time. (See also "Discharge")

**International Boundary Commission Survey Datum** refers to a geodetic datum established at numerous monuments along the United States-Canada boundary by the International Boundary Commission.

**Island**, as used in this report, is a mid-channel bar that has permanent woody vegetation, is flooded once a year, on average, and remains stable except during large flood events.

**Laboratory reporting level** (LRL) generally is equal to twice the yearly determined long-term method detection level (LT-MDL). The LRL controls false negative error. The probability of falsely reporting a nondetection for a sample that contained an analyte at a concentration equal to or greater than the LRL is predicted to be less than or equal to 1 percent. The value of the LRL will be reported with a "less than" (<) remark code for samples in which the analyte was not detected. The National Water Quality Laboratory (NWQL) collects quality-control data from selected analytical methods on a continuing basis to determine LT-MDLs and to establish LRLs. These values are reevaluated annually on the basis of the most current quality-control data and, therefore, may change. The LRL replaces the term 'non-detection value' (NDV).

**Land-surface datum** (lsd) is a datum plane that is approximately at land surface at each ground-water observation well.

**Latent heat flux** (often used interchangeably with latent heat-flux density) is the amount of heat energy that converts water from liquid to vapor (evaporation) or from vapor to liquid (condensation) across a specified cross-sectional area per unit time. Usually expressed in watts per square meter.

**Light-attenuation coefficient,** also known as the extinction coefficient, is a measure of water clarity. Light is attenuated according to the Lambert-Beer equation:

$$I = I_o e^{-\lambda L},$$

where $I_o$ is the source light intensity, $I$ is the light intensity at length $L$ (in meters) from the source, $\lambda$ is the light-attenuation coefficient, and $e$ is the base of the natural logarithm. The light-attenuation coefficient is defined as

$$\lambda = -\frac{1}{L}\log_e \frac{I}{I_o}.$$

**Lipid** is any one of a family of compounds that are insoluble in water and that make up one of the principal components of living cells. Lipids include fats, oils, waxes, and steroids. Many environmental contaminants such as organochlorine pesticides are lipophilic.

**Long-term method detection level** (LT-MDL) is a detection level derived by determining the standard deviation of a minimum of 24 method detection limit (MDL) spike-sample measurements over an extended period of time. LT-MDL data are collected on a continuous basis to assess year-to-year variations in the LT-MDL. The LT-MDL controls false positive error. The chance of falsely reporting a concentration at or greater than the LT-MDL for a sample that did not contain the analyte is predicted to be less than or equal to 1 percent.

**Low tide** is the minimum height reached by each falling tide. The high-low and low-low tides are the higher and lower of the two low tides, respectively, of each tidal day. *See NOAA Web site: http://www.co-ops.nos.noaa.gov/tideglos.html*

**Macrophytes** are the macroscopic plants in the aquatic environment. The most common macrophytes are the rooted vascular plants that usually are arranged in zones in aquatic ecosystems and restricted in the area by the extent of illumination through the water and sediment deposition along the shoreline.

**Mean concentration of suspended sediment** (Daily mean suspended-sediment concentration) is the time-weighted concentration of suspended sediment passing a stream cross section during a given time period. (See also "Daily mean suspended-sediment concentration" and "Suspended-sediment concentration")

**Mean discharge** (MEAN) is the arithmetic mean of individual daily mean discharges during a specific period. (See also "Discharge")

**Mean high** or **low tide** is the average of all high or low tides, respectively, over a specific period.

**Mean sea level** is a local tidal datum. It is the arithmetic mean of hourly heights observed over the National Tidal Datum Epoch. Shorter series are specified in the name; for example, monthly mean sea level and yearly mean sea level. In order that they may be recovered when needed, such datums are referenced to fixed points known as benchmarks. (See also "Datum")

**Measuring point** (MP) is an arbitrary permanent reference point from which the distance to water surface in a well is measured to obtain water level.

**Megahertz** is a unit of frequency. One megahertz equals one million cycles per second.

**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.

**Method detection limit** (MDL) is the minimum concentration of a substance that can be measured and reported with 99-percent confidence that the analyte concentration is greater than zero. It is determined from the analysis of a sample in a given matrix containing the analyte. At the MDL concentration, the risk of a false positive is predicted to be less than or equal to 1 percent.

**Method of Cubatures** is a method of computing discharge in tidal estuaries based on the conservation of mass equation.

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

**Micrograms per gram** (UG/G, µg/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 kilogram** (UG/KG, µg/kg) is a unit expressing the concentration of a chemical constituent as the mass (micrograms) of the constituent per unit mass (kilogram) of the material analyzed. One microgram per kilogram is equivalent to 1 part per billion.

**Micrograms per liter** (UG/L, µg/L) is a unit expressing the concentration of chemical constituents in water as mass (micrograms) of constituent per unit volume (liter) of water. One thousand micrograms per liter is equivalent to 1 milligram per liter. One microgram per liter is equivalent to 1 part per billion.

**Microsiemens per centimeter** (US/CM, µS/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 water as the mass (milligrams) of constituent per unit volume (liter) of water. Concentration of suspended sediment also is expressed in milligrams per liter and is based on the mass of dry sediment per liter of water-sediment mixture.

**Minimum reporting level** (MRL) is the smallest measured concentration of a constituent that may be reliably reported by using a given analytical method.

**Miscellaneous site,** miscellaneous station, or miscellaneous sampling site is a site where streamflow, sediment, and/or water-quality data or water-quality or sediment samples are collected once, or more often on a random or discontinuous basis to provide better areal coverage for defining hydrologic and water-quality conditions over a broad area in a river basin.

**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. MPN 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.

**Nanograms per liter** (NG/L, ng/L) is a unit expressing the concentration of chemical constituents in solution as mass (nanograms) of solute per unit volume (liter) of water. One million nanograms per liter is equivalent to 1 milligram per liter.

**National Geodetic Vertical Datum of 1929** (NGVD 29) is a fixed reference adopted as a standard geodetic datum for elevations determined by leveling. It formerly was called "Sea Level Datum of 1929" or "mean sea level." Although the datum was derived from the mean sea level at 26 tide stations**,** it does not necessarily represent local mean sea level at any particular place. *See NOAA Web site: http://www.ngs.noaa.gov/faq.shtml#WhatVD29VD88* (See "North American Vertical Datum of 1988")

**Natural substrate** refers to any naturally occurring immersed or submersed solid surface, such as a rock or tree, upon which an organism lives. (See also "Substrate")

**Nekton** are the consumers in the aquatic environment and consist of large, free-swimming organisms that are capable of sustained, directed mobility.

**Nephelometric turbidity unit** (NTU) is the measurement for reporting turbidity that is based on use of a standard suspension of formazin. Turbidity measured in NTU uses nephelometric methods that depend on passing specific light of a specific wavelength through the sample.

**North American Datum of 1927** (NAD 27) is the horizontal control datum for the United States that was defined by a location and azimuth on the Clarke spheroid of 1866.

**North American Datum of 1983** (NAD 83) is the horizontal control datum for the United States, Canada, Mexico, and Central America that is based on the adjustment of 250,000 points including 600 satellite Doppler stations that constrain the system to a geocentric origin. NAD 83 has been officially adopted as the legal horizontal datum for the United States by the Federal government.

**North American Vertical Datum of 1988** (NAVD 88) is a fixed reference adopted as the official civilian vertical datum for elevations determined by Federal surveying and mapping activities in the United States. This datum was established in 1991 by minimum-constraint adjustment of the Canadian**,** Mexican, and United States first-order terrestrial leveling networks.

**Open** or **screened interval** is the length of unscreened opening or of well screen through which water enters a well, in feet below land surface.

**Organic carbon** (OC) is a measure of organic matter present in aqueous solution, suspension, or bottom sediment. May be reported as dissolved organic carbon (DOC), particulate organic carbon (POC), or total organic carbon (TOC).

**Organic mass** or **volatile mass** of a living substance is the difference between the dry mass and ash mass and represents the actual mass of the living matter. Organic mass is expressed in the same units as for ash mass and dry mass. (See also "Ash mass," "Biomass," and "Dry mass")

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

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

**Organochlorine compounds** are any chemicals that contain carbon and chlorine. Organochlorine compounds that are important in investigations of water, sediment, and biological quality include certain pesticides and industrial compounds.

**Parameter code** is a 5-digit number used in the USGS computerized data system, National Water Information System (NWIS), to uniquely identify a specific constituent or property.

**Partial-record station** is a site where discrete measurements of one or more hydrologic parameters are obtained over a period of time without continuous data being recorded or computed. A common example is a crest-stage gage partial-record station at which only peak stages and flows are recorded.

**Particle size** is the diameter, in millimeters (mm), of a particle determined by sieve or sedimentation methods. The sedimentation method uses the principle of Stokes Law to calculate sediment particle sizes. Sedimentation methods (pipet, bottom-withdrawal tube, visual-accumulation tube, sedigraph) 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**, as 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 | >0.004 - 0.062 | Sedimentation |
| Sand | >0.062 - 2.0 | Sedimentation/sieve |
| Gravel | >2.0 - 64.0 | Sieve |
| Cobble | >64 - 256 | Manual measurement |
| Boulder | >256 | Manual measurement |

The particle-size distributions given in this report are not necessarily representative of all particles in transport in the stream. For the sedimentation method, 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.

**Peak flow (peak stage)** is an instantaneous local maximum value in the continuous time series of streamflows or stages, preceded by a period of increasing values and followed by a period of decreasing values. Several peak values ordinarily occur in a year. The maximum peak value in a year is called the annual peak; peaks lower than the annual peak are called secondary peaks. Occasionally, the annual peak may not be the maximum value for the year; in such cases, the maximum value occurs at midnight at the beginning or end of the year, on the recession from or rise toward a higher peak in the adjoining year. If values are recorded at a discrete series of times, the peak recorded value may be taken as an approximation of the true peak, which may occur between the recording instants. If the values are recorded with finite precision, a sequence of equal recorded values may occur at the peak; in this case, the first value is taken as the peak.

**Percent composition** or **percent of total** 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, weight, mass, or volume.

**Percent shading** is a measure of the amount of sunlight potentially reaching the stream. A clinometer is used to measure left and right bank canopy angles. These values are added together, divided by 180, and multiplied by 100 to compute percentage of shade.

**Periodic-record station** is a site where stage, discharge, sediment, chemical, physical, or other hydrologic measurements are made one or more times during a year but at a frequency insufficient to develop a daily record.

**Periphyton** is the assemblage of microorganisms attached to and living upon submerged solid surfaces. Although primarily consisting of algae, they also include bacteria, fungi, protozoa, rotifers, and other small organisms. Periphyton are useful indicators of water quality.

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

**pH** of water is the negative logarithm of the hydrogen-ion activity. Solutions with pH less than 7.0 standard units are termed "acidic," and solutions with a pH greater than 7.0 are termed "basic." Solutions with a pH of 7.0 are neutral. The presence and concentration of many dissolved chemical constituents found in water are affected, in part, by the hydrogen-ion activity of water. Biological processes including growth, distribution of organisms, and toxicity of the water to organisms also are affected, in part, by the hydrogen-ion activity of water.

**Phytoplankton** is the plant part of the plankton. They usually are 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 commonly are known as algae. (See also "Plankton")

**Picocurie** (PC, pCi) is one-trillionth ($1 \times 10^{-12}$) of the amount of radioactive nuclide represented by a curie (Ci). A curie is the quantity of radioactive nuclide that yields $3.7 \times 10^{10}$ radioactive disintegrations per second (dps). A picocurie yields 0.037 dps, or 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. Concentrations are expressed as a number of cells per milliliter (cells/mL) of sample.

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

**Polychlorinated naphthalenes** (PCNs) are industrial chemicals that are mixtures of chlorinated naphthalene compounds. They have properties and applications similar to polychlorinated biphenyls (PCBs) and have been identified in commercial PCB preparations.

**Pool**, as used in this report, is a small part of a stream reach with little velocity, commonly with water deeper than surrounding areas.

**Primary productivity** is a measure of the rate at which new organic matter is formed and accumulated through photo-synthetic 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 (carbon method) by the plants.

**Primary productivity (carbon method)** is expressed as milligrams of carbon per area per unit time [mg C/($m^2$/time)] for periphyton and macrophytes or per volume [mg C/($m^3$/time)] for phytoplankton. The carbon method defines 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 with unenriched water samples. Unit time may be either the hour or day, depending on the incubation period. (See also "Primary productivity")

**Primary productivity (oxygen method)** is expressed as milligrams of oxygen per area per unit time [mg O/($m^2$/time)] for periphyton and macrophytes or per volume [mg O/($m^3$/time)] for phytoplankton. The oxygen method defines 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. (See also "Primary productivity")

**Radioisotopes** are isotopic forms of elements that exhibit radioactivity. Isotopes are varieties of a chemical element that differ in atomic weight but are very nearly alike in chemical properties. The difference arises because the atoms of the isotopic forms of an element differ in the number of neutrons in the nucleus; for example, ordinary chlorine is a mixture of isotopes having atomic weights of 35 and 37, and the natural mixture has an atomic weight of about 35.453. Many of the elements similarly exist as mixtures of isotopes, and a great many new isotopes have been produced in the operation of nuclear devices such as the cyclotron. There are 275 isotopes of the 81 stable elements, in addition to more than 800 radioactive isotopes.

**Reach**, as used in this report, is a length of stream that is chosen to represent a uniform set of physical, chemical, and biological conditions within a segment. It is the principal sampling unit for collecting physical, chemical, and biological data.

**Recoverable from bed (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. (See also "Bed material")

**Recurrence interval,** also referred to as return period, is the average time, usually expressed in years, between occurrences of hydrologic events of a specified type (such as exceedances of a specified high flow or nonexceedance of a specified low flow). The terms "return period" and "recurrence interval" do not imply regular cyclic occurrence. The actual times between occurrences vary randomly, with most of the times being less than the average and a few being substantially greater than the average. For example, the 100-year flood is the flow rate that is exceeded by the annual maximum peak flow at intervals whose average length is 100 years (that is, once in 100 years, on average); almost two-thirds of all exceedances of the 100-year flood occur less than 100 years after the previous exceedance, half occur less than 70 years after the previous exceedance, and about one-eighth occur more than 200 years after the previous exceedance. Similarly, the 7-day, 10-year low flow ($7Q_{10}$) is the flow rate below which the annual minimum 7-day-mean flow dips at intervals whose average length is 10 years (that is, once in 10 years, on average); almost two-thirds of the nonexceedances of the $7Q_{10}$ occur less than 10 years after the previous nonexceedance, half occur less than 7 years after, and about one-eighth occur more than 20 years after the previous nonexceedance. The recurrence interval for annual events is the reciprocal of the annual probability of occurrence. Thus, the 100-year flood has a 1-percent chance of being exceeded by the maximum peak flow in any year, and there is a 10-percent chance in any year that the annual minimum 7-day-mean flow will be less than the $7Q_{10}$.

**Replicate samples** are a group of samples collected in a manner such that the samples are thought to be essentially identical in composition.

**Return period** (See "Recurrence interval")

**Riffle**, as used in this report, is a shallow part of the stream where water flows swiftly over completely or partially submerged obstructions to produce surface agitation.

**River mileage** is the curvilinear distance, in miles, measured upstream from the mouth along the meandering path of a stream channel in accordance with Bulletin No. 14 (October 1968) of the Water Resources Council and typically is used to denote location along a river.

**Run**, as used in this report, is a relatively shallow part of a stream with moderate velocity and little or no surface turbulence.

**Runoff** is the quantity of water that is discharged ("runs off") from a drainage basin during a given time period. Runoff data may be presented as volumes in acre-feet, as mean discharges per unit of drainage area in cubic feet per second per square mile, or as depths of water on the drainage basin in inches. (See also "Annual runoff")

**Sea level,** as used in this report, refers to one of the two commonly used national vertical datums (NGVD 1929 or NAVD 1988). See separate entries for definitions of these datums.

**Sediment** is solid material that originates mostly from disintegrated rocks; when transported by, suspended in, or deposited from water, it is referred to as "fluvial sediment." Sediment 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 affected by environmental and land-use factors. Some major factors are topography, soil characteristics, land cover, and depth and intensity of precipitation.

**Sensible heat flux** (often used interchangeably with latent sensible heat-flux density) is the amount of heat energy that moves by turbulent transport through the air across a specified cross-sectional area per unit time and goes to heating (cooling) the air. Usually expressed in watts per square meter.

**Seven-day, 10-year low flow** ($7Q_{10}$) is the discharge below which the annual 7-day minimum flow falls in 1 year out of 10 on the long-term average. The recurrence interval of the $7Q_{10}$ is 10 years; the chance that the annual 7-day minimum flow will be less than the $7Q_{10}$ is 10 percent in any given year. (See also "Annual 7-day minimum" and "Recurrence interval")

**Shelves**, as used in this report, are streambank features extending nearly horizontally from the flood plain to the lower limit of persistent woody vegetation.

**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. Sodium hazard in water is an index that can be used to evaluate the suitability of water for irrigating crops.

**Soil heat flux** (often used interchangeably with soil heat-flux density) is the amount of heat energy that moves by conduction across a specified cross-sectional area of soil per unit time and goes to heating (or cooling) the soil. Usually expressed in watts per square meter.

**Soil-water content** is the water lost from the soil upon drying to constant mass at 105 °C; expressed either as mass of water per unit mass of dry soil or as the volume of water per unit bulk volume of soil.

**Specific electrical conductance (conductivity)** is a measure of the capacity of water (or other media) to conduct an electrical current. It is expressed in microsiemens per centimeter at 25 °C. Specific electrical conductance is a function of the types and quantity of dissolved substances in water 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.

**Stable isotope ratio** (per MIL) is a unit expressing the ratio of the abundance of two radioactive isotopes. Isotope ratios are used in hydrologic studies to determine the age or source of specific water, to evaluate mixing of different water, as an aid in determining reaction rates, and other chemical or hydrologic processes.

**Stage** (See "Gage height")

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

**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.

**Substrate embeddedness class** is a visual estimate of riffle streambed substrate larger than gravel that is surrounded or covered by fine sediment (<2 mm, sand or finer). Below are the class categories expressed as the percentage covered by fine sediment:

| | | | |
|---|---|---|---|
| 0 | no gravel or larger substrate | 3 | 26-50 percent |
| 1 | > 75 percent | 4 | 5-25 percent |
| 2 | 51-75 percent | 5 | < 5 percent |

**Surface area of a lake** is that area (acres) encompassed by the boundary of the lake as shown on USGS topographic maps, or other available maps or photographs. Because surface area changes with lake stage, surface areas listed in this report represent those determined for the stage at the time the maps or photographs were obtained.

**Surficial bed material** is the upper surface (0.1 to 0.2 foot) of the bed material that is sampled using U.S. Series Bed-Material Samplers.

**Surrogate** is an analyte that behaves similarly to a target analyte, but that is highly unlikely to occur in a sample. A surrogate is added to a sample in known amounts before extraction and is measured with the same laboratory procedures used to measure the target analyte. Its purpose is to monitor method performance for an individual sample.

**Suspended** (as used in tables of chemical analyses) refers to the amount (concentration) of undissolved material in a water-sediment mixture. It is defined operationally as 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 suspended water-sediment sample that is retained on a 0.45-micrometer 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 directly analyzing the suspended mate-rial collected on the filter or, more commonly, by difference, on the basis of determinations of (1) dissolved and (2) total recoverable concentrations of the constituent. (See also "Suspended")

**Suspended sediment** is the sediment maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid. (See also "Sediment")

**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 foot above the bed) expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L). The analytical technique uses the mass of all of the sediment and the net weight of the water-sediment mixture in a sample to compute the suspended-sediment concentration. (See also "Sediment" and "Suspended sediment")

**Suspended-sediment discharge** (tons/d) is the rate of sediment transport, as measured by dry mass or volume, that passes a cross section in a given time. It is calculated in units of tons per day as follows: concentration (mg/L) x discharge ($ft^3/s$) x 0.0027. (See also "Sediment," "Suspended sediment," and "Suspended-sediment concentration")

**Suspended-sediment load** is a general term that refers to a given characteristic of the material in suspension that passes a point during a specified period of time. The term needs to be qualified, such as "annual suspended-sediment load" or "sand-size suspended-sediment load," and so on. It is not synonymous with either suspended-sediment discharge or concentration. (See also "Sediment")

**Suspended solids, total residue at 105 ˚C concentration** is the concentration of inorganic and organic material retained on a filter, expressed as milligrams of dry material per liter of water (mg/L). An aliquot of the sample is used for this analysis.

**Suspended, total** is the total amount of a given constituent in the part of a water-sediment sample that is retained on a 0.45-micrometer membrane filter. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. 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 directly analyzing portions of the suspended material collected on the filter or, more commonly, by difference, on the basis of determinations of (1) dissolved and (2) total concentrations of the constituent. (See also "Suspended")

**Synoptic studies** are short-term investigations of specific water-quality conditions during selected seasonal or hydro-logic 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.

**Taxa (Species) richness** is the number of species (taxa) present in a defined area or sampling unit.

**Taxonomy** is the division of biology concerned with the classification and naming of organisms. The classification of organisms is based upon a hierarchial 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: | Arthropeda |
| Class: | Insecta |
| Order: | Ephemeroptera |
| Family: | Ephemeridae |
| Genus: | *Hexagenia* |
| Species: | *Hexagenia limbata* |

**Thalweg** is the line formed by connecting points of minimum streambed elevation (deepest part of the channel).

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

**Time-weighted average** is computed by multiplying the number of days in the sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the total number of days. A time-weighted average represents the composition of water resulting from the mixing of flow proportionally to the duration of the concentration.

**Tons per acre-foot** (T/acre-ft) is the dry mass (tons) of a constituent per unit volume (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, tons/d) is a common chemical or sediment discharge unit. It is the quantity of a substance in solution, in suspension, or as bedload that passes a stream section during a 24-hour period. It is equivalent to 2,000 pounds per day, or 0.9072 metric ton per day.

**Total** is the amount of a given constituent in a representative whole-water (unfiltered) 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 at least 95 percent of the constituent in the sample.)

**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 warmblooded animals and those that inhabit soils. They are characterized as aerobic or facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria that 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 milliliters of sample. (See also "Bacteria")

**Total discharge** is the quantity of a given constituent, measured as dry mass or volume, that passes a stream cross section per unit of time. When referring to constituents other than water, this term needs to be qualified, such as "total sediment discharge," "total chloride discharge," and so on.

**Total in bottom material** is the amount of a given constituent in a representative sample of bottom material. 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 judge when the results should be reported as "total in bottom material."

**Total length** (fish) is the straight-line distance from the anterior point of a fish specimen's snout, with the mouth closed, to the posterior end of the caudal (tail) fin, with the lobes of the caudal fin squeezed together.

**Total load** refers to all of a constituent in transport. When referring to sediment, it includes suspended load plus bed load.

**Total organism count** is the number of organisms collected and enumerated in any particular sample. (See also "Organism count/volume")

**Total recoverable** is the amount of a given constituent in a whole-water sample after a 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 for whole-water samples, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures may produce different analytical results.

**Total sediment discharge** is the mass of suspended-sediment plus bed-load transport, measured as dry weight, that passes a cross section in a given time. It is a rate and is reported as tons per day. (See also "Bedload," "Bedload discharge," "Sediment," "Suspended sediment," and "Suspended-sediment concentration")

**Total sediment load** or **total load** is the sediment in transport as bedload and suspended-sediment load. The term may be qualified, such as "annual suspended-sediment load" or "sand-size suspended-sediment load," and so on. It differs from total sediment discharge in that load refers to the material, whereas discharge refers to the quantity of material, expressed in units of mass per unit time. (See also "Sediment," "Suspended-sediment load," and "Total load")

**Transect**, as used in this report, is a line across a stream perpendicular to the flow and along which measurements are taken, so that morphological and flow characteristics along the line are described from bank to bank. Unlike a cross section, no attempt is made to determine known elevation points along the line.

**Turbidity** is the reduction in the transparency of a solution because of the presence of suspended and some dissolved substances. The measurement technique records the collective optical properties of the solution that cause light to be scattered and attenuated rather than transmitted in straight lines; the higher the intensity of scattered or attenuated light, the higher the value of the turbidity. Turbidity is expressed in nephelometric turbidity units (NTU). Depending on the method used, the turbidity units as NTU can be defined as the intensity of light of a specified wavelength scattered or attenuated by suspended particles or absorbed at a method specified angle, usually 90 degrees, from the path of the incident light. Currently approved methods for the measurement of turbidity in the USGS include those that conform to USEPA Method 180.1, ASTM D1889-00, and ISO 7027. Measurements of turbidity by these different methods and different instruments are unlikely to yield equivalent values.

**Ultraviolet (UV) absorbance (absorption)** at 254 or 280 nanometers is a measure of the aggregate concentration of the mixture of UV absorbing organic materials dissolved in the analyzed water, such as lignin, tannin, humic substances, and various aromatic compounds. UV absorbance (absorption) at 254 or 280 nanometers is measured in UV absorption units per centimeter of path length of UV light through a sample.

**Unconfined aquifer** is an aquifer whose upper surface is a water table free to fluctuate under atmospheric pressure. (See "Water-table aquifer")

**Vertical datum** (See "Datum")

**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 human-made chemicals that are used and produced in the manufacture of paints, adhesives, petroleum products, pharmaceuticals, and refrigerants. They often are 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.

**Water table** is that surface in a ground-water body at which the water pressure is equal to the atmospheric pressure.

**Water-table aquifer** is an unconfined aquifer within which the water table is found.

**Water year** in USGS 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, 2002, is called the "2002 water year."

**Watershed** (See "Drainage basin")

**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.

**Wet mass** is the mass of living matter plus contained water. (See also "Biomass" and "Dry mass")

**Wet weight** refers to the weight of animal tissue or other substance including its contained water. (See also "Dry weight")

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

**Zooplankton** is the animal part of the plankton. Zooplankton are capable of extensive movements within the water column and often are 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. (See also "Plankton")

## Techniques of Water-Resources Investigations of the U.S. Geological Survey

The USGS publishes a series of manuals, the Techniques of Water-Resources Investigations, 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.

Reports in the Techniques of Water-Resources Investigations series, which are listed below, are online at *http://water.usgs.gov/pubs/twri/*. Printed copies are for sale by the USGS, Information Services, Box 25286, Federal Center, Denver, Colorado 80225 (authorized agent of the Superintendent of Documents, Government Printing Office), telephone 1-888-ASK-USGS. Please telephone 1-888-ASK-USGS for current prices, and refer to the title, book number, chapter number, and mention the "U.S. Geological Survey Techniques of Water-Resources Investigations." Products can then be ordered by telephone, or online at http://www.usgs.gov/sales.html, or by FAX to (303)236-469 of an order form available online at *http://mac.usgs.gov/isb/pubs/forms/*. Prepayment by major credit card or by a check or money order payable to the "U.S. Geological Survey" is required.

### 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, chap. D1. 1975. 65 p.
1–D2.*Guidelines for collection and field analysis of ground-water samples for selected unstable constituents*, by W.W. Wood: USGS–TWRI book 1, chap. D2. 1976. 24 p.

### 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, chap. D1. 1974. 116 p.
2–D2.*Application of seismic-refraction techniques to hydrologic studies*, by F.P. Haeni: USGS–TWRI book 2, chap. D2. 1988. 86 p.

#### 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, chap. E1. 1971. 126 p.
2–E2.*Borehole geophysics applied to ground-water investigations*, by W.S. Keys: USGS–TWRI book 2, chap. E2. 1990. 150 p.

#### 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, chap. F1. 1989. 97 p.

### 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, chap. A1. 1967. 30 p.
3–A2.*Measurement of peak discharge by the slope-area method*, by Tate Dalrymple and M.A. Benson: USGS–TWRI book 3, chap. A2. 1967. 12 p.
3–A3.*Measurement of peak discharge at culverts by indirect methods*, by G.L. Bodhaine: USGS–TWRI book 3, chap. A3. 1968. 60 p.
3–A4.*Measurement of peak discharge at width contractions by indirect methods*, by H.F. Matthai: USGS-TWRI book 3, chap. A4. 1967. 44 p.
3–A5.*Measurement of peak discharge at dams by indirect methods*, by Harry Hulsing: USGS–TWRI book 3, chap. A5. 1967. 29 p.
3–A6.*General procedure for gaging streams*, by R.W. Carter and Jacob Davidian: USGS–TWRI book 3, chap. A6. 1968. 13 p.
3–A7.*Stage measurement at gaging stations*, by T.J. Buchanan and W.P. Somers: USGS–TWRI book 3, chap. A7. 1968. 28 p.
3–A8.*Discharge measurements at gaging stations*, by T.J. Buchanan and W.P. Somers: USGS–TWRI book 3, chap. A8. 1969. 65 p.

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, chap. A9. 1989. 27 p.
3–Al0.*Discharge ratings at gaging stations*, by E.J. Kennedy: USGS–TWRI book 3, chap. A10. 1984. 59 p.
3–A11.*Measurement of discharge by the moving-boat method*, by G.F. Smoot and C.E. Novak: USGS–TWRI book 3, chap. A11. 1969. 22 p.
3–A12.*Fluorometric procedures for dye tracing*, Revised, by J.F. Wilson, Jr., E.D. Cobb, and F.A. Kilpatrick: USGS–TWRI book 3, chap. A12. 1986. 34 p.
3–A13.*Computation of continuous records of streamflow*, by E.J. Kennedy: USGS–TWRI book 3, chap. A13. 1983. 53 p.
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3–A21*Stream-gaging cableways*, by C. Russell Wagner: USGS–TWRI book 3, chap. A21. 1995. 56 p.

### Section B. Ground-Water Techniques

3–B1. *Aquifer-test design, observation, and data analysis*, by R.W. Stallman: USGS–TWRI book 3, chap. B1. 1971. 26 p.
3–B2.*Introduction to ground-water hydraulics, a programed text for self-instruction*, by G.D. Bennett: USGS–TWRI book 3, chap. B2. 1976. 172 p.
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3–B8.*System and boundary conceptualization in ground-water flow simulation*, by T.E. Reilly: USGS–TWRI book 3, chap. B8. 2001. 29 p.

### Section C. Sedimentation and Erosion Techniques

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3–C2.*Field methods for measurement of fluvial sediment*, by T.K. Edwards and G.D. Glysson: USGS–TWRI book 3, chap. C2. 1999. 89 p.
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## 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, chap. A1. 1968. 39 p.
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4–D1.*Computation of rate and volume of stream depletion by wells*, by C.T. Jenkins: USGS–TWRI book 4, chap. D1. 1970. 17 p.

## 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, chap. A1. 1989. 545 p.
5–A2.*Determination of minor elements in water by emission spectroscopy*, by P.R. Barnett and E.C. Mallory, Jr.: USGS–TWRI book 5, chap. A2. 1971. 31 p.
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, chap. A3. 1987. 80 p.
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, chap. A4. 1989. 363 p.
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, chap. A5. 1977. 95 p.
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, chap. A6. 1982. 181 p.

### Section C. Sediment Analysis

5–C1.*Laboratory theory and methods for sediment analysis*, by H.P. Guy: USGS–TWRI book 5, chap. C1. 1969. 58 p.

## 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, chap. A1. 1988. 586 p.
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, chap. A2. 1991. 68 p.
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, chap. A3. 1993. 136 p.
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, chap. A4. 1992. 108 p.
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, chap. A5. 1993. 243 p.
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: USGS–TWRI book 6, chap. A6. 1996. 125 p.
6–A7.*User's guide to SEAWAT: A computer program for simulation of three-dimensional variable-density ground-water flow*, by Weixing Guo and Christian D. Langevin: USGS–TWRI book 6, chap. A7. 2002.
77 p.

## Book 7. Automated Data Processing and Computations

### 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, chap. C1. 1976. 116 p.
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, chap. C2. 1978. 90 p.
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, chap. C3. 1981. 110 p.

### 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, chap. A1. 1968. 23 p.
8–A2.*Installation and service manual for U.S. Geological Survey manometers*, by J.D. Craig: USGS–TWRI book 8, chap. A2. 1983. 57 p.

#### 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, chap. B2. 1968. 15 p.

### Book 9. Handbooks for Water-Resources Investigations

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

9–A1.*National field manual for the collection of water-quality data: Preparations for water sampling*, by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A1. 1998. 47 p.
9–A2.*National field manual for the collection of water-quality data: Selection of equipment for water sampling*, edited by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A2. 1998. 94 p.
9–A3.*National field manual for the collection of water-quality data: Cleaning of equipment for water sampling*, edited by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A3. 1998. 75 p.
9–A4.*National field manual for the collection of water-quality data: Collection of water samples*, edited by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A4. 1999. 156 p.
9–A5.*National field manual for the collection of water-quality data: Processing of water samples*, edited by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A5. 1999, 149 p.
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, chap. A6. 1998. Variously paginated.
9–A7.*National field manual for the collection of water-quality data: Biological indicators*, edited by D.N. Myers and F.D. Wilde: USGS–TWRI book 9, chap. A7. 1997 and 1999. Variously paginated.
9–A8.*National field manual for the collection of water-quality data: Bottom-material samples*, by D.B. Radtke: USGS–TWRI book 9, chap. A8. 1998. 48 p.
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, chap. A9. 1998. 60 p.

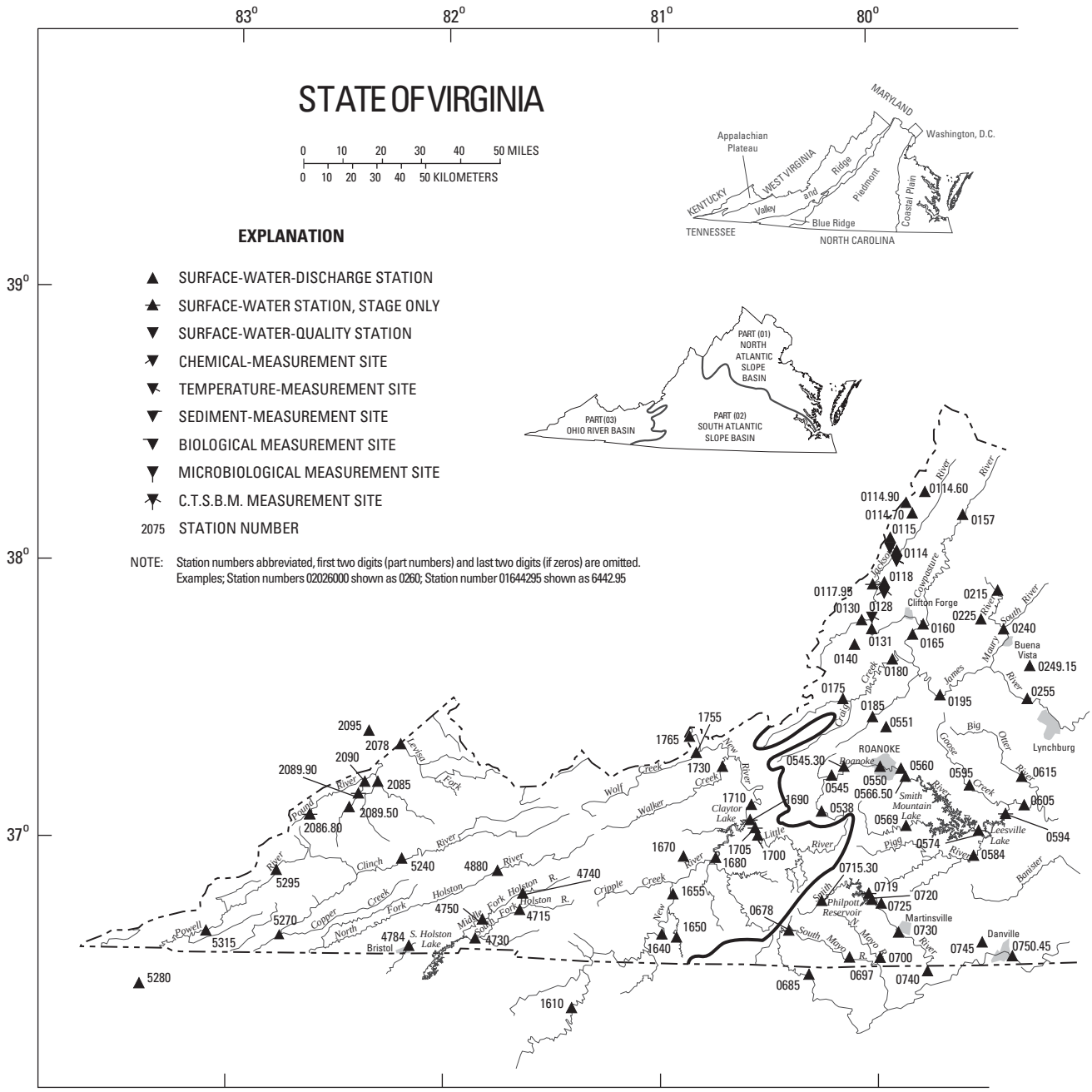
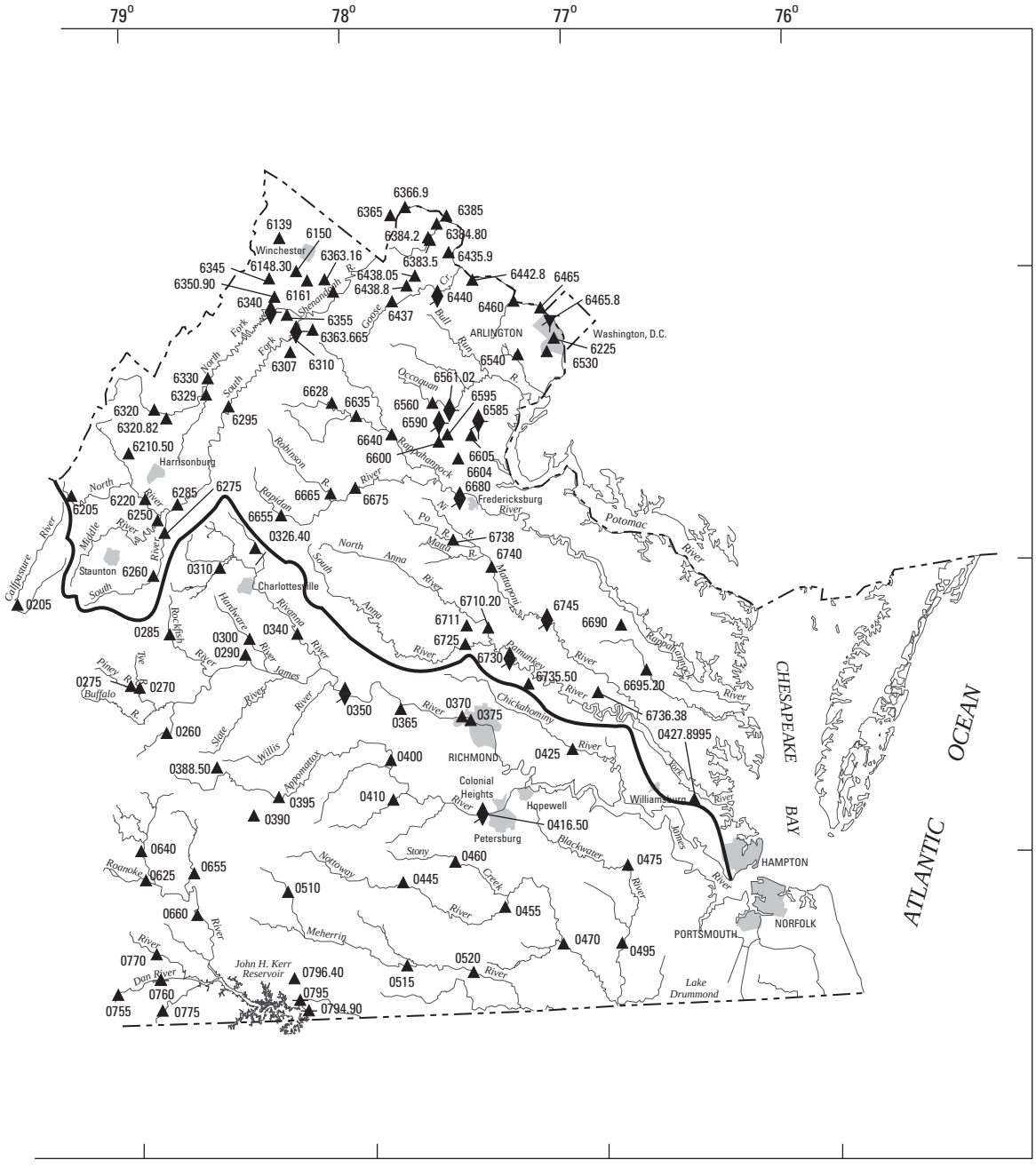



**Figure 4.** Location of surface-water-discharge and surface-water-quality data-collection stations.


79°
78°
77°
76°
Winchester
Harrisonburg
Staunton
Charlottesville
Fredericksburg
ARLINGTON
Washington, D.C.
RICHMOND
Colonial Heights
Hopewell
Petersburg
Williamsburg
HAMPTON
NORFOLK
PORTSMOUTH
CHESAPEAKE BAY
ATLANTIC OCEAN
Lake Drummond
John H. Kerr Reservoir
Potomac River
Rappahannock River
James River
Chickahominy River
Appomattox River
Blackwater River
Nottoway River
Meherrin River
Roanoke River
Dan River
Shenandoah River
North Fork Shenandoah River
South Fork Shenandoah River
Occoquan Creek
Bull Run
Goose Creek
Robinson River
Rapidan River
North Anna River
South Anna River
Mattaponi River
Pamunkey River
Po River
Ni River
Mattaponi River
Piney River
Buffalo R.
Tye River
Rockfish River
Hardware River
Rivanna River
Slate River
Willis River
Jones Creek
Stony Creek
Callaseture River
North River
Middle River
South River
Calfpasture River
0205
0260
0270
0275
0285
0290
0300
0310
0326.40
0340
0350
0365
0370
0375
0388.50
0390
0395
0400
0410
0416.50
0425
0427.8995
0445
0455
0460
0470
0475
0495
0510
0515
0520
0625
0640
0655
0660
0755
0760
0770
0775
0794.90
0795
0796.40
6139
6148.30
6150
6161
6205
6210.50
6220
6250
6260
6285
6295
6310
6320
6320.82
6329
6330
6340
6345
6350.90
6355
6363.16
6363.665
6366.9
6365
6384.2
6383.5
6385
6384.80
6435.9
6438.05
6438.8
6437
6440
6442.8
6460
6465
6465.8
6225
6530
6540
6561.02
6560
6590
6600
6628
6635
6640
6595
6585
6605
6604
6680
6665
6675
6655
6275
6738
6740
6710.20
6711
6725
6730
6735.50
6745
6690
6695.20
6736.38

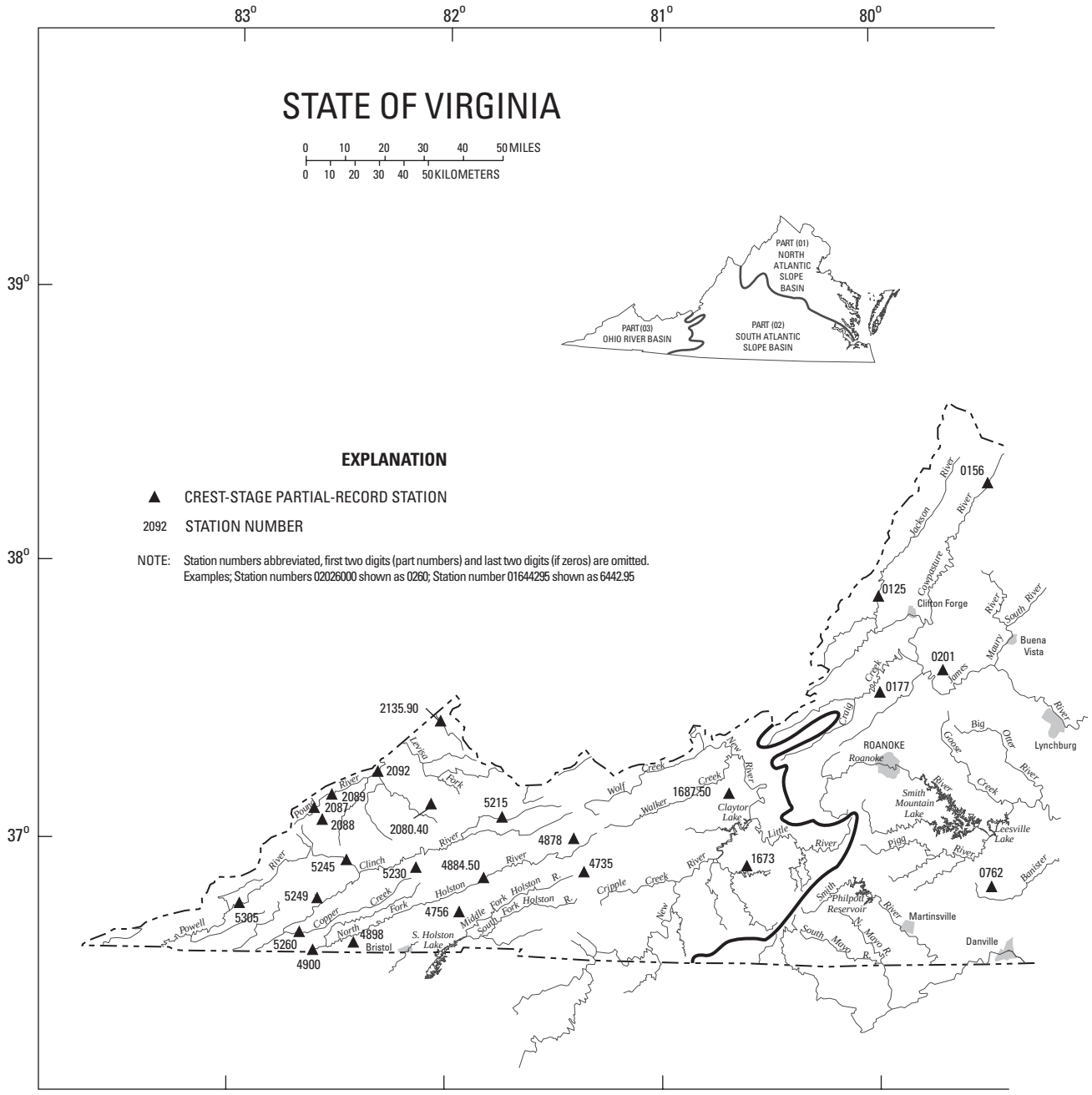
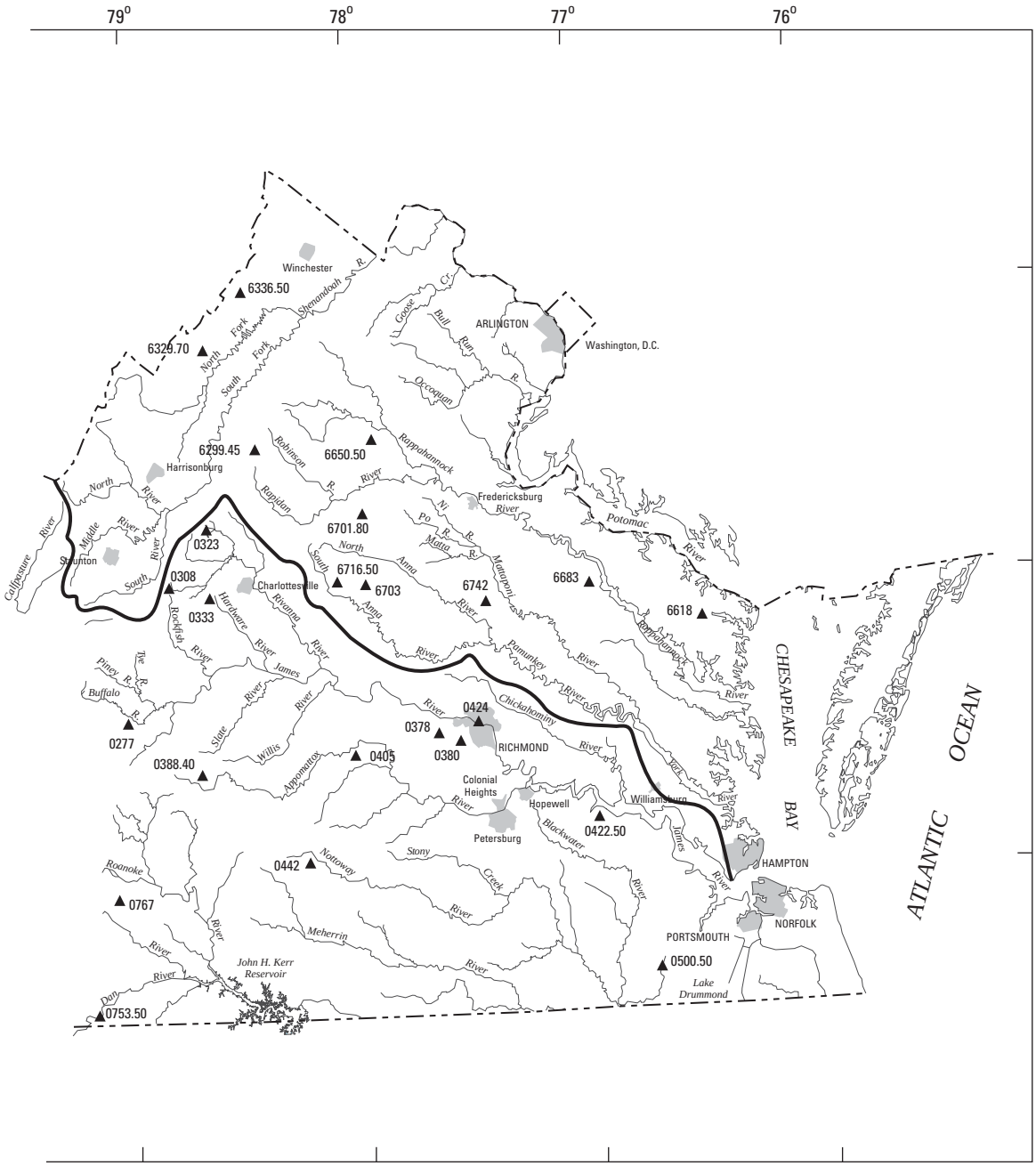



**Figure 5.** Location of surface-water partial-record stations.


79°
78°
77°
76°
Winchester
6336.50
6329.70
Shenandoah R.
North Fork
South Fork
Goose Cr.
Bull Run
ARLINGTON
Washington, D.C.
Occoquan R.
6299.45
Harrisonburg
Robinson R.
6650.50
Rappahannock River
North River
Rapidan R.
Fredericksburg
Po R.
Ni R.
Mata R.
6701.80
Potomac River
Middle River
Calfpasture River
South River
Stuanton
0323
0308
0333
Charlottesville
South Anna
North Anna
6716.50
6703
6742
Mattaponi River
6683
6618
Rappahannock River
Rockfish River
Hardware River
Rivanna River
James River
Pamunkey River
Piney R.
Tye R.
Buffalo R.
0277
Slate
Willis
Appomattox River
0388.40
0405
0424
0378
0380
RICHMOND
Chickahominy River
York River
CHESAPEAKE BAY
ATLANTIC OCEAN
Colonial Heights
Hopewell
Williamsburg
0422.50
Petersburg
Blackwater River
James River
Stony Creek
0442
Nottoway River
Roanoke River
0767
Meherrin River
HAMPTON
NORFOLK
PORTSMOUTH
0500.50
John H. Kerr Reservoir
Dam
0753.50
Lake Drummond

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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 enviromental 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).

## 01613900 HOGUE CREEK NEAR HAYFIELD, VA

LOCATION.--Lat 39°12'52", long 78°17'17", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 4-10, Jan. 16-27, and Feb. 1-15, and period of doubtful gage-height record, Feb. 16-21, which are fair. Maximum discharge, 4,090 $ft^3/s$, from rating curve extended above 870 $ft^3/s$. Several measurements of water temperature were made during the year.

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

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 400 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 1 | 1915 | *784 | *4.37 | Mar 20 | 1630 | 752 | 4.29 |
| Feb 22 | 1445 | 409 | 3.31 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.2 | 10 | 7.0 | 241 | e4.6 | 27 | 44 | 8.4 | 20 | 4.5 | 3.9 | 2.0 |
| 2 | 1.1 | 7.7 | 5.9 | 214 | e4.5 | 60 | 46 | 7.7 | 12 | 4.7 | 3.5 | 2.8 |
| 3 | 1.1 | 5.8 | 5.5 | 104 | e4.5 | 82 | 36 | 6.8 | 14 | 6.4 | 3.9 | 3.7 |
| 4 | 1.1 | 5.4 | e5.1 | 65 | e5.2 | 53 | 24 | 7.3 | 83 | 5.2 | 5.1 | 11 |
| 5 | 1.2 | 6.1 | e4.8 | 45 | e6.0 | 90 | 20 | 11 | 50 | 4.6 | 4.5 | 5.1 |
| 6 | 1.2 | 23 | e5.3 | 35 | e5.3 | 190 | 15 | 16 | 25 | 4.2 | 3.6 | 3.1 |
| 7 | 1.3 | 13 | e5.1 | 26 | e4.7 | 136 | 59 | 14 | 49 | 3.9 | 3.0 | 2.7 |
| 8 | 1.3 | 9.3 | e4.8 | 30 | e4.4 | 109 | 64 | 16 | 45 | 4.0 | 2.8 | 2.1 |
| 9 | 1.3 | 7.6 | e4.7 | 36 | e4.0 | 173 | 127 | 44 | 37 | 8.4 | 2.6 | 2.1 |
| 10 | 1.9 | 6.4 | e4.6 | 28 | e4.9 | 120 | 109 | 169 | 23 | 7.9 | 2.6 | 2.3 |
| 11 | 3.7 | 13 | 53 | 22 | e4.3 | 70 | 149 | 113 | 16 | 9.3 | 4.0 | 1.9 |
| 12 | 4.8 | 57 | 78 | 17 | e4.2 | 51 | 91 | 52 | 16 | 5.2 | 3.2 | 1.8 |
| 13 | 3.4 | 49 | 116 | 15 | e3.9 | 66 | 52 | 33 | 54 | 4.5 | 2.8 | 3.3 |
| 14 | 2.6 | 21 | 150 | 13 | e3.8 | 69 | 34 | 25 | 72 | 4.2 | 2.8 | 3.6 |
| 15 | 2.1 | 13 | 98 | 11 | e5.2 | 44 | 27 | 21 | 37 | 4.0 | 2.0 | 5.4 |
| 16 | 44 | 14 | 57 | e9.4 | e4.6 | 34 | 22 | 174 | 23 | 3.9 | 2.0 | 12 |
| 17 | 21 | 83 | 36 | e8.5 | e12 | 27 | 19 | 110 | 30 | 3.5 | 4.4 | 12 |
| 18 | 7.9 | 64 | 26 | e7.8 | e24 | 23 | 17 | 88 | 39 | 3.3 | 3.7 | 5.3 |
| 19 | 5.3 | 31 | 22 | e6.9 | e17 | 21 | 25 | 68 | 33 | 3.3 | 2.5 | 135 |
| 20 | 4.7 | 20 | 21 | e6.5 | e13 | 296 | 19 | 47 | 87 | 2.9 | 2.1 | 24 |
| 21 | 4.2 | 27 | 17 | e6.1 | e55 | 204 | 19 | 36 | 73 | 2.7 | 2.1 | 11 |
| 22 | 3.9 | 43 | 14 | e5.9 | 204 | 112 | 28 | 26 | 47 | 2.7 | 1.9 | 7.9 |
| 23 | 3.6 | 24 | 13 | e5.5 | 195 | 64 | 24 | 20 | 26 | 3.7 | 1.7 | 39 |
| 24 | 3.5 | 17 | 11 | e5.1 | 110 | 38 | 24 | 31 | 14 | 4.2 | 1.7 | 14 |
| 25 | 3.5 | 13 | 13 | e4.7 | 78 | 28 | 20 | 38 | 11 | 3.1 | 1.6 | 9.4 |
| 26 | 5.6 | 11 | 14 | e5.0 | 59 | 26 | 17 | 31 | 8.0 | 2.8 | 1.7 | 7.3 |
| 27 | 5.2 | 9.9 | 12 | e5.4 | 55 | 24 | 14 | 26 | 6.8 | 2.7 | 1.9 | 6.9 |
| 28 | 4.8 | 8.3 | 10 | 5.0 | 43 | 18 | 11 | 25 | 5.9 | 4.1 | 1.9 | 10 |
| 29 | 17 | 7.4 | 11 | 4.8 | --- | 18 | 10 | 19 | 5.2 | 4.8 | 1.9 | 7.0 |
| 30 | 40 | 7.1 | 11 | 4.7 | --- | 26 | 9.5 | 16 | 4.7 | 3.4 | 1.9 | 5.3 |
| 31 | 17 | --- | 13 | 4.8 | --- | 32 | --- | 22 | --- | 3.0 | 1.9 | --- |
| TOTAL | 220.5 | 627.0 | 848.8 | 998.1 | 939.1 | 2,331 | 1,175.5 | 1,321.2 | 966.6 | 135.1 | 85.2 | 359.0 |
| MEAN | 7.11 | 20.9 | 27.4 | 32.2 | 33.5 | 75.2 | 39.2 | 42.6 | 32.2 | 4.36 | 2.75 | 12.0 |
| MAX | 44 | 83 | 150 | 241 | 204 | 296 | 149 | 174 | 87 | 9.3 | 5.1 | 135 |
| MIN | 1.1 | 5.4 | 4.6 | 4.7 | 3.8 | 18 | 9.5 | 6.8 | 4.7 | 2.7 | 1.6 | 1.8 |
| CFSM | 0.47 | 1.39 | 1.83 | 2.15 | 2.24 | 5.01 | 2.61 | 2.84 | 2.15 | 0.29 | 0.18 | 0.80 |
| IN. | 0.55 | 1.55 | 2.11 | 2.48 | 2.33 | 5.78 | 2.92 | 3.28 | 2.40 | 0.34 | 0.21 | 0.89 |

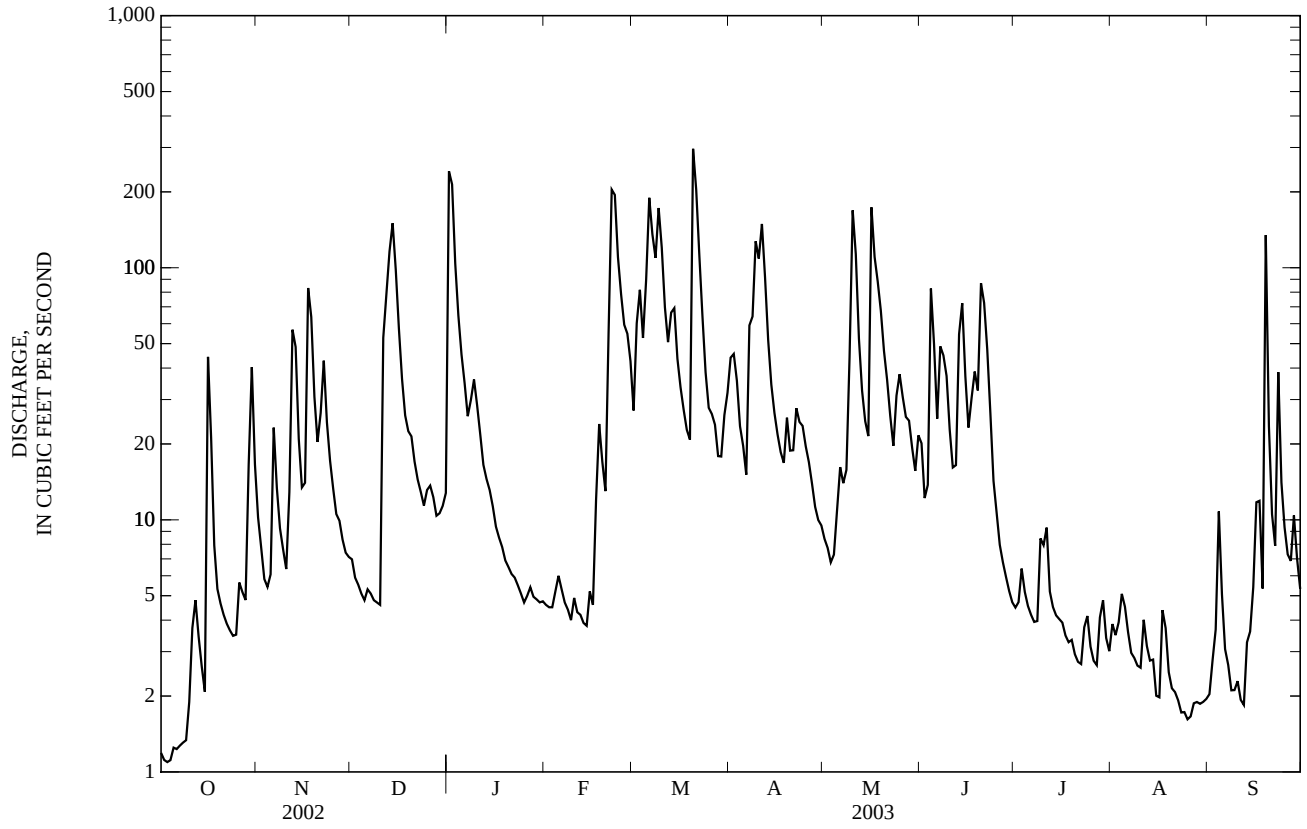
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1989, 1993 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 6.80 | 12.3 | 15.6 | 19.0 | 25.4 | 38.3 | 25.7 | 17.1 | 12.6 | 4.73 | 5.07 | 5.96 |
| 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 | 0.52 | 1.08 | 1.06 | 1.72 | 2.22 | 5.81 | 6.31 | 2.17 | 0.98 | 0.81 | 0.31 | 0.78 |
| (WY) | (1964) | (1966) | (1966) | (1966) | (2002) | (1981) | (1963) | (1969) | (1969) | (1964) | (1999) | (1963) |

01613900 HOGUE CREEK NEAR HAYFIELD, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1960 - 1986, 1993 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 3,468.27 | | 10,007.1 | | | |
| ANNUAL MEAN | 9.50 | | 27.4 | | 15.7 | |
| HIGHEST ANNUAL MEAN | | | | | 32.2 | 1996 |
| LOWEST ANNUAL MEAN | | | | | 3.84 | 1969 |
| HIGHEST DAILY MEAN | 150 | Dec 14 | 296 | Mar 20 | 1,060 | Sep 6, 1996 |
| LOWEST DAILY MEAN | 0.41 | Aug 11 | 1.1 | aOct 2 | 0.06 | Sep 14, 1968 |
| ANNUAL SEVEN-DAY MINIMUM | 0.44 | Aug 9 | 1.2 | bOct 1 | 0.19 | Aug 7, 1999 |
| MAXIMUM PEAK FLOW | | | 784 | Jan 1 | 4,090 | Sep 6, 1996 |
| MAXIMUM PEAK STAGE | | | 4.37 | Jan 1 | 9.71 | Sep 6, 1996 |
| INSTANTANEOUS LOW FLOW | | | 0.97 | Oct 4 | 0.00 | cSep 14, 1968 |
| ANNUAL RUNOFF (CFSM) | 0.63 | | 1.83 | | 1.05 | |
| ANNUAL RUNOFF (INCHES) | 8.60 | | 24.82 | | 14.21 | |
| 10 PERCENT EXCEEDS | 24 | | 71 | | 35 | |
| 50 PERCENT EXCEEDS | 3.0 | | 11 | | 5.2 | |
| 90 PERCENT EXCEEDS | 0.73 | | 2.7 | | 1.2 | |

a Also Oct. 3, 4, 2002.
b Also Oct. 2, 2002.
c No flow part of day, cause unknown.
e Estimated.



## 01614830 OPEQUON CREEK NEAR STEPHENS CITY, VA

LOCATION.--Lat 39°06'32", long 78°12'18", NAD83, Frederick County, Hydrologic Unit Code 02070004, on right bank, 5 ft upstream from U.S. Highway 11, 1.5 mi north of Stephens City.

DRAINAGE AREA.--14.8 $mi^2$.

PERIOD OF RECORD.--December 2000 to current year.

GAGE.--Water stage recorder. Datum of gage is 705 ft NGVD of 1929, from topographic map.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Nov. 22-25, Dec. 25-27, Jan. 22, Mar. 25 to Apr. 4, and Sept. 26, which are fair.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.0 | 4.6 | 6.4 | 50 | 6.9 | 14 | e22 | 14 | 17 | 17 | 13 | 7.4 |
| 2 | 1.7 | 5.7 | 6.0 | 51 | 6.9 | 19 | e19 | 14 | 15 | 17 | 12 | 8.2 |
| 3 | 1.4 | 4.1 | 5.7 | 24 | 6.6 | 23 | e17 | 13 | 15 | 22 | 19 | 13 |
| 4 | 1.2 | 4.0 | 5.5 | 20 | 8.1 | 18 | e16 | 14 | 33 | 18 | 17 | 20 |
| 5 | 1.2 | 4.1 | 5.9 | 16 | 7.3 | 31 | 16 | 14 | 21 | 17 | 14 | 12 |
| 6 | 1.1 | 6.0 | 6.0 | 15 | 6.5 | 96 | 15 | 14 | 17 | 20 | 12 | 9.9 |
| 7 | 1.1 | 5.2 | 5.5 | 14 | 6.7 | 53 | 23 | 13 | 25 | 33 | 12 | 9.1 |
| 8 | 0.93 | 4.6 | 5.0 | 14 | 6.3 | 47 | 20 | 15 | 22 | 18 | 12 | 8.6 |
| 9 | 0.81 | 4.3 | 4.6 | 14 | 6.1 | 76 | 40 | 19 | 21 | 45 | 11 | 8.4 |
| 10 | 1.0 | 4.1 | 4.4 | 12 | 6.2 | 42 | 27 | 32 | 17 | 43 | 11 | 8.2 |
| 11 | 2.1 | 5.7 | 9.7 | 11 | 6.1 | 28 | 49 | 21 | 17 | 39 | 13 | 7.9 |
| 12 | 2.4 | 10 | 20 | 11 | 5.8 | 25 | 28 | 16 | 17 | 25 | 11 | 8.0 |
| 13 | 2.0 | 13 | 51 | 10 | 5.5 | 24 | 22 | 15 | 24 | 26 | 11 | 9.9 |
| 14 | 1.6 | 9.6 | 124 | 10 | 5.5 | 25 | 20 | 14 | 31 | 20 | 10 | 9.3 |
| 15 | 1.5 | 8.0 | 41 | 9.8 | 5.7 | 20 | 19 | 14 | 23 | 19 | 9.9 | 8.6 |
| 16 | 6.5 | 8.2 | 17 | 9.2 | 4.8 | 19 | 18 | 59 | 20 | 18 | 9.6 | 8.2 |
| 17 | 5.7 | 17 | 14 | 9.3 | 5.4 | 19 | 17 | 23 | 24 | 16 | 23 | 7.8 |
| 18 | 4.1 | 15 | 13 | 9.0 | 5.5 | 18 | 17 | 23 | 27 | 16 | 12 | 12 |
| 19 | 3.6 | 12 | 12 | 8.8 | 5.2 | 17 | 21 | 20 | 28 | 15 | 11 | 95 |
| 20 | 3.2 | 11 | 14 | 8.6 | 5.6 | 89 | 18 | 18 | 54 | 14 | 10 | 16 |
| 21 | 3.0 | 12 | 12 | 8.2 | 6.0 | 63 | 17 | 17 | 36 | 14 | 9.5 | 10 |
| 22 | 2.8 | e15 | 11 | e7.7 | 18 | 40 | 20 | 17 | 60 | 13 | 9.1 | 9.8 |
| 23 | 2.5 | e13 | 9.9 | 7.3 | 31 | 27 | 17 | 17 | 28 | 13 | 8.6 | 34 |
| 24 | 2.3 | e11 | 9.6 | 7.0 | 26 | 22 | 16 | 20 | 24 | 13 | 8.3 | 14 |
| 25 | 2.4 | e10 | e10 | 7.0 | 23 | 21 | 16 | 24 | 22 | 12 | 8.3 | 11 |
| 26 | 3.3 | 9.9 | e9.6 | 7.1 | 18 | 20 | 16 | 19 | 20 | 12 | 8.1 | e10 |
| 27 | 2.7 | 9.6 | e8.9 | 6.8 | 16 | 21 | 15 | 18 | 19 | 12 | 8.2 | 9.8 |
| 28 | 2.5 | 8.6 | 8.7 | 6.8 | 15 | 19 | 15 | 20 | 19 | 14 | 8.2 | 10 |
| 29 | 4.0 | 8.1 | 8.8 | 7.0 | --- | e18 | 14 | 18 | 18 | 16 | 7.5 | 9.4 |
| 30 | 6.4 | 7.3 | 9.2 | 6.7 | --- | e19 | 14 | 16 | 17 | 13 | 7.4 | 8.7 |
| 31 | 5.3 | --- | 8.9 | 6.8 | --- | e24 | --- | 16 | --- | 12 | 7.3 | --- |
| TOTAL | 82.34 | 260.7 | 477.3 | 405.1 | 275.7 | 997 | 604 | 587 | 731 | 602 | 344.0 | 414.2 |
| MEAN | 2.66 | 8.69 | 15.4 | 13.1 | 9.85 | 32.2 | 20.1 | 18.9 | 24.4 | 19.4 | 11.1 | 13.8 |
| MAX | 6.5 | 17 | 124 | 51 | 31 | 96 | 49 | 59 | 60 | 45 | 23 | 95 |
| MIN | 0.81 | 4.0 | 4.4 | 6.7 | 4.8 | 14 | 14 | 13 | 15 | 12 | 7.3 | 7.4 |
| CFSM | 0.17 | 0.57 | 1.01 | 0.86 | 0.65 | 2.12 | 1.32 | 1.25 | 1.60 | 1.28 | 0.73 | 0.91 |
| IN. | 0.20 | 0.64 | 1.17 | 0.99 | 0.67 | 2.44 | 1.48 | 1.44 | 1.79 | 1.47 | 0.84 | 1.01 |

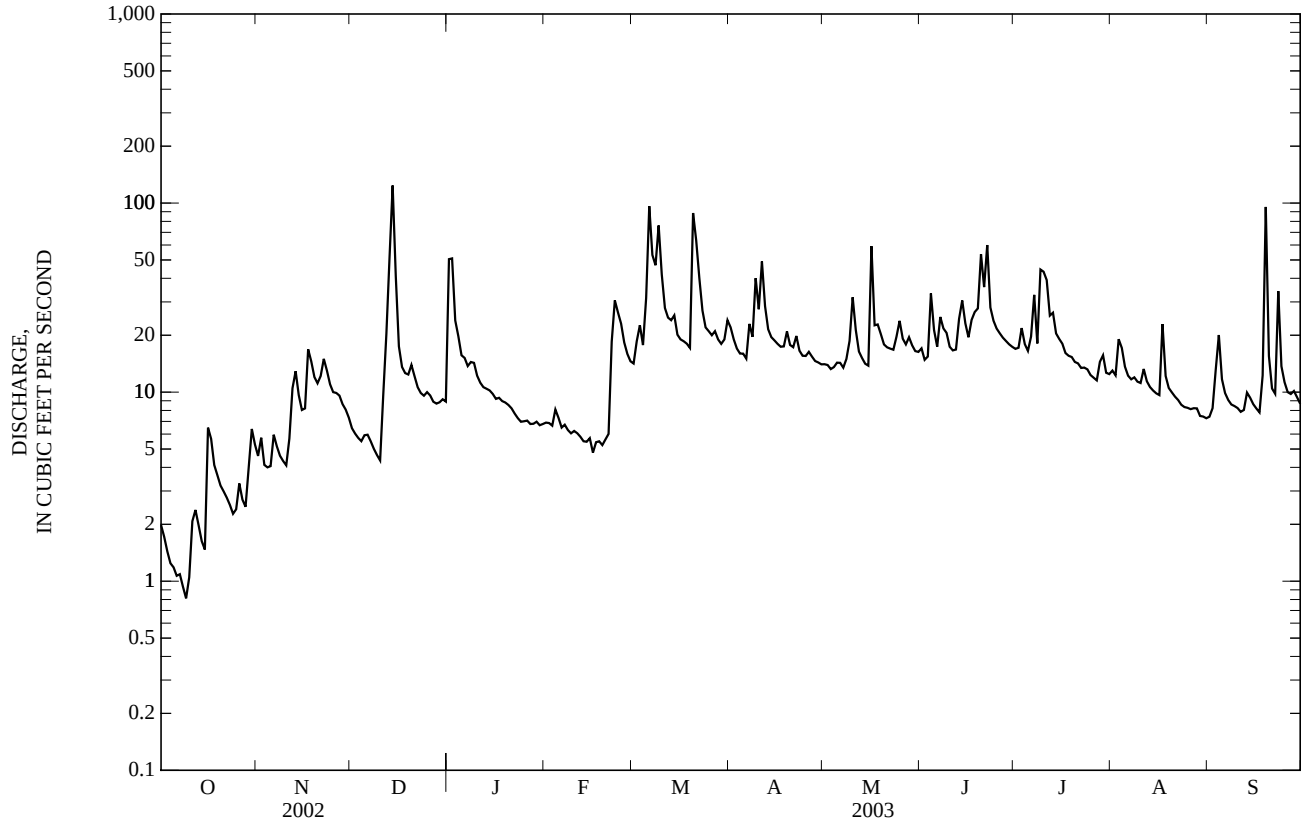
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2001 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 2.34 | 5.38 | 8.83 | 6.14 | 5.37 | 13.6 | 10.4 | 9.82 | 11.4 | 8.43 | 5.22 | 5.99 |
| MAX | 2.66 | 8.69 | 15.4 | 13.1 | 9.85 | 32.2 | 20.1 | 18.9 | 24.4 | 19.4 | 11.1 | 13.8 |
| (WY) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) |
| MIN | 2.03 | 2.07 | 2.26 | 2.04 | 1.72 | 1.61 | 2.08 | 4.97 | 4.75 | 2.54 | 1.19 | 1.73 |
| (WY) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2001) | (2002) | (2002) | (2002) |

01614830 OPEQUON CREEK NEAR STEPHENS CITY, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 2001 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 1,519.17 | | 5,780.34 | | | |
| ANNUAL MEAN | 4.16 | | 15.8 | | 9.14 | |
| HIGHEST ANNUAL MEAN | | | | | 15.8 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 2.45 | 2002 |
| HIGHEST DAILY MEAN | 124 | Dec 14 | 124 | Dec 14 | 124 | Dec 14, 2002 |
| LOWEST DAILY MEAN | 0.79 | Aug 21 | 0.81 | Oct 9 | 0.79 | Aug 21, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.89 | Aug 17 | 1.0 | Oct 4 | 0.89 | Aug 17, 2002 |
| MAXIMUM PEAK FLOW | | | 320 | Sep 19 | 320 | Sep 19, 2003 |
| MAXIMUM PEAK STAGE | | | 6.15 | Sep 19 | 6.15 | Sep 19, 2003 |
| INSTANTANEOUS LOW FLOW | | | 0.47 | Oct 10 | 0.47 | Oct 10, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.27 | | 1.04 | | 0.60 | |
| ANNUAL RUNOFF (INCHES) | 3.72 | | 14.15 | | 8.17 | |
| 10 PERCENT EXCEEDS | 8.9 | | 27 | | 20 | |
| 50 PERCENT EXCEEDS | 2.1 | | 13 | | 4.6 | |
| 90 PERCENT EXCEEDS | 1.1 | | 4.7 | | 1.4 | |

e Estimated.



## 01615000 OPEQUON CREEK NEAR BERRYVILLE, VA

LOCATION.--Lat 39°10'29", long 78°04'42", NAD83, Frederick County, Hydrologic Unit 02070004, on left bank, 1,200 ft upstream of bridge on State Highway 7, 0.4 mi upstream from Abrams Creek, and 5.0 mi west of Berryville.

DRAINAGE AREA.--57.3 $mi^2$.

PERIOD OF RECORD.--October 1943 to September 1997, October 2002 to September 2003.

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

GAGE.--Water stage recorder. Datum of gage is 503.24 ft NGVD of 1929. Prior to July 26, 1949, nonrecording gage, at site 1,200 ft downstream, July 26, 1949 to September 30, 1997, water-stage recorder at same site and datum, and October 15, 2002 to current year, at present site and same datum.

REMARKS.--Records good except those for periods of no gage-height record, Dec. 10-27 and Jan. 5-8, and periods with ice effect, Jan. 16 to Feb. 21, which are fair. Some diurnal fluctuation caused by mills upstream. Records from July 18, 1988 to Sept. 30, 1997 affected by water discharged from treatment plant, which was diverted from another drainage basin for municipal supply. Present location of the gage is upstream from treatment plant and as a result, records after 2003 are no longer affected by this inflow. Statistics of monthly mean data and summary statistics after 2003 reflect unregulated flow only for the period of record. Maximum discharge, 12,600 $ft^3/s$, from rating curve extended above 4,800 $ft^3/s$. 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 October 1942 reached a stage of 18.4 ft, discharge not determined, from information by local residents.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 850 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 1 | 2330 | 1,920 | 9.83 | May 16 | 0900 | 1,600 | 9.05 |
| Feb 22 | 1915 | 1,550 | 8.94 | Jun 20 | 1630 | 1,160 | 7.95 |
| Mar 5 | 2345 | 1,070 | 7.70 | Jun 22 | 0130 | 1,280 | 8.27 |
| Mar 6 | 1845 | 1,210 | 8.09 | Jul 9 | 2400 | 1,110 | 7.82 |
| Mar 20 | 2115 | 1,810 | 9.56 | Sep 19 | 0915 | *2,770 | *11.71 |
| May 10 | 1545 | 983 | 7.48 | Sep 23 | 0830 | 987 | 7.49 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | --- | 72 | 33 | 571 | e21 | 101 | 133 | 34 | 56 | 40 | 34 | 19 |
| 2 | --- | 52 | 30 | 721 | e23 | 207 | 95 | 40 | 44 | 36 | 31 | 27 |
| 3 | --- | 42 | 28 | 247 | e23 | 336 | 75 | 33 | 42 | 58 | 29 | 35 |
| 4 | --- | 35 | 31 | 197 | e27 | 180 | 65 | 34 | 270 | 48 | 63 | 202 |
| 5 | --- | 32 | 80 | e120 | e30 | 337 | 60 | 38 | 309 | 37 | 69 | 68 |
| 6 | --- | 133 | 53 | e100 | e29 | 879 | 53 | 46 | 111 | 35 | 37 | 38 |
| 7 | --- | 71 | 43 | e92 | e28 | 429 | 159 | 38 | 167 | 292 | 31 | 30 |
| 8 | --- | 49 | 27 | e89 | e27 | 317 | 183 | 48 | 167 | 79 | 38 | 26 |
| 9 | --- | 39 | 25 | 97 | e26 | 539 | 447 | 116 | 113 | 262 | 29 | 23 |
| 10 | --- | 35 | e48 | 74 | e26 | 285 | 258 | 444 | 77 | 338 | 27 | 22 |
| 11 | --- | 84 | e90 | 61 | e25 | 153 | 403 | 247 | 60 | 133 | 32 | 20 |
| 12 | --- | 284 | e250 | 52 | e25 | 130 | 202 | 107 | 53 | 71 | 29 | 19 |
| 13 | --- | 234 | e600 | 48 | e24 | 142 | 117 | 72 | 89 | 108 | 25 | 44 |
| 14 | --- | 103 | e1,800 | 45 | e24 | 176 | 89 | 54 | 151 | 59 | 23 | 47 |
| 15 | 15 | 69 | e400 | 42 | e26 | 113 | 75 | 46 | 125 | 49 | 21 | 35 |
| 16 | 329 | 61 | e200 | e42 | e32 | 96 | 64 | 755 | 75 | 43 | 20 | 30 |
| 17 | 187 | 365 | e97 | e41 | e36 | 86 | 55 | 213 | 95 | 37 | 181 | 24 |
| 18 | 69 | 218 | e88 | e40 | e45 | 74 | 51 | 171 | 175 | 36 | 82 | 29 |
| 19 | 44 | 107 | e82 | e37 | e55 | 63 | 86 | 144 | 124 | 37 | 38 | 1,290 |
| 20 | 34 | 77 | e170 | e35 | e45 | 651 | 68 | 95 | 655 | 33 | 29 | 185 |
| 21 | 29 | 102 | e110 | e31 | e55 | 552 | 59 | 75 | 361 | 31 | 25 | 93 |
| 22 | 23 | 187 | e90 | e30 | 760 | 243 | 78 | 66 | 580 | 32 | 22 | 69 |
| 23 | 19 | 96 | e78 | e29 | 672 | 140 | 62 | 60 | 144 | 36 | 21 | 430 |
| 24 | 17 | 67 | e74 | e29 | 330 | 105 | 50 | 109 | 89 | 35 | 18 | 131 |
| 25 | 15 | 55 | e80 | e30 | 259 | 87 | 46 | 147 | 68 | 30 | 18 | 88 |
| 26 | 54 | 47 | e66 | e30 | 175 | 85 | 51 | 103 | 57 | 27 | 18 | 167 |
| 27 | 40 | 45 | e56 | e31 | 130 | 104 | 47 | 85 | 49 | 25 | 18 | 79 |
| 28 | 30 | 41 | 51 | e31 | 110 | 77 | 40 | 94 | 43 | 30 | 18 | 66 |
| 29 | 111 | 37 | 52 | e30 | --- | 70 | 37 | 82 | 40 | 64 | 19 | 57 |
| 30 | 321 | 37 | 62 | e27 | --- | 93 | 35 | 63 | 37 | 34 | 21 | 49 |
| 31 | 135 | --- | 66 | e25 | --- | 136 | --- | 55 | --- | 29 | 18 | --- |
| TOTAL | --- | 2,876 | 4,960 | 3,074 | 3,088 | 6,986 | 3,243 | 3,714 | 4,426 | 2,204 | 1,084 | 3,442 |
| MEAN | --- | 95.9 | 160 | 99.2 | 110 | 225 | 108 | 120 | 148 | 71.1 | 35.0 | 115 |
| MAX | --- | 365 | 1,800 | 721 | 760 | 879 | 447 | 755 | 655 | 338 | 181 | 1,290 |
| MIN | --- | 32 | 25 | 25 | 21 | 63 | 35 | 33 | 37 | 25 | 18 | 19 |
| CFSM | --- | 1.67 | 2.79 | 1.73 | 1.92 | 3.93 | 1.89 | 2.09 | 2.57 | 1.24 | 0.61 | 2.00 |
| IN. | --- | 1.87 | 3.22 | 2.00 | 2.00 | 4.54 | 2.11 | 2.41 | 2.87 | 1.43 | 0.70 | 2.23 |

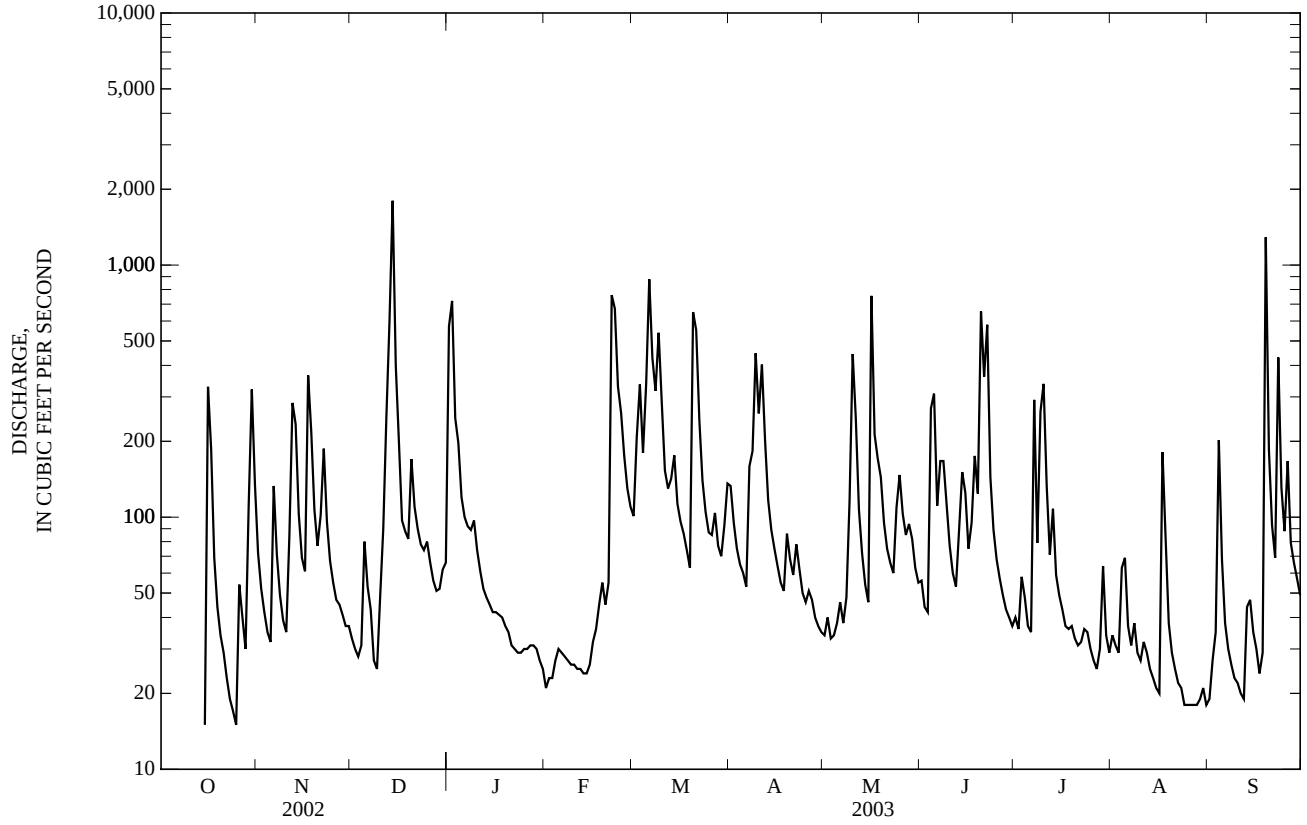
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 1997, 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 29.3 | 35.5 | 52.3 | 60.0 | 71.5 | 92.6 | 64.3 | 48.7 | 38.4 | 22.0 | 23.1 | 26.7 |
| MAX | 186 | 146 | 167 | 288 | 250 | 309 | 254 | 269 | 347 | 120 | 130 | 230 |
| (WY) | (1977) | (1971) | (1973) | (1996) | (1984) | (1993) | (1952) | (1988) | (1972) | (1975) | (1955) | (1996) |
| MIN | 2.67 | 2.61 | 2.83 | 4.63 | 12.0 | 16.8 | 11.0 | 10.3 | 5.58 | 1.87 | 0.92 | 1.32 |
| (WY) | (1966) | (1966) | (1966) | (1966) | (1947) | (1981) | (1947) | (1969) | (1966) | (1966) | (1966) | (1965) |

01615000 OPEQUON CREEK NEAR BERRYVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2003 WATER YEAR | | WATER YEARS 1944 - 1997 2003 | |
|---|---|---|---|---|
| ANNUAL TOTAL | | | | |
| ANNUAL MEAN | | | 46.9 | |
| HIGHEST ANNUAL MEAN | | | 116 | 2003 |
| LOWEST ANNUAL MEAN | | | 14.5 | 1947 |
| HIGHEST DAILY MEAN | 1,800 | Dec 14 | 4,670 | Jun 22, 1972 |
| LOWEST DAILY MEAN | 15 | Oct 15 | 0.20 | aSep 12, 1966 |
| ANNUAL SEVEN-DAY MINIMUM | 19 | Aug 23 | 0.27 | Sep 7, 1966 |
| MAXIMUM PEAK FLOW | 2,770 | Sep 19 | 12,600 | May 18, 1988 |
| MAXIMUM PEAK STAGE | 11.71 | Sep 19 | 13.49 | May 18, 1988 |
| INSTANTANEOUS LOW FLOW | 13 | Oct 15 | 0.20 | Sep 11, 1966 |
| ANNUAL RUNOFF (CFSM) | | | 0.82 | |
| ANNUAL RUNOFF (INCHES) | | | 11.12 | |
| 10 PERCENT EXCEEDS | | | 89 | |
| 50 PERCENT EXCEEDS | | | 19 | |
| 90 PERCENT EXCEEDS | | | 5.4 | |

a Also Sept. 13, 1966.
e Estimated.



## 01616100 DRY MARSH RUN NEAR BERRYVILLE, VA

LOCATION.--Lat 39°11'33", long 78°04'07", NAD83, Clarke County, Hydrologic Unit 02070004, on right bank, 20 ft upstream from bridge on State Highway 645 (Wrights Mill Road), 5.8 mi northwest of Berryville, and 4.5 mi east of Winchester.

DRAINAGE AREA.--11.4 $mi^2$.

PERIOD OF RECORD.--August 2002 to current year.

GAGE.--Water stage recorder. Elevation of gage is 540 ft NGVD of 1929, from topographic map.

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

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.8 |
| 2 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.7 |
| 3 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.7 |
| 4 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.8 |
| 5 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.7 |
| 6 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.7 |
| 7 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.7 |
| 8 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.7 |
| 9 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.7 |
| 10 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.6 |
| 11 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.6 |
| 12 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.7 |
| 13 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.6 |
| 14 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.6 |
| 15 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.6 |
| 16 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.6 |
| 17 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.5 |
| 18 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.5 |
| 19 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.5 |
| 20 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.4 |
| 21 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.4 |
| 22 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 2.1 | 1.5 |
| 23 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 2.1 | 1.5 |
| 24 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 2.2 | 1.4 |
| 25 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 2.1 | 1.4 |
| 26 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 2.0 | 1.6 |
| 27 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.9 | 2.1 |
| 28 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 2.0 | 2.1 |
| 29 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.9 | 2.1 |
| 30 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.9 | 2.0 |
| 31 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.8 | --- |
| TOTAL | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 49.8 |
| MEAN | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.66 |
| MAX | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 2.1 |
| MIN | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.4 |
| CFSM | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 0.15 |
| IN. | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 0.16 |

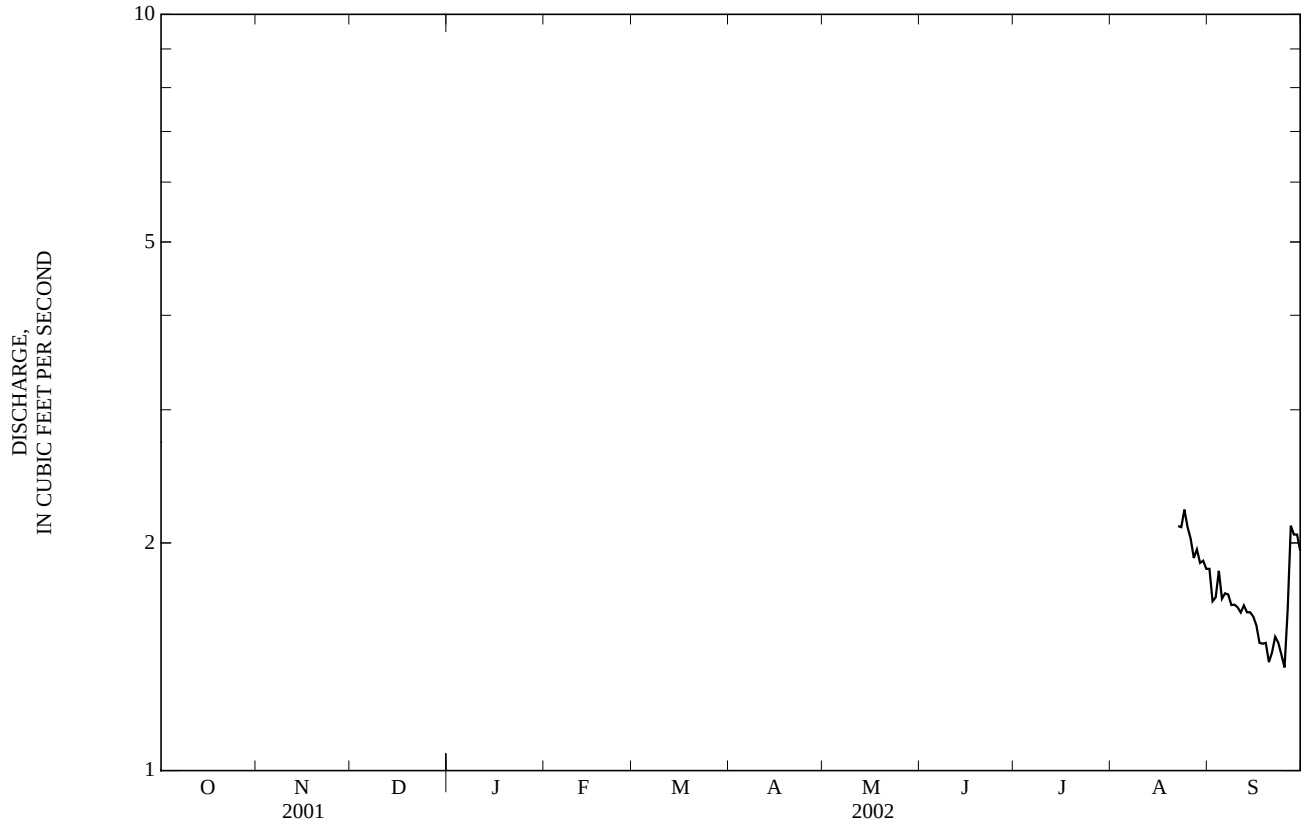
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEAR 2002

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.66 |
| MAX | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.66 |
| (WY) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | (2002) |
| MIN | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.66 |
| (WY) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | (2002) |

01616100 DRY MARSH RUN NEAR BERRYVILLE, VA—Continued

| SUMMARY STATISTICS | FOR WATER YEAR 2002 | |
|---|---|---|
| HIGHEST DAILY MEAN | 2.2 | Aug 24 |
| LOWEST DAILY MEAN | 1.4 | aSep 20 |
| ANNUAL SEVEN-DAY MINIMUM | 1.4 | Sep 19 |
| MAXIMUM PEAK FLOW | 2.5 | Sep 27 |
| MAXIMUM PEAK STAGE | 1.36 | Aug 21 |
| INSTANTANEOUS LOW FLOW | 1.3 | bSep 18 |

a Also Sept. 21, 24, 25, 2002.
b Also Sept. 20, 21, 24-26, 2002.



01616100 DRY MARSH RUN NEAR BERRYVILLE, VA—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.9 | 4.9 | 7.2 | 29 | 12 | 24 | 29 | 15 | 21 | 19 | 11 | 6.0 |
| 2 | 1.8 | 4.6 | 7.1 | 66 | 12 | 27 | 28 | 15 | 20 | 18 | 10 | 6.6 |
| 3 | 1.7 | 4.4 | 6.5 | 37 | 11 | 38 | 27 | 14 | 20 | 20 | 9.8 | 6.4 |
| 4 | 1.7 | 4.4 | 6.4 | 33 | 13 | 33 | 26 | 15 | 32 | 18 | 9.8 | 7.7 |
| 5 | 1.7 | 4.3 | 6.9 | 29 | 12 | 35 | 25 | 15 | 41 | 17 | 10 | 7.0 |
| 6 | 1.7 | 4.5 | 6.6 | 27 | 11 | 71 | 24 | 15 | 32 | 15 | 9.3 | 6.4 |
| 7 | 1.7 | 4.4 | 6.5 | 24 | 11 | 72 | 28 | 14 | 33 | 16 | 9.3 | 6.0 |
| 8 | 1.6 | 4.4 | 6.4 | 23 | 11 | 58 | 30 | 15 | 39 | 15 | 9.7 | 6.0 |
| 9 | 1.5 | 4.4 | 6.1 | 22 | 10 | 118 | 47 | 16 | 32 | 17 | 9.1 | 6.3 |
| 10 | 1.5 | 4.6 | 6.2 | 21 | 11 | 80 | 49 | 19 | 27 | 20 | 8.5 | 6.1 |
| 11 | 1.6 | 4.9 | 9.8 | 19 | 11 | 53 | 50 | 21 | 24 | 17 | 8.4 | 6.0 |
| 12 | 1.8 | 5.7 | 16 | 18 | 11 | 47 | 44 | 18 | 23 | 15 | 8.1 | 5.9 |
| 13 | 1.7 | 6.8 | 24 | 18 | 11 | 43 | 35 | 17 | 24 | 15 | 8.0 | 6.8 |
| 14 | 1.6 | 6.5 | 38 | 17 | 10 | 44 | 31 | 16 | 23 | 15 | 8.2 | 6.8 |
| 15 | 1.5 | 6.0 | 31 | 16 | 11 | 39 | 29 | 16 | 22 | 15 | 8.4 | 6.8 |
| 16 | 3.1 | 5.8 | 25 | 16 | 9.8 | 36 | 27 | 62 | 20 | 15 | 8.3 | 7.1 |
| 17 | 4.1 | 8.5 | 21 | 15 | 9.7 | 33 | 25 | 42 | 20 | 14 | 8.0 | 6.3 |
| 18 | 3.6 | 8.1 | 20 | 14 | 11 | 31 | 23 | 34 | 21 | 14 | 8.0 | 6.6 |
| 19 | 3.2 | 7.6 | 19 | 14 | 11 | 28 | 24 | 30 | 21 | 14 | 7.8 | 24 |
| 20 | 3.0 | 7.0 | 19 | 14 | 11 | 60 | 22 | 26 | 33 | 13 | 7.5 | 18 |
| 21 | 3.0 | 6.9 | 17 | 13 | 12 | 78 | 21 | 25 | 57 | 13 | 7.2 | 14 |
| 22 | 3.0 | 7.6 | 15 | 13 | 23 | 50 | 21 | 23 | 149 | 12 | 6.9 | 12 |
| 23 | 3.0 | 7.5 | 14 | 12 | 37 | 41 | 19 | 22 | 54 | 13 | 6.8 | 21 |
| 24 | 3.0 | 8.3 | 14 | 12 | 36 | 35 | 18 | 26 | 38 | 13 | 6.4 | 19 |
| 25 | 3.0 | 8.8 | 15 | 12 | 33 | 32 | 18 | 42 | 32 | 12 | 6.4 | 17 |
| 26 | 3.4 | 8.8 | 13 | 12 | 31 | 31 | 18 | 35 | 28 | 11 | 6.2 | 17 |
| 27 | 3.3 | 8.9 | 12 | 11 | 28 | 30 | 17 | 30 | 25 | 11 | 6.2 | 16 |
| 28 | 3.3 | 8.9 | 12 | 11 | 25 | 28 | 16 | 28 | 23 | 12 | 6.0 | 15 |
| 29 | 3.8 | 9.1 | 12 | 11 | --- | 27 | 16 | 26 | 21 | 12 | 6.0 | 14 |
| 30 | 5.0 | 7.9 | 11 | 11 | --- | 28 | 15 | 24 | 20 | 10 | 6.0 | 13 |
| 31 | 5.0 | --- | 12 | 11 | --- | 29 | --- | 23 | --- | 10 | 5.7 | --- |
| TOTAL | 80.8 | 194.5 | 435.7 | 601 | 445.5 | 1,379 | 802 | 739 | 975 | 451 | 247.0 | 316.8 |
| MEAN | 2.61 | 6.48 | 14.1 | 19.4 | 15.9 | 44.5 | 26.7 | 23.8 | 32.5 | 14.5 | 7.97 | 10.6 |
| MAX | 5.0 | 9.1 | 38 | 66 | 37 | 118 | 50 | 62 | 149 | 20 | 11 | 24 |
| MIN | 1.5 | 4.3 | 6.1 | 11 | 9.7 | 24 | 15 | 14 | 20 | 10 | 5.7 | 5.9 |
| CFSM | 0.23 | 0.57 | 1.23 | 1.70 | 1.40 | 3.90 | 2.35 | 2.09 | 2.85 | 1.28 | 0.70 | 0.93 |
| IN. | 0.26 | 0.63 | 1.42 | 1.96 | 1.45 | 4.50 | 2.62 | 2.41 | 3.18 | 1.47 | 0.81 | 1.03 |

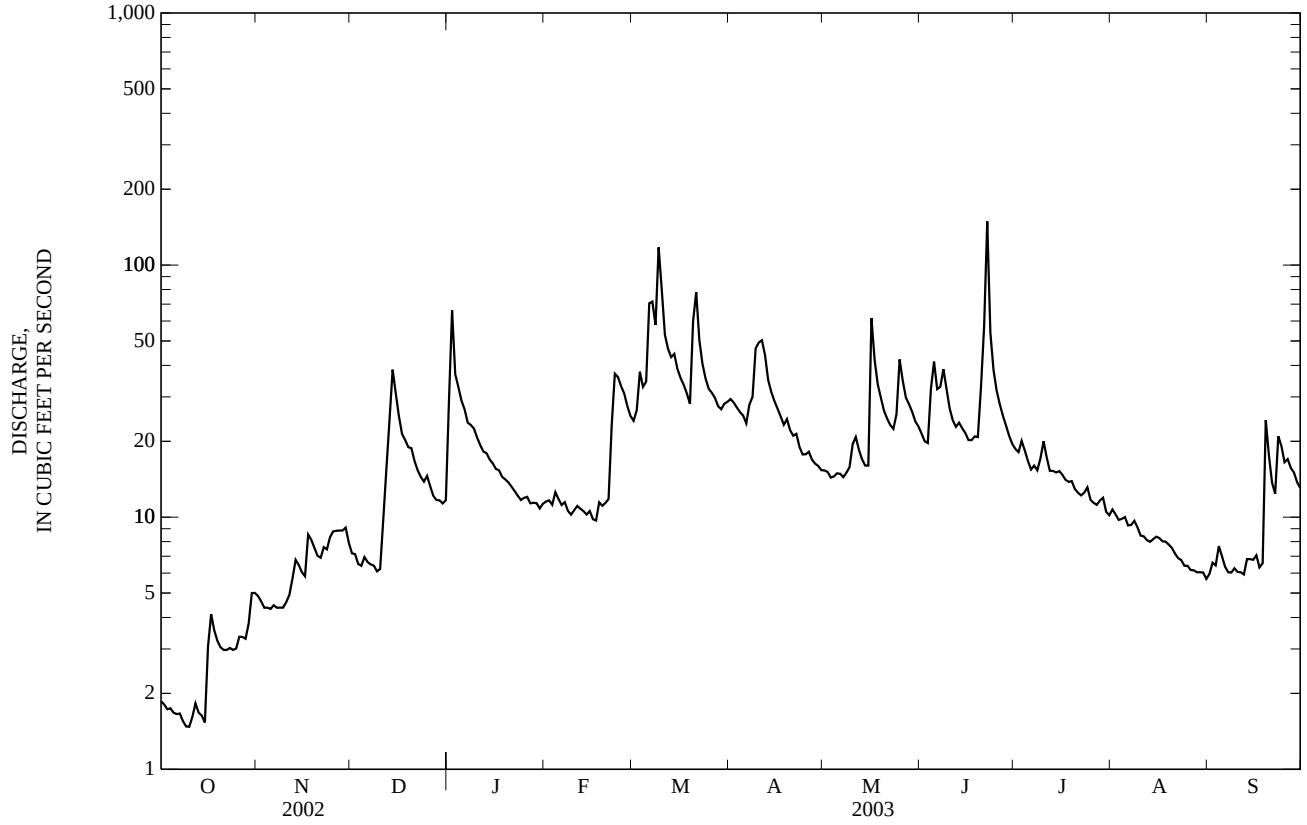
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2002 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 2.61 | 6.48 | 14.1 | 19.4 | 15.9 | 44.5 | 26.7 | 23.8 | 32.5 | 14.5 | 7.97 | 6.11 |
| MAX | 2.61 | 6.48 | 14.1 | 19.4 | 15.9 | 44.5 | 26.7 | 23.8 | 32.5 | 14.5 | 7.97 | 10.6 |
| (WY) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) |
| MIN | 2.61 | 6.48 | 14.1 | 19.4 | 15.9 | 44.5 | 26.7 | 23.8 | 32.5 | 14.5 | 7.97 | 1.66 |
| (WY) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2002) |

01616100 DRY MARSH RUN NEAR BERRYVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2003 WATER YEAR | | WATER YEARS 2002 - 2003 | |
|---|---|---|---|---|
| ANNUAL TOTAL | 6,667.3 | | | |
| ANNUAL MEAN | 18.3 | | 18.3 | |
| HIGHEST ANNUAL MEAN | | | 18.3 | 2003 |
| LOWEST ANNUAL MEAN | | | 18.3 | 2003 |
| HIGHEST DAILY MEAN | 149 | Jun 22 | 149 | Jun 22, 2003 |
| LOWEST DAILY MEAN | 1.5 | aOct 9 | 1.4 | bSep 20, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 1.6 | Oct 9 | 1.4 | Sep 19, 2002 |
| MAXIMUM PEAK FLOW | 274 | Jun 22 | 274 | Jun 22, 2003 |
| MAXIMUM PEAK STAGE | 3.31 | Jun 22 | 3.31 | Jun 22, 2003 |
| INSTANTANEOUS LOW FLOW | c1.4 | Oct 15 | 1.3 | dSep 18, 2002 |
| ANNUAL RUNOFF (CFSM) | 1.60 | | 1.60 | |
| ANNUAL RUNOFF (INCHES) | 21.76 | | 21.77 | |
| 10 PERCENT EXCEEDS | 35 | | 35 | |
| 50 PERCENT EXCEEDS | 14 | | 14 | |
| 90 PERCENT EXCEEDS | 4.6 | | 4.6 | |

a Also Oct. 10, 15, 2002.
b Also Sept. 21, 24, 25, 2002.
c Observed.
d Also Sept. 20, 21, 24-26, 2002.



## 01620500 NORTH RIVER NEAR STOKESVILLE, VA

LOCATION.--Lat 38°20'15", long 79°14'24", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to June 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 good except those for periods of doubtful or no gage-height record, Oct. 2-4, 19-25, Dec. 18, 27-31, Jan. 3-7, 11-14, Jan. 22 to Mar. 7, June 21, 22, and Aug. 7-14, which are poor. Maximum discharge, 9,530 $ft^3/s$, from rating curve extended above 900 $ft^3/s$ on basis of computation of peak flow over dam at site 2.8 mi downstream. 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 200 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Dec 20 | 1330 | 382 | 3.62 | Jun 18 | 0515 | 245 | 3.27 |
| Mar 21 | 0245 | 255 | 3.30 | Sep 19 | 0330 | *2,080 | *5.63 |
| Apr 10 | 0445 | 228 | 3.22 | Sep 23 | 1215 | 216 | 2.79 |
| May 10 | 0130 | 228 | 3.22 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 13 | 68 | 21 | 46 | e6.8 | e70 | 34 | 38 | 18 | 14 | 3.9 | 4.1 |
| 2 | e10 | 51 | 18 | 109 | e6.6 | e110 | 67 | 32 | 15 | 15 | 3.8 | 12 |
| 3 | e8.2 | 39 | 16 | e88 | e6.6 | e130 | 78 | 29 | 18 | 19 | 3.9 | 30 |
| 4 | e7.0 | 32 | 14 | e70 | e7.0 | e100 | 68 | 53 | 53 | 17 | 4.7 | 31 |
| 5 | e5.8 | 28 | 14 | e58 | e7.6 | e130 | 55 | 79 | 92 | 14 | 5.2 | 39 |
| 6 | 5.2 | 54 | 13 | e50 | e7.4 | e200 | 45 | 80 | 79 | 12 | 5.3 | 32 |
| 7 | 4.7 | 58 | 12 | e42 | e7.2 | e150 | 66 | 71 | 69 | 10 | e4.7 | 24 |
| 8 | 4.2 | 50 | 11 | 38 | e7.2 | 116 | 88 | 57 | 71 | 9.8 | e4.5 | 18 |
| 9 | 3.8 | 43 | 11 | 34 | e7.0 | 97 | 162 | 106 | 91 | 9.5 | e16 | 14 |
| 10 | 3.7 | 36 | 9.9 | 30 | e6.8 | 91 | 208 | 193 | 84 | 13 | e14 | 12 |
| 11 | 4.1 | 47 | 14 | e26 | e6.8 | 78 | 200 | 123 | 64 | 18 | e13 | 10 |
| 12 | 3.7 | 96 | 23 | e22 | e6.6 | 65 | 158 | 85 | 52 | 19 | e94 | 9.0 |
| 13 | 3.8 | 168 | 34 | e19 | e6.2 | 60 | 121 | 64 | 89 | 18 | e52 | 9.3 |
| 14 | 3.8 | 111 | 49 | e18 | e6.8 | 73 | 90 | 47 | 130 | 18 | e40 | 9.1 |
| 15 | 3.7 | 76 | 53 | 17 | e7.6 | 72 | 68 | 38 | 101 | 16 | 32 | 8.4 |
| 16 | 32 | 60 | 49 | 15 | e8.6 | 62 | 53 | 32 | 81 | 14 | 24 | 7.9 |
| 17 | 79 | 72 | 42 | 14 | e11 | 54 | 43 | 27 | 123 | 13 | 18 | 7.1 |
| 18 | 56 | 83 | e36 | 13 | e12 | 51 | 38 | 81 | 224 | 12 | 14 | 12 |
| 19 | e40 | 75 | 34 | 12 | e11 | 46 | 41 | 176 | 151 | 10 | 12 | 1,140 |
| 20 | e30 | 62 | 265 | 11 | e15 | 106 | 45 | 123 | 119 | 8.9 | 10 | 315 |
| 21 | e23 | 55 | 201 | 10 | e30 | 226 | 46 | 91 | e100 | 7.7 | 8.5 | 145 |
| 22 | e19 | 60 | 114 | e9.6 | e300 | 142 | 43 | 76 | e92 | 6.9 | 7.3 | 90 |
| 23 | e17 | 62 | 78 | e9.4 | e820 | 96 | 37 | 67 | 72 | 6.4 | 6.4 | 192 |
| 24 | e15 | 55 | 60 | e9.2 | e370 | 72 | 32 | 59 | 52 | 5.9 | 5.8 | 149 |
| 25 | e13 | 47 | 50 | e9.0 | e220 | 55 | 28 | 50 | 39 | 5.4 | 5.1 | 91 |
| 26 | 14 | 39 | 39 | e8.6 | e150 | 46 | 32 | 42 | 29 | 4.8 | 4.5 | 61 |
| 27 | 16 | 34 | e34 | e8.2 | e110 | 38 | 48 | 35 | 24 | 4.4 | 4.3 | 47 |
| 28 | 18 | 29 | e24 | e8.0 | e66 | 32 | 54 | 30 | 20 | 3.9 | 4.5 | 51 |
| 29 | 41 | 25 | e23 | e7.6 | --- | 30 | 51 | 26 | 18 | 3.8 | 4.0 | 42 |
| 30 | 136 | 23 | e21 | e7.4 | --- | 31 | 45 | 22 | 15 | 3.7 | 4.0 | 36 |
| 31 | 98 | --- | e20 | e7.0 | --- | 31 | --- | 20 | --- | 3.7 | 3.7 | --- |
| TOTAL | 731.7 | 1,738 | 1,402.9 | 826.0 | 2,227.8 | 2,660 | 2,144 | 2,052 | 2,185 | 336.8 | 433.1 | 2,647.9 |
| MEAN | 23.6 | 57.9 | 45.3 | 26.6 | 79.6 | 85.8 | 71.5 | 66.2 | 72.8 | 10.9 | 14.0 | 88.3 |
| MAX | 136 | 168 | 265 | 109 | 820 | 226 | 208 | 193 | 224 | 19 | 94 | 1,140 |
| MIN | 3.7 | 23 | 9.9 | 7.0 | 6.2 | 30 | 28 | 20 | 15 | 3.7 | 3.7 | 4.1 |
| CFSM | 1.37 | 3.37 | 2.63 | 1.55 | 4.63 | 4.99 | 4.16 | 3.85 | 4.23 | 0.63 | 0.81 | 5.13 |
| IN. | 1.58 | 3.76 | 3.03 | 1.79 | 4.82 | 5.75 | 4.64 | 4.44 | 4.73 | 0.73 | 0.94 | 5.73 |

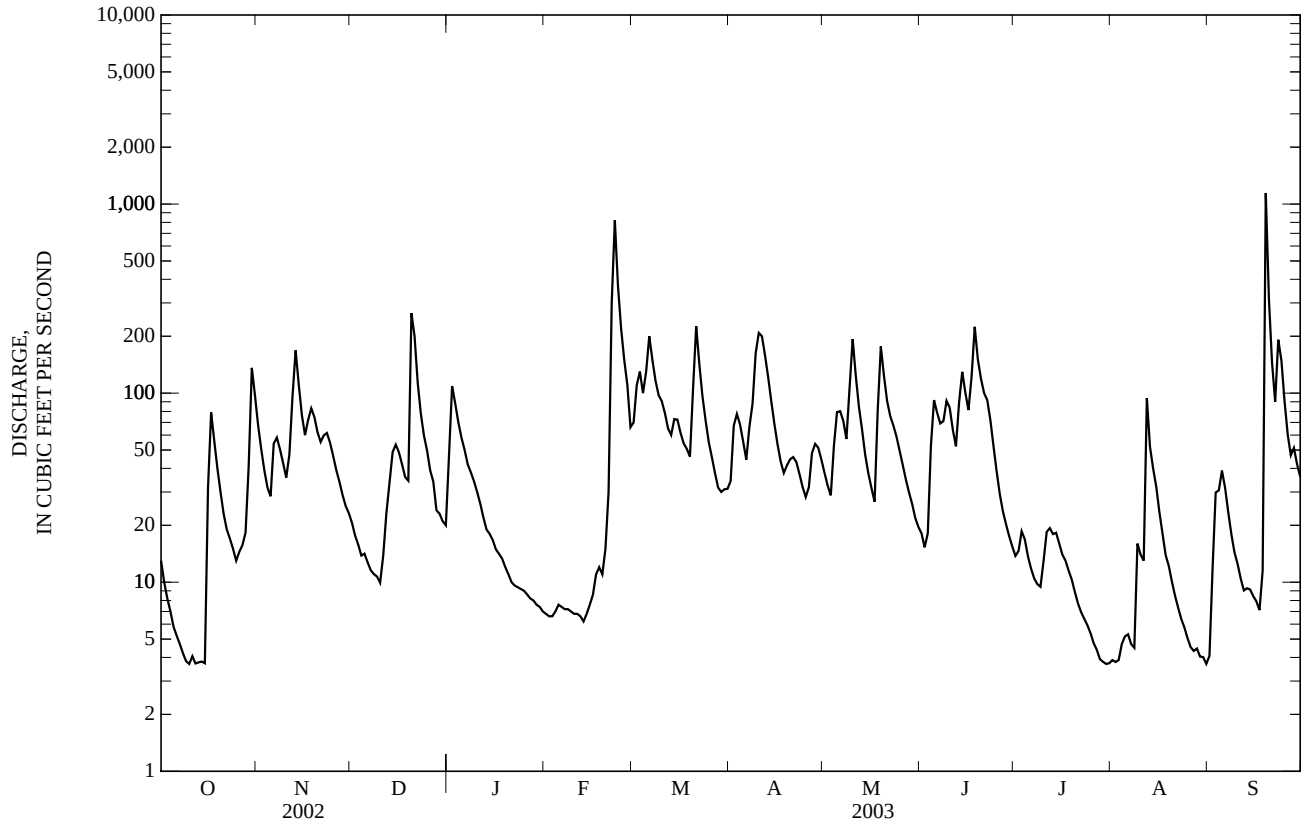
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 13.6 | 26.3 | 27.0 | 33.5 | 36.6 | 56.9 | 47.1 | 35.0 | 24.3 | 7.16 | 8.61 | 11.8 |
| 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 | 0.21 | 0.41 | 0.71 | 0.74 | 3.67 | 8.21 | 11.1 | 5.32 | 1.65 | 0.76 | 0.26 | 0.25 |
| (WY) | (1964) | (1954) | (1999) | (1981) | (2002) | (1981) | (1999) | (1977) | (1999) | (1999) | (1987) | (1963) |

01620500 NORTH RIVER NEAR STOKESVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1947 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 7,652.21 | | 19,385.2 | | | |
| ANNUAL MEAN | 21.0 | | 53.1 | | 27.3 | |
| HIGHEST ANNUAL MEAN | | | | | 53.1 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 9.52 | 1999 |
| HIGHEST DAILY MEAN | 314 | Apr 22 | 1,140 | Sep 19 | 3,300 | Nov 5, 1985 |
| LOWEST DAILY MEAN | 0.24 | aSep 11 | 3.7 | bOct 10 | 0.10 | cSep 15, 1962 |
| ANNUAL SEVEN-DAY MINIMUM | 0.26 | Sep 9 | 3.8 | Oct 9 | 0.12 | Sep 29, 1968 |
| MAXIMUM PEAK FLOW | | | 2,080 | Sep 19 | 9,530 | Jun 17, 1949 |
| MAXIMUM PEAK STAGE | | | 5.63 | Sep 19 | d19.80 | Nov 5, 1985 |
| INSTANTANEOUS LOW FLOW | | | 3.5 | fOct 12 | 0.10 | gSep 15, 1962 |
| ANNUAL RUNOFF (CFSM) | 1.22 | | 3.09 | | 1.58 | |
| ANNUAL RUNOFF (INCHES) | 16.55 | | 41.93 | | 21.53 | |
| 10 PERCENT EXCEEDS | 55 | | 112 | | 61 | |
| 50 PERCENT EXCEEDS | 5.4 | | 32 | | 12 | |
| 90 PERCENT EXCEEDS | 1.2 | | 6.1 | | 1.1 | |

a Also Sept. 13, 14, 2002.
b Also Oct. 12, 15, 2002, and July 30, 31, Aug. 31, 2003.
c Also Sept. 16, 19-22, 1962, and Sept. 9, 11, 12, 1966.
d From floodmarks, backwater from Elkhorn Lake.
e Estimated.
f Also Aug. 2, 3, and Sept. 1, 2003.
d Also Sept. 16, 19-22, 1962, and Sept. 7-13, 1966.



## 01621050 MUDDY CREEK AT MOUNT CLINTON, VA

LOCATION.--Lat 38°29'12", long 78°57'37", NAD83, Rockingham County, Hydrologic Unit 02070005, on right downstream side of bridge on State Highway 726, at Mount Clinton.

DRAINAGE AREA.--14.2 $mi^2$.

### WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Elevation of gage is 1,320 ft NGVD of 1929, from topographic map.

REMARKS.--Records good except for period with ice effect, Feb, 13-19, which is fair. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 150 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1700 | 188 | 4.21 | Jun 20 | 1145 | 490 | 5.17 |
| Mar 2 | 1845 | 168 | 4.12 | Jul 6 | 2245 | 2,450 | 8.55 |
| Mar 5 | 1700 | 313 | 4.67 | Jul 8 | 1130 | 172 | 4.14 |
| Mar 20 | 1600 | 433 | 5.01 | Jul 9 | 1700 | 170 | 4.13 |
| Apr 11 | 0215 | 277 | 4.55 | Aug 5 | 2030 | 192 | 4.23 |
| Jun 4 | 2300 | 157 | 4.07 | Aug 9 | 2030 | 209 | 4.30 |
| Jun 13 | 1915 | 216 | 4.33 | Sep 2 | 1630 | 195 | 4.24 |
| Jun 18 | 2330 | 190 | 4.22 | Sep 19 | 0315 | *2,550 | *8.68 |
| Jun 19 | 2230 | 603 | 5.46 | Sep 23 | 0145 | 190 | 4.22 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.72 | 11 | 11 | 46 | 7.4 | 24 | 22 | 14 | 14 | 18 | 12 | 17 |
| 2 | 0.65 | 10 | 11 | 35 | 7.1 | 69 | 20 | 13 | 13 | 19 | 13 | 37 |
| 3 | 0.62 | 9.6 | 10 | 37 | 6.9 | 59 | 18 | 13 | 15 | 54 | 13 | 20 |
| 4 | 0.59 | 9.1 | 9.9 | 29 | 7.6 | 49 | 17 | 19 | 37 | 26 | 13 | 19 |
| 5 | 0.55 | 9.5 | 10 | 25 | 6.8 | 125 | 17 | 17 | 48 | 22 | 31 | 15 |
| 6 | 0.51 | 14 | 9.7 | 23 | 6.5 | 81 | 15 | 15 | 25 | 286 | 20 | 13 |
| 7 | 0.49 | 11 | 9.3 | 20 | 6.8 | 51 | 34 | 14 | 39 | 158 | 14 | 12 |
| 8 | 0.49 | 9.7 | 9.0 | 19 | 6.0 | 39 | 27 | 13 | 34 | 64 | 13 | 12 |
| 9 | 0.49 | 9.2 | 8.6 | 17 | 5.7 | 34 | 54 | 18 | 39 | 54 | 38 | 11 |
| 10 | 0.55 | 8.9 | 8.1 | 16 | 6.0 | 28 | 40 | 27 | 27 | 40 | 28 | 11 |
| 11 | 3.8 | 14 | 15 | 14 | 5.6 | 26 | 101 | 30 | 24 | 38 | 49 | 10 |
| 12 | 3.2 | 30 | 18 | 13 | 5.3 | 24 | 45 | 21 | 22 | 29 | 28 | 10 |
| 13 | 1.3 | 22 | 27 | 13 | e5.2 | 23 | 34 | 18 | 48 | 25 | 21 | 10 |
| 14 | 0.88 | 16 | 36 | 12 | e5.0 | 21 | 29 | 16 | 35 | 24 | 18 | 10 |
| 15 | 0.74 | 14 | 28 | 12 | e4.9 | 19 | 26 | 16 | 28 | 22 | 16 | 9.7 |
| 16 | 8.8 | 15 | 24 | 11 | e4.8 | 19 | 24 | 21 | 31 | 20 | 15 | 9.2 |
| 17 | 8.2 | 27 | 21 | 11 | e4.8 | 18 | 22 | 17 | 52 | 18 | 14 | 8.8 |
| 18 | 5.9 | 20 | 19 | 11 | e4.9 | 17 | 24 | 56 | 64 | 17 | 13 | 27 |
| 19 | 4.6 | 16 | 17 | 10 | e5.0 | 16 | 27 | 47 | 128 | 17 | 13 | 697 |
| 20 | 3.5 | 15 | 46 | 10 | 5.5 | 138 | 22 | 32 | 186 | 15 | 12 | 69 |
| 21 | 3.0 | 16 | 27 | 10 | 6.5 | 67 | 21 | 30 | 74 | 15 | 12 | 44 |
| 22 | 2.4 | 19 | 22 | 9.3 | 84 | 41 | 20 | 26 | 47 | 14 | 12 | 39 |
| 23 | 2.0 | 15 | 19 | 8.8 | 118 | 33 | 18 | 24 | 36 | 14 | 11 | 83 |
| 24 | 1.8 | 14 | 18 | 8.9 | 61 | 28 | 17 | 22 | 30 | 15 | 11 | 38 |
| 25 | 1.8 | 14 | 20 | 8.5 | 45 | 25 | 17 | 20 | 26 | 13 | 10 | 32 |
| 26 | 6.0 | 13 | 17 | 8.2 | 32 | 24 | 18 | 19 | 24 | 12 | 10 | 29 |
| 27 | 3.5 | 13 | 15 | 8.0 | 27 | 21 | 16 | 18 | 22 | 12 | 9.8 | 32 |
| 28 | 5.1 | 12 | 15 | 7.7 | 24 | 20 | 15 | 18 | 20 | 12 | 10 | 34 |
| 29 | 16 | 12 | 14 | 7.8 | --- | 20 | 14 | 17 | 19 | 12 | 10 | 25 |
| 30 | 19 | 12 | 14 | 7.5 | --- | 23 | 14 | 15 | 18 | 11 | 9.2 | 22 |
| 31 | 12 | --- | 14 | 7.4 | --- | 23 | --- | 15 | --- | 11 | 9.1 | --- |
| TOTAL | 119.18 | 431.0 | 542.6 | 476.1 | 515.3 | 1,205 | 788 | 661 | 1,225 | 1,107 | 508.1 | 1,405.7 |
| MEAN | 3.84 | 14.4 | 17.5 | 15.4 | 18.4 | 38.9 | 26.3 | 21.3 | 40.8 | 35.7 | 16.4 | 46.9 |
| MAX | 19 | 30 | 46 | 46 | 118 | 138 | 101 | 56 | 186 | 286 | 49 | 697 |
| MIN | 0.49 | 8.9 | 8.1 | 7.4 | 4.8 | 16 | 14 | 13 | 13 | 11 | 9.1 | 8.8 |
| CFSM | 0.27 | 1.01 | 1.23 | 1.08 | 1.30 | 2.74 | 1.85 | 1.50 | 2.88 | 2.51 | 1.15 | 3.30 |
| IN. | 0.31 | 1.13 | 1.42 | 1.25 | 1.35 | 3.16 | 2.06 | 1.73 | 3.21 | 2.90 | 1.33 | 3.68 |

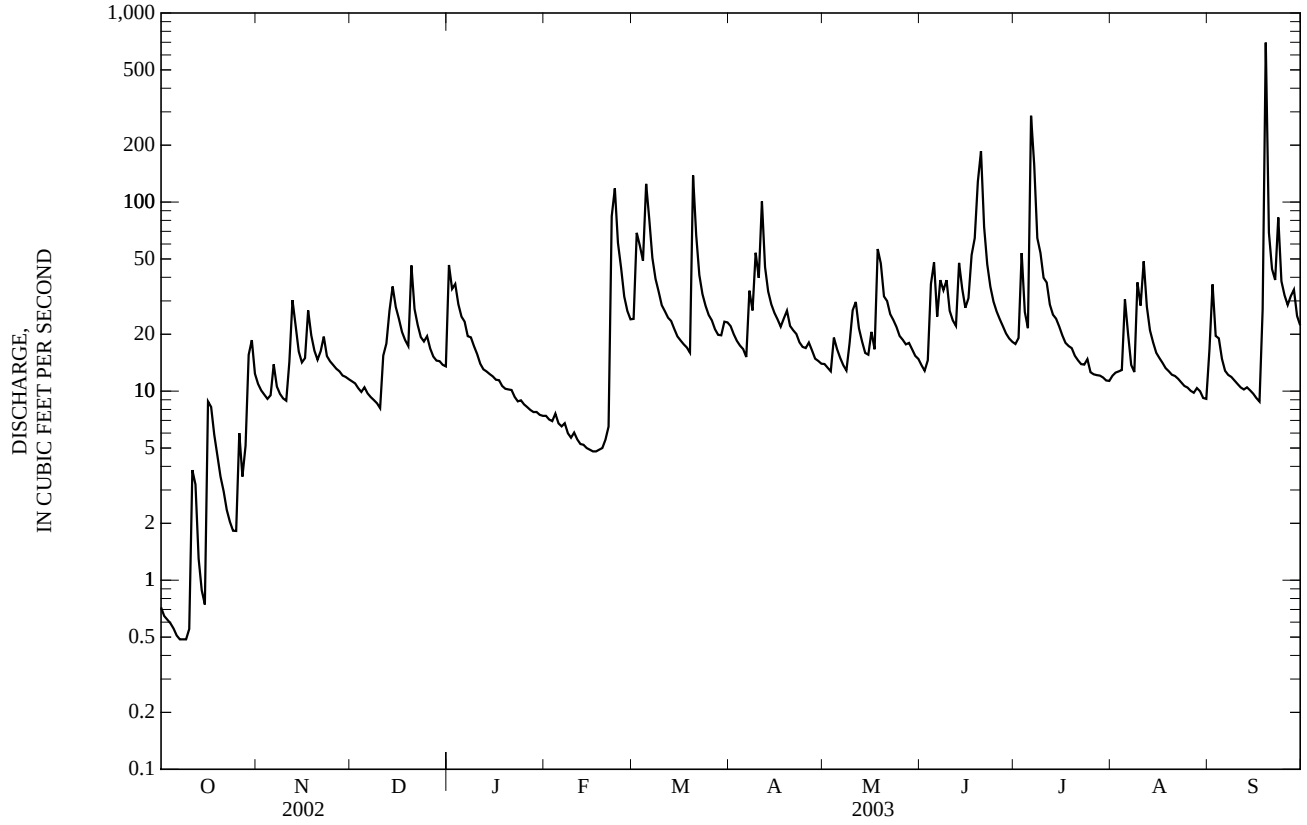
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1993 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 6.09 | 6.31 | 8.78 | 16.3 | 16.6 | 19.8 | 12.0 | 10.4 | 11.9 | 8.91 | 8.15 | 16.2 |
| MAX | 22.1 | 19.3 | 37.5 | 66.9 | 63.5 | 44.0 | 26.3 | 22.7 | 40.8 | 35.7 | 33.8 | 105 |
| (WY) | (1996) | (1997) | (1997) | (1996) | (1998) | (1998) | (2003) | (1998) | (2003) | (2003) | (1996) | (1996) |
| MIN | 0.96 | 0.92 | 0.96 | 0.73 | 0.59 | 0.81 | 2.64 | 2.30 | 1.01 | 1.20 | 0.97 | 0.71 |
| (WY) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (1999) | (1999) | (1999) | (1999) | (2002) | (2001) |

01621050 MUDDY CREEK AT MOUNT CLINTON, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1993 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 1,707.66 | | 8,983.98 | | | |
| ANNUAL MEAN | 4.68 | | 24.6 | | 12.0 | |
| HIGHEST ANNUAL MEAN | | | | | 30.0 | 1996 |
| LOWEST ANNUAL MEAN | | | | | 1.92 | 2002 |
| HIGHEST DAILY MEAN | 82 | May 27 | 697 | Sep 19 | 1,760 | Sep 6, 1996 |
| LOWEST DAILY MEAN | 0.29 | Sep 14 | 0.49 | aOct 7 | 0.29 | Sep 14, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.33 | Sep 11 | 0.52 | Oct 4 | 0.33 | Sep 11, 2002 |
| MAXIMUM PEAK FLOW | | | 2,550 | Sep 19 | 3,850 | Sep 6, 1996 |
| MAXIMUM PEAK STAGE | | | 8.68 | Sep 19 | 10.37 | Sep 6, 1996 |
| INSTANTANEOUS LOW FLOW | | | 0.49 | bOct 6 | 0.27 | cOct 5, 2001 |
| ANNUAL RUNOFF (CFSM) | 0.33 | | 1.73 | | 0.85 | |
| ANNUAL RUNOFF (INCHES) | 4.47 | | 23.54 | | 11.51 | |
| 10 PERCENT EXCEEDS | 14 | | 44 | | 25 | |
| 50 PERCENT EXCEEDS | 1.2 | | 17 | | 5.0 | |
| 90 PERCENT EXCEEDS | 0.44 | | 6.0 | | 1.1 | |

a Also Oct. 8, 9, 2002.
b Also Oct. 7-10, 2002.
c Also Sept. 14, 2002.
e Estimated.



01621050 MUDDY CREEK AT MOUNT CLINTON, VA—Continued

WATER-QUALITY RECORDS

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

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: January 2002 to current year.
WATER TEMPERATURE: January 2002 to current year.

INSTRUMENTATION.--Water-quality monitor January 2002 to current year.

REMARKS.--Missing record due to instrument malfunctions. Records good.

EXTREMES FOR PERIOD OF DAILY RECORD--
SPECIFIC CONDUCTANCE: Maximum, 596 microsiemens/cm, Nov. 1-3, 2002; minimum, 136 microsiemens/cm, July 6, Sept. 19, 2003.
WATER TEMPERATURE: Maximum, 31.0°C, Aug. 2, 2002; minimum, 0.0°C, on many day during winter periods.

EXTREMES FOR JANUARY 2002 TO SEPTEMBER 2002.--
SPECIFIC CONDUCTANCE: Maximum, 534 microsiemens/cm, Sept. 30; minimum, 186 microsiemens/cm, May 28
WATER TEMPERATURE: Maximum, 31.0°C, Aug. 2; minimum, 0.0°C, Feb. 8, Mar. 5.

EXTREMES FOR WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003.--
SPECIFIC CONDUCTANCE: Maximum, 596 microsiemens/cm, Nov. 1-3; minimum, 136 microsiemens/cm, July 6, Sept. 19.
WATER TEMPERATURE: Maximum, 25.0°C, Aug. 27; minimum, 0.0°C, on many day during winter periods.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Time | Sample type | Instantaneous discharge, cfs (00061) | Barometric pressure, mm Hg (00025) | Dissolved oxygen, mg/L (00300) | Dissolved oxygen, percent of saturation (00301) | pH, water, unfltrd field, std units (00400) | Specif. conductance, wat unf uS/cm 25 degC (00095) | Temperature, air, deg C (00020) | Temperature, water, deg C (00010) | Alkalinity, wat flt inc tit field, mg/L as CaCO3 (39086) | Bicarbonate, wat flt incrm. titr., field, mg/L (00453) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | |
| 16... | 1330 | Environmental | 12 | 718 | 8.3 | 83 | 7.9 | 550 | 13.5 | 12.6 | 183 | 222 |
| NOV | | | | | | | | | | | | |
| 06... | 1230 | Environmental | 13 | 714 | 13.6 | 129 | 7.3 | 520 | 10.0 | 10.0 | 184 | 224 |
| DEC | | | | | | | | | | | | |
| 09... | 1305 | Environmental | 8.5 | 735 | 19.0 | 149 | 8.4 | 542 | -0.5 | 3.6 | 212 | 236 |
| JAN | | | | | | | | | | | | |
| 08... | 1210 | Environmental | 19 | 712 | 15.3 | 135 | 7.9 | 507 | 9.5 | 7.0 | 173 | 211 |
| FEB | | | | | | | | | | | | |
| 12... | 1200 | Environmental | 5.6 | 722 | 16.5 | 129 | 8.6 | 497 | -1.0 | 2.9 | 209 | 246 |
| MAR | | | | | | | | | | | | |
| 03... | 1200 | Environmental | 51 | 725 | 14.7 | 119 | 7.6 | 386 | 0.0 | 6.3 | 122 | 150 |
| 19... | 0945 | Environmental | 16 | 758 | 16.1 | 146 | 8.2 | 494 | 11.5 | 10.6 | -- | -- |
| APR | | | | | | | | | | | | |
| 02... | 1115 | Environmental | 20 | 728 | 22.4 | 226 | 8.8 | 434 | 23.0 | 13.6 | 166 | 195 |
| 24... | 1045 | Environmental | 17 | 730 | 14.8 | 147 | 8.5 | 446 | 16.5 | 13.0 | -- | -- |
| MAY | | | | | | | | | | | | |
| *07...* | *1114* | *Blank* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 07... | 1230 | Environmental | 14 | 724 | 12.1 | 136 | 8.0 | 443 | 25.0 | 18.3 | 183 | 223 |
| 22... | 1000 | Environmental | 26 | 730 | 10.1 | 100 | 6.6 | 444 | 13.0 | 12.7 | -- | -- |
| JUN | | | | | | | | | | | | |
| 11... | 1100 | Environmental | 24 | 730 | 10.4 | 112 | 6.8 | 461 | 28.0 | 16.9 | 191 | 231 |
| *11...* | *1101* | *Replicate* | -- | -- | -- | -- | -- | -- | -- | -- | *E191* | *E230* |
| 16... | 1030 | Environmental | 26 | 731 | 9.6 | 100 | 6.2 | 442 | 19.0 | 15.4 | -- | -- |
| JUL | | | | | | | | | | | | |
| 08... | 1145 | Environmental | 170 | 728 | 8.2 | 95 | 7.3 | 326 | 27.5 | 20.0 | 176 | 211 |
| 22... | 1100 | Environmental | 14 | 725 | 17.1 | 198 | 8.3 | 500 | 28.0 | 20.1 | -- | -- |
| AUG | | | | | | | | | | | | |
| 04... | 1300 | Environmental | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | 1045 | Environmental | 14 | 724 | 11.1 | 129 | 7.3 | 488 | 24.0 | 19.9 | 209 | 254 |
| 21... | 1015 | Environmental | 12 | 762 | 12.5 | 136 | 8.1 | 506 | 26.5 | 19.5 | -- | -- |
| SEP | | | | | | | | | | | | |
| 04... | 1030 | Environmental | 19 | 723 | -- | 78 | 7.8 | 512 | 22.0 | 18.2 | 221 | 269 |

01621050 MUDDY CREEK AT MOUNT CLINTON, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Carbonate, wat flt incrm. titr., field, mg/L (00452) | Chloride, water, fltrd, mg/L (00940) | Silica, water, fltrd, mg/L (00955) | Sulfate water, fltrd, mg/L (00945) | Ammonia + org-N, water, unfltrd mg/L as N (00625) | Ammonia water, fltrd, mg/L as N (00608) | Nitrate water, fltrd, mg/L as N (00618) | Nitrite + nitrate water fltrd, mg/L as N (00631) | Nitrite water, fltrd, mg/L as N (00613) | Organic nitrogen, water, unfltrd mg/L (00605) | Orthophosphate, water, fltrd, mg/L as P (00671) | Phosphorus, water, unfltrd mg/L (00665) | Total nitrogen, water, unfltrd mg/L (00600) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 16... | -- | 18.8 | -- | 26.1 | 2.4 | 0.28 | 6.86 | 6.96 | 0.100 | 2.1 | 0.87 | 1.20 | 9.4 |
| NOV | | | | | | | | | | | | | |
| 06... | -- | 14.0 | -- | 23.0 | 1.3 | 0.08 | 9.31 | 9.39 | 0.077 | 1.2 | 0.31 | 0.41 | 11 |
| DEC | | | | | | | | | | | | | |
| 09... | 11 | 10.2 | -- | 15.6 | 0.27 | <0.04 | 9.25 | 9.27 | 0.020 | -- | 0.04 | 0.027 | 9.5 |
| JAN | | | | | | | | | | | | | |
| 08... | -- | 11.3 | -- | 16.3 | 0.34 | <0.04 | 11.0 | 11.0 | 0.016 | -- | 0.04 | 0.072 | 11 |
| FEB | | | | | | | | | | | | | |
| 12... | 6 | 8.64 | -- | 13.5 | 0.30 | <0.04 | 7.79 | 7.82 | 0.027 | -- | E.01 | 0.040 | 8.1 |
| MAR | | | | | | | | | | | | | |
| 03... | -- | 9.30 | -- | 15.2 | 0.92 | 0.18 | 7.99 | 8.02 | 0.026 | 0.74 | 0.22 | 0.31 | 8.9 |
| 19... | -- | -- | -- | -- | 0.39 | <0.04 | 9.40 | 9.43 | 0.031 | -- | E.02 | 0.047 | 9.8 |
| APR | | | | | | | | | | | | | |
| 02... | 4 | 9.92 | -- | 13.2 | 0.52 | <0.04 | 8.07 | 8.09 | 0.018 | -- | E.02 | 0.053 | 8.6 |
| 24... | -- | -- | -- | -- | 0.36 | <0.04 | 7.94 | 7.96 | 0.029 | -- | E.01 | 0.030 | 8.3 |
| MAY | | | | | | | | | | | | | |
| *07*... | -- | *<0.20* | -- | *<0.2* | *E.06* | *<0.04* | -- | *<0.06* | *<0.008* | -- | *<0.02* | *<0.004* | -- |
| 07... | -- | 8.95 | 3.58 | 12.1 | 0.45 | <0.04 | 6.58 | 6.62 | 0.038 | -- | 0.03 | 0.069 | 7.1 |
| 22... | -- | -- | -- | -- | 0.64 | <0.04 | 6.73 | 6.79 | 0.060 | -- | <0.02 | 0.130 | 7.4 |
| JUN | | | | | | | | | | | | | |
| 11... | -- | 9.35 | -- | 12.4 | 0.60 | <0.04 | 7.14 | 7.20 | 0.066 | -- | E.01 | 0.128 | 7.8 |
| *11*... | -- | *9.54* | -- | *12.1* | *0.68* | *<0.04* | *7.38* | *7.44* | *0.062* | -- | *E.01* | *0.126* | *8.1* |
| 16... | -- | -- | -- | -- | 0.75 | E.03 | 6.71 | 6.76 | 0.056 | -- | 0.06 | 0.134 | 7.5 |
| JUL | | | | | | | | | | | | | |
| 08... | -- | 6.98 | -- | 9.7 | 2.6 | <0.04 | 3.41 | 3.47 | 0.060 | -- | 0.32 | 0.82 | 6.0 |
| 22... | -- | -- | -- | -- | 0.45 | <0.04 | 8.63 | 8.67 | 0.040 | -- | E.01 | 0.055 | 9.1 |
| AUG | | | | | | | | | | | | | |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | -- | 10.4 | -- | 11.2 | 0.92 | <0.04 | 5.76 | 5.85 | 0.086 | -- | 0.06 | 0.195 | 6.8 |
| 21... | -- | -- | -- | -- | 0.35 | <0.04 | 7.51 | 7.54 | 0.032 | -- | 0.02 | 0.056 | 7.9 |
| SEP | | | | | | | | | | | | | |
| 04... | -- | 11.0 | -- | 13.5 | 0.73 | <0.04 | 6.02 | 6.09 | 0.066 | -- | 0.06 | 0.177 | 6.8 |

01621050 MUDDY CREEK AT MOUNT CLINTON, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Organic carbon, suspnd sedimnt total, mg/L (00689) | Organic carbon, water, fltrd, mg/L (00681) | Peri-phyton biomass ash weight, g/m2 (00572) | Peri-phyton biomass dry weight, g/m2 (00573) | Pheo-phytin a, peri-phyton, mg/m2 (62359) | Chloro-phyll a peri-phyton, chromo-fluoro, mg/m2 (70957) | Iron, water, fltrd, ug/L (01046) | 2,6-Di-ethyl-aniline water fltrd 0.7u GF ug/L (82660) | CIAT, water, fltrd, ug/L (04040) | Aceto-chlor, water, fltrd, ug/L (49260) | Ala-chlor, water, fltrd, ug/L (46342) | alpha-HCH, water, fltrd, ug/L (34253) | alpha-HCH-d6, surrog, wat flt 0.7u GF percent recovry (91065) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 16... | 12.0 | 14.6 | -- | -- | -- | -- | -- | <0.006 | E.083 | <0.006 | <0.004 | <0.005 | 94.5 |
| NOV | | | | | | | | | | | | | |
| 06... | 1.9 | 8.0 | -- | -- | -- | -- | -- | <0.006 | E.111 | <0.006 | <0.004 | <0.005 | 92.7 |
| DEC | | | | | | | | | | | | | |
| 09... | 0.2 | 1.7 | -- | -- | -- | -- | -- | <0.006 | E.164 | <0.006 | <0.004 | <0.005 | 85.4 |
| JAN | | | | | | | | | | | | | |
| 08... | 0.5 | 1.8 | -- | -- | -- | -- | -- | <0.006 | E.125 | <0.006 | <0.004 | <0.005 | 101 |
| FEB | | | | | | | | | | | | | |
| 12... | 0.4 | 1.4 | -- | -- | -- | -- | -- | <0.006 | E.130 | <0.006 | <0.004 | <0.005 | 97.3 |
| MAR | | | | | | | | | | | | | |
| 03... | 2.0 | 4.1 | -- | -- | -- | -- | -- | <0.006 | E.110 | <0.006 | <0.004 | <0.005 | 80.6 |
| 19... | -- | -- | -- | -- | -- | -- | -- | <0.006 | E.193 | <0.006 | <0.004 | <0.005 | 91.1 |
| APR | | | | | | | | | | | | | |
| 02... | 0.7 | 2.2 | -- | -- | -- | -- | -- | <0.006 | E.166 | <0.006 | <0.004 | <0.005 | 86.9 |
| 24... | -- | -- | -- | -- | -- | -- | -- | <0.006 | E.154 | <0.006 | <0.004 | <0.005 | 107 |
| MAY | | | | | | | | | | | | | |
| *07...* | *<0.1* | *<0.3* | -- | -- | -- | -- | -- | *<0.006* | *<0.006* | *<0.006* | *<0.004* | *<0.005* | *89.0* |
| 07... | 0.6 | 2.1 | -- | -- | -- | -- | 15 | <0.006 | E.095 | <0.006 | <0.004 | <0.005 | 88.1 |
| 22... | -- | -- | -- | -- | -- | -- | -- | <0.006 | E.153 | <0.006 | <0.004 | <0.005 | 95.7 |
| JUN | | | | | | | | | | | | | |
| 11... | 0.9 | 2.8 | -- | -- | -- | -- | -- | <0.006 | E.184 | <0.006 | <0.004 | <0.005 | 85.2 |
| *11...* | *0.8* | *2.7* | -- | -- | -- | -- | -- | *<0.006* | *E.196* | *<0.006* | *<0.004* | *<0.005* | *102* |
| 16... | -- | -- | -- | -- | -- | -- | -- | <0.006 | E.220 | <0.006 | <0.004 | <0.005 | 108 |
| JUL | | | | | | | | | | | | | |
| 08... | 6.6 | 10.4 | -- | -- | -- | -- | -- | <0.006 | E.258 | <0.006 | <0.004 | <0.005 | 101 |
| 22... | -- | -- | -- | -- | -- | -- | -- | <0.006 | E.192 | <0.006 | <0.004 | <0.005 | 111 |
| AUG | | | | | | | | | | | | | |
| 04... | -- | -- | 13 | 13.80 | 1.2 | 2.5 | -- | -- | -- | -- | -- | -- | -- |
| 05... | 1.1 | 4.2 | -- | -- | -- | -- | -- | <0.006 | E.161 | <0.006 | <0.004 | <0.005 | 111 |
| 21... | -- | -- | -- | -- | -- | -- | -- | <0.006 | E.142 | <0.006 | <0.004 | <0.005 | 84.3 |
| SEP | | | | | | | | | | | | | |
| 04... | 1.6 | 4.6 | -- | -- | -- | -- | -- | <0.006 | E.125 | <0.006 | <0.004 | <0.005 | 101 |

01621050 MUDDY CREEK AT MOUNT CLINTON, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Atrazine, water, fltrd, ug/L (39632) | Azinphos-methyl, water, fltrd 0.7u GF ug/L (82686) | Benfluralin, water, fltrd 0.7u GF ug/L (82673) | Butylate, water, fltrd, ug/L (04028) | Carbaryl, water, fltrd 0.7u GF ug/L (82680) | Carbofuran, water, fltrd 0.7u GF ug/L (82674) | Chlorpyrifos water, fltrd, ug/L (38933) | cis-Permethrin water fltrd 0.7u GF ug/L (82687) | Cyanazine, water, fltrd, ug/L (04041) | DCPA, water fltrd 0.7u GF ug/L (82682) | Diazinon, water, fltrd, ug/L (39572) | Diazinon-d10 surrog. wat flt 0.7u GF percent recovry (91063) | Dieldrin, water, fltrd, ug/L (39381) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 16... | 0.105 | <0.050 | <0.010 | <0.002 | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 110 | <0.005 |
| NOV | | | | | | | | | | | | | |
| 06... | 0.095 | <0.050 | <0.010 | <0.002 | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 117 | <0.005 |
| DEC | | | | | | | | | | | | | |
| 09... | 0.115 | <0.050 | <0.010 | <0.002 | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 114 | <0.005 |
| JAN | | | | | | | | | | | | | |
| 08... | 0.087 | <0.050 | <0.010 | <0.002 | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 123 | <0.005 |
| FEB | | | | | | | | | | | | | |
| 12... | 0.097 | <0.050 | <0.010 | <0.002 | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 109 | <0.005 |
| MAR | | | | | | | | | | | | | |
| 03... | 0.044 | <0.050 | <0.010 | <0.002 | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 96.5 | <0.005 |
| 19... | 0.097 | <0.050 | <0.010 | <0.002 | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 116 | <0.005 |
| APR | | | | | | | | | | | | | |
| 02... | 0.078 | <0.050 | <0.010 | <0.002 | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 115 | <0.005 |
| 24... | 0.117 | <0.050 | <0.010 | <0.002 | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 124 | <0.005 |
| MAY | | | | | | | | | | | | | |
| *07...* | *<0.007* | *<0.050* | *<0.010* | *<0.002* | *<0.041* | *<0.020* | *<0.005* | *<0.006* | *<0.018* | *<0.003* | *<0.005* | *98.3* | *<0.005* |
| 07... | 0.083 | <0.050 | <0.010 | <0.002 | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 96.6 | <0.005 |
| 22... | 0.906 | <0.050 | <0.010 | <0.002 | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 108 | <0.005 |
| JUN | | | | | | | | | | | | | |
| 11... | 1.96 | <0.050 | <0.010 | <0.002 | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 106 | <0.005 |
| *11...* | *2.23* | *<0.050* | *<0.010* | *<0.002* | *<0.041* | *<0.020* | *E.004* | *<0.006* | *<0.018* | *<0.003* | *<0.005* | *119* | *<0.005* |
| 16... | 2.02 | <0.050 | <0.010 | <0.002 | <0.041 | <0.020 | 0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 130 | <0.005 |
| JUL | | | | | | | | | | | | | |
| 08... | 2.73 | <0.050 | <0.010 | <0.002 | <0.041 | <0.020 | 0.037 | <0.006 | <0.018 | <0.003 | <0.005 | 129 | <0.005 |
| 22... | 0.492 | <0.050 | <0.010 | <0.002 | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 127 | <0.005 |
| AUG | | | | | | | | | | | | | |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | 0.313 | <0.050 | <0.010 | <0.002 | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 129 | <0.005 |
| 21... | 0.245 | <0.050 | <0.010 | <0.002 | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 109 | <0.005 |
| SEP | | | | | | | | | | | | | |
| 04... | 0.171 | <0.050 | <0.010 | <0.002 | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 105 | <0.005 |

01621050 MUDDY CREEK AT MOUNT CLINTON, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Disulfoton, water, fltrd 0.7u GF ug/L (82677) | EPTC, water, fltrd 0.7u GF ug/L (82668) | Ethalfluralin, water, fltrd 0.7u GF ug/L (82663) | Ethoprop, water, fltrd 0.7u GF ug/L (82672) | Fonofos water, fltrd, ug/L (04095) | Lindane water, fltrd, ug/L (39341) | Linuron water fltrd 0.7u GF ug/L (82666) | Malathion, water, fltrd, ug/L (39532) | Methyl parathion, water, fltrd 0.7u GF ug/L (82667) | Metolachlor, water, fltrd, ug/L (39415) | Metribuzin, water, fltrd, ug/L (82630) | Molinate, water, fltrd 0.7u GF ug/L (82671) | Napropamide, water, fltrd 0.7u GF ug/L (82684) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 16... | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | E.009 | <0.006 | <0.002 | <0.007 |
| NOV | | | | | | | | | | | | | |
| 06... | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | <0.013 | <0.006 | <0.002 | <0.007 |
| DEC | | | | | | | | | | | | | |
| 09... | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | <0.013 | <0.006 | <0.002 | <0.007 |
| JAN | | | | | | | | | | | | | |
| 08... | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | <0.013 | <0.006 | <0.002 | <0.007 |
| FEB | | | | | | | | | | | | | |
| 12... | <0.02 | <0.010 | <0.009 | <0.005 | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | <0.013 | <0.006 | <0.002 | <0.007 |
| MAR | | | | | | | | | | | | | |
| 03... | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | E.006 | <0.006 | <0.002 | <0.007 |
| 19... | <0.02 | 0.033 | <0.009 | <0.005 | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | E.003 | <0.006 | <0.002 | <0.007 |
| APR | | | | | | | | | | | | | |
| 02... | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | E.004 | <0.006 | <0.004 | <0.007 |
| 24... | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.043 | <0.006 | <0.002 | <0.007 |
| MAY | | | | | | | | | | | | | |
| *07...* | *<0.02* | *<0.002* | *<0.009* | *<0.005* | *<0.003* | *<0.004* | *<0.035* | *<0.027* | *<0.006* | *<0.013* | *<0.006* | *<0.002* | *<0.007* |
| 07... | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | E.004 | <0.006 | <0.002 | <0.007 |
| 22... | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.118 | <0.006 | <0.002 | <0.007 |
| JUN | | | | | | | | | | | | | |
| 11... | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.358 | <0.006 | <0.002 | <0.007 |
| *11...* | *<0.02* | *<0.015* | *<0.009* | *<0.005* | *<0.003* | *<0.004* | *<0.035* | *<0.027* | *<0.006* | *0.359* | *<0.006* | *<0.002* | *<0.007* |
| 16... | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.360 | <0.006 | <0.002 | <0.007 |
| JUL | | | | | | | | | | | | | |
| 08... | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 1.13 | <0.006 | <0.002 | <0.007 |
| 22... | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.051 | <0.006 | <0.002 | <0.007 |
| AUG | | | | | | | | | | | | | |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.023 | <0.006 | <0.002 | <0.007 |
| 21... | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.019 | <0.006 | <0.002 | <0.007 |
| SEP | | | | | | | | | | | | | |
| 04... | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.018 | <0.006 | <0.002 | <0.007 |

01621050 MUDDY CREEK AT MOUNT CLINTON, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | p,p'-DDE, water, fltrd, ug/L (34653) | Parathion, water, fltrd, ug/L (39542) | Pebulate, water, fltrd 0.7u GF ug/L (82669) | Pendimethalin, water, fltrd 0.7u GF ug/L (82683) | Phorate water fltrd 0.7u GF ug/L (82664) | Prometon, water, fltrd, ug/L (04037) | Pronamide, water, fltrd 0.7u GF ug/L (82676) | Propachlor, water, fltrd, ug/L (04024) | Propanil, water, fltrd 0.7u GF ug/L (82679) | Propargite, water, fltrd 0.7u GF ug/L (82685) | Simazine, water, fltrd, ug/L (04035) | Tebuthiuron water fltrd 0.7u GF ug/L (82670) | Terbacil, water, fltrd 0.7u GF ug/L (82665) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 16... | <0.003 | <0.010 | <0.007 | <0.022 | <0.011 | M | <0.004 | <0.010 | <0.011 | <0.02 | 0.055 | E.01 | <0.050 |
| NOV | | | | | | | | | | | | | |
| 06... | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 | <0.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.047 | <0.02 | <0.034 |
| DEC | | | | | | | | | | | | | |
| 09... | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 | <0.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.052 | <0.02 | <0.034 |
| JAN | | | | | | | | | | | | | |
| 08... | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 | <0.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.034 | <0.02 | <0.034 |
| FEB | | | | | | | | | | | | | |
| 12... | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 | M | <0.004 | <0.010 | <0.011 | <0.02 | 0.042 | E.01 | <0.034 |
| MAR | | | | | | | | | | | | | |
| 03... | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 | <0.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.022 | E.01 | <0.034 |
| 19... | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 | M | <0.004 | <0.010 | <0.011 | <0.02 | 0.040 | E.01 | <0.034 |
| APR | | | | | | | | | | | | | |
| 02... | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 | M | <0.004 | <0.010 | <0.011 | <0.02 | 0.031 | <0.02 | <0.034 |
| 24... | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 | M | <0.004 | <0.010 | <0.011 | <0.02 | 0.068 | E.01 | <0.034 |
| MAY | | | | | | | | | | | | | |
| *07...* | *<0.003* | *<0.010* | *<0.004* | *<0.022* | *<0.011* | *<0.01* | *<0.004* | *<0.010* | *<0.011* | *<0.02* | *<0.005* | *<0.02* | *<0.034* |
| 07... | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 | E.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.032 | <0.02 | <0.034 |
| 22... | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 | <0.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.462 | <0.02 | <0.034 |
| JUN | | | | | | | | | | | | | |
| 11... | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 | <0.01 | <0.004 | <0.010 | <0.011 | <0.02 | 1.13 | E.01 | <0.034 |
| *11...* | *<0.003* | *<0.010* | *<0.004* | *<0.022* | *<0.011* | *M* | *<0.004* | *<0.010* | *<0.011* | *<0.02* | *1.38* | *E.01* | *<0.034* |
| 16... | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 | M | <0.004 | <0.010 | <0.011 | <0.02 | 1.08 | E.01 | <0.034 |
| JUL | | | | | | | | | | | | | |
| 08... | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 | <0.01 | <0.004 | <0.010 | <0.011 | <0.02 | 1.92 | 0.02 | <0.034 |
| 22... | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 | <0.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.196 | E.02 | <0.034 |
| AUG | | | | | | | | | | | | | |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 | <0.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.140 | E.05 | <0.034 |
| 21... | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 | M | <0.004 | <0.010 | <0.011 | <0.02 | 0.092 | <0.02 | <0.034 |
| SEP | | | | | | | | | | | | | |
| 04... | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 | <0.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.072 | 0.04 | <0.034 |

01621050 MUDDY CREEK AT MOUNT CLINTON, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Terbufos, water, fltrd 0.7u GF ug/L (82675) | Thiobencarb water fltrd 0.7u GF ug/L (82681) | Triallate, water, fltrd 0.7u GF ug/L (82678) | Trifluralin, water, fltrd 0.7u GF ug/L (82661) | Suspended sediment concentration mg/L (80154) | Suspended sediment load, tons/d (80155) |
|---|---|---|---|---|---|---|
| OCT | | | | | | |
| 16... | <0.02 | <0.005 | <0.002 | <0.009 | 97 | 3.1 |
| NOV | | | | | | |
| 06... | <0.02 | <0.005 | <0.002 | <0.009 | 18 | 0.65 |
| DEC | | | | | | |
| 09... | <0.02 | <0.005 | <0.002 | <0.009 | 6 | 0.15 |
| JAN | | | | | | |
| 08... | <0.02 | <0.005 | <0.002 | <0.009 | 9 | 0.48 |
| FEB | | | | | | |
| 12... | <0.02 | <0.005 | <0.002 | <0.009 | 40 | 0.61 |
| MAR | | | | | | |
| 03... | <0.02 | <0.005 | <0.002 | <0.009 | 35 | 4.9 |
| 19... | <0.02 | <0.005 | <0.002 | <0.009 | 7 | 0.31 |
| APR | | | | | | |
| 02... | <0.02 | <0.005 | <0.002 | <0.009 | 11 | 0.60 |
| 24... | <0.02 | <0.005 | <0.002 | <0.009 | 13 | 0.61 |
| MAY | | | | | | |
| *07...* | *<0.02* | *<0.005* | *<0.002* | *<0.009* | *0.0* | -- |
| 07... | <0.02 | <0.005 | <0.002 | <0.009 | 10 | 0.37 |
| 22... | <0.02 | <0.005 | <0.002 | <0.009 | 26 | 1.8 |
| JUN | | | | | | |
| 11... | <0.02 | <0.005 | <0.002 | <0.009 | 27 | 1.7 |
| *11...* | *<0.02* | *<0.005* | *<0.002* | *<0.009* | *27* | -- |
| 16... | <0.02 | <0.005 | <0.002 | <0.009 | 19 | 1.3 |
| JUL | | | | | | |
| 08... | <0.02 | <0.005 | <0.002 | <0.009 | 183 | 84 |
| 22... | <0.02 | <0.005 | <0.002 | <0.009 | 23 | 0.88 |
| AUG | | | | | | |
| 04... | -- | -- | -- | -- | -- | -- |
| 05... | <0.02 | <0.005 | <0.002 | <0.009 | 25 | 0.95 |
| 21... | <0.02 | <0.005 | <0.002 | <0.009 | 9 | 0.30 |
| SEP | | | | | | |
| 04... | <0.02 | <0.005 | <0.002 | <0.009 | 21 | 1.1 |

**Remark codes used in this table:**
**< -- Less than**
**E -- Estimated value**
**M-- Presence verified, not quantified**

01621050 MUDDY CREEK AT MOUNT CLINTON, VA—Continued

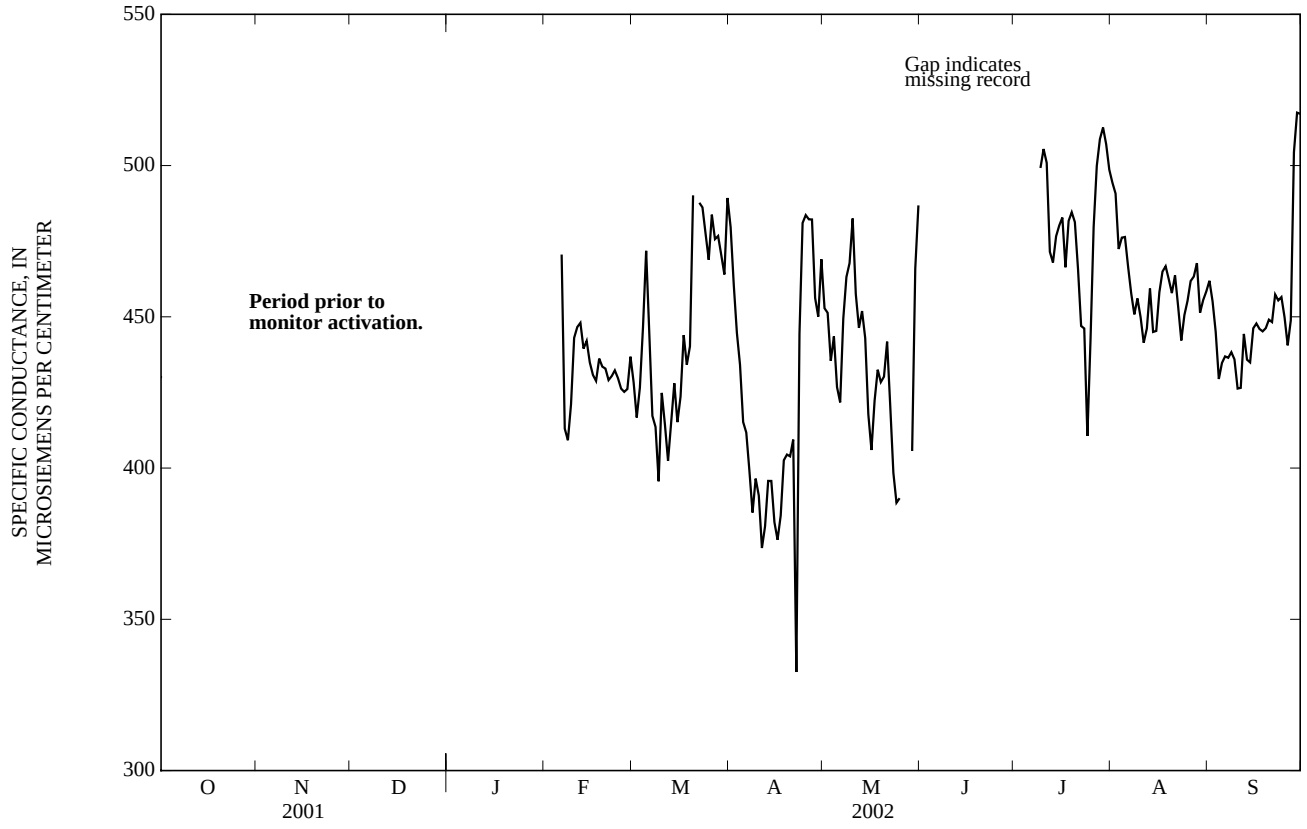
SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS
JANUARY 2002 TO SEPTEMBER 2002

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | | |
| 1 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 4 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 6 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 7 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 11 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 12 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 13 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 14 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 15 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 16 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 17 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 18 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 19 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 20 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 21 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 22 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 23 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 24 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 25 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 26 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 27 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 28 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 29 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 30 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 31 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MONTH | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | FEBRUARY | | | MARCH | | | APRIL | | | MAY | | |
| 1 | --- | --- | --- | 467 | 392 | 428 | 509 | 417 | 480 | 490 | 391 | 453 |
| 2 | --- | --- | --- | 436 | 393 | 417 | 510 | 391 | 461 | 481 | 400 | 451 |
| 3 | --- | --- | --- | 445 | 384 | 427 | 471 | 417 | 445 | 478 | 369 | 435 |
| 4 | --- | --- | --- | 459 | 434 | 447 | 464 | 385 | 434 | 471 | 406 | 444 |
| 5 | --- | --- | --- | 507 | 444 | 472 | 448 | 365 | 415 | 471 | 352 | 427 |
| 6 | 507 | 356 | 471 | 458 | 416 | 445 | 437 | 376 | 412 | 459 | 371 | 422 |
| 7 | 435 | 386 | 413 | 456 | 315 | 417 | 431 | 349 | 399 | 465 | 419 | 449 |
| 8 | 420 | 399 | 409 | 453 | 304 | 414 | 426 | 323 | 385 | 484 | 443 | 463 |
| 9 | 433 | 405 | 421 | 451 | 288 | 396 | 414 | 372 | 397 | 517 | 385 | 468 |
| 10 | 452 | 428 | 443 | 447 | 391 | 425 | 439 | 326 | 391 | 519 | 438 | 483 |
| 11 | 460 | 425 | 447 | 439 | 374 | 414 | 409 | 320 | 374 | 490 | 401 | 458 |
| 12 | 469 | 423 | 448 | 432 | 323 | 402 | 399 | 348 | 381 | 485 | 387 | 446 |
| 13 | 451 | 417 | 440 | 441 | 349 | 415 | 409 | 362 | 396 | 479 | 410 | 452 |
| 14 | 469 | 413 | 442 | 457 | 387 | 428 | 440 | 347 | 396 | 480 | 380 | 443 |
| 15 | 451 | 410 | 435 | 445 | 372 | 415 | 411 | 345 | 382 | 469 | 352 | 418 |
| 16 | 446 | 407 | 431 | 447 | 390 | 424 | 409 | 327 | 376 | 459 | 342 | 406 |
| 17 | 442 | 409 | 429 | 454 | 428 | 444 | 416 | 359 | 384 | 463 | 358 | 422 |
| 18 | 463 | 411 | 436 | 449 | 411 | 434 | 438 | 369 | 403 | 459 | 403 | 433 |
| 19 | 457 | 406 | 434 | 457 | 422 | 440 | 427 | 367 | 404 | 455 | 379 | 428 |
| 20 | 443 | 416 | 433 | 524 | 425 | 490 | 422 | 388 | 404 | 463 | 394 | 430 |
| 21 | 447 | 398 | 429 | --- | --- | --- | 423 | 349 | 409 | 474 | 400 | 442 |
| 22 | 443 | 416 | 430 | 501 | 469 | 488 | 406 | 271 | 333 | 468 | 354 | 421 |
| 23 | 446 | 412 | 432 | 502 | 465 | 486 | 475 | 397 | 444 | 451 | 341 | 398 |
| 24 | 447 | 406 | 430 | 496 | 451 | 477 | 486 | 475 | 481 | 447 | 334 | 389 |
| 25 | 440 | 405 | 426 | 492 | 435 | 469 | 491 | 472 | 484 | 445 | 338 | 390 |
| 26 | 439 | 406 | 425 | 505 | 439 | 484 | 490 | 469 | 482 | --- | --- | --- |
| 27 | 437 | 409 | 426 | 503 | 437 | 476 | 493 | 466 | 482 | --- | --- | --- |
| 28 | 475 | 399 | 437 | 503 | 424 | 477 | 483 | 412 | 456 | --- | --- | --- |
| 29 | --- | --- | --- | 521 | 374 | 470 | 478 | 420 | 450 | 442 | 356 | 406 |
| 30 | --- | --- | --- | 505 | 371 | 464 | 491 | 432 | 469 | 484 | 442 | 466 |
| 31 | --- | --- | --- | 502 | 470 | 489 | --- | --- | --- | 494 | 477 | 487 |
| MONTH | 507 | 356 | 433 | 524 | 288 | 446 | 510 | 271 | 420 | 519 | 334 | 437 |

01621050 MUDDY CREEK AT MOUNT CLINTON, VA—Continued

SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS—CONTINUED
JANUARY 2002 TO SEPTEMBER 2002

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | |
| 1 | --- | --- | --- | --- | --- | --- | 528 | 449 | 494 | 481 | 430 | 462 |
| 2 | --- | --- | --- | --- | --- | --- | 531 | 439 | 491 | 480 | 418 | 455 |
| 3 | --- | --- | --- | --- | --- | --- | 504 | 439 | 472 | 480 | 397 | 445 |
| 4 | --- | --- | --- | --- | --- | --- | 506 | 441 | 476 | 461 | 384 | 429 |
| 5 | --- | --- | --- | --- | --- | --- | 507 | 433 | 476 | 468 | 399 | 435 |
| 6 | --- | --- | --- | --- | --- | --- | 502 | 428 | 467 | 471 | 409 | 437 |
| 7 | --- | --- | --- | --- | --- | --- | 486 | 417 | 458 | 462 | 406 | 436 |
| 8 | --- | --- | --- | --- | --- | --- | 475 | 416 | 451 | 462 | 414 | 438 |
| 9 | --- | --- | --- | 515 | 474 | 499 | 480 | 428 | 456 | 453 | 414 | 436 |
| 10 | --- | --- | --- | 520 | 491 | 505 | 469 | 421 | 450 | 443 | 402 | 426 |
| 11 | --- | --- | --- | 530 | 460 | 501 | 460 | 412 | 441 | 456 | 384 | 427 |
| 12 | --- | --- | --- | 488 | 440 | 471 | 463 | 423 | 446 | 492 | 395 | 444 |
| 13 | --- | --- | --- | 476 | 459 | 468 | 492 | 420 | 459 | 484 | 384 | 436 |
| 14 | --- | --- | --- | 490 | 453 | 477 | 468 | 407 | 445 | 444 | 424 | 435 |
| 15 | --- | --- | --- | 499 | 447 | 480 | 458 | 421 | 445 | 451 | 441 | 446 |
| 16 | --- | --- | --- | 511 | 445 | 483 | 470 | 442 | 458 | 464 | 426 | 448 |
| 17 | --- | --- | --- | 490 | 421 | 466 | 481 | 442 | 465 | 467 | 417 | 446 |
| 18 | --- | --- | --- | 510 | 450 | 482 | 485 | 439 | 467 | 462 | 419 | 445 |
| 19 | --- | --- | --- | 503 | 449 | 485 | 484 | 431 | 462 | 456 | 434 | 446 |
| 20 | --- | --- | --- | 499 | 461 | 481 | 484 | 426 | 458 | 463 | 431 | 449 |
| 21 | --- | --- | --- | 498 | 418 | 466 | 489 | 430 | 464 | 458 | 440 | 448 |
| 22 | --- | --- | --- | 486 | 388 | 447 | 497 | 402 | 453 | 463 | 440 | 457 |
| 23 | --- | --- | --- | 472 | 400 | 446 | 481 | 401 | 442 | 465 | 445 | 455 |
| 24 | --- | --- | --- | 471 | 385 | 411 | 481 | 417 | 451 | 475 | 432 | 457 |
| 25 | --- | --- | --- | 476 | 403 | 442 | 486 | 425 | 455 | 464 | 432 | 450 |
| 26 | --- | --- | --- | 502 | 473 | 480 | 487 | 432 | 462 | 477 | 390 | 441 |
| 27 | --- | --- | --- | 512 | 489 | 500 | 486 | 445 | 463 | 492 | 417 | 449 |
| 28 | --- | --- | --- | 520 | 494 | 509 | 480 | 452 | 468 | 519 | 481 | 504 |
| 29 | --- | --- | --- | 532 | 478 | 513 | 463 | 437 | 451 | 530 | 493 | 517 |
| 30 | --- | --- | --- | 533 | 469 | 507 | 465 | 446 | 456 | 534 | 492 | 517 |
| 31 | --- | --- | --- | 531 | 457 | 499 | 472 | 445 | 458 | --- | --- | --- |
| MONTH | --- | --- | --- | 533 | 385 | 479 | 531 | 401 | 460 | 534 | 384 | 451 |




DAILY MEAN SPECIFIC CONDUCTANCE - JANUARY 2002 TO SEPTEMBER 2002

01621050 MUDDY CREEK AT MOUNT CLINTON, VA—Continued

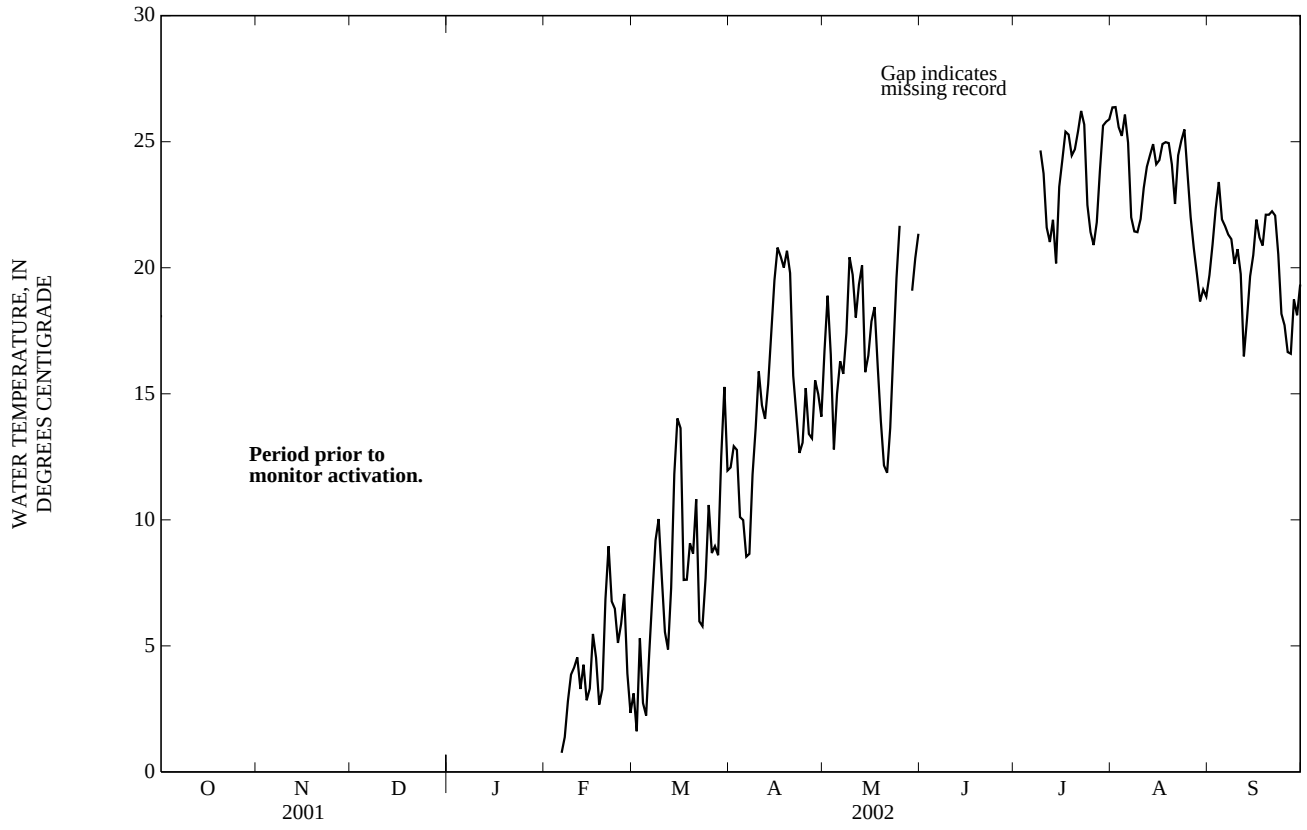
TEMPERATURE, WATER, DEGREES CELSIUS
JANUARY 2002 TO SEPTEMBER 2002

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | | |
| 1 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 4 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 6 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 7 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 11 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 12 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 13 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 14 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 15 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 16 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 17 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 18 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 19 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 20 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 21 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 22 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 23 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 24 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 25 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 26 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 27 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 28 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 29 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 30 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 31 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MONTH | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | FEBRUARY | | | MARCH | | | APRIL | | | MAY | | |
| 1 | --- | --- | --- | 7.4 | 0.2 | 3.1 | 18.1 | 8.0 | 12.1 | 22.8 | 11.4 | 16.7 |
| 2 | --- | --- | --- | 3.1 | 0.9 | 1.6 | 19.1 | 7.6 | 12.9 | 22.4 | 16.0 | 18.9 |
| 3 | --- | --- | --- | 10.6 | 2.0 | 5.3 | 15.5 | 8.2 | 12.8 | 20.6 | 13.0 | 16.6 |
| 4 | --- | --- | --- | 6.6 | 0.2 | 2.7 | 17.2 | 4.4 | 10.1 | 15.0 | 10.4 | 12.8 |
| 5 | --- | --- | --- | 6.5 | 0.0 | 2.2 | 16.1 | 5.3 | 10 | 21.5 | 10.2 | 15.0 |
| 6 | 1.6 | 0.1 | 0.8 | 10.9 | 0.1 | 4.7 | 12.8 | 5.0 | 8.5 | 20.2 | 11.9 | 16.3 |
| 7 | 3.3 | 0.1 | 1.4 | 12.9 | 1.8 | 7.0 | 15.3 | 2.5 | 8.6 | 16.8 | 14.6 | 15.8 |
| 8 | 7.3 | 0.0 | 2.8 | 15.1 | 3.9 | 9.2 | 18.7 | 6.9 | 11.8 | 21.3 | 13.3 | 17.4 |
| 9 | 8.4 | 0.4 | 3.9 | 13.2 | 6.4 | 10.0 | 15.4 | 12.0 | 13.6 | 25.4 | 17.2 | 20.4 |
| 10 | 5.2 | 3.0 | 4.1 | 11.4 | 3.6 | 7.7 | 22.1 | 11.2 | 15.9 | 23.7 | 16.2 | 19.7 |
| 11 | 7.4 | 2.3 | 4.5 | 10.9 | 1.1 | 5.6 | 21.6 | 8.4 | 14.5 | 23.4 | 13.1 | 18.0 |
| 12 | 6.9 | 0.4 | 3.3 | 6.3 | 3.4 | 4.9 | 18.0 | 10.2 | 14.0 | 23.9 | 14.9 | 19.3 |
| 13 | 7.7 | 1.3 | 4.3 | 9.1 | 6.0 | 7.3 | 17.5 | 13.4 | 15.4 | 22.8 | 17.2 | 20.1 |
| 14 | 6.2 | 0.3 | 2.8 | 17.9 | 7.4 | 11.8 | 22.5 | 13.0 | 17.4 | 19.9 | 12.5 | 15.9 |
| 15 | 6.9 | 0.5 | 3.3 | 19.8 | 9.1 | 14.0 | 24.9 | 15.3 | 19.5 | 23.0 | 10.6 | 16.5 |
| 16 | 9.7 | 2.2 | 5.5 | 16.7 | 11.4 | 13.6 | 28.0 | 14.5 | 20.8 | 24.4 | 11.6 | 17.9 |
| 17 | 6.9 | 1.9 | 4.5 | 11.4 | 5.9 | 7.6 | 25.1 | 15.8 | 20.4 | 20.8 | 15.2 | 18.4 |
| 18 | 6.3 | 0.2 | 2.7 | 10.4 | 5.3 | 7.6 | 23.9 | 16.4 | 20.0 | 18.8 | 12.7 | 16.1 |
| 19 | 6.8 | 0.3 | 3.3 | 11.1 | 7.5 | 9.1 | 25.6 | 16.5 | 20.7 | 18.3 | 10.0 | 13.9 |
| 20 | 9.2 | 4.6 | 6.9 | 10.8 | 6.7 | 8.7 | 22.0 | 17.3 | 19.8 | 14.5 | 8.9 | 12.2 |
| 21 | 12.3 | 6.1 | 9.0 | 17.2 | 6.4 | 10.8 | 18.7 | 11.7 | 15.7 | 15.8 | 9.0 | 11.9 |
| 22 | 8.8 | 5.2 | 6.8 | 10.9 | 1.9 | 6.0 | 19.2 | 10.8 | 14.2 | 20.9 | 7.1 | 13.6 |
| 23 | 9.9 | 4.2 | 6.5 | 12.5 | 0.5 | 5.8 | 16.3 | 10.3 | 12.7 | 23.9 | 10.1 | 16.7 |
| 24 | 9.8 | 1.1 | 5.1 | 14.3 | 2.1 | 7.7 | 19.1 | 7.6 | 13.1 | 26.9 | 13.0 | 19.6 |
| 25 | 10.3 | 1.7 | 5.9 | 16.4 | 5.8 | 10.6 | 19.9 | 12.6 | 15.2 | 25.9 | 17.7 | 21.7 |
| 26 | 10.9 | 3.3 | 7.1 | 10.1 | 7.7 | 8.7 | 18.5 | 9.6 | 13.4 | --- | --- | --- |
| 27 | 7.0 | 0.8 | 3.9 | 13.4 | 6.4 | 9.0 | 16.7 | 9.0 | 13.2 | --- | --- | --- |
| 28 | 5.2 | 0.2 | 2.3 | 15.3 | 2.7 | 8.6 | 20.7 | 12.4 | 15.5 | --- | --- | --- |
| 29 | --- | --- | --- | 18.7 | 7.6 | 12.5 | 19.8 | 11.5 | 15.0 | 22.9 | 15.4 | 19.1 |
| 30 | --- | --- | --- | 20.6 | 11.4 | 15.3 | 19.9 | 9.0 | 14.1 | 24.6 | 16.5 | 20.4 |
| 31 | --- | --- | --- | 14.7 | 9.6 | 12.0 | --- | --- | --- | 25.7 | 17.4 | 21.3 |
| MONTH | 12.3 | 0.0 | 4.4 | 20.6 | 0.0 | 8.1 | 28.0 | 2.5 | 14.7 | 26.9 | 7.1 | 17.2 |

01621050 MUDDY CREEK AT MOUNT CLINTON, VA—Continued

TEMPERATURE, WATER, DEGREES CELSIUS—CONTINUED
JANUARY 2002 TO SEPTEMBER 2002

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | |
| 1 | --- | --- | --- | --- | --- | --- | 30.6 | 22.5 | 26.4 | 21.9 | 18.1 | 19.7 |
| 2 | --- | --- | --- | --- | --- | --- | 31.0 | 22.7 | 26.4 | 24.4 | 18.6 | 20.9 |
| 3 | --- | --- | --- | --- | --- | --- | 30.4 | 22.5 | 25.6 | 25.6 | 19.3 | 22.3 |
| 4 | --- | --- | --- | --- | --- | --- | 29.8 | 21.2 | 25.2 | 27.0 | 20.5 | 23.4 |
| 5 | --- | --- | --- | --- | --- | --- | 30.3 | 22.6 | 26.1 | 25.0 | 18.7 | 21.9 |
| 6 | --- | --- | --- | --- | --- | --- | 27.6 | 22.4 | 25.0 | 24.8 | 18.5 | 21.6 |
| 7 | --- | --- | --- | --- | --- | --- | 25.7 | 18.8 | 22.0 | 24.5 | 17.9 | 21.3 |
| 8 | --- | --- | --- | --- | --- | --- | 25.7 | 18.1 | 21.4 | 24.4 | 17.9 | 21.1 |
| 9 | --- | --- | --- | 27.9 | 21.9 | 24.7 | 26.0 | 17.4 | 21.4 | 23.0 | 17.0 | 20.2 |
| 10 | --- | --- | --- | 24.8 | 22.4 | 23.7 | 26.7 | 17.8 | 21.9 | 24.7 | 17.2 | 20.7 |
| 11 | --- | --- | --- | 24.1 | 18.9 | 21.6 | 27.2 | 19.5 | 23.2 | 22.9 | 16.4 | 19.7 |
| 12 | --- | --- | --- | 25.6 | 16.5 | 21.0 | 27.2 | 20.8 | 24.0 | 20.8 | 10.8 | 16.5 |
| 13 | --- | --- | --- | 23.3 | 20.6 | 21.9 | 28.3 | 21.0 | 24.5 | 24.9 | 11.2 | 18.0 |
| 14 | --- | --- | --- | 21.1 | 19.2 | 20.2 | 28.1 | 22.1 | 24.9 | 21.2 | 17.3 | 19.7 |
| 15 | --- | --- | --- | 28.0 | 19.5 | 23.2 | 27.5 | 21.0 | 24.1 | 21.4 | 19.8 | 20.5 |
| 16 | --- | --- | --- | 27.9 | 20.5 | 24.3 | 26.4 | 22.3 | 24.3 | 24.7 | 19.8 | 21.9 |
| 17 | --- | --- | --- | 29.7 | 21.6 | 25.4 | 27.0 | 23.0 | 24.9 | 24.2 | 18.6 | 21.2 |
| 18 | --- | --- | --- | 27.2 | 23.4 | 25.3 | 27.4 | 22.6 | 25.0 | 23.0 | 18.4 | 20.9 |
| 19 | --- | --- | --- | 27.1 | 22.2 | 24.5 | 27.9 | 22.1 | 24.9 | 23.3 | 20.9 | 22.1 |
| 20 | --- | --- | --- | 28.1 | 22.1 | 24.7 | 26.0 | 22.0 | 24.1 | 23.4 | 20.3 | 22.1 |
| 21 | --- | --- | --- | 29.5 | 21.8 | 25.4 | 25.4 | 20.0 | 22.5 | 23.4 | 21.0 | 22.2 |
| 22 | --- | --- | --- | 30.4 | 22.7 | 26.2 | 27.5 | 21.8 | 24.5 | 22.7 | 21.2 | 22.1 |
| 23 | --- | --- | --- | 29.6 | 23.0 | 25.7 | 27.9 | 22.1 | 25.0 | 22.7 | 18.3 | 20.5 |
| 24 | --- | --- | --- | 24.3 | 21.5 | 22.5 | 26.9 | 23.7 | 25.5 | 21.8 | 14.8 | 18.2 |
| 25 | --- | --- | --- | 22.2 | 20.8 | 21.4 | 25.4 | 21.5 | 23.7 | 19.2 | 15.8 | 17.7 |
| 26 | --- | --- | --- | 22.0 | 20.1 | 20.9 | 23.6 | 20.7 | 22.0 | 17.9 | 15.7 | 16.7 |
| 27 | --- | --- | --- | 23.7 | 20.1 | 21.8 | 22.0 | 19.7 | 20.8 | 18.5 | 15.3 | 16.6 |
| 28 | --- | --- | --- | 27.3 | 20.6 | 23.8 | 20.6 | 18.0 | 19.7 | 21.5 | 16.9 | 18.7 |
| 29 | --- | --- | --- | 29.5 | 22.2 | 25.6 | 20.6 | 17.1 | 18.7 | 21.5 | 15.0 | 18.1 |
| 30 | --- | --- | --- | 29.8 | 22.3 | 25.8 | 20.4 | 17.9 | 19.1 | 22.0 | 17.1 | 19.3 |
| 31 | --- | --- | --- | 30.1 | 22.2 | 25.9 | 20.2 | 17.4 | 18.9 | --- | --- | --- |
| MONTH | --- | --- | --- | 30.4 | 16.5 | 23.7 | 31.0 | 17.1 | 23.4 | 27.0 | 10.8 | 20.2 |




DAILY MEAN WATER TEMPERATURE - JANUARY 2002 TO SEPTEMBER 2002

01621050 MUDDY CREEK AT MOUNT CLINTON, VA—Continued

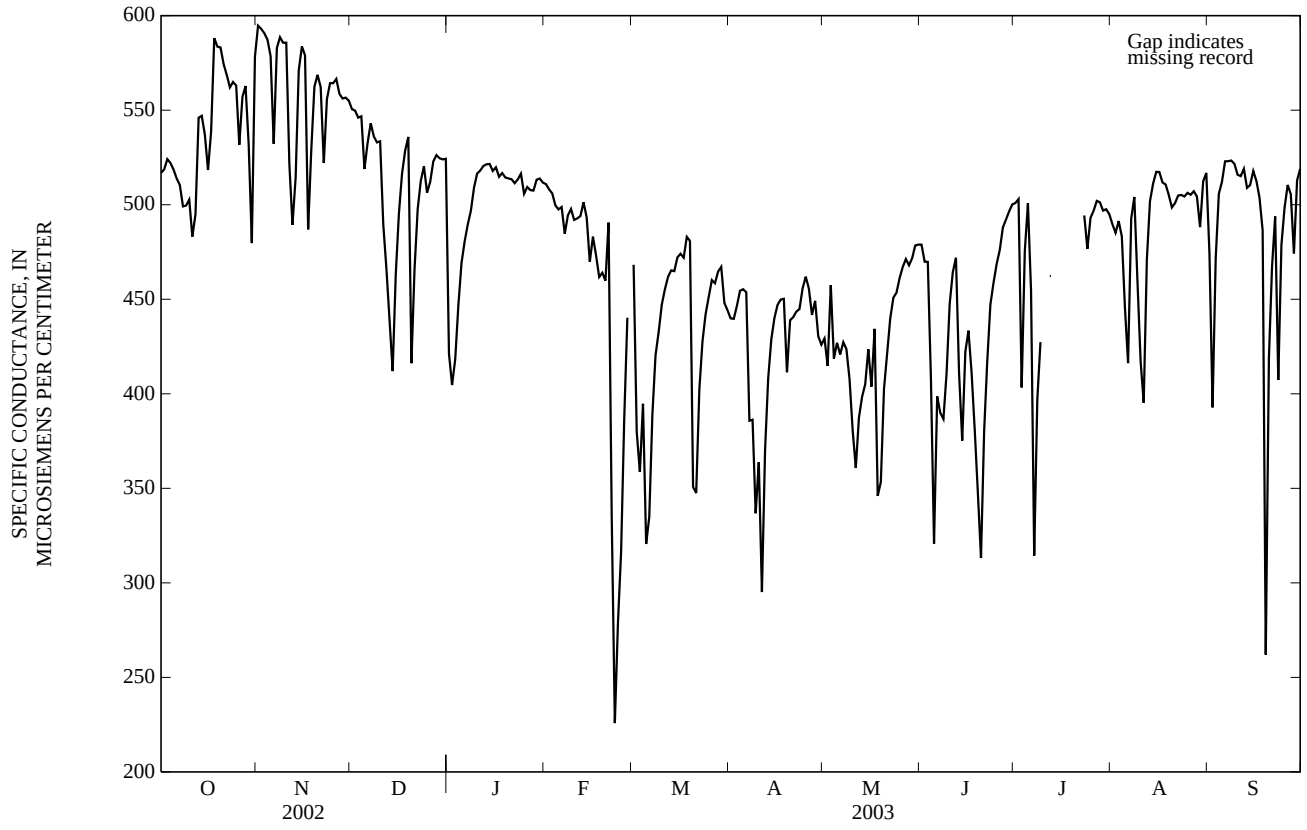
SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | |
| 1 | 535 | 492 | 517 | 596 | 593 | 595 | 561 | 532 | 551 | 532 | 277 | 421 |
| 2 | 541 | 483 | 519 | 596 | 589 | 593 | 557 | 534 | 550 | 434 | 349 | 405 |
| 3 | 544 | 496 | 524 | 596 | 585 | 591 | 555 | 526 | 546 | 438 | 402 | 418 |
| 4 | 543 | 490 | 522 | 592 | 581 | 587 | 553 | 534 | 547 | 463 | 427 | 447 |
| 5 | 540 | 481 | 519 | 590 | 559 | 579 | 546 | 495 | 519 | 474 | 463 | 469 |
| 6 | 533 | 483 | 514 | 564 | 512 | 532 | 541 | 516 | 533 | 484 | 474 | 480 |
| 7 | 531 | 481 | 510 | 592 | 564 | 583 | 563 | 522 | 543 | 495 | 478 | 490 |
| 8 | 519 | 465 | 499 | 593 | 580 | 589 | 549 | 512 | 536 | 501 | 492 | 497 |
| 9 | 509 | 482 | 500 | 592 | 573 | 586 | 544 | 511 | 533 | 517 | 500 | 509 |
| 10 | 509 | 493 | 503 | 591 | 575 | 586 | 546 | 509 | 534 | 520 | 509 | 516 |
| 11 | 510 | 442 | 483 | 592 | 467 | 521 | 541 | 425 | 490 | 521 | 511 | 518 |
| 12 | 539 | 467 | 495 | 574 | 378 | 489 | 501 | 433 | 466 | 525 | 513 | 521 |
| 13 | 553 | 538 | 546 | 559 | 426 | 514 | 483 | 377 | 439 | 527 | 510 | 521 |
| 14 | 560 | 527 | 547 | 583 | 559 | 571 | 435 | 378 | 412 | 525 | 513 | 522 |
| 15 | 546 | 525 | 537 | 590 | 580 | 584 | 484 | 421 | 463 | 524 | 504 | 518 |
| 16 | 553 | 485 | 518 | 590 | 540 | 579 | 509 | 484 | 495 | 525 | 513 | 520 |
| 17 | 591 | 481 | 539 | 540 | 451 | 487 | 524 | 509 | 516 | 522 | 499 | 515 |
| 18 | 594 | 580 | 588 | 556 | 503 | 529 | 536 | 523 | 529 | 527 | 502 | 517 |
| 19 | 589 | 574 | 584 | 567 | 556 | 562 | 541 | 525 | 536 | 521 | 500 | 514 |
| 20 | 588 | 576 | 583 | 574 | 564 | 569 | 538 | 322 | 416 | 522 | 495 | 514 |
| 21 | 584 | 558 | 574 | 576 | 529 | 562 | 489 | 435 | 466 | 522 | 495 | 513 |
| 22 | 579 | 551 | 569 | 545 | 508 | 522 | 506 | 489 | 498 | 520 | 492 | 511 |
| 23 | 574 | 542 | 562 | 566 | 545 | 556 | 520 | 506 | 513 | 527 | 496 | 513 |
| 24 | 570 | 557 | 565 | 569 | 556 | 564 | 524 | 515 | 520 | 536 | 490 | 516 |
| 25 | 571 | 536 | 563 | 570 | 551 | 564 | 516 | 493 | 506 | 517 | 483 | 506 |
| 26 | 550 | 520 | 532 | 571 | 560 | 567 | 523 | 494 | 512 | 518 | 493 | 509 |
| 27 | 572 | 540 | 557 | 566 | 546 | 559 | 527 | 517 | 523 | 522 | 488 | 508 |
| 28 | 579 | 545 | 563 | 564 | 541 | 556 | 530 | 521 | 526 | 517 | 487 | 507 |
| 29 | 586 | 384 | 532 | 564 | 541 | 557 | 530 | 511 | 525 | 520 | 504 | 513 |
| 30 | 552 | 373 | 480 | 565 | 536 | 555 | 531 | 510 | 524 | 519 | 508 | 514 |
| 31 | 594 | 552 | 578 | --- | --- | --- | 532 | 507 | 524 | 518 | 503 | 512 |
| MONTH | 594 | 373 | 536 | 596 | 378 | 560 | 563 | 322 | 509 | 536 | 277 | 499 |
| | | FEBRUARY | | | MARCH | | | APRIL | | | MAY | |
| 1 | 517 | 501 | 511 | 482 | 448 | 468 | 456 | 424 | 440 | 454 | 376 | 429 |
| 2 | 517 | 495 | 508 | 448 | 254 | 380 | 465 | 408 | 440 | 447 | 333 | 415 |
| 3 | 516 | 490 | 506 | 397 | 285 | 359 | 468 | 404 | 446 | 475 | 441 | 457 |
| 4 | 514 | 483 | 500 | 423 | 350 | 395 | 472 | 418 | 455 | 472 | 372 | 419 |
| 5 | 505 | 486 | 498 | 398 | 206 | 321 | 474 | 413 | 455 | 443 | 413 | 427 |
| 6 | 508 | 488 | 499 | 372 | 289 | 335 | 475 | 413 | 454 | 440 | 378 | 421 |
| 7 | 493 | 473 | 485 | 414 | 354 | 389 | 471 | 301 | 386 | 443 | 381 | 427 |
| 8 | 505 | 482 | 494 | 442 | 409 | 420 | 404 | 360 | 386 | 439 | 383 | 424 |
| 9 | 516 | 483 | 498 | 443 | 427 | 433 | 404 | 283 | 337 | 437 | 346 | 408 |
| 10 | 506 | 475 | 492 | 459 | 443 | 447 | 378 | 341 | 364 | 413 | 348 | 381 |
| 11 | 502 | 479 | 493 | 466 | 450 | 455 | 371 | 220 | 295 | 377 | 345 | 361 |
| 12 | 504 | 485 | 494 | 470 | 456 | 462 | 397 | 344 | 370 | 397 | 377 | 387 |
| 13 | 540 | 474 | 501 | 470 | 454 | 465 | 425 | 397 | 408 | 407 | 381 | 398 |
| 14 | 511 | 482 | 493 | 477 | 452 | 465 | 441 | 424 | 429 | 419 | 386 | 405 |
| 15 | 487 | 455 | 470 | 484 | 453 | 472 | 452 | 430 | 440 | 428 | 418 | 424 |
| 16 | 491 | 462 | 483 | 488 | 446 | 474 | 458 | 433 | 447 | 423 | 385 | 404 |
| 17 | 485 | 462 | 473 | 490 | 438 | 472 | 461 | 432 | 450 | 452 | 423 | 434 |
| 18 | 471 | 453 | 462 | 494 | 465 | 483 | 465 | 394 | 450 | 437 | 292 | 346 |
| 19 | 476 | 455 | 464 | 496 | 453 | 481 | 439 | 386 | 411 | 386 | 328 | 353 |
| 20 | 487 | 435 | 460 | 489 | 204 | 351 | 448 | 428 | 439 | 418 | 385 | 402 |
| 21 | 512 | 468 | 491 | 383 | 287 | 348 | 452 | 420 | 441 | 430 | 415 | 421 |
| 22 | 496 | 196 | 335 | 421 | 383 | 402 | 456 | 424 | 443 | 449 | 430 | 440 |
| 23 | 250 | 213 | 226 | 440 | 406 | 428 | 463 | 417 | 445 | 453 | 449 | 451 |
| 24 | 297 | 250 | 279 | 454 | 435 | 442 | 492 | 423 | 456 | 459 | 451 | 453 |
| 25 | 347 | 277 | 316 | 464 | 438 | 451 | 470 | 449 | 462 | 466 | 458 | 461 |
| 26 | 429 | 339 | 387 | 465 | 448 | 460 | 465 | 443 | 456 | 473 | 460 | 467 |
| 27 | 456 | 422 | 440 | 473 | 439 | 458 | 465 | 396 | 442 | 476 | 464 | 471 |
| 28 | --- | --- | --- | 479 | 439 | 465 | 469 | 401 | 449 | 474 | 464 | 468 |
| 29 | --- | --- | --- | 483 | 429 | 467 | 461 | 359 | 430 | 478 | 466 | 472 |
| 30 | --- | --- | --- | 476 | 424 | 448 | 454 | 362 | 426 | 488 | 472 | 478 |
| 31 | --- | --- | --- | 454 | 420 | 444 | --- | --- | --- | 493 | 464 | 479 |
| MONTH | 540 | 196 | 454 | 496 | 204 | 430 | 492 | 220 | 425 | 493 | 292 | 425 |

01621050 MUDDY CREEK AT MOUNT CLINTON, VA—Continued

SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS—CONTINUED
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | |
| 1 | 494 | 449 | 479 | 511 | 483 | 501 | 498 | 479 | 490 | 521 | 335 | 474 |
| 2 | 487 | 459 | 470 | 513 | 491 | 503 | 497 | 454 | 485 | 475 | 222 | 393 |
| 3 | 482 | 445 | 470 | 492 | 333 | 403 | 504 | 444 | 491 | 511 | 383 | 471 |
| 4 | 458 | 274 | 408 | 496 | 444 | 476 | 501 | 444 | 483 | 520 | 487 | 506 |
| 5 | 371 | 249 | 321 | 508 | 487 | 501 | 502 | 217 | 445 | 524 | 496 | 512 |
| 6 | 421 | 365 | 399 | 511 | 136 | 454 | 479 | 276 | 416 | 528 | 518 | 523 |
| 7 | 434 | 334 | 390 | 409 | 156 | 314 | 502 | 479 | 493 | 528 | 513 | 523 |
| 8 | 421 | 344 | 387 | 430 | 326 | 397 | 508 | 494 | 504 | 528 | 517 | 523 |
| 9 | 455 | 378 | 411 | 455 | 302 | 427 | 509 | 262 | 460 | 526 | 514 | 522 |
| 10 | 458 | 440 | 448 | --- | --- | --- | 472 | 306 | 417 | 525 | 497 | 516 |
| 11 | 471 | 456 | 464 | --- | --- | --- | 471 | 314 | 395 | 526 | 494 | 515 |
| 12 | 478 | 461 | 472 | 469 | 452 | 462 | 494 | 447 | 471 | 527 | 509 | 519 |
| 13 | 462 | 240 | 411 | --- | --- | --- | 508 | 494 | 502 | 522 | 489 | 509 |
| 14 | 413 | 305 | 375 | --- | --- | --- | 519 | 499 | 511 | 525 | 498 | 510 |
| 15 | 427 | 413 | 422 | --- | --- | --- | 533 | 507 | 517 | 526 | 506 | 518 |
| 16 | 446 | 407 | 433 | --- | --- | --- | 525 | 507 | 517 | 524 | 492 | 513 |
| 17 | 439 | 366 | 411 | --- | --- | --- | 524 | 494 | 512 | 521 | 482 | 504 |
| 18 | 407 | 306 | 381 | --- | --- | --- | 525 | 491 | 511 | 524 | 243 | 486 |
| 19 | 395 | 225 | 348 | --- | --- | --- | 525 | 467 | 505 | 379 | 136 | 262 |
| 20 | 364 | 247 | 313 | --- | --- | --- | 513 | 475 | 499 | 452 | 376 | 419 |
| 21 | 415 | 336 | 380 | --- | --- | --- | 515 | 471 | 501 | 486 | 449 | 467 |
| 22 | 430 | 396 | 417 | --- | --- | --- | 518 | 477 | 505 | 501 | 472 | 494 |
| 23 | 462 | 427 | 447 | 505 | 480 | 494 | 518 | 481 | 505 | 472 | 338 | 407 |
| 24 | 467 | 449 | 459 | 491 | 461 | 477 | 517 | 478 | 504 | 492 | 463 | 479 |
| 25 | 479 | 452 | 469 | 505 | 480 | 493 | 521 | 478 | 506 | 506 | 491 | 498 |
| 26 | 488 | 467 | 476 | 509 | 477 | 497 | 520 | 480 | 505 | 516 | 506 | 510 |
| 27 | 494 | 480 | 488 | 509 | 492 | 502 | 523 | 474 | 507 | 519 | 438 | 506 |
| 28 | 499 | 478 | 492 | 510 | 495 | 501 | 521 | 461 | 504 | 507 | 429 | 474 |
| 29 | 506 | 480 | 497 | 504 | 487 | 497 | 515 | 469 | 488 | 519 | 505 | 513 |
| 30 | 510 | 478 | 500 | 505 | 490 | 498 | 521 | 496 | 512 | 524 | 511 | 519 |
| 31 | --- | --- | --- | 504 | 481 | 495 | 522 | 507 | 517 | --- | --- | --- |
| MONTH | 510 | 225 | 428 | 513 | 136 | 468 | 533 | 217 | 490 | 528 | 136 | 486 |




DAILY MEAN SPECIFIC CONDUCTANCE - 2003 WATER YEAR

01621050 MUDDY CREEK AT MOUNT CLINTON, VA—Continued

TEMPERATURE, WATER, DEGREES CELSIUS
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

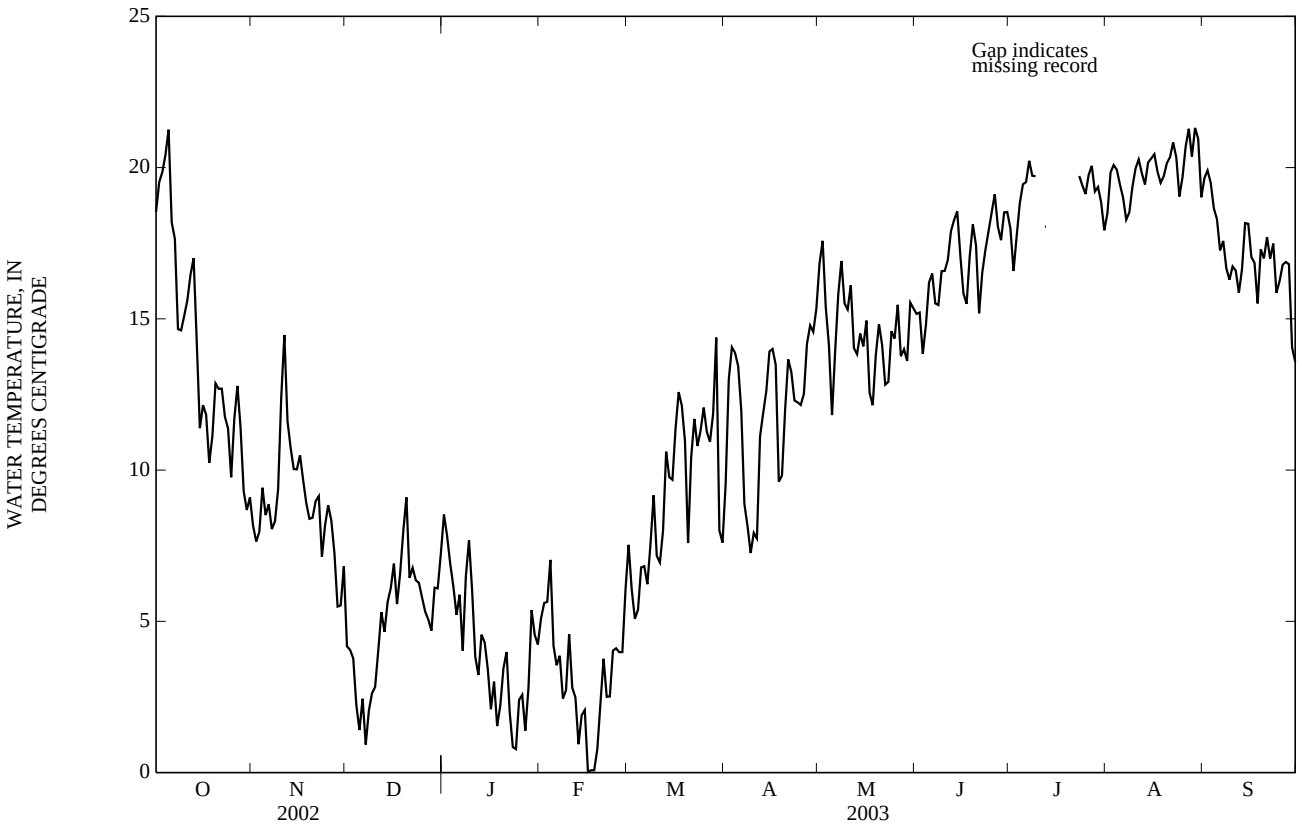
| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | |
| 1 | 21.5 | 15.7 | 18.5 | 9.3 | 7.0 | 8.2 | 5.8 | 2.7 | 4.2 | 8.9 | 8.0 | 8.5 |
| 2 | 23.3 | 16.5 | 19.5 | 9.9 | 5.8 | 7.6 | 5.8 | 2.5 | 4.1 | 8.0 | 7.6 | 7.8 |
| 3 | 22.3 | 17.6 | 19.9 | 10.3 | 5.8 | 8.0 | 5.1 | 2.3 | 3.8 | 7.6 | 6.0 | 6.9 |
| 4 | 23.1 | 18.1 | 20.4 | 10.7 | 8.2 | 9.4 | 3.2 | 0.9 | 2.2 | 7.5 | 5.2 | 6.2 |
| 5 | 24.1 | 19.2 | 21.3 | 9.5 | 8.0 | 8.5 | 2.5 | 0.1 | 1.4 | 5.5 | 4.7 | 5.2 |
| 6 | 21.2 | 15.4 | 18.2 | 10.0 | 8.1 | 8.9 | 5.0 | 1.0 | 2.4 | 7.0 | 3.8 | 5.9 |
| 7 | 19.7 | 15.8 | 17.7 | 9.1 | 7.2 | 8.1 | 2.4 | 0.0 | 0.9 | 5.8 | 2.4 | 4.0 |
| 8 | 16.7 | 12.5 | 14.7 | 11.2 | 5.6 | 8.3 | 3.9 | 0.3 | 2.0 | 8.9 | 4.5 | 6.5 |
| 9 | 16.0 | 13.4 | 14.6 | 11.7 | 7.0 | 9.4 | 4.3 | 1.0 | 2.6 | 9.9 | 6.0 | 7.7 |
| 10 | 15.9 | 14.5 | 15.1 | 14.6 | 10.0 | 12.4 | 4.9 | 1.4 | 2.8 | 7.4 | 4.4 | 6.0 |
| 11 | 16.1 | 15.3 | 15.6 | 15.7 | 12.8 | 14.5 | 4.9 | 3.3 | 4.0 | 5.9 | 2.3 | 3.8 |
| 12 | 17.7 | 15.4 | 16.5 | 12.8 | 10.8 | 11.6 | 7.9 | 3.8 | 5.3 | 5.5 | 1.2 | 3.2 |
| 13 | 18.3 | 16.0 | 17.0 | 12.2 | 9.4 | 10.7 | 5.3 | 4.0 | 4.7 | 7.0 | 2.7 | 4.6 |
| 14 | 16.6 | 12.2 | 14.2 | 12.3 | 7.9 | 10.0 | 6.7 | 4.5 | 5.6 | 5.4 | 3.4 | 4.3 |
| 15 | 13.0 | 9.5 | 11.4 | 11.7 | 8.1 | 10.0 | 7.8 | 4.5 | 6.1 | 5.3 | 1.9 | 3.4 |
| 16 | 13.4 | 11.3 | 12.1 | 10.8 | 10.2 | 10.5 | 8.4 | 5.6 | 6.9 | 3.4 | 0.9 | 2.1 |
| 17 | 12.7 | 10.3 | 11.8 | 10.2 | 8.9 | 9.7 | 7.1 | 3.7 | 5.6 | 5.1 | 1.8 | 3.0 |
| 18 | 12.8 | 7.9 | 10.2 | 10.6 | 7.4 | 8.9 | 7.5 | 6.0 | 6.6 | 3.4 | 0.1 | 1.5 |
| 19 | 12.9 | 9.6 | 11.1 | 9.8 | 7.0 | 8.4 | 10.1 | 5.8 | 8.0 | 4.3 | 1.1 | 2.2 |
| 20 | 13.4 | 12.5 | 12.9 | 10.7 | 6.3 | 8.4 | 10.0 | 6.7 | 9.1 | 6.0 | 1.5 | 3.4 |
| 21 | 14.6 | 11.3 | 12.7 | 10.2 | 7.9 | 9.0 | 8.1 | 5.1 | 6.4 | 5.3 | 2.5 | 4.0 |
| 22 | 15.4 | 10.9 | 12.7 | 10.2 | 6.8 | 9.1 | 8.8 | 5.1 | 6.8 | 4.1 | 0.4 | 2.0 |
| 23 | 14.4 | 9.2 | 11.8 | 8.9 | 5.3 | 7.1 | 7.8 | 5.0 | 6.4 | 2.1 | 0.0 | 0.8 |
| 24 | 12.4 | 10.8 | 11.4 | 10.7 | 5.9 | 8.2 | 6.9 | 5.8 | 6.3 | 2.1 | 0.0 | 0.8 |
| 25 | 10.8 | 9.3 | 9.8 | 11.1 | 6.5 | 8.8 | 7.3 | 4.8 | 5.8 | 4.8 | 0.9 | 2.4 |
| 26 | 14.7 | 9.3 | 11.7 | 9.6 | 7.6 | 8.3 | 7.1 | 4.1 | 5.3 | 4.2 | 1.0 | 2.6 |
| 27 | 15.3 | 10.4 | 12.8 | 8.5 | 5.4 | 7.3 | 7.1 | 3.4 | 5.1 | 3.4 | 0.0 | 1.4 |
| 28 | 12.7 | 10.3 | 11.4 | 7.9 | 3.8 | 5.5 | 5.8 | 3.3 | 4.7 | 5.3 | 0.6 | 2.8 |
| 29 | 10.3 | 8.4 | 9.3 | 7.4 | 4.0 | 5.5 | 8.4 | 4.3 | 6.1 | 6.4 | 4.5 | 5.4 |
| 30 | 9.2 | 8.3 | 8.7 | 8.8 | 5.0 | 6.8 | 7.6 | 4.2 | 6.1 | 5.2 | 4.0 | 4.6 |
| 31 | 10.4 | 8.3 | 9.1 | --- | --- | --- | 9.0 | 5.2 | 7.2 | 4.9 | 3.5 | 4.2 |
| MONTH | 24.1 | 7.9 | 14.0 | 15.7 | 3.8 | 8.9 | 10.1 | 0.0 | 5.0 | 9.9 | 0.0 | 4.1 |
| | | FEBRUARY | | | MARCH | | | APRIL | | | MAY | |
| 1 | 6.4 | 4.1 | 5.1 | 10.6 | 5.7 | 7.5 | 14.4 | 5.4 | 9.5 | 21.3 | 13.3 | 16.8 |
| 2 | 9.0 | 3.3 | 5.6 | 8.7 | 3.3 | 6.0 | 18.2 | 8.6 | 13.0 | 22.4 | 13.6 | 17.6 |
| 3 | 7.6 | 3.6 | 5.6 | 8.7 | 3.0 | 5.1 | 19.1 | 9.5 | 14.1 | 17.1 | 13.6 | 15.4 |
| 4 | 9.3 | 4.4 | 7.0 | 9.3 | 2.7 | 5.4 | 17.3 | 10.5 | 13.9 | 16.4 | 12.2 | 14.1 |
| 5 | 7.3 | 1.8 | 4.2 | 9.8 | 5.0 | 6.8 | 17.5 | 11.0 | 13.4 | 13.8 | 11.0 | 11.8 |
| 6 | 5.4 | 2.3 | 3.5 | 8.7 | 5.2 | 6.8 | 16.1 | 8.3 | 12.0 | 17.8 | 10.8 | 13.9 |
| 7 | 6.5 | 2.0 | 3.9 | 9.3 | 4.1 | 6.2 | 12.1 | 7.5 | 8.9 | 19.8 | 12.5 | 15.8 |
| 8 | 5.6 | 0.1 | 2.4 | 11.9 | 4.0 | 7.6 | 9.6 | 7.0 | 8.1 | 20.6 | 13.5 | 16.9 |
| 9 | 6.1 | 0.0 | 2.7 | 12.7 | 6.7 | 9.2 | 8.5 | 6.0 | 7.3 | 17.1 | 13.9 | 15.5 |
| 10 | 6.7 | 3.4 | 4.6 | 10.5 | 4.2 | 7.2 | 9.7 | 6.9 | 7.9 | 16.0 | 14.7 | 15.3 |
| 11 | 4.8 | 0.7 | 2.8 | 10.1 | 4.2 | 6.9 | 9.9 | 5.6 | 7.7 | 19.2 | 14.1 | 16.1 |
| 12 | 5.6 | 0.0 | 2.5 | 10.6 | 5.1 | 8.0 | 15.9 | 7.6 | 11.1 | 16.1 | 12.4 | 14.0 |
| 13 | 2.8 | 0.0 | 0.9 | 14.0 | 7.6 | 10.6 | 16.8 | 7.7 | 11.9 | 17.5 | 11.0 | 13.8 |
| 14 | 3.9 | 0.1 | 1.9 | 13.1 | 6.8 | 9.8 | 17.4 | 8.3 | 12.6 | 19.4 | 10.0 | 14.5 |
| 15 | 3.1 | 0.0 | 2.1 | 14.0 | 5.8 | 9.7 | 19.0 | 9.4 | 13.9 | 15.6 | 12.5 | 14.1 |
| 16 | 0.1 | 0.0 | 0.0 | 14.3 | 8.4 | 11.4 | 17.7 | 10.3 | 14.0 | 18.2 | 13.1 | 14.9 |
| 17 | 0.1 | 0.0 | 0.1 | 16.5 | 8.9 | 12.6 | 16.0 | 11.2 | 13.5 | 14.1 | 12.0 | 12.6 |
| 18 | 0.1 | 0.0 | 0.1 | 13.3 | 11.1 | 12.1 | 12.1 | 8.5 | 9.6 | 13.0 | 11.4 | 12.1 |
| 19 | 1.4 | 0.1 | 0.8 | 12.5 | 9.4 | 11.0 | 11.8 | 8.3 | 9.8 | 17.4 | 11.6 | 13.8 |
| 20 | 4.3 | 1.1 | 2.3 | 9.4 | 6.6 | 7.6 | 13.8 | 10.5 | 12.0 | 18.9 | 11.2 | 14.8 |
| 21 | 5.1 | 2.1 | 3.8 | 14.8 | 7.0 | 10.4 | 16.7 | 11.5 | 13.7 | 15.4 | 13.0 | 14.1 |
| 22 | 4.3 | 1.1 | 2.5 | 15.3 | 9.3 | 11.7 | 15.5 | 11.6 | 13.2 | 13.7 | 11.9 | 12.8 |
| 23 | 3.4 | 1.8 | 2.5 | 13.7 | 8.6 | 10.8 | 16.6 | 8.7 | 12.3 | 13.8 | 12.2 | 12.9 |
| 24 | 7.7 | 1.8 | 4.0 | 15.8 | 7.4 | 11.3 | 16.8 | 7.8 | 12.2 | 17.9 | 12.4 | 14.6 |
| 25 | 5.6 | 2.9 | 4.1 | 16.6 | 8.0 | 12.1 | 13.2 | 10.5 | 12.2 | 17.5 | 11.5 | 14.3 |
| 26 | 5.2 | 3.0 | 4.0 | 13.4 | 9.3 | 11.3 | 13.7 | 11.6 | 12.5 | 17.2 | 13.5 | 15.5 |
| 27 | 5.1 | 3.3 | 4.0 | 15.6 | 6.9 | 10.9 | 19.3 | 9.9 | 14.2 | 15.1 | 12.9 | 13.8 |
| 28 | 9.5 | 3.3 | 6.0 | 15.5 | 9.0 | 11.9 | 20.2 | 9.8 | 14.8 | 16.1 | 12.2 | 14.0 |
| 29 | --- | --- | --- | 18.1 | 12.2 | 14.4 | 17.9 | 11.8 | 14.6 | 14.6 | 12.7 | 13.6 |
| 30 | --- | --- | --- | 12.3 | 5.8 | 8.0 | 20.1 | 11.4 | 15.3 | 20.0 | 11.7 | 15.5 |
| 31 | --- | --- | --- | 10.9 | 4.6 | 7.6 | --- | --- | --- | 17.1 | 13.5 | 15.3 |
| MONTH | 9.5 | 0.0 | 3.2 | 18.1 | 2.7 | 9.3 | 20.2 | 5.4 | 12.0 | 22.4 | 10.0 | 14.5 |

01621050 MUDDY CREEK AT MOUNT CLINTON, VA—Continued

TEMPERATURE, WATER, DEGREES CELSIUS—CONTINUED
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | |
| 1 | 18.9 | 12.2 | 15.2 | 19.6 | 16.4 | 18.0 | 20.6 | 17.1 | 18.5 | 22.9 | 17.6 | 19.7 |
| 2 | 19.5 | 11.2 | 15.2 | 17.6 | 15.8 | 16.6 | 23.0 | 17.1 | 19.8 | 21.2 | 18.5 | 19.9 |
| 3 | 15.7 | 13.4 | 13.8 | 19.7 | 16.4 | 17.7 | 23.4 | 18.0 | 20.1 | 21.3 | 18.1 | 19.5 |
| 4 | 16.3 | 13.7 | 14.8 | 21.9 | 16.1 | 18.8 | 22.4 | 17.9 | 19.9 | 19.6 | 18.1 | 18.7 |
| 5 | 19.6 | 13.6 | 16.2 | 22.6 | 16.4 | 19.4 | 22.2 | 17.8 | 19.4 | 21.0 | 16.1 | 18.3 |
| 6 | 20.5 | 13.0 | 16.5 | 22.7 | 16.6 | 19.5 | 21.1 | 16.8 | 19.0 | 20.1 | 14.7 | 17.3 |
| 7 | 16.9 | 14.5 | 15.5 | 23.0 | 17.8 | 20.2 | 19.2 | 17.2 | 18.3 | 20.3 | 14.8 | 17.6 |
| 8 | 16.6 | 14.5 | 15.5 | 22.7 | 17.2 | 19.7 | 20.6 | 16.9 | 18.5 | 18.0 | 15.3 | 16.7 |
| 9 | 19.2 | 14.2 | 16.6 | 22.4 | 17.5 | 19.7 | 21.4 | 17.4 | 19.4 | 17.6 | 14.7 | 16.3 |
| 10 | 20.1 | 13.3 | 16.6 | --- | --- | --- | 22.9 | 17.7 | 20.0 | 19.9 | 14.2 | 16.7 |
| 11 | 19.7 | 14.5 | 16.9 | --- | --- | --- | 22.6 | 18.8 | 20.3 | 20.1 | 13.3 | 16.6 |
| 12 | 21.4 | 15.0 | 17.9 | 20.2 | 15.7 | 18.0 | 22.0 | 17.7 | 19.8 | 17.0 | 14.5 | 15.9 |
| 13 | 20.5 | 16.1 | 18.3 | --- | --- | --- | 21.8 | 17.4 | 19.4 | 18.4 | 15.2 | 16.6 |
| 14 | 21.8 | 15.6 | 18.6 | --- | --- | --- | 23.5 | 17.3 | 20.2 | 20.9 | 16.5 | 18.2 |
| 15 | 18.3 | 15.9 | 17.1 | --- | --- | --- | 23.2 | 17.8 | 20.3 | 19.6 | 16.8 | 18.1 |
| 16 | 16.9 | 15.0 | 15.8 | --- | --- | --- | 23.0 | 18.4 | 20.4 | 20.4 | 14.0 | 17.0 |
| 17 | 15.9 | 15.0 | 15.5 | --- | --- | --- | 22.2 | 18.1 | 19.9 | 20.1 | 13.8 | 16.9 |
| 18 | 20.2 | 14.7 | 17.1 | --- | --- | --- | 22.3 | 17.2 | 19.5 | 16.8 | 15.0 | 15.5 |
| 19 | 19.8 | 16.5 | 18.1 | --- | --- | --- | 22.7 | 17.5 | 19.7 | 17.8 | 16.4 | 17.3 |
| 20 | 20.0 | 15.8 | 17.4 | --- | --- | --- | 23.6 | 17.3 | 20.1 | 19.2 | 15.0 | 17.0 |
| 21 | 17.4 | 13.6 | 15.2 | --- | --- | --- | 23.5 | 17.4 | 20.3 | 19.6 | 16.3 | 17.7 |
| 22 | 19.8 | 13.9 | 16.5 | --- | --- | --- | 24.1 | 18.1 | 20.8 | 17.7 | 16.3 | 17.0 |
| 23 | 21.1 | 14.0 | 17.3 | 22.4 | 17.4 | 19.7 | 23.5 | 18.0 | 20.3 | 18.4 | 16.0 | 17.5 |
| 24 | 21.7 | 14.4 | 17.9 | 22.2 | 16.7 | 19.4 | 22.3 | 16.1 | 19.0 | 18.4 | 13.5 | 15.9 |
| 25 | 22.4 | 15.0 | 18.5 | 22.8 | 15.6 | 19.1 | 23.3 | 16.6 | 19.7 | 18.4 | 13.7 | 16.2 |
| 26 | 22.8 | 15.8 | 19.1 | 23.1 | 16.4 | 19.8 | 24.4 | 17.5 | 20.7 | 18.4 | 15.6 | 16.8 |
| 27 | 20.0 | 16.0 | 18.0 | 22.6 | 17.7 | 20.1 | 25.0 | 18.9 | 21.3 | 19.3 | 14.7 | 16.9 |
| 28 | 20.5 | 14.9 | 17.6 | 20.4 | 18.2 | 19.2 | 23.1 | 17.9 | 20.4 | 18.3 | 15.4 | 16.8 |
| 29 | 21.7 | 15.4 | 18.5 | 21.6 | 17.4 | 19.4 | 24.9 | 18.5 | 21.3 | 15.4 | 12.9 | 14.1 |
| 30 | 21.0 | 15.7 | 18.5 | 20.0 | 17.5 | 18.8 | 22.9 | 18.9 | 21.0 | 16.5 | 11.3 | 13.6 |
| 31 | --- | --- | --- | 18.8 | 16.9 | 17.9 | 20.5 | 18.1 | 19.0 | --- | --- | --- |
| MONTH | 22.8 | 11.2 | 16.9 | 23.1 | 15.6 | 19.0 | 25.0 | 16.1 | 19.9 | 22.9 | 11.3 | 17.1 |

01621050 MUDDY CREEK AT MOUNT CLINTON, VA—Continued




DAILY MEAN WATER TEMPERATURE - 2003 WATER YEAR

## 01622000 NORTH RIVER NEAR BURKETOWN, VA

LOCATION.--Lat 38°20'25", long 78°54'49", NAD83, Rockingham County, Hydrologic Unit 02070005, on right bank 0.8 mi downstream from Pleasant Run, 2.8 mi northeast of Burketown, and 8.5 mi upstream from Middle River.

DRAINAGE AREA.--379 $mi^2$.

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 NGVD of 1929. Prior to Dec. 12, 1938, nonrecording gage at site 3.0 mi downstream at different datum.

REMARKS.--Records good except those for period of doubtful gage-height record, Oct. 30, 31, and periods with ice effect, Jan. 24, 27, 28, which are fair. At a point 26.8 mi upstream from station, there is an aqueduct tunnel diversion of about 2.4 $ft^3/s$ 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 $ft^3/s$, from rating curve extended above 16,000 $ft^3/s$ 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 $ft^3/s$, 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 June 18, 1949.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1915 | 5,230 | 9.40 | Aug 12 | 0215 | 3,360 | 7.31 |
| Mar 20 | 2015 | 3,780 | 7.81 | Sep 19 | 0915 | *13,600 | *16.99 |
| Apr 11 | 0630 | 3,630 | 7.63 | Sep 23 | 0700 | 4,960 | 9.12 |
| Jun 20 | 1930 | 3,230 | 7.16 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 79 | 865 | 247 | 825 | 166 | 927 | 493 | 518 | 434 | 353 | 198 | 181 |
| 2 | 81 | 623 | 226 | 2,000 | 164 | 1,310 | 499 | 488 | 386 | 365 | 173 | 265 |
| 3 | 82 | 456 | 203 | 1,910 | 159 | 1,640 | 596 | 474 | 390 | 656 | 203 | 277 |
| 4 | 80 | 355 | 183 | 1,610 | 165 | 1,430 | 635 | 615 | 641 | 564 | 232 | 270 |
| 5 | 77 | 296 | 189 | 1,280 | 160 | 1,540 | 609 | 946 | 1,370 | 451 | 234 | 263 |
| 6 | 71 | 424 | 174 | 1,040 | 155 | 1,990 | 542 | 1,070 | 1,280 | 362 | 359 | 244 |
| 7 | 70 | 472 | 158 | 843 | 160 | 2,040 | 821 | 1,010 | 1,270 | 1,000 | 275 | 224 |
| 8 | 66 | 456 | 152 | 726 | 153 | 1,660 | 1,190 | 864 | 1,300 | 605 | 245 | 209 |
| 9 | 66 | 408 | 144 | 642 | 147 | 1,390 | 1,820 | 877 | 1,570 | 647 | 286 | 196 |
| 10 | 66 | 356 | 136 | 568 | 148 | 1,250 | 2,220 | 1,550 | 1,370 | 648 | 770 | 184 |
| 11 | 99 | 431 | 202 | 500 | 143 | 1,100 | 2,980 | 2,140 | 1,130 | 609 | 822 | 176 |
| 12 | 100 | 824 | 338 | 449 | 140 | 946 | 2,320 | 1,810 | 920 | 528 | 1,640 | 168 |
| 13 | 81 | 1,560 | 649 | 415 | 135 | 835 | 1,830 | 1,390 | 1,040 | 459 | 1,070 | 190 |
| 14 | 78 | 1,310 | 1,140 | 384 | 136 | 816 | 1,470 | 1,050 | 1,310 | 443 | 916 | 173 |
| 15 | 74 | 984 | 1,140 | 362 | 149 | 846 | 1,190 | 797 | 1,320 | 394 | 710 | 167 |
| 16 | 196 | 759 | 983 | 328 | 143 | 797 | 962 | 769 | 1,300 | 349 | 577 | 159 |
| 17 | 195 | 906 | 803 | 316 | 146 | 723 | 790 | 580 | 1,680 | 309 | 491 | 151 |
| 18 | 372 | 992 | 667 | 282 | 145 | 658 | 684 | 1,260 | 2,590 | 281 | 426 | 232 |
| 19 | 303 | 894 | 581 | 272 | 147 | 612 | 800 | 2,130 | 2,310 | 276 | 365 | 7,540 |
| 20 | 217 | 766 | 1,550 | 262 | 152 | 1,710 | 735 | 1,780 | 2,690 | 278 | 320 | 3,690 |
| 21 | 169 | 659 | 2,160 | 246 | 174 | 2,750 | 739 | 1,570 | 2,090 | 235 | 283 | 2,740 |
| 22 | 143 | 652 | 1,620 | 229 | 2,040 | 2,080 | 730 | 1,320 | 1,620 | 225 | 260 | 1,930 |
| 23 | 121 | 592 | 1,240 | 217 | 4,410 | 1,580 | 651 | 1,140 | 1,290 | 221 | 239 | 3,250 |
| 24 | 106 | 546 | 964 | e190 | 3,370 | 1,240 | 578 | 1,010 | 999 | 272 | 223 | 1,810 |
| 25 | 99 | 492 | 835 | 198 | 2,400 | 968 | 528 | 861 | 790 | 211 | 212 | 1,350 |
| 26 | 141 | 430 | 685 | 193 | 1,740 | 791 | 525 | 754 | 640 | 199 | 203 | 1,030 |
| 27 | 110 | 382 | 562 | e180 | 1,340 | 673 | 568 | 655 | 537 | 191 | 193 | 836 |
| 28 | 131 | 338 | 499 | e170 | 1,070 | 573 | 590 | 608 | 471 | 186 | 188 | 967 |
| 29 | 228 | 297 | 451 | 173 | --- | 523 | 574 | 542 | 422 | 184 | 188 | 737 |
| 30 | e1,110 | 275 | 413 | 169 | --- | 561 | 545 | 504 | 383 | 176 | 179 | 634 |
| 31 | e1,210 | --- | 386 | 169 | --- | 525 | --- | 460 | --- | 174 | 173 | --- |
| TOTAL | 6,021 | 18,800 | 19,680 | 17,148 | 19,557 | 36,484 | 29,214 | 31,542 | 35,543 | 11,851 | 12,653 | 30,243 |
| MEAN | 194 | 627 | 635 | 553 | 698 | 1,177 | 974 | 1,017 | 1,185 | 382 | 408 | 1,008 |
| MAX | 1,210 | 1,560 | 2,160 | 2,000 | 4,410 | 2,750 | 2,980 | 2,140 | 2,690 | 1,000 | 1,640 | 7,540 |
| MIN | 66 | 275 | 136 | 169 | 135 | 523 | 493 | 460 | 383 | 174 | 173 | 151 |
| CFSM | 0.51 | 1.65 | 1.68 | 1.46 | 1.84 | 3.11 | 2.57 | 2.68 | 3.13 | 1.01 | 1.08 | 2.66 |
| IN. | 0.59 | 1.85 | 1.93 | 1.68 | 1.92 | 3.58 | 2.87 | 3.10 | 3.49 | 1.16 | 1.24 | 2.97 |

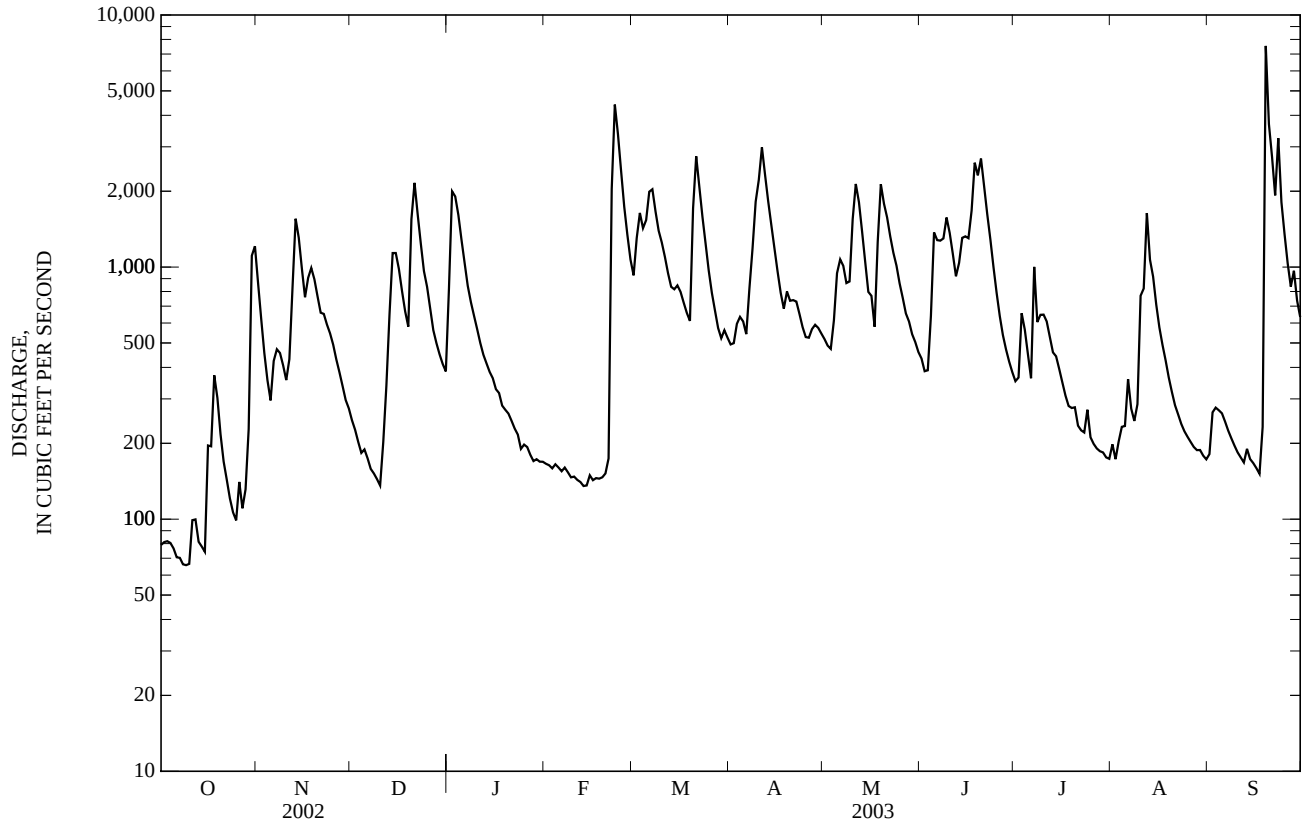
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1926 - 1972, 1976 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 243 | 282 | 331 | 432 | 516 | 709 | 613 | 495 | 342 | 198 | 237 | 235 |
| MAX | 1,500 | 2,080 | 1,087 | 1,777 | 1,841 | 1,932 | 1,831 | 1,486 | 1,704 | 809 | 1,102 | 3,130 |
| (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) |

01622000 NORTH RIVER NEAR BURKETOWN, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1926 - 1972 1976 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 94,057 | | 268,736 | | | |
| ANNUAL MEAN | 258 | | 736 | | 385 | |
| HIGHEST ANNUAL MEAN | | | | | 871 | 1996 |
| LOWEST ANNUAL MEAN | | | | | 145 | 1999 |
| HIGHEST DAILY MEAN | 4,070 | Apr 22 | 7,540 | Sep 19 | e32,000 | Sep 7, 1996 |
| LOWEST DAILY MEAN | 32 | aJul 13 | 66 | bOct 8 | 22 | Sep 24, 1930 |
| ANNUAL SEVEN-DAY MINIMUM | 34 | Sep 9 | 71 | Oct 4 | 30 | Dec 20, 1930 |
| MAXIMUM PEAK FLOW | | | 13,600 | Sep 19 | 70,400 | Sep 6, 1996 |
| MAXIMUM PEAK STAGE | | | 16.99 | Sep 19 | c36.70 | Sep 6, 1996 |
| INSTANTANEOUS LOW FLOW | | | 59 | Oct 9 | d16 | Nov 23, 1965 |
| ANNUAL RUNOFF (CFSM) | 0.68 | | 1.94 | | 1.01 | |
| ANNUAL RUNOFF (INCHES) | 9.23 | | 26.38 | | 13.79 | |
| 10 PERCENT EXCEEDS | 688 | | 1,630 | | 832 | |
| 50 PERCENT EXCEEDS | 88 | | 525 | | 203 | |
| 90 PERCENT EXCEEDS | 42 | | 152 | | 63 | |

a Also Aug. 24 and Sept. 15, 2002.
b Also Oct. 9, 10, 2002.
c From high-water mark in gage house.
d Result of temporary dam upstream.
e Estimated.



## 01625000 MIDDLE RIVER NEAR GROTTOES, VA

LOCATION.--Lat 38°15'42", long 78°51'43", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Sep. 1, 1938, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 6-10, Jan. 19-29, and Feb. 10-12, 16, 17, and periods of doubtful or no gage-height record, Feb. 18-20 and Sept. 21-30, which are fair. There are discharges of about 7.4 $ft^3/s$ 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 $ft^3/s$, from rating curve extended above 15,000 $ft^3/s$ on basis of slope-area measurement at gage height 33.09 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.--Maximum stage since at least 1877, that of Sep. 7, 1996.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 23 | 0730 | 8,670 | 15.98 | Jun 21 | 0300 | 4,370 | 11.19 |
| Apr 11 | 0900 | 3,380 | 9.88 | Sep 19 | 1500 | *12,900 | *19.31 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 44 | 182 | 117 | 459 | 143 | 868 | 481 | 407 | 579 | 416 | 220 | 192 |
| 2 | 41 | 131 | 108 | 1,170 | 141 | 1,670 | 442 | 367 | 506 | 435 | 219 | 185 |
| 3 | 38 | 108 | 104 | 1,070 | 138 | 1,810 | 456 | 327 | 465 | 822 | 203 | 196 |
| 4 | 36 | 96 | 95 | 978 | 144 | 1,240 | 442 | 400 | 908 | 807 | 239 | 196 |
| 5 | 36 | 93 | 117 | 775 | 161 | 1,070 | 413 | 741 | 1,540 | 707 | 286 | 259 |
| 6 | 36 | 145 | e110 | 636 | 149 | 1,250 | 383 | 665 | 1,290 | 470 | 429 | 203 |
| 7 | 35 | 196 | e102 | 531 | 148 | 1,210 | 522 | 567 | 1,030 | 409 | 312 | 181 |
| 8 | 35 | 203 | e97 | 452 | 147 | 923 | 999 | 481 | 1,220 | 388 | 367 | 172 |
| 9 | 36 | 159 | e92 | 413 | 135 | 742 | 1,560 | 498 | 1,220 | 396 | 508 | 169 |
| 10 | 37 | 135 | e90 | 366 | e130 | 641 | 1,980 | 1,130 | 1,010 | 398 | 601 | 165 |
| 11 | 43 | 176 | 118 | 324 | e128 | 569 | 2,830 | 1,270 | 807 | 375 | 716 | 157 |
| 12 | 59 | 311 | 235 | 289 | e125 | 508 | 1,890 | 949 | 951 | 348 | 530 | 152 |
| 13 | 56 | 823 | 404 | 264 | 121 | 459 | 1,290 | 696 | 828 | 309 | 664 | 171 |
| 14 | 49 | 558 | 958 | 255 | 127 | 428 | 986 | 551 | 934 | 1,050 | 574 | 184 |
| 15 | 45 | 327 | 852 | 242 | 147 | 392 | 807 | 480 | 1,340 | 967 | 449 | 170 |
| 16 | 65 | 259 | 625 | 222 | e210 | 370 | 689 | 866 | 1,820 | 642 | 379 | 155 |
| 17 | 155 | 565 | 474 | 214 | e185 | 356 | 609 | 577 | 1,490 | 483 | 391 | 148 |
| 18 | 90 | 845 | 382 | 195 | e240 | 334 | 549 | 1,510 | 2,190 | 398 | 449 | 340 |
| 19 | 74 | 574 | 323 | e190 | e220 | 316 | 603 | 2,340 | 1,620 | 356 | 335 | 9,220 |
| 20 | 63 | 400 | 645 | e188 | e275 | 906 | 536 | 1,490 | 1,970 | 327 | 291 | 3,220 |
| 21 | 58 | 304 | 1,640 | e182 | 322 | 2,190 | 490 | 1,200 | 3,010 | 299 | 267 | e2,600 |
| 22 | 58 | 274 | 819 | e178 | 2,680 | 1,280 | 596 | 1,050 | 1,620 | 281 | 250 | e2,100 |
| 23 | 54 | 257 | 557 | e170 | 7,710 | 875 | 586 | 872 | 1,150 | 283 | 234 | e4,400 |
| 24 | 52 | 237 | 435 | e165 | 4,060 | 693 | 493 | 830 | 903 | 277 | 219 | e2,500 |
| 25 | 50 | 212 | 456 | e190 | 2,440 | 583 | 456 | 741 | 752 | 255 | 208 | e1,500 |
| 26 | 57 | 187 | 466 | e175 | 1,450 | 513 | 451 | 698 | 653 | 232 | 197 | e1,100 |
| 27 | 71 | 168 | 367 | e157 | 1,080 | 474 | 429 | 643 | 581 | 220 | 194 | e860 |
| 28 | 62 | 150 | 315 | e150 | 894 | 418 | 395 | 634 | 525 | 217 | 189 | e1,000 |
| 29 | 77 | 135 | 287 | e160 | --- | 389 | 377 | 592 | 482 | 231 | 225 | e800 |
| 30 | 176 | 125 | 265 | 152 | --- | 436 | 363 | 744 | 447 | 242 | 201 | e650 |
| 31 | 241 | --- | 248 | 146 | --- | 515 | --- | 602 | --- | 219 | 217 | --- |
| TOTAL | 2,029 | 8,335 | 11,903 | 11,058 | 23,850 | 24,428 | 23,103 | 24,918 | 33,841 | 13,259 | 10,563 | 33,345 |
| MEAN | 65.5 | 278 | 384 | 357 | 852 | 788 | 770 | 804 | 1,128 | 428 | 341 | 1,112 |
| MAX | 241 | 845 | 1,640 | 1,170 | 7,710 | 2,190 | 2,830 | 2,340 | 3,010 | 1,050 | 716 | 9,220 |
| MIN | 35 | 93 | 90 | 146 | 121 | 316 | 363 | 327 | 447 | 217 | 189 | 148 |
| CFSM | 0.17 | 0.74 | 1.02 | 0.95 | 2.27 | 2.10 | 2.05 | 2.14 | 3.01 | 1.14 | 0.91 | 2.96 |
| IN. | 0.20 | 0.83 | 1.18 | 1.10 | 2.37 | 2.42 | 2.29 | 2.47 | 3.36 | 1.32 | 1.05 | 3.31 |

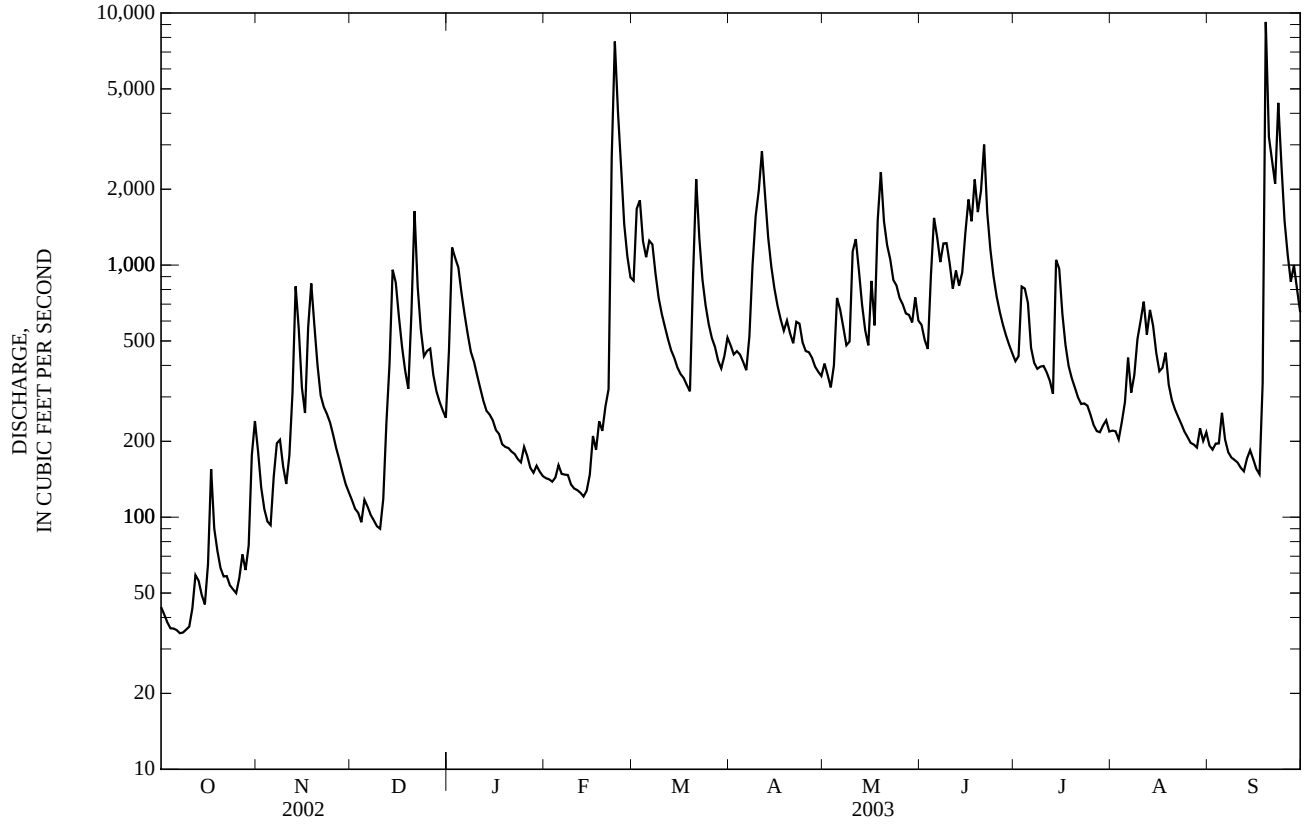
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1928 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 228 | 230 | 298 | 397 | 465 | 579 | 461 | 344 | 262 | 178 | 193 | 211 |
| MAX | 1,138 | 2,019 | 1,111 | 1,436 | 2,288 | 1,704 | 1,674 | 963 | 1,128 | 705 | 1,017 | 1,887 |
| (WY) | (1980) | (1986) | (1949) | (1996) | (1998) | (1936) | (1987) | (1989) | (2003) | (1972) | (1940) | (1996) |
| MIN | 57.6 | 58.9 | 55.8 | 56.4 | 50.2 | 78.2 | 95.8 | 89.7 | 47.1 | 47.2 | 31.8 | 37.8 |
| (WY) | (2002) | (1931) | (1966) | (2002) | (2002) | (2002) | (1981) | (1969) | (2002) | (1966) | (2002) | (2002) |

01625000 MIDDLE RIVER NEAR GROTTOES, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1928 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 44,221 | | 220,632 | | | |
| ANNUAL MEAN | 121 | | 604 | | 320 | |
| HIGHEST ANNUAL MEAN | | | | | 623 | 1998 |
| LOWEST ANNUAL MEAN | | | | | 75.6 | 2002 |
| HIGHEST DAILY MEAN | 1,640 | Dec 21 | 9,220 | Sep 19 | 26,000 | Nov 5, 1985 |
| LOWEST DAILY MEAN | 18 | Sep 14 | 35 | aOct 7 | 18 | Sep 14, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 20 | Sep 9 | 36 | Oct 4 | 20 | Sep 9, 2002 |
| MAXIMUM PEAK FLOW | | | 12,900 | Sep 19 | 44,300 | Sep 7, 1996 |
| MAXIMUM PEAK STAGE | | | 19.31 | Sep 19 | b35.62 | Sep 7, 1996 |
| INSTANTANEOUS LOW FLOW | | | 32 | aOct 7 | c8.9 | Dec 31, 2001 |
| ANNUAL RUNOFF (CFSM) | 0.32 | | 1.61 | | 0.85 | |
| ANNUAL RUNOFF (INCHES) | 4.39 | | 21.89 | | 11.58 | |
| 10 PERCENT EXCEEDS | 264 | | 1,260 | | 635 | |
| 50 PERCENT EXCEEDS | 60 | | 389 | | 186 | |
| 90 PERCENT EXCEEDS | 29 | | 106 | | 81 | |

a Also Oct. 8, 2002.
b From high-water mark in gage house.
c Result of freezeup.
e Estimated.



## 01626000 SOUTH RIVER NEAR WAYNESBORO, VA

LOCATION.--Lat 38°03'27", long 78°54'29", NAD83, 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 $mi^2$, of which 41 $mi^2$ 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 NGVD of 1929.

REMARKS.--Records good except those for periods with ice effect, Jan. 17, 19-24, 26-28, and Feb. 16-19, which are fair. There is discharge of about 4.8 $ft^3/s$ from a wastewater treatment plant upstream from station, originating from well fields. Flow from 41 $mi^2$ 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 $ft^3/s$, from rating curve extended above 4,200 $ft^3/s$ 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 $ft^3/s$.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 23 | 0700 | 2,070 | 6.68 | Sep 19 | 0400 | *13,800 | *13.95 |
| Apr 11 | 1430 | 1,350 | 5.69 | Sep 23 | 2200 | 2,180 | 6.82 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 19 | 45 | 53 | 291 | 57 | 342 | 301 | 170 | 327 | 137 | 77 | 79 |
| 2 | 18 | 37 | 50 | 483 | 58 | 478 | 319 | 149 | 274 | 167 | 79 | 76 |
| 3 | 17 | 33 | 47 | 365 | 57 | 569 | 307 | 137 | 247 | 584 | 87 | 86 |
| 4 | 17 | 32 | 44 | 308 | 62 | 457 | 277 | 155 | 268 | 633 | 187 | 96 |
| 5 | 17 | 31 | 50 | 264 | 68 | 425 | 254 | 152 | 357 | 448 | 244 | 123 |
| 6 | 17 | 50 | 48 | 237 | 60 | 508 | 227 | 146 | 330 | 335 | 203 | 91 |
| 7 | 25 | 55 | 45 | 210 | 62 | 504 | 274 | 134 | 298 | 253 | 161 | 80 |
| 8 | 18 | 45 | 44 | 191 | 60 | 411 | 327 | 126 | 354 | 220 | 207 | 74 |
| 9 | 16 | 39 | 44 | 173 | 55 | 349 | 519 | 200 | 420 | 210 | 178 | 72 |
| 10 | 17 | 35 | 43 | 159 | 57 | 307 | 733 | 366 | 396 | 210 | 353 | 69 |
| 11 | 20 | 53 | 53 | 138 | 57 | 274 | 1,280 | 306 | 336 | 184 | 335 | 65 |
| 12 | 20 | 177 | 70 | 121 | 56 | 248 | 1,030 | 232 | 389 | 157 | 269 | 64 |
| 13 | 23 | 260 | 104 | 115 | 51 | 227 | 686 | 191 | 401 | 138 | 223 | 126 |
| 14 | 19 | 165 | 230 | 111 | 53 | 211 | 525 | 167 | 339 | 132 | 203 | 165 |
| 15 | 19 | 118 | 228 | 103 | 66 | 194 | 435 | 163 | 291 | 126 | 177 | 128 |
| 16 | 41 | 124 | 196 | 94 | e63 | 184 | 372 | 248 | 305 | 116 | 155 | 108 |
| 17 | 52 | 301 | 168 | e92 | e57 | 178 | 321 | 214 | 364 | 106 | 227 | 91 |
| 18 | 30 | 350 | 144 | 81 | e68 | 167 | 290 | 491 | 399 | 98 | 282 | 605 |
| 19 | 23 | 255 | 129 | e78 | e80 | 156 | 289 | 721 | 384 | 92 | 224 | 8,110 |
| 20 | 20 | 196 | 254 | e76 | 89 | 454 | 270 | 522 | 471 | 87 | 187 | 2,910 |
| 21 | 20 | 159 | 313 | e74 | 104 | 759 | 251 | 430 | 490 | 81 | 159 | 1,700 |
| 22 | 20 | 136 | 250 | e70 | 811 | 517 | 239 | 422 | 402 | 77 | 139 | 1,210 |
| 23 | 19 | 111 | 208 | e64 | 1,950 | 379 | 221 | 395 | 327 | 80 | 125 | 1,850 |
| 24 | 19 | 93 | 185 | e61 | 1,420 | 313 | 203 | 391 | 275 | 81 | 111 | 1,550 |
| 25 | 19 | 82 | 190 | 66 | 890 | 274 | 193 | 358 | 238 | 74 | 101 | 970 |
| 26 | 21 | 73 | 171 | e60 | 622 | 250 | 190 | 371 | 212 | 67 | 91 | 716 |
| 27 | 26 | 67 | 147 | e56 | 463 | 236 | 182 | 367 | 192 | 64 | 83 | 575 |
| 28 | 25 | 61 | 134 | e53 | 381 | 210 | 165 | 360 | 177 | 62 | 82 | 640 |
| 29 | 32 | 57 | 125 | 60 | --- | 219 | 153 | 365 | 163 | 90 | 122 | 491 |
| 30 | 84 | 56 | 118 | 59 | --- | 264 | 148 | 409 | 148 | 80 | 92 | 365 |
| 31 | 62 | --- | 112 | 58 | --- | 291 | --- | 362 | --- | 69 | 83 | --- |
| TOTAL | 795 | 3,296 | 3,997 | 4,371 | 7,877 | 10,355 | 10,981 | 9,220 | 9,574 | 5,258 | 5,246 | 23,285 |
| MEAN | 25.6 | 110 | 129 | 141 | 281 | 334 | 366 | 297 | 319 | 170 | 169 | 776 |
| MAX | 84 | 350 | 313 | 483 | 1,950 | 759 | 1,280 | 721 | 490 | 633 | 353 | 8,110 |
| MIN | 16 | 31 | 43 | 53 | 51 | 156 | 148 | 126 | 148 | 62 | 77 | 64 |
| CFSM | 0.20 | 0.87 | 1.02 | 1.11 | 2.22 | 2.63 | 2.88 | 2.34 | 2.51 | 1.34 | 1.33 | 6.11 |
| IN. | 0.23 | 0.97 | 1.17 | 1.28 | 2.31 | 3.03 | 3.22 | 2.70 | 2.80 | 1.54 | 1.54 | 6.82 |

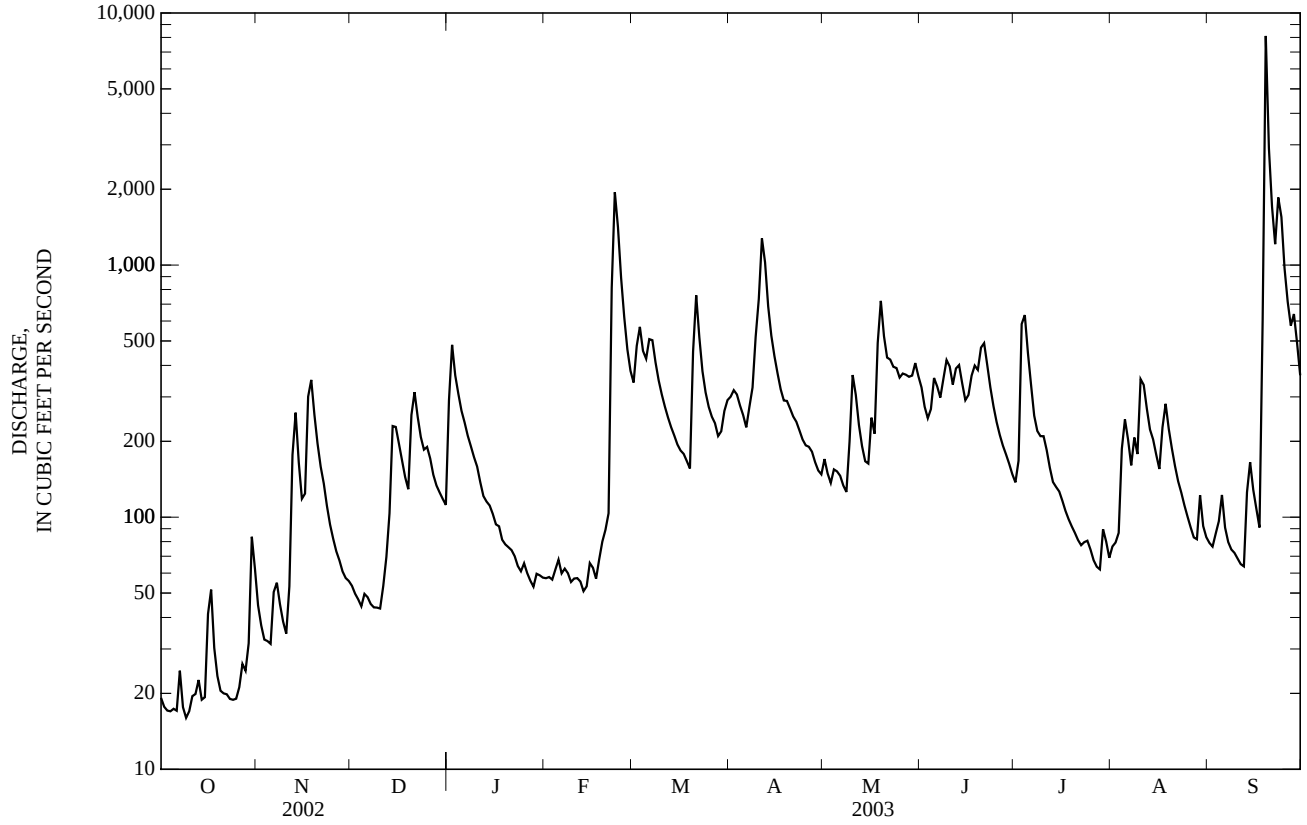
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 109 | 128 | 132 | 175 | 204 | 276 | 240 | 165 | 119 | 66.9 | 79.8 | 95.9 |
| MAX | 549 | 1,214 | 355 | 767 | 1,312 | 748 | 1,062 | 485 | 875 | 305 | 700 | 776 |
| (WY) | (1973) | (1986) | (1997) | (1996) | (1998) | (1993) | (1987) | (1989) | (1972) | (1972) | (1955) | (2003) |
| MIN | 25.5 | 24.7 | 24.2 | 23.6 | 23.8 | 49.0 | 44.0 | 50.4 | 22.1 | 21.5 | 18.5 | 18.4 |
| (WY) | (1966) | (2002) | (1966) | (1966) | (2002) | (1981) | (1981) | (1981) | (2002) | (2002) | (2002) | (2002) |

01626000 SOUTH RIVER NEAR WAYNESBORO, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1953 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 19,245 | | 94,255 | | | |
| ANNUAL MEAN | 52.7 | | 258 | | 149 | |
| HIGHEST ANNUAL MEAN | | | | | 312 | 1998 |
| LOWEST ANNUAL MEAN | | | | | 37.1 | 2002 |
| HIGHEST DAILY MEAN | 464 | Apr 22 | 8,110 | Sep 19 | 9,670 | Aug 18, 1955 |
| LOWEST DAILY MEAN | 16 | aSep 12 | 16 | Oct 9 | 16 | aSep 12, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 16 | bSep 11 | 18 | Oct 3 | 16 | bSep 11, 2002 |
| MAXIMUM PEAK FLOW | | | 13,800 | Sep 19 | 17,500 | Nov 4, 1985 |
| MAXIMUM PEAK STAGE | | | 13.95 | Sep 19 | 15.30 | Nov 4, 1985 |
| INSTANTANEOUS LOW FLOW | | | 15 | Oct 9 | c7.0 | Jul 18, 1966 |
| ANNUAL RUNOFF (CFSM) | 0.42 | | 2.03 | | 1.17 | |
| ANNUAL RUNOFF (INCHES) | 5.64 | | 27.61 | | 15.93 | |
| 10 PERCENT EXCEEDS | 120 | | 474 | | 299 | |
| 50 PERCENT EXCEEDS | 26 | | 163 | | 81 | |
| 90 PERCENT EXCEEDS | 18 | | 44 | | 32 | |

a Also Sept. 13-15, 19, 24, 25 and Oct. 9, 2002.
b Also Sept. 12, 2002.
c Result of regulation from unknown source upstream from gage.
e Estimated.



## 01627500 SOUTH RIVER AT HARRISTON, VA

LOCATION.--Lat 38°13'07", long 78°50'12", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Sept. 1, 1938, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Jan. 24, 25, 27, 28 and Feb. 16-18, which are fair. There are discharges of about 11.1 $ft^3/s$ from industrial and municipal wastewater treatment plants upstream from station, originating from well fields. Maximum discharge, 28,900 $ft^3/s$, from rating curve extended above 10,000 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 23 | 0930 | 4,150 | 7.98 | Sep 19 | 0715 | *22,000 | *14.41 |
| Mar 21 | 0100 | 1,600 | 5.31 | Sep 21 | 1330 | 2,330 | 6.16 |
| Apr 11 | 0945 | 2,200 | 6.01 | Sep 23 | 1130 | 3,600 | 7.46 |
| May 19 | 0515 | 1,450 | 5.10 | Sep 28 | 0200 | 1,230 | 4.78 |
| Jun 20 | 2230 | 1,290 | 4.85 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 41 | 80 | 96 | 265 | 96 | 556 | 510 | 267 | 534 | 217 | 135 | 137 |
| 2 | 40 | 67 | 91 | 762 | 95 | 786 | 529 | 242 | 442 | 246 | 139 | 131 |
| 3 | 39 | 59 | 88 | 571 | 95 | 995 | 507 | 219 | 395 | 744 | 140 | 136 |
| 4 | 38 | 57 | 84 | 474 | 100 | 785 | 456 | 236 | 431 | 1,010 | 307 | 158 |
| 5 | 37 | 56 | 91 | 393 | 106 | 704 | 407 | 239 | 499 | 704 | 272 | 178 |
| 6 | 37 | 83 | 87 | 345 | 100 | 877 | 359 | 229 | 501 | 524 | 310 | 154 |
| 7 | 39 | 88 | 83 | 298 | 102 | 891 | 430 | 217 | 457 | 408 | 252 | 137 |
| 8 | 41 | 77 | 80 | 263 | 99 | 703 | 555 | 206 | 524 | 348 | 298 | 129 |
| 9 | 37 | 68 | 80 | 241 | 94 | 584 | 868 | 279 | 594 | 323 | 252 | 125 |
| 10 | 35 | 62 | 78 | 219 | 92 | 509 | 1,210 | 652 | 580 | 334 | 378 | 121 |
| 11 | 42 | 105 | 96 | 200 | 93 | 448 | 2,030 | 611 | 492 | 285 | 478 | 116 |
| 12 | 48 | 194 | 111 | 181 | 91 | 403 | 1,650 | 469 | 606 | 247 | 395 | 113 |
| 13 | 40 | 441 | 137 | 168 | 88 | 366 | 1,080 | 365 | 625 | 220 | 362 | 166 |
| 14 | 39 | 245 | 337 | 162 | 87 | 336 | 799 | 302 | 544 | 209 | 313 | 227 |
| 15 | 36 | 174 | 385 | 154 | 105 | 306 | 652 | 274 | 483 | 201 | 266 | 198 |
| 16 | 86 | 167 | 312 | 141 | e130 | 288 | 561 | 447 | 480 | 187 | 236 | 171 |
| 17 | 86 | 400 | 257 | 138 | e115 | 276 | 490 | 397 | 536 | 176 | 272 | 152 |
| 18 | 60 | 607 | 219 | 128 | e150 | 261 | 442 | 825 | 622 | 166 | 351 | 252 |
| 19 | 47 | 412 | 197 | 126 | 127 | 245 | 451 | 1,300 | 619 | 160 | 318 | 12,500 |
| 20 | 42 | 300 | 297 | 125 | 128 | 613 | 408 | 922 | 840 | 157 | 253 | 4,940 |
| 21 | 41 | 237 | 470 | 121 | 150 | 1,360 | 377 | 728 | 1,010 | 147 | 221 | 2,450 |
| 22 | 41 | 206 | 379 | 116 | 1,460 | 903 | 369 | 677 | 748 | 141 | 202 | 1,710 |
| 23 | 40 | 177 | 304 | 111 | 3,830 | 638 | 332 | 622 | 581 | 149 | 184 | 2,950 |
| 24 | 39 | 152 | 258 | e108 | 2,450 | 517 | 301 | 605 | 471 | 140 | 170 | 2,350 |
| 25 | 39 | 136 | 270 | e104 | 1,510 | 438 | 282 | 552 | 397 | 137 | 160 | 1,460 |
| 26 | 51 | 124 | 251 | 102 | 1,010 | 393 | 280 | 557 | 344 | 128 | 148 | 1,090 |
| 27 | 44 | 116 | 213 | e95 | 752 | 369 | 269 | 543 | 305 | 122 | 139 | 858 |
| 28 | 48 | 109 | 196 | e91 | 612 | 324 | 248 | 543 | 275 | 118 | 134 | 1,050 |
| 29 | 59 | 103 | 184 | 99 | --- | 338 | 233 | 566 | 253 | 144 | 161 | 803 |
| 30 | 116 | 100 | 174 | 97 | --- | 461 | 225 | 684 | 234 | 147 | 160 | 593 |
| 31 | 106 | --- | 166 | 96 | --- | 505 | --- | 595 | --- | 128 | 149 | --- |
| TOTAL | 1,534 | 5,202 | 6,071 | 6,494 | 13,867 | 17,178 | 17,310 | 15,370 | 15,422 | 8,367 | 7,555 | 35,555 |
| MEAN | 49.5 | 173 | 196 | 209 | 495 | 554 | 577 | 496 | 514 | 270 | 244 | 1,185 |
| MAX | 116 | 607 | 470 | 762 | 3,830 | 1,360 | 2,030 | 1,300 | 1,010 | 1,010 | 478 | 12,500 |
| MIN | 35 | 56 | 78 | 91 | 87 | 245 | 225 | 206 | 234 | 118 | 134 | 113 |
| CFSM | 0.23 | 0.82 | 0.92 | 0.99 | 2.34 | 2.61 | 2.72 | 2.34 | 2.42 | 1.27 | 1.15 | 5.59 |
| IN. | 0.27 | 0.91 | 1.07 | 1.14 | 2.43 | 3.01 | 3.04 | 2.70 | 2.71 | 1.47 | 1.33 | 6.24 |

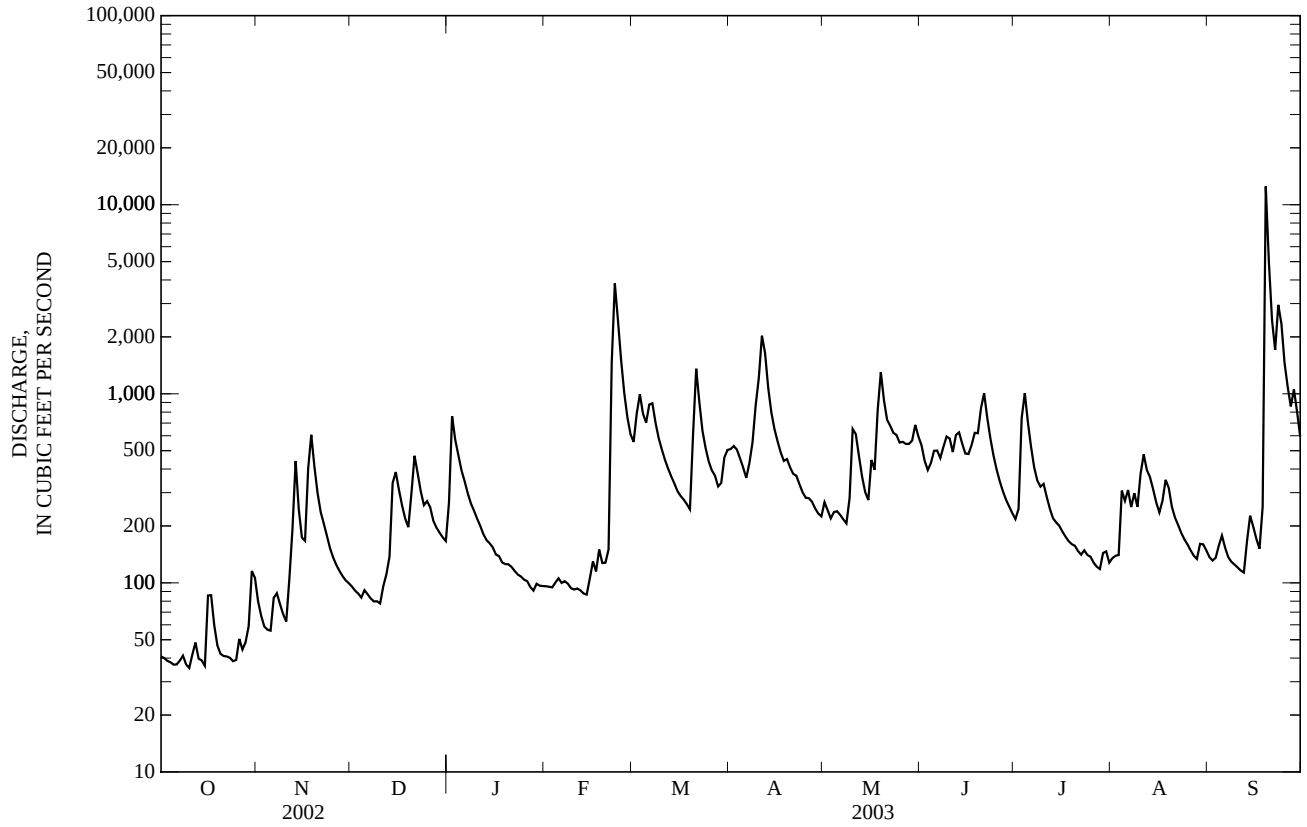
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1926 - 1951, 1969 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 217 | 228 | 247 | 307 | 350 | 403 | 392 | 282 | 208 | 132 | 147 | 195 |
| MAX | 1,048 | 1,988 | 802 | 1,252 | 2,160 | 1,407 | 1,414 | 819 | 1,454 | 520 | 925 | 1,185 |
| (WY) | (1943) | (1986) | (1949) | (1996) | (1998) | (1936) | (1987) | (1989) | (1972) | (1972) | (1940) | (2003) |
| MIN | 46.5 | 54.0 | 53.8 | 55.7 | 55.4 | 97.8 | 93.1 | 83.2 | 47.6 | 46.8 | 38.5 | 41.0 |
| (WY) | (1931) | (1931) | (1932) | (2002) | (2002) | (2002) | (1981) | (1930) | (2002) | (2002) | (2002) | (1930) |

01627500 SOUTH RIVER AT HARRISTON, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1926 - 1951, 1969 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 33,027 | | 149,925 | | | |
| ANNUAL MEAN | 90.5 | | 411 | | 260 | |
| HIGHEST ANNUAL MEAN | | | | | 516 | 1998 |
| LOWEST ANNUAL MEAN | | | | | 69.8 | 2002 |
| HIGHEST DAILY MEAN | 663 | Apr 22 | 12,500 | Sep 19 | 16,400 | Nov 5, 1985 |
| LOWEST DAILY MEAN | 35 | aSep 12 | 35 | Oct 10 | b25 | Aug 24, 1930 |
| ANNUAL SEVEN-DAY MINIMUM | 36 | Aug 21 | 38 | Oct 4 | 36 | Aug 21, 2002 |
| MAXIMUM PEAK FLOW | | | 22,000 | Sep 19 | 28,900 | Sep 6, 1996 |
| MAXIMUM PEAK STAGE | | | 14.41 | Sep 19 | c17.20 | Oct 15, 1942 |
| INSTANTANEOUS LOW FLOW | | | 34 | Oct 10 | b17 | Nov 14, 1941 |
| ANNUAL RUNOFF (CFSM) | 0.43 | | 1.94 | | 1.22 | |
| ANNUAL RUNOFF (INCHES) | 5.80 | | 26.31 | | 16.64 | |
| 10 PERCENT EXCEEDS | 179 | | 756 | | 490 | |
| 50 PERCENT EXCEEDS | 57 | | 245 | | 153 | |
| 90 PERCENT EXCEEDS | 38 | | 80 | | 68 | |

a Also Sept. 13 and Oct. 10, 2002.
b Probably result of regulation by mill then in existence upstream from station.
c Peak discharge 23,100 $ft^3/s$.
e Estimated.



## 01628500 SOUTH FORK SHENANDOAH RIVER NEAR LYNNWOOD, VA

LOCATION.--Lat 38°19'21", long 78°45'17", NAD83, Rockingham County, Hydrologic Unit 02070005, on left bank 1.2 mi northeast of Lynnwood and 3.3 mi downstream from confluence of North and South Rivers.

DRAINAGE AREA.--1,084 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except those for periods with ice effect, Jan. 20, 21, 25, and period of doubtful gage-height record, Feb. 17-19, which are 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 $ft^3/s$, from rating curve extended above 22,000 $ft^3/s$ on basis of computations of flow over dam at gage heights 23.60 ft and 27.2 ft. Minimum gage height, 1.63 ft, Sept. 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 Sept. 7, 1996.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 7,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 23 | 1200 | 20,200 | 15.19 | Jun 21 | 0330 | 9,390 | 10.52 |
| Mar 21 | 0100 | 8,400 | 9.87 | Sep 19 | 1530 | *48,400 | *22.40 |
| Apr 11 | 1100 | 9,940 | 10.87 | Sep 23 | 0700 | 18,100 | 14.46 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 186 | 1,260 | 429 | 1,220 | 439 | 2,590 | 1,730 | 1,270 | 1,670 | 1,110 | 641 | 597 |
| 2 | 179 | 905 | 394 | 3,930 | 435 | 3,940 | 1,690 | 1,190 | 1,440 | 1,120 | 639 | 658 |
| 3 | 177 | 666 | 364 | 3,710 | 428 | 5,050 | 1,760 | 1,110 | 1,300 | 2,280 | 609 | 715 |
| 4 | 179 | 515 | 328 | 3,280 | 435 | 3,800 | 1,760 | 1,200 | 2,030 | 2,750 | 856 | 695 |
| 5 | 176 | 431 | 321 | 2,650 | 458 | 3,500 | 1,660 | 1,860 | 3,220 | 2,300 | 848 | 796 |
| 6 | 174 | 571 | 318 | 2,190 | 435 | 4,310 | 1,530 | 2,000 | 3,250 | 1,570 | 1,140 | 708 |
| 7 | 167 | 705 | 298 | 1,820 | 437 | 4,460 | 1,800 | 1,860 | 2,790 | 1,880 | 936 | 647 |
| 8 | 175 | 739 | 297 | 1,560 | 430 | 3,620 | 2,930 | 1,640 | 3,160 | 1,440 | 997 | 608 |
| 9 | 167 | 631 | 278 | 1,420 | 405 | 3,010 | 4,380 | 1,550 | 3,390 | 1,450 | 1,100 | 586 |
| 10 | 164 | 539 | 260 | 1,260 | 399 | 2,650 | 6,040 | 3,170 | 3,110 | 1,480 | 1,830 | 564 |
| 11 | 181 | 609 | 309 | 1,120 | 398 | 2,360 | 8,650 | 4,040 | 2,590 | 1,370 | 2,500 | 541 |
| 12 | 250 | 1,020 | 621 | 1,010 | 391 | 2,100 | 6,730 | 3,430 | 2,600 | 1,240 | 2,930 | 526 |
| 13 | 209 | 2,870 | 1,020 | 930 | 372 | 1,890 | 4,640 | 2,620 | 2,480 | 1,100 | 2,180 | 588 |
| 14 | 196 | 2,390 | 2,460 | 882 | 370 | 1,780 | 3,530 | 2,050 | 2,970 | 1,630 | 1,950 | 674 |
| 15 | 188 | 1,670 | 2,550 | 842 | 417 | 1,730 | 2,870 | 1,660 | 3,680 | 1,700 | 1,560 | 631 |
| 16 | 292 | 1,290 | 2,050 | 780 | 588 | 1,660 | 2,410 | 2,160 | 4,090 | 1,270 | 1,300 | 574 |
| 17 | 537 | 1,820 | 1,630 | 735 | e530 | 1,560 | 2,060 | 1,700 | 3,800 | 1,060 | 1,220 | 539 |
| 18 | 498 | 2,610 | 1,330 | 672 | e840 | 1,450 | 1,800 | 3,420 | 5,930 | 942 | 1,350 | 682 |
| 19 | 492 | 2,060 | 1,120 | 653 | e650 | 1,370 | 1,970 | 6,480 | 4,980 | 885 | 1,130 | 33,800 |
| 20 | 371 | 1,610 | 1,990 | e620 | 544 | 2,880 | 1,810 | 4,610 | 5,780 | 880 | 979 | 15,000 |
| 21 | 302 | 1,280 | 4,570 | e610 | 631 | 7,200 | 1,720 | 3,840 | 7,410 | 790 | 887 | 7,340 |
| 22 | 264 | 1,190 | 3,080 | 585 | 5,460 | 4,800 | 1,820 | 3,390 | 4,450 | 753 | 829 | 5,030 |
| 23 | 240 | 1,060 | 2,320 | 532 | 18,400 | 3,430 | 1,700 | 2,860 | 3,330 | 751 | 769 | 14,200 |
| 24 | 216 | 962 | 1,820 | 491 | 11,400 | 2,750 | 1,490 | 2,660 | 2,620 | 779 | 717 | 7,860 |
| 25 | 204 | 862 | 1,680 | e550 | 7,350 | 2,270 | 1,370 | 2,330 | 2,150 | 718 | 682 | 4,670 |
| 26 | 250 | 758 | 1,560 | 511 | 4,710 | 1,960 | 1,350 | 2,150 | 1,820 | 666 | 651 | 3,430 |
| 27 | 253 | 670 | 1,270 | 479 | 3,530 | 1,770 | 1,340 | 1,980 | 1,590 | 635 | 628 | 2,730 |
| 28 | 238 | 583 | 1,110 | 440 | 2,890 | 1,560 | 1,310 | 1,930 | 1,420 | 620 | 607 | 3,220 |
| 29 | 313 | 514 | 1,020 | 473 | --- | 1,460 | 1,270 | 1,790 | 1,290 | 636 | 644 | 2,570 |
| 30 | 1,120 | 474 | 954 | 455 | --- | 1,630 | 1,220 | 2,080 | 1,190 | 667 | 648 | 2,040 |
| 31 | 1,630 | --- | 892 | 445 | --- | 1,820 | --- | 1,790 | --- | 622 | 627 | --- |
| TOTAL | 9,988 | 33,264 | 38,643 | 36,855 | 63,772 | 86,360 | 76,340 | 75,820 | 91,530 | 37,094 | 34,384 | 113,219 |
| MEAN | 322 | 1,109 | 1,247 | 1,189 | 2,278 | 2,786 | 2,545 | 2,446 | 3,051 | 1,197 | 1,109 | 3,774 |
| MAX | 1,630 | 2,870 | 4,570 | 3,930 | 18,400 | 7,200 | 8,650 | 6,480 | 7,410 | 2,750 | 2,930 | 33,800 |
| MIN | 164 | 431 | 260 | 440 | 370 | 1,370 | 1,220 | 1,110 | 1,190 | 620 | 607 | 526 |
| CFSM | 0.30 | 1.02 | 1.15 | 1.10 | 2.10 | 2.57 | 2.35 | 2.26 | 2.81 | 1.10 | 1.02 | 3.48 |
| IN. | 0.34 | 1.14 | 1.33 | 1.26 | 2.19 | 2.96 | 2.62 | 2.60 | 3.14 | 1.27 | 1.18 | 3.89 |

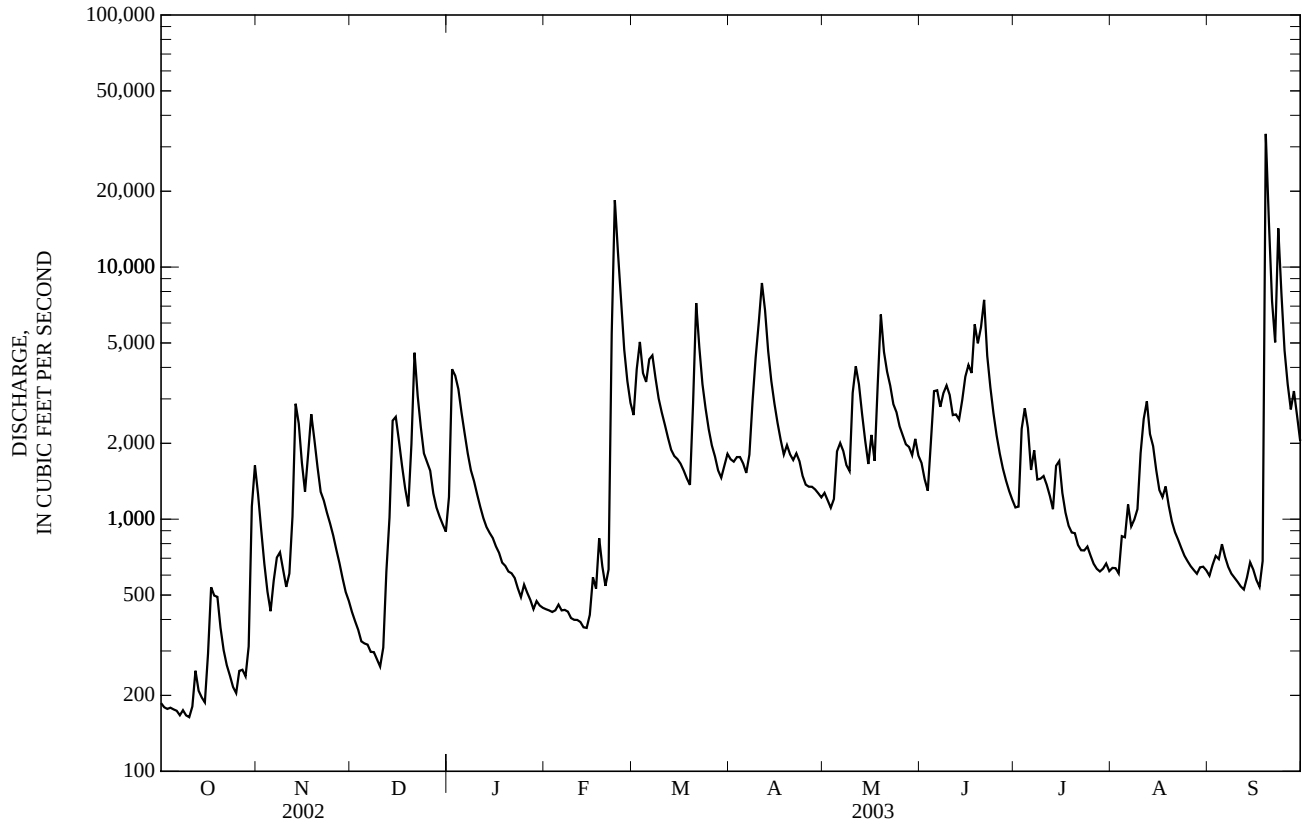
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 709 | 767 | 939 | 1,228 | 1,435 | 1,865 | 1,571 | 1,203 | 882 | 546 | 610 | 662 |
| MAX | 4,172 | 6,886 | 3,302 | 4,904 | 6,939 | 5,785 | 5,454 | 3,086 | 3,656 | 2,013 | 2,895 | 5,822 |
| (WY) | (1943) | (1986) | (1949) | (1996) | (1998) | (1936) | (1987) | (1989) | (1972) | (1949) | (1940) | (1996) |
| MIN | 122 | 150 | 156 | 154 | 168 | 333 | 317 | 362 | 215 | 155 | 137 | 142 |
| (WY) | (1931) | (1931) | (1966) | (1966) | (2002) | (2002) | (1981) | (1977) | (2002) | (2002) | (2002) | (2002) |

01628500 SOUTH FORK SHENANDOAH RIVER NEAR LYNNWOOD, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1931 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 177,542 | | 697,269 | | | |
| ANNUAL MEAN | 486 | | 1,910 | | 1,033 | |
| HIGHEST ANNUAL MEAN | | | | | 2,020 | 1996 |
| LOWEST ANNUAL MEAN | | | | | 306 | 2002 |
| HIGHEST DAILY MEAN | 5,230 | Apr 22 | 33,800 | Sep 19 | e63,500 | Sep 7, 1996 |
| LOWEST DAILY MEAN | 84 | aJul 7 | 164 | Oct 10 | 84 | aJul 7, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 90 | bAug 21 | 172 | cOct 4 | 90 | bAug 21, 2002 |
| MAXIMUM PEAK FLOW | | | 48,400 | Sep 19 | 107,000 | Sep 7, 1996 |
| MAXIMUM PEAK STAGE | | | 22.40 | Sep 19 | d30.84 | Sep 7, 1996 |
| INSTANTANEOUS LOW FLOW | | | 160 | fOct 7 | g32 | Sep 20, 1932 |
| ANNUAL RUNOFF (CFSM) | 0.45 | | 1.76 | | 0.95 | |
| ANNUAL RUNOFF (INCHES) | 6.09 | | 23.93 | | 12.94 | |
| 10 PERCENT EXCEEDS | 1,170 | | 3,800 | | 2,120 | |
| 50 PERCENT EXCEEDS | 209 | | 1,280 | | 594 | |
| 90 PERCENT EXCEEDS | 112 | | 372 | | 234 | |

a Also Aug. 25, 2002.
b Also Aug. 22, 2002.
c Also Oct. 5, 2002.
d From high-water mark in gage house.
e Estimated.
f Also Oct. 9-11, 2002.
g Result of regulation.



## 01629500 SOUTH FORK SHENANDOAH RIVER NEAR LURAY, VA

LOCATION.--Lat 38°38'46", long 78°32'05", NAD83, 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 $mi^2$.

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 NGVD of 1929. April 1925 to September 1930, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Jan. 19, 24, 26-28, and periods of doubtful gage-height record, Feb. 26 to Mar. 9, Apr. 27 to May 4, May 20 to June 4, June 11-14, June 24 to July 2, and July 5-31, which are 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 $ft^3/s$, from rating curve extended above 86,300 $ft^3/s$. Minimum gage height, 1.88 ft, Sept. 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 $ft^3/s$.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 8,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 23 | 1815 | 28,000 | 14.48 | Jun 18 | 2400 | 9,530 | 8.15 |
| Mar 21 | 0945 | 12,000 | 9.30 | Jun 21 | 1315 | 12,200 | 9.37 |
| Apr 11 | 1915 | 13,800 | 10.10 | Sep 20 | 0030 | *50,600 | *19.11 |
| May 19 | 1745 | 9,440 | 8.11 | Sep 23 | 1230 | 32,500 | 15.49 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 296 | 1,870 | 569 | 2,190 | 585 | e3,300 | 2,510 | e1,550 | e2,250 | e1,550 | 809 | 809 |
| 2 | 267 | 1,330 | 537 | 6,180 | 581 | e4,500 | 2,570 | e1,520 | e2,000 | e1,440 | 845 | 865 |
| 3 | 248 | 941 | 482 | 5,860 | 582 | e7,100 | 2,500 | e1,460 | e1,800 | 3,420 | 816 | 991 |
| 4 | 245 | 719 | 444 | 5,100 | 598 | e5,700 | 2,450 | e1,410 | e2,000 | 5,080 | 879 | 1,010 |
| 5 | 236 | 575 | 443 | 4,030 | 608 | e5,200 | 2,310 | 1,920 | 3,750 | e3,700 | 1,170 | 1,010 |
| 6 | 227 | 539 | 398 | 3,190 | 606 | e6,200 | 2,110 | 2,480 | 4,820 | e2,650 | 1,370 | 1,030 |
| 7 | 225 | 687 | 389 | 2,520 | 601 | e7,000 | 2,180 | 2,430 | 4,020 | e2,350 | 1,500 | 897 |
| 8 | 209 | 790 | 370 | 2,060 | 578 | e5,700 | 3,770 | 2,220 | 4,480 | e2,150 | 1,290 | 819 |
| 9 | 206 | 763 | 390 | 1,800 | 556 | e4,800 | 5,420 | 2,000 | 4,890 | e2,000 | 1,330 | 764 |
| 10 | 212 | 671 | 360 | 1,600 | 545 | 3,970 | 8,750 | 3,010 | 4,790 | e1,950 | 1,890 | 738 |
| 11 | 231 | 652 | 399 | 1,400 | 534 | 3,470 | 11,700 | 5,060 | e3,700 | e1,800 | 2,920 | 703 |
| 12 | 233 | 1,010 | 512 | 1,230 | 533 | 3,010 | 10,700 | 5,010 | e3,450 | e1,700 | 3,730 | 680 |
| 13 | 262 | 2,630 | 988 | 1,080 | 515 | 2,650 | 7,510 | 3,850 | e3,200 | e1,500 | 2,790 | 778 |
| 14 | 267 | 3,670 | 2,480 | 1,030 | 490 | 2,460 | 5,610 | 2,960 | e3,900 | e1,320 | 2,600 | 954 |
| 15 | 229 | 2,440 | 3,670 | 969 | 533 | 2,310 | 4,470 | 2,370 | 4,570 | e2,300 | 2,180 | 1,030 |
| 16 | 335 | 1,780 | 3,050 | 909 | 633 | 2,220 | 3,700 | 2,710 | 6,490 | e1,900 | 1,830 | 910 |
| 17 | 425 | 1,990 | 2,330 | 851 | 497 | 2,090 | 3,090 | 2,900 | 5,500 | e1,500 | 1,670 | 806 |
| 18 | 612 | 3,560 | 1,850 | 821 | 583 | 1,960 | 2,630 | 3,430 | 8,200 | e1,200 | 1,650 | 1,090 |
| 19 | 528 | 3,180 | 1,530 | e760 | 770 | 1,820 | 2,730 | 8,540 | 8,310 | e1,150 | 1,640 | 38,900 |
| 20 | 537 | 2,340 | 1,680 | 738 | 738 | 3,330 | 2,640 | e6,700 | 7,450 | e1,100 | 1,390 | 29,900 |
| 21 | 426 | 1,810 | 5,210 | 757 | 803 | 10,500 | 2,400 | e5,200 | 10,800 | e1,060 | 1,210 | 11,100 |
| 22 | 339 | 1,530 | 4,660 | 717 | 4,190 | 8,130 | 2,430 | e4,600 | 7,790 | e1,020 | 1,090 | 7,780 |
| 23 | 296 | 1,380 | 3,250 | 689 | 23,200 | 5,650 | 2,450 | e4,000 | 5,740 | e950 | 1,030 | 22,100 |
| 24 | 271 | 1,220 | 2,370 | e625 | 18,800 | 4,330 | 2,160 | e3,600 | e4,100 | e1,040 | 940 | 14,000 |
| 25 | 249 | 1,120 | 1,940 | 611 | 11,700 | 3,450 | 1,970 | e3,250 | e3,150 | e1,000 | 866 | 7,910 |
| 26 | 253 | 970 | 1,860 | e605 | e7,200 | 2,830 | 1,900 | e2,950 | e2,600 | e950 | 841 | 5,660 |
| 27 | 258 | 842 | 1,510 | e575 | e4,700 | 2,480 | e1,800 | e2,700 | e2,100 | e940 | 803 | 4,370 |
| 28 | 300 | 742 | 1,250 | e560 | e3,800 | 2,180 | e1,740 | e2,630 | e1,950 | e920 | 785 | 4,460 |
| 29 | 320 | 687 | 1,100 | 563 | --- | 1,990 | e1,680 | e2,500 | e1,750 | e900 | 769 | 4,070 |
| 30 | 561 | 607 | 986 | 596 | --- | 2,140 | e1,600 | e2,600 | e1,600 | e850 | 834 | 3,150 |
| 31 | 1,810 | --- | 899 | 582 | --- | 2,520 | --- | e2,500 | --- | e820 | 825 | --- |
| TOTAL | 11,113 | 43,045 | 47,906 | 51,198 | 86,059 | 124,990 | 109,480 | 100,060 | 131,150 | 52,210 | 44,292 | 169,284 |
| MEAN | 358 | 1,435 | 1,545 | 1,652 | 3,074 | 4,032 | 3,649 | 3,228 | 4,372 | 1,684 | 1,429 | 5,643 |
| MAX | 1,810 | 3,670 | 5,210 | 6,180 | 23,200 | 10,500 | 11,700 | 8,540 | 10,800 | 5,080 | 3,730 | 38,900 |
| MIN | 206 | 539 | 360 | 560 | 490 | 1,820 | 1,600 | 1,410 | 1,600 | 820 | 769 | 680 |
| CFSM | 0.26 | 1.04 | 1.12 | 1.20 | 2.23 | 2.93 | 2.65 | 2.34 | 3.17 | 1.22 | 1.04 | 4.10 |
| IN. | 0.30 | 1.16 | 1.29 | 1.38 | 2.32 | 3.38 | 2.96 | 2.70 | 3.54 | 1.41 | 1.20 | 4.57 |

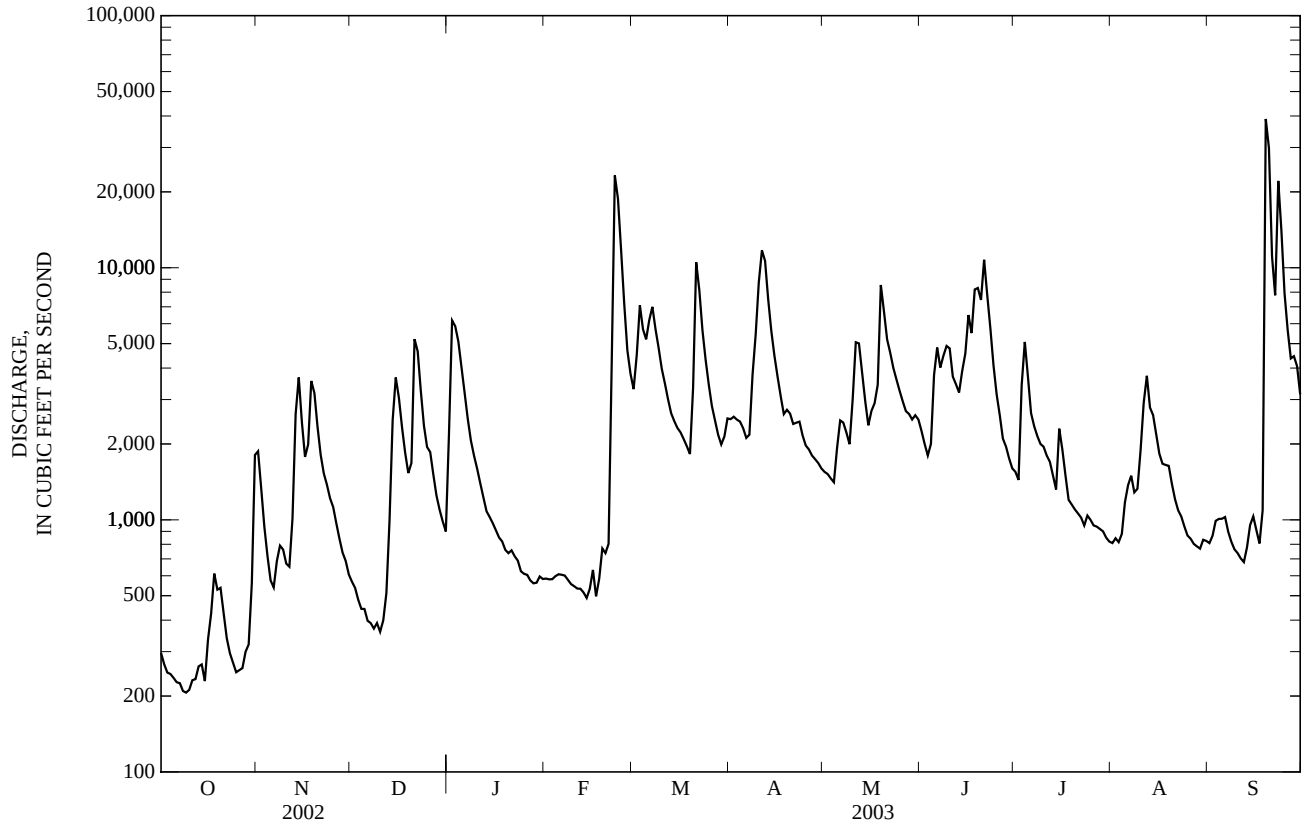
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1926 - 1930, 1939 - 1951, 1980 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 985 | 1,104 | 1,290 | 1,563 | 1,977 | 2,261 | 2,162 | 1,662 | 1,262 | 755 | 846 | 1,103 |
| MAX | 6,332 | 8,783 | 3,821 | 6,490 | 9,892 | 7,143 | 7,412 | 4,449 | 4,372 | 2,460 | 3,637 | 8,043 |
| (WY) | (1943) | (1986) | (1949) | (1996) | (1998) | (1993) | (1987) | (1989) | (2003) | (1949) | (1940) | (1996) |
| MIN | 237 | 249 | 307 | 260 | 276 | 482 | 452 | 499 | 332 | 231 | 216 | 228 |
| (WY) | (2002) | (2002) | (2002) | (1981) | (2002) | (2002) | (1981) | (1930) | (1999) | (2002) | (2002) | (2002) |

01629500 SOUTH FORK SHENANDOAH RIVER NEAR LURAY, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1926 - 1930, 1939 - 1951, 1980 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 238,179 | | 970,787 | | | |
| ANNUAL MEAN | 653 | | 2,660 | | 1,403 | |
| HIGHEST ANNUAL MEAN | | | | | 2,707 | 1996 |
| LOWEST ANNUAL MEAN | | | | | 440 | 2002 |
| HIGHEST DAILY MEAN | e8,290 | Apr 23 | 38,900 | Sep 19 | 84,400 | Sep 7, 1996 |
| LOWEST DAILY MEAN | 163 | Aug 27 | 206 | Oct 9 | a135 | bSep 28, 1930 |
| ANNUAL SEVEN-DAY MINIMUM | 168 | Aug 21 | 220 | Oct 6 | 168 | Aug 21, 2002 |
| MAXIMUM PEAK FLOW | | | 50,600 | Sep 20 | 112,000 | Sep 7, 1996 |
| MAXIMUM PEAK STAGE | | | 19.11 | Sep 20 | 26.95 | Sep 7, 1996 |
| INSTANTANEOUS LOW FLOW | | | 204 | Oct 9 | a70 | Sep 27, 1941 |
| ANNUAL RUNOFF (CFSM) | 0.47 | | 1.93 | | 1.02 | |
| ANNUAL RUNOFF (INCHES) | 6.43 | | 26.23 | | 13.84 | |
| 10 PERCENT EXCEEDS | 1,520 | | 5,540 | | 2,800 | |
| 50 PERCENT EXCEEDS | 321 | | 1,740 | | 820 | |
| 90 PERCENT EXCEEDS | 189 | | 494 | | 352 | |

a Result of regulation.
b Also Sept. 16, 1925; data collected for only part of 1925 water year.
e Estimated.



## 01630700 GOONEY RUN NEAR GLEN ECHO, VA

LOCATION.--Lat 38°50'06", long 78°13'55", NAD83, Warren County, Hydrologic Unit 02070005, on right bank along State Highway 649 (Browntown Road), 40 ft upstream from bridge on State Highway 622, 6.3 mi southwest of Front Royal, and 1.1 mi south of Glen Echo.

DRAINAGE AREA.--20.6 $mi^2$.

PERIOD OF RECORD.--May 2002 to current year.

GAGE.--Water stage recorder. Datum of gage is 819 ft NGVD of 1929, from topographic map.

REMARKS.--Records good except for period with ice effect, Jan. 16 to Feb. 21, 2003, which is fair. Miscellaneous water-quality data collected at this site in 1968 and 1969 were published as site 01630600.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | --- | --- | --- | --- | --- | --- | --- | --- | 15 | 2.7 | 0.60 | 0.93 |
| 2 | --- | --- | --- | --- | --- | --- | --- | --- | 12 | 2.2 | 0.52 | 1.2 |
| 3 | --- | --- | --- | --- | --- | --- | --- | --- | 9.8 | 1.9 | 0.52 | 1.1 |
| 4 | --- | --- | --- | --- | --- | --- | --- | --- | 9.4 | 1.6 | 0.81 | 0.86 |
| 5 | --- | --- | --- | --- | --- | --- | --- | --- | 23 | 1.4 | 0.59 | 0.68 |
| 6 | --- | --- | --- | --- | --- | --- | --- | --- | 24 | 1.2 | 0.81 | 0.58 |
| 7 | --- | --- | --- | --- | --- | --- | --- | --- | 14 | 1.1 | 0.62 | 0.53 |
| 8 | --- | --- | --- | --- | --- | --- | --- | --- | 11 | 1.1 | 0.49 | 0.46 |
| 9 | --- | --- | --- | --- | --- | --- | --- | --- | 9.0 | 0.98 | 0.39 | 0.42 |
| 10 | --- | --- | --- | --- | --- | --- | --- | --- | 7.6 | 1.0 | 0.31 | 0.39 |
| 11 | --- | --- | --- | --- | --- | --- | --- | --- | 6.3 | 1.2 | 0.25 | 0.35 |
| 12 | --- | --- | --- | --- | --- | --- | --- | --- | 5.4 | 0.95 | 0.25 | 0.29 |
| 13 | --- | --- | --- | --- | --- | --- | --- | --- | 15 | 0.85 | 0.39 | 0.21 |
| 14 | --- | --- | --- | --- | --- | --- | --- | --- | 24 | 9.6 | 0.30 | 0.18 |
| 15 | --- | --- | --- | --- | --- | --- | --- | --- | 16 | 4.2 | 0.23 | 0.20 |
| 16 | --- | --- | --- | --- | --- | --- | --- | --- | 10 | 1.9 | 0.20 | 0.37 |
| 17 | --- | --- | --- | --- | --- | --- | --- | --- | 8.3 | 1.4 | 0.22 | 0.45 |
| 18 | --- | --- | --- | --- | --- | --- | --- | --- | 6.7 | 1.3 | 0.40 | 0.39 |
| 19 | --- | --- | --- | --- | --- | --- | --- | --- | 6.1 | 1.4 | 0.85 | 0.28 |
| 20 | --- | --- | --- | --- | --- | --- | --- | --- | 5.6 | 1.3 | 0.46 | 0.23 |
| 21 | --- | --- | --- | --- | --- | --- | --- | --- | 4.4 | 1.2 | 0.37 | 0.21 |
| 22 | --- | --- | --- | --- | --- | --- | --- | --- | 3.7 | 0.98 | 0.29 | 0.72 |
| 23 | --- | --- | --- | --- | --- | --- | --- | --- | 3.1 | 0.83 | 0.21 | 5.0 |
| 24 | --- | --- | --- | --- | --- | --- | --- | --- | 2.7 | 1.0 | 0.27 | 1.2 |
| 25 | --- | --- | --- | --- | --- | --- | --- | --- | 2.2 | 1.2 | 0.27 | 0.91 |
| 26 | --- | --- | --- | --- | --- | --- | --- | --- | 3.4 | 1.6 | 0.18 | 11 |
| 27 | --- | --- | --- | --- | --- | --- | --- | --- | 12 | 1.9 | 0.18 | 19 |
| 28 | --- | --- | --- | --- | --- | --- | --- | --- | 10 | 1.8 | 0.34 | 10 |
| 29 | --- | --- | --- | --- | --- | --- | --- | 31 | 4.9 | 1.1 | 2.8 | 4.5 |
| 30 | --- | --- | --- | --- | --- | --- | --- | 24 | 3.5 | 0.84 | 1.3 | 2.6 |
| 31 | --- | --- | --- | --- | --- | --- | --- | 19 | --- | 0.67 | 0.96 | --- |
| TOTAL | --- | --- | --- | --- | --- | --- | --- | --- | 288.1 | 52.40 | 16.38 | 65.24 |
| MEAN | --- | --- | --- | --- | --- | --- | --- | --- | 9.60 | 1.69 | 0.53 | 2.17 |
| MAX | --- | --- | --- | --- | --- | --- | --- | --- | 24 | 9.6 | 2.8 | 19 |
| MIN | --- | --- | --- | --- | --- | --- | --- | --- | 2.2 | 0.67 | 0.18 | 0.18 |
| CFSM | --- | --- | --- | --- | --- | --- | --- | --- | 0.47 | 0.08 | 0.03 | 0.11 |
| IN. | --- | --- | --- | --- | --- | --- | --- | --- | 0.52 | 0.09 | 0.03 | 0.12 |

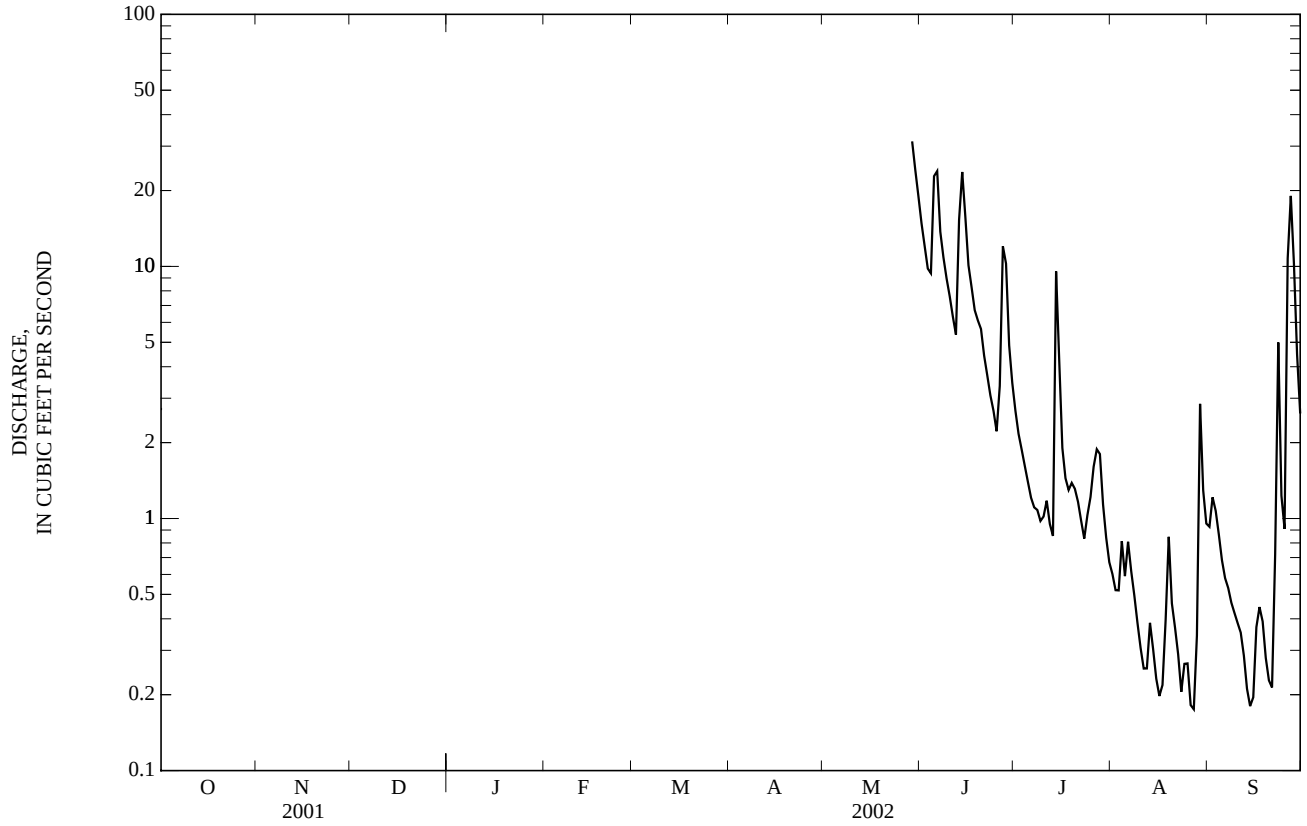
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEAR 2002

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | --- | --- | --- | --- | --- | --- | --- | --- | 9.60 | 1.69 | 0.53 | 2.17 |
| MAX | --- | --- | --- | --- | --- | --- | --- | --- | 9.60 | 1.69 | 0.53 | 2.17 |
| (WY) | --- | --- | --- | --- | --- | --- | --- | --- | (2002) | (2002) | (2002) | (2002) |
| MIN | --- | --- | --- | --- | --- | --- | --- | --- | 9.60 | 1.69 | 0.53 | 2.17 |
| (WY) | --- | --- | --- | --- | --- | --- | --- | --- | (2002) | (2002) | (2002) | (2002) |

01630700 GOONEY RUN NEAR GLEN ECHO, VA—Continued

| SUMMARY STATISTICS | FOR WATER YEAR 2002 | |
|---|---|---|
| HIGHEST DAILY MEAN | 31 | May 29 |
| LOWEST DAILY MEAN | 0.18 | aAug 26 |
| ANNUAL SEVEN-DAY MINIMUM | 0.25 | Aug 22 |
| MAXIMUM PEAK FLOW | 106 | Jun 5 |
| MAXIMUM PEAK STAGE | 2.49 | Jun 5 |
| INSTANTANEOUS LOW FLOW | 0.17 | bAug 17 |

a Also Aug. 27 and Sept. 14, 2002.
b Also Aug. 23, 24, 26-28, and Sept. 19, 2002.



01630700 GOONEY RUN NEAR GLEN ECHO, VA—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.8 | 31 | 13 | 122 | e13 | 42 | 82 | 34 | 43 | 27 | 13 | 6.0 |
| 2 | 1.6 | 24 | 12 | 143 | e13 | 53 | 87 | 31 | 36 | 31 | 13 | 11 |
| 3 | 1.4 | 20 | 11 | 109 | e13 | 57 | 83 | 29 | 40 | 142 | 20 | 13 |
| 4 | 1.3 | 17 | 11 | 83 | e13 | 49 | 76 | 29 | 80 | 97 | 21 | 24 |
| 5 | 1.3 | 16 | 12 | 68 | e12 | 79 | 69 | 29 | 82 | 68 | 14 | 15 |
| 6 | 1.2 | 38 | 9.9 | 59 | e12 | 118 | 59 | 28 | 64 | 65 | 12 | 9.4 |
| 7 | 1.1 | 24 | 19 | 48 | e12 | 99 | 88 | 35 | 75 | 64 | 12 | 7.6 |
| 8 | 1.1 | 21 | 13 | 44 | e12 | 99 | 78 | 42 | 70 | 52 | 12 | 7.2 |
| 9 | 1.0 | 18 | 9.3 | 40 | e11 | 153 | 110 | 45 | 103 | 56 | 11 | 7.0 |
| 10 | 1.3 | 17 | 8.3 | 34 | e11 | 122 | 105 | 66 | 79 | 53 | 12 | 6.3 |
| 11 | 6.8 | 23 | 21 | 30 | e11 | 96 | 207 | 69 | 68 | 52 | 15 | 5.6 |
| 12 | 11 | 49 | 28 | 26 | e10 | 83 | 156 | 56 | 58 | 35 | 12 | 10 |
| 13 | 6.7 | 56 | 54 | 24 | e10 | 107 | 124 | 49 | 109 | 29 | 11 | 80 |
| 14 | 5.6 | 42 | 86 | 23 | e9.7 | 145 | 102 | 42 | 94 | 26 | 9.4 | 75 |
| 15 | 4.2 | 34 | 69 | 21 | e9.5 | 114 | 88 | 46 | 75 | 23 | 8.0 | 43 |
| 16 | 74 | 38 | 56 | e20 | e9.2 | 99 | 77 | 126 | 66 | 20 | 7.6 | 30 |
| 17 | 47 | 109 | 43 | e19 | e30 | 95 | 68 | 105 | 83 | 18 | 7.4 | 23 |
| 18 | 21 | 95 | 35 | e17 | e35 | 92 | 65 | 122 | 88 | 17 | 7.1 | 142 |
| 19 | 14 | 73 | 32 | e15 | e28 | 83 | 74 | 110 | 85 | 17 | 6.8 | 1,040 |
| 20 | 11 | 57 | 63 | e15 | e25 | 256 | 59 | 94 | 123 | 14 | 6.0 | 215 |
| 21 | 8.6 | 50 | 62 | e14 | e28 | 224 | 54 | 97 | 119 | 13 | 5.3 | 119 |
| 22 | 7.2 | 42 | 54 | e13 | 156 | 154 | 70 | 87 | 119 | 12 | 4.9 | 89 |
| 23 | 6.1 | 32 | 46 | e13 | 144 | 121 | 53 | 85 | 93 | 13 | 5.2 | 530 |
| 24 | 5.2 | 27 | 39 | e13 | 105 | 100 | 48 | 85 | 77 | 24 | 3.8 | 209 |
| 25 | 5.3 | 23 | 41 | e13 | 80 | 86 | 46 | 78 | 63 | 13 | 3.5 | 133 |
| 26 | 19 | 21 | 32 | e14 | 63 | 85 | 50 | 79 | 52 | 11 | 3.2 | 98 |
| 27 | 12 | 19 | 26 | e16 | 52 | 75 | 44 | 71 | 56 | 9.7 | 6.9 | 76 |
| 28 | 11 | 17 | 23 | e15 | 45 | 64 | 39 | 66 | 43 | 12 | 11 | 68 |
| 29 | 30 | 15 | 22 | e14 | --- | 68 | 37 | 62 | 35 | 13 | 5.5 | 54 |
| 30 | 69 | 15 | 20 | e14 | --- | 79 | 34 | 54 | 30 | 10 | 5.8 | 46 |
| 31 | 45 | --- | 21 | e14 | --- | 78 | --- | 48 | --- | 9.8 | 6.0 | --- |
| TOTAL | 432.8 | 1,063 | 991.5 | 1,113 | 972.4 | 3,175 | 2,332 | 1,999 | 2,208 | 1,046.5 | 291.4 | 3,192.1 |
| MEAN | 14.0 | 35.4 | 32.0 | 35.9 | 34.7 | 102 | 77.7 | 64.5 | 73.6 | 33.8 | 9.40 | 106 |
| MAX | 74 | 109 | 86 | 143 | 156 | 256 | 207 | 126 | 123 | 142 | 21 | 1,040 |
| MIN | 1.0 | 15 | 8.3 | 13 | 9.2 | 42 | 34 | 28 | 30 | 9.7 | 3.2 | 5.6 |
| CFSM | 0.68 | 1.72 | 1.55 | 1.74 | 1.69 | 4.97 | 3.77 | 3.13 | 3.57 | 1.64 | 0.46 | 5.17 |
| IN. | 0.78 | 1.92 | 1.79 | 2.01 | 1.76 | 5.73 | 4.21 | 3.61 | 3.99 | 1.89 | 0.53 | 5.76 |

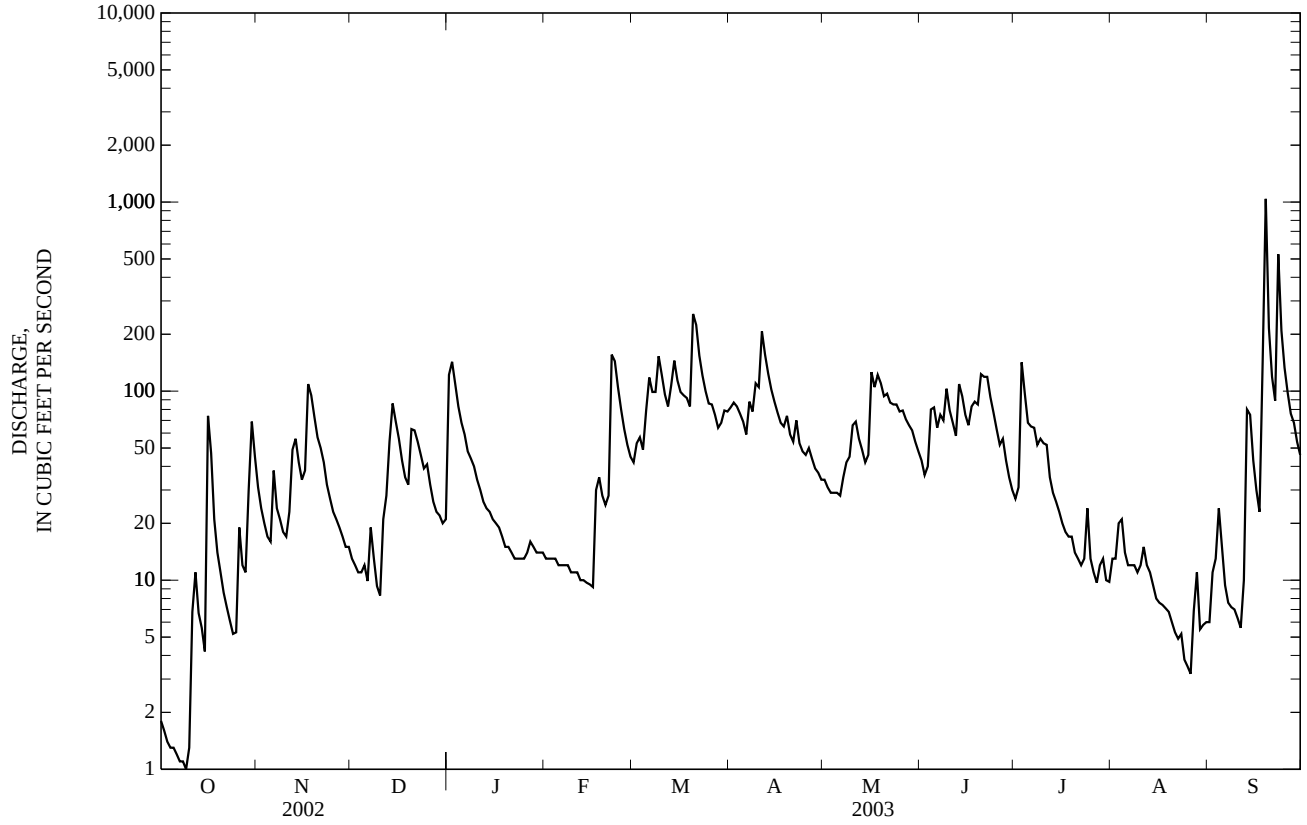
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2002 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 14.0 | 35.4 | 32.0 | 35.9 | 34.7 | 102 | 77.7 | 64.5 | 41.6 | 17.7 | 4.96 | 54.3 |
| MAX | 14.0 | 35.4 | 32.0 | 35.9 | 34.7 | 102 | 77.7 | 64.5 | 73.6 | 33.8 | 9.40 | 106 |
| (WY) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) |
| MIN | 14.0 | 35.4 | 32.0 | 35.9 | 34.7 | 102 | 77.7 | 64.5 | 9.60 | 1.69 | 0.53 | 2.17 |
| (WY) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2002) | (2002) | (2002) | (2002) |

01630700 GOONEY RUN NEAR GLEN ECHO, VA—Continued

| SUMMARY STATISTICS | FOR 2003 WATER YEAR | | WATER YEARS 2002 - 2003 | |
|---|---|---|---|---|
| ANNUAL TOTAL | 18,816.7 | | | |
| ANNUAL MEAN | 51.6 | | 51.6 | |
| HIGHEST ANNUAL MEAN | | | 51.6 | 2003 |
| LOWEST ANNUAL MEAN | | | 51.6 | 2003 |
| HIGHEST DAILY MEAN | 1,040 | Sep 19 | 1,040 | Sep 19, 2003 |
| LOWEST DAILY MEAN | 1.0 | Oct 9 | 0.18 | aAug 26, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 1.2 | Oct 4 | 0.25 | Aug 22, 2002 |
| MAXIMUM PEAK FLOW | 2,650 | Sep 19 | 2,650 | Sep 19, 2003 |
| MAXIMUM PEAK STAGE | 8.89 | Sep 19 | 8.89 | Sep 19, 2003 |
| INSTANTANEOUS LOW FLOW | 1.0 | bOct 8 | 0.17 | cAug 17, 2002 |
| ANNUAL RUNOFF (CFSM) | 2.50 | | 2.50 | |
| ANNUAL RUNOFF (INCHES) | 33.98 | | 34.00 | |
| 10 PERCENT EXCEEDS | 105 | | 105 | |
| 50 PERCENT EXCEEDS | 35 | | 35 | |
| 90 PERCENT EXCEEDS | 7.3 | | 7.3 | |

a Also Aug. 27 and Sept. 14, 2002.
b Also Oct. 9, 10, 2002.
c Also Aug. 23, 24, 26-28, and Sept. 19, 2002.
e Estimated.



## 01631000 SOUTH FORK SHENANDOAH RIVER AT FRONT ROYAL, VA

LOCATION.--Lat 38°54'50", long 78°12'39", NAD83, 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 $mi^2$.

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 NGVD of 1929. June 1899 to July 1906, nonrecording gage at site 1.0 mi upstream at different datum.

REMARKS.--Records good except those for periods of no gage-height record, Jan. 9-14, Mar. 28-30, and June 26, 27, and period with ice effect, Jan. 22-29, which are poor. 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 $ft^3/s$, from rating curve extended above 92,000 $ft^3/s$ on basis of slope-area measurement of peak flow. 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 8,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 24 | 0415 | 27,100 | 12.76 | Jun 21 | 2200 | 10,700 | 7.50 |
| Mar 21 | 1945 | 12,000 | 8.02 | Sep 19 | 2230 | *47,500 | *18.07 |
| Apr 12 | 0345 | 13,600 | 8.62 | Sep 23 | 2345 | 30,700 | 13.78 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 388 | 1,800 | 995 | 1,550 | 830 | 3,900 | 2,860 | 1,890 | 2,590 | 1,810 | 979 | 880 |
| 2 | 334 | 1,570 | 955 | 5,130 | 823 | 3,870 | 2,820 | 1,900 | 2,390 | 1,740 | 955 | 892 |
| 3 | 308 | 1,210 | 923 | 6,140 | 805 | 6,570 | 2,820 | 1,850 | 2,260 | 2,470 | 975 | 988 |
| 4 | 296 | 955 | 866 | 5,300 | 809 | 6,410 | 2,720 | 1,720 | 2,380 | 5,280 | 985 | 1,120 |
| 5 | 289 | 803 | 865 | 4,500 | 813 | 5,620 | 2,620 | 1,770 | 3,400 | 4,520 | 1,030 | 1,090 |
| 6 | 279 | 807 | 842 | 3,700 | 807 | 6,870 | 2,430 | 2,290 | 4,190 | 3,680 | 1,250 | 1,030 |
| 7 | 274 | 711 | 826 | 3,100 | 832 | 6,940 | 2,370 | 2,550 | 4,200 | 2,870 | 1,400 | 1,040 |
| 8 | 271 | 783 | 778 | 2,650 | 804 | 6,320 | 3,020 | 2,500 | 4,010 | 2,720 | 1,450 | 948 |
| 9 | 268 | 860 | 747 | e2,200 | 782 | 5,560 | 4,590 | 2,330 | 4,720 | 2,450 | 1,270 | 894 |
| 10 | 274 | 831 | 764 | e1,900 | 776 | 4,740 | 7,320 | 2,430 | 4,730 | 2,420 | 1,350 | 852 |
| 11 | 315 | 805 | 823 | e1,700 | 761 | 3,980 | 10,400 | 4,340 | 4,140 | 2,250 | 2,060 | 825 |
| 12 | 349 | 896 | 934 | e1,600 | 755 | 3,490 | 11,900 | 4,850 | 3,600 | 2,130 | 2,870 | 810 |
| 13 | 345 | 1,450 | 1,240 | e1,500 | 738 | 3,160 | 8,090 | 4,140 | 3,800 | 1,880 | 3,440 | 917 |
| 14 | 325 | 3,150 | 2,220 | e1,400 | 726 | 3,180 | 6,050 | 3,310 | 3,930 | 1,670 | 2,440 | 1,020 |
| 15 | 380 | 2,980 | 3,510 | 1,360 | 739 | 2,890 | 4,920 | 2,760 | 4,640 | 1,730 | 2,350 | 1,120 |
| 16 | 523 | 2,200 | 3,570 | 1,300 | 1,030 | 2,670 | 4,160 | 2,950 | 5,130 | 2,370 | 1,960 | 1,090 |
| 17 | 642 | 2,270 | 2,980 | 1,250 | 1,570 | 2,520 | 3,600 | 3,410 | 5,220 | 1,810 | 1,670 | 1,010 |
| 18 | 582 | 3,100 | 2,450 | 1,230 | 1,320 | 2,360 | 3,180 | 3,210 | 6,050 | 1,560 | 1,530 | 1,060 |
| 19 | 662 | 3,670 | 2,080 | 1,250 | 1,230 | 2,180 | 3,040 | 6,380 | 7,860 | 1,400 | 1,560 | 27,500 |
| 20 | 576 | 2,980 | 1,970 | 1,100 | 1,510 | 3,150 | 3,050 | 7,590 | 6,860 | 1,320 | 1,470 | 41,700 |
| 21 | 619 | 2,460 | 2,820 | 1,040 | 1,190 | 9,330 | 2,830 | 5,750 | 8,680 | 1,210 | 1,290 | 14,000 |
| 22 | 526 | 2,110 | 5,120 | e1,000 | 2,160 | 9,200 | 2,760 | 5,280 | 8,170 | 1,220 | 1,160 | 8,040 |
| 23 | 461 | 1,850 | 3,770 | e980 | 16,000 | 6,330 | 2,760 | 4,640 | 5,780 | 1,090 | 1,080 | 16,500 |
| 24 | 436 | 1,690 | 2,940 | e920 | 23,300 | 4,860 | 2,600 | 4,110 | 4,660 | 1,220 | 1,030 | 20,700 |
| 25 | 411 | 1,550 | 2,460 | e860 | 12,800 | 3,920 | 2,380 | 3,820 | 3,800 | 1,230 | 958 | 9,120 |
| 26 | 410 | 1,430 | 2,190 | e860 | 8,280 | 3,300 | 2,260 | 3,430 | e3,300 | 1,120 | 909 | 6,150 |
| 27 | 397 | 1,320 | 2,050 | e860 | 5,910 | 3,000 | 2,160 | 3,150 | e2,700 | 1,020 | 932 | 4,780 |
| 28 | 399 | 1,200 | 1,720 | e880 | 4,740 | e2,650 | 2,070 | 3,000 | 2,360 | 1,000 | 875 | 3,990 |
| 29 | 489 | 1,120 | 1,510 | e860 | --- | e2,400 | 2,000 | 2,880 | 2,120 | 984 | 873 | 4,280 |
| 30 | 713 | 1,070 | 1,390 | 849 | --- | e2,500 | 1,940 | 2,700 | 1,940 | 954 | 854 | 3,450 |
| 31 | 862 | --- | 1,310 | 848 | --- | 2,690 | --- | 2,870 | --- | 965 | 883 | --- |
| TOTAL | 13,403 | 49,631 | 57,618 | 59,817 | 92,840 | 136,560 | 115,720 | 105,800 | 129,610 | 60,093 | 43,838 | 177,796 |
| MEAN | 432 | 1,654 | 1,859 | 1,930 | 3,316 | 4,405 | 3,857 | 3,413 | 4,320 | 1,938 | 1,414 | 5,927 |
| MAX | 862 | 3,670 | 5,120 | 6,140 | 23,300 | 9,330 | 11,900 | 7,590 | 8,680 | 5,280 | 3,440 | 41,700 |
| MIN | 268 | 711 | 747 | 848 | 726 | 2,180 | 1,940 | 1,720 | 1,940 | 954 | 854 | 810 |
| CFSM | 0.26 | 1.01 | 1.13 | 1.18 | 2.02 | 2.68 | 2.35 | 2.08 | 2.63 | 1.18 | 0.86 | 3.61 |
| IN. | 0.30 | 1.12 | 1.31 | 1.36 | 2.10 | 3.09 | 2.62 | 2.40 | 2.94 | 1.36 | 0.99 | 4.03 |

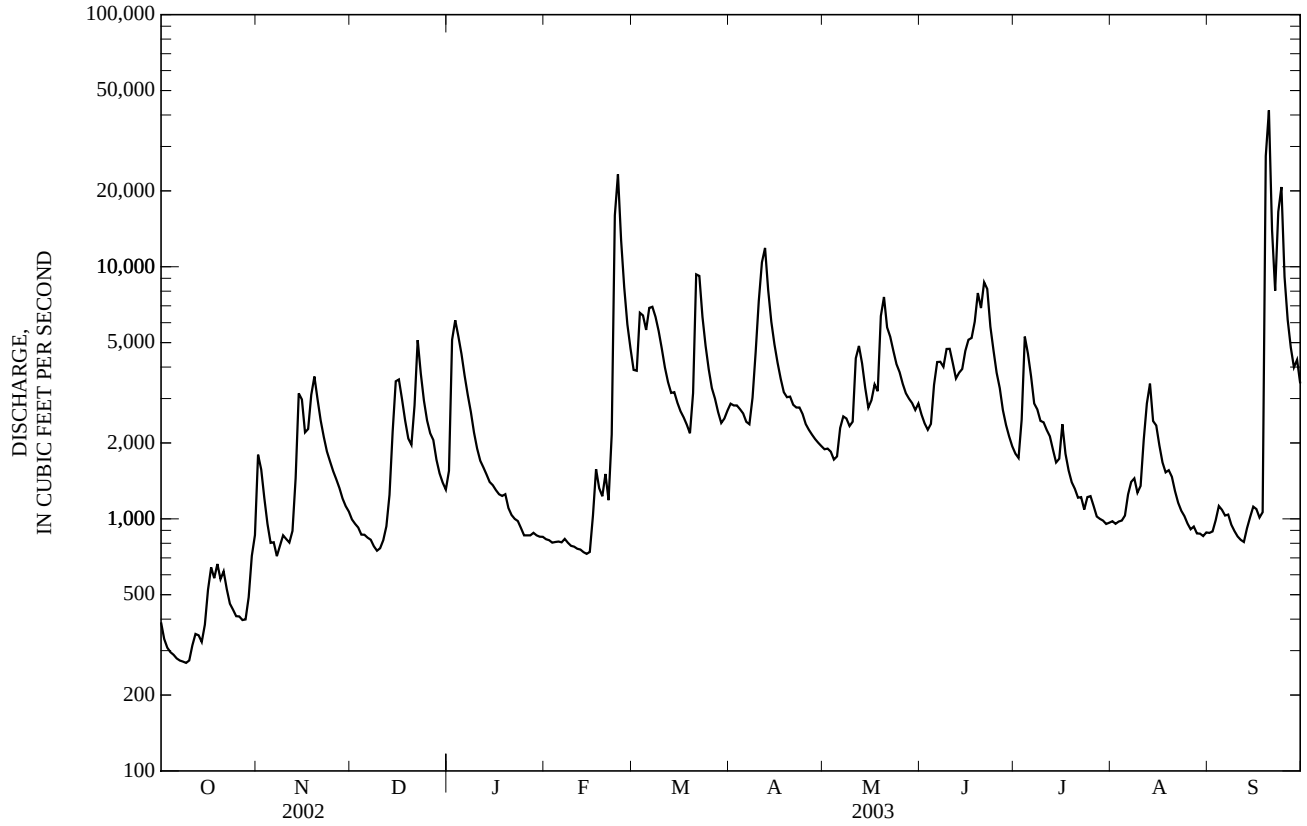
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 1,131 | 1,204 | 1,456 | 1,886 | 2,195 | 2,843 | 2,446 | 1,843 | 1,354 | 806 | 935 | 1,029 |
| MAX | 8,678 | 10,130 | 4,795 | 7,876 | 10,600 | 10,300 | 7,963 | 4,807 | 6,586 | 2,876 | 6,807 | 9,631 |
| (WY) | (1943) | (1986) | (1973) | (1996) | (1998) | (1936) | (1987) | (1989) | (1972) | (1949) | (1955) | (1996) |
| MIN | 225 | 242 | 268 | 285 | 311 | 510 | 516 | 578 | 377 | 252 | 260 | 280 |
| (WY) | (1931) | (1931) | (1966) | (1966) | (2002) | (2002) | (1981) | (1977) | (1999) | (1966) | (2002) | (2002) |

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

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1931 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 271,145 | | 1,042,726 | | | |
| ANNUAL MEAN | 743 | | 2,857 | | 1,590 | |
| HIGHEST ANNUAL MEAN | | | | | 3,189 | 1996 |
| LOWEST ANNUAL MEAN | | | | | 493 | 2002 |
| HIGHEST DAILY MEAN | 6,510 | Apr 23 | 41,700 | Sep 20 | 114,000 | Oct 16, 1942 |
| LOWEST DAILY MEAN | e196 | Aug 21 | 268 | Oct 9 | 107 | Nov 18, 1930 |
| ANNUAL SEVEN-DAY MINIMUM | 208 | Aug 16 | 279 | Oct 4 | 152 | Sep 6, 1966 |
| MAXIMUM PEAK FLOW | | | 47,500 | Sep 19 | 130,000 | Oct 16, 1942 |
| MAXIMUM PEAK STAGE | | | 18.07 | Sep 19 | a34.80 | Oct 16, 1942 |
| INSTANTANEOUS LOW FLOW | | | 260 | bOct 9 | 59 | Jan 30, 1934 |
| ANNUAL RUNOFF (CFSM) | 0.45 | | 1.74 | | 0.97 | |
| ANNUAL RUNOFF (INCHES) | 6.14 | | 23.62 | | 13.16 | |
| 10 PERCENT EXCEEDS | 1,780 | | 5,670 | | 3,200 | |
| 50 PERCENT EXCEEDS | 388 | | 1,940 | | 939 | |
| 90 PERCENT EXCEEDS | 242 | | 759 | | 384 | |

a From floodmarks.
b Also Oct. 10, 2002.
e Estimated.



## 01632000 NORTH FORK SHENANDOAH RIVER AT COOTES STORE, VA

LOCATION.--Lat 38°38'13", long 78°51'10", NAD83, 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 $mi^2$.

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 NGVD of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Nov. 15, 1937, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Jan. 19-29 and Feb. 9-15, 18-20, and periods of doubtful gage-height record, July 15 tp Aug. 4, Aug. 7-9, and Aug. 15 to Sept. 18, which are poor. National Weather Service gage-height telemeter and Virginia Department of Emergency Services gage-height radio transmitter at station. Maximum discharge, 63,400 $ft^3/s$, from rating curve extended above 9,000 $ft^3/s$ on basis of indirect 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.--Maximum stage since at least 1836, that of Oct. 15, 1942.

REVISIONS.--Revised maximum discharges for water years 1997-2002, and revised daily discharges, in cubic feet per second, are given in the following tables. These figures supersede those published in the reports for 1997-2002.

PEAK DISCHARGES FOR 1997 WATER YEAR.--Peak discharges greater than base discharge of 3,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Nov 8 | 0530 | *6,160 | *8.38 | Mar 3 | 1900 | 5,510 | 7.95 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 85 | 82 | 1,930 | 175 | 223 | 851 | 184 | 87 | 38 | 21 | 29 | 7.6 |
| 2 | 77 | 75 | e1,700 | 162 | 196 | 1,080 | 167 | 88 | 1,260 | 20 | 25 | 7.0 |
| 3 | 67 | 69 | e1,260 | 154 | 171 | 2,450 | 158 | 85 | 1,380 | 19 | 23 | 6.6 |
| 4 | 59 | 62 | e960 | 144 | 168 | 2,380 | 154 | 85 | 900 | 17 | 22 | 6.0 |
| 5 | 52 | 58 | e800 | 136 | 198 | 1,310 | 148 | 79 | 538 | 16 | 23 | 5.8 |
| 6 | 48 | 54 | e700 | 126 | 209 | 861 | 141 | 72 | 354 | 15 | 19 | 5.6 |
| 7 | 61 | 89 | e690 | 113 | 211 | 588 | 134 | 68 | 256 | 14 | 17 | 5.2 |
| 8 | 217 | 4,010 | e820 | 100 | 227 | 454 | 121 | 63 | 193 | 13 | 15 | 5.1 |
| 9 | 401 | 1,280 | e530 | 104 | 217 | 361 | 115 | 63 | 148 | 13 | 14 | 5.4 |
| 10 | 439 | 641 | e400 | 102 | 203 | 309 | 107 | 62 | 118 | 14 | 13 | 10 |
| 11 | 325 | 431 | e350 | 95 | 193 | 261 | 98 | 58 | 97 | 13 | 12 | 15 |
| 12 | 248 | 322 | 392 | 80 | 184 | 220 | 105 | 53 | 84 | 12 | 11 | 21 |
| 13 | 198 | 266 | 1,500 | 74 | 170 | 187 | 122 | 53 | 80 | 11 | 11 | 22 |
| 14 | 161 | 226 | 1,210 | 68 | 169 | 211 | 104 | 55 | 73 | 11 | 11 | 21 |
| 15 | 135 | 189 | 724 | 65 | 186 | 217 | 93 | 52 | 66 | 10 | 10 | 19 |
| 16 | 113 | 165 | 523 | 76 | 233 | 192 | 86 | 47 | 56 | 9.6 | 9.2 | 17 |
| 17 | 99 | 150 | 422 | 64 | 269 | 178 | 82 | 44 | 49 | 11 | 8.3 | 16 |
| 18 | 425 | 161 | 349 | e61 | 278 | 195 | 80 | 42 | 46 | 9.2 | 7.8 | 15 |
| 19 | 466 | 157 | 326 | e58 | 389 | 793 | 77 | 40 | 44 | 8.4 | 7.7 | 13 |
| 20 | 409 | 143 | 268 | e55 | 509 | 935 | 76 | 40 | 39 | 7.5 | 11 | 12 |
| 21 | 339 | 143 | 214 | 63 | 456 | 634 | 72 | 38 | 39 | 6.9 | 19 | 11 |
| 22 | 279 | 131 | 198 | 71 | 394 | 487 | 66 | 35 | 38 | 7.9 | 16 | 11 |
| 23 | 236 | 125 | 189 | 97 | 317 | 377 | 64 | 33 | 33 | 190 | 15 | 10 |
| 24 | 201 | 126 | 255 | 120 | 266 | 305 | 69 | 31 | 30 | 859 | 15 | 10 |
| 25 | 170 | 982 | 308 | 285 | 233 | 260 | 64 | 30 | 27 | 462 | 14 | 10 |
| 26 | 150 | 1,440 | 291 | 340 | 211 | 244 | 58 | 42 | 31 | 194 | 12 | 9.7 |
| 27 | 132 | 741 | 274 | 312 | 194 | 216 | 55 | 48 | 37 | 105 | 11 | 9.0 |
| 28 | 119 | 507 | 253 | 316 | 172 | 190 | 73 | 43 | 27 | 66 | 11 | 12 |
| 29 | 108 | 392 | 231 | 278 | --- | 175 | 82 | 38 | 24 | 49 | 9.6 | 38 |
| 30 | 97 | 541 | 210 | 248 | --- | 167 | 82 | 36 | 22 | 38 | 8.7 | 28 |
| 31 | 89 | --- | 192 | 237 | --- | 207 | --- | 34 | --- | 32 | 8.0 | --- |
| TOTAL | 6,005 | 13,758 | 18,469 | 4,379 | 6,846 | 17,295 | 3,037 | 1,644 | 6,127 | 2,274.5 | 438.3 | 384.0 |
| MEAN | 194 | 459 | 596 | 141 | 244 | 558 | 101 | 53.0 | 204 | 73.4 | 14.1 | 12.8 |
| MAX | 466 | 4,010 | 1,930 | 340 | 509 | 2,450 | 184 | 88 | 1,380 | 859 | 29 | 38 |
| MIN | 48 | 54 | 189 | 55 | 168 | 167 | 55 | 30 | 22 | 6.9 | 7.7 | 5.1 |
| CFSM | 0.92 | 2.18 | 2.84 | 0.67 | 1.16 | 2.66 | 0.48 | 0.25 | 0.97 | 0.35 | 0.07 | 0.06 |
| IN. | 1.06 | 2.44 | 3.27 | 0.78 | 1.21 | 3.06 | 0.54 | 0.29 | 1.09 | 0.40 | 0.08 | 0.07 |

e Estimated

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

REVISIONS.--Revised maximum discharges for water years 1997-2002, and revised daily discharges, in cubic feet per second, are given in the following tables. These figures supersede those published in the reports for 1997-2002.

PEAK DISCHARGES FOR 1998 WATER YEAR.--Peak discharges greater than base discharge of 3,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 8 | 0815 | 10,100 | 10.63 | Mar 21 | 0700 | 5,330 | 7.83 |
| Feb 17 | 1930 | *10,700 | *10.97 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 1997 TO SEPTEMBER 1998
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 22 | 30 | 61 | 74 | 541 | 1,100 | 224 | 143 | 34 | 39 | 4.2 | 2.4 |
| 2 | 20 | 64 | 56 | 78 | 474 | 729 | 258 | 264 | 30 | 35 | 4.0 | 2.2 |
| 3 | 18 | 69 | 51 | 130 | 487 | 600 | 233 | 268 | 28 | 32 | 3.8 | 2.0 |
| 4 | 17 | 52 | 48 | 408 | 764 | 471 | 457 | 270 | 25 | 30 | 3.6 | 1.8 |
| 5 | 16 | 42 | 45 | 463 | 1,310 | 378 | 627 | 518 | 24 | 28 | 3.2 | 1.6 |
| 6 | 14 | 40 | 43 | 381 | 1,050 | 310 | 487 | 717 | 24 | 25 | 3.0 | 1.6 |
| 7 | 14 | 1,460 | 40 | 342 | 766 | 270 | 382 | 460 | 22 | 22 | 2.9 | 1.5 |
| 8 | 13 | 1,910 | 38 | 5,510 | 640 | 711 | 318 | 2,000 | 21 | 26 | 2.8 | 2.6 |
| 9 | 12 | 773 | 38 | 2,490 | 624 | 2,310 | 559 | 1,490 | 21 | 21 | 3.3 | 2.1 |
| 10 | 12 | 411 | 39 | 1,100 | 620 | 1,590 | 978 | 729 | 25 | 18 | 3.9 | 1.9 |
| 11 | 12 | 267 | 40 | 626 | 786 | 771 | 831 | 501 | 24 | 16 | 3.9 | 1.7 |
| 12 | 11 | 192 | 41 | 419 | 1,660 | 507 | 568 | 425 | 27 | 14 | 3.1 | 1.6 |
| 13 | 11 | 144 | 40 | 327 | 1,530 | 390 | 425 | 396 | 23 | 13 | 3.0 | 1.5 |
| 14 | 11 | 148 | 40 | 262 | 998 | 326 | 349 | 358 | 35 | 12 | 3.5 | 1.4 |
| 15 | 10 | 190 | 39 | 241 | 654 | 275 | 295 | 304 | 38 | 11 | 4.4 | 2.2 |
| 16 | 10 | 178 | 39 | 339 | 522 | 231 | 263 | 260 | 175 | 10 | 5.9 | 1.3 |
| 17 | 10 | 154 | 38 | 412 | 4,030 | 200 | 229 | 322 | 91 | 9.8 | 37 | 1.3 |
| 18 | 10 | 131 | 38 | 384 | 4,160 | 287 | 196 | 250 | 57 | 9.0 | 22 | 1.7 |
| 19 | 9.9 | 112 | 37 | 333 | 1,980 | 1,880 | 266 | 198 | 56 | 8.1 | 14 | 1.6 |
| 20 | 9.3 | 97 | 36 | 288 | 1,520 | 1,520 | 953 | 158 | 66 | 7.7 | 9.6 | 1.8 |
| 21 | 8.8 | 86 | 35 | 243 | 1,230 | 4,190 | 628 | 128 | 50 | 7.1 | 7.4 | 1.5 |
| 22 | 8.8 | 95 | 36 | 213 | 932 | 1,560 | 455 | 104 | 43 | 6.3 | 6.2 | 1.5 |
| 23 | 8.3 | 104 | 36 | 726 | 911 | 744 | 364 | 86 | 49 | 5.8 | 5.5 | 1.6 |
| 24 | 8.6 | 102 | 35 | 1,080 | 1,090 | 514 | 301 | 77 | 59 | 5.4 | 4.7 | 1.6 |
| 25 | 10 | 94 | 46 | 802 | 1,000 | 393 | 251 | 73 | 42 | 5.0 | 4.0 | 1.6 |
| 26 | 11 | 88 | 68 | 559 | 1,010 | 325 | 213 | 61 | 35 | 4.5 | 3.6 | 1.7 |
| 27 | 12 | 81 | 78 | 447 | 844 | 287 | 202 | 56 | 31 | 4.3 | e3.3 | 1.4 |
| 28 | 12 | 74 | 80 | 638 | 958 | 277 | 172 | 52 | 33 | 4.3 | e3.2 | 1.7 |
| 29 | 11 | 67 | 80 | 607 | --- | 255 | 147 | 46 | 50 | 4.0 | e3.0 | 1.5 |
| 30 | 11 | 64 | 92 | 692 | --- | 221 | 134 | 41 | 51 | 3.7 | e2.9 | 1.7 |
| 31 | 11 | --- | 90 | 665 | --- | 193 | --- | 38 | --- | 4.2 | e2.6 | --- |
| TOTAL | 374.7 | 7,319 | 1,523 | 21,279 | 33,091 | 23,815 | 11,765 | 10,793 | 1,289 | 441.2 | 187.5 | 51.6 |
| MEAN | 12.1 | 244 | 49.1 | 686 | 1,182 | 768 | 392 | 348 | 43.0 | 14.2 | 6.05 | 1.72 |
| MAX | 22 | 1,910 | 92 | 5,510 | 4,160 | 4,190 | 978 | 2,000 | 175 | 39 | 37 | 2.6 |
| MIN | 8.3 | 30 | 35 | 74 | 474 | 193 | 134 | 38 | 21 | 3.7 | 2.6 | 1.3 |
| CFSM | 0.06 | 1.16 | 0.23 | 3.27 | 5.63 | 3.66 | 1.87 | 1.66 | 0.20 | 0.07 | 0.03 | 0.01 |
| IN. | 0.07 | 1.30 | 0.27 | 3.77 | 5.86 | 4.22 | 2.08 | 1.91 | 0.23 | 0.08 | 0.03 | 0.01 |

e Estimated

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

REVISIONS.--Revised maximum discharges for water years 1997-2002, and revised daily discharges, in cubic feet per second, are given in the following tables. These figures supersede those published in the reports for 1997-2002.

PEAK DISCHARGES FOR 1999 WATER YEAR.--Peak discharges greater than base discharge of 3,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Sep 6 | 1815 | *3,810 | *6.87 | No other 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 | 1.5 | 2.5 | 4.3 | 6.1 | 54 | 41 | 92 | 39 | 24 | 2.8 | 0.66 | 18 |
| 2 | 1.2 | 2.7 | 4.3 | 6.0 | 52 | 38 | 89 | 37 | 22 | 3.1 | 0.56 | 16 |
| 3 | 1.2 | 4.1 | 4.5 | 11 | 46 | 36 | 79 | 36 | 20 | 2.7 | 0.77 | 14 |
| 4 | 1.5 | 3.8 | 4.4 | 12 | 42 | 38 | 72 | 35 | 18 | 2.4 | 0.47 | 13 |
| 5 | 1.7 | 3.4 | 4.5 | 9.3 | 39 | 38 | 68 | 33 | 16 | 2.1 | 0.46 | 470 |
| 6 | 1.7 | 3.3 | 4.5 | 7.2 | 36 | 40 | 62 | 32 | 15 | 1.8 | 0.44 | 2,390 |
| 7 | 1.9 | 3.3 | 4.7 | 8.6 | 35 | 49 | 56 | 31 | 14 | 1.5 | 0.41 | 1,540 |
| 8 | 3.2 | 3.4 | 6.2 | e9.6 | 34 | 67 | 52 | 184 | 12 | 1.2 | 0.44 | 541 |
| 9 | 3.1 | 3.6 | 8.6 | e18 | 33 | 81 | 52 | 176 | 11 | 1.0 | 0.45 | 269 |
| 10 | 2.6 | 3.6 | 7.0 | e19 | 31 | 83 | 53 | 121 | 9.9 | 0.98 | 0.44 | 191 |
| 11 | 2.4 | 3.8 | 5.9 | e9.4 | 30 | 76 | 53 | 88 | 9.7 | 1.0 | 0.42 | 127 |
| 12 | 2.4 | 3.7 | 5.6 | 10 | 30 | 75 | 52 | 70 | 9.4 | 1.0 | 0.39 | 88 |
| 13 | 2.3 | 3.6 | 7.6 | 17 | 30 | 90 | 50 | 59 | 8.6 | 1.2 | 0.39 | 65 |
| 14 | 2.2 | 3.7 | 7.8 | 36 | 28 | 119 | 47 | 85 | 8.2 | 1.1 | 1.0 | 52 |
| 15 | 2.1 | 3.6 | 7.1 | 52 | 27 | 143 | 47 | 126 | 7.7 | 0.94 | 0.61 | 46 |
| 16 | 2.3 | 3.6 | 6.9 | 55 | 26 | 197 | 47 | 102 | 6.7 | 0.81 | 0.54 | 76 |
| 17 | 2.3 | 3.7 | 6.7 | 48 | 25 | 613 | 44 | 88 | 7.2 | 0.73 | 0.50 | 83 |
| 18 | 2.3 | 3.6 | 6.6 | 66 | 45 | 1,460 | 42 | 75 | 7.5 | 0.68 | 0.47 | 82 |
| 19 | 2.1 | 3.8 | 6.6 | 103 | 74 | 887 | 40 | 66 | 7.6 | 0.68 | 16 | 70 |
| 20 | 2.1 | 3.9 | 6.7 | 74 | 77 | 472 | 39 | 57 | 7.6 | 0.62 | 45 | 70 |
| 21 | 2.0 | 3.8 | 6.7 | 100 | 73 | 361 | 38 | 50 | 7.6 | 0.68 | 54 | 153 |
| 22 | 1.9 | 3.9 | 6.5 | 354 | 66 | 425 | 38 | 46 | 7.1 | 0.75 | 18 | 213 |
| 23 | 2.1 | 4.0 | 6.4 | 248 | 63 | 378 | 38 | 90 | 6.5 | 0.69 | 12 | 159 |
| 24 | 2.1 | 3.9 | 6.8 | 554 | 60 | 308 | 47 | 77 | 5.8 | 0.68 | 9.1 | 115 |
| 25 | 2.4 | 4.1 | 6.6 | 410 | 54 | 254 | 45 | 60 | 5.4 | 0.71 | 61 | 85 |
| 26 | 2.3 | 4.3 | 6.3 | 250 | 49 | 213 | 44 | 49 | 5.0 | 0.61 | 67 | 65 |
| 27 | 2.5 | 4.2 | 6.2 | 173 | 45 | 183 | 44 | 42 | 4.2 | 0.57 | 62 | 52 |
| 28 | 2.3 | 4.4 | 6.1 | 128 | 44 | 155 | 44 | 37 | 2.8 | 0.61 | 41 | 50 |
| 29 | 2.4 | 4.5 | 6.4 | 97 | --- | 133 | 43 | 33 | 2.5 | 0.70 | 30 | 54 |
| 30 | 2.5 | 4.4 | 6.3 | 77 | --- | 113 | 41 | 29 | 2.3 | 0.67 | 24 | 488 |
| 31 | 2.5 | --- | 6.2 | 62 | --- | 96 | --- | 26 | --- | 0.62 | 21 | --- |
| TOTAL | 67.1 | 112.2 | 191.0 | 3,030.2 | 1,248 | 7,262 | 1,558 | 2,079 | 291.3 | 35.63 | 469.52 | 7,655 |
| MEAN | 2.16 | 3.74 | 6.16 | 97.7 | 44.6 | 234 | 51.9 | 67.1 | 9.71 | 1.15 | 15.1 | 255 |
| MAX | 3.2 | 4.5 | 8.6 | 554 | 77 | 1,460 | 92 | 184 | 24 | 3.1 | 67 | 2,390 |
| MIN | 1.2 | 2.5 | 4.3 | 6.0 | 25 | 36 | 38 | 26 | 2.3 | 0.57 | 0.39 | 13 |
| CFSM | 0.01 | 0.02 | 0.03 | 0.47 | 0.21 | 1.12 | 0.25 | 0.32 | 0.05 | 0.01 | 0.07 | 1.22 |
| IN. | 0.01 | 0.02 | 0.03 | 0.54 | 0.22 | 1.29 | 0.28 | 0.37 | 0.05 | 0.01 | 0.08 | 1.36 |

e Estimated

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

REVISIONS.--Revised maximum discharges for water years 1997-2002, and revised daily discharges, in cubic feet per second, are given in the following tables. These figures supersede those published in the reports for 1997-2002.

PEAK DISCHARGES FOR 2000 WATER YEAR.--Peak discharges greater than base discharge of 3,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jun 14 | 1930 | *2,240 | *5.68 | No peak greater than base discharge. | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 282 | 25 | 180 | 73 | e31 | 123 | 185 | 226 | 67 | 72 | 491 | 24 |
| 2 | 199 | 60 | 149 | 67 | e31 | 118 | 170 | 209 | 59 | 61 | 415 | 30 |
| 3 | 146 | 185 | 129 | 62 | e31 | 110 | 160 | 189 | 51 | 55 | 414 | 34 |
| 4 | 138 | 168 | 111 | 60 | 31 | 101 | 210 | 167 | 46 | 57 | 374 | 44 |
| 5 | 246 | 144 | 96 | 57 | 31 | 94 | 222 | 159 | 42 | 50 | 283 | 131 |
| 6 | 231 | 123 | 89 | 53 | 30 | 85 | 219 | 151 | 87 | 45 | 199 | 247 |
| 7 | 183 | 105 | 81 | 49 | 30 | 77 | 214 | 138 | 114 | 40 | 153 | 182 |
| 8 | 142 | 91 | 71 | 46 | 31 | 70 | 208 | 135 | 91 | 36 | 113 | 130 |
| 9 | 114 | 79 | 63 | 45 | 32 | 66 | 201 | 121 | 76 | 33 | 88 | 97 |
| 10 | 149 | 70 | 64 | 47 | 35 | 63 | 186 | 109 | 64 | 30 | 75 | 77 |
| 11 | 241 | 63 | 71 | 50 | 44 | 71 | 168 | 98 | 54 | 32 | 60 | 66 |
| 12 | 201 | 58 | 75 | 48 | 57 | 477 | 155 | 86 | 77 | 31 | 53 | 59 |
| 13 | 167 | 53 | 84 | 47 | 59 | 460 | 143 | 81 | 66 | 30 | 47 | e49 |
| 14 | 146 | 48 | 518 | 46 | 73 | 358 | 132 | 81 | 449 | 27 | 41 | 45 |
| 15 | 120 | 45 | 780 | 43 | 88 | 290 | 126 | 67 | 663 | 25 | 36 | e36 |
| 16 | 97 | 42 | 482 | 44 | 92 | 246 | 123 | 57 | 381 | 24 | 32 | e28 |
| 17 | 82 | 39 | 344 | 43 | 99 | 227 | 135 | 51 | 354 | 22 | 29 | e22 |
| 18 | 69 | 37 | 270 | 43 | 124 | 190 | 385 | 48 | 963 | 20 | 65 | e20 |
| 19 | 60 | 35 | 220 | 43 | 1,100 | 161 | 515 | 47 | 671 | 19 | 70 | 43 |
| 20 | 57 | 34 | 198 | e42 | 784 | 153 | 430 | 51 | 555 | 35 | 49 | 43 |
| 21 | 53 | 31 | 185 | e40 | 472 | 545 | 367 | 48 | 396 | 38 | 42 | 33 |
| 22 | 47 | 31 | 173 | e39 | 342 | 996 | 320 | 135 | 312 | 31 | 38 | 28 |
| 23 | 43 | 30 | 158 | e37 | 274 | 770 | 278 | 188 | 232 | 27 | 36 | 25 |
| 24 | 40 | 29 | 151 | e35 | 230 | 635 | 248 | 152 | 173 | 28 | 35 | 24 |
| 25 | 37 | 29 | 138 | e34 | 199 | 499 | 252 | 134 | 138 | 28 | 32 | 71 |
| 26 | 34 | 280 | 128 | e34 | 172 | 406 | 239 | 108 | 109 | 27 | 29 | 441 |
| 27 | 31 | 700 | 123 | e33 | 151 | 342 | 229 | 92 | e90 | 26 | 26 | 318 |
| 28 | 30 | 413 | 112 | e29 | 149 | 303 | 222 | 88 | e90 | 27 | 25 | 220 |
| 29 | 28 | 287 | 101 | e30 | 134 | 265 | 253 | 88 | e106 | 147 | 23 | 156 |
| 30 | 27 | 223 | 90 | e31 | --- | 232 | 249 | 85 | 86 | 388 | 22 | 117 |
| 31 | 26 | --- | 82 | e31 | --- | 205 | --- | 75 | --- | 583 | 23 | --- |
| TOTAL | 3,466 | 3,557 | 5,516 | 1,381 | 4,956 | 8,738 | 6,944 | 3,464 | 6,662 | 2,094 | 3,418 | 2,840 |
| MEAN | 112 | 119 | 178 | 44.5 | 171 | 282 | 231 | 112 | 222 | 67.5 | 110 | 94.7 |
| MAX | 282 | 700 | 780 | 73 | 1,100 | 996 | 515 | 226 | 963 | 583 | 491 | 441 |
| MIN | 26 | 25 | 63 | 29 | 30 | 63 | 123 | 47 | 42 | 19 | 22 | 20 |
| CFSM | 0.53 | 0.56 | 0.85 | 0.21 | 0.81 | 1.34 | 1.10 | 0.53 | 1.06 | 0.32 | 0.53 | 0.45 |
| IN. | 0.61 | 0.63 | 0.98 | 0.24 | 0.88 | 1.55 | 1.23 | 0.61 | 1.18 | 0.37 | 0.61 | 0.50 |

e Estimated

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

REVISIONS.--Revised maximum discharges for water years 1997-2002, and revised daily discharges, in cubic feet per second, are given in the following tables. These figures supersede those published in the reports for 1997-2002.

PEAK DISCHARGES FOR 2001 WATER YEAR.--Peak discharges greater than base discharge of 3,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Mar 21 | 1615 | 4,830 | 7.50 | Jun 22 | 2215 | *13,600 | *12.37 |
| Jun 22 | 0200 | 4,380 | 7.23 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2000 TO SEPTEMBER 2001
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 90 | 15 | 32 | e38 | 443 | 126 | 645 | 57 | 112 | 94 | 297 | 40 |
| 2 | 72 | 15 | 33 | e37 | 333 | 121 | 597 | 54 | 96 | 90 | 205 | 33 |
| 3 | 60 | 14 | 34 | e37 | 267 | 115 | 506 | 51 | 81 | 80 | 155 | 28 |
| 4 | 51 | 14 | 34 | e34 | 216 | 111 | 430 | 49 | 72 | 69 | 143 | 25 |
| 5 | 45 | 14 | 34 | e30 | 187 | 130 | 369 | 48 | 137 | 62 | 156 | 23 |
| 6 | 41 | 14 | 34 | e29 | 162 | 140 | 335 | 45 | 117 | 55 | 122 | 23 |
| 7 | 36 | 13 | 33 | e26 | 139 | 140 | 325 | 42 | 141 | 49 | 95 | 22 |
| 8 | 33 | 13 | 32 | e27 | 118 | 134 | 300 | 39 | 156 | 47 | 76 | 21 |
| 9 | 30 | 14 | 31 | e28 | 103 | 133 | 278 | 38 | 144 | 61 | 62 | 19 |
| 10 | 28 | 41 | 30 | e29 | 96 | 128 | 274 | 35 | 121 | 57 | 53 | 18 |
| 11 | 26 | 49 | 30 | e28 | 88 | 120 | 1,330 | 34 | 97 | 51 | 51 | 18 |
| 12 | 24 | 37 | 29 | e27 | 78 | 113 | 1,070 | 32 | 78 | 48 | 242 | 18 |
| 13 | 23 | 32 | 27 | e26 | 71 | 110 | 609 | 30 | 132 | 46 | 580 | 16 |
| 14 | 22 | 30 | 39 | e25 | 68 | 110 | 425 | 28 | 311 | 45 | 242 | 15 |
| 15 | 21 | 31 | 62 | e25 | 67 | 109 | 333 | 27 | 182 | 43 | 164 | 14 |
| 16 | 20 | 31 | 81 | 25 | 73 | 171 | 282 | 28 | 138 | 41 | 123 | 13 |
| 17 | 19 | 30 | 368 | 25 | 132 | 232 | 239 | 28 | 117 | 39 | 97 | 12 |
| 18 | 18 | 30 | 401 | 24 | 157 | 263 | 199 | 30 | 87 | 38 | 75 | 11 |
| 19 | 17 | 29 | 287 | 46 | 152 | 256 | 169 | 95 | 69 | 37 | 64 | 10 |
| 20 | 16 | 28 | 216 | 263 | 146 | 234 | 148 | 147 | 59 | 36 | 65 | 10 |
| 21 | 16 | 26 | 163 | 301 | 135 | 2,140 | 136 | 183 | 155 | 36 | 53 | 9.4 |
| 22 | 15 | 25 | e130 | 240 | 125 | 1,800 | 124 | 424 | 3,380 | 35 | 44 | 8.8 |
| 23 | 15 | 24 | e95 | 202 | 115 | 998 | 110 | 1,250 | 3,360 | 34 | 39 | 7.7 |
| 24 | 15 | 22 | e85 | 186 | 112 | 622 | 100 | 549 | 777 | 32 | 41 | 7.3 |
| 25 | 15 | 22 | e73 | 164 | 112 | 485 | 93 | 336 | 384 | 31 | 38 | 7.3 |
| 26 | 15 | 29 | e75 | 139 | 130 | 403 | 84 | 307 | 253 | 156 | 37 | 6.9 |
| 27 | 15 | 30 | e60 | 132 | 130 | 334 | 76 | 480 | 185 | 292 | 41 | 6.5 |
| 28 | 15 | 31 | e55 | 113 | 128 | 285 | 72 | 309 | 150 | 249 | 33 | 6.4 |
| 29 | 15 | 31 | e50 | 101 | --- | 264 | 67 | 224 | 121 | 753 | 32 | 6.4 |
| 30 | 15 | 32 | e45 | 371 | --- | 1,250 | 62 | 170 | 109 | 1,870 | 35 | 5.8 |
| 31 | 15 | --- | e40 | 631 | --- | 906 | --- | 135 | --- | 570 | 34 | --- |
| TOTAL | 858 | 766 | 2,738 | 3,409 | 4,083 | 12,483 | 9,787 | 5,304 | 11,321 | 5,146 | 3,494 | 461.5 |
| MEAN | 27.7 | 25.5 | 88.3 | 110 | 146 | 403 | 326 | 171 | 377 | 166 | 113 | 15.4 |
| MAX | 90 | 49 | 401 | 631 | 443 | 2,140 | 1,330 | 1,250 | 3,380 | 1,870 | 580 | 40 |
| MIN | 15 | 13 | 27 | 24 | 67 | 109 | 62 | 27 | 59 | 31 | 32 | 5.8 |
| CFSM | 0.13 | 0.12 | 0.42 | 0.52 | 0.69 | 1.92 | 1.55 | 0.81 | 1.80 | 0.79 | 0.54 | 0.07 |
| IN. | 0.15 | 0.14 | 0.49 | 0.60 | 0.72 | 2.21 | 1.73 | 0.94 | 2.01 | 0.91 | 0.62 | 0.08 |

e Estimated

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

REVISIONS.--Revised maximum discharges for water years 1997-2002, and revised daily discharges, in cubic feet per second, are given in the following tables. These figures supersede those published in the reports for 1997-2002.

PEAK DISCHARGES FOR 2002 WATER YEAR.--Peak discharges greater than base discharge of 3,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Apr 22 | 0500 | *10,200 | *10.70 | May 26 | 2300 | 3,520 | 6.67 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.6 | e8.2 | 11 | 9.9 | e16 | 12 | 241 | 405 | 117 | 31 | 13 | 1.8 |
| 2 | 5.4 | e8.5 | 11 | e8.4 | e15 | 13 | 243 | 333 | 91 | 26 | 11 | 1.4 |
| 3 | 5.2 | e8.7 | 11 | e8.5 | e14 | 34 | 219 | 268 | 74 | 23 | 9.0 | 1.4 |
| 4 | 5.1 | e8.8 | 11 | e8.3 | e15 | 60 | 179 | 217 | 80 | 19 | 6.9 | 1.4 |
| 5 | 4.8 | e8.3 | 11 | e8.2 | e14 | 47 | 148 | 190 | 86 | 17 | 5.9 | 1.4 |
| 6 | 4.8 | e8.0 | 11 | e8.4 | e13 | 46 | 130 | 165 | 105 | 14 | 5.4 | 1.4 |
| 7 | 4.8 | e8.5 | 11 | e8.8 | e16 | 45 | 114 | 164 | 83 | 12 | 4.8 | 1.4 |
| 8 | 4.5 | e8.5 | 11 | e8.7 | e17 | 44 | 100 | 193 | 65 | 11 | 4.2 | 1.5 |
| 9 | 4.0 | e8.3 | 12 | 8.7 | e16 | 42 | 92 | 228 | 55 | 9.4 | 3.8 | 1.2 |
| 10 | 3.8 | e8.8 | 11 | 9.2 | 16 | 38 | 85 | 272 | 48 | 10 | 3.8 | 1.3 |
| 11 | 3.6 | e8.7 | 20 | 11 | 15 | 35 | 75 | 237 | 42 | 13 | 3.1 | 1.3 |
| 12 | e3.5 | e8.7 | 25 | 16 | 15 | 33 | 67 | 205 | 36 | 11 | 3.0 | 1.4 |
| 13 | e3.9 | e8.7 | 23 | 19 | 15 | 35 | 65 | 190 | 55 | 9.2 | 2.7 | 1.4 |
| 14 | e4.0 | e8.7 | 21 | 20 | 14 | 37 | 65 | 176 | 95 | 18 | 2.4 | 1.5 |
| 15 | e3.9 | e8.8 | 20 | 19 | 14 | 36 | 82 | 147 | 70 | 22 | 2.4 | 1.6 |
| 16 | e4.5 | e9.0 | 20 | 18 | 14 | 36 | 103 | 120 | 57 | 16 | 2.4 | 1.6 |
| 17 | e5.0 | e9.0 | 19 | 17 | 14 | 35 | 126 | 102 | 48 | 14 | 2.4 | 1.4 |
| 18 | e5.8 | e9.0 | 19 | 16 | e17 | 49 | 140 | 190 | 42 | 13 | 2.0 | 1.4 |
| 19 | e6.1 | e9.0 | 19 | 16 | e16 | 82 | 152 | 229 | 39 | 12 | 1.9 | 1.4 |
| 20 | e6.9 | e8.8 | 18 | 16 | e16 | 813 | 229 | 192 | 47 | 11 | 1.9 | 1.4 |
| 21 | e7.5 | e8.7 | 18 | 15 | e15 | 558 | 1,200 | 162 | 43 | 9.1 | 1.9 | 9.6 |
| 22 | e7.6 | e8.6 | 17 | 15 | e15 | 317 | 5,950 | 136 | 36 | 8.6 | 1.9 | 36 |
| 23 | e8.5 | e8.5 | 17 | 15 | e14 | 220 | 1,310 | 113 | 31 | 7.6 | 1.9 | 39 |
| 24 | e8.7 | e8.5 | 16 | 16 | e14 | 169 | 586 | 98 | 27 | 31 | 1.5 | 13 |
| 25 | e8.8 | e8.5 | 15 | 17 | e14 | 137 | 379 | 86 | 23 | 32 | 1.4 | 6.7 |
| 26 | e8.7 | e9.5 | 14 | 18 | 13 | 122 | 288 | 334 | 26 | 31 | 1.4 | 175 |
| 27 | e8.5 | e10 | 13 | 19 | 12 | 198 | 227 | 592 | 61 | 48 | 1.4 | 344 |
| 28 | e8.5 | e11 | 13 | 19 | 12 | 199 | 893 | 324 | 76 | 36 | 1.6 | 164 |
| 29 | e8.7 | 12 | 12 | 19 | --- | 177 | 1,340 | 213 | 47 | 28 | 1.9 | 104 |
| 30 | e8.8 | 12 | 12 | e18 | --- | 153 | 609 | 155 | 36 | 21 | 1.9 | 80 |
| 31 | e8.8 | --- | 11 | e17 | --- | 146 | --- | 136 | --- | 16 | 1.9 | --- |
| TOTAL | 188.3 | 270.3 | 473 | 443.1 | 411 | 3,968 | 15,437 | 6,572 | 1,741 | 579.9 | 110.7 | 999.9 |
| MEAN | 6.07 | 9.01 | 15.3 | 14.3 | 14.7 | 128 | 515 | 212 | 58.0 | 18.7 | 3.57 | 33.3 |
| MAX | 8.8 | 12 | 25 | 20 | 17 | 813 | 5,950 | 592 | 117 | 48 | 13 | 344 |
| MIN | 3.5 | 8.0 | 11 | 8.2 | 12 | 12 | 65 | 86 | 23 | 7.6 | 1.4 | 1.2 |
| CFSM | 0.03 | 0.04 | 0.07 | 0.07 | 0.07 | 0.61 | 2.45 | 1.01 | 0.28 | 0.09 | 0.02 | 0.16 |
| IN. | 0.03 | 0.05 | 0.08 | 0.08 | 0.07 | 0.70 | 2.73 | 1.16 | 0.31 | 0.10 | 0.02 | 0.18 |

e Estimated

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

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 1 | 1930 | 4,340 | 7.21 | Mar 20 | 1830 | 4,740 | 7.45 |
| Feb 22 | 1700 | 6,190 | 8.40 | May 11 | 0000 | 4,070 | 7.04 |
| Feb 23 | 1100 | 5,130 | 7.69 | Sep 19 | 0730 | *20,400 | *15.22 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 63 | 319 | 117 | 1,590 | 44 | 367 | 268 | 555 | 147 | 106 | e35 | e9.7 |
| 2 | 52 | 237 | 103 | 1,940 | 44 | 525 | 366 | 693 | 115 | 106 | e36 | e20 |
| 3 | 44 | 188 | 92 | 779 | 44 | 809 | 369 | 397 | 106 | 153 | e45 | e52 |
| 4 | 36 | 155 | 81 | 552 | 46 | 605 | 336 | 632 | 366 | 127 | e88 | e28 |
| 5 | 30 | 137 | 82 | 418 | 45 | 1,230 | 307 | 693 | 638 | 99 | 85 | e35 |
| 6 | 25 | 246 | 76 | 338 | 42 | 2,320 | 269 | 577 | 433 | 98 | 100 | e21 |
| 7 | 22 | 248 | 63 | 259 | 43 | 1,370 | 772 | 460 | 391 | 499 | e72 | e16 |
| 8 | 19 | 217 | 66 | 215 | 38 | 763 | 969 | 393 | 449 | 315 | e68 | e13 |
| 9 | 17 | 188 | 63 | 183 | e32 | 881 | 1,510 | 371 | 617 | 270 | e66 | e11 |
| 10 | 17 | 161 | 61 | 150 | e36 | 787 | 1,490 | 1,580 | 487 | 220 | 282 | e10 |
| 11 | 51 | 318 | 241 | 126 | e34 | 523 | 2,420 | 2,580 | 369 | 237 | 338 | e9.8 |
| 12 | 97 | 876 | 442 | 106 | e33 | 424 | 1,240 | 881 | 309 | 151 | 335 | e9.6 |
| 13 | 76 | 1,140 | 705 | 95 | e28 | 423 | 681 | 523 | 330 | 104 | 207 | e11 |
| 14 | 66 | 502 | 1,180 | 91 | e29 | 563 | 482 | 387 | 398 | 92 | 114 | e12 |
| 15 | 56 | 340 | 780 | 85 | e30 | 458 | 398 | 311 | 596 | e86 | e60 | e11 |
| 16 | 681 | 277 | 522 | 69 | 14 | 392 | 344 | 317 | 850 | e72 | e40 | e10 |
| 17 | 541 | 591 | 411 | 71 | 11 | 354 | 302 | 260 | 1,010 | e60 | e30 | e9.6 |
| 18 | 278 | 599 | 337 | 60 | e14 | 330 | 274 | 880 | 1,480 | e54 | e23 | e10 |
| 19 | 191 | 415 | 289 | e58 | e19 | 302 | 348 | 1,280 | 895 | e52 | e20 | 8,990 |
| 20 | 144 | 326 | 634 | e56 | e35 | 1,940 | 340 | 701 | 773 | e48 | e17 | 1,530 |
| 21 | 112 | 287 | 708 | e56 | 57 | 2,080 | 331 | 515 | 654 | e45 | e15 | 644 |
| 22 | 90 | 332 | 448 | e53 | 2,430 | 795 | 337 | 425 | 486 | e43 | e14 | 377 |
| 23 | 74 | 309 | 343 | e52 | 4,160 | 509 | 311 | 378 | 379 | e42 | e13 | 400 |
| 24 | 62 | 272 | 282 | e50 | 1,590 | 407 | 281 | 348 | 300 | e66 | e12 | 301 |
| 25 | 56 | 234 | 260 | e49 | 924 | 347 | 258 | 306 | 229 | e52 | e11 | 216 |
| 26 | 79 | 204 | 227 | e49 | 593 | 309 | 247 | 276 | 180 | e42 | e10 | 165 |
| 27 | 77 | 182 | 195 | e50 | 459 | 276 | 211 | 232 | 151 | e39 | e9.8 | 132 |
| 28 | 75 | 159 | 177 | e49 | 396 | 234 | 177 | 234 | 135 | e37 | e9.8 | 130 |
| 29 | 320 | 141 | 166 | e47 | --- | 210 | 158 | 210 | 120 | e36 | e10 | 104 |
| 30 | 1,240 | 129 | 155 | 46 | --- | 228 | 143 | 193 | 111 | e35 | e11 | 86 |
| 31 | 498 | --- | 150 | 45 | --- | 228 | --- | 165 | --- | e33 | e10 | --- |
| TOTAL | 5,189 | 9,729 | 9,456 | 7,787 | 11,270 | 20,989 | 15,939 | 17,753 | 13,504 | 3,419 | 2,186.6 | 13,373.7 |
| MEAN | 167 | 324 | 305 | 251 | 402 | 677 | 531 | 573 | 450 | 110 | 70.5 | 446 |
| MAX | 1,240 | 1,140 | 1,180 | 1,940 | 4,160 | 2,320 | 2,420 | 2,580 | 1,480 | 499 | 338 | 8,990 |
| MIN | 17 | 129 | 61 | 45 | 11 | 210 | 143 | 165 | 106 | 33 | 9.8 | 9.6 |
| CFSM | 0.80 | 1.54 | 1.45 | 1.20 | 1.92 | 3.22 | 2.53 | 2.73 | 2.14 | 0.53 | 0.34 | 2.12 |
| IN. | 0.92 | 1.72 | 1.68 | 1.38 | 2.00 | 3.72 | 2.82 | 3.14 | 2.39 | 0.61 | 0.39 | 2.37 |

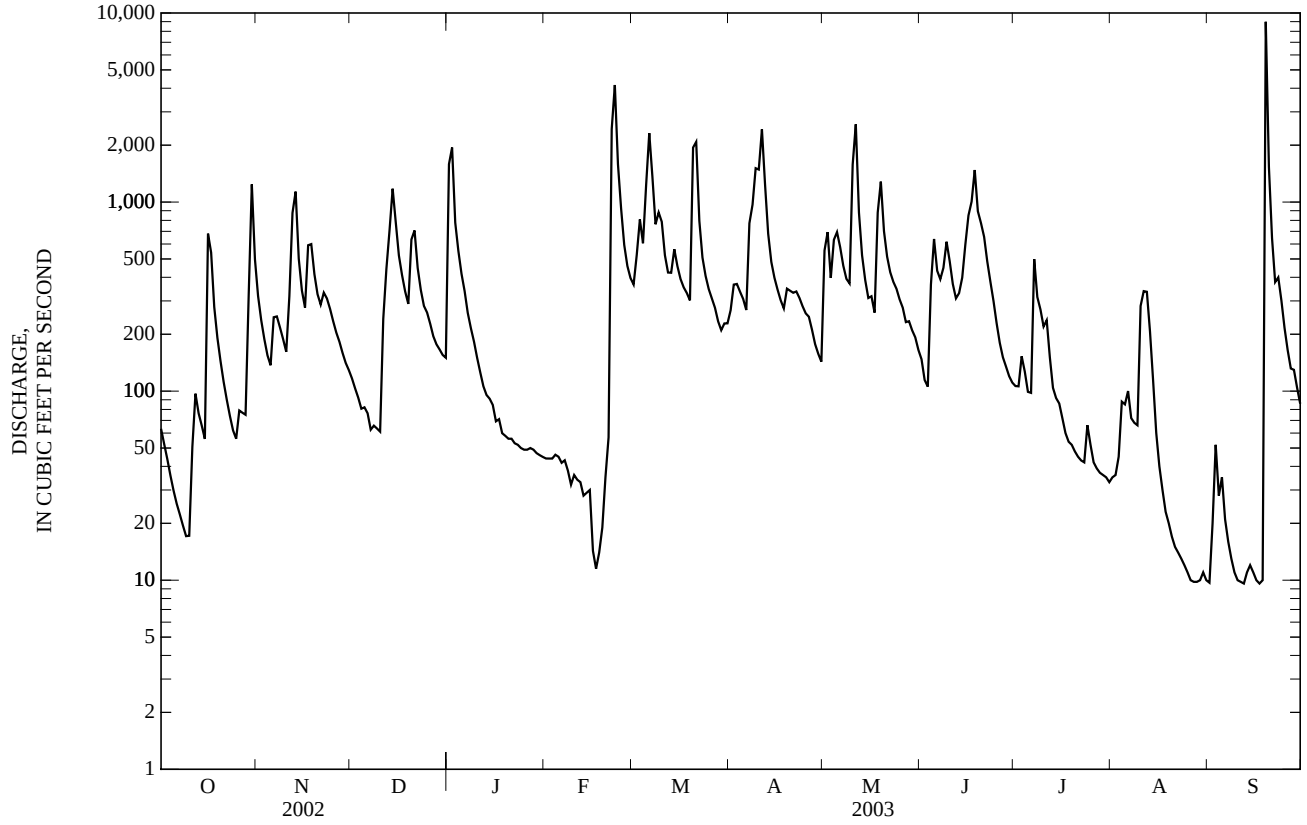
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1925 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 124 | 144 | 182 | 216 | 285 | 413 | 346 | 271 | 136 | 65.4 | 86.6 | 91.8 |
| MAX | 1,401 | 1,883 | 850 | 1,114 | 1,182 | 1,536 | 1,156 | 964 | 906 | 552 | 697 | 1,582 |
| (WY) | (1943) | (1986) | (1974) | (1996) | (1998) | (1936) | (1987) | (1942) | (1972) | (1949) | (1955) | (1996) |
| MIN | 0.76 | 3.26 | 3.04 | 5.13 | 11.3 | 38.4 | 27.7 | 24.3 | 6.10 | 1.15 | 0.52 | 0.66 |
| (WY) | (1931) | (1931) | (1966) | (1966) | (1934) | (1981) | (1981) | (1977) | (1977) | (1999) | (1930) | (1930) |

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

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1925 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 54,636.6 | | 130,595.3 | | | |
| ANNUAL MEAN | 150 | | 358 | | 197 | |
| HIGHEST ANNUAL MEAN | | | | | 463 | 1996 |
| LOWEST ANNUAL MEAN | | | | | 58.1 | 1934 |
| HIGHEST DAILY MEAN | 5,950 | Apr 22 | 8,990 | Sep 19 | 26,400 | Sep 6, 1996 |
| LOWEST DAILY MEAN | 1.2 | Sep 9 | e9.6 | aSep 12 | 0.20 | bAug 28, 1957 |
| ANNUAL SEVEN-DAY MINIMUM | 1.4 | Sep 5 | 10 | Aug 26 | 0.27 | Sep 3, 1966 |
| MAXIMUM PEAK FLOW | | | 20,400 | Sep 19 | 63,400 | Sep 6, 1996 |
| MAXIMUM PEAK STAGE | | | 15.22 | Sep 19 | c27.86 | Sep 6, 1996 |
| INSTANTANEOUS LOW FLOW | | | 5.9 | Feb 13 | 0.20 | Aug 28, 1957 |
| ANNUAL RUNOFF (CFSM) | 0.71 | | 1.70 | | 0.94 | |
| ANNUAL RUNOFF (INCHES) | 9.68 | | 23.13 | | 12.74 | |
| 10 PERCENT EXCEEDS | 333 | | 779 | | 430 | |
| 50 PERCENT EXCEEDS | 48 | | 204 | | 62 | |
| 90 PERCENT EXCEEDS | 2.4 | | 23 | | 4.8 | |

a Also Sept. 17, 2003.
b Also Aug. 29, Sept. 4, 1957, and Sept. 7-10, 1966.
c From floodmarks.
e Estimated.



## 01632082 LINVILLE CREEK AT BROADWAY, VA

LOCATION.--Lat 38°36'24", long 78°48'12", NAD83, Rockingham County, Hydrologic Unit 02070006, on left bank at Broadway, 170 ft downstream from bridge on State Highway 1421, and 1.1 mi upstream from mouth.

DRAINAGE AREA.--45.5 $mi^2$.

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

GAGE.--Water-stage recorder. Datum of gage is 1,029.90 ft NGVD of 1929.

REMARKS.--Records good except those for periods with ice effect, Jan. 16-29 and Feb. 8-10, 13-15, 17-20, which are fair. Maximum discharge, 17,800 $ft^3/s$, from rating curve extended above 1,860 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Nov 12 | 1545 | 556 | 3.70 | Jun 18 | 2145 | 699 | 3.95 |
| Dec 20 | 0745 | 1,010 | 4.41 | Jun 19 | 2345 | 910 | 4.27 |
| Feb 22 | 1700 | 869 | 4.21 | Jun 20 | 1300 | 1,440 | 4.94 |
| Mar 2 | 1915 | 910 | 4.27 | Jul 3 | 0930 | 931 | 4.30 |
| Mar 5 | 1630 | 1,200 | 4.66 | Jul 7 | 0215 | 1,090 | 4.52 |
| Mar 20 | 1545 | 1,960 | 5.49 | Aug 3 | 1530 | 903 | 4.26 |
| Apr 11 | 0310 | 1,150 | 4.59 | Sep 1 | 2100 | 600 | 3.78 |
| Jun 14 | 2015 | 2,550 | 6.02 | Sep 2 | 1845 | 1,460 | 4.96 |
| Jun 17 | 2130 | 561 | 3.71 | Sep 19 | 0345 | *10,500 | *10.54 |
| Jun 18 | 1800 | 693 | 3.94 | Sep 23 | 0430 | 1,030 | 4.43 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7.9 | 67 | 29 | 175 | 25 | 177 | 67 | 25 | 32 | 68 | 34 | 95 |
| 2 | 6.3 | 51 | 26 | 188 | 24 | 432 | 59 | 23 | 28 | 71 | 29 | 324 |
| 3 | 5.5 | 40 | 24 | 208 | 23 | 370 | 53 | 21 | 32 | 480 | 186 | 181 |
| 4 | 5.4 | 35 | 21 | 180 | 27 | 307 | 48 | 30 | 78 | 223 | 108 | 136 |
| 5 | 5.4 | 37 | 22 | 155 | 24 | 577 | 46 | 28 | 154 | 151 | 115 | 113 |
| 6 | 4.9 | 64 | 19 | 145 | 22 | 378 | 39 | 24 | 74 | 119 | 129 | 81 |
| 7 | 5.0 | 53 | 17 | 130 | 23 | 270 | 90 | 21 | 159 | 365 | 85 | 67 |
| 8 | 4.8 | 44 | 16 | 123 | e20 | 223 | 84 | 20 | 151 | 174 | 73 | 58 |
| 9 | 4.9 | 36 | 14 | 109 | e19 | 200 | 240 | 24 | 176 | 167 | 75 | 51 |
| 10 | 6.3 | 33 | 13 | 97 | e20 | 177 | 154 | 47 | 106 | 153 | 92 | 47 |
| 11 | 17 | 88 | 57 | 84 | 20 | 164 | 461 | 60 | 86 | 137 | 113 | 41 |
| 12 | 21 | 255 | 87 | 75 | 19 | 148 | 175 | 41 | 73 | 103 | 91 | 38 |
| 13 | 15 | 202 | 170 | 71 | e17 | 141 | 125 | 35 | 117 | 87 | 79 | 40 |
| 14 | 11 | 135 | 235 | 66 | e13 | 136 | 105 | 30 | 357 | 84 | 67 | 36 |
| 15 | 10 | 104 | 168 | 61 | e15 | 120 | 93 | 28 | 253 | 80 | 60 | 34 |
| 16 | 77 | 96 | 123 | e50 | 9.9 | 112 | 82 | 46 | 227 | 64 | 54 | 32 |
| 17 | 59 | 224 | 92 | e46 | e15 | 107 | 71 | 34 | 348 | 55 | 49 | 30 |
| 18 | 33 | 177 | 80 | e43 | e25 | 101 | 68 | 274 | 407 | 51 | 46 | 236 |
| 19 | 25 | 134 | 71 | e39 | e23 | 91 | 75 | 200 | 383 | 48 | 42 | 3,020 |
| 20 | 20 | 113 | 344 | e37 | e21 | 683 | 60 | 119 | 732 | 43 | 39 | 424 |
| 21 | 17 | 108 | 136 | e36 | 28 | 291 | 54 | 109 | 370 | 39 | 37 | 290 |
| 22 | 16 | 129 | 98 | e33 | 410 | 170 | 51 | 95 | 271 | 36 | 35 | 226 |
| 23 | 14 | 100 | 80 | e29 | 555 | 124 | 43 | 82 | 207 | 38 | 32 | 506 |
| 24 | 11 | 82 | 71 | e26 | 384 | 104 | 38 | 70 | 166 | 56 | 31 | 261 |
| 25 | 12 | 70 | 75 | e28 | 327 | 91 | 37 | 59 | 138 | 36 | 30 | 198 |
| 26 | 25 | 61 | 65 | e26 | 234 | 82 | 36 | 53 | 120 | 33 | 28 | 165 |
| 27 | 20 | 53 | 56 | e24 | 198 | 74 | 32 | 49 | 104 | 30 | 28 | 146 |
| 28 | 23 | 43 | 50 | e21 | 177 | 65 | 29 | 56 | 88 | 29 | 46 | 174 |
| 29 | 97 | 38 | 45 | e24 | --- | 61 | 28 | 46 | 77 | 29 | 45 | 124 |
| 30 | 159 | 34 | 42 | 26 | --- | 69 | 26 | 39 | 70 | 27 | 34 | 105 |
| 31 | 96 | --- | 37 | 26 | --- | 67 | --- | 35 | --- | 26 | 30 | --- |
| TOTAL | 834.4 | 2,706 | 2,383 | 2,381 | 2,717.9 | 6,112 | 2,569 | 1,823 | 5,584 | 3,102 | 1,942 | 7,279 |
| MEAN | 26.9 | 90.2 | 76.9 | 76.8 | 97.1 | 197 | 85.6 | 58.8 | 186 | 100 | 62.6 | 243 |
| MAX | 159 | 255 | 344 | 208 | 555 | 683 | 461 | 274 | 732 | 480 | 186 | 3,020 |
| MIN | 4.8 | 33 | 13 | 21 | 9.9 | 61 | 26 | 20 | 28 | 26 | 28 | 30 |
| CFSM | 0.59 | 1.98 | 1.69 | 1.69 | 2.13 | 4.33 | 1.88 | 1.29 | 4.09 | 2.20 | 1.38 | 5.33 |
| IN. | 0.68 | 2.21 | 1.95 | 1.95 | 2.22 | 5.00 | 2.10 | 1.49 | 4.57 | 2.54 | 1.59 | 5.95 |

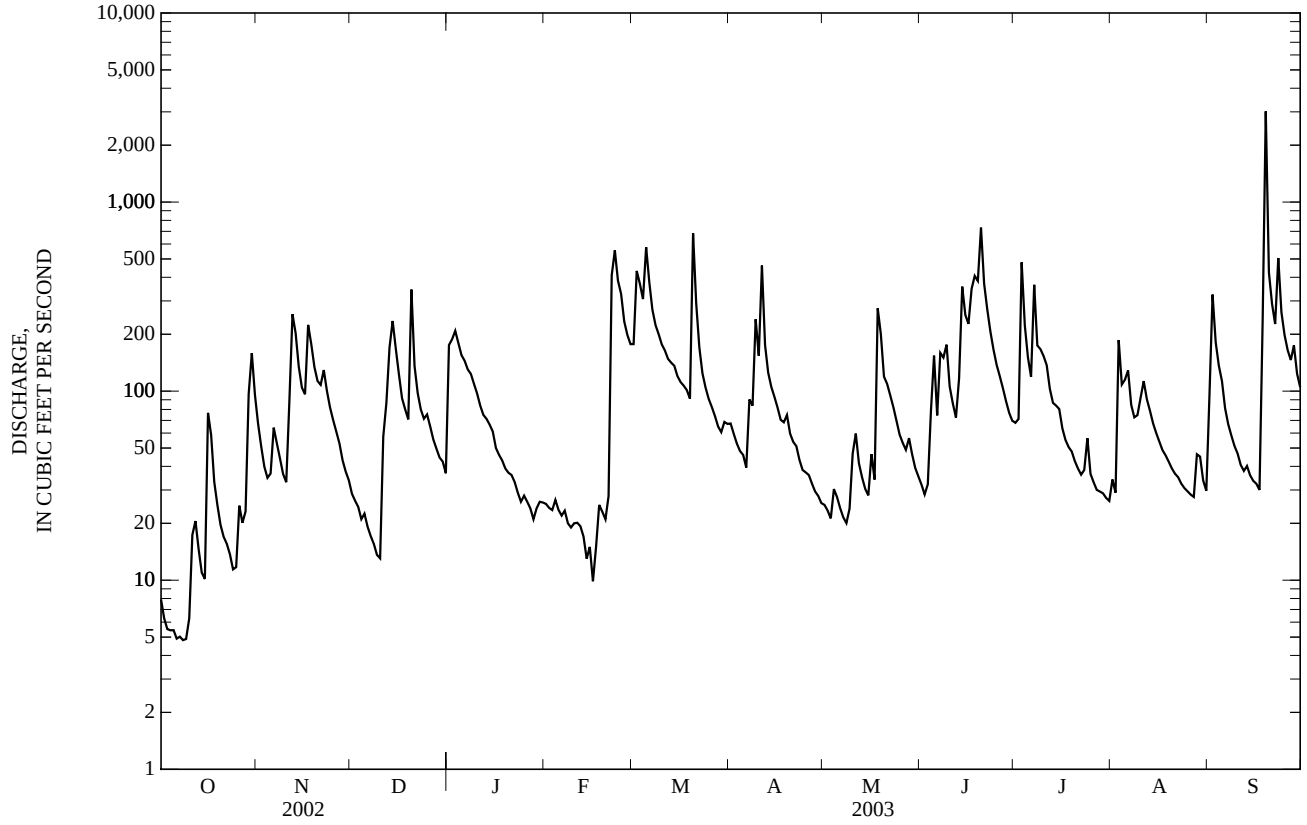
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1985 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 23.0 | 30.4 | 31.9 | 55.3 | 49.4 | 73.1 | 48.8 | 35.9 | 32.6 | 21.9 | 25.7 | 43.1 |
| MAX | 108 | 144 | 115 | 213 | 195 | 206 | 135 | 91.0 | 186 | 100 | 138 | 275 |
| (WY) | (1991) | (1986) | (1997) | (1996) | (1998) | (1994) | (1993) | (1989) | (2003) | (2003) | (1996) | (1996) |
| MIN | 6.48 | 6.11 | 5.53 | 4.75 | 4.16 | 6.96 | 11.5 | 12.9 | 6.58 | 3.62 | 4.31 | 5.21 |
| (WY) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (1995) | (1986) | (1999) | (1999) | (1999) | (1986) |

01632082 LINVILLE CREEK AT BROADWAY, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1985 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 8,367.5 | | 39,433.3 | | | |
| ANNUAL MEAN | 22.9 | | 108 | | 39.4 | |
| HIGHEST ANNUAL MEAN | | | | | 108 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 8.22 | 2002 |
| HIGHEST DAILY MEAN | 344 | Dec 20 | 3,020 | Sep 19 | e4,700 | Sep 6, 1996 |
| LOWEST DAILY MEAN | 2.2 | aSep 13 | 4.8 | Oct 8 | 1.7 | Aug 11, 1999 |
| ANNUAL SEVEN-DAY MINIMUM | 2.4 | Sep 8 | 5.1 | Oct 3 | 2.3 | Aug 7, 1999 |
| MAXIMUM PEAK FLOW | | | 10,500 | Sep 19 | 17,800 | Sep 6, 1996 |
| MAXIMUM PEAK STAGE | | | 10.54 | Sep 19 | 13.23 | Sep 6, 1996 |
| INSTANTANEOUS LOW FLOW | | | 4.6 | bOct 6 | 1.0 | cAug 8, 1999 |
| ANNUAL RUNOFF (CFSM) | 0.50 | | 2.37 | | 0.87 | |
| ANNUAL RUNOFF (INCHES) | 6.84 | | 32.24 | | 11.75 | |
| 10 PERCENT EXCEEDS | 66 | | 230 | | 80 | |
| 50 PERCENT EXCEEDS | 7.1 | | 64 | | 18 | |
| 90 PERCENT EXCEEDS | 3.8 | | 20 | | 6.8 | |

a Also Sept. 14, 2002.
b Also Oct. 7-9, 2002.
c Also Aug. 13, 1999.
e Estimated.



## 01632900 SMITH CREEK NEAR NEW MARKET, VA

LOCATION.--Lat 38°41'36", long 78°38'34", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Aug. 2, 1963, on right bank a short distance downstream, at datum 0.71 ft higher.

REMARKS.--Records good except those for period of doubtful gage-height record due to backwater from beaver dam, Oct. 1-16, and periods with ice effect, Dec. 5-9, Jan. 17-19, 22-29, and Feb. 1-20, which are fair. Maximum discharge, 12,400 $ft^3/s$, from rating curve extended above 2,300 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 650 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 1 | 1930 | 1,700 | 8.19 | Jun 15 | 0130 | 923 | 5.93 |
| Feb 23 | 0130 | 1,610 | 7.94 | Jun 19 | 0330 | 716 | 5.21 |
| Mar 3 | 0200 | 814 | 5.56 | Jun 20 | 1730 | 1,010 | 6.20 |
| Mar 5 | 2200 | 1,390 | 7.36 | Jul 3 | 1500 | 1,210 | 6.84 |
| Mar 20 | 2230 | 2,050 | 8.93 | Aug 13 | 0730 | 686 | 5.10 |
| Apr 9 | 1630 | 887 | 5.81 | Sep 19 | 0800 | *10,300 | *16.25 |
| Apr 11 | 1100 | 1,430 | 7.47 | Sep 23 | 1330 | 3,540 | 11.55 |
| May 18 | 2200 | 652 | 4.97 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | e10 | 90 | 54 | 643 | e41 | 212 | 186 | 88 | 98 | 104 | 53 | 55 |
| 2 | e9.7 | 74 | 50 | 588 | e38 | 416 | 182 | 83 | 87 | 106 | 55 | 85 |
| 3 | e9.4 | 64 | 47 | 340 | e36 | 585 | 155 | 78 | 87 | 664 | 53 | 176 |
| 4 | e8.9 | 56 | 44 | 278 | e42 | 377 | 138 | 95 | 175 | 447 | 55 | 140 |
| 5 | e8.8 | 52 | e45 | 211 | e40 | 711 | 129 | 97 | 235 | 266 | 62 | 148 |
| 6 | e8.0 | 81 | e42 | 183 | e37 | 837 | 116 | 89 | 139 | 185 | 75 | 105 |
| 7 | e8.2 | 76 | e38 | 159 | e39 | 531 | 241 | 79 | 151 | 187 | 58 | 91 |
| 8 | e7.8 | 64 | e36 | 146 | e35 | 385 | 299 | 74 | 214 | 181 | 81 | 82 |
| 9 | e7.4 | 57 | e35 | 135 | e32 | 355 | 608 | 74 | 362 | 153 | 129 | 77 |
| 10 | e7.9 | 51 | 34 | 119 | e34 | 276 | 505 | 189 | 219 | 148 | 193 | 72 |
| 11 | e16 | 79 | 74 | 105 | e36 | 229 | 1,000 | 240 | 167 | 130 | 127 | 68 |
| 12 | e35 | 251 | 138 | 95 | e33 | 206 | 516 | 136 | 143 | 112 | 111 | 65 |
| 13 | e32 | 324 | 247 | 89 | e30 | 197 | 346 | 107 | 144 | 101 | 245 | 80 |
| 14 | e24 | 170 | 417 | 85 | e33 | 223 | 273 | 92 | 224 | 96 | 131 | 78 |
| 15 | e20 | 127 | 323 | 81 | e36 | 179 | 233 | 85 | 401 | 92 | 108 | 70 |
| 16 | e140 | 113 | 200 | 74 | e28 | 159 | 206 | 134 | 224 | 84 | 97 | 68 |
| 17 | 123 | 275 | 137 | e70 | e38 | 149 | 183 | 107 | 296 | 74 | 89 | 61 |
| 18 | 59 | 311 | 106 | e67 | e50 | 139 | 168 | 367 | 435 | 70 | 84 | 79 |
| 19 | 39 | 189 | 90 | e64 | e45 | 129 | 219 | 401 | 488 | 70 | 78 | 4,840 |
| 20 | 31 | 149 | 348 | 62 | e41 | 871 | 176 | 234 | 663 | 65 | 74 | 701 |
| 21 | 27 | 137 | 309 | 60 | 63 | 920 | 158 | 202 | 620 | 61 | 70 | 384 |
| 22 | 24 | 141 | 204 | e53 | 677 | 435 | 157 | 206 | 384 | 57 | 67 | 298 |
| 23 | 22 | 117 | 164 | e47 | 1,080 | 304 | 139 | 176 | 276 | 58 | 64 | 1,710 |
| 24 | 20 | 100 | 141 | e43 | 620 | 241 | 125 | 170 | 221 | 141 | 61 | 548 |
| 25 | 19 | 88 | 144 | e46 | 519 | 201 | 119 | 147 | 188 | 76 | 59 | 345 |
| 26 | 32 | 81 | 137 | e42 | 331 | 181 | 119 | 134 | 165 | 62 | 57 | 272 |
| 27 | 28 | 75 | 118 | e40 | 258 | 175 | 110 | 122 | 148 | 56 | 55 | 233 |
| 28 | 28 | 67 | 107 | e38 | 222 | 148 | 99 | 143 | 135 | 54 | 55 | 259 |
| 29 | 88 | 62 | 99 | e45 | --- | 137 | 94 | 129 | 122 | 54 | 58 | 200 |
| 30 | 220 | 59 | 92 | 44 | --- | 158 | 90 | 116 | 111 | 52 | 71 | 173 |
| 31 | 134 | --- | 89 | 43 | --- | 181 | --- | 105 | --- | 50 | 56 | --- |
| TOTAL | 1,247.1 | 3,580 | 4,109 | 4,095 | 4,514 | 10,247 | 7,089 | 4,499 | 7,322 | 4,056 | 2,631 | 11,563 |
| MEAN | 40.2 | 119 | 133 | 132 | 161 | 331 | 236 | 145 | 244 | 131 | 84.9 | 385 |
| MAX | 220 | 324 | 417 | 643 | 1,080 | 920 | 1,000 | 401 | 663 | 664 | 245 | 4,840 |
| MIN | 7.4 | 51 | 34 | 38 | 28 | 129 | 90 | 74 | 87 | 50 | 53 | 55 |
| CFSM | 0.43 | 1.28 | 1.42 | 1.42 | 1.73 | 3.55 | 2.54 | 1.56 | 2.62 | 1.40 | 0.91 | 4.14 |
| IN. | 0.50 | 1.43 | 1.64 | 1.63 | 1.80 | 4.09 | 2.83 | 1.80 | 2.92 | 1.62 | 1.05 | 4.62 |

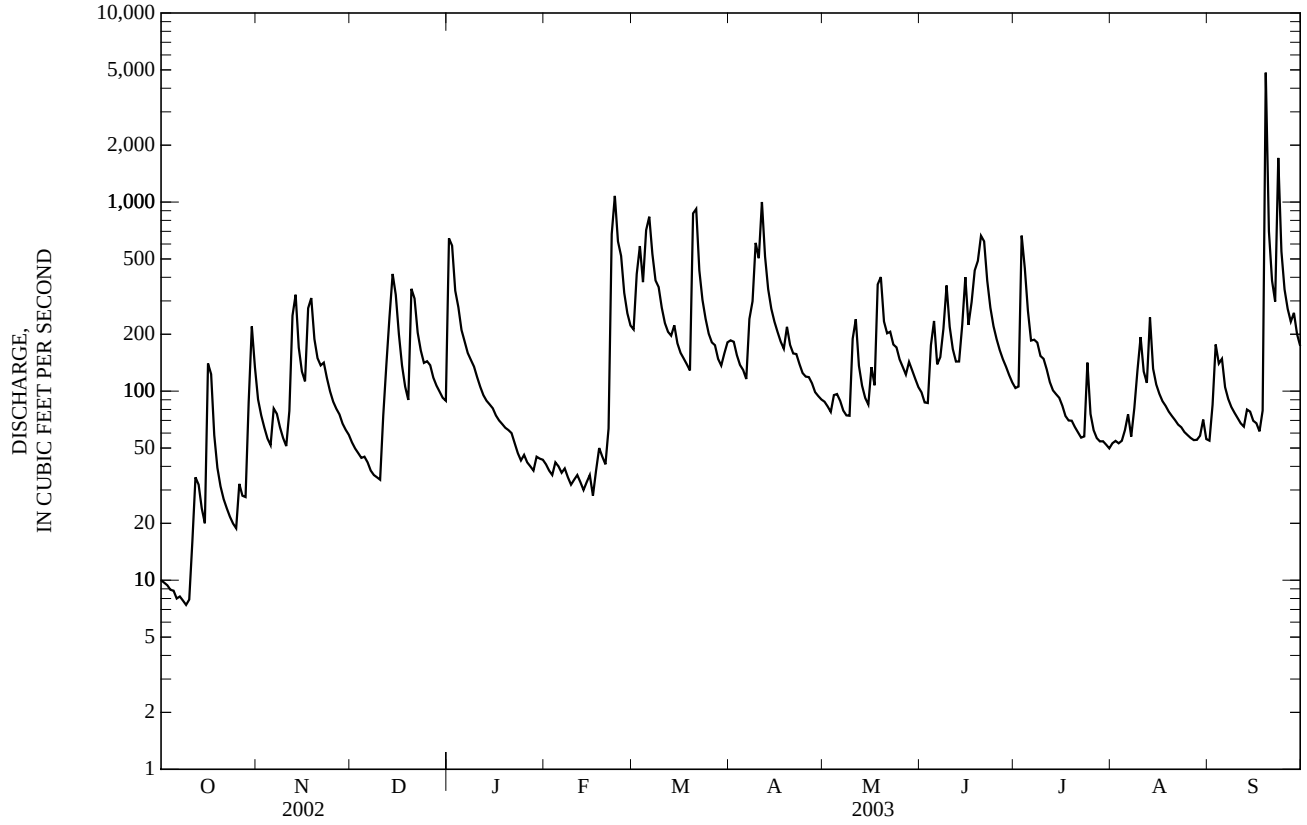
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 51.5 | 56.5 | 67.4 | 98.8 | 112 | 153 | 115 | 82.6 | 61.2 | 36.9 | 36.4 | 47.1 |
| MAX | 297 | 324 | 240 | 423 | 447 | 530 | 372 | 238 | 294 | 131 | 139 | 408 |
| (WY) | (1973) | (1986) | (1997) | (1996) | (1998) | (1994) | (1987) | (1988) | (1972) | (2003) | (1996) | (1996) |
| MIN | 8.56 | 11.0 | 8.86 | 10.1 | 9.58 | 18.4 | 19.4 | 20.0 | 12.3 | 8.64 | 6.83 | 9.36 |
| (WY) | (1987) | (1966) | (1966) | (1966) | (2002) | (2002) | (1981) | (1969) | (1999) | (2002) | (2002) | (1986) |

01632900 SMITH CREEK NEAR NEW MARKET, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1960 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 13,952.1 | | 64,952.1 | | | |
| ANNUAL MEAN | 38.2 | | 178 | | 76.4 | |
| HIGHEST ANNUAL MEAN | | | | | 178 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 17.0 | 2002 |
| HIGHEST DAILY MEAN | 417 | Dec 14 | 4,840 | Sep 19 | 5,190 | Jan 19, 1996 |
| LOWEST DAILY MEAN | e2.8 | Sep 14 | e7.4 | Oct 9 | e2.8 | Sep 14, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | e3.3 | Sep 8 | e8.1 | Oct 4 | e3.3 | Sep 8, 2002 |
| MAXIMUM PEAK FLOW | | | 10,300 | Sep 19 | 12,400 | Sep 6, 1996 |
| MAXIMUM PEAK STAGE | | | 16.25 | Sep 19 | 17.62 | Sep 6, 1996 |
| INSTANTANEOUS LOW FLOW | | | (a) | (b) | (a) | (c) |
| ANNUAL RUNOFF (CFSM) | 0.41 | | 1.91 | | 0.82 | |
| ANNUAL RUNOFF (INCHES) | 5.57 | | 25.93 | | 11.13 | |
| 10 PERCENT EXCEEDS | 102 | | 364 | | 154 | |
| 50 PERCENT EXCEEDS | 16 | | 107 | | 42 | |
| 90 PERCENT EXCEEDS | 6.3 | | 36 | | 14 | |

a Not determined.
b Probably occurred Oct. 9, 2002.
b Probably occurred Sept. 14, 2002.
e Estimated.



## 01633000 NORTH FORK SHENANDOAH RIVER AT MOUNT JACKSON, VA

LOCATION.--Lat 38°44'44", long 78°38'20", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to July 1, 1976, nonrecording gage, and July 1, 1976, to Oct. 23, 1981, water-stage recorder, at site 400 ft upstream at same datum.

REMARKS.--Records good except those for period with ice effect, Jan. 23-28, and period of doubtful gage-height record, Feb. 16-18, which are 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 $ft^3/s$, Sept. 6, 1996, from rating curve extended above 19,000 $ft^3/s$ on basis of peak runoff for stations at Cootes Store and near Strasburg. 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 $ft^3/s$, from rating curve extended above 18,000 $ft^3/s$ on basis of peak runoff for flood in October, 1942 for stations at Cootes Store and near Strasburg.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 1 | 2345 | 6,260 | 9.45 | Mar 20 | 2145 | 9,630 | 11.57 |
| Feb 22 | 2315 | 8,460 | 10.88 | Apr 11 | 1145 | 6,100 | 9.34 |
| Mar 6 | 0200 | 5,850 | 9.16 | Sep 19 | 1215 | *27,900 | *16.36 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 110 | 756 | 312 | 1,780 | 185 | 938 | 761 | 455 | 492 | 415 | 227 | 165 |
| 2 | 89 | 535 | 285 | 3,940 | 185 | 1,410 | 863 | 1,590 | 441 | 408 | 229 | 253 |
| 3 | 75 | 411 | 264 | 2,070 | 183 | 2,430 | 891 | 863 | 418 | 1,170 | 296 | 502 |
| 4 | 66 | 332 | 242 | 1,650 | 187 | 1,780 | 807 | 1,010 | 852 | 980 | 384 | 328 |
| 5 | 57 | 286 | 247 | 1,260 | 188 | 2,580 | 735 | 1,400 | 1,680 | 711 | 360 | 368 |
| 6 | 52 | 447 | 236 | 1,050 | 175 | 4,840 | 654 | 1,220 | 1,150 | 545 | 401 | 276 |
| 7 | 48 | 534 | 213 | 874 | 179 | 3,350 | 1,170 | 974 | 988 | 1,100 | 350 | 235 |
| 8 | 42 | 454 | 208 | 767 | 169 | 2,190 | 2,180 | 809 | 1,270 | 876 | 332 | 213 |
| 9 | 39 | 385 | 199 | 695 | 159 | 2,140 | 2,830 | 701 | 1,630 | 782 | 316 | 197 |
| 10 | 40 | 331 | 189 | 612 | 162 | 2,060 | 3,130 | 1,820 | 1,340 | 699 | 622 | 182 |
| 11 | 56 | 607 | 306 | 537 | 160 | 1,490 | 4,690 | 3,990 | 1,000 | 761 | 664 | 170 |
| 12 | 166 | 1,300 | 1,090 | 476 | 154 | 1,200 | 3,030 | 1,950 | 820 | 587 | 734 | 164 |
| 13 | 160 | 2,450 | 1,500 | 439 | 143 | 1,100 | 1,930 | 1,220 | 849 | 492 | 683 | 190 |
| 14 | 129 | 1,350 | 2,670 | 418 | 147 | 1,430 | 1,430 | 883 | 1,120 | 456 | 464 | 191 |
| 15 | 108 | 907 | 2,160 | 394 | 160 | 1,210 | 1,160 | 701 | 1,380 | 463 | 372 | 180 |
| 16 | 583 | 698 | 1,540 | 352 | e140 | 1,000 | 984 | 836 | 1,890 | 390 | 322 | 171 |
| 17 | 1,370 | 1,310 | 1,190 | 344 | e165 | 877 | 853 | 686 | 1,840 | 345 | 289 | 160 |
| 18 | 649 | 1,660 | 955 | 312 | e210 | 795 | 757 | 1,650 | 2,970 | 320 | 263 | 176 |
| 19 | 393 | 1,170 | 798 | 303 | 192 | 724 | 937 | 2,790 | 2,620 | 312 | 243 | 14,000 |
| 20 | 282 | 903 | 1,520 | 297 | 181 | 3,410 | 874 | 1,800 | 2,750 | 293 | 228 | 3,920 |
| 21 | 221 | 754 | 1,890 | 283 | 210 | 5,170 | 825 | 1,360 | 2,370 | 274 | 215 | 1,740 |
| 22 | 178 | 860 | 1,310 | 262 | 2,520 | 2,370 | 812 | 1,170 | 1,650 | 255 | 201 | 1,210 |
| 23 | 150 | 803 | 994 | e225 | 6,720 | 1,600 | 749 | 993 | 1,230 | 250 | 188 | 2,800 |
| 24 | 130 | 697 | 799 | e215 | 3,660 | 1,250 | 669 | 913 | 961 | 363 | 178 | 1,490 |
| 25 | 119 | 598 | 745 | e220 | 2,490 | 1,040 | 618 | 802 | 791 | 272 | 171 | 1,040 |
| 26 | 147 | 519 | 682 | e205 | 1,680 | 913 | 603 | 727 | 682 | 241 | 168 | 849 |
| 27 | 169 | 463 | 573 | e195 | 1,280 | 836 | 562 | 647 | 600 | 227 | 164 | 729 |
| 28 | 157 | 408 | 517 | e185 | 1,070 | 726 | 501 | 654 | 541 | 219 | 162 | 760 |
| 29 | 256 | 362 | 485 | 201 | --- | 675 | 466 | 610 | 489 | 219 | 182 | 627 |
| 30 | 2,020 | 335 | 457 | 191 | --- | 709 | 443 | 564 | 447 | 211 | 194 | 532 |
| 31 | 1,240 | --- | 438 | 188 | --- | 732 | --- | 518 | --- | 199 | 170 | --- |
| TOTAL | 9,301 | 22,625 | 25,014 | 20,940 | 23,054 | 52,975 | 36,914 | 36,306 | 37,261 | 14,835 | 9,772 | 33,818 |
| MEAN | 300 | 754 | 807 | 675 | 823 | 1,709 | 1,230 | 1,171 | 1,242 | 479 | 315 | 1,127 |
| MAX | 2,020 | 2,450 | 2,670 | 3,940 | 6,720 | 5,170 | 4,690 | 3,990 | 2,970 | 1,170 | 734 | 14,000 |
| MIN | 39 | 286 | 189 | 185 | 140 | 675 | 443 | 455 | 418 | 199 | 162 | 160 |
| CFSM | 0.59 | 1.49 | 1.59 | 1.33 | 1.63 | 3.38 | 2.43 | 2.31 | 2.45 | 0.95 | 0.62 | 2.23 |
| IN. | 0.68 | 1.66 | 1.84 | 1.54 | 1.69 | 3.89 | 2.71 | 2.67 | 2.74 | 1.09 | 0.72 | 2.49 |

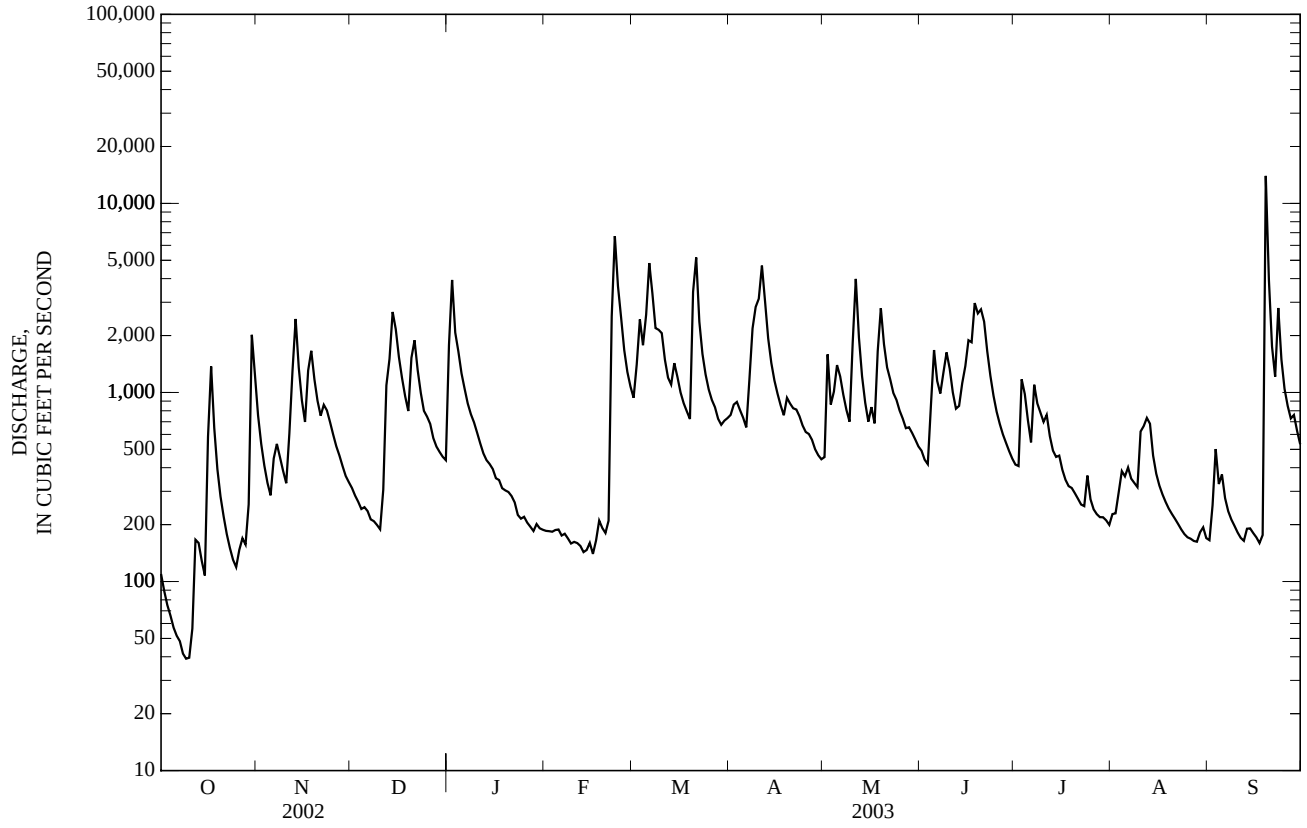
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 232 | 289 | 374 | 476 | 571 | 838 | 643 | 519 | 323 | 170 | 215 | 230 |
| MAX | 1,580 | 2,371 | 1,272 | 2,283 | 2,445 | 2,387 | 2,193 | 1,418 | 1,483 | 834 | 1,403 | 2,804 |
| (WY) | (1980) | (1986) | (1973) | (1996) | (1998) | (1994) | (1987) | (1988) | (1972) | (1949) | (1955) | (1996) |
| MIN | 22.2 | 26.3 | 22.7 | 30.1 | 29.4 | 119 | 79.2 | 84.3 | 31.1 | 8.80 | 15.0 | 26.2 |
| (WY) | (1987) | (1966) | (1966) | (1966) | (2002) | (1981) | (1981) | (1969) | (1999) | (1999) | (2002) | (1954) |

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

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1944 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 106,586.7 | | 322,815 | | | |
| ANNUAL MEAN | 292 | | 884 | | 406 | |
| HIGHEST ANNUAL MEAN | | | | | 935 | 1996 |
| LOWEST ANNUAL MEAN | | | | | 136 | 1981 |
| HIGHEST DAILY MEAN | 7,180 | Apr 22 | 14,000 | Sep 19 | 32,200 | Sep 6, 1996 |
| LOWEST DAILY MEAN | 2.2 | Sep 14 | 39 | Oct 9 | 1.8 | Aug 13, 1999 |
| ANNUAL SEVEN-DAY MINIMUM | 4.0 | Sep 9 | 48 | Oct 5 | 2.8 | Aug 7, 1999 |
| MAXIMUM PEAK FLOW | | | 27,900 | Sep 19 | 103,000 | Sep 6, 1996 |
| MAXIMUM PEAK STAGE | | | 16.36 | Sep 19 | 22.17 | Sep 6, 1996 |
| INSTANTANEOUS LOW FLOW | | | 37 | Oct 10 | 1.5 | aAug 12, 1999 |
| ANNUAL RUNOFF (CFSM) | 0.58 | | 1.75 | | 0.80 | |
| ANNUAL RUNOFF (INCHES) | 7.84 | | 23.73 | | 10.90 | |
| 10 PERCENT EXCEEDS | 772 | | 1,910 | | 870 | |
| 50 PERCENT EXCEEDS | 99 | | 600 | | 186 | |
| 90 PERCENT EXCEEDS | 14 | | 169 | | 44 | |

a Also Aug. 13, 1999.
e Estimated.



## 01634000 NORTH FORK SHENANDOAH RIVER NEAR STRASBURG, VA

LOCATION.--Lat 38°58'36", long 78°20'10", NAD83, Warren County, Hydrologic Unit 02070006, on right bank at upstream 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 $mi^2$.

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 NGVD of 1929. Prior to Sept. 21, 1930, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect, Jan. 22 to Feb. 2, which is poor. 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 $ft^3/s$, from rating curve extended above 46,000 $ft^3/s$. 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.--Maximum stage since at least 1870, that of Sept. 7, 1996.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 2 | 1315 | 7,040 | 9.74 | Apr 11 | 2400 | 7,430 | 10.06 |
| Feb 23 | 1300 | 9,150 | 11.42 | May 11 | 1530 | 6,190 | 9.02 |
| Mar 6 | 1515 | 7,270 | 9.93 | Sep 20 | 0545 | *21,800 | *19.27 |
| Mar 21 | 1015 | 10,900 | 12.71 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 255 | 1,340 | 542 | 1,270 | e360 | 1,540 | 1,210 | 703 | 800 | 780 | 366 | 302 |
| 2 | 212 | 915 | 498 | 5,190 | e370 | 1,630 | 1,250 | 1,090 | 733 | 694 | 394 | 299 |
| 3 | 190 | 692 | 458 | 3,700 | 359 | 2,990 | 1,340 | 1,630 | 673 | 812 | 584 | 569 |
| 4 | 185 | 562 | 423 | 2,780 | 369 | 2,980 | 1,300 | 1,160 | 893 | 1,640 | 594 | 1,020 |
| 5 | 160 | 499 | 428 | 2,170 | 366 | 2,650 | 1,200 | 1,570 | 1,900 | 1,190 | 597 | 585 |
| 6 | 150 | 544 | 410 | 1,760 | 361 | 5,700 | 1,090 | 1,760 | 2,090 | 935 | 533 | 564 |
| 7 | 146 | 681 | 414 | 1,510 | 359 | 5,860 | 1,150 | 1,520 | 1,540 | 1,010 | 546 | 476 |
| 8 | 141 | 722 | 365 | 1,320 | 343 | 3,990 | 2,640 | 1,310 | 1,690 | 1,420 | 519 | 414 |
| 9 | 108 | 630 | 363 | 1,220 | 327 | 3,530 | 3,040 | 1,220 | 2,220 | 1,220 | 518 | 368 |
| 10 | 104 | 547 | 372 | 1,100 | 320 | 3,630 | 4,820 | 1,460 | 2,410 | 1,320 | 476 | 351 |
| 11 | 138 | 528 | 450 | 984 | 325 | 2,750 | 5,370 | 5,340 | 1,740 | 1,470 | 1,140 | 327 |
| 12 | 164 | 954 | 742 | 883 | 321 | 2,140 | 5,690 | 3,900 | 1,440 | 1,180 | 1,100 | 320 |
| 13 | 180 | 2,450 | 1,710 | 798 | 305 | 1,840 | 3,470 | 2,260 | 2,140 | 887 | 934 | 382 |
| 14 | 285 | 2,330 | 2,810 | 744 | 291 | 2,060 | 2,490 | 1,620 | 2,020 | 758 | 855 | 362 |
| 15 | 231 | 1,530 | 3,170 | 710 | 309 | 2,110 | 1,960 | 1,280 | 2,110 | 707 | 634 | 363 |
| 16 | 337 | 1,180 | 2,400 | 664 | 278 | 1,750 | 1,660 | 1,360 | 2,120 | 699 | 535 | 361 |
| 17 | 954 | 1,230 | 1,870 | 636 | 444 | 1,510 | 1,460 | 1,500 | 2,410 | 604 | 480 | 308 |
| 18 | 1,360 | 2,130 | 1,520 | 617 | 759 | 1,360 | 1,290 | 1,280 | 3,390 | 545 | 437 | 421 |
| 19 | 782 | 1,890 | 1,290 | 618 | 1,230 | 1,240 | 1,310 | 3,290 | 3,960 | 515 | 402 | 7,270 |
| 20 | 525 | 1,460 | 1,210 | 595 | 931 | 1,840 | 1,430 | 3,030 | 3,660 | 496 | 388 | 14,100 |
| 21 | 387 | 1,230 | 2,170 | 525 | 467 | 8,250 | 1,310 | 2,130 | 4,530 | 466 | 339 | 3,660 |
| 22 | 330 | 1,210 | 2,000 | e480 | 1,070 | 4,730 | 1,290 | 1,810 | 3,000 | 449 | 371 | 2,180 |
| 23 | 286 | 1,280 | 1,560 | e440 | 6,980 | 2,950 | 1,290 | 1,550 | 2,210 | 422 | 313 | 2,140 |
| 24 | 251 | 1,130 | 1,290 | e400 | 6,830 | 2,200 | 1,140 | 1,410 | 1,710 | 415 | 318 | 3,420 |
| 25 | 226 | 991 | 1,140 | e390 | 4,060 | 1,800 | 1,040 | 1,310 | 1,400 | 480 | 307 | 1,850 |
| 26 | 227 | 879 | 1,070 | e400 | 2,970 | 1,560 | 985 | 1,180 | 1,210 | 428 | 292 | 1,470 |
| 27 | 221 | 782 | 963 | e390 | 2,180 | 1,450 | 947 | 1,090 | 1,050 | 383 | 296 | 1,250 |
| 28 | 259 | 704 | 871 | e370 | 1,770 | 1,290 | 869 | 988 | 922 | 466 | 291 | 1,130 |
| 29 | 287 | 638 | 795 | e380 | --- | 1,160 | 790 | 983 | 836 | 541 | 293 | 1,120 |
| 30 | 655 | 584 | 756 | e390 | --- | 1,150 | 736 | 906 | 760 | 403 | 327 | 929 |
| 31 | 2,170 | --- | 725 | e370 | --- | 1,230 | --- | 844 | --- | 368 | 315 | --- |
| TOTAL | 11,906 | 32,242 | 34,785 | 33,804 | 35,054 | 80,870 | 55,567 | 52,484 | 57,567 | 23,703 | 15,494 | 48,311 |
| MEAN | 384 | 1,075 | 1,122 | 1,090 | 1,252 | 2,609 | 1,852 | 1,693 | 1,919 | 765 | 500 | 1,610 |
| MAX | 2,170 | 2,450 | 3,170 | 5,190 | 6,980 | 8,250 | 5,690 | 5,340 | 4,530 | 1,640 | 1,140 | 14,100 |
| MIN | 104 | 499 | 363 | 370 | 278 | 1,150 | 736 | 703 | 673 | 368 | 291 | 299 |
| CFSM | 0.50 | 1.40 | 1.46 | 1.42 | 1.63 | 3.40 | 2.41 | 2.20 | 2.50 | 1.00 | 0.65 | 2.10 |
| IN. | 0.58 | 1.56 | 1.68 | 1.64 | 1.70 | 3.92 | 2.69 | 2.54 | 2.79 | 1.15 | 0.75 | 2.34 |

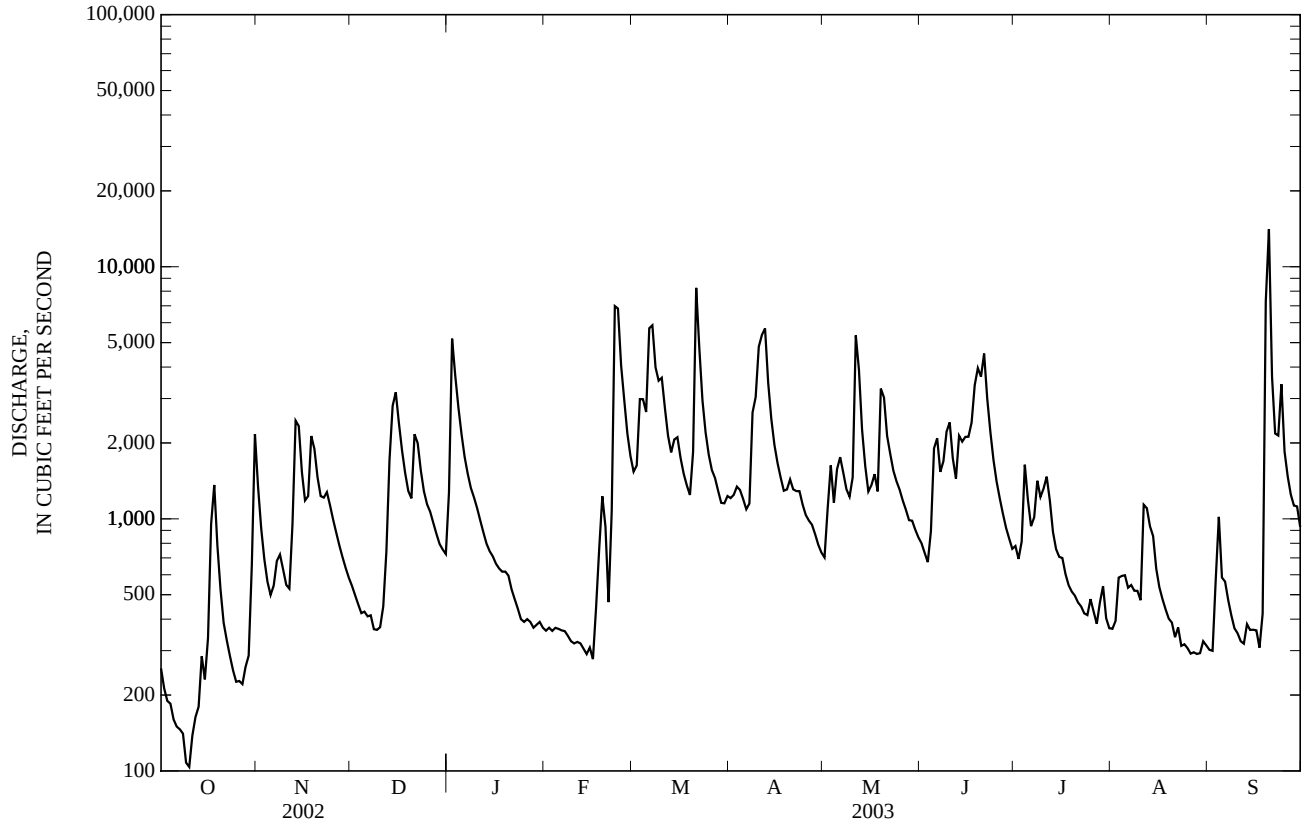
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1925 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 397 | 419 | 534 | 687 | 863 | 1,154 | 983 | 764 | 491 | 299 | 355 | 336 |
| MAX | 3,488 | 2,813 | 1,955 | 3,394 | 3,466 | 5,017 | 2,876 | 1,821 | 2,234 | 1,169 | 2,510 | 3,838 |
| (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) |

01634000 NORTH FORK SHENANDOAH RIVER NEAR STRASBURG, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1925 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 164,209 | | 481,787 | | | |
| ANNUAL MEAN | 450 | | 1,320 | | 607 | |
| HIGHEST ANNUAL MEAN | | | | | 1,360 | 1996 |
| LOWEST ANNUAL MEAN | | | | | 226 | 1934 |
| HIGHEST DAILY MEAN | 5,930 | Apr 23 | 14,100 | Sep 20 | 60,700 | Sep 7, 1996 |
| LOWEST DAILY MEAN | 72 | aSep 6 | 104 | Oct 10 | 35 | bOct 15, 1985 |
| ANNUAL SEVEN-DAY MINIMUM | 77 | Sep 9 | 135 | Oct 5 | 45 | Sep 13, 1986 |
| MAXIMUM PEAK FLOW | | | 21,800 | Sep 20 | 114,000 | Sep 7, 1996 |
| MAXIMUM PEAK STAGE | | | 19.27 | Sep 20 | 32.27 | Sep 7, 1996 |
| INSTANTANEOUS LOW FLOW | | | 93 | Oct 9 | 6.0 | Feb 9, 1934 |
| ANNUAL RUNOFF (CFSM) | 0.59 | | 1.72 | | 0.79 | |
| ANNUAL RUNOFF (INCHES) | 7.95 | | 23.34 | | 10.73 | |
| 10 PERCENT EXCEEDS | 1,180 | | 2,790 | | 1,280 | |
| 50 PERCENT EXCEEDS | 215 | | 947 | | 316 | |
| 90 PERCENT EXCEEDS | 87 | | 317 | | 110 | |

a Also Sept. 13, 2002.
b Also Sept. 14, 18, 1986.
e Estimated.



## 01634500 CEDAR CREEK NEAR WINCHESTER, VA

LOCATION.--Lat 39°04'52", long 78°19'46", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 6-10 and Jan. 17 to Feb. 17, and period of doubtful gage-height record, Feb. 18-20, which are fair. Maximum discharge, 22,000 $ft^3/s$, from rating curve extended above 15,000 $ft^3/s$. Minimum discharge, 1.5 $ft^3/s$, 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 $ft^3/s$, from information by local residents.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Oct 16 | 1630 | 1,010 | 4.69 | Mar 20 | 1830 | 4,330 | 10.42 |
| Nov 12 | 2000 | 1,240 | 5.16 | Apr 9 | 1900 | 1,110 | 4.91 |
| Dec 13 | 2200 | 1,460 | 5.60 | Apr 11 | 0900 | 1,810 | 6.26 |
| Jan 1 | 2200 | *6,840 | *13.81 | May 10 | 2000 | 1,330 | 5.35 |
| Feb 22 | 1600 | 4,760 | 11.06 | May 16 | 0900 | 1,320 | 5.32 |
| Mar 5 | 2230 | 1,810 | 6.25 | Jun 13 | 0130 | 3,060 | 8.42 |
| Mar 6 | 1630 | 1,860 | 6.34 | Jun 13 | 2130 | 3,000 | 8.32 |
| Mar 9 | 1830 | 1,450 | 5.58 | Sep 19 | 0830 | 6,240 | 13.10 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 21 | 111 | 84 | 1,850 | e55 | 223 | 258 | 107 | 140 | 79 | 44 | 21 |
| 2 | 18 | 90 | 73 | 1,870 | e53 | 327 | 279 | 103 | 107 | 68 | 43 | 23 |
| 3 | 17 | 77 | 67 | 704 | e52 | 461 | 239 | 92 | 100 | 115 | 40 | 38 |
| 4 | 16 | 68 | 59 | 508 | e56 | 331 | 215 | 107 | 392 | 89 | 45 | 166 |
| 5 | 14 | 63 | 59 | 361 | e60 | 637 | 194 | 113 | 285 | 64 | 45 | 63 |
| 6 | 13 | 165 | e63 | 296 | e57 | 1,510 | 166 | 129 | 187 | 58 | 36 | 38 |
| 7 | 12 | 119 | e59 | 242 | e55 | 899 | 415 | 110 | 238 | 188 | 32 | 31 |
| 8 | 12 | 96 | e56 | 233 | e52 | 627 | 425 | 140 | 261 | 79 | 33 | 27 |
| 9 | 11 | 85 | e52 | 252 | e52 | 1,030 | 758 | 195 | 247 | 81 | 30 | 26 |
| 10 | 13 | 76 | e50 | 217 | e51 | 723 | 694 | 680 | 179 | 135 | 32 | 25 |
| 11 | 28 | 171 | 305 | 184 | e50 | 429 | 1,130 | 681 | 146 | 209 | 90 | 23 |
| 12 | 58 | 454 | 402 | 160 | e48 | 349 | 674 | 361 | 255 | 94 | 53 | 23 |
| 13 | 34 | 431 | 633 | 148 | e45 | 372 | 422 | 259 | 1,650 | 76 | 54 | 36 |
| 14 | 26 | 231 | 926 | 137 | e44 | 464 | 321 | 197 | 1,010 | 60 | 42 | 44 |
| 15 | 21 | 173 | 573 | 125 | e48 | 331 | 269 | 162 | 467 | 54 | 35 | 37 |
| 16 | 352 | 148 | 374 | 109 | e54 | 276 | 233 | 716 | 325 | 49 | 31 | 30 |
| 17 | 239 | 543 | 269 | e102 | e47 | 242 | 203 | 494 | 329 | 42 | 45 | 26 |
| 18 | 113 | 506 | 211 | e86 | e57 | 215 | 179 | 533 | 392 | 39 | 41 | 29 |
| 19 | 77 | 280 | 181 | e86 | e80 | 186 | 245 | 484 | 329 | 39 | 33 | 3,000 |
| 20 | 61 | 215 | 238 | e76 | e73 | 1,640 | 193 | 350 | 591 | 36 | 28 | 543 |
| 21 | 51 | 211 | 241 | e80 | 124 | 1,400 | 186 | 279 | 502 | 34 | 26 | 278 |
| 22 | 43 | 293 | 206 | e72 | 1,450 | 692 | 350 | 236 | 366 | 33 | 24 | 186 |
| 23 | 38 | 209 | 176 | e68 | 1,570 | 421 | 259 | 209 | 262 | 34 | 22 | 470 |
| 24 | 34 | 172 | 154 | e62 | 804 | 325 | 208 | 224 | 197 | 35 | 21 | 241 |
| 25 | 32 | 147 | 156 | e66 | 525 | 268 | 186 | 232 | 157 | 30 | 20 | 168 |
| 26 | 52 | 130 | 139 | e72 | 369 | 249 | 184 | 214 | 130 | 28 | 19 | 137 |
| 27 | 48 | 121 | 120 | e65 | 298 | 245 | 159 | 205 | 110 | 26 | 20 | 112 |
| 28 | 39 | 105 | 110 | e59 | 253 | 198 | 137 | 195 | 96 | 34 | 21 | 119 |
| 29 | 65 | 95 | 109 | e57 | --- | 189 | 125 | 171 | 84 | 80 | 20 | 94 |
| 30 | 283 | 91 | 111 | e59 | --- | 207 | 114 | 151 | 74 | 39 | 20 | 76 |
| 31 | 156 | --- | 114 | e56 | --- | 223 | --- | 137 | --- | 33 | 21 | --- |
| TOTAL | 1,997 | 5,676 | 6,370 | 8,462 | 6,482 | 15,689 | 9,420 | 8,266 | 9,608 | 2,060 | 1,066 | 6,130 |
| MEAN | 64.4 | 189 | 205 | 273 | 232 | 506 | 314 | 267 | 320 | 66.5 | 34.4 | 204 |
| MAX | 352 | 543 | 926 | 1,870 | 1,570 | 1,640 | 1,130 | 716 | 1,650 | 209 | 90 | 3,000 |
| MIN | 11 | 63 | 50 | 56 | 44 | 186 | 114 | 92 | 74 | 26 | 19 | 21 |
| CFSM | 0.63 | 1.85 | 2.01 | 2.68 | 2.27 | 4.96 | 3.08 | 2.61 | 3.14 | 0.65 | 0.34 | 2.00 |
| IN. | 0.73 | 2.07 | 2.32 | 3.09 | 2.36 | 5.72 | 3.44 | 3.01 | 3.50 | 0.75 | 0.39 | 2.24 |

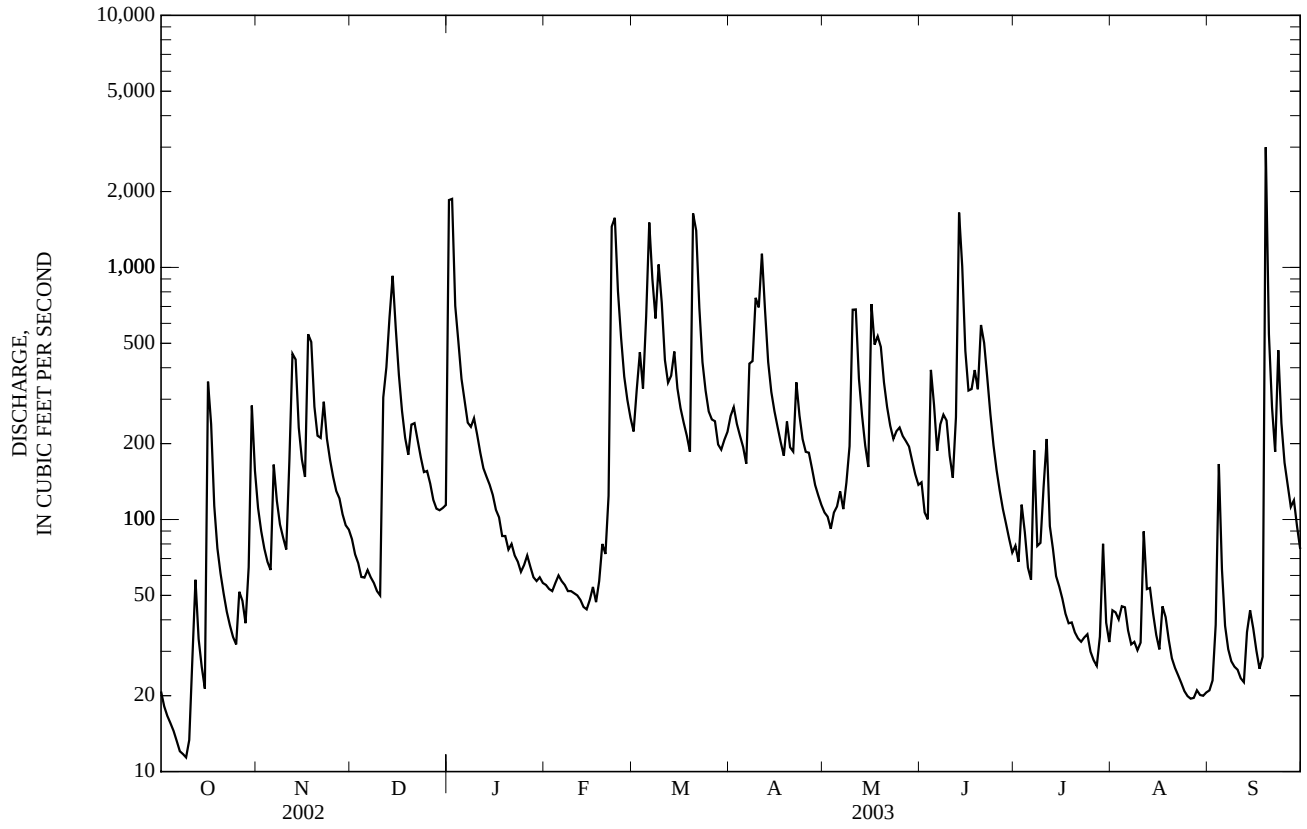
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 59.4 | 69.0 | 90.4 | 114 | 143 | 208 | 175 | 130 | 86.0 | 32.8 | 38.4 | 41.8 |
| 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 | 16.4 | 38.2 | 37.0 | 24.5 | 10.5 | 6.06 | 4.52 | 6.95 |
| (WY) | (1964) | (1966) | (1966) | (1966) | (2002) | (1981) | (1947) | (1969) | (1969) | (1966) | (1957) | (1986) |

01634500 CEDAR CREEK NEAR WINCHESTER, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1938 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 31,259.3 | | 81,226 | | | |
| ANNUAL MEAN | 85.6 | | 223 | | 98.7 | |
| HIGHEST ANNUAL MEAN | | | | | 223 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 28.3 | 1969 |
| HIGHEST DAILY MEAN | 926 | Dec 14 | 3,000 | Sep 19 | e13,900 | Oct 15, 1942 |
| LOWEST DAILY MEAN | 7.7 | Aug 23 | 11 | Oct 9 | 2.8 | aSep 7, 1964 |
| ANNUAL SEVEN-DAY MINIMUM | 7.9 | Sep 7 | 13 | Oct 4 | 3.0 | bSep 2, 1966 |
| MAXIMUM PEAK FLOW | | | 6,840 | Jan 1 | 22,000 | Oct 15, 1942 |
| MAXIMUM PEAK STAGE | | | 13.81 | Jan 1 | c27.00 | Oct 15, 1942 |
| INSTANTANEOUS LOW FLOW | | | d7.6 | Feb 13 | d1.5 | Feb 2, 1992 |
| ANNUAL RUNOFF (CFSM) | 0.83 | | 2.16 | | 0.96 | |
| ANNUAL RUNOFF (INCHES) | 11.29 | | 29.34 | | 13.02 | |
| 10 PERCENT EXCEEDS | 221 | | 497 | | 212 | |
| 50 PERCENT EXCEEDS | 35 | | 120 | | 42 | |
| 90 PERCENT EXCEEDS | 11 | | 30 | | 10 | |

a Also Sept. 3, 4, 7, 8, 1966.
b Also Sept. 3, 1966.
c From floodmarks.
d Result of freezeup.
e Estimated.



## 01635090 CEDAR CREEK ABOVE HIGHWAY 11 NEAR MIDDLETOWN, VA

LOCATION.--Lat 39°00'24", long 78°18'59", NAD83, Warren County, Hydrologic Unit Code 01070006, on left bank, 5 ft upstream from U.S. Highway 11, 1.5 mi north of Strasburg.

DRAINAGE AREA.--155 $mi^2$.

PERIOD OF RECORD.--November 2000 to current year.

GAGE.--Water-stage recorder. Datum of gage is 600 ft NGVD of 1929, from topographic map.

REMARKS.--Records good except for period with ice effect, Jan. 17 to Feb. 20, which is fair.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 36 | 136 | 110 | 1,650 | e70 | 294 | 374 | 157 | 214 | 133 | 74 | 54 |
| 2 | 30 | 108 | 96 | 2,820 | e68 | 392 | 399 | 152 | 172 | 119 | 82 | 61 |
| 3 | 27 | 92 | 91 | 792 | e66 | 639 | 339 | 139 | 155 | 169 | 109 | 641 |
| 4 | 25 | 81 | 75 | 584 | e70 | 447 | 300 | 149 | 567 | 158 | 105 | 550 |
| 5 | 23 | 74 | 77 | 400 | e85 | 709 | 269 | 156 | 499 | 116 | 93 | 144 |
| 6 | 21 | 164 | 91 | 326 | e80 | 1,960 | 232 | 185 | 309 | 106 | 80 | 85 |
| 7 | 20 | 152 | 59 | 273 | e76 | 1,270 | 514 | 157 | 347 | 399 | 70 | 69 |
| 8 | 19 | 118 | 79 | 255 | e70 | 861 | 665 | 187 | 433 | 153 | 67 | 63 |
| 9 | 19 | 101 | 75 | 289 | e67 | 1,280 | 1,010 | 245 | 386 | 220 | 64 | 62 |
| 10 | 19 | 90 | 64 | 260 | e66 | 1,030 | 1,060 | 839 | 287 | 272 | 60 | 62 |
| 11 | 30 | 166 | 222 | 230 | e64 | 616 | 1,530 | 984 | 233 | 362 | 144 | 60 |
| 12 | 68 | 359 | 478 | 199 | e62 | 498 | 1,030 | 516 | 269 | 186 | 106 | 61 |
| 13 | 53 | 531 | 656 | 182 | e56 | 488 | 663 | 355 | 2,210 | 160 | 90 | 79 |
| 14 | 40 | 273 | 1,180 | 173 | e58 | 645 | 491 | 269 | 1,710 | 127 | 83 | 98 |
| 15 | 34 | 209 | 748 | 158 | e66 | 466 | 402 | 223 | 767 | 113 | 67 | 95 |
| 16 | 254 | 179 | 483 | 132 | e72 | 388 | 344 | 937 | 526 | 104 | 60 | 86 |
| 17 | 335 | 511 | 351 | e125 | e62 | 342 | 299 | 704 | 483 | 93 | 73 | 78 |
| 18 | 149 | 568 | 283 | e110 | e80 | 307 | 261 | 719 | 620 | 86 | 84 | 103 |
| 19 | 96 | 327 | 242 | e100 | e110 | 273 | 360 | 693 | 494 | 85 | 73 | 3,130 |
| 20 | 74 | 261 | 285 | e90 | e100 | 2,060 | 285 | 492 | 794 | 79 | 61 | 564 |
| 21 | 61 | 234 | 314 | e95 | 148 | 2,120 | 256 | 376 | 791 | 76 | 56 | 272 |
| 22 | 52 | 338 | 275 | e85 | 1,400 | 1,080 | 487 | 318 | 580 | 75 | 52 | 192 |
| 23 | 47 | 257 | 241 | e84 | 1,940 | 674 | 377 | 278 | 403 | 74 | 50 | 486 |
| 24 | 43 | 214 | 216 | e81 | 1,050 | 505 | 297 | 302 | 301 | 75 | 45 | 261 |
| 25 | 40 | 187 | 217 | e78 | 710 | 408 | 263 | 312 | 240 | 67 | 45 | 189 |
| 26 | 51 | 165 | 206 | e81 | 492 | 368 | 260 | 287 | 199 | 61 | 43 | 160 |
| 27 | 61 | 155 | 181 | e80 | 391 | 382 | 231 | 288 | 174 | 58 | 47 | 138 |
| 28 | 48 | 138 | 166 | e70 | 334 | 298 | 199 | 271 | 154 | 64 | 52 | 139 |
| 29 | 57 | 124 | 163 | e68 | --- | 278 | 183 | 243 | 137 | 134 | 53 | 122 |
| 30 | 291 | 118 | 167 | e75 | --- | 306 | 170 | 216 | 127 | 80 | 52 | 107 |
| 31 | 192 | --- | 168 | e72 | --- | 324 | --- | 192 | --- | 68 | 52 | --- |
| TOTAL | 2,315 | 6,430 | 8,059 | 10,017 | 7,913 | 21,708 | 13,550 | 11,341 | 14,581 | 4,072 | 2,192 | 8,211 |
| MEAN | 74.7 | 214 | 260 | 323 | 283 | 700 | 452 | 366 | 486 | 131 | 70.7 | 274 |
| MAX | 335 | 568 | 1,180 | 2,820 | 1,940 | 2,120 | 1,530 | 984 | 2,210 | 399 | 144 | 3,130 |
| MIN | 19 | 74 | 59 | 68 | 56 | 273 | 170 | 139 | 127 | 58 | 43 | 54 |
| CFSM | 0.49 | 1.40 | 1.70 | 2.11 | 1.85 | 4.58 | 2.95 | 2.39 | 3.18 | 0.86 | 0.46 | 1.79 |
| IN. | 0.56 | 1.56 | 1.96 | 2.44 | 1.92 | 5.28 | 3.29 | 2.76 | 3.55 | 0.99 | 0.53 | 2.00 |

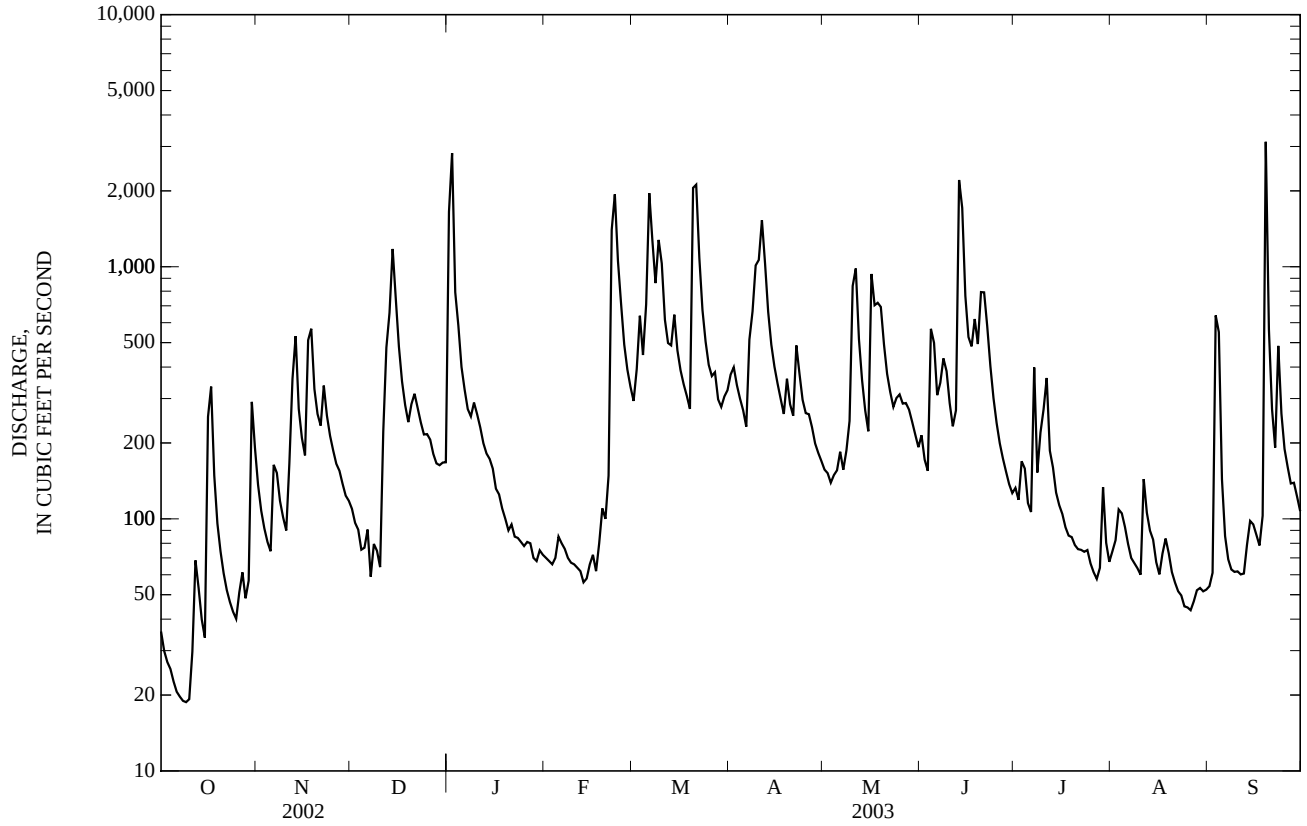
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2001 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 48.1 | 121 | 112 | 144 | 134 | 374 | 288 | 242 | 221 | 72.6 | 50.2 | 110 |
| MAX | 74.7 | 214 | 260 | 323 | 283 | 700 | 452 | 366 | 486 | 131 | 70.7 | 274 |
| (WY) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) |
| MIN | 21.6 | 28.6 | 23.5 | 25.0 | 26.4 | 65.9 | 172 | 149 | 88.5 | 40.8 | 26.5 | 26.3 |
| (WY) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2001) | (2002) | (2002) | (2002) | (2001) |

01635090 CEDAR CREEK ABOVE HIGHWAY 11 NEAR MIDDLETOWN, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 2001 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 37,727 | | 110,389 | | | |
| ANNUAL MEAN | 103 | | 302 | | 183 | |
| HIGHEST ANNUAL MEAN | | | | | 302 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 63.5 | 2002 |
| HIGHEST DAILY MEAN | 1,180 | Dec 14 | 3,130 | Sep 19 | 3,130 | Sep 19, 2003 |
| LOWEST DAILY MEAN | 10 | Sep 13 | 19 | aOct 8 | 10 | Sep 13, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 12 | Sep 9 | 21 | Oct 4 | 12 | Sep 9, 2002 |
| MAXIMUM PEAK FLOW | | | 9,320 | Jan 2 | 9,320 | Jan 2, 2003 |
| MAXIMUM PEAK STAGE | | | 11.94 | Jan 2 | 11.94 | Jan 2, 2003 |
| INSTANTANEOUS LOW FLOW | | | b13 | Feb 13 | 9.0 | Sep 13, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.68 | | 1.98 | | 1.20 | |
| ANNUAL RUNOFF (INCHES) | 9.17 | | 26.84 | | 16.25 | |
| 10 PERCENT EXCEEDS | 256 | | 664 | | 433 | |
| 50 PERCENT EXCEEDS | 47 | | 169 | | 75 | |
| 90 PERCENT EXCEEDS | 20 | | 59 | | 21 | |

a Also Oct. 9, 10, 2002.
b Result of freezeup.
e Estimated.



## 01635500 PASSAGE CREEK NEAR BUCKTON, VA

LOCATION.--Lat 38°57'29", long 78°16'00", NAD83, 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 $mi^2$.

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 NGVD of 1929. October 1905 to July 1906, nonrecording gage at site 1 mi downstream at different datum. Apr. 4, 1932, to Oct. 7, 1937, nonrecording gage at site 350 ft downstream at different datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 6-10, Jan. 16, and Feb. 10-14, and periods of no gage-height record, Jan. 17 to Feb. 5 and Feb. 15-21, 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. Maximum discharge, 23,000 $ft^3/s$, from rating curve extended above 5,200 $ft^3/s$. 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 2 | 0630 | 2,360 | 8.04 | May 11 | 0100 | 1,020 | 6.06 |
| Feb 23 | 0430 | 2,300 | 7.96 | Jun 13 | 2300 | 1,110 | 6.22 |
| Mar 6 | 0230 | 1,410 | 6.71 | Sep 19 | 1130 | *4,990 | *10.72 |
| Mar 21 | 0300 | 2,320 | 7.99 | Sep 23 | 1330 | 1,390 | 6.68 |
| Apr 11 | 1430 | 1,720 | 7.18 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 11 | 95 | 56 | 451 | e34 | 204 | 212 | 69 | 77 | 53 | 16 | 7.4 |
| 2 | 8.4 | 70 | 49 | 1,370 | e33 | 377 | 217 | 65 | 63 | 47 | 20 | 8.1 |
| 3 | 7.1 | 57 | 45 | 497 | e33 | 610 | 175 | 59 | 58 | 179 | 20 | 41 |
| 4 | 6.4 | 48 | 40 | 367 | e36 | 362 | 153 | 66 | 324 | 160 | 25 | 71 |
| 5 | 5.9 | 44 | 39 | 251 | e40 | 592 | 140 | 79 | 574 | 79 | 25 | 30 |
| 6 | 4.9 | 149 | e45 | 207 | 37 | 1,160 | 124 | 79 | 239 | 61 | 20 | 20 |
| 7 | 4.8 | 108 | e42 | 173 | 35 | 719 | 251 | 69 | 185 | 164 | 18 | 14 |
| 8 | 4.6 | 76 | e39 | 159 | 32 | 510 | 361 | 88 | 263 | 68 | 16 | 12 |
| 9 | 4.5 | 64 | e36 | 157 | 31 | 645 | 594 | 134 | 418 | 126 | 15 | 11 |
| 10 | 5.3 | 55 | e40 | 132 | e32 | 495 | 575 | 386 | 226 | 432 | 14 | 11 |
| 11 | 10 | 64 | 83 | 112 | e31 | 306 | 1,200 | 697 | 154 | 249 | 19 | 10 |
| 12 | 49 | 200 | 189 | 98 | e30 | 249 | 680 | 286 | 173 | 143 | 21 | 9.6 |
| 13 | 26 | 387 | 406 | 91 | e29 | 238 | 395 | 186 | 507 | 95 | 20 | 15 |
| 14 | 17 | 169 | 645 | 86 | e28 | 300 | 280 | 141 | 541 | 74 | 17 | 23 |
| 15 | 13 | 121 | 444 | 80 | e34 | 218 | 225 | 116 | 302 | 65 | 14 | 20 |
| 16 | 165 | 107 | 305 | e68 | e32 | 182 | 189 | 232 | 212 | 55 | 12 | 15 |
| 17 | 194 | 420 | 223 | e60 | e70 | 160 | 161 | 163 | 209 | 45 | 11 | 13 |
| 18 | 70 | 458 | 175 | e55 | e160 | 142 | 139 | 243 | 314 | 37 | 11 | 54 |
| 19 | 44 | 225 | 151 | e49 | e100 | 124 | 217 | 347 | 535 | 35 | 10 | 2,830 |
| 20 | 32 | 168 | 255 | e46 | e80 | 779 | 171 | 215 | 581 | 31 | 9.5 | 460 |
| 21 | 25 | 154 | 283 | e50 | e180 | 1,330 | 148 | 173 | 529 | 26 | 8.8 | 187 |
| 22 | 20 | 203 | 200 | e45 | 387 | 543 | 154 | 163 | 314 | 23 | 8.8 | 118 |
| 23 | 17 | 145 | 163 | e43 | 1,380 | 346 | 134 | 141 | 206 | 20 | 8.0 | 871 |
| 24 | 15 | 115 | 141 | e41 | 747 | 265 | 115 | 141 | 148 | 23 | 6.7 | 338 |
| 25 | 14 | 98 | 140 | e40 | 574 | 218 | 107 | 133 | 115 | 24 | 6.5 | 177 |
| 26 | 23 | 86 | 128 | e42 | 365 | 198 | 107 | 123 | 93 | 18 | 6.4 | 130 |
| 27 | 32 | 80 | 110 | e44 | 273 | 204 | 98 | 114 | 77 | 15 | 6.1 | 101 |
| 28 | 23 | 71 | 102 | e41 | 225 | 163 | 86 | 114 | 67 | 26 | 6.3 | 95 |
| 29 | 37 | 65 | 99 | e38 | --- | 148 | 79 | 101 | 57 | 34 | 6.5 | 81 |
| 30 | 300 | 62 | 94 | e36 | --- | 163 | 74 | 88 | 49 | 20 | 16 | 63 |
| 31 | 162 | --- | 91 | e35 | --- | 177 | --- | 77 | --- | 17 | 9.3 | --- |
| TOTAL | 1,350.9 | 4,164 | 4,858 | 4,964 | 5,068 | 12,127 | 7,561 | 5,088 | 7,610 | 2,444 | 422.9 | 5,836.1 |
| MEAN | 43.6 | 139 | 157 | 160 | 181 | 391 | 252 | 164 | 254 | 78.8 | 13.6 | 195 |
| MAX | 300 | 458 | 645 | 1,370 | 1,380 | 1,330 | 1,200 | 697 | 581 | 432 | 25 | 2,830 |
| MIN | 4.5 | 44 | 36 | 35 | 28 | 124 | 74 | 59 | 49 | 15 | 6.1 | 7.4 |
| CFSM | 0.50 | 1.58 | 1.78 | 1.82 | 2.06 | 4.46 | 2.87 | 1.87 | 2.89 | 0.90 | 0.16 | 2.22 |
| IN. | 0.57 | 1.76 | 2.06 | 2.10 | 2.15 | 5.14 | 3.20 | 2.16 | 3.22 | 1.04 | 0.18 | 2.47 |

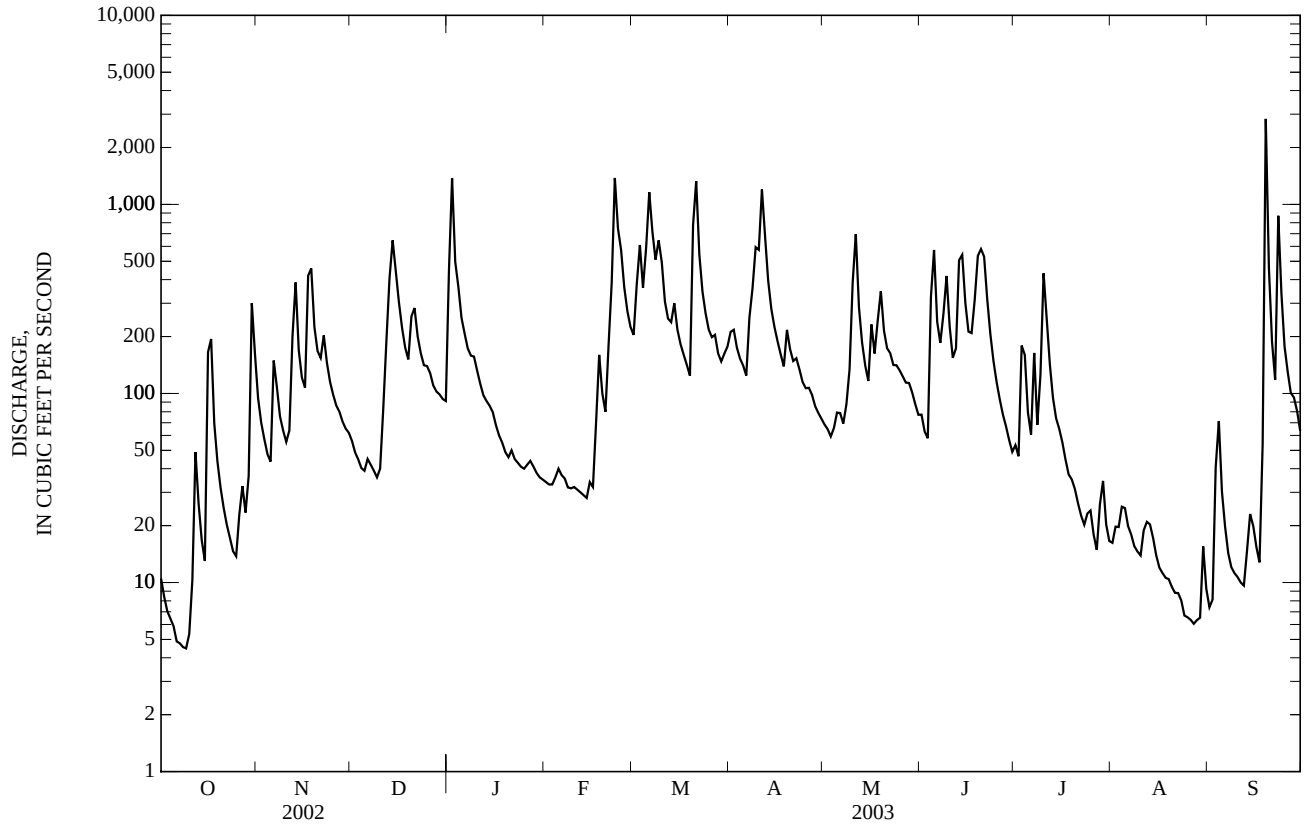
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1933 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 39.0 | 43.3 | 66.8 | 97.1 | 118 | 158 | 136 | 94.6 | 53.7 | 18.8 | 24.8 | 30.1 |
| 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) |

01635500 PASSAGE CREEK NEAR BUCKTON, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1933 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 20,587.2 | | 61,493.9 | | | |
| ANNUAL MEAN | 56.4 | | 168 | | 73.1 | |
| HIGHEST ANNUAL MEAN | | | | | 168 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 20.0 | 1934 |
| HIGHEST DAILY MEAN | 913 | May 27 | 2,830 | Sep 19 | 9,290 | Oct 15, 1942 |
| LOWEST DAILY MEAN | 1.2 | aSep 13 | 4.5 | Oct 9 | 0.40 | Jul 20, 1934 |
| ANNUAL SEVEN-DAY MINIMUM | 1.5 | bSep 11 | 5.2 | Oct 4 | 0.50 | Jul 15, 1934 |
| MAXIMUM PEAK FLOW | | | 4,990 | Sep 19 | 23,000 | Sep 6, 1996 |
| MAXIMUM PEAK STAGE | | | 10.72 | Sep 19 | 15.89 | Sep 6, 1996 |
| INSTANTANEOUS LOW FLOW | | | 4.4 | cOct 8 | d0.10 | Aug 5, 1932 |
| ANNUAL RUNOFF (CFSM) | 0.64 | | 1.92 | | 0.83 | |
| ANNUAL RUNOFF (INCHES) | 8.72 | | 26.05 | | 11.31 | |
| 10 PERCENT EXCEEDS | 150 | | 411 | | 160 | |
| 50 PERCENT EXCEEDS | 15 | | 91 | | 26 | |
| 90 PERCENT EXCEEDS | 3.4 | | 14 | | 4.4 | |

a Also Sept. 14, 2002.
b Also Sept. 12, 2002.
c Also Oct. 9, 10, 2002.
d Observed.
e Estimated.



## 0163626650 MANASSAS RUN AT ROUTE 645 NEAR FRONT ROYAL, VA

LOCATION.--Lat 38°56'03", long 78°07'41", NAD83, Warren County, Hydrologic Unit 02070005, on right bank at end of State Highway 645, 5.6 mi northeast of Front Royal, and 7.5 mi upstream from mouth.

DRAINAGE AREA.--11.2 $mi^2$.

PERIOD OF RECORD.--May 2002 to current year.

GAGE.--Water stage recorder. Datum of gage is 540 ft NGVD of 1929, from topographic map.

REMARKS.--Records good except for period Dec. 12 to May 29, 2003, which is fair, and periods of doubtful gage-height record, June 9-13 and June 21 to July 30, 2002, which are poor.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | --- | --- | --- | --- | --- | --- | --- | e12 | 11 | e1.4 | 0.35 | 1.1 |
| 2 | --- | --- | --- | --- | --- | --- | --- | 12 | 8.5 | e1.1 | 0.28 | 1.5 |
| 3 | --- | --- | --- | --- | --- | --- | --- | 8.6 | 6.2 | e1.0 | 8.2 | 1.2 |
| 4 | --- | --- | --- | --- | --- | --- | --- | 6.5 | 8.0 | e1.1 | 6.5 | 0.85 |
| 5 | --- | --- | --- | --- | --- | --- | --- | 5.6 | 7.4 | e0.90 | 6.5 | 0.65 |
| 6 | --- | --- | --- | --- | --- | --- | --- | 4.1 | 12 | e0.80 | 5.6 | 0.53 |
| 7 | --- | --- | --- | --- | --- | --- | --- | 4.4 | 6.6 | e0.84 | 2.1 | 0.50 |
| 8 | --- | --- | --- | --- | --- | --- | --- | 3.5 | 4.6 | e0.88 | 1.3 | 0.47 |
| 9 | --- | --- | --- | --- | --- | --- | --- | 6.0 | e3.1 | e0.78 | 0.95 | 0.44 |
| 10 | --- | --- | --- | --- | --- | --- | --- | 5.8 | e2.5 | e0.82 | 0.78 | 0.44 |
| 11 | --- | --- | --- | --- | --- | --- | --- | 2.0 | e2.1 | e0.94 | 0.63 | 0.40 |
| 12 | --- | --- | --- | --- | --- | --- | --- | 1.4 | e1.9 | e0.74 | 0.60 | 0.35 |
| 13 | --- | --- | --- | --- | --- | --- | --- | 1.9 | e11 | e3.0 | 0.60 | 0.30 |
| 14 | --- | --- | --- | --- | --- | --- | --- | 2.1 | 15 | 14 | 0.51 | 0.33 |
| 15 | --- | --- | --- | --- | --- | --- | --- | 1.7 | 18 | e3.1 | 0.84 | 0.42 |
| 16 | --- | --- | --- | --- | --- | --- | --- | 1.2 | 7.7 | e1.6 | 0.82 | 1.1 |
| 17 | --- | --- | --- | --- | --- | --- | --- | 1.2 | 5.2 | e0.86 | 0.61 | 1.4 |
| 18 | --- | --- | --- | --- | --- | --- | --- | 9.4 | 3.8 | e0.82 | 0.53 | 0.79 |
| 19 | --- | --- | --- | --- | --- | --- | --- | 4.2 | 4.7 | e1.5 | 0.46 | 0.65 |
| 20 | --- | --- | --- | --- | --- | --- | --- | 2.9 | 3.9 | e1.3 | 0.36 | 0.57 |
| 21 | --- | --- | --- | --- | --- | --- | --- | 2.7 | e3.4 | e0.95 | 0.31 | 0.60 |
| 22 | --- | --- | --- | --- | --- | --- | --- | 2.6 | e3.0 | e0.80 | 0.29 | 0.91 |
| 23 | --- | --- | --- | --- | --- | --- | --- | 2.4 | e2.5 | e0.68 | 0.28 | 4.4 |
| 24 | --- | --- | --- | --- | --- | --- | --- | 2.0 | e2.0 | e0.64 | 0.52 | 1.1 |
| 25 | --- | --- | --- | --- | --- | --- | --- | 1.7 | e1.7 | e0.61 | 0.45 | 0.76 |
| 26 | --- | --- | --- | --- | --- | --- | --- | 3.1 | e2.5 | e0.60 | 0.39 | 9.7 |
| 27 | --- | --- | --- | --- | --- | --- | --- | 57 | e3.5 | e1.4 | 0.40 | 16 |
| 28 | --- | --- | --- | --- | --- | --- | --- | 30 | e2.9 | e1.3 | 1.3 | 8.2 |
| 29 | --- | --- | --- | --- | --- | --- | --- | 23 | e2.2 | e0.62 | 5.1 | 3.5 |
| 30 | --- | --- | --- | --- | --- | --- | --- | 18 | e1.8 | e0.50 | 1.9 | 2.3 |
| 31 | --- | --- | --- | --- | --- | --- | --- | 15 | --- | 0.42 | 1.2 | --- |
| TOTAL | --- | --- | --- | --- | --- | --- | --- | 254.0 | 168.7 | 46.00 | 50.66 | 61.46 |
| MEAN | --- | --- | --- | --- | --- | --- | --- | 8.19 | 5.62 | 1.48 | 1.63 | 2.05 |
| MAX | --- | --- | --- | --- | --- | --- | --- | 57 | 18 | 14 | 8.2 | 16 |
| MIN | --- | --- | --- | --- | --- | --- | --- | 1.2 | 1.7 | 0.42 | 0.28 | 0.30 |
| CFSM | --- | --- | --- | --- | --- | --- | --- | 0.73 | 0.50 | 0.13 | 0.15 | 0.18 |
| IN. | --- | --- | --- | --- | --- | --- | --- | 0.84 | 0.56 | 0.15 | 0.17 | 0.20 |

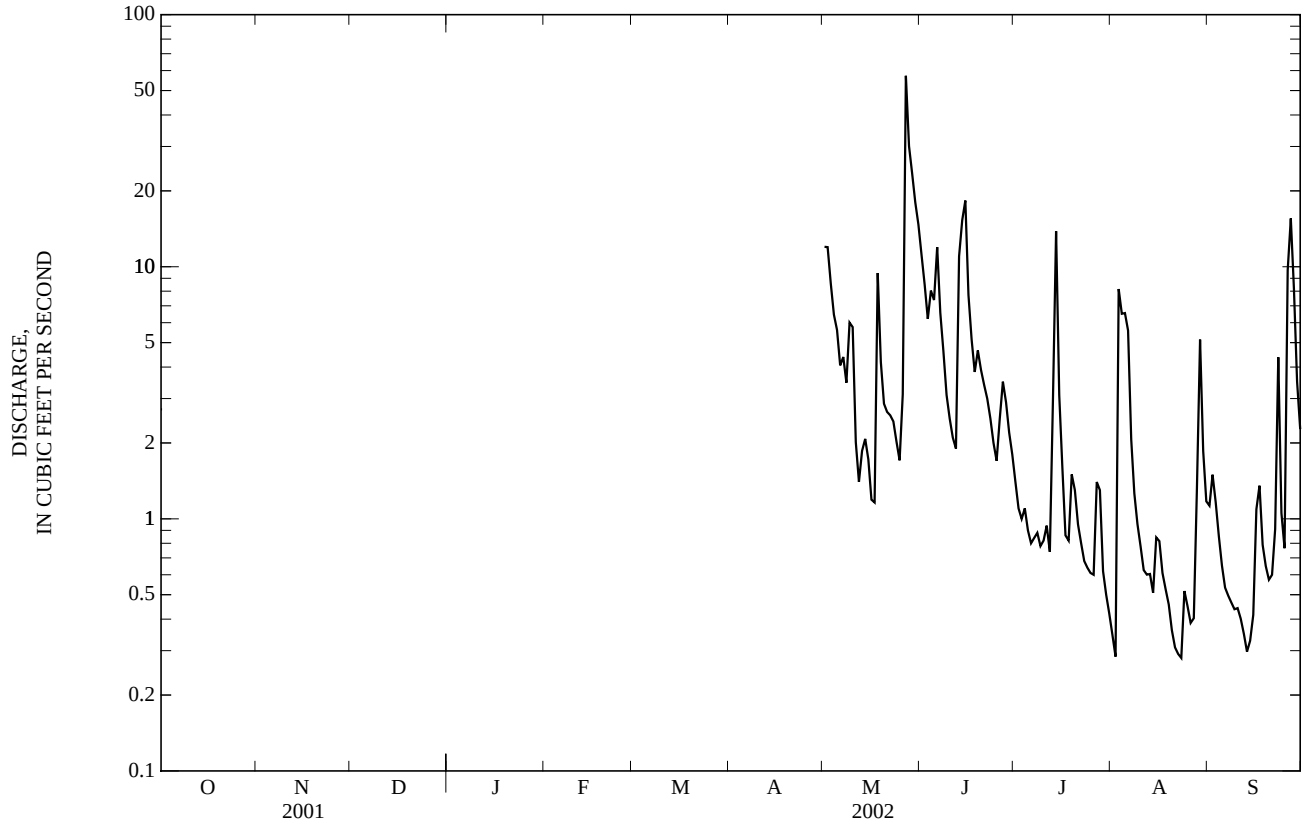
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEAR 2002

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | --- | --- | --- | --- | --- | --- | --- | 8.19 | 5.62 | 1.48 | 1.63 | 2.05 |
| MAX | --- | --- | --- | --- | --- | --- | --- | 8.19 | 5.62 | 1.48 | 1.63 | 2.05 |
| (WY) | --- | --- | --- | --- | --- | --- | --- | (2002) | (2002) | (2002) | (2002) | (2002) |
| MIN | --- | --- | --- | --- | --- | --- | --- | 8.19 | 5.62 | 1.48 | 1.63 | 2.05 |
| (WY) | --- | --- | --- | --- | --- | --- | --- | (2002) | (2002) | (2002) | (2002) | (2002) |

0163626650 MANASSAS RUN AT ROUTE 645 NEAR FRONT ROYAL, VA—Continued

| SUMMARY STATISTICS | FOR WATER YEAR 2002 | |
|---|---|---|
| HIGHEST DAILY MEAN | 57 | May 27 |
| LOWEST DAILY MEAN | 0.28 | aAug 2 |
| ANNUAL SEVEN-DAY MINIMUM | 0.37 | Aug 20 |
| MAXIMUM PEAK FLOW | 119 | May 27 |
| MAXIMUM PEAK STAGE | 3.29 | May 27 |
| INSTANTANEOUS LOW FLOW | 0.22 | bAug 2 |

a Also Aug. 23, 2002.
b Also Aug. 3, 23, 2002.
e Estimated.



0163626650 MANASSAS RUN AT ROUTE 645 NEAR FRONT ROYAL, VA—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.8 | 11 | 7.0 | 47 | e6.4 | 23 | 52 | 13 | 20 | 21 | 11 | 5.8 |
| 2 | 1.4 | 7.2 | 6.4 | 74 | e6.3 | 34 | 49 | 12 | 18 | 21 | 7.3 | 8.5 |
| 3 | 1.3 | 5.1 | 6.2 | 62 | e6.1 | 37 | 45 | 11 | 20 | 67 | 19 | 26 |
| 4 | 1.2 | 3.8 | 5.2 | 47 | e6.0 | 30 | 41 | 11 | 37 | 35 | 25 | 62 |
| 5 | 1.2 | 4.2 | 6.0 | 37 | e6.0 | 44 | 37 | 11 | 39 | 24 | 18 | 34 |
| 6 | 1.1 | 22 | 6.8 | 31 | e5.9 | 67 | 32 | 11 | 30 | 19 | 13 | 22 |
| 7 | 0.98 | 12 | 5.9 | 26 | e5.8 | 59 | 45 | 10 | 32 | 17 | 12 | 18 |
| 8 | 0.92 | 9.3 | 6.4 | 25 | e5.7 | 56 | 42 | 11 | 29 | 17 | 12 | 16 |
| 9 | 0.90 | 7.8 | 6.5 | 24 | e5.5 | 74 | 67 | 13 | 31 | 42 | 9.2 | 15 |
| 10 | 1.3 | 6.7 | 5.8 | 20 | e5.5 | 69 | 63 | 24 | 25 | 39 | 9.6 | 14 |
| 11 | 7.6 | 9.5 | 15 | 17 | e5.4 | 56 | 86 | 23 | 24 | 31 | 11 | 12 |
| 12 | 7.9 | 22 | 21 | 15 | e5.3 | 47 | 72 | 19 | 36 | 22 | 9.9 | 14 |
| 13 | 4.5 | 21 | 35 | 15 | e5.2 | 57 | 61 | 16 | 68 | 17 | 25 | 39 |
| 14 | 4.4 | 14 | 42 | 14 | e5.0 | 72 | 51 | 14 | 88 | 14 | 18 | 37 |
| 15 | 3.0 | 11 | 29 | 13 | e5.0 | 61 | 43 | 15 | 69 | 12 | 12 | 27 |
| 16 | 48 | 13 | 24 | 12 | e5.5 | 54 | 37 | 44 | 55 | 9.8 | 9.4 | 22 |
| 17 | 22 | 42 | 19 | 12 | e15 | 50 | 32 | 37 | 56 | 7.7 | 9.1 | 18 |
| 18 | 9.5 | 29 | 16 | e11 | e20 | 45 | 30 | 41 | 72 | 6.8 | 8.0 | 61 |
| 19 | 5.5 | 20 | 15 | e11 | e13 | 39 | 34 | 38 | 114 | 6.4 | 6.7 | 189 |
| 20 | 4.1 | 16 | 23 | e10 | e8.8 | 113 | 27 | 32 | 111 | 4.9 | 5.6 | 72 |
| 21 | 3.0 | 16 | 19 | e10 | e11 | 119 | 25 | 32 | 107 | 4.3 | 4.5 | 51 |
| 22 | 2.6 | 15 | 17 | e9.8 | 85 | 90 | 26 | 29 | 120 | 4.2 | 4.1 | 44 |
| 23 | 2.3 | 13 | 14 | e9.6 | 80 | 74 | 22 | 29 | 74 | 4.6 | 3.8 | 227 |
| 24 | 1.9 | 11 | 13 | e9.4 | 54 | 62 | 20 | 30 | 60 | 7.2 | 2.9 | 76 |
| 25 | 1.9 | 10 | 15 | e8.5 | 39 | 55 | 19 | 29 | 49 | 3.5 | 2.5 | 52 |
| 26 | 12 | 9.2 | 14 | e7.5 | 30 | 51 | 20 | 30 | 42 | 2.5 | 2.4 | 40 |
| 27 | 5.3 | 9.0 | 12 | e7.0 | 26 | 44 | 17 | 28 | 37 | 2.2 | 11 | 30 |
| 28 | 4.2 | 8.0 | 11 | e6.8 | 23 | 38 | 15 | 27 | 32 | 14 | 16 | 26 |
| 29 | 18 | 7.6 | 12 | e6.6 | --- | 43 | 14 | 25 | 27 | 14 | 9.4 | 19 |
| 30 | 37 | 7.7 | 12 | e6.5 | --- | 48 | 13 | 24 | 23 | 6.4 | 8.7 | 15 |
| 31 | 20 | --- | 14 | e6.5 | --- | 50 | --- | 22 | --- | 4.9 | 6.2 | --- |
| TOTAL | 236.80 | 393.1 | 454.2 | 611.2 | 495.4 | 1,761 | 1,137 | 711 | 1,545 | 501.4 | 322.3 | 1,292.3 |
| MEAN | 7.64 | 13.1 | 14.7 | 19.7 | 17.7 | 56.8 | 37.9 | 22.9 | 51.5 | 16.2 | 10.4 | 43.1 |
| MAX | 48 | 42 | 42 | 74 | 85 | 119 | 86 | 44 | 120 | 67 | 25 | 227 |
| MIN | 0.90 | 3.8 | 5.2 | 6.5 | 5.0 | 23 | 13 | 10 | 18 | 2.2 | 2.4 | 5.8 |
| CFSM | 0.68 | 1.17 | 1.31 | 1.76 | 1.58 | 5.07 | 3.38 | 2.05 | 4.60 | 1.44 | 0.93 | 3.85 |
| IN. | 0.79 | 1.31 | 1.51 | 2.03 | 1.65 | 5.85 | 3.78 | 2.36 | 5.13 | 1.67 | 1.07 | 4.29 |

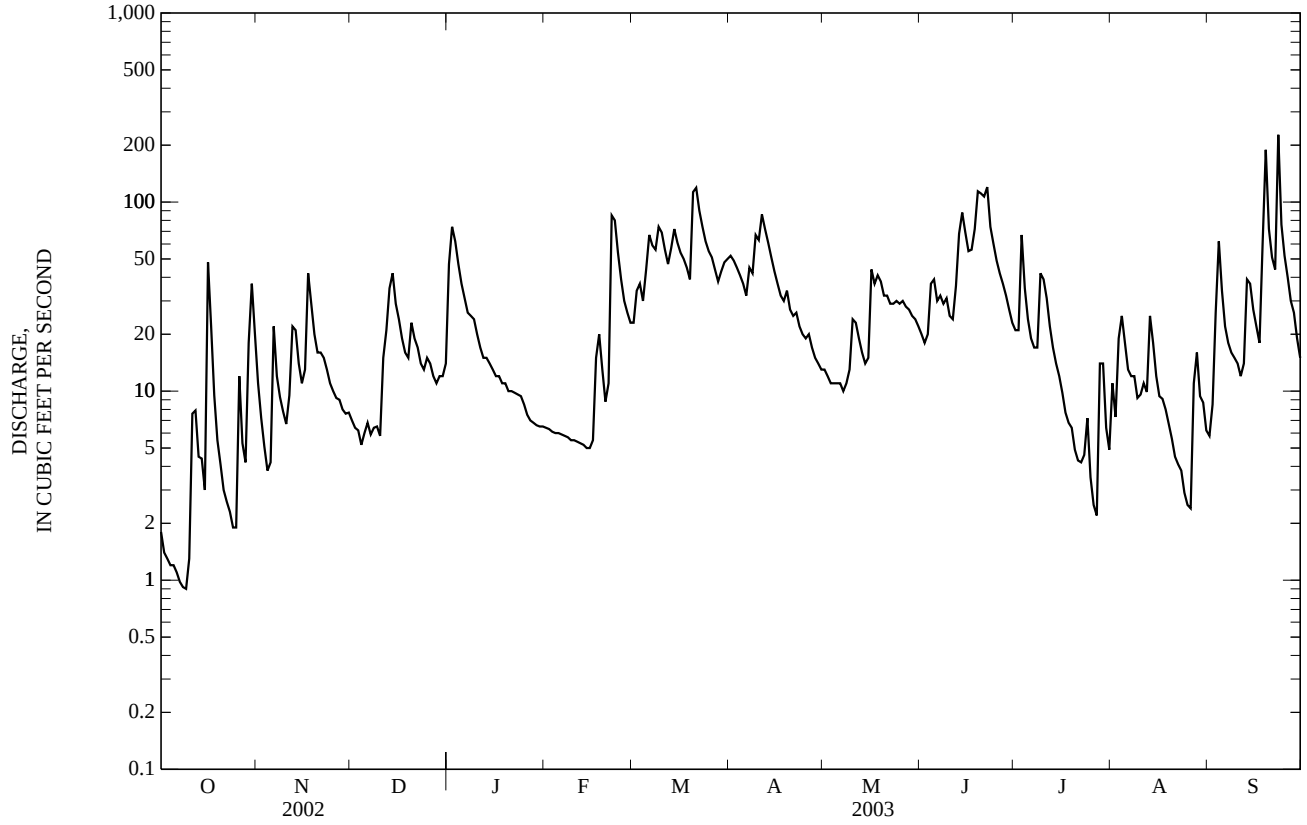
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2002 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 7.64 | 13.1 | 14.7 | 19.7 | 17.7 | 56.8 | 37.9 | 15.6 | 28.6 | 8.83 | 6.02 | 22.6 |
| MAX | 7.64 | 13.1 | 14.7 | 19.7 | 17.7 | 56.8 | 37.9 | 22.9 | 51.5 | 16.2 | 10.4 | 43.1 |
| (WY) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) |
| MIN | 7.64 | 13.1 | 14.7 | 19.7 | 17.7 | 56.8 | 37.9 | 8.19 | 5.62 | 1.48 | 1.63 | 2.05 |
| (WY) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2002) | (2002) | (2002) | (2002) | (2002) |

0163626650 MANASSAS RUN AT ROUTE 645 NEAR FRONT ROYAL, VA—Continued

| SUMMARY STATISTICS | FOR 2003 WATER YEAR | | WATER YEARS 2002 - 2003 | |
|---|---|---|---|---|
| ANNUAL TOTAL | 9,460.70 | | | |
| ANNUAL MEAN | 25.9 | | 25.9 | |
| HIGHEST ANNUAL MEAN | | | 25.9 | 2003 |
| LOWEST ANNUAL MEAN | | | 25.9 | 2003 |
| HIGHEST DAILY MEAN | 227 | Sep 23 | 227 | Sep 23, 2003 |
| LOWEST DAILY MEAN | 0.90 | Oct 9 | 0.28 | aAug 2, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 1.1 | Oct 3 | 0.37 | Aug 20, 2002 |
| MAXIMUM PEAK FLOW | 685 | Sep 23 | 685 | Sep 23, 2003 |
| MAXIMUM PEAK STAGE | 6.75 | Sep 23 | 6.75 | Sep 23, 2003 |
| INSTANTANEOUS LOW FLOW | 0.88 | bOct 8 | 0.22 | cAug 2, 2002 |
| ANNUAL RUNOFF (CFSM) | 2.31 | | 2.31 | |
| ANNUAL RUNOFF (INCHES) | 31.42 | | 31.44 | |
| 10 PERCENT EXCEEDS | 59 | | 59 | |
| 50 PERCENT EXCEEDS | 17 | | 17 | |
| 90 PERCENT EXCEEDS | 5.0 | | 5.0 | |

a Also Aug. 23, 2002.
b Also Oct. 9, 2002.
c Also Aug. 3, 23, 2002.
e Estimated.



## 01636316 SPOUT RUN AT ROUTE 621 NEAR MILLWOOD, VA

LOCATION.--Lat 39°04'01", long 78°00'13", NAD83, Loudon County, Hydrologic Unit 02070007, on left bank, 300 ft downstream from bridge on State Highway 621, 2 mi west of Millwood, 10 mi south of Berryville, and 0.2 mi upstream from mouth.

DRAINAGE AREA.--21.3 $mi^2$.

PERIOD OF RECORD.--August 2002 to current year.

GAGE.--Water stage recorder. Datum of gage is 440 ft NGVD of 1929, from topographic map.

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

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 6.3 |
| 2 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 6.3 |
| 3 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 6.2 |
| 4 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 6.1 |
| 5 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.8 |
| 6 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.8 |
| 7 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.8 |
| 8 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.5 |
| 9 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.5 |
| 10 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.5 |
| 11 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.4 |
| 12 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.2 |
| 13 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.2 |
| 14 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.3 |
| 15 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.5 |
| 16 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.7 |
| 17 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.5 |
| 18 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.3 |
| 19 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.2 |
| 20 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.3 |
| 21 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.6 |
| 22 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.5 | 6.1 |
| 23 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.6 | 6.5 |
| 24 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.6 | 5.6 |
| 25 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.5 | 5.5 |
| 26 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.4 | 6.8 |
| 27 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.5 | 8.8 |
| 28 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 6.2 | 7.9 |
| 29 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 7.0 | 7.1 |
| 30 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 6.3 | 6.9 |
| 31 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 6.1 | --- |
| TOTAL | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 179.2 |
| MEAN | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.97 |
| MAX | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 8.8 |
| MIN | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.2 |
| CFSM | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 0.28 |
| IN. | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 0.31 |

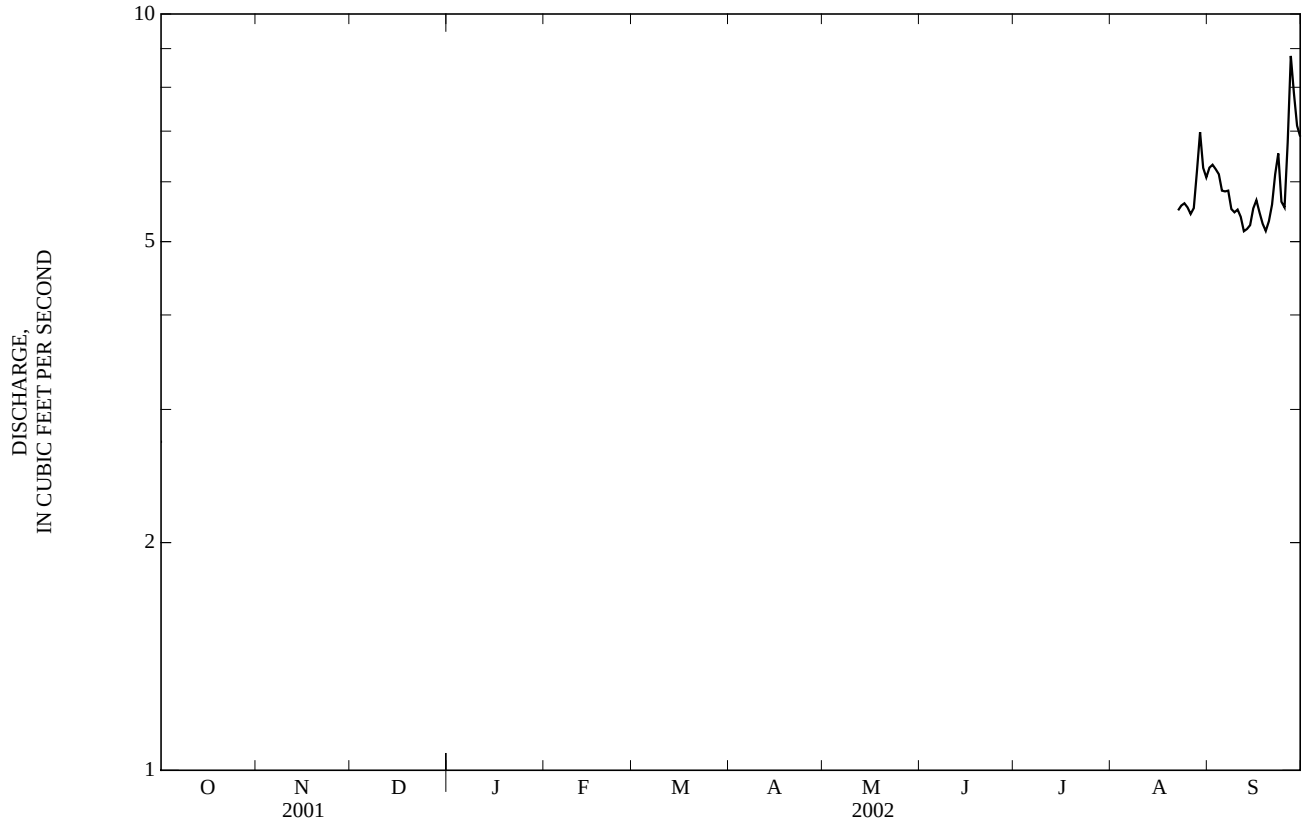
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEAR 2002

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.97 |
| MAX | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.97 |
| (WY) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | (2002) |
| MIN | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.97 |
| (WY) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | (2002) |

01636316 SPOUT RUN AT ROUTE 621 NEAR MILLWOOD, VA—Continued

| SUMMARY STATISTICS | FOR WATER YEAR 2002 | |
|---|---|---|
| HIGHEST DAILY MEAN | 8.8 | Sep 27 |
| LOWEST DAILY MEAN | 5.2 | aSep 12 |
| ANNUAL SEVEN-DAY MINIMUM | 5.4 | Sep 8 |
| MAXIMUM PEAK FLOW | 9.7 | Sep 26 |
| MAXIMUM PEAK STAGE | 1.59 | Sep 27 |
| INSTANTANEOUS LOW FLOW | 4.8 | Sep 21 |

a Also Sept. 13, 19, 2002.



01636316 SPOUT RUN AT ROUTE 621 NEAR MILLWOOD, VA—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.7 | 12 | 11 | 63 | 21 | 38 | 39 | 28 | 46 | 42 | 33 | 25 |
| 2 | 6.5 | 12 | 11 | 139 | 19 | 49 | 39 | 32 | 33 | 34 | 31 | 23 |
| 3 | 6.4 | 11 | 11 | 67 | 18 | 72 | 45 | 24 | 32 | 40 | 35 | 25 |
| 4 | 6.5 | 11 | 11 | 56 | 20 | 56 | 38 | 26 | 59 | 34 | 32 | 48 |
| 5 | 6.5 | 11 | 11 | 48 | 19 | 71 | 34 | 24 | 61 | 31 | 36 | 28 |
| 6 | 6.2 | 14 | 11 | 43 | 18 | 145 | 32 | 24 | 43 | 34 | 30 | 28 |
| 7 | 6.2 | 12 | 10 | 38 | 19 | 123 | 43 | 24 | 48 | 194 | 30 | 26 |
| 8 | 6.2 | 11 | 10 | 38 | 18 | 99 | 45 | 27 | 50 | 52 | 38 | 24 |
| 9 | 6.2 | 11 | 9.9 | 39 | 18 | 168 | 81 | 30 | 45 | 63 | 34 | 23 |
| 10 | 6.6 | 11 | 9.7 | 34 | 18 | 114 | 71 | 52 | 38 | 72 | 32 | 20 |
| 11 | 7.4 | 11 | 13 | 31 | 18 | 77 | 98 | 46 | 36 | 52 | 30 | 19 |
| 12 | 7.5 | 13 | 28 | 28 | 17 | 65 | 71 | 34 | 40 | 43 | 30 | 20 |
| 13 | 7.2 | 19 | 48 | 29 | 17 | 63 | 53 | 30 | 58 | 41 | 29 | 26 |
| 14 | 7.4 | 13 | 85 | 28 | 17 | 67 | 48 | 27 | 60 | 38 | 29 | 24 |
| 15 | 7.3 | 13 | 52 | 26 | 18 | 54 | 44 | 27 | 49 | 37 | 28 | 23 |
| 16 | 10 | 15 | 39 | 24 | 18 | 46 | 42 | 87 | 43 | 38 | 29 | 23 |
| 17 | 10 | 28 | 33 | 25 | 20 | 43 | 38 | 48 | 41 | 38 | 44 | 22 |
| 18 | 9.2 | 26 | 30 | 25 | 18 | 42 | 38 | 45 | 45 | 37 | 32 | 29 |
| 19 | 8.8 | 18 | 29 | 25 | 17 | 42 | 44 | 43 | 39 | 35 | 28 | 312 |
| 20 | 8.6 | 17 | 31 | 26 | 17 | 128 | 37 | 39 | 108 | 36 | 27 | 80 |
| 21 | 8.3 | 17 | 28 | 23 | 18 | 136 | 36 | 35 | 104 | 36 | 25 | 53 |
| 22 | 8.1 | 22 | 25 | 24 | 36 | 90 | 34 | 34 | 230 | 33 | 29 | 45 |
| 23 | 8.1 | 16 | 24 | 22 | 60 | 56 | 31 | 33 | 80 | 35 | 26 | 246 |
| 24 | 8.1 | 15 | 23 | 21 | 60 | 58 | 32 | 43 | 56 | 38 | 23 | 102 |
| 25 | 8.0 | 15 | 25 | 20 | 66 | 53 | 31 | 70 | 48 | 34 | 23 | 72 |
| 26 | 9.0 | 14 | 24 | 19 | 55 | 55 | 32 | 49 | 44 | 33 | 23 | 108 |
| 27 | 8.6 | 14 | 24 | 19 | 45 | 51 | 30 | 41 | 41 | 33 | 23 | 67 |
| 28 | 8.4 | 13 | 23 | 18 | 42 | 44 | 27 | 43 | 37 | 35 | 22 | 61 |
| 29 | 9.2 | 12 | 23 | 20 | --- | 42 | 26 | 39 | 34 | 37 | 22 | 53 |
| 30 | 14 | 12 | 24 | 20 | --- | 41 | 27 | 34 | 33 | 28 | 25 | 47 |
| 31 | 13 | --- | 24 | 20 | --- | 41 | --- | 40 | --- | 29 | 23 | --- |
| TOTAL | 250.2 | 439 | 760.6 | 1,058 | 747 | 2,229 | 1,286 | 1,178 | 1,681 | 1,362 | 901 | 1,702 |
| MEAN | 8.07 | 14.6 | 24.5 | 34.1 | 26.7 | 71.9 | 42.9 | 38.0 | 56.0 | 43.9 | 29.1 | 56.7 |
| MAX | 14 | 28 | 85 | 139 | 66 | 168 | 98 | 87 | 230 | 194 | 44 | 312 |
| MIN | 6.2 | 11 | 9.7 | 18 | 17 | 38 | 26 | 24 | 32 | 28 | 22 | 19 |
| CFSM | 0.38 | 0.69 | 1.15 | 1.60 | 1.25 | 3.38 | 2.01 | 1.78 | 2.63 | 2.06 | 1.36 | 2.66 |
| IN. | 0.44 | 0.77 | 1.33 | 1.85 | 1.30 | 3.89 | 2.25 | 2.06 | 2.94 | 2.38 | 1.57 | 2.97 |

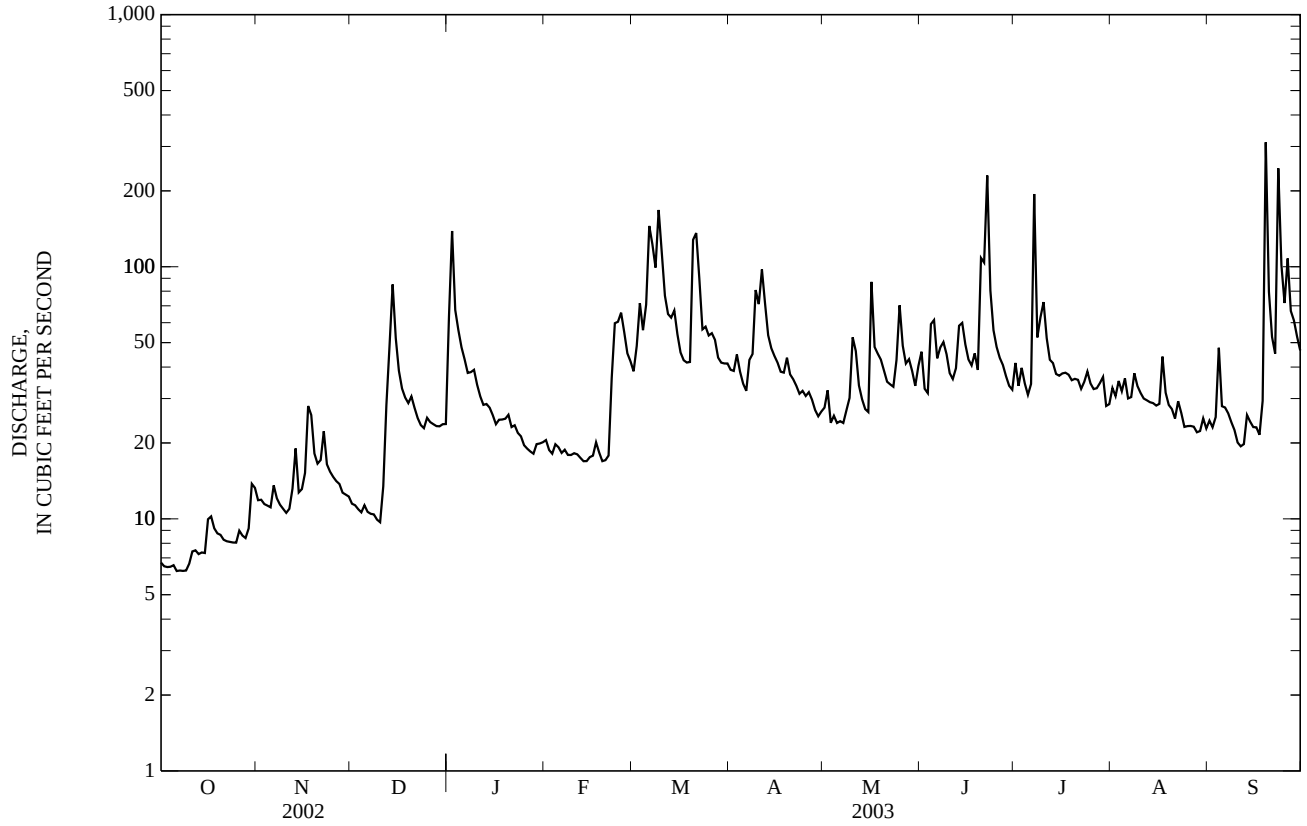
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2002 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 8.07 | 14.6 | 24.5 | 34.1 | 26.7 | 71.9 | 42.9 | 38.0 | 56.0 | 43.9 | 29.1 | 31.4 |
| MAX | 8.07 | 14.6 | 24.5 | 34.1 | 26.7 | 71.9 | 42.9 | 38.0 | 56.0 | 43.9 | 29.1 | 56.7 |
| (WY) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) |
| MIN | 8.07 | 14.6 | 24.5 | 34.1 | 26.7 | 71.9 | 42.9 | 38.0 | 56.0 | 43.9 | 29.1 | 5.97 |
| (WY) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2002) |

01636316 SPOUT RUN AT ROUTE 621 NEAR MILLWOOD, VA—Continued

| SUMMARY STATISTICS | FOR 2003 WATER YEAR | | WATER YEARS 2002 - 2003 | |
|---|---|---|---|---|
| ANNUAL TOTAL | 13,593.8 | | | |
| ANNUAL MEAN | 37.2 | | 37.2 | |
| HIGHEST ANNUAL MEAN | | | 37.2 | 2003 |
| LOWEST ANNUAL MEAN | | | 37.2 | 2003 |
| HIGHEST DAILY MEAN | 312 | Sep 19 | 312 | Sep 19, 2003 |
| LOWEST DAILY MEAN | 6.2 | aOct 6 | 5.2 | bSep 12, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 6.3 | Oct 3 | 5.4 | Sep 8, 2002 |
| MAXIMUM PEAK FLOW | 547 | Sep 19 | 547 | Sep 19, 2003 |
| MAXIMUM PEAK STAGE | 4.07 | Sep 19 | 4.07 | Sep 19, 2003 |
| INSTANTANEOUS LOW FLOW | 6.1 | cOct 6 | 4.8 | Sep 21, 2002 |
| ANNUAL RUNOFF (CFSM) | 1.75 | | 1.75 | |
| ANNUAL RUNOFF (INCHES) | 23.74 | | 23.76 | |
| 10 PERCENT EXCEEDS | 64 | | 64 | |
| 50 PERCENT EXCEEDS | 31 | | 31 | |
| 90 PERCENT EXCEEDS | 11 | | 11 | |

a Also Oct. 7-9, 2002.
b Also Sept. 13, 19, 2002.
c Also Oct. 7-10, 2002.



## 01636500 SHENANDOAH RIVER AT MILLVILLE, WV

LOCATION.--Lat 39°16'55", long 77°47'22", NAD27, 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 $mi^2$.

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 with satellite telemeter. Datum of gage is 293.00 ft above NGVD of 1929. Apr. 15, 1895, to Mar. 31, 1909, nonrecording gage at site 0.8 mi downstream at datum 0.32 ft higher.

REMARKS.--Records good except those for periods of estimated daily discharges (ice effect), which are poor. Some regulation by upstream hydroelectric plants, including that of Potomac Light and Power Company, 0.5 mi upstream from 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 $ft^3/s$.

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

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|
| Jan 3 | 0100 | 18,200 | 9.05 |
| Feb 24 | 1300 | 38,900 | 13.23 |
| Mar 7 | 0530 | 20,300 | 9.55 |
| Mar 22 | 0130 | 27,000 | 11.02 |
| Apr 12 | 1130 | 25,700 | 10.76 |
| May 20 | 1130 | 15,200 | 8.26 |
| Jun 22 | 0830 | 19,300 | 9.31 |
| Sep 20 | 2000 | *66,100 | *17.31 |
| Sep 24 | 0900 | 35,600 | 12.65 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1,450 | 4,180 | 1,950 | 2,960 | 1,770 | 7,700 | 5,700 | 3,500 | 5,050 | 3,670 | 1,970 | 1,570 |
| 2 | 1,160 | 3,940 | 1,780 | 11,500 | 1,730 | 7,020 | 5,810 | 3,400 | 4,410 | 3,480 | 1,910 | 1,590 |
| 3 | 885 | 3,140 | 1,690 | 15,700 | 1,710 | 9,600 | 5,800 | 3,970 | 4,170 | 3,540 | 1,860 | 1,600 |
| 4 | 766 | 2,470 | 1,580 | 12,000 | 1,680 | 13,400 | 5,670 | 4,020 | 4,420 | 6,040 | 2,090 | 4,940 |
| 5 | 711 | 2,030 | 1,520 | 9,890 | 1,690 | 11,100 | 5,390 | 3,670 | 6,530 | 7,750 | 2,170 | 3,790 |
| 6 | 665 | 1,890 | 1,490 | 7,980 | 1,620 | 14,800 | 5,070 | 4,350 | 7,960 | 6,050 | 2,200 | 2,460 |
| 7 | 592 | 2,210 | 1,430 | 6,690 | 1,650 | 19,200 | 4,870 | 4,930 | 8,010 | 5,560 | 2,320 | 2,170 |
| 8 | 537 | 2,070 | 1,290 | 5,670 | 1,640 | 15,700 | 6,050 | 4,880 | 7,320 | 4,720 | 2,560 | 2,030 |
| 9 | 498 | 2,130 | e1,200 | 5,100 | 1,560 | 14,000 | 9,380 | 4,710 | 7,890 | 5,050 | 2,510 | 1,820 |
| 10 | 482 | 2,050 | 1,260 | 4,710 | 1,510 | 13,700 | 13,800 | 4,730 | 9,070 | 5,560 | 2,300 | 1,710 |
| 11 | 521 | 1,940 | 1,430 | 4,260 | 1,500 | 11,000 | 18,000 | 8,870 | 8,160 | 4,980 | 2,400 | 1,540 |
| 12 | 544 | 2,060 | 2,300 | 3,820 | 1,470 | 8,830 | 24,200 | 12,600 | 6,850 | 4,900 | 4,090 | 1,570 |
| 13 | 710 | 3,710 | 3,650 | 3,480 | 1,400 | 7,660 | 17,900 | 9,420 | 7,730 | 4,110 | 4,700 | 1,680 |
| 14 | 817 | 6,210 | 7,080 | 3,220 | 1,370 | 7,770 | 12,700 | 7,050 | 11,400 | 3,580 | 4,490 | 1,940 |
| 15 | 796 | 6,470 | 9,210 | 2,970 | 1,410 | 7,780 | 9,920 | 5,680 | 9,240 | 3,230 | 3,870 | 2,010 |
| 16 | 1,010 | 4,990 | 9,240 | 2,780 | 1,420 | 6,900 | 8,110 | 7,470 | 8,800 | 3,470 | 3,450 | 2,110 |
| 17 | 2,430 | 4,690 | 7,410 | 2,680 | e1,400 | 6,190 | 6,950 | 7,760 | 9,930 | 3,590 | 3,010 | 1,960 |
| 18 | 2,980 | 6,250 | 5,910 | 2,470 | 1,350 | 5,640 | 6,070 | 7,110 | 9,720 | 3,050 | 2,750 | 1,860 |
| 19 | 2,740 | 7,450 | 4,950 | 2,350 | 1,810 | 5,170 | 5,740 | 8,010 | 14,400 | 2,680 | 2,560 | 21,100 |
| 20 | 2,060 | 6,470 | 4,390 | e2,300 | 2,320 | 5,330 | 5,770 | 14,400 | 14,400 | 2,500 | 2,490 | 60,600 |
| 21 | 1,620 | 5,190 | 4,570 | e2,250 | 2,730 | 19,300 | 5,630 | 11,500 | 15,800 | 2,380 | 2,330 | 35,400 |
| 22 | 1,460 | 4,630 | 7,700 | e2,200 | 2,940 | 23,200 | 5,320 | 9,180 | 17,600 | 2,250 | 2,060 | 14,800 |
| 23 | 1,240 | 4,340 | 7,670 | e2,150 | 16,000 | 15,000 | 5,340 | 8,520 | 12,200 | 2,220 | 2,000 | 18,100 |
| 24 | 1,120 | 3,910 | 6,040 | e2,100 | 37,000 | 10,900 | 5,130 | 7,460 | 9,160 | 2,130 | 1,780 | 31,800 |
| 25 | 941 | 3,510 | 5,050 | 2,060 | 26,200 | 8,660 | 4,730 | 7,270 | 7,220 | 2,180 | 1,720 | 17,800 |
| 26 | 958 | 3,190 | 4,450 | 2,040 | 17,200 | 7,260 | 4,470 | 6,530 | 6,000 | 2,180 | 1,720 | 11,200 |
| 27 | 908 | 2,790 | 4,100 | e2,000 | 12,000 | 6,580 | 4,270 | 5,930 | 5,140 | 2,020 | 1,580 | 8,510 |
| 28 | 917 | 2,530 | 3,740 | e1,950 | 9,410 | 5,900 | 4,040 | 5,530 | 4,590 | 1,920 | 1,620 | 7,270 |
| 29 | 961 | 2,290 | 3,290 | 1,940 | --- | 5,260 | 3,830 | 5,290 | 4,160 | 2,120 | 1,620 | 6,960 |
| 30 | 1,310 | 2,100 | 2,990 | e1,850 | --- | 4,980 | 3,670 | 5,010 | 3,810 | 2,120 | 1,530 | 6,920 |
| 31 | 3,200 | --- | 2,800 | 1,820 | --- | 5,250 | --- | 4,840 | --- | 1,880 | 1,520 | --- |
| TOTAL | 36,989 | 110,830 | 123,160 | 134,890 | 155,490 | 310,780 | 229,330 | 207,590 | 251,140 | 110,910 | 75,180 | 278,810 |
| MEAN | 1,193 | 3,694 | 3,973 | 4,351 | 5,553 | 10,030 | 7,644 | 6,696 | 8,371 | 3,578 | 2,425 | 9,294 |
| MAX | 3,200 | 7,450 | 9,240 | 15,700 | 37,000 | 23,200 | 24,200 | 14,400 | 17,600 | 7,750 | 4,700 | 60,600 |
| MIN | 482 | 1,890 | 1,200 | 1,820 | 1,350 | 4,980 | 3,670 | 3,400 | 3,810 | 1,880 | 1,520 | 1,540 |
| CFSM | 0.39 | 1.22 | 1.31 | 1.44 | 1.84 | 3.32 | 2.53 | 2.22 | 2.77 | 1.18 | 0.80 | 3.08 |
| IN. | 0.46 | 1.36 | 1.52 | 1.66 | 1.91 | 3.83 | 2.82 | 2.56 | 3.09 | 1.37 | 0.93 | 3.43 |

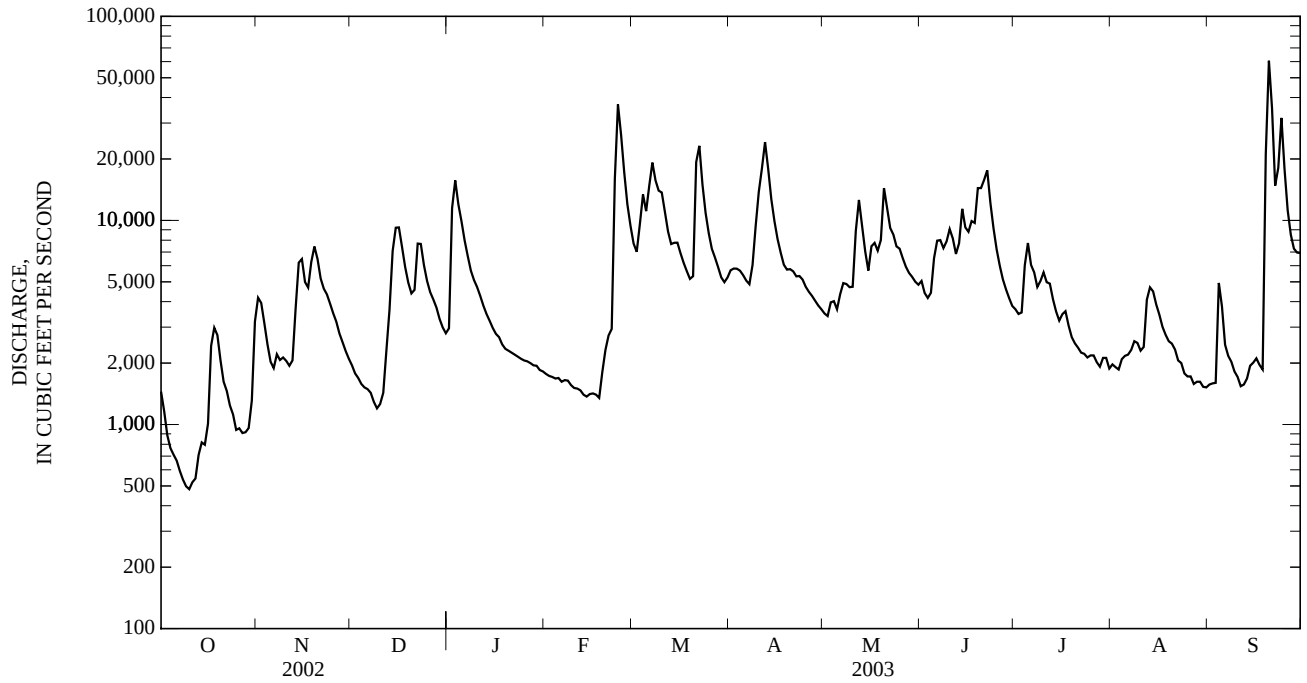
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1895 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 1,923 | 1,858 | 2,471 | 3,215 | 3,897 | 5,058 | 4,384 | 3,358 | 2,445 | 1,454 | 1,623 | 1,547 |
| MAX | 16,250 | 13,350 | 8,164 | 13,470 | 18,100 | 17,540 | 12,840 | 8,701 | 10,380 | 4,809 | 10,390 | 14,780 |
| (WY) | (1943) | (1986) | (1973) | (1996) | (1998) | (1936) | (1901) | (1901) | (1972) | (1972) | (1955) | (1996) |
| MIN | 343 | 388 | 410 | 475 | 471 | 929 | 992 | 1,001 | 643 | 402 | 388 | 411 |
| (WY) | (1931) | (1932) | (1966) | (2002) | (2002) | (1931) | (1981) | (1969) | (1999) | (1966) | (1930) | (1963) |

01636500 SHENANDOAH RIVER AT MILLVILLE, WV—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1895 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 565,360 | | 2,025,099 | | | |
| ANNUAL MEAN | 1,549 | | 5,548 | | 2,763 | |
| HIGHEST ANNUAL MEAN | | | | | 5,618 | 1996 |
| LOWEST ANNUAL MEAN | | | | | 927 | 2002 |
| HIGHEST DAILY MEAN | 13,500 | Apr 23 | 60,600 | Sep 20 | 192,000 | Oct 16, 1942 |
| LOWEST DAILY MEAN | 302 | Aug 26 | 482 | Oct 10 | 194 | Jul 24, 1930 |
| ANNUAL SEVEN-DAY MINIMUM | 326 | Aug 21 | 548 | Oct 6 | 240 | Sep 7, 1966 |
| MAXIMUM PEAK FLOW | | | 66,100 | Sep 20 | 230,000 | Oct 16, 1942 |
| MAXIMUM PEAK STAGE | | | 17.31 | Sep 20 | (a)32.40 | Oct 16, 1942 |
| INSTANTANEOUS LOW FLOW | | | 479 | (b) | 59 | Oct 4, 1930 |
| ANNUAL RUNOFF (CFSM) | 0.51 | | 1.84 | | 0.91 | |
| ANNUAL RUNOFF (INCHES) | 6.96 | | 24.93 | | 12.42 | |
| 10 PERCENT EXCEEDS | 4,000 | | 11,500 | | 5,630 | |
| 50 PERCENT EXCEEDS | 720 | | 3,970 | | 1,610 | |
| 90 PERCENT EXCEEDS | 389 | | 1,470 | | 608 | |

a From floodmarks.
b Oct. 9, 10.
e Estimated.



## 01636690 PINEY RUN NEAR LOVETTSVILLE, VA

LOCATION.--Lat 39°18'39", long 77°43'07", NAD83, Loudoun County, Hydrologic Unit 02070008, on right bank 100 ft downstream from State Highway 671, 0.2 mi south of Loudoun Heights, and 1.3 mi upstream from mouth.

DRAINAGE AREA.--Not determined.

PERIOD OF RECORD.--October 2001 to September 2002.

GAGE.--Water stage recorder. Datum of gage is 400 ft NVGD of 1929, from topographic map.

REMARKS.--Records good except those for periods with ice effect, Dec. 7-9 and Jan. 16 to Feb. 21, and periods of partial or no gage-height record, Dec. 28-30 and May 21, 22, which are fair.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.94 | 5.5 | 5.0 | 125 | e9.5 | 21 | 35 | 15 | 67 | 11 | 6.8 | 5.1 |
| 2 | 0.79 | 4.0 | 4.7 | 139 | e9.0 | 34 | 30 | 14 | 35 | 11 | 5.5 | 8.1 |
| 3 | 0.69 | 3.4 | 4.6 | 85 | e8.7 | 41 | 27 | 13 | 45 | 15 | 5.0 | 6.8 |
| 4 | 0.72 | 3.0 | 4.6 | 57 | e8.3 | 28 | 25 | 16 | 161 | 14 | 5.4 | 38 |
| 5 | 0.81 | 3.0 | 5.8 | 42 | e7.8 | 35 | 25 | 17 | 78 | 14 | 6.2 | 13 |
| 6 | 0.80 | 17 | 6.4 | 37 | e7.4 | 73 | 22 | 17 | 52 | 13 | 4.8 | 8.9 |
| 7 | 0.80 | 7.1 | e4.5 | 31 | e6.9 | 48 | 52 | 21 | 79 | 20 | 6.2 | 8.0 |
| 8 | 0.77 | 4.8 | e4.3 | 35 | e6.5 | 50 | 38 | 28 | 56 | 15 | 8.1 | 6.6 |
| 9 | 0.82 | 4.1 | e4.0 | 36 | e6.3 | 110 | 81 | 24 | 55 | 12 | 5.2 | 6.2 |
| 10 | 1.2 | 3.8 | 4.8 | 28 | e6.1 | 74 | 52 | 34 | 37 | 14 | 15 | 5.5 |
| 11 | 3.6 | 5.0 | 31 | 22 | e6.0 | 50 | 57 | 29 | 33 | 12 | 7.4 | 5.1 |
| 12 | 4.6 | 19 | 46 | 18 | e5.8 | 46 | 43 | 20 | 31 | 9.7 | 5.4 | 5.1 |
| 13 | 2.8 | 20 | 65 | 17 | e5.8 | 61 | 35 | 17 | 33 | 11 | 4.5 | 13 |
| 14 | 2.3 | 8.7 | 97 | 16 | e5.8 | 64 | 31 | 15 | 29 | 8.6 | 4.2 | 9.5 |
| 15 | 1.7 | 6.4 | 50 | 15 | e5.8 | 46 | 29 | 18 | 25 | 8.1 | 3.9 | 7.8 |
| 16 | 20 | 6.5 | 35 | e14 | e5.7 | 43 | 27 | 436 | 22 | 7.6 | 3.9 | 7.5 |
| 17 | 14 | 37 | 26 | e14 | e5.5 | 39 | 25 | 176 | 23 | 6.8 | 19 | 5.8 |
| 18 | 4.2 | 41 | 21 | e14 | e15 | 34 | 24 | 122 | 27 | 6.6 | 6.0 | 15 |
| 19 | 2.5 | 16 | 18 | e13 | e13 | 29 | 64 | 77 | 26 | 6.8 | 4.5 | 90 |
| 20 | 2.0 | 12 | 24 | e13 | e10 | 125 | 34 | 56 | 36 | 6.2 | 4.0 | 25 |
| 21 | 1.7 | 16 | 19 | e12 | e8.7 | 103 | 29 | e51 | 29 | 5.9 | 3.8 | 16 |
| 22 | 1.4 | 24 | 15 | e11 | 151 | 58 | 30 | e46 | 29 | 6.0 | 3.6 | 14 |
| 23 | 1.4 | 13 | 13 | e10 | 128 | 44 | 25 | 41 | 21 | 6.9 | 3.6 | 281 |
| 24 | 1.2 | 9.4 | 12 | e11 | 56 | 37 | 22 | 63 | 18 | 6.8 | 2.9 | 50 |
| 25 | 1.3 | 8.1 | 16 | e12 | 38 | 33 | 22 | 175 | 16 | 5.6 | 2.7 | 32 |
| 26 | 6.4 | 7.1 | 16 | e14 | 30 | 33 | 25 | 72 | 15 | 5.2 | 8.9 | 39 |
| 27 | 3.7 | 7.5 | 12 | e15 | 26 | 31 | 21 | 52 | 14 | 4.8 | 11 | 23 |
| 28 | 2.5 | 6.2 | e11 | e14 | 24 | 26 | 18 | 54 | 13 | 4.7 | 7.3 | 30 |
| 29 | 5.7 | 5.6 | e12 | e12 | --- | 29 | 17 | 43 | 12 | 5.7 | 11 | 19 |
| 30 | 18 | 5.6 | e15 | e11 | --- | 39 | 16 | 35 | 11 | 4.5 | 7.6 | 16 |
| 31 | 9.1 | --- | 15 | e10 | --- | 39 | --- | 55 | --- | 4.2 | 5.2 | --- |
| TOTAL | 118.44 | 329.8 | 617.7 | 903 | 616.6 | 1,523 | 981 | 1,852 | 1,128 | 282.7 | 198.6 | 810.0 |
| MEAN | 3.82 | 11.0 | 19.9 | 29.1 | 22.0 | 49.1 | 32.7 | 59.7 | 37.6 | 9.12 | 6.41 | 27.0 |
| MAX | 20 | 41 | 97 | 139 | 151 | 125 | 81 | 436 | 161 | 20 | 19 | 281 |
| MIN | 0.69 | 3.0 | 4.0 | 10 | 5.5 | 21 | 16 | 13 | 11 | 4.2 | 2.7 | 5.1 |
| CFSM | 0.28 | 0.80 | 1.45 | 2.13 | 1.61 | 3.59 | 2.39 | 4.36 | 2.74 | 0.67 | 0.47 | 1.97 |
| IN. | 0.32 | 0.90 | 1.68 | 2.45 | 1.67 | 4.14 | 2.66 | 5.03 | 3.06 | 0.77 | 0.54 | 2.20 |

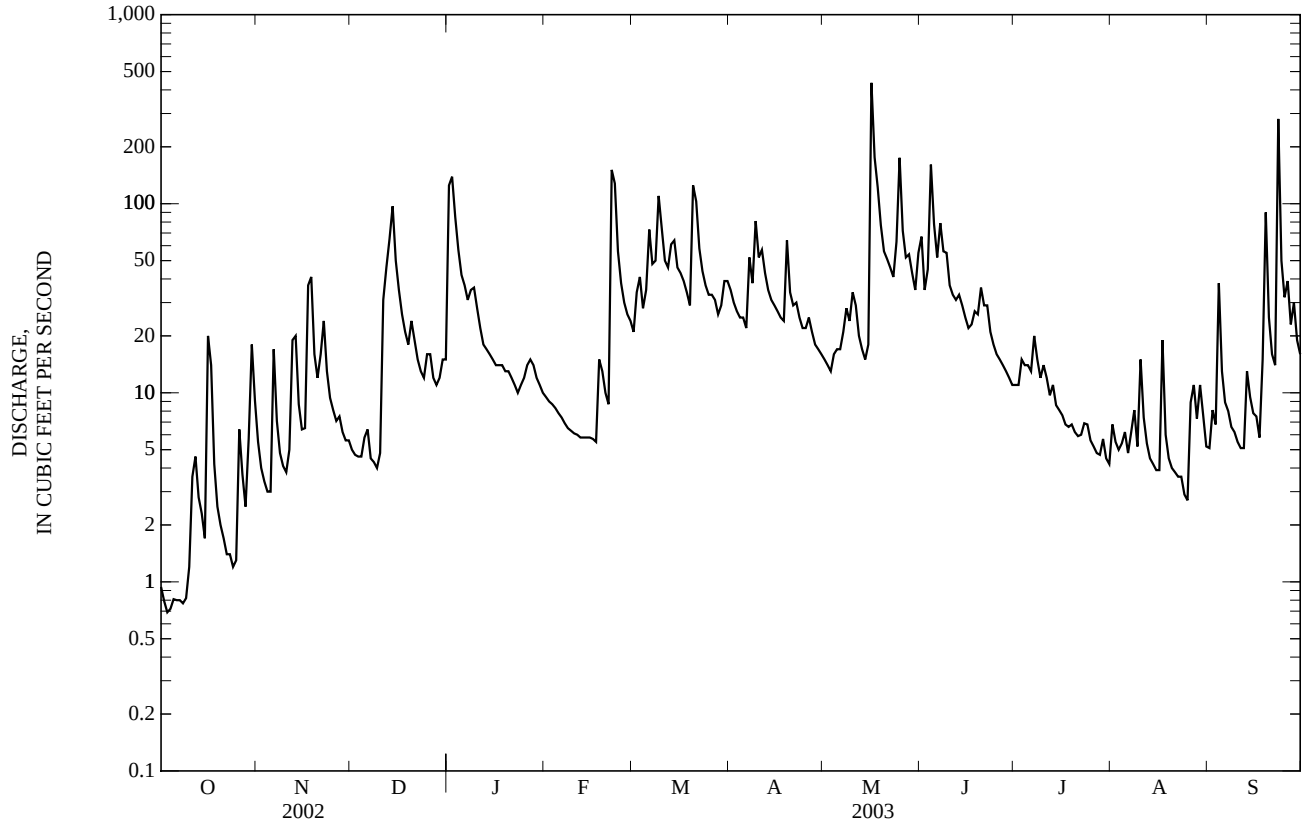
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2002 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 2.35 | 6.17 | 10.7 | 15.6 | 11.9 | 27.4 | 19.0 | 32.9 | 20.0 | 5.06 | 3.30 | 13.9 |
| MAX | 3.82 | 11.0 | 19.9 | 29.1 | 22.0 | 49.1 | 32.7 | 59.7 | 37.6 | 9.12 | 6.41 | 27.0 |
| (WY) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) |
| MIN | 0.87 | 1.34 | 1.45 | 2.08 | 1.83 | 5.68 | 5.33 | 5.99 | 2.39 | 1.00 | 0.20 | 0.83 |
| (WY) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) |

01636690 PINEY RUN NEAR LOVETTSVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 2002 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 1,837.68 | | 9,360.84 | | | |
| ANNUAL MEAN | 5.03 | | 25.6 | | 14.0 | |
| HIGHEST ANNUAL MEAN | | | | | 25.6 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 2.42 | 2002 |
| HIGHEST DAILY MEAN | 97 | Dec 14 | 436 | May 16 | 436 | May 16, 2003 |
| LOWEST DAILY MEAN | 0.03 | aAug 22 | 0.69 | Oct 3 | 0.03 | aAug 22, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.04 | Aug 17 | 0.77 | Oct 2 | 0.04 | Aug 17, 2002 |
| MAXIMUM PEAK FLOW | | | 631 | May 16 | 631 | May 16, 2003 |
| MAXIMUM PEAK STAGE | | | 6.98 | May 16 | 6.98 | May 16, 2003 |
| INSTANTANEOUS LOW FLOW | | | 0.68 | bOct 2 | 0.02 | Aug 22, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.37 | | 1.87 | | 1.02 | |
| ANNUAL RUNOFF (INCHES) | 4.99 | | 25.42 | | 13.92 | |
| 10 PERCENT EXCEEDS | 13 | | 55 | | 36 | |
| 50 PERCENT EXCEEDS | 2.3 | | 15 | | 4.6 | |
| 90 PERCENT EXCEEDS | 0.25 | | 4.0 | | 0.63 | |

a Also Aug. 23, 2002.
b Also Oct. 3-5, 2002.
e Estimated.



## 01638350 SOUTH FORK CATOCTIN CREEK AT ROUTE 698 NEAR WATERFORD, VA

LOCATION.--Lat 39°11'28", long 77°36'56", NAD83, Loudoun County, Hydrologic Unit 02070008, on right bank 50 ft downstream from State Highway 698 and 0.25 mi northwest of Waterford.

DRAINAGE AREA.--31.6 $mi^2$..

PERIOD OF RECORD.--July 2001 to current year.

GAGE.--Water stage recorder. Elevation of gage is 335 ft NVGD of 1929, from topographic map.

REMARKS.--Records good except those for periods with ice effect, Dec. 4-10 and Jan. 16 tp Feb. 21, wich are poor.

REVISIONS.--The maximum discharges for the water years 2001 and 2002 have been revised to 1,360 $ft^3/s$, Sept. 25, 2001, gage height, 8.46 ft, and 435 $ft^3/s$, June 15, 2002, gage height, 5.35 ft, superseding figures published in the report for 2002.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.9 | 29 | 24 | 460 | e20 | 55 | 78 | 28 | 171 | 33 | 58 | 10 |
| 2 | 1.4 | 20 | 21 | 472 | e20 | 120 | 62 | 26 | 78 | 31 | 26 | 13 |
| 3 | 0.97 | 16 | 20 | 239 | e20 | 181 | 54 | 23 | 82 | 57 | 19 | 15 |
| 4 | 0.73 | 14 | e14 | 141 | e19 | 96 | 50 | 22 | 269 | 45 | 19 | 273 |
| 5 | 0.53 | 13 | e15 | 101 | e19 | 127 | 48 | 25 | 201 | 35 | 20 | 62 |
| 6 | 0.38 | 77 | e18 | 88 | e19 | 331 | 43 | 30 | 107 | 28 | 15 | 35 |
| 7 | 0.26 | 27 | e10 | 73 | e18 | 179 | 95 | 24 | 214 | 43 | 17 | 26 |
| 8 | 0.15 | 19 | e14 | 81 | e18 | 198 | 85 | 30 | 150 | 42 | 39 | 22 |
| 9 | 0.19 | 16 | e10 | 84 | e18 | 322 | 184 | 41 | 136 | 50 | 17 | 19 |
| 10 | 0.27 | 14 | e12 | 60 | e18 | 163 | 115 | 67 | 89 | 66 | 32 | 17 |
| 11 | 17 | 18 | 128 | 50 | e17 | 113 | 135 | 59 | 102 | 38 | 61 | 15 |
| 12 | 16 | 54 | 165 | 43 | e14 | 100 | 95 | 35 | 141 | 29 | 20 | 15 |
| 13 | 5.0 | 59 | 220 | 41 | e12 | 105 | 71 | 29 | 168 | 29 | 14 | 37 |
| 14 | 2.6 | 29 | 267 | 39 | e13 | 116 | 61 | 25 | 165 | 23 | 12 | 25 |
| 15 | 1.8 | 22 | 142 | 36 | e14 | 83 | 54 | 62 | 111 | 22 | 10 | 24 |
| 16 | 122 | 27 | 96 | e34 | e14 | 74 | 50 | 1,560 | 83 | 20 | 10 | 18 |
| 17 | 66 | 181 | 73 | e32 | e15 | 69 | 45 | 278 | 79 | 18 | 166 | 14 |
| 18 | 23 | 166 | 62 | e29 | e35 | 61 | 42 | 241 | 111 | 16 | 31 | 40 |
| 19 | 14 | 77 | 56 | e27 | e30 | 52 | 132 | 160 | 104 | 17 | 21 | 355 |
| 20 | 10 | 61 | 67 | e24 | e25 | 365 | 67 | 113 | 137 | 14 | 17 | 84 |
| 21 | 7.6 | 61 | 55 | e22 | e25 | 226 | 52 | 116 | 102 | 14 | 15 | 52 |
| 22 | 6.1 | 75 | 46 | e20 | 340 | 130 | 53 | 106 | 88 | 23 | 14 | 43 |
| 23 | 5.0 | 50 | 41 | e20 | 331 | 95 | 45 | 87 | 68 | 66 | 13 | 1,840 |
| 24 | 4.2 | 42 | 38 | e19 | 194 | 77 | 38 | 146 | 56 | 46 | 10 | 129 |
| 25 | 3.9 | 38 | 52 | e18 | 128 | 66 | 37 | 254 | 50 | 19 | 9.1 | 84 |
| 26 | 30 | 34 | 51 | e18 | 89 | 68 | 43 | 183 | 46 | 14 | 49 | 103 |
| 27 | 14 | 33 | 44 | e17 | 69 | 68 | 38 | 117 | 42 | 13 | 34 | 63 |
| 28 | 8.2 | 29 | 39 | e17 | 61 | 53 | 32 | 113 | 38 | 29 | 16 | 58 |
| 29 | 30 | 27 | 41 | e17 | --- | 52 | 29 | 92 | 35 | 48 | 13 | 44 |
| 30 | 93 | 26 | 45 | e18 | --- | 93 | 27 | 75 | 32 | 18 | 14 | 36 |
| 31 | 53 | --- | 44 | e19 | --- | 93 | --- | 133 | --- | 15 | 10 | --- |
| TOTAL | 539.18 | 1,354 | 1,930 | 2,359 | 1,615 | 3,931 | 1,960 | 4,300 | 3,255 | 961 | 821.1 | 3,571 |
| MEAN | 17.4 | 45.1 | 62.3 | 76.1 | 57.7 | 127 | 65.3 | 139 | 108 | 31.0 | 26.5 | 119 |
| MAX | 122 | 181 | 267 | 472 | 340 | 365 | 184 | 1,560 | 269 | 66 | 166 | 1,840 |
| MIN | 0.15 | 13 | 10 | 17 | 12 | 52 | 27 | 22 | 32 | 13 | 9.1 | 10 |
| CFSM | 0.55 | 1.43 | 1.97 | 2.41 | 1.83 | 4.01 | 2.07 | 4.39 | 3.43 | 0.98 | 0.84 | 3.77 |
| IN. | 0.63 | 1.59 | 2.27 | 2.78 | 1.90 | 4.63 | 2.31 | 5.06 | 3.83 | 1.13 | 0.97 | 4.20 |

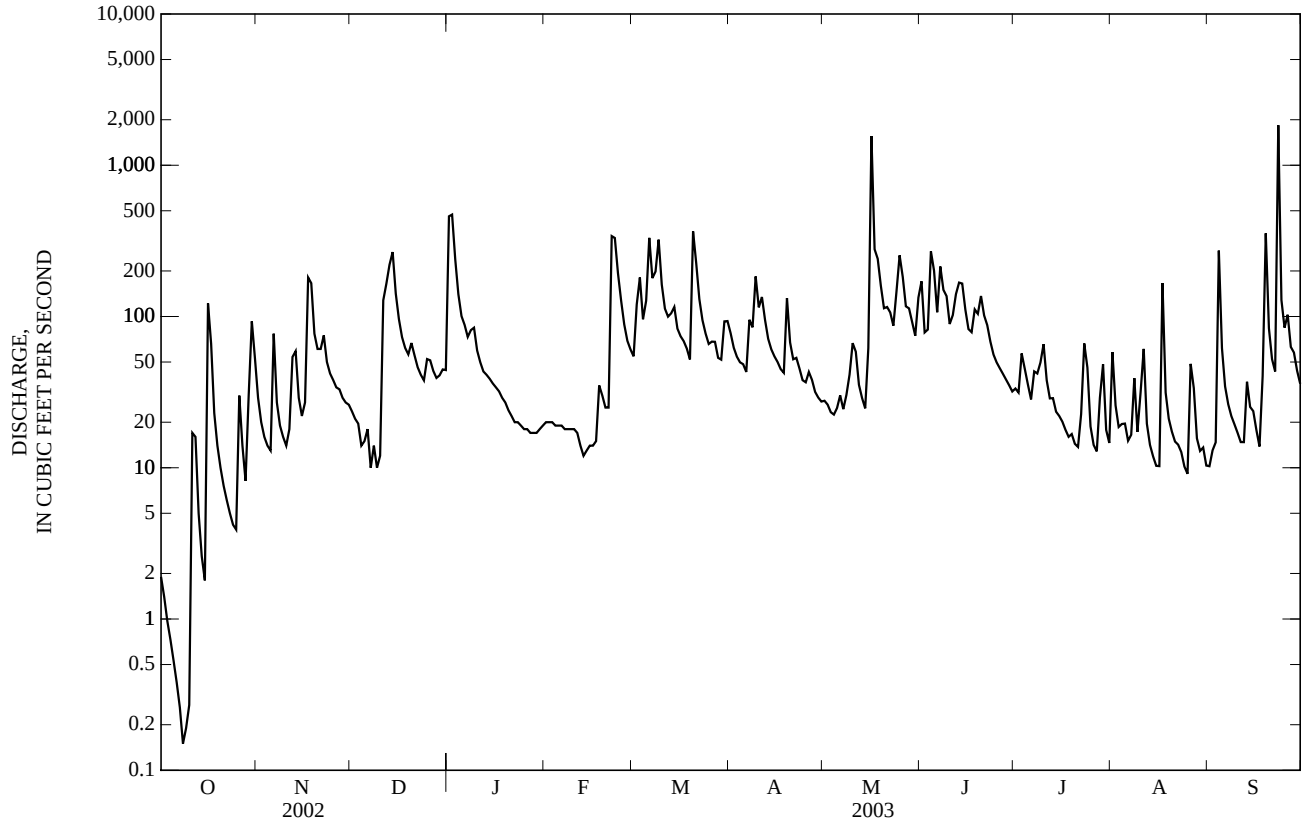
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2001 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 11.3 | 25.1 | 34.1 | 41.2 | 31.9 | 74.5 | 41.2 | 80.5 | 63.3 | 22.8 | 14.1 | 48.0 |
| MAX | 17.4 | 45.1 | 62.3 | 76.1 | 57.7 | 127 | 65.3 | 139 | 108 | 31.0 | 26.5 | 119 |
| (WY) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) |
| MIN | 5.22 | 5.13 | 5.88 | 6.35 | 6.10 | 22.3 | 17.1 | 22.3 | 18.0 | 6.88 | 2.05 | 7.83 |
| (WY) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) |

01638350 SOUTH FORK CATOCTIN CREEK AT ROUTE 698 NEAR WATERFORD, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 2001 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 7,137.35 | | 26,596.28 | | | |
| ANNUAL MEAN | 19.6 | | 72.9 | | 41.7 | |
| HIGHEST ANNUAL MEAN | | | | | 72.9 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 10.4 | 2002 |
| HIGHEST DAILY MEAN | 267 | Dec 14 | 1,840 | Sep 23 | 1,840 | Sep 23, 2003 |
| LOWEST DAILY MEAN | 0.07 | Sep 14 | 0.15 | Oct 8 | 0.07 | Sep 14, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.18 | Sep 14 | 0.36 | Oct 4 | 0.18 | Sep 14, 2002 |
| MAXIMUM PEAK FLOW | | | 5,700 | Sep 23 | 5,700 | Sep 23, 2003 |
| MAXIMUM PEAK STAGE | | | 12.10 | Sep 23 | 12.10 | Sep 23, 2003 |
| INSTANTANEOUS LOW FLOW | | | 0.04 | Oct 10 | 0.01 | Sep 20, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.62 | | 2.31 | | 1.32 | |
| ANNUAL RUNOFF (INCHES) | 8.40 | | 31.31 | | 17.91 | |
| 10 PERCENT EXCEEDS | 52 | | 154 | | 101 | |
| 50 PERCENT EXCEEDS | 8.4 | | 40 | | 15 | |
| 90 PERCENT EXCEEDS | 0.80 | | 13 | | 2.6 | |

e Estimated.



## 01638420 NORTH FORK CATOCTIN CREEK AT ROUTE 681 NEAR WATERFORD, VA

LOCATION.--Lat 39°12'18", long 77°37'26", NAD83, Loudoun County, Hydrologic Unit 02070008, on left bank 2 ft downstream from State Highway 681 and 2.2 mi northeast of Waterford.

DRAINAGE AREA.--23.1 $mi^2$.

PERIOD OF RECORD.--July 2001 to current year.

GAGE.--Water stage recorder. Elevation of gage is 330 ft NVGD of 1929, from topographic map.

REMARKS.--Records good except those for period of no gage-height record, Oct. 11-16, which is fair, and periods with ice effect, Dec. 4-10 and Jan. 16 to Feb. 21, which are poor.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.79 | 11 | 11 | 202 | e14 | 39 | 60 | 26 | 137 | 22 | 20 | 5.0 |
| 2 | 0.52 | 7.8 | 9.9 | 315 | e13 | 68 | 51 | 25 | 68 | 22 | 14 | 8.2 |
| 3 | 0.37 | 6.6 | 9.4 | 153 | e13 | 106 | 46 | 23 | 73 | 34 | 11 | 9.6 |
| 4 | 0.35 | 5.9 | e7.0 | 95 | e13 | 57 | 43 | 24 | 258 | 31 | 12 | 71 |
| 5 | 0.34 | 5.6 | e6.0 | 71 | e12 | 73 | 43 | 25 | 150 | 24 | 12 | 23 |
| 6 | 0.33 | 27 | e10 | 64 | e12 | 245 | 39 | 28 | 94 | 19 | 9.0 | 13 |
| 7 | 0.28 | 16 | e6.0 | 54 | e12 | 123 | 64 | 24 | 153 | 24 | 8.4 | 9.4 |
| 8 | 0.25 | 9.7 | e5.5 | 60 | e12 | 134 | 60 | 28 | 107 | 30 | 15 | 8.0 |
| 9 | 0.24 | 8.3 | e5.0 | 60 | e12 | 252 | 118 | 30 | 115 | 24 | 10 | 7.4 |
| 10 | 0.35 | 7.5 | e8.0 | 47 | e11 | 126 | 81 | 49 | 76 | 36 | 37 | 6.8 |
| 11 | e4.2 | 9.0 | 46 | 40 | e11 | 87 | 88 | 40 | 67 | 24 | 35 | 6.1 |
| 12 | e4.0 | 17 | 66 | 36 | e11 | 77 | 70 | 29 | 64 | 18 | 13 | 6.0 |
| 13 | e2.5 | 33 | 100 | 34 | e11 | 84 | 57 | 26 | 67 | 18 | 9.4 | 14 |
| 14 | e1.5 | 15 | 179 | 32 | e10 | 96 | 51 | 23 | 64 | 15 | 8.0 | 13 |
| 15 | e0.90 | 11 | 82 | 30 | e10 | 71 | 48 | 29 | 57 | 13 | 6.8 | 10 |
| 16 | e40 | 12 | 47 | e27 | e10 | 64 | 44 | 1,060 | 49 | 13 | 6.4 | 9.6 |
| 17 | 28 | 60 | 37 | e25 | e10 | 60 | 41 | 294 | 49 | 11 | 61 | 7.1 |
| 18 | 7.3 | 75 | 33 | e22 | e25 | 56 | 38 | 212 | 62 | 10 | 14 | 16 |
| 19 | 4.3 | 43 | 30 | e20 | e20 | 48 | 91 | 138 | 50 | 11 | 9.3 | 164 |
| 20 | 3.2 | 25 | 30 | e18 | e17 | 248 | 53 | 102 | 77 | 9.7 | 7.9 | 43 |
| 21 | 2.6 | 23 | 26 | e15 | e15 | 183 | 44 | 94 | 60 | 8.8 | 6.9 | 25 |
| 22 | 2.1 | 33 | 21 | e12 | 261 | 104 | 46 | 83 | 56 | 11 | 6.8 | 22 |
| 23 | 1.8 | 24 | 9.7 | e10 | 263 | 79 | 39 | 73 | 44 | 16 | 5.9 | 933 |
| 24 | 1.6 | 19 | 9.0 | e13 | 120 | 67 | 35 | 109 | 37 | 17 | 4.8 | 83 |
| 25 | 1.6 | 16 | 36 | e14 | 76 | 59 | 33 | 268 | 33 | 10 | 4.2 | 55 |
| 26 | 7.5 | 15 | 36 | e17 | 57 | 58 | 37 | 141 | 32 | 7.8 | 18 | 62 |
| 27 | 7.3 | 15 | 19 | e20 | 48 | 57 | 33 | 97 | 28 | 7.6 | 19 | 42 |
| 28 | 3.9 | 13 | 17 | e18 | 43 | 48 | 30 | 99 | 25 | 9.1 | 8.6 | 43 |
| 29 | 6.0 | 12 | 18 | e17 | --- | 49 | 27 | 80 | 24 | 14 | 6.6 | 33 |
| 30 | 30 | 12 | 19 | e16 | --- | 72 | 26 | 67 | 23 | 8.7 | 5.8 | 28 |
| 31 | 19 | --- | 19 | e15 | --- | 68 | --- | 125 | --- | 7.6 | 5.1 | --- |
| TOTAL | 183.12 | 587.4 | 957.5 | 1,572 | 1,142 | 2,958 | 1,536 | 3,471 | 2,199 | 526.3 | 410.9 | 1,776.2 |
| MEAN | 5.91 | 19.6 | 30.9 | 50.7 | 40.8 | 95.4 | 51.2 | 112 | 73.3 | 17.0 | 13.3 | 59.2 |
| MAX | 40 | 75 | 179 | 315 | 263 | 252 | 118 | 1,060 | 258 | 36 | 61 | 933 |
| MIN | 0.24 | 5.6 | 5.0 | 10 | 10 | 39 | 26 | 23 | 23 | 7.6 | 4.2 | 5.0 |
| CFSM | 0.26 | 0.85 | 1.34 | 2.20 | 1.77 | 4.13 | 2.22 | 4.85 | 3.17 | 0.73 | 0.57 | 2.56 |
| IN. | 0.29 | 0.95 | 1.54 | 2.53 | 1.84 | 4.76 | 2.47 | 5.59 | 3.54 | 0.85 | 0.66 | 2.86 |

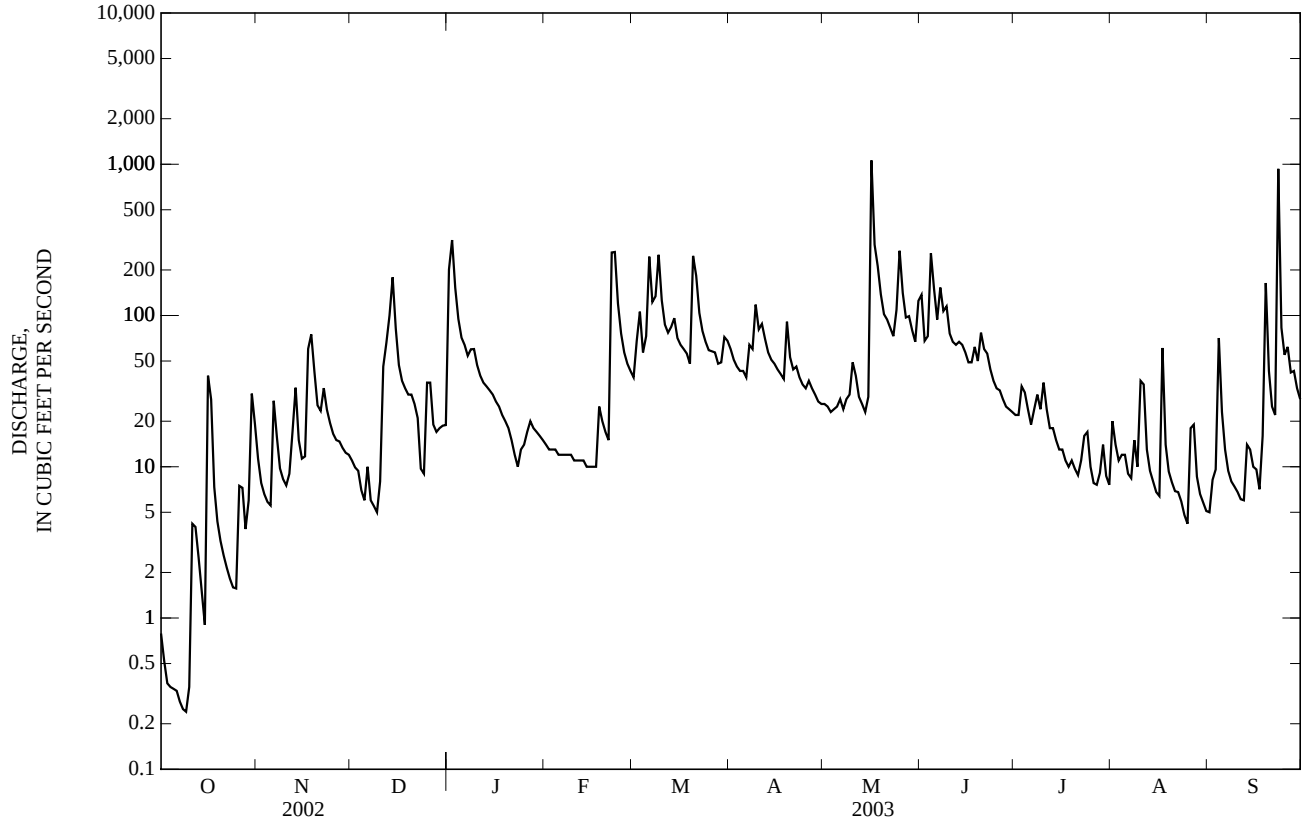
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2001 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 3.59 | 10.8 | 16.6 | 26.6 | 21.7 | 52.7 | 29.3 | 60.3 | 39.0 | 9.30 | 5.82 | 21.1 |
| MAX | 5.91 | 19.6 | 30.9 | 50.7 | 40.8 | 95.4 | 51.2 | 112 | 73.3 | 17.0 | 13.3 | 59.2 |
| (WY) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) |
| MIN | 1.27 | 1.96 | 2.22 | 2.56 | 2.59 | 10.1 | 7.41 | 8.65 | 4.79 | 1.63 | 0.038 | 1.01 |
| (WY) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) |

01638420 NORTH FORK CATOCTIN CREEK AT ROUTE 681 NEAR WATERFORD, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 2001 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 2,908.04 | | 17,319.42 | | | |
| ANNUAL MEAN | 7.97 | | 47.5 | | 25.6 | |
| HIGHEST ANNUAL MEAN | | | | | 47.5 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 3.69 | 2002 |
| HIGHEST DAILY MEAN | 179 | Dec 14 | 1,060 | May 16 | 1,060 | May 16, 2003 |
| LOWEST DAILY MEAN | 0.00 | aAug 9 | 0.24 | Oct 9 | 0.00 | aAug 9, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.00 | Aug 9 | 0.31 | Oct 4 | 0.00 | Aug 9, 2002 |
| MAXIMUM PEAK FLOW | | | 2,150 | Sep 23 | 2,150 | Sep 23, 2003 |
| MAXIMUM PEAK STAGE | | | 10.91 | Sep 23 | 10.91 | Sep 23, 2003 |
| INSTANTANEOUS LOW FLOW | | | 0.20 | bOct 7 | 0.00 | (c) |
| ANNUAL RUNOFF (CFSM) | 0.34 | | 2.05 | | 1.11 | |
| ANNUAL RUNOFF (INCHES) | 4.68 | | 27.89 | | 15.04 | |
| 10 PERCENT EXCEEDS | 19 | | 98 | | 64 | |
| 50 PERCENT EXCEEDS | 3.8 | | 25 | | 7.3 | |
| 90 PERCENT EXCEEDS | 0.00 | | 6.0 | | 0.75 | |

a Also Aug. 10-31 and Sept. 7-20, 2002.
b Also Oct, 8, 9, 2002.
c No flow part or all of many days in August and September 2002.
e Estimated.



## 01638480 CATOCTIN CREEK AT TAYLORSTOWN, VA

LOCATION.--Lat 39°15'16", long 77°34'35", NAD83, 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 $mi^2$.

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

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

REMARKS.--Records good except those for periods with ice effect, Dec. 6-8, Jan. 17-29, and Feb. 13-15, and periods of doubtful or no gage-height record, Jan. 30 to Feb. 12, Feb. 17-20, May 19, Aug. 18, 19, and Sept. 25-30, which are fair. Maximum discharge, 23,800 $ft^3/s$, from rating curve extended above 7,400 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 1 | 2245 | 3,730 | 10.06 | May 25 | 0515 | 1,640 | 7.01 |
| Feb 22 | 2000 | 1,900 | 7.45 | May 31 | 2100 | 1,730 | 7.16 |
| Mar 9 | 1800 | 1,470 | 6.72 | Jun 4 | 1000 | 1,320 | 6.45 |
| Mar 20 | 2030 | 2,620 | 8.58 | Sep 23 | 1030 | *9,800 | *15.59 |
| May 16 | 1030 | 7,660 | 13.88 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 9.4 | 88 | 50 | 757 | e46 | 147 | 206 | 97 | 670 | 81 | 92 | 39 |
| 2 | 7.4 | 66 | 46 | 1,250 | e45 | 231 | 171 | 93 | 328 | 74 | 64 | 46 |
| 3 | 5.8 | 55 | 44 | 560 | e44 | 451 | 153 | 85 | 303 | 109 | 49 | 50 |
| 4 | 5.2 | 48 | 39 | 411 | e52 | 250 | 143 | 78 | 977 | 124 | 49 | 376 |
| 5 | 4.7 | 44 | 35 | 281 | e63 | 274 | 138 | 81 | 824 | 88 | 55 | 183 |
| 6 | 4.3 | 170 | e47 | 241 | e52 | 822 | 134 | 99 | 587 | 88 | 43 | 103 |
| 7 | 3.8 | 103 | e43 | 201 | e46 | 485 | 198 | 97 | 775 | 97 | 39 | 78 |
| 8 | 3.6 | 68 | e41 | 210 | e41 | 474 | 230 | 111 | 561 | 131 | 64 | 66 |
| 9 | 3.2 | 59 | 40 | 243 | e38 | 879 | 433 | 122 | 527 | 89 | 45 | 59 |
| 10 | 4.1 | 52 | 39 | 172 | e45 | 509 | 388 | 182 | 372 | 145 | 72 | 53 |
| 11 | 13 | 54 | 177 | 145 | e42 | 331 | 391 | 200 | 301 | 106 | 121 | 49 |
| 12 | 50 | 87 | 393 | 127 | e38 | 294 | 329 | 133 | 367 | 82 | 61 | 45 |
| 13 | 27 | 195 | 468 | 118 | e35 | 287 | 255 | 112 | 308 | 80 | 45 | 74 |
| 14 | 17 | 100 | 998 | 112 | e32 | 365 | 219 | 100 | 417 | 67 | 39 | 71 |
| 15 | 11 | 77 | 548 | 105 | e48 | 263 | 196 | 113 | 294 | 57 | 35 | 60 |
| 16 | 88 | 73 | 277 | 91 | 40 | 227 | 178 | 5,030 | 228 | 51 | 32 | 55 |
| 17 | 169 | 348 | 205 | e88 | e38 | 205 | 160 | 1,200 | 205 | 46 | 327 | 47 |
| 18 | 69 | 462 | 169 | e80 | e65 | 190 | 152 | 723 | 269 | 42 | e110 | 72 |
| 19 | 45 | 256 | 152 | e70 | e55 | 165 | 331 | e440 | 243 | 43 | e62 | 661 |
| 20 | 36 | 176 | 162 | e65 | e50 | 841 | 251 | 358 | 292 | 41 | 53 | 302 |
| 21 | 29 | 149 | 149 | e60 | 85 | 822 | 194 | 316 | 281 | 38 | 48 | 196 |
| 22 | 24 | 182 | 125 | e56 | 779 | 401 | 190 | 310 | 232 | 41 | 44 | 153 |
| 23 | 21 | 122 | 98 | e52 | 975 | 282 | 167 | 252 | 192 | 108 | 45 | 5,400 |
| 24 | 19 | 95 | 88 | e50 | 493 | 230 | 145 | 385 | 156 | 86 | 36 | 570 |
| 25 | 18 | 80 | 119 | e47 | 330 | 195 | 136 | 872 | 133 | 53 | 33 | e285 |
| 26 | 59 | 71 | 149 | e54 | 237 | 179 | 144 | 514 | 115 | 42 | 85 | e220 |
| 27 | 57 | 67 | 111 | e60 | 186 | 189 | 136 | 394 | 104 | 39 | 132 | e170 |
| 28 | 36 | 61 | 99 | e57 | 163 | 153 | 119 | 396 | 92 | 38 | 64 | e190 |
| 29 | 38 | 56 | 98 | e54 | --- | 147 | 109 | 338 | 84 | 83 | 50 | e140 |
| 30 | 196 | 54 | 106 | e51 | --- | 209 | 102 | 272 | 78 | 46 | 46 | e120 |
| 31 | 145 | --- | 104 | e48 | --- | 249 | --- | 508 | --- | 39 | 41 | --- |
| TOTAL | 1,218.5 | 3,518 | 5,219 | 5,916 | 4,163 | 10,746 | 6,098 | 14,011 | 10,315 | 2,254 | 2,081 | 9,933 |
| MEAN | 39.3 | 117 | 168 | 191 | 149 | 347 | 203 | 452 | 344 | 72.7 | 67.1 | 331 |
| MAX | 196 | 462 | 998 | 1,250 | 975 | 879 | 433 | 5,030 | 977 | 145 | 327 | 5,400 |
| MIN | 3.2 | 44 | 35 | 47 | 32 | 147 | 102 | 78 | 78 | 38 | 32 | 39 |
| CFSM | 0.44 | 1.31 | 1.88 | 2.13 | 1.66 | 3.87 | 2.27 | 5.04 | 3.84 | 0.81 | 0.75 | 3.70 |
| IN. | 0.51 | 1.46 | 2.17 | 2.46 | 1.73 | 4.46 | 2.53 | 5.82 | 4.28 | 0.94 | 0.86 | 4.12 |

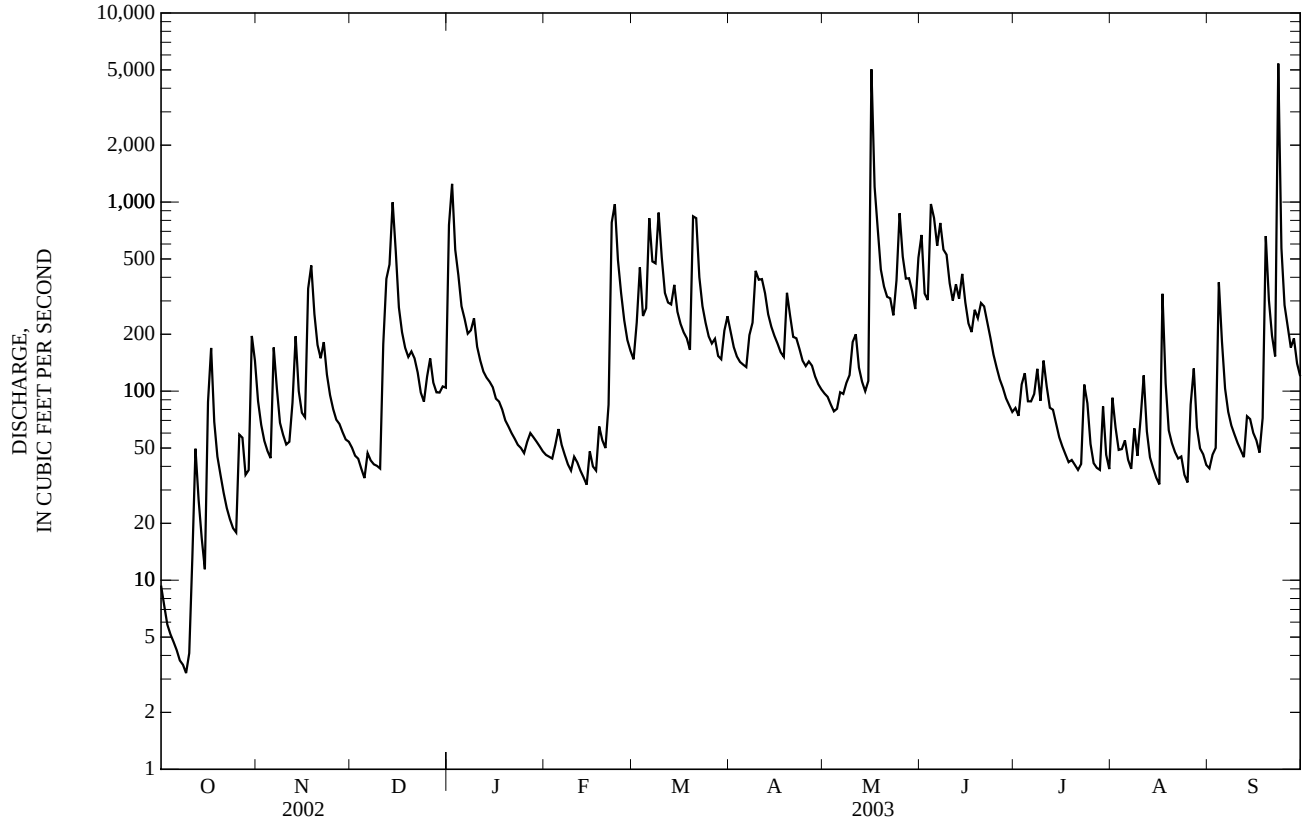
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1971 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 61.7 | 59.3 | 111 | 131 | 141 | 190 | 158 | 126 | 96.3 | 46.4 | 31.4 | 54.1 |
| MAX | 414 | 148 | 358 | 488 | 382 | 580 | 476 | 452 | 706 | 284 | 186 | 331 |
| (WY) | (1977) | (1997) | (1997) | (1998) | (1998) | (1993) | (1983) | (2003) | (1972) | (1987) | (1984) | (2003) |
| MIN | 2.07 | 5.16 | 3.88 | 10.2 | 12.8 | 43.7 | 37.7 | 26.6 | 6.82 | 1.35 | 1.25 | 1.05 |
| (WY) | (1987) | (1992) | (1999) | (1981) | (2002) | (1981) | (2002) | (1999) | (1999) | (1999) | (1999) | (1986) |

01638480 CATOCTIN CREEK AT TAYLORSTOWN, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1971 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 16,523.74 | | 75,472.5 | | | |
| ANNUAL MEAN | 45.3 | | 207 | | 99.9 | |
| HIGHEST ANNUAL MEAN | | | | | 207 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 20.9 | 2002 |
| HIGHEST DAILY MEAN | 998 | Dec 14 | 5,400 | Sep 23 | e9,530 | Jun 22, 1972 |
| LOWEST DAILY MEAN | 0.24 | aAug 23 | 3.2 | Oct 9 | 0.09 | bAug 14, 1999 |
| ANNUAL SEVEN-DAY MINIMUM | 0.29 | Aug 17 | 4.1 | Oct 4 | 0.10 | Aug 14, 1999 |
| MAXIMUM PEAK FLOW | | | 9,800 | Sep 23 | 23,800 | Jun 22, 1972 |
| MAXIMUM PEAK STAGE | | | 15.59 | Sep 23 | c23.83 | Jun 22, 1972 |
| INSTANTANEOUS LOW FLOW | | | 3.0 | Oct 9 | 0.08 | Aug 14, 1999 |
| ANNUAL RUNOFF (CFSM) | 0.51 | | 2.31 | | 1.12 | |
| ANNUAL RUNOFF (INCHES) | 6.86 | | 31.33 | | 15.15 | |
| 10 PERCENT EXCEEDS | 108 | | 423 | | 209 | |
| 50 PERCENT EXCEEDS | 19 | | 105 | | 47 | |
| 90 PERCENT EXCEEDS | 0.86 | | 39 | | 7.1 | |

a Also Sept. 19, 20, 2002.
b Also Aug. 19, 20, 1999.
c From floodmarks, site and datum then in use.
e Estimated.



## 01638500 POTOMAC RIVER AT POINT OF ROCKS, MD

LOCATION.--Lat 39°16'24.9", long 77°32'35.2", 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 $mi^2$.

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

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

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

REMARKS.--Records good except those for estimated daily discharges (missing record, partial plugged intake), 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. U.S. Geological Survey satellite collection platform 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 $ft^3/s$ from rating curve extended as explained in footnotes.

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

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Dec 15 | 1815 | 44,300 | 10.01 | May 17 | 1230 | 56,300 | 11.79 |
| Jan 3 | 0615 | 88,800 | 16.11 | May 20 | 0900 | 37,800 | 8.98 |
| Feb 24 | 1430 | 90,100 | 16.26 | Jun 5 | 0615 | 62,900 | 12.72 |
| Mar 7 | 1800 | 78,000 | 14.74 | Jun 8 | 1745 | 54,200 | 11.49 |
| Mar 10 | 1830 | 66,300 | 13.18 | Jun 14 | 1345 | 40,400 | 9.39 |
| Mar 15 | 1345 | 42,400 | 9.71 | Jun 22 | 1200 | 58,300 | 12.08 |
| Mar 22 | 0300 | 94,800 | 16.85 | Sep 21 | 0030 | *150,000 | *23.12 |
| Apr 12 | 1930 | 68,600 | 13.49 | Sep 24 | 1215 | 79,100 | 14.88 |
| May 12 | 0745 | 68,600 | 13.50 | | | | |

Minimum discharge, 1,480 $ft^3/s$, Oct. 10.

DISCHARGE, CUBIC FEET PER SECOND , WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4,980 | 20,700 | 4,840 | 11,200 | 4,810 | 21,200 | 17,100 | 10,000 | 18,000 | 9,670 | 5,540 | 3,930 |
| 2 | 4,580 | 15,300 | 4,430 | 36,400 | 4,740 | 19,000 | 17,400 | 10,500 | 21,100 | 9,020 | 4,930 | 4,130 |
| 3 | 4,070 | 10,400 | 4,100 | 80,500 | 4,630 | 21,100 | 17,500 | 12,100 | 19,300 | 8,590 | 4,810 | 6,830 |
| 4 | 3,240 | 7,670 | 3,760 | 53,600 | 5,000 | 27,300 | 17,800 | 11,200 | 37,500 | 10,100 | 4,630 | 12,300 |
| 5 | 2,650 | 5,970 | 3,440 | 40,800 | 4,960 | 26,700 | 17,100 | 10,300 | 58,000 | 12,700 | 4,840 | 19,300 |
| 6 | 2,200 | 5,420 | 3,310 | 31,800 | 5,030 | 30,300 | 16,500 | 11,300 | 42,100 | 10,900 | 5,260 | 16,800 |
| 7 | 2,040 | 6,110 | 3,100 | 26,100 | 4,990 | 67,800 | 16,900 | 16,800 | 34,600 | 10,600 | 6,090 | 13,500 |
| 8 | 1,850 | 9,160 | 2,670 | 22,100 | 4,880 | 63,700 | 20,100 | 17,500 | 48,500 | 9,670 | 6,060 | 9,780 |
| 9 | 1,620 | 9,320 | 2,680 | 19,500 | 4,830 | 51,300 | 36,400 | 18,600 | 46,800 | 9,320 | 6,080 | 8,020 |
| 10 | 1,540 | 7,670 | 2,940 | 18,500 | 4,590 | 60,800 | 46,200 | 25,000 | 41,400 | 10,500 | 5,660 | 7,180 |
| 11 | 1,690 | 7,010 | 3,330 | 17,000 | 4,560 | 54,600 | 54,500 | 46,500 | 34,800 | 15,300 | 5,820 | 6,100 |
| 12 | 1,860 | 6,570 | 5,600 | 14,900 | 4,320 | 38,500 | 62,700 | 66,300 | 27,000 | 14,500 | 8,640 | 5,010 |
| 13 | 2,790 | 7,980 | 12,300 | 14,100 | 3,980 | 31,400 | 57,000 | 46,900 | 24,100 | 13,300 | 13,000 | 4,990 |
| 14 | 3,900 | e9,610 | 25,400 | 13,900 | 3,660 | 33,800 | 41,200 | 30,200 | 37,100 | 11,100 | 11,800 | 5,080 |
| 15 | 3,430 | e17,300 | 41,800 | 12,400 | 3,720 | 41,700 | 32,100 | 23,800 | 36,300 | 9,680 | 10,100 | 5,190 |
| 16 | 3,660 | e18,000 | 40,000 | 11,100 | 3,880 | 37,400 | 27,000 | 35,700 | 30,400 | 8,350 | 8,530 | 5,710 |
| 17 | 5,220 | e18,700 | 30,400 | 10,000 | 2,500 | 32,800 | 23,000 | 52,400 | 26,500 | 8,410 | 8,580 | 6,310 |
| 18 | 10,900 | e21,400 | 24,000 | 9,830 | 2,040 | 31,000 | 19,400 | 40,700 | 24,300 | 7,320 | 8,040 | 6,170 |
| 19 | 12,000 | e23,900 | 19,700 | 8,600 | 2,570 | 29,000 | 17,700 | 34,300 | 29,500 | 6,570 | 7,050 | e13,600 |
| 20 | 10,000 | 21,600 | 16,700 | 8,040 | 4,230 | 27,900 | 16,600 | 37,200 | 32,100 | 6,020 | 6,460 | e79,300 |
| 21 | 7,540 | 16,500 | 16,500 | 7,750 | 6,120 | 59,900 | 16,400 | 32,900 | 39,400 | 5,580 | 5,760 | 112,000 |
| 22 | 6,120 | 14,200 | 23,300 | 8,060 | 9,310 | 83,200 | 15,500 | 26,900 | 56,000 | 5,250 | 4,930 | e47,500 |
| 23 | 4,820 | 13,900 | 27,500 | 7,490 | 24,400 | 53,200 | 16,100 | 23,600 | 42,700 | 5,460 | 4,570 | 55,000 |
| 24 | 4,160 | 12,500 | 21,900 | 5,850 | 79,300 | 38,500 | 16,100 | 21,600 | 29,400 | 5,460 | 4,180 | 72,600 |
| 25 | 3,600 | 11,000 | 18,600 | 5,600 | 68,900 | 30,200 | 15,000 | 23,100 | 22,700 | 5,120 | 3,780 | 44,900 |
| 26 | 3,520 | 9,310 | 16,300 | 5,890 | 43,800 | 24,900 | 15,000 | 20,700 | 18,400 | 5,120 | 3,960 | 29,600 |
| 27 | 3,500 | 7,950 | 14,500 | 5,930 | 32,300 | 21,900 | 12,800 | 19,000 | 15,400 | 4,800 | 4,180 | 22,600 |
| 28 | 4,660 | 6,760 | 12,800 | 5,470 | 25,600 | 19,600 | 12,200 | 19,300 | 13,400 | 4,290 | 3,990 | 19,800 |
| 29 | 4,450 | 6,190 | 11,100 | 5,030 | --- | 17,200 | 11,300 | 19,100 | 11,700 | 4,460 | 4,140 | 27,900 |
| 30 | 4,390 | 5,440 | 10,100 | 5,000 | --- | 15,800 | 10,800 | 18,400 | 10,500 | 4,580 | 4,020 | 22,600 |
| 31 | 10,200 | --- | 9,630 | 4,870 | --- | 16,200 | --- | 17,400 | --- | 4,430 | 3,910 | --- |
| TOTAL | 141,180 | 353,540 | 436,730 | 527,310 | 373,650 | 1,127,900 | 715,400 | 799,300 | 929,000 | 256,170 | 189,340 | 693,730 |
| MEAN | 4,554 | 11,780 | 14,090 | 17,010 | 13,340 | 36,380 | 23,850 | 25,780 | 30,970 | 8,264 | 6,108 | 23,120 |
| MAX | 12,000 | 23,900 | 41,800 | 80,500 | 79,300 | 83,200 | 62,700 | 66,300 | 58,000 | 15,300 | 13,000 | 112,000 |
| MIN | 1,540 | 5,420 | 2,670 | 4,870 | 2,040 | 15,800 | 10,800 | 10,000 | 10,500 | 4,290 | 3,780 | 3,930 |
| CFSM | 0.47 | 1.22 | 1.46 | 1.76 | 1.38 | 3.77 | 2.47 | 2.67 | 3.21 | 0.86 | 0.63 | 2.40 |
| IN. | 0.54 | 1.36 | 1.68 | 2.03 | 1.44 | 4.35 | 2.76 | 3.08 | 3.58 | 0.99 | 0.73 | 2.67 |

e Estimated

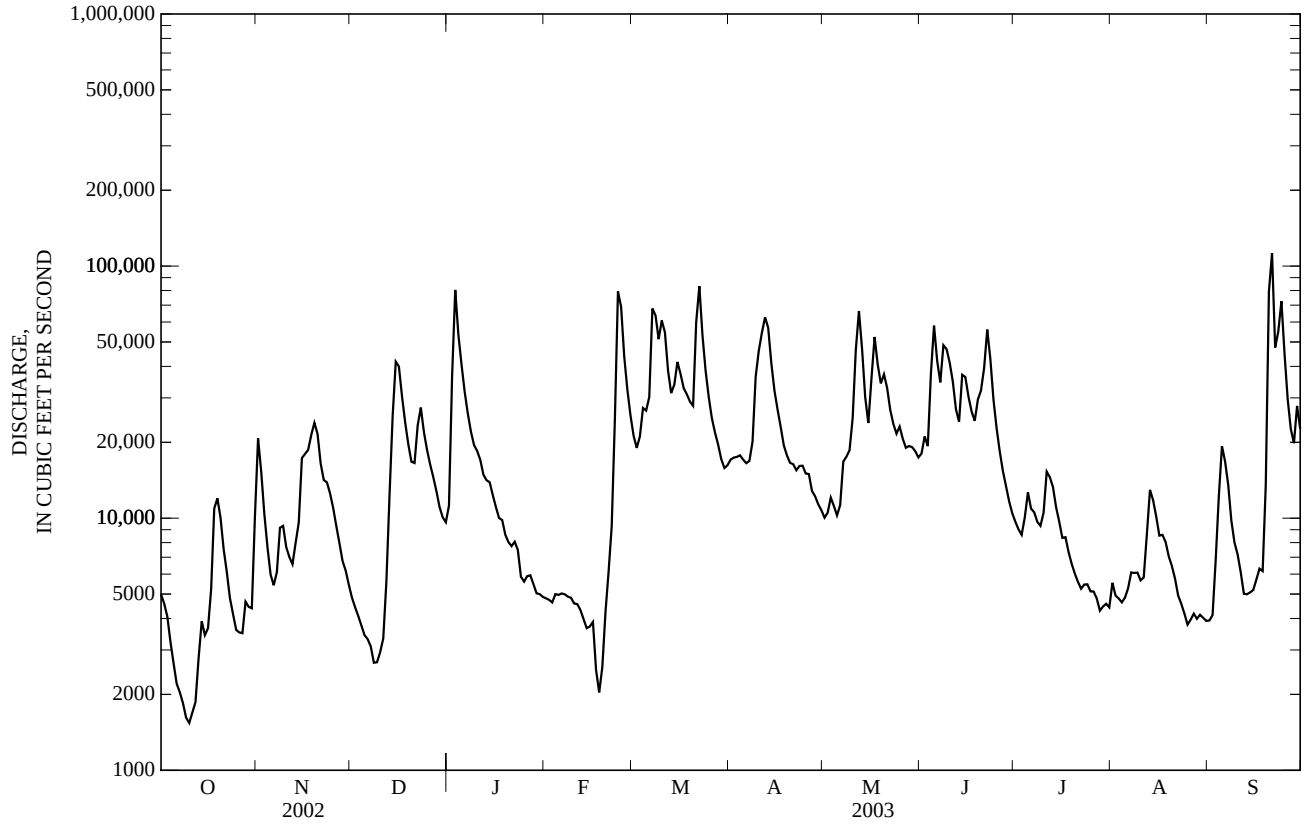
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1895 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 4,988 | 5,649 | 8,529 | 11,420 | 14,310 | 19,770 | 16,480 | 12,360 | 8,136 | 4,505 | 4,279 | 3,942 |
| MAX | 37,030 | 39,000 | 32,610 | 42,160 | 47,870 | 68,360 | 43,840 | 41,970 | 40,400 | 16,000 | 23,580 | 38,300 |
| (WY) | (1943) | (1986) | (1973) | (1996) | (1998) | (1936) | (1993) | (1924) | (1972) | (1949) | (1955) | (1996) |
| MIN | 706 | 840 | 1,253 | 1,703 | 1,982 | 5,400 | 4,368 | 3,276 | 1,932 | 1,056 | 771 | 834 |
| (WY) | (1931) | (1931) | (1966) | (1981) | (2002) | (1931) | (1915) | (1930) | (1969) | (1966) | (1930) | (1930) |

01638500 POTOMAC RIVER AT POINT OF ROCKS, MD—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1895 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 2,258,972 | | 6,543,250 | | | |
| ANNUAL MEAN | 6,189 | | 17,930 | | 9,516 | |
| HIGHEST ANNUAL MEAN | | | | | 18,750 | 1996 |
| LOWEST ANNUAL MEAN | | | | | 4,015 | 2002 |
| HIGHEST DAILY MEAN | 44,300 | Apr 24 | 112,000 | Sep 21 | 434,000 | Mar 19, 1936 |
| LOWEST DAILY MEAN | 771 | Aug 16 | 1,540 | Oct 10 | 540 | Sep 10, 1914 |
| ANNUAL SEVEN-DAY MINIMUM | 942 | Sep 8 | 1,830 | Oct 6 | 593 | Sep 6, 1966 |
| MAXIMUM PEAK FLOW | | | 150,000 | Sep 21 | (a)480,000 | Mar 19, 1936 |
| MAXIMUM PEAK STAGE | | | 23.12 | Sep 21 | 41.03 | Mar 19, 1936 |
| INSTANTANEOUS LOW FLOW | | | 1,480 | Oct 10 | 530 | (b) |
| ANNUAL RUNOFF (CFSM) | 0.64 | | 1.86 | | 0.99 | |
| ANNUAL RUNOFF (INCHES) | 8.71 | | 25.22 | | 13.40 | |
| 10 PERCENT EXCEEDS | 16,300 | | 41,300 | | 20,900 | |
| 50 PERCENT EXCEEDS | 2,860 | | 12,000 | | 5,380 | |
| 90 PERCENT EXCEEDS | 1,230 | | 4,010 | | 1,680 | |

a From rating curve extended above 300,000 $ft^3/s$, 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.




DAILY MEAN DISCHARGE - 2003 WATER YEAR

## 01643590 LIMESTONE BRANCH NEAR LEESBURG, VA

LOCATION.--Lat 39°10'03", long 77°32'09", NAD83, Loudoun County, Hydrologic Unit Code 02070008, on left bank, 70 ft downstream from U.S. Highway 15 and 4 mi north of Leesburg.

DRAINAGE AREA.--7.83 $mi^2$.

PERIOD OF RECORD.--August 2001 to current year.

GAGE.--Water stage recorder. Datum of gage is 235 ft NGVD of 1929, from topographic map.

REMARKS.--No estimated daily discharges. Records good except for period May 16 to July 17, which is poor.

REVISIONS.--The maximum discharges for the water years 2001 and 2002 have been revised to 3,040 $ft^3/s$, Sept. 24, 2001, gage height, 7.62 ft, and 96 $ft^3/s$, May 26, 2002, gage height, 1.74 ft, superseding figures published in the report for 2002.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.6 | 8.2 | 4.1 | 376 | 7.2 | 11 | 15 | 8.3 | 25 | 6.6 | 7.8 | 5.3 |
| 2 | 1.4 | 6.3 | 3.6 | 64 | 6.6 | 30 | 13 | 8.0 | 18 | 6.3 | 5.1 | 6.9 |
| 3 | 1.2 | 5.6 | 3.6 | 55 | 5.7 | 26 | 11 | 7.3 | 21 | 14 | 4.6 | 6.2 |
| 4 | 1.6 | 5.4 | 3.5 | 27 | 7.2 | 17 | 11 | 6.9 | 45 | 8.0 | 4.7 | 129 |
| 5 | 1.2 | 5.2 | 4.3 | 19 | 5.6 | 25 | 11 | 8.0 | 39 | 5.9 | 5.3 | 16 |
| 6 | 0.90 | 14 | 4.2 | 16 | 5.0 | 100 | 9.1 | 8.6 | 27 | 5.3 | 4.2 | 9.8 |
| 7 | 0.91 | 6.5 | 3.7 | 13 | 5.6 | 39 | 16 | 8.1 | 79 | 8.8 | 4.0 | 8.5 |
| 8 | 0.98 | 5.9 | 3.6 | 13 | 4.8 | 35 | 16 | 10 | 41 | 7.3 | 3.7 | 7.5 |
| 9 | 1.1 | 5.7 | 3.4 | 13 | 4.5 | 44 | 33 | 12 | 32 | 5.8 | 3.5 | 6.6 |
| 10 | 1.6 | 5.7 | 3.3 | 10 | 4.8 | 24 | 26 | 14 | 22 | 5.3 | 3.4 | 5.9 |
| 11 | 9.0 | 7.3 | 18 | 8.8 | 4.7 | 18 | 27 | 12 | 42 | 4.4 | 5.5 | 5.2 |
| 12 | 6.3 | 12 | 20 | 8.0 | 4.4 | 15 | 20 | 9.4 | 48 | 5.9 | 3.8 | 5.0 |
| 13 | 4.5 | 9.7 | 41 | 7.8 | 3.9 | 16 | 16 | 9.6 | 195 | 3.9 | 3.4 | 9.2 |
| 14 | 3.4 | 7.3 | 39 | 7.4 | 3.9 | 15 | 14 | 8.1 | 56 | 4.0 | 2.9 | 6.1 |
| 15 | 3.3 | 6.3 | 17 | 6.5 | 4.8 | 11 | 13 | 43 | 30 | 4.0 | 3.0 | 5.8 |
| 16 | 26 | 10 | 11 | 6.1 | 4.6 | 10 | 12 | 424 | 17 | 3.2 | 3.0 | 5.3 |
| 17 | 13 | 32 | 8.6 | 6.0 | 5.4 | 9.8 | 11 | 54 | 16 | 3.5 | 102 | 5.3 |
| 18 | 8.1 | 22 | 7.5 | 5.3 | 6.0 | 8.8 | 10 | 49 | 22 | 3.7 | 12 | 12 |
| 19 | 6.3 | 12 | 7.1 | 5.1 | 5.3 | 7.6 | 15 | 33 | 31 | 4.0 | 8.5 | 30 |
| 20 | 5.7 | 9.7 | 7.8 | 5.2 | 5.3 | 123 | 12 | 23 | 24 | 3.8 | 7.2 | 11 |
| 21 | 4.9 | 9.5 | 6.5 | 5.1 | 6.3 | 49 | 11 | 25 | 21 | 3.0 | 6.4 | 8.3 |
| 22 | 4.4 | 9.3 | 5.8 | 4.7 | 148 | 26 | 11 | 21 | 17 | 4.1 | 5.6 | 8.6 |
| 23 | 4.2 | 6.9 | 5.2 | 4.4 | 76 | 19 | 9.5 | 21 | 13 | 21 | 6.2 | 976 |
| 24 | 3.7 | 6.4 | 5.1 | 4.3 | 35 | 16 | 8.2 | 26 | 12 | 13 | 5.5 | 32 |
| 25 | 3.9 | 6.1 | 7.8 | 4.3 | 22 | 13 | 8.7 | 74 | 9.7 | 5.2 | 4.9 | 23 |
| 26 | 8.6 | 5.6 | 6.8 | 4.4 | 18 | 14 | 11 | 48 | 7.3 | 4.3 | 28 | 22 |
| 27 | 5.1 | 5.3 | 6.3 | 4.2 | 14 | 13 | 9.8 | 27 | 6.3 | 3.4 | 10 | 16 |
| 28 | 4.4 | 5.0 | 6.0 | 4.1 | 12 | 11 | 8.8 | 24 | 6.2 | 8.9 | 6.7 | 15 |
| 29 | 10 | 4.8 | 5.9 | 4.5 | --- | 11 | 8.4 | 20 | 5.6 | 8.2 | 5.9 | 12 |
| 30 | 15 | 4.7 | 5.9 | 4.5 | --- | 18 | 7.9 | 18 | 5.6 | 4.9 | 5.6 | 11 |
| 31 | 11 | --- | 6.0 | 5.0 | --- | 17 | --- | 24 | --- | 4.5 | 4.8 | --- |
| TOTAL | 173.29 | 260.4 | 281.6 | 721.7 | 436.6 | 792.2 | 405.4 | 1,084.3 | 933.7 | 194.2 | 287.2 | 1,420.5 |
| MEAN | 5.59 | 8.68 | 9.08 | 23.3 | 15.6 | 25.6 | 13.5 | 35.0 | 31.1 | 6.26 | 9.26 | 47.4 |
| MAX | 26 | 32 | 41 | 376 | 148 | 123 | 33 | 424 | 195 | 21 | 102 | 976 |
| MIN | 0.90 | 4.7 | 3.3 | 4.1 | 3.9 | 7.6 | 7.9 | 6.9 | 5.6 | 3.0 | 2.9 | 5.0 |
| CFSM | 0.71 | 1.10 | 1.16 | 2.96 | 1.98 | 3.25 | 1.72 | 4.45 | 3.96 | 0.80 | 1.18 | 6.02 |
| IN. | 0.82 | 1.23 | 1.33 | 3.42 | 2.07 | 3.75 | 1.92 | 5.13 | 4.42 | 0.92 | 1.36 | 6.72 |

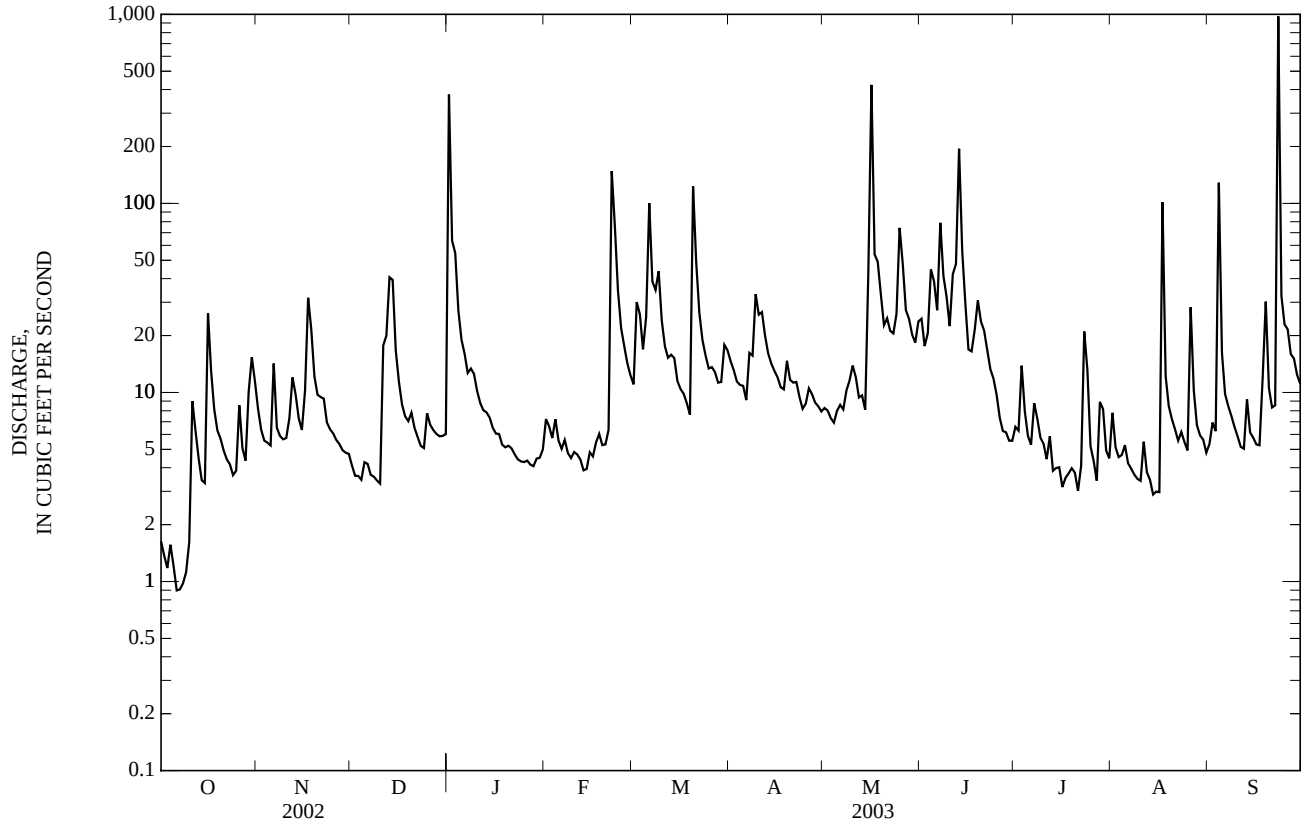
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2001 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 3.92 | 5.52 | 5.52 | 12.6 | 8.64 | 15.4 | 8.59 | 19.5 | 16.5 | 3.79 | 5.06 | 22.5 |
| MAX | 5.59 | 8.68 | 9.08 | 23.3 | 15.6 | 25.6 | 13.5 | 35.0 | 31.1 | 6.26 | 9.26 | 47.4 |
| (WY) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) |
| MIN | 2.26 | 2.35 | 1.96 | 1.88 | 1.68 | 5.19 | 3.66 | 4.01 | 1.97 | 1.31 | 0.85 | 2.54 |
| (WY) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) |

01643590 LIMESTONE BRANCH NEAR LEESBURG, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 2001 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 1,418.21 | | 6,991.09 | | | |
| ANNUAL MEAN | 3.89 | | 19.2 | | 10.8 | |
| HIGHEST ANNUAL MEAN | | | | | 19.2 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 2.48 | 2002 |
| HIGHEST DAILY MEAN | 41 | Dec 13 | 976 | Sep 23 | 976 | Sep 23, 2003 |
| LOWEST DAILY MEAN | 0.68 | Aug 21 | 0.90 | Oct 6 | 0.68 | Aug 21, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.72 | Aug 17 | 1.1 | Oct 3 | 0.72 | Aug 17, 2002 |
| MAXIMUM PEAK FLOW | | | 8,950 | Sep 23 | 8,950 | Sep 23, 2003 |
| MAXIMUM PEAK STAGE | | | a11.19 | Sep 23 | a11.19 | Sep 23, 2003 |
| INSTANTANEOUS LOW FLOW | | | 0.79 | Oct 6 | 0.60 | bAug 13, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.49 | | 2.44 | | 1.38 | |
| ANNUAL RUNOFF (INCHES) | 6.71 | | 33.09 | | 18.70 | |
| 10 PERCENT EXCEEDS | 8.8 | | 31 | | 20 | |
| 50 PERCENT EXCEEDS | 2.0 | | 8.1 | | 4.0 | |
| 90 PERCENT EXCEEDS | 0.86 | | 3.9 | | 1.0 | |

a From floodmarks.
b Also Aug. 14, 19-22, 2002.



## 01643700 GOOSE CREEK NEAR MIDDLEBURG, VA

LOCATION.--Lat 38°59'11", long 77°47'48", NAD83, Loudoun County, Hydrologic Unit 02070008, on right bank 250 ft upstream from bridge on State Highway 611, 2.0 mi downstream from Panther Skin Creek, and 3.4 mi northwest of Middleburg.

DRAINAGE AREA.--123 $mi^2$.

PERIOD OF RECORD.--October 1965 to September 1967, July 1969 to September 1996, June 2001 to current year.

REVISED RECORDS.--WSP 2103: Drainage area.

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

REMARKS.--Records good except those for period of partial gage-height record, Dec. 9, 10, 17, 18, Mar. 30, and period with ice effect, Jan. 17-29, which are fair, and for periods of no gage-height record, Sept. 19, 23-25, which are poor. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,350 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 2045 | 1,670 | 7.50 | Jun 19 | 0530 | 3,460 | 11.31 |
| Mar 20 | 2030 | 2,580 | 9.54 | Jun 20 | 1645 | 1,490 | 7.08 |
| May 16 | 0545 | 2,390 | 9.15 | Aug 4 | 2315 | 2,100 | 8.50 |
| Jun 11 | 2400 | 1,550 | 7.21 | Sep 4 | 0045 | 3,540 | 11.47 |
| Jun 12 | 2230 | 2,390 | 9.15 | Sep 19 | --- | unknown | unknown |
| Jun 13 | 2300 | 2,300 | 8.95 | Sep 23 | --- | *23,000 | *24.36 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.1 | 102 | 67 | 429 | e75 | 261 | 385 | 143 | 247 | 164 | 104 | 100 |
| 2 | 4.3 | 79 | 60 | 745 | e72 | 391 | 357 | 132 | 216 | 158 | 101 | 116 |
| 3 | 3.0 | 65 | 58 | 637 | e70 | 546 | 325 | 123 | 221 | 465 | 88 | 293 |
| 4 | 2.0 | 57 | 51 | 471 | e69 | 384 | 293 | 117 | 485 | 238 | 324 | 1,460 |
| 5 | 1.5 | 52 | 55 | 349 | e80 | 428 | 275 | 122 | 437 | 167 | 611 | 405 |
| 6 | 1.9 | 127 | 68 | 296 | e72 | 757 | 242 | 130 | 311 | 144 | 197 | 249 |
| 7 | 1.9 | 88 | 63 | 242 | e65 | 664 | 362 | 128 | 416 | 138 | 154 | 195 |
| 8 | 1.9 | 70 | 58 | 233 | e60 | 642 | 336 | 158 | 398 | 130 | 145 | 165 |
| 9 | 1.7 | 63 | e52 | 231 | e58 | 865 | 529 | 165 | 394 | 294 | 123 | 149 |
| 10 | 2.2 | 57 | e54 | 184 | e57 | 687 | 500 | 275 | 295 | 327 | 167 | 129 |
| 11 | 16 | 68 | 164 | 159 | e56 | 560 | 617 | 295 | 371 | 196 | 311 | 115 |
| 12 | 68 | 116 | 252 | 139 | e55 | 474 | 493 | 223 | 979 | 151 | 141 | 113 |
| 13 | 30 | 166 | 336 | 132 | e55 | 444 | 393 | 189 | 1,380 | 127 | 147 | 306 |
| 14 | 19 | 112 | 641 | 126 | e55 | 555 | 334 | 165 | 1,160 | 117 | 119 | 211 |
| 15 | 15 | 93 | 452 | 117 | e56 | 444 | 295 | 162 | 702 | 112 | 101 | 182 |
| 16 | 106 | 96 | 310 | 109 | e58 | 385 | 268 | 1,910 | 544 | 103 | 91 | 168 |
| 17 | 137 | 407 | e230 | e100 | e60 | 354 | 241 | 967 | 515 | 92 | 140 | 136 |
| 18 | 66 | 453 | e190 | e98 | e62 | 316 | 227 | 880 | 596 | 86 | 102 | 229 |
| 19 | 44 | 236 | 165 | e96 | e75 | 271 | 316 | 681 | 2,090 | 88 | 86 | e2,200 |
| 20 | 35 | 178 | 197 | e94 | e70 | 1,050 | 239 | 536 | 1,130 | 79 | 79 | 761 |
| 21 | 29 | 158 | 167 | e96 | e60 | 1,020 | 216 | 491 | 808 | 75 | 72 | 505 |
| 22 | 24 | 164 | 141 | e92 | 750 | 750 | 221 | 434 | 689 | 74 | 70 | 375 |
| 23 | 21 | 120 | 127 | e90 | 1,010 | 562 | 193 | 373 | 497 | 155 | 77 | e14,000 |
| 24 | 19 | 106 | 117 | e88 | 676 | 451 | 173 | 437 | 375 | 178 | 60 | e1,500 |
| 25 | 18 | 97 | 158 | e86 | 520 | 374 | 168 | 524 | 302 | 90 | 54 | e700 |
| 26 | 54 | 89 | 147 | e84 | 390 | 342 | 193 | 504 | 258 | 76 | 52 | 543 |
| 27 | 50 | 86 | 125 | e80 | 322 | 328 | 170 | 404 | 227 | 70 | 88 | 440 |
| 28 | 36 | 76 | 115 | e80 | 288 | 271 | 151 | 384 | 201 | 79 | 231 | 397 |
| 29 | 48 | 73 | 114 | e82 | --- | 274 | 143 | 334 | 185 | 136 | 301 | 310 |
| 30 | 211 | 71 | 111 | e80 | --- | e380 | 137 | 297 | 168 | 81 | 291 | 262 |
| 31 | 158 | --- | 109 | e77 | --- | 401 | --- | 267 | --- | 70 | 116 | --- |
| TOTAL | 1,230.5 | 3,725 | 4,954 | 5,922 | 5,296 | 15,631 | 8,792 | 11,950 | 16,597 | 4,460 | 4,743 | 26,714 |
| MEAN | 39.7 | 124 | 160 | 191 | 189 | 504 | 293 | 385 | 553 | 144 | 153 | 890 |
| MAX | 211 | 453 | 641 | 745 | 1,010 | 1,050 | 617 | 1,910 | 2,090 | 465 | 611 | 14,000 |
| MIN | 1.5 | 52 | 51 | 77 | 55 | 261 | 137 | 117 | 168 | 70 | 52 | 100 |
| CFSM | 0.32 | 1.01 | 1.30 | 1.55 | 1.54 | 4.10 | 2.38 | 3.13 | 4.50 | 1.17 | 1.24 | 7.24 |
| IN. | 0.37 | 1.13 | 1.50 | 1.79 | 1.60 | 4.73 | 2.66 | 3.61 | 5.02 | 1.35 | 1.43 | 8.08 |

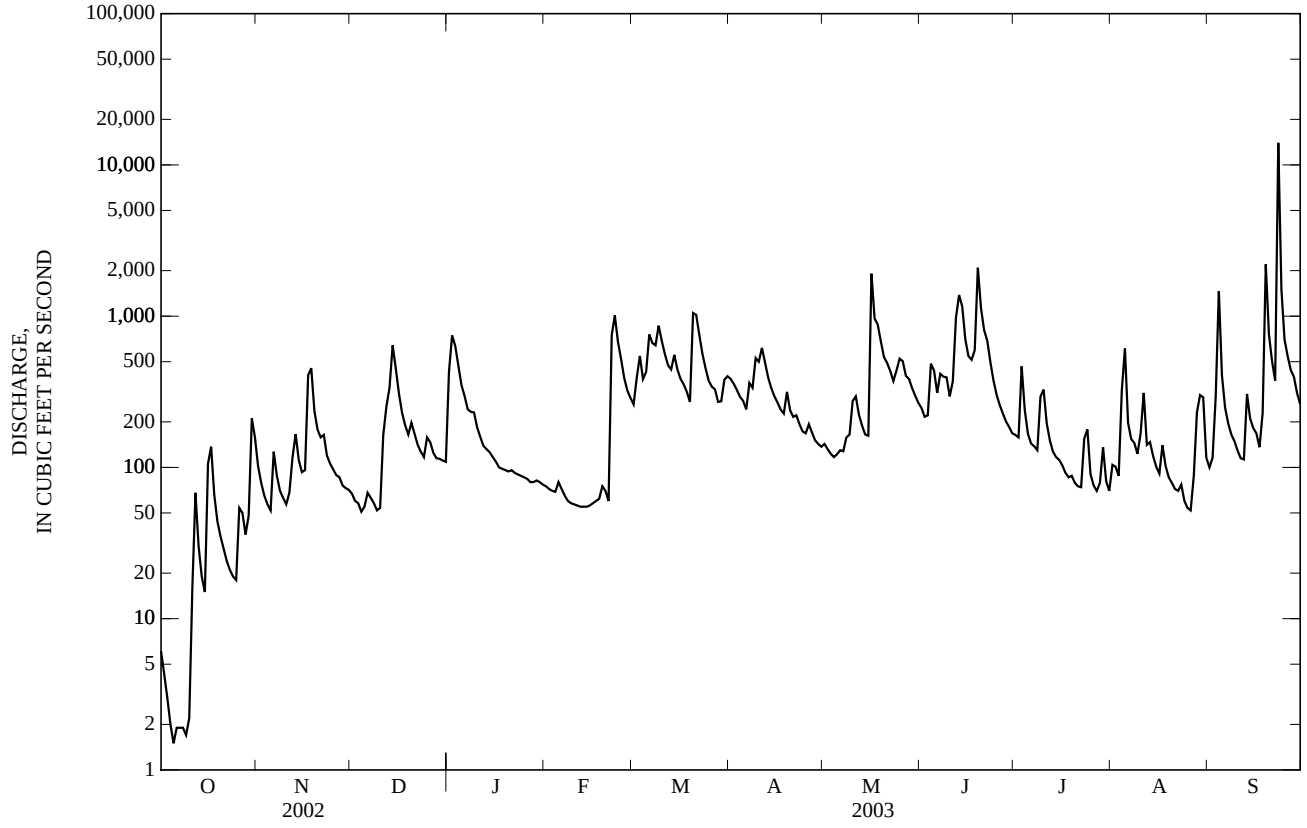
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 1967, 1969 - 1996, 2001 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 82.3 | 90.1 | 144 | 165 | 198 | 243 | 221 | 167 | 131 | 56.4 | 52.1 | 79.3 |
| MAX | 602 | 233 | 455 | 520 | 609 | 722 | 688 | 463 | 645 | 217 | 206 | 890 |
| (WY) | (1980) | (1978) | (1997) | (1996) | (1984) | (1993) | (1983) | (1989) | (1972) | (1972) | (1967) | (2003) |
| MIN | 0.004 | 3.41 | 4.17 | 7.65 | 10.4 | 33.3 | 43.5 | 26.1 | 15.2 | 2.81 | 0.41 | 0.000 |
| (WY) | (1992) | (1992) | (1966) | (1966) | (2002) | (2002) | (1981) | (1985) | (1986) | (1966) | (1991) | (1991) |

01643700 GOOSE CREEK NEAR MIDDLEBURG, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1966 - 1967, 1969 - 1996, 2001 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 16,657.41 | | 110,014.5 | | | |
| ANNUAL MEAN | 45.6 | | 301 | | 134 | |
| HIGHEST ANNUAL MEAN | | | | | 301 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 20.8 | 2002 |
| HIGHEST DAILY MEAN | 641 | Dec 14 | 14,000 | Sep 23 | 14,000 | Sep 23, 2003 |
| LOWEST DAILY MEAN | 0.11 | aAug 23 | 1.5 | Oct 5 | 0.00 | (b) |
| ANNUAL SEVEN-DAY MINIMUM | 0.11 | Aug 21 | 1.9 | Oct 4 | 0.00 | (b) |
| MAXIMUM PEAK FLOW | | | 23,000 | Sep 23 | 23,000 | Sep 23, 2003 |
| MAXIMUM PEAK STAGE | | | c24.36 | Sep 23 | 27.46 | Jun 22, 1972 |
| INSTANTANEOUS LOW FLOW | | | 1.2 | dOct 4 | 0.00 | (f) |
| ANNUAL RUNOFF (CFSM) | 0.37 | | 2.45 | | 1.09 | |
| ANNUAL RUNOFF (INCHES) | 5.04 | | 33.27 | | 14.85 | |
| 10 PERCENT EXCEEDS | 119 | | 561 | | 308 | |
| 50 PERCENT EXCEEDS | 18 | | 164 | | 70 | |
| 90 PERCENT EXCEEDS | 0.99 | | 56 | | 5.9 | |

a Also Aug. 24-27, 2002.
b No flow many days in September 1985, September, October 1986, and September to November 1991.
c From floodmarks.
d Also Oct. 5, 2002.
e Estimated.
f No flow part or all of many days in September 1985, September, October 1986, and September to November 1991.



## 01643805 NORTH FORK GOOSE CREEK AT ROUTE 729 NEAR LINCOLN, VA

LOCATION.--Lat 39°04'20", long 77°41'02", NAD83, Loudoun County, Hydrologic Unit Code 02070008, on left bank, 5 ft downstream from bridge on State Highway 729, 5 mi south of Lincoln.

DRAINAGE AREA.--38.2 $mi^2$.

PERIOD OF RECORD.--July 2001 to current year.

GAGE.--Water stage recorder. Datum of gage is 300 ft NGVD of 1929, from topographic map.

REMARKS.--Records good except those for periods with ice effect, Dec. 3-10 and Jan. 16 to Feb. 21, which are poor.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8.7 | 43 | 29 | 934 | e23 | 74 | 91 | 47 | 199 | 50 | 60 | 15 |
| 2 | 7.7 | 35 | 27 | 667 | e23 | 159 | 81 | 45 | 102 | 46 | 41 | 18 |
| 3 | 6.6 | 30 | e25 | 381 | e23 | 225 | 73 | 40 | 105 | 79 | 34 | 19 |
| 4 | 6.0 | 27 | e25 | 206 | e24 | 126 | 69 | 40 | 375 | 62 | 40 | 366 |
| 5 | 6.1 | 26 | e24 | 142 | e25 | 154 | 68 | 43 | 323 | 46 | 41 | 58 |
| 6 | 6.1 | 71 | e24 | 120 | e25 | 488 | 63 | 45 | 159 | 40 | 33 | 35 |
| 7 | 5.4 | 40 | e23 | 96 | e24 | 265 | 104 | 43 | 346 | 60 | 30 | 28 |
| 8 | 5.4 | 33 | e23 | 94 | e23 | 268 | 100 | 55 | 230 | 54 | 34 | 24 |
| 9 | 5.7 | 30 | e23 | 93 | e22 | 456 | 196 | 61 | 190 | 400 | 32 | 21 |
| 10 | 7.0 | 28 | e22 | 74 | e20 | 242 | 148 | 77 | 125 | 178 | 39 | 20 |
| 11 | 25 | 34 | 150 | 64 | e18 | 159 | 154 | 73 | 140 | 67 | 41 | 18 |
| 12 | 24 | 61 | 142 | 56 | e18 | 133 | 117 | 55 | 369 | 50 | 35 | 18 |
| 13 | 16 | 63 | 270 | 54 | e17 | 136 | 92 | 47 | 625 | 44 | 29 | 34 |
| 14 | 13 | 45 | 401 | 52 | e17 | 144 | 81 | 42 | 431 | 38 | 25 | 30 |
| 15 | 10 | 38 | 179 | 49 | e18 | 108 | 74 | 81 | 240 | 35 | 22 | 26 |
| 16 | 118 | 45 | 111 | e43 | e20 | 95 | 68 | 2,750 | 158 | 32 | 21 | 26 |
| 17 | 67 | 182 | 79 | e40 | e23 | 87 | 62 | 820 | 146 | 29 | 40 | 22 |
| 18 | 37 | 175 | 65 | e36 | e30 | 78 | 59 | 400 | 173 | 27 | 27 | 49 |
| 19 | 27 | 85 | 59 | e31 | e25 | 69 | 133 | 244 | 305 | 27 | 22 | 603 |
| 20 | 23 | 66 | 66 | e27 | e22 | 690 | 87 | 168 | 279 | 25 | 20 | 113 |
| 21 | 20 | 63 | 55 | e25 | e27 | 391 | 72 | 169 | 192 | 23 | 18 | 63 |
| 22 | 17 | 67 | 47 | e23 | 773 | 185 | 72 | 147 | 150 | 213 | 19 | 50 |
| 23 | 16 | 52 | 43 | e22 | 587 | 131 | 63 | 125 | 113 | 144 | 17 | 3,040 |
| 24 | 14 | 44 | 40 | e22 | 265 | 105 | 56 | 190 | 90 | 97 | 15 | 251 |
| 25 | 14 | 41 | 55 | e22 | 160 | 91 | 55 | 555 | 76 | 44 | 14 | 119 |
| 26 | 33 | 38 | 51 | e22 | 114 | 90 | 59 | 276 | 67 | 34 | 17 | 108 |
| 27 | 24 | 37 | 44 | e21 | 92 | 85 | 55 | 177 | 60 | 30 | 19 | 81 |
| 28 | 20 | 33 | 41 | e21 | 82 | 72 | 50 | 153 | 52 | 42 | 16 | 72 |
| 29 | 38 | 31 | 41 | e21 | --- | 70 | 48 | 125 | 48 | 56 | 19 | 58 |
| 30 | 85 | 31 | 42 | e22 | --- | 106 | 46 | 103 | 45 | 35 | 20 | 49 |
| 31 | 62 | --- | 42 | e22 | --- | 106 | --- | 155 | --- | 29 | 16 | --- |
| TOTAL | 767.7 | 1,594 | 2,268 | 3,502 | 2,540 | 5,588 | 2,496 | 7,351 | 5,913 | 2,136 | 856 | 5,434 |
| MEAN | 24.8 | 53.1 | 73.2 | 113 | 90.7 | 180 | 83.2 | 237 | 197 | 68.9 | 27.6 | 181 |
| MAX | 118 | 182 | 401 | 934 | 773 | 690 | 196 | 2,750 | 625 | 400 | 60 | 3,040 |
| MIN | 5.4 | 26 | 22 | 21 | 17 | 69 | 46 | 40 | 45 | 23 | 14 | 15 |
| CFSM | 0.65 | 1.39 | 1.92 | 2.96 | 2.37 | 4.72 | 2.18 | 6.21 | 5.16 | 1.80 | 0.72 | 4.74 |
| IN. | 0.75 | 1.55 | 2.21 | 3.41 | 2.47 | 5.44 | 2.43 | 7.16 | 5.76 | 2.08 | 0.83 | 5.29 |

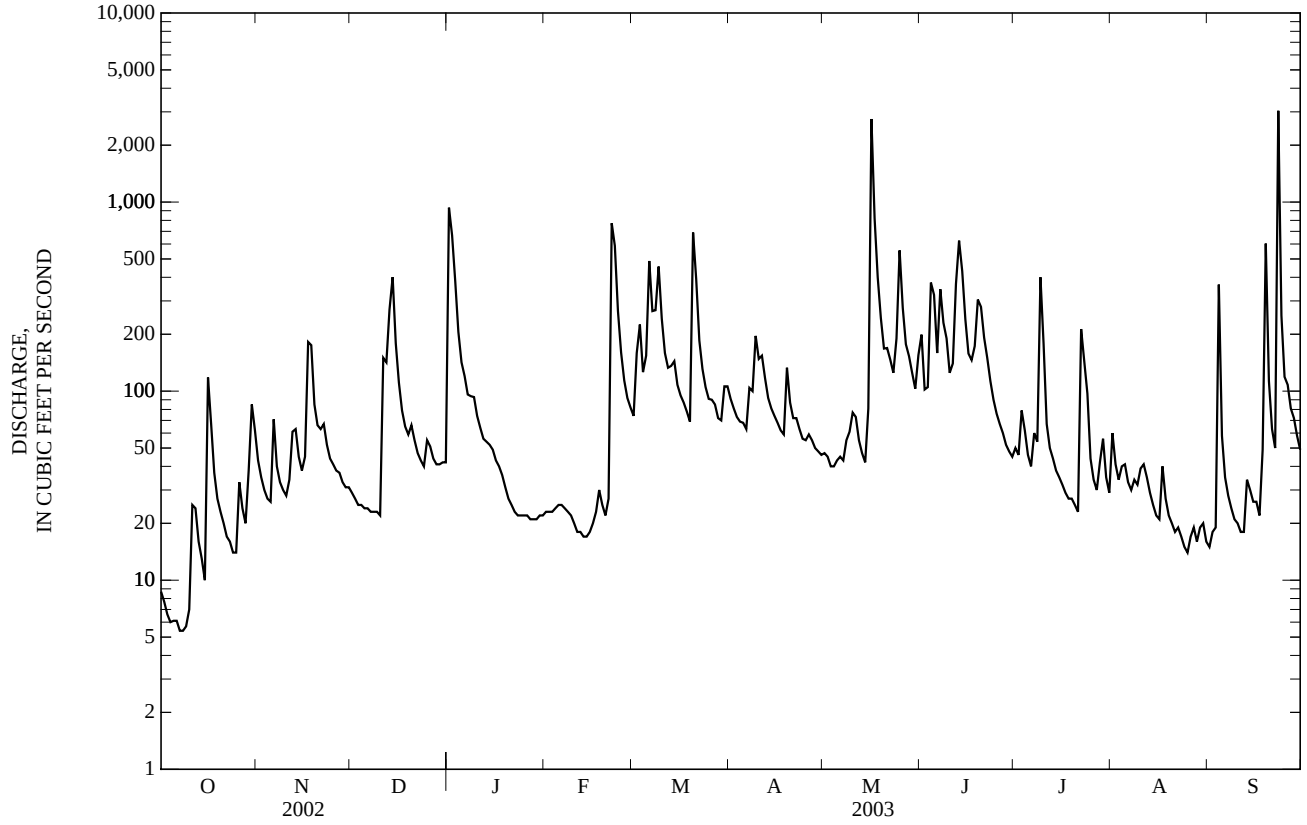
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2001 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 15.4 | 30.2 | 41.1 | 60.9 | 49.5 | 103 | 53.3 | 140 | 111 | 39.9 | 16.4 | 70.6 |
| MAX | 24.8 | 53.1 | 73.2 | 113 | 90.7 | 180 | 83.2 | 237 | 197 | 68.9 | 27.6 | 181 |
| (WY) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) |
| MIN | 6.10 | 7.22 | 9.04 | 8.79 | 8.33 | 25.8 | 23.5 | 42.8 | 25.6 | 10.9 | 3.13 | 10.0 |
| (WY) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) |

01643805 NORTH FORK GOOSE CREEK AT ROUTE 729 NEAR LINCOLN, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 2001 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 9,468.2 | | 40,445.7 | | | |
| ANNUAL MEAN | 25.9 | | 111 | | 63.0 | |
| HIGHEST ANNUAL MEAN | | | | | 111 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 15.1 | 2002 |
| HIGHEST DAILY MEAN | 401 | Dec 14 | 3,040 | Sep 23 | 3,040 | Sep 23, 2003 |
| LOWEST DAILY MEAN | 1.2 | Aug 23 | 5.4 | aOct 7 | 1.2 | Aug 23, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 1.5 | Aug 18 | 5.9 | Oct 3 | 1.5 | Aug 18, 2002 |
| MAXIMUM PEAK FLOW | | | 13,500 | Sep 23 | 13,500 | Sep 23, 2003 |
| MAXIMUM PEAK STAGE | | | b13.45 | Sep 23 | b13.45 | Sep 23, 2003 |
| INSTANTANEOUS LOW FLOW | | | 4.8 | Oct 8 | 0.85 | cAug 20, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.68 | | 2.90 | | 1.65 | |
| ANNUAL RUNOFF (INCHES) | 9.22 | | 39.39 | | 22.40 | |
| 10 PERCENT EXCEEDS | 55 | | 227 | | 142 | |
| 50 PERCENT EXCEEDS | 14 | | 50 | | 22 | |
| 90 PERCENT EXCEEDS | 4.2 | | 19 | | 4.9 | |

a Also Oct. 8, 2002.
b From Floodmarks.
c Also Aug. 23, 2002.
e Estimated.



## 01643880 BEAVERDAM CREEK AT ROUTE 734 NEAR MOUNTVILLE, VA

LOCATION.--Lat 39°02'16", long 77°43'20", NAD83, Loudoun County, Hydrologic Unit 02070008, on left bank 250 ft downstream from State Highway 743 and 2.0 mi northwest of Mountville.

DRAINAGE AREA.--47.2 $mi^2$.

PERIOD OF RECORD.--July 2001 to current year.

GAGE.--Water stage recorder. Datum of gage is 315 ft NVGD of 1929, from topographic map.

REMARKS.--Records good except those for period of no gage-height record, Sept. 23-30, which is fair, and periods with ice effect, Dec. 3-10 and Jan. 16 to Feb. 21, which are poor.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.0 | 54 | 36 | 399 | e40 | 94 | 136 | 42 | 142 | 46 | 56 | 24 |
| 2 | 2.3 | 44 | 33 | 531 | e41 | 189 | 113 | 38 | 91 | 42 | 41 | 26 |
| 3 | 1.8 | 37 | e33 | 364 | e35 | 273 | 100 | 34 | 96 | 142 | 31 | 73 |
| 4 | 1.6 | 34 | e33 | 247 | e40 | 160 | 92 | 32 | 327 | 87 | 37 | 945 |
| 5 | 1.5 | 32 | e33 | 189 | e45 | 202 | 88 | 35 | 303 | 51 | 44 | 164 |
| 6 | 1.3 | 92 | e34 | 169 | e43 | 488 | 78 | 41 | 151 | 40 | 28 | 95 |
| 7 | 1.3 | 49 | e34 | 143 | e40 | 299 | 150 | 34 | 253 | 77 | 24 | 71 |
| 8 | 1.3 | 41 | e36 | 153 | e37 | 290 | 136 | 42 | 206 | 46 | 38 | 55 |
| 9 | 1.2 | 36 | e36 | 150 | e35 | 436 | 253 | 55 | 182 | 343 | 35 | 47 |
| 10 | 1.9 | 34 | e33 | 111 | e34 | 267 | 189 | 115 | 129 | 241 | 53 | 40 |
| 11 | 13 | 40 | 102 | 94 | e32 | 186 | 218 | 90 | 138 | 100 | 86 | 34 |
| 12 | 25 | 79 | 164 | 81 | e30 | 160 | 156 | 59 | 380 | 70 | 38 | 33 |
| 13 | 14 | 90 | 216 | 76 | e28 | 166 | 118 | 47 | 672 | 59 | 29 | 89 |
| 14 | 8.5 | 57 | 314 | 74 | e26 | 191 | 102 | 40 | 531 | 50 | 24 | 62 |
| 15 | 6.1 | 48 | 177 | 68 | e28 | 135 | 92 | 46 | 221 | 45 | 19 | 50 |
| 16 | 104 | 53 | 125 | e66 | e29 | 118 | 82 | 3,060 | 163 | 40 | 18 | 55 |
| 17 | 72 | 204 | 95 | e63 | e30 | 107 | 72 | 607 | 157 | 33 | 41 | 36 |
| 18 | 39 | 224 | 81 | e62 | e50 | 94 | 68 | 452 | 196 | 29 | 24 | 76 |
| 19 | 29 | 107 | 74 | e57 | e45 | 77 | 153 | 289 | 433 | 29 | 18 | 834 |
| 20 | 25 | 85 | 91 | e49 | e40 | 649 | 100 | 209 | 310 | 24 | 15 | 172 |
| 21 | 21 | 82 | 73 | e45 | e50 | 441 | 82 | 189 | 211 | 22 | 13 | 113 |
| 22 | 19 | 95 | 61 | e48 | 460 | 261 | 84 | 166 | 181 | 65 | 23 | 90 |
| 23 | 17 | 62 | 54 | e45 | 521 | 186 | 69 | 151 | 132 | 114 | 31 | e5,000 |
| 24 | 14 | 54 | 50 | e37 | 304 | 153 | 59 | 219 | 104 | 126 | 14 | e500 |
| 25 | 14 | 50 | 69 | e36 | 208 | 130 | 55 | 390 | 86 | 48 | 11 | e200 |
| 26 | 40 | 46 | 66 | e35 | 148 | 122 | 66 | 278 | 74 | 34 | 11 | e150 |
| 27 | 28 | 45 | 55 | e35 | 119 | 119 | 57 | 189 | 63 | 28 | 15 | e100 |
| 28 | 22 | 40 | 51 | e34 | 105 | 96 | 48 | 175 | 56 | 35 | 18 | e90 |
| 29 | 36 | 38 | 54 | e34 | --- | 95 | 45 | 141 | 50 | 62 | 126 | e80 |
| 30 | 133 | 38 | 55 | e33 | --- | 155 | 41 | 118 | 44 | 31 | 69 | e70 |
| 31 | 85 | --- | 54 | e34 | --- | 161 | --- | 123 | --- | 25 | 30 | --- |
| TOTAL | 781.8 | 1,990 | 2,422 | 3,562 | 2,643 | 6,500 | 3,102 | 7,506 | 6,082 | 2,184 | 1,060 | 9,374 |
| MEAN | 25.2 | 66.3 | 78.1 | 115 | 94.4 | 210 | 103 | 242 | 203 | 70.5 | 34.2 | 312 |
| MAX | 133 | 224 | 314 | 531 | 521 | 649 | 253 | 3,060 | 672 | 343 | 126 | 5,000 |
| MIN | 1.2 | 32 | 33 | 33 | 26 | 77 | 41 | 32 | 44 | 22 | 11 | 24 |
| CFSM | 0.53 | 1.41 | 1.66 | 2.43 | 2.00 | 4.44 | 2.19 | 5.13 | 4.30 | 1.49 | 0.72 | 6.62 |
| IN. | 0.62 | 1.57 | 1.91 | 2.81 | 2.08 | 5.12 | 2.44 | 5.92 | 4.79 | 1.72 | 0.84 | 7.39 |

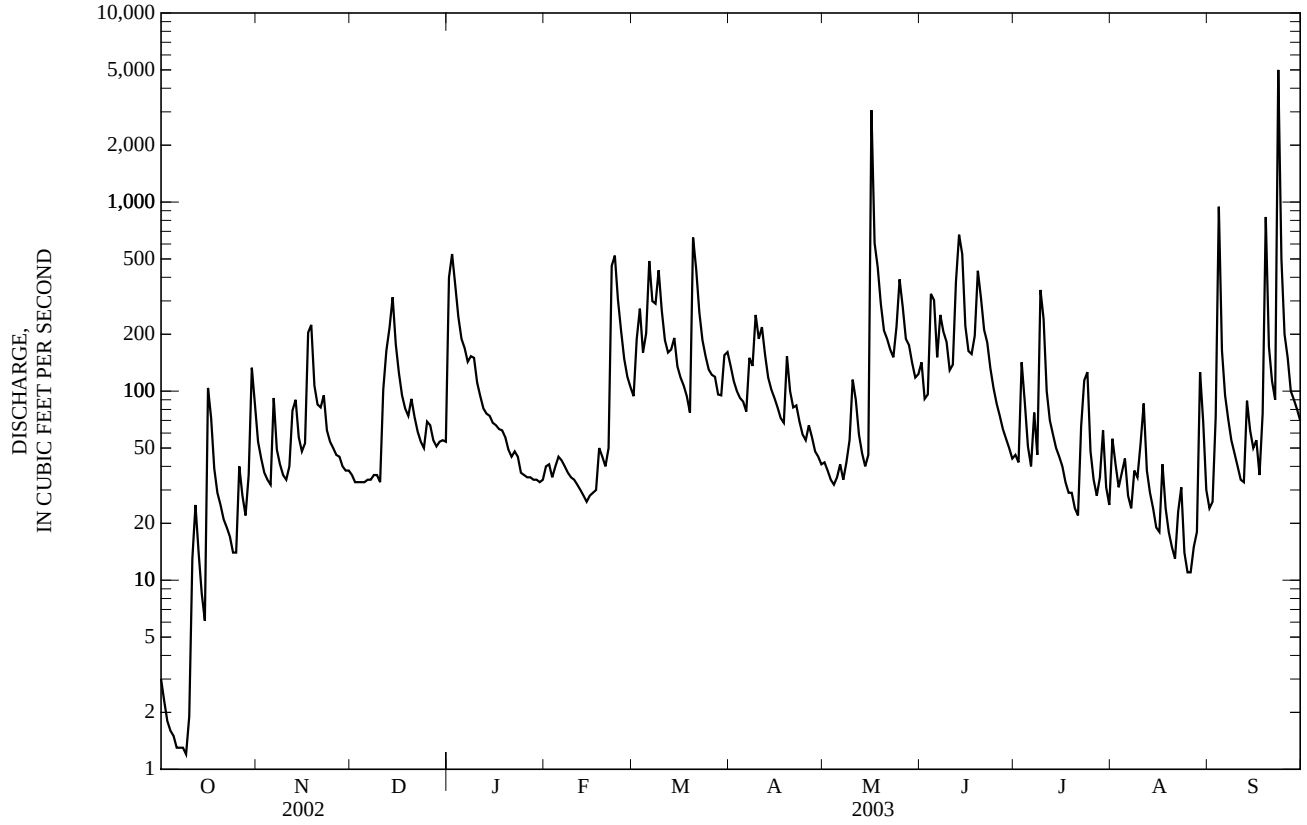
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2001 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 13.1 | 34.8 | 41.5 | 60.1 | 48.9 | 116 | 63.3 | 136 | 111 | 37.9 | 14.6 | 107 |
| MAX | 25.2 | 66.3 | 78.1 | 115 | 94.4 | 210 | 103 | 242 | 203 | 70.5 | 34.2 | 312 |
| (WY) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) |
| MIN | 1.02 | 3.30 | 4.95 | 5.38 | 3.34 | 21.9 | 23.3 | 30.6 | 20.0 | 5.37 | 0.64 | 2.84 |
| (WY) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) |

01643880 BEAVERDAM CREEK AT ROUTE 734 NEAR MOUNTVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 2001 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 8,651.00 | | 47,206.8 | | | |
| ANNUAL MEAN | 23.7 | | 129 | | 69.8 | |
| HIGHEST ANNUAL MEAN | | | | | 129 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 10.2 | 2002 |
| HIGHEST DAILY MEAN | 314 | Dec 14 | e5,000 | Sep 23 | e5,000 | Sep 23, 2003 |
| LOWEST DAILY MEAN | 0.02 | aAug 26 | 1.2 | Oct 9 | 0.02 | aAug 26, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.03 | Aug 21 | 1.4 | Oct 3 | 0.03 | Aug 21, 2002 |
| MAXIMUM PEAK FLOW | | | 22,000 | Sep 23 | 22,000 | Sep 23, 2003 |
| MAXIMUM PEAK STAGE | | | b17.00 | Sep 23 | b17.00 | Sep 23, 2003 |
| INSTANTANEOUS LOW FLOW | | | 0.91 | Oct 7 | 0.02 | cAug 26, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.50 | | 2.74 | | 1.48 | |
| ANNUAL RUNOFF (INCHES) | 6.82 | | 37.21 | | 20.09 | |
| 10 PERCENT EXCEEDS | 62 | | 249 | | 160 | |
| 50 PERCENT EXCEEDS | 9.3 | | 62 | | 26 | |
| 90 PERCENT EXCEEDS | 0.37 | | 24 | | 0.76 | |

a Also Aug. 27, 2002.
b Form floodmarks.
b Also Aug. 27, 28, 2002.
e Estimated.



## 01644000 GOOSE CREEK NEAR LEESBURG, VA

LOCATION.--Lat 39°01'10", long 77°34'39", NAD83, 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 $mi^2$.

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 NGVD of 1929. July 12, 1909, to Dec. 31, 1912, nonrecording gage at site 1,000 ft downstream at different datum. Jan. 21, 1930, to Nov. 28, 1938, non-recording gage at site 400 ft downstream at datum 4.20 ft lower than present datum.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Oct. 8, Jan. 30 to Feb. 15, Feb. 18-20, and July 17, 18, and periods with ice effect, Dec. 6, 8-10, and Jan. 16-29, which are fair. National Weather Service gage-height telemeter at station. Maximum discharge, 78,100 $ft^3/s$, from rating curve extended above 11,000 $ft^3/s$ 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 $ft^3/s$, site and datum in use 1930-38, from information by local residents.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 2 | 0145 | 7,140 | 10.83 | Jun 14 | 0545 | 4,950 | 7.90 |
| Feb 23 | 0145 | 6,560 | 10.07 | Jun 19 | 1000 | 6,430 | 9.89 |
| Mar 21 | 0230 | 6,990 | 10.63 | Sep 4 | 0915 | 5,570 | 8.74 |
| May 16 | 2100 | 14,200 | 16.44 | Sep 19 | 1500 | 7,980 | 11.82 |
| Jun 13 | 0545 | 5,520 | 8.68 | Sep 23 | 1615 | *36,900 | *23.32 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 30 | 353 | 214 | 1,910 | e165 | 661 | 954 | 339 | 806 | 430 | 307 | 217 |
| 2 | 23 | 259 | 188 | 3,900 | e160 | 1,020 | 841 | 325 | 589 | 415 | 327 | 253 |
| 3 | 19 | 206 | 177 | 2,200 | e155 | 1,900 | 746 | 294 | 549 | 1,250 | 263 | 257 |
| 4 | 17 | 175 | 146 | 1,600 | e195 | 1,120 | 680 | 274 | 1,570 | 819 | 271 | 3,240 |
| 5 | 15 | 158 | 130 | 1,080 | e230 | 1,150 | 634 | 278 | 1,500 | 498 | 1,260 | 1,100 |
| 6 | 16 | 421 | e170 | 931 | e200 | 2,500 | 577 | 324 | 898 | 413 | 448 | 594 |
| 7 | 15 | 356 | 146 | 794 | e175 | 2,080 | 753 | 295 | 1,360 | 424 | 314 | 446 |
| 8 | e15 | 246 | e144 | 715 | e160 | 1,750 | 981 | 445 | 1,530 | 399 | 299 | 370 |
| 9 | 14 | 207 | e140 | 786 | e140 | 2,730 | 1,450 | 419 | 1,180 | 720 | 275 | 323 |
| 10 | 17 | 184 | e135 | 620 | e170 | 2,280 | 1,400 | 651 | 866 | 1,580 | 279 | 288 |
| 11 | 39 | 266 | 372 | 527 | e150 | 1,440 | 1,570 | 839 | 774 | 712 | 579 | 257 |
| 12 | 117 | 409 | 1,120 | 458 | e130 | 1,230 | 1,240 | 562 | 2,330 | 487 | 351 | 239 |
| 13 | 101 | 701 | 1,230 | 422 | e120 | 1,120 | 948 | 451 | 3,610 | 403 | 290 | 615 |
| 14 | 58 | 424 | 2,450 | 412 | e105 | 1,430 | 801 | 389 | 3,420 | 347 | 251 | 544 |
| 15 | 42 | 328 | 1,520 | 387 | e135 | 1,070 | 713 | 529 | 1,880 | 325 | 206 | 428 |
| 16 | 208 | 370 | 973 | e345 | 99 | 930 | 647 | 8,610 | 1,280 | 300 | 182 | 394 |
| 17 | 548 | 1,540 | 725 | e315 | 96 | 847 | 580 | 5,480 | 1,080 | e274 | 278 | 314 |
| 18 | 240 | 1,630 | 599 | e280 | e200 | 760 | 527 | 2,950 | 1,480 | e235 | 262 | 343 |
| 19 | 151 | 811 | 525 | e250 | e180 | 663 | 950 | 2,140 | 4,830 | 238 | 186 | 5,820 |
| 20 | 112 | 603 | 579 | e235 | e165 | 2,330 | 756 | 1,440 | 2,770 | 224 | 164 | 1,800 |
| 21 | 91 | 502 | 570 | e220 | 312 | 4,060 | 612 | 1,320 | 2,160 | 207 | 150 | 1,040 |
| 22 | 75 | 573 | 445 | e200 | 2,220 | 2,120 | 626 | 1,380 | 1,630 | 204 | 142 | 784 |
| 23 | 65 | 423 | 402 | e185 | 4,480 | 1,380 | 542 | 1,020 | 1,210 | 808 | 196 | 20,800 |
| 24 | 56 | 346 | 368 | e170 | 2,230 | 1,090 | 459 | 1,320 | 940 | 571 | 138 | 5,510 |
| 25 | 52 | 314 | 488 | e160 | 1,470 | 909 | 427 | 2,410 | 784 | 328 | 117 | 1,490 |
| 26 | 113 | 288 | 572 | e190 | 1,050 | 815 | 474 | 1,720 | 682 | 251 | 116 | 1,090 |
| 27 | 174 | 272 | 448 | e175 | 848 | 845 | 451 | 1,270 | 601 | 220 | 131 | 864 |
| 28 | 113 | 249 | 405 | e169 | 747 | 679 | 387 | 1,100 | 530 | 219 | 392 | 806 |
| 29 | 113 | 227 | 399 | e185 | --- | 637 | 359 | 955 | 483 | 419 | 227 | 664 |
| 30 | 590 | 225 | 393 | e175 | --- | 910 | 340 | 812 | 443 | 279 | 903 | 567 |
| 31 | 613 | --- | 380 | e170 | --- | 1,110 | --- | 703 | --- | 222 | 283 | --- |
| TOTAL | 3,852 | 13,066 | 16,553 | 20,166 | 16,487 | 43,566 | 22,425 | 41,044 | 43,765 | 14,221 | 9,587 | 51,457 |
| MEAN | 124 | 436 | 534 | 651 | 589 | 1,405 | 748 | 1,324 | 1,459 | 459 | 309 | 1,715 |
| MAX | 613 | 1,630 | 2,450 | 3,900 | 4,480 | 4,060 | 1,570 | 8,610 | 4,830 | 1,580 | 1,260 | 20,800 |
| MIN | 14 | 158 | 130 | 160 | 96 | 637 | 340 | 274 | 443 | 204 | 116 | 217 |
| CFSM | 0.37 | 1.31 | 1.61 | 1.96 | 1.77 | 4.23 | 2.25 | 3.99 | 4.39 | 1.38 | 0.93 | 5.17 |
| IN. | 0.43 | 1.46 | 1.85 | 2.26 | 1.85 | 4.88 | 2.51 | 4.60 | 4.90 | 1.59 | 1.07 | 5.77 |

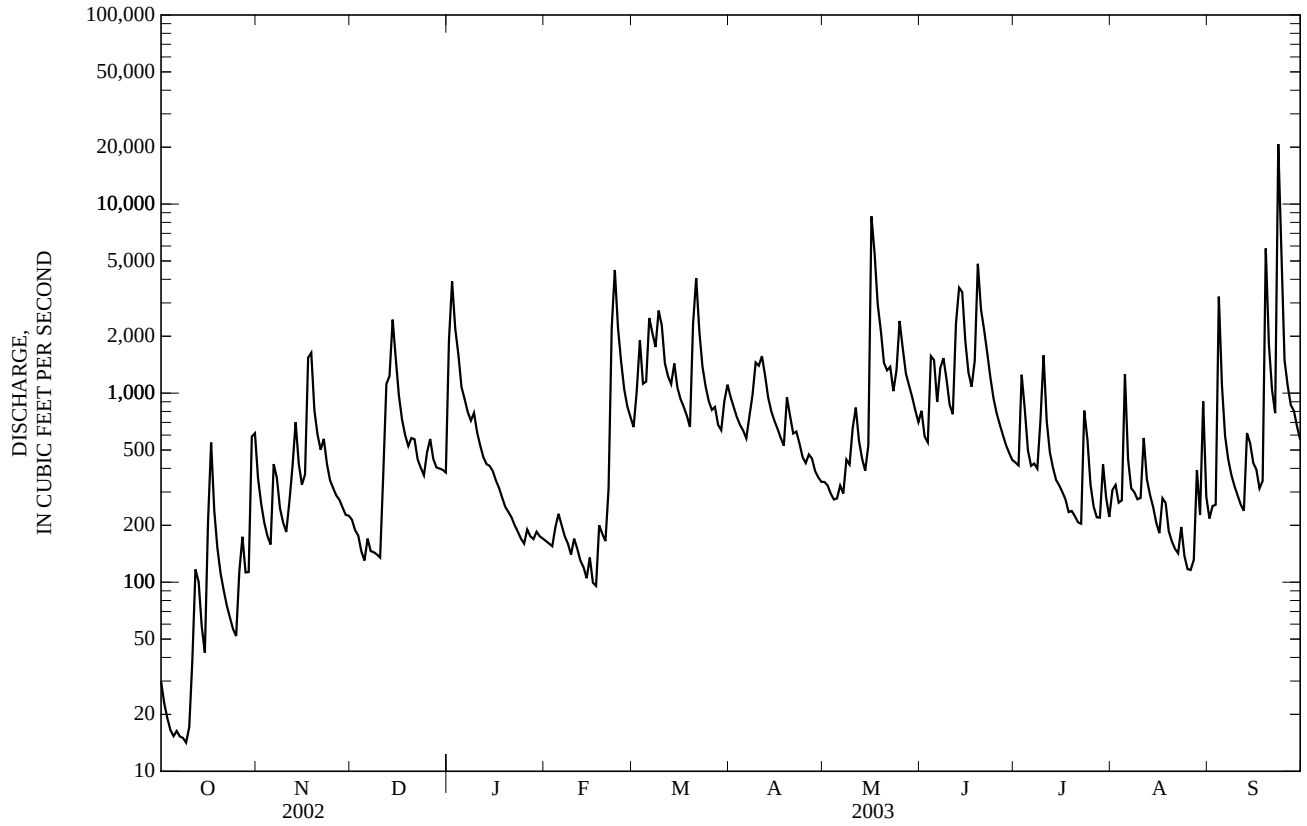
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1909 - 1912, 1930 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 191 | 218 | 327 | 410 | 505 | 600 | 515 | 375 | 271 | 140 | 154 | 155 |
| MAX | 2,265 | 1,155 | 1,316 | 1,499 | 1,621 | 1,892 | 1,766 | 1,324 | 2,887 | 1,207 | 1,188 | 1,715 |
| (WY) | (1943) | (1933) | (1993) | (1996) | (1998) | (1993) | (1983) | (2003) | (1972) | (1956) | (1937) | (2003) |
| 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) |

01644000 GOOSE CREEK NEAR LEESBURG, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1909 - 1912 1930 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 58,937.4 | | 296,189 | | | |
| ANNUAL MEAN | 161 | | 811 | | 324 | |
| HIGHEST ANNUAL MEAN | | | | | 811 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 55.2 | 1931 |
| HIGHEST DAILY MEAN | 2,450 | Dec 14 | 20,800 | Sep 23 | e53,600 | Jun 22, 1972 |
| LOWEST DAILY MEAN | 2.5 | Aug 22 | 14 | Oct 9 | 0.40 | aSep 27, 1941 |
| ANNUAL SEVEN-DAY MINIMUM | 2.8 | Aug 16 | 16 | Oct 4 | 0.45 | Sep 19, 1985 |
| MAXIMUM PEAK FLOW | | | 36,900 | Sep 23 | 78,100 | Jun 22, 1972 |
| MAXIMUM PEAK STAGE | | | 23.32 | Sep 23 | b30.59 | Jun 22, 1972 |
| INSTANTANEOUS LOW FLOW | | | 14 | Oct 9 | (c) | (d) |
| ANNUAL RUNOFF (CFSM) | 0.49 | | 2.44 | | 0.98 | |
| ANNUAL RUNOFF (INCHES) | 6.60 | | 33.19 | | 13.26 | |
| 10 PERCENT EXCEEDS | 422 | | 1,610 | | 711 | |
| 50 PERCENT EXCEEDS | 70 | | 443 | | 160 | |
| 90 PERCENT EXCEEDS | 9.3 | | 139 | | 18 | |

a Also Sept. 28-30, 1941.
b From high-water mark in gage house.
c Not determined.
d Probably occurred Sept. 27-30, 1941.
e Estimated.



## 01644280 BROAD RUN NEAR LEESBURG, VA

LOCATION.--Lat 39°02'47", long 77°25'57", NAD83, Loudoun County, Hydrologic Unit 02070008, on right bank 15 ft upstream from State Highway 7 and 8 mi southeast of Leesburg.

DRAINAGE AREA.--76.1 $mi^2$.

PERIOD OF RECORD.--October 2001 to current year.

GAGE.--Water stage recorder. Elevation of gage is 195 ft NVGD of 1929, from topographic map.

REMARKS.--Records good except those for periods of no gage-height record, May 28, June 12-16, July 11, 12, 16, 17, and July 31 to Aug. 12, which are fair.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 23 | 100 | 26 | 1,650 | 25 | 110 | 143 | 20 | 50 | 21 | e20 | 24 |
| 2 | 18 | 60 | 23 | 2,910 | 25 | 577 | 87 | 18 | 36 | 26 | e18 | 39 |
| 3 | 14 | 44 | 20 | 735 | 20 | 846 | 65 | 15 | 57 | 132 | e17 | 46 |
| 4 | 11 | 36 | 19 | 332 | 35 | 275 | 49 | 13 | 520 | 75 | e40 | 188 |
| 5 | 9.0 | 37 | 21 | 141 | 45 | 403 | 39 | 14 | 296 | 38 | e25 | 111 |
| 6 | 6.7 | 380 | 22 | 112 | 25 | 1,080 | 33 | 23 | 32 | 27 | e17 | 51 |
| 7 | 5.0 | 120 | 21 | 104 | 24 | 494 | 161 | 27 | 621 | 25 | e15 | 33 |
| 8 | 4.6 | 61 | 20 | 100 | 26 | 357 | 201 | 135 | 395 | 30 | e14 | 27 |
| 9 | 4.8 | 47 | 19 | 144 | 22 | 654 | 543 | 95 | 51 | 295 | e13 | 21 |
| 10 | 11 | 37 | 19 | 90 | 22 | 323 | 279 | 282 | 24 | 386 | e35 | 17 |
| 11 | 153 | 226 | 372 | 61 | 24 | 135 | 319 | 187 | 46 | e800 | e90 | 15 |
| 12 | 148 | 342 | 757 | 43 | 22 | 112 | 162 | 73 | e250 | e300 | e56 | 24 |
| 13 | 49 | 320 | 943 | 35 | 20 | 118 | 86 | 41 | e180 | 88 | 44 | 207 |
| 14 | 37 | 115 | 1,350 | 31 | 18 | 196 | 60 | 30 | e110 | 44 | 128 | 108 |
| 15 | 26 | 74 | 401 | 28 | 21 | 97 | 46 | 534 | e60 | 35 | 34 | 65 |
| 16 | 381 | 498 | 175 | 22 | 25 | 77 | 38 | 5,200 | e30 | e25 | 23 | 76 |
| 17 | 255 | 1,670 | 116 | 20 | 32 | 70 | 32 | 718 | 85 | e21 | 467 | 38 |
| 18 | 112 | 872 | 86 | 17 | 34 | 58 | 29 | 756 | 220 | 19 | 99 | 90 |
| 19 | 55 | 211 | 73 | 16 | 34 | 45 | 173 | 314 | 2,080 | 17 | 41 | 1,480 |
| 20 | 39 | 127 | 225 | 15 | 41 | 1,480 | 95 | 132 | 870 | 16 | 28 | 233 |
| 21 | 30 | 101 | 168 | 14 | 89 | 1,890 | 54 | 442 | 357 | 13 | 21 | 102 |
| 22 | 24 | 125 | 93 | 12 | 1,800 | 313 | 81 | 546 | 137 | 20 | 16 | 88 |
| 23 | 19 | 83 | 69 | 11 | 2,640 | 131 | 53 | 164 | 91 | 328 | 18 | 3,290 |
| 24 | 15 | 56 | 55 | 8.8 | 846 | 90 | 35 | 198 | 63 | 78 | 15 | 755 |
| 25 | 14 | 47 | 347 | 8.8 | 420 | 70 | 29 | 1,090 | 45 | 37 | 11 | 145 |
| 26 | 213 | 38 | 376 | 8.4 | 226 | 65 | 46 | 676 | 36 | 27 | 68 | 91 |
| 27 | 77 | 36 | 166 | 8.3 | 144 | 100 | 45 | 329 | 31 | 20 | 211 | 64 |
| 28 | 41 | 32 | 110 | 7.5 | 118 | 58 | 29 | e230 | 27 | 25 | 147 | 99 |
| 29 | 125 | 28 | 96 | 7.7 | --- | 46 | 23 | 153 | 23 | 97 | 52 | 61 |
| 30 | 455 | 27 | 83 | 7.8 | --- | 272 | 20 | 91 | 21 | 35 | 30 | 37 |
| 31 | 250 | --- | 74 | 8.9 | --- | 343 | --- | 62 | --- | e25 | 31 | --- |
| TOTAL | 2,625.1 | 5,950 | 6,345 | 6,709.2 | 6,823 | 10,885 | 3,055 | 12,608 | 6,844 | 3,125 | 1,844 | 7,625 |
| MEAN | 84.7 | 198 | 205 | 216 | 244 | 351 | 102 | 407 | 228 | 101 | 59.5 | 254 |
| MAX | 455 | 1,670 | 1,350 | 2,910 | 2,640 | 1,890 | 543 | 5,200 | 2,080 | 800 | 467 | 3,290 |
| MIN | 4.6 | 27 | 19 | 7.5 | 18 | 45 | 20 | 13 | 21 | 13 | 11 | 15 |
| CFSM | 1.11 | 2.61 | 2.69 | 2.84 | 3.20 | 4.61 | 1.34 | 5.34 | 3.00 | 1.32 | 0.78 | 3.34 |
| IN. | 1.28 | 2.91 | 3.10 | 3.28 | 3.34 | 5.32 | 1.49 | 6.16 | 3.35 | 1.53 | 0.90 | 3.73 |

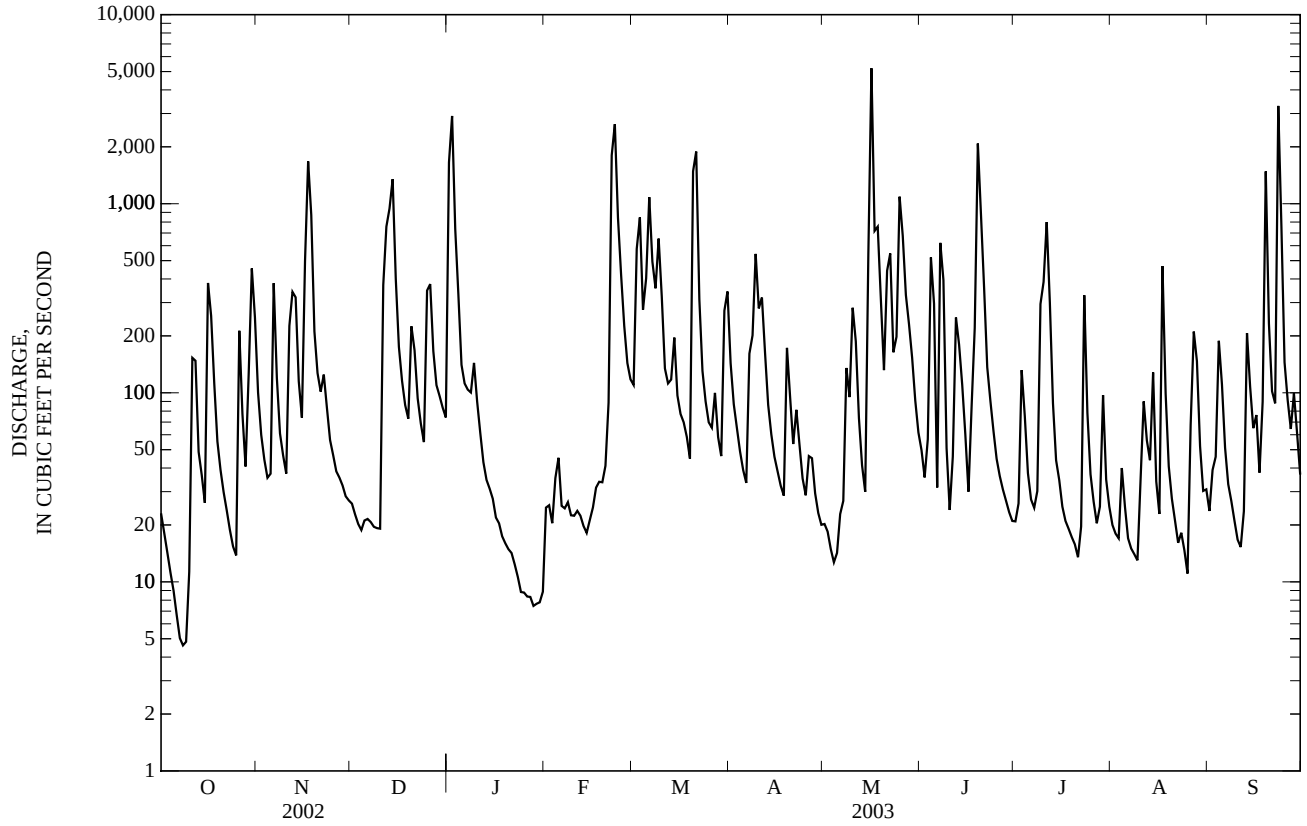
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2002 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 50.7 | 105 | 113 | 119 | 128 | 214 | 93.1 | 254 | 134 | 61.0 | 38.3 | 141 |
| MAX | 84.7 | 198 | 205 | 216 | 244 | 351 | 102 | 407 | 228 | 101 | 59.5 | 254 |
| (WY) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) |
| MIN | 16.7 | 11.6 | 20.4 | 22.0 | 11.8 | 77.4 | 84.4 | 102 | 40.1 | 21.2 | 17.2 | 28.7 |
| (WY) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) |

01644280 BROAD RUN NEAR LEESBURG, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 2002 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 27,266.5 | | 74,438.3 | | | |
| ANNUAL MEAN | 74.7 | | 204 | | 121 | |
| HIGHEST ANNUAL MEAN | | | | | 204 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 37.9 | 2002 |
| HIGHEST DAILY MEAN | 1,670 | Nov 17 | 5,200 | May 16 | 5,200 | May 16, 2003 |
| LOWEST DAILY MEAN | 1.3 | Aug 21 | 4.6 | Oct 8 | 1.3 | aAug 21, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 1.6 | Aug 17 | 7.4 | Oct 4 | 1.6 | Aug 17, 2002 |
| MAXIMUM PEAK FLOW | | | 6,890 | May 16 | 6,890 | May 16, 2003 |
| MAXIMUM PEAK STAGE | | | 10.43 | May 16 | 10.43 | May 16, 2003 |
| INSTANTANEOUS LOW FLOW | | | 4.2 | Oct 7 | 1.3 | bAug 20, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.98 | | 2.68 | | 1.59 | |
| ANNUAL RUNOFF (INCHES) | 13.33 | | 36.39 | | 21.59 | |
| 10 PERCENT EXCEEDS | 179 | | 460 | | 273 | |
| 50 PERCENT EXCEEDS | 22 | | 58 | | 28 | |
| 90 PERCENT EXCEEDS | 3.2 | | 17 | | 4.6 | |

a Also Aug. 22, 2002.
b Also Aug. 21, 22, 2002.
e Estimated.



## 01646000 DIFFICULT RUN NEAR GREAT FALLS, VA

LOCATION.--Lat 38°58'33", long 77°14'45", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 5-10 and Jan. 16-18, and periods of doubtful gage-height record, Jan. 19 to Feb. 20, which are fair. Maximum discharge, 32,200 $ft^3/s$, from rating curve extended above 1,600 $ft^3/s$ 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, Sept. 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Nov 17 | 0100 | 1,030 | 7.07 | Jun 19 | 1100 | 2,900 | 10.35 |
| Dec 11 | 1830 | 1,000 | 7.02 | Jun 20 | 0230 | 1,620 | 8.31 |
| Jan 1 | 2330 | 1,370 | 7.83 | Jun 20 | 1700 | 1,250 | 7.57 |
| Feb 22 | 2200 | 2,350 | 9.56 | Jul 11 | 0500 | 1,210 | 7.49 |
| Mar 20 | 2330 | 1,730 | 8.51 | Jul 23 | 0630 | 1,400 | 7.88 |
| May 16 | 1130 | 1,070 | 7.17 | Aug 11 | 2100 | 1,440 | 7.96 |
| May 26 | 1000 | 1,080 | 7.19 | Sep 19 | 0600 | 1,270 | 7.62 |
| Jun 7 | 2000 | 1,880 | 8.78 | Sep 23 | 1100 | *4,400 | *11.71 |
| Jun 13 | 0030 | 1,000 | 7.01 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.8 | 41 | 27 | 488 | e21 | 80 | 94 | 70 | 138 | 95 | 48 | 44 |
| 2 | 5.9 | 29 | 23 | 561 | e21 | 244 | 79 | 56 | 68 | 71 | 48 | 58 |
| 3 | 5.3 | 22 | 22 | 241 | e20 | 229 | 72 | 51 | 105 | 176 | 45 | 65 |
| 4 | 4.9 | 20 | 21 | 121 | e24 | 110 | 68 | 49 | 194 | 80 | 55 | 97 |
| 5 | 4.5 | 21 | e20 | 77 | e34 | 190 | 66 | 53 | 122 | 61 | 47 | 61 |
| 6 | 4.0 | 214 | e24 | 76 | e33 | 346 | 62 | 62 | 75 | 55 | 44 | 45 |
| 7 | 3.4 | 46 | e22 | 69 | e30 | 162 | 165 | 90 | 928 | 73 | 40 | 41 |
| 8 | 3.2 | 29 | e21 | 60 | e21 | 119 | 119 | 177 | 422 | 76 | 40 | 38 |
| 9 | 3.0 | 25 | e20 | 68 | e18 | 173 | 249 | 112 | 156 | 145 | 38 | 36 |
| 10 | 9.8 | 22 | e19 | 56 | e23 | 125 | 128 | 187 | 94 | 164 | 40 | 34 |
| 11 | 134 | 214 | 359 | 48 | e21 | 88 | 177 | 111 | 106 | 605 | 368 | 33 |
| 12 | 57 | 201 | 221 | 43 | e19 | 83 | 105 | 69 | 365 | 120 | 134 | 73 |
| 13 | 24 | 116 | 281 | 41 | e17 | 83 | 81 | 60 | 348 | 145 | 53 | 262 |
| 14 | 15 | 54 | 350 | 40 | e16 | 102 | 72 | 55 | 180 | 78 | 60 | 74 |
| 15 | 10 | 37 | 107 | 39 | e24 | 73 | 69 | 88 | 117 | 62 | 43 | 53 |
| 16 | 338 | 221 | 65 | e36 | e22 | 70 | 67 | 736 | 86 | 57 | 45 | 54 |
| 17 | 87 | 517 | 50 | e35 | e20 | 69 | 62 | 157 | 78 | 51 | 306 | 43 |
| 18 | 48 | 293 | 43 | e33 | e68 | 66 | 71 | 235 | 221 | 49 | 70 | 170 |
| 19 | 23 | 80 | 39 | e31 | e58 | 61 | 173 | 115 | 1,350 | 48 | 52 | 748 |
| 20 | 17 | 58 | 60 | e28 | e63 | 613 | 86 | 77 | 912 | 46 | 46 | 106 |
| 21 | 14 | 45 | 49 | e26 | 106 | 556 | 73 | 363 | 222 | 43 | 42 | 65 |
| 22 | 13 | 44 | 39 | e25 | 1,100 | 144 | 70 | 201 | 130 | 75 | 40 | 53 |
| 23 | 11 | 35 | 37 | e23 | 993 | 98 | 64 | 106 | 102 | 670 | 46 | 1,730 |
| 24 | 9.0 | 32 | 34 | e22 | 270 | 80 | 60 | 101 | 84 | 83 | 37 | 163 |
| 25 | 8.7 | 30 | 235 | e22 | 163 | 73 | 59 | 173 | 75 | 59 | 35 | 86 |
| 26 | 167 | 29 | 127 | e26 | 106 | 80 | 115 | 518 | 68 | 48 | 218 | 66 |
| 27 | 36 | 29 | 68 | e24 | 87 | 98 | 74 | 148 | 64 | 45 | 296 | 58 |
| 28 | 21 | 28 | 52 | e23 | 84 | 70 | 60 | 198 | 62 | 69 | 225 | 62 |
| 29 | 81 | 27 | 48 | e25 | --- | 69 | 58 | 118 | 59 | 159 | 72 | 55 |
| 30 | 213 | 27 | 46 | e23 | --- | 254 | 56 | 91 | 56 | 56 | 73 | 48 |
| 31 | 107 | --- | 44 | e22 | --- | 161 | --- | 76 | --- | 47 | 65 | --- |
| TOTAL | 1,484.5 | 2,586 | 2,573 | 2,452 | 3,482 | 4,769 | 2,754 | 4,703 | 6,987 | 3,611 | 2,771 | 4,521 |
| MEAN | 47.9 | 86.2 | 83.0 | 79.1 | 124 | 154 | 91.8 | 152 | 233 | 116 | 89.4 | 151 |
| MAX | 338 | 517 | 359 | 561 | 1,100 | 613 | 249 | 736 | 1,350 | 670 | 368 | 1,730 |
| MIN | 3.0 | 20 | 19 | 22 | 16 | 61 | 56 | 49 | 56 | 43 | 35 | 33 |
| CFSM | 0.83 | 1.49 | 1.43 | 1.37 | 2.15 | 2.66 | 1.59 | 2.62 | 4.02 | 2.01 | 1.54 | 2.60 |
| IN. | 0.95 | 1.66 | 1.65 | 1.58 | 2.24 | 3.06 | 1.77 | 3.02 | 4.49 | 2.32 | 1.78 | 2.90 |

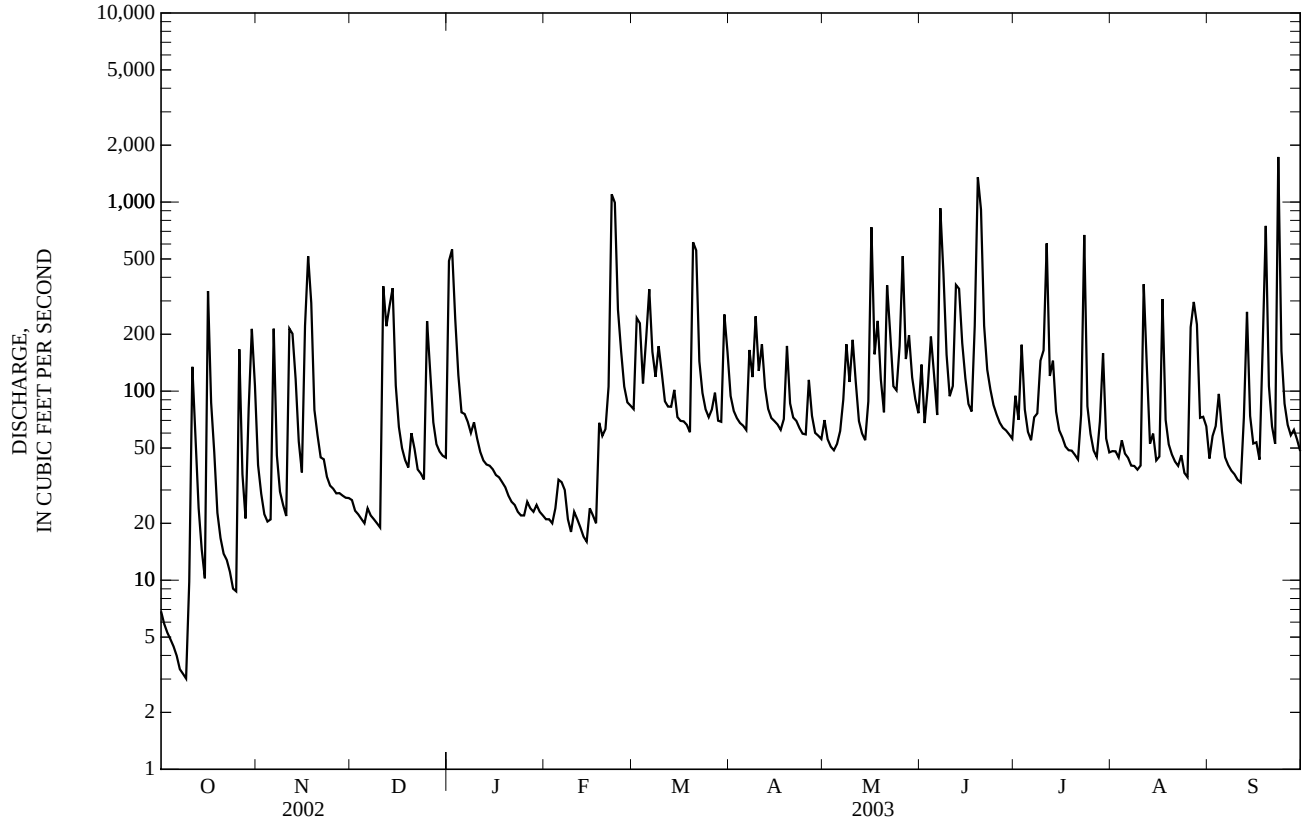
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1935 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 39.5 | 50.2 | 59.8 | 73.7 | 81.5 | 90.7 | 81.9 | 72.2 | 69.3 | 41.8 | 39.7 | 39.7 |
| MAX | 317 | 116 | 165 | 194 | 228 | 227 | 224 | 203 | 1,210 | 116 | 143 | 245 |
| (WY) | (1980) | (1973) | (1997) | (1996) | (1998) | (1993) | (1973) | (1989) | (1972) | (2003) | (1955) | (1975) |
| MIN | 4.69 | 7.75 | 11.4 | 16.5 | 17.5 | 33.2 | 31.5 | 21.8 | 10.0 | 4.52 | 1.88 | 5.57 |
| (WY) | (1942) | (1942) | (1966) | (1966) | (2002) | (1981) | (1985) | (1955) | (1986) | (1955) | (1966) | (1986) |

01646000 DIFFICULT RUN NEAR GREAT FALLS, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1935 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 15,595.54 | | 42,693.5 | | | |
| ANNUAL MEAN | 42.7 | | 117 | | 61.5 | |
| HIGHEST ANNUAL MEAN | | | | | 184 | 1972 |
| LOWEST ANNUAL MEAN | | | | | 28.4 | 1966 |
| HIGHEST DAILY MEAN | 578 | Apr 28 | 1,730 | Sep 23 | e25,000 | Jun 22, 1972 |
| LOWEST DAILY MEAN | 0.66 | Aug 23 | 3.0 | Oct 9 | 0.10 | aSep 7, 1966 |
| ANNUAL SEVEN-DAY MINIMUM | 1.0 | Aug 18 | 4.0 | Oct 3 | 0.16 | Sep 3, 1966 |
| MAXIMUM PEAK FLOW | | | 4,400 | Sep 23 | 32,200 | Jun 22, 1972 |
| MAXIMUM PEAK STAGE | | | 11.71 | Sep 23 | b21.40 | Jun 22, 1972 |
| INSTANTANEOUS LOW FLOW | | | 3.0 | Oct 9 | 0.05 | cSep 9, 1966 |
| ANNUAL RUNOFF (CFSM) | 0.74 | | 2.02 | | 1.06 | |
| ANNUAL RUNOFF (INCHES) | 10.02 | | 27.43 | | 14.44 | |
| 10 PERCENT EXCEEDS | 84 | | 235 | | 106 | |
| 50 PERCENT EXCEEDS | 22 | | 65 | | 38 | |
| 90 PERCENT EXCEEDS | 4.6 | | 22 | | 13 | |

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



## 01646500 POTOMAC RIVER NEAR WASHINGTON, DC

LOCATION.--Lat 38°56'59.2", long 77°07'39.5", 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 $mi^2$.

### WATER-DISCHARGE RECORDS

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

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

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

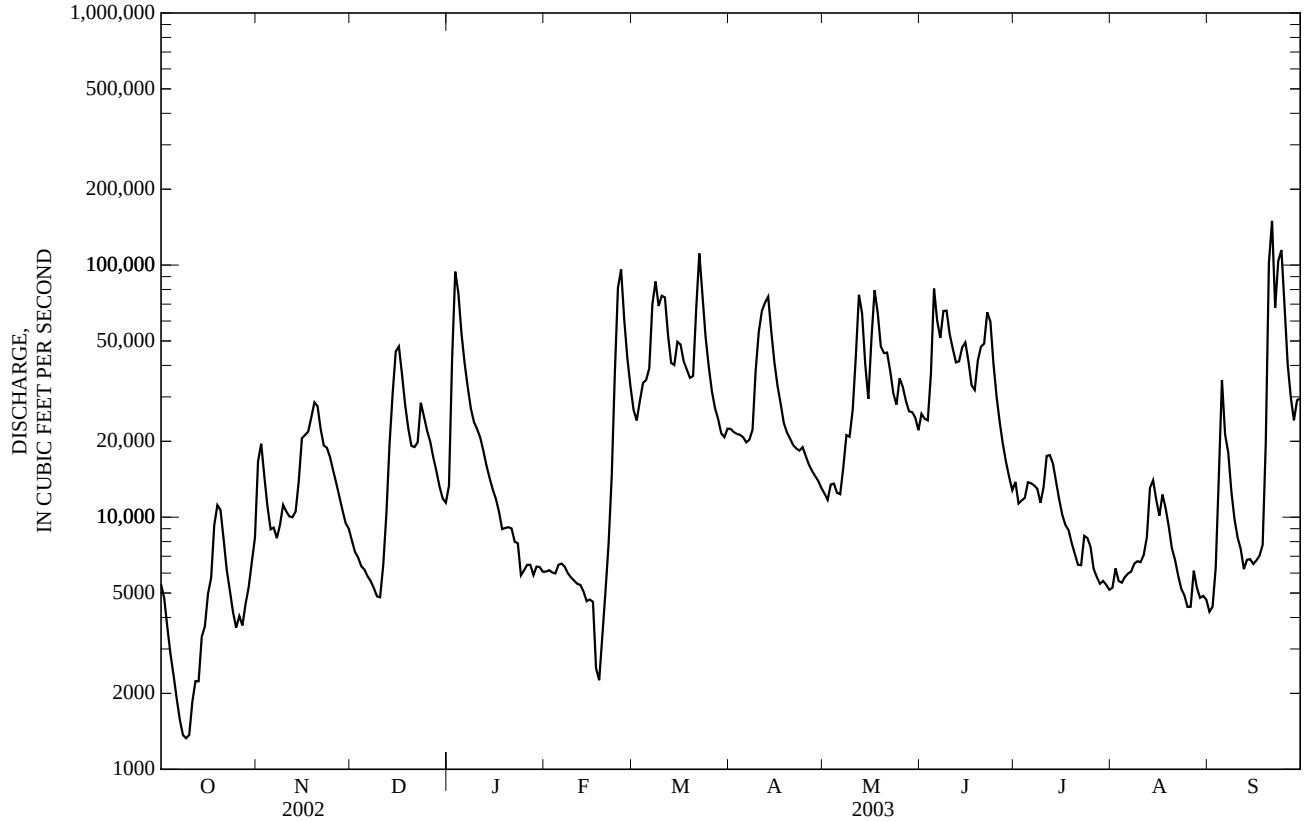
REMARKS.--Water-discharge records good except those for estimated daily discharges (ice effrect), which are fair. Diversions at Great Falls through aqueducts, and since June 1959, from gage pool at Little Falls Dam, for municipal supply of Washington, D.C.; since October 1958, at Rockville Filtration Plant, for municipal supply of city of Rockville; since April 1961, at Potomac Filtration Plant for water supply of Washington Suburban Sanitary District; since October 1961, at Fairfax Water Treatment Plant for water supply of city of Fairfax (from Goose Creek); since April 1964, at Violets Lock to Chesapeake and Ohio Canal; and since October 1985, at Fairfax County Water Authority Treatment Plant for water supply of the county. Low flow affected slightly prior to July 1981 by Stony River Reservoir, since December 1950, by Savage River Reservoir (see station 01597500), and since July 1981, by Jennings Randolph Lake. National Weather Service gage-height telemeter at station. U.S. Geological Survey satellite collection platform 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 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Dec 16 | 0130 | 50,000 | 6.70 | May 17 | 1915 | 83,700 | 8.23 |
| Jan 3 | 1530 | 115,000 | 9.37 | May 21 | 1430 | 46,000 | 6.49 |
| Feb 24 | 2330 | 109,000 | 9.16 | Jun 5 | 1000 | 87,000 | 8.36 |
| Mar 8 | 0515 | 95,300 | 8.68 | Jun 9 | 0000 | 75,900 | 7.91 |
| Mar 11 | 1745 | 69,700 | 7.64 | Jun 13 | 0100 | 48,700 | 6.63 |
| Mar 15 | 1945 | 51,800 | 6.79 | Jun 14 | 2200 | 55,800 | 6.99 |
| Mar 22 | 1030 | 120,000 | 9.54 | Jun 22 | 1745 | 70,200 | 7.66 |
| Apr 13 | 0230 | 81,700 | 8.15 | Sep 21 | 0630 | *167,000 | *11.44 |
| May 12 | 1800 | 80,200 | 8.09 | Sep 23 | 1200 | 133,000 | 9.97 |

Minimum discharge, 1,260 $ft^3/s$, Oct. 8, 9.




DAILY MEAN DISCHARGE - 2003 WATER YEAR

01646500 POTOMAC RIVER NEAR WASHINGTON, DC—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5,410 | 16,700 | 8,060 | 13,300 | 6,090 | 26,600 | 22,400 | 12,400 | 25,700 | 13,800 | 5,250 | 4,220 |
| 2 | 4,770 | 19,600 | 7,270 | 42,300 | 6,160 | 24,200 | 21,800 | 11,700 | 24,600 | 11,300 | 6,260 | 4,410 |
| 3 | 3,670 | 14,500 | 6,900 | 94,200 | 6,040 | 28,900 | 21,400 | 13,500 | 24,200 | 11,600 | 5,580 | 6,280 |
| 4 | 2,870 | 11,000 | 6,380 | 77,600 | 5,980 | 34,000 | 21,200 | 13,600 | 37,100 | 11,900 | 5,500 | 14,500 |
| 5 | 2,360 | 8,950 | 6,190 | 53,400 | 6,480 | 35,000 | 20,800 | 12,500 | 80,700 | 13,800 | 5,790 | 35,000 |
| 6 | 1,910 | 9,090 | 5,820 | 40,800 | 6,540 | 39,000 | 19,800 | 12,300 | 60,200 | 13,600 | 5,970 | 21,300 |
| 7 | 1,570 | 8,260 | 5,570 | 32,800 | 6,350 | 69,900 | 20,300 | 15,700 | 51,400 | 13,400 | 6,090 | 18,100 |
| 8 | 1,370 | 9,320 | 5,230 | 26,900 | 5,990 | 86,100 | 22,200 | 21,200 | 65,800 | 13,000 | 6,540 | 12,700 |
| 9 | 1,330 | 11,200 | 4,850 | 23,800 | 5,770 | 68,900 | 38,200 | 20,900 | 65,900 | 11,400 | 6,690 | 9,850 |
| 10 | 1,370 | 10,500 | 4,810 | 22,400 | 5,600 | 75,600 | 54,400 | 26,600 | 53,100 | 13,200 | 6,630 | 8,300 |
| 11 | 1,850 | 10,100 | 6,480 | 20,700 | 5,440 | 74,400 | 65,900 | 43,200 | 46,500 | 17,500 | 7,080 | 7,470 |
| 12 | 2,240 | 9,990 | 10,300 | 18,300 | 5,390 | 52,700 | 71,000 | 76,200 | 41,100 | 17,600 | 8,320 | 6,220 |
| 13 | 2,230 | 10,500 | 19,400 | 16,000 | 5,070 | 40,900 | 75,000 | 64,400 | 41,500 | 16,300 | 13,100 | 6,780 |
| 14 | 3,350 | 13,900 | 31,000 | 14,300 | 4,640 | 40,200 | 54,400 | 40,600 | 47,200 | 13,800 | 14,000 | 6,810 |
| 15 | 3,690 | 20,500 | 45,500 | 12,900 | 4,710 | 49,600 | 41,000 | 29,500 | 49,400 | 11,700 | 11,700 | 6,520 |
| 16 | 4,970 | 21,200 | 47,600 | 11,800 | 4,620 | 48,400 | 33,100 | 51,000 | 41,500 | 10,200 | 10,100 | 6,730 |
| 17 | 5,740 | 21,800 | 36,800 | 10,500 | 2,510 | 41,500 | 28,100 | 79,400 | 33,300 | 9,300 | 12,300 | 7,030 |
| 18 | 9,300 | 24,800 | 27,900 | 8,970 | 2,260 | 38,500 | 23,600 | 64,600 | 32,000 | 8,860 | 10,800 | 7,760 |
| 19 | 11,200 | 28,500 | 22,500 | 9,060 | 3,370 | 35,700 | 21,700 | 47,500 | 41,900 | 7,880 | 9,180 | 19,700 |
| 20 | 10,700 | 27,600 | 19,200 | 9,120 | 5,060 | 36,300 | 20,500 | 44,700 | 47,500 | 7,140 | 7,530 | 102,000 |
| 21 | 8,160 | 22,400 | 19,000 | 9,020 | 7,810 | 67,100 | 19,300 | 45,000 | 48,800 | 6,470 | 6,770 | 150,000 |
| 22 | 6,150 | 19,200 | 19,800 | 7,990 | 14,500 | 111,000 | 18,700 | 38,000 | 64,900 | 6,450 | 5,870 | 67,700 |
| 23 | 5,100 | 18,800 | 28,400 | e7,880 | 37,200 | 76,000 | 18,400 | 30,900 | 59,700 | 8,430 | 5,200 | 104,000 |
| 24 | 4,190 | 17,300 | 25,100 | 5,880 | 81,300 | 51,900 | 19,000 | 27,900 | 40,500 | 8,260 | 4,890 | 115,000 |
| 25 | 3,650 | 15,300 | 22,100 | 6,160 | 96,100 | 39,600 | 17,500 | 35,600 | 30,000 | 7,630 | 4,400 | 68,900 |
| 26 | 4,050 | 13,600 | 19,900 | e6,470 | 60,900 | 31,700 | 16,200 | 32,900 | 23,700 | 6,240 | 4,410 | 40,400 |
| 27 | 3,720 | 12,000 | 17,200 | e6,470 | 42,700 | 27,100 | 15,300 | 29,000 | 19,500 | 5,790 | 6,130 | 29,900 |
| 28 | 4,530 | 10,600 | 15,200 | 5,890 | 33,000 | 24,500 | 14,600 | 26,300 | 16,500 | 5,450 | 5,240 | 24,200 |
| 29 | 5,270 | 9,460 | 13,200 | 6,370 | --- | 21,500 | 13,900 | 26,100 | 14,400 | 5,580 | 4,790 | 29,100 |
| 30 | 6,630 | 8,990 | 11,900 | 6,330 | --- | 20,800 | 13,100 | 24,800 | 12,800 | 5,400 | 4,870 | 29,600 |
| 31 | 8,290 | --- | 11,400 | 6,070 | --- | 22,400 | --- | 22,100 | --- | 5,150 | 4,710 | --- |
| TOTAL | 141,640 | 455,660 | 530,960 | 633,680 | 477,580 | 1,440,000 | 862,800 | 1,040,100 | 1,241,400 | 318,130 | 221,690 | 970,480 |
| MEAN | 4,569 | 15,190 | 17,130 | 20,440 | 17,060 | 46,450 | 28,760 | 33,550 | 41,380 | 10,260 | 7,151 | 32,350 |
| MAX | 11,200 | 28,500 | 47,600 | 94,200 | 96,100 | 111,000 | 75,000 | 79,400 | 80,700 | 17,600 | 14,000 | 150,000 |
| MIN | 1,330 | 8,260 | 4,810 | 5,880 | 2,260 | 20,800 | 13,100 | 11,700 | 12,800 | 5,150 | 4,400 | 4,220 |
| (†) | 646 | 604 | 580 | 584 | 573 | 566 | 573 | 585 | 605 | 646 | 652 | 643 |
| MEAN‡ | 5214 | 15800 | 17710 | 21030 | 17630 | 47040 | 29330 | 34140 | 41990 | 10910 | 7805 | 33050 |
| CFSM‡ | 0.45 | 1.37 | 1.53 | 1.82 | 1.53 | 4.07 | 2.54 | 2.95 | 3.63 | 0.94 | 0.68 | 2.86 |
| IN‡ | 0.52 | 1.52 | 1.77 | 2.10 | 1.59 | 4.69 | 2.83 | 3.41 | 4.05 | 1.09 | 0.78 | 3.19 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 5,954 | 7,202 | 10,690 | 13,740 | 17,030 | 23,580 | 20,060 | 14,700 | 9,114 | 4,888 | 4,781 | 4,929 |
| MAX | 44,100 | 42,030 | 37,630 | 52,890 | 61,040 | 76,510 | 57,850 | 40,410 | 46,630 | 21,040 | 28,210 | 44,620 |
| (WY) | (1943) | (1986) | (1997) | (1996) | (1998) | (1936) | (1993) | (1989) | (1972) | (1949) | (1955) | (1996) |
| MIN | 583 | 700 | 1,038 | 1,682 | 1,882 | 6,225 | 5,810 | 3,921 | 1,536 | 599 | 538 | 679 |
| (WY) | (1931) | (1931) | (1966) | (1981) | (2002) | (2002) | (1995) | (1969) | (1999) | (1999) | (1966) | (1930) |

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1930 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 2,473,975 | | 8,334,120 | | | |
| ANNUAL MEAN | 6,778 | | 22,830 | | 11,410 | |
| ANNUAL MEAN‡ | 7,428 | | 23,450 | | 11,859 | |
| HIGHEST ANNUAL MEAN | | | | | 23,760 | 1996 |
| HIGHEST ANNUAL MEAN‡ | | | | | 24,370 | 1996 |
| LOWEST ANNUAL MEAN | | | | | 4,017 | 2002 |
| LOWEST ANNUAL MEAN‡ | | | | | 4,664 | 2002 |
| HIGHEST DAILY MEAN | 48,500 | Apr 24 | 150,000 | Sep 21 | 426,000 | Mar 19, 1936 |
| LOWEST DAILY MEAN | 258 | Aug 20 | 1,330 | Oct 9 | (a)121 | Sep 9, 1966 |
| LOWEST DAILY MEAN‡ | 995 | Sep 13 | 1,970 | Oct 10 | (b)601 | Sep 10, 1966 |
| ANNUAL SEVEN-DAY MINIMUM | 327 | Aug 18 | 1,660 | Oct 6 | 181 | Sep 7, 1966 |
| MAXIMUM PEAK FLOW | | | 167,000 | Sep 21 | 484,000 | Mar 19, 1936 |
| MAXIMUM PEAK STAGE | | | 11.44 | Sep 21 | (c)28.10 | Mar 19, 1936 |
| INSTANTANEOUS LOW FLOW | | | 1,260 | Oct 8 | 66 | Sep 9, 1966 |
| ANNUAL RUNOFF (CFSM) | 0.59 | | 1.98 | | 0.99 | |
| ANNUAL RUNOFF (CFSM)‡ | 0.64 | | 2.03 | | 1.03 | |
| ANNUAL RUNOFF (INCHES) | 7.96 | | 26.82 | | 13.42 | |
| ANNUAL RUNOFF (INCHES)‡ | 8.72 | | 27.54 | | 13.93 | |
| 10 PERCENT EXCEEDS | 18,900 | | 52,900 | | 25,600 | |
| 50 PERCENT EXCEEDS | 2,880 | | 14,000 | | 6,450 | |
| 90 PERCENT EXCEEDS | 658 | | 5,020 | | 1,650 | |

e Estimated
† 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.
a Minimum daily discharge observed at gaging station, does not include diversion of 489 $ft^3/s$.
b Includes diversion of 449 $ft^3/s$ for municipal use.
c At previous site, 1 mi upstream at same datum.

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.-- No missing record. Records good.

EXTREMES FOR PERIOD OF DAILY RECORD--
SPECIFIC CONDUCTANCE: Maximum, 1,260 (road salt) microsiemens/cm, Dec. 11, 2002; minimum, 68 microsiemens/cm, Oct. 23, 1990.
WATER TEMPERATURE (water years 1989-93, 1995-99, 2001-03): Maximum, 33.5°C, July 11, 1993; minimum, 0.0°C, on many day during winter periods.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum, 1,260 (road salt) microsiemens/cm, Dec. 11; minimum, 108 microsiemens/cm, Sept. 23.
WATER TEMPERATURE: Maximum, 30.1°C, Aug. 23; minimum, 0.0°C, Jan. 18-25, 27.

SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

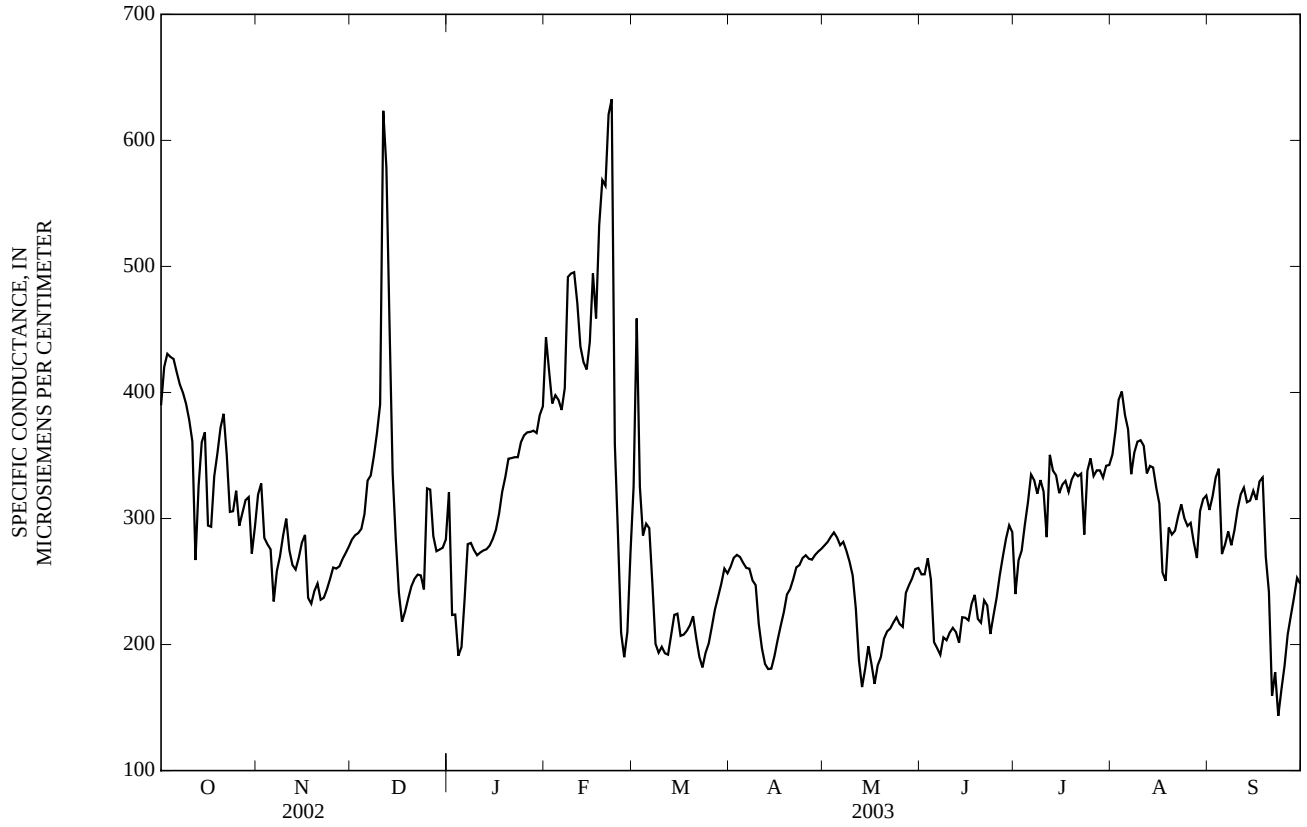
| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | |
| 1 | 400 | 374 | 390 | 325 | 309 | 319 | 286 | 280 | 283 | 431 | 248 | 321 |
| 2 | 436 | 400 | 420 | 339 | 314 | 328 | 288 | 284 | 287 | 264 | 201 | 223 |
| 3 | 435 | 426 | 431 | 314 | 276 | 285 | 293 | 285 | 288 | 263 | 187 | 224 |
| 4 | 440 | 426 | 428 | 281 | 276 | 280 | 303 | 285 | 292 | 197 | 186 | 191 |
| 5 | 429 | 423 | 427 | 281 | 266 | 276 | 316 | 294 | 303 | 206 | 195 | 198 |
| 6 | 423 | 405 | 416 | 268 | 201 | 234 | 342 | 316 | 330 | 279 | 206 | 236 |
| 7 | 410 | 396 | 406 | 263 | 252 | 258 | 343 | 327 | 334 | 293 | 260 | 280 |
| 8 | 404 | 392 | 400 | 279 | 263 | 270 | 360 | 332 | 350 | 293 | 271 | 281 |
| 9 | 394 | 383 | 391 | 294 | 279 | 286 | 382 | 340 | 368 | 293 | 267 | 275 |
| 10 | 384 | 373 | 378 | 306 | 293 | 300 | 400 | 373 | 390 | 273 | 268 | 271 |
| 11 | 375 | 324 | 361 | 301 | 252 | 275 | 1,260 | 377 | 623 | 275 | 271 | 273 |
| 12 | 324 | 236 | 267 | 276 | 238 | 263 | 756 | 492 | 579 | 278 | 273 | 275 |
| 13 | 345 | 308 | 326 | 266 | 241 | 260 | 553 | 407 | 455 | 283 | 271 | 276 |
| 14 | 368 | 345 | 361 | 274 | 265 | 269 | 414 | 317 | 336 | 281 | 275 | 279 |
| 15 | 370 | 367 | 368 | 296 | 273 | 281 | 318 | 259 | 284 | 287 | 280 | 284 |
| 16 | 369 | 165 | 294 | 299 | 269 | 287 | 264 | 219 | 241 | 297 | 287 | 291 |
| 17 | 330 | 211 | 293 | 243 | 212 | 237 | 224 | 215 | 218 | 312 | 293 | 304 |
| 18 | 352 | 324 | 334 | 241 | 221 | 232 | 233 | 222 | 226 | 341 | 312 | 321 |
| 19 | 360 | 343 | 352 | 251 | 238 | 243 | 240 | 231 | 237 | 348 | 323 | 333 |
| 20 | 380 | 359 | 372 | 255 | 237 | 248 | 256 | 239 | 246 | 354 | 337 | 347 |
| 21 | 385 | 376 | 383 | 237 | 234 | 236 | 256 | 248 | 252 | 350 | 346 | 348 |
| 22 | 376 | 323 | 350 | 241 | 234 | 237 | 259 | 252 | 256 | 359 | 342 | 349 |
| 23 | 323 | 297 | 305 | 248 | 240 | 244 | 259 | 243 | 255 | 369 | 341 | 349 |
| 24 | 316 | 297 | 306 | 256 | 248 | 252 | 251 | 237 | 244 | 369 | 353 | 361 |
| 25 | 326 | 316 | 322 | 264 | 256 | 261 | 498 | 247 | 324 | 369 | 362 | 366 |
| 26 | 327 | 255 | 294 | 263 | 258 | 260 | 336 | 312 | 323 | 372 | 365 | 368 |
| 27 | 313 | 288 | 304 | 266 | 260 | 262 | 312 | 274 | 286 | 372 | 366 | 369 |
| 28 | 316 | 313 | 315 | 271 | 265 | 268 | 277 | 271 | 274 | 374 | 365 | 370 |
| 29 | 320 | 290 | 317 | 277 | 270 | 273 | 279 | 273 | 275 | 371 | 364 | 368 |
| 30 | 290 | 248 | 272 | 281 | 274 | 278 | 280 | 274 | 277 | 391 | 370 | 382 |
| 31 | 309 | 277 | 293 | --- | --- | --- | 289 | 277 | 283 | 393 | 386 | 389 |
| MONTH | 440 | 165 | 351 | 339 | 201 | 267 | 1,260 | 215 | 314 | 431 | 186 | 307 |

01646500 POTOMAC RIVER NEAR WASHINGTON, DC—Continued

SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS—CONTINUED
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | FEBRUARY | | | MARCH | | | APRIL | | | MAY | |
| 1 | 480 | 388 | 444 | 372 | 307 | 325 | 267 | 257 | 262 | 284 | 275 | 279 |
| 2 | 448 | 396 | 417 | 557 | 372 | 459 | 272 | 267 | 269 | 286 | 278 | 281 |
| 3 | 398 | 383 | 391 | 395 | 290 | 325 | 273 | 269 | 271 | 290 | 283 | 286 |
| 4 | 431 | 385 | 398 | 292 | 282 | 287 | 272 | 266 | 269 | 292 | 286 | 289 |
| 5 | 417 | 385 | 394 | 321 | 284 | 296 | 268 | 250 | 265 | 289 | 280 | 285 |
| 6 | 390 | 380 | 386 | 310 | 267 | 292 | 263 | 259 | 261 | 293 | 266 | 279 |
| 7 | 482 | 375 | 403 | 267 | 230 | 248 | 272 | 251 | 260 | 290 | 273 | 282 |
| 8 | 523 | 465 | 492 | 230 | 186 | 200 | 253 | 246 | 251 | 280 | 269 | 274 |
| 9 | 508 | 474 | 494 | 199 | 187 | 194 | 252 | 240 | 247 | 270 | 260 | 266 |
| 10 | 508 | 480 | 495 | 200 | 197 | 198 | 240 | 210 | 216 | 260 | 244 | 255 |
| 11 | 488 | 450 | 471 | 200 | 187 | 193 | 212 | 177 | 197 | 244 | 214 | 229 |
| 12 | 453 | 425 | 436 | 198 | 186 | 192 | 191 | 176 | 185 | 214 | 168 | 188 |
| 13 | 433 | 414 | 424 | 220 | 198 | 208 | 190 | 175 | 181 | 172 | 164 | 166 |
| 14 | 428 | 408 | 418 | 225 | 220 | 224 | 186 | 176 | 181 | 192 | 172 | 181 |
| 15 | 516 | 411 | 440 | 228 | 219 | 224 | 196 | 186 | 191 | 205 | 192 | 199 |
| 16 | 539 | 437 | 494 | 219 | 203 | 207 | 210 | 195 | 203 | 211 | 165 | 185 |
| 17 | 483 | 440 | 459 | 210 | 205 | 208 | 220 | 209 | 215 | 196 | 152 | 169 |
| 18 | 569 | 474 | 533 | 214 | 209 | 211 | 232 | 220 | 226 | 194 | 178 | 184 |
| 19 | 633 | 541 | 568 | 220 | 212 | 215 | 243 | 232 | 240 | 197 | 184 | 190 |
| 20 | 604 | 538 | 564 | 247 | 208 | 222 | 246 | 242 | 244 | 211 | 197 | 205 |
| 21 | 703 | 599 | 621 | 218 | 196 | 205 | 258 | 245 | 252 | 219 | 203 | 210 |
| 22 | 811 | 404 | 633 | 216 | 173 | 190 | 263 | 258 | 261 | 216 | 207 | 213 |
| 23 | 444 | 278 | 359 | 190 | 176 | 182 | 265 | 261 | 263 | 220 | 215 | 217 |
| 24 | 309 | 246 | 288 | 198 | 188 | 193 | 271 | 265 | 269 | 224 | 219 | 222 |
| 25 | 246 | 184 | 209 | 207 | 195 | 201 | 275 | 267 | 271 | 231 | 207 | 216 |
| 26 | 205 | 181 | 190 | 230 | 207 | 214 | 276 | 259 | 268 | 233 | 193 | 214 |
| 27 | 231 | 201 | 210 | 234 | 225 | 228 | 272 | 259 | 267 | 245 | 233 | 241 |
| 28 | 317 | 231 | 273 | 243 | 231 | 238 | 275 | 267 | 271 | 256 | 243 | 247 |
| 29 | --- | --- | --- | 253 | 243 | 248 | 276 | 272 | 274 | 258 | 250 | 253 |
| 30 | --- | --- | --- | 274 | 252 | 260 | 279 | 274 | 276 | 264 | 258 | 260 |
| 31 | --- | --- | --- | 259 | 252 | 257 | --- | --- | --- | 264 | 258 | 261 |
| MONTH | 811 | 181 | 425 | 557 | 173 | 237 | 279 | 175 | 244 | 293 | 152 | 233 |
| | | JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | |
| 1 | 266 | 244 | 256 | 279 | 181 | 240 | 357 | 344 | 351 | 325 | 301 | 307 |
| 2 | 265 | 244 | 256 | 285 | 251 | 267 | 413 | 348 | 370 | 328 | 308 | 318 |
| 3 | 272 | 265 | 268 | 293 | 264 | 275 | 413 | 382 | 394 | 339 | 328 | 333 |
| 4 | 266 | 221 | 252 | 303 | 291 | 295 | 415 | 388 | 401 | 358 | 321 | 340 |
| 5 | 221 | 180 | 202 | 328 | 301 | 313 | 395 | 374 | 382 | 321 | 249 | 272 |
| 6 | 206 | 181 | 197 | 353 | 321 | 335 | 379 | 352 | 371 | 287 | 274 | 280 |
| 7 | 209 | 148 | 192 | 340 | 293 | 330 | 352 | 330 | 335 | 299 | 279 | 290 |
| 8 | 212 | 198 | 206 | 330 | 302 | 320 | 360 | 338 | 352 | 284 | 276 | 279 |
| 9 | 214 | 196 | 203 | 342 | 294 | 330 | 366 | 356 | 361 | 302 | 280 | 291 |
| 10 | 214 | 203 | 209 | 330 | 299 | 321 | 365 | 358 | 362 | 316 | 300 | 307 |
| 11 | 215 | 211 | 213 | 336 | 216 | 285 | 368 | 344 | 358 | 327 | 312 | 319 |
| 12 | 214 | 200 | 210 | 362 | 328 | 351 | 354 | 306 | 336 | 330 | 321 | 325 |
| 13 | 211 | 189 | 201 | 349 | 312 | 338 | 358 | 325 | 342 | 330 | 303 | 313 |
| 14 | 227 | 211 | 222 | 346 | 326 | 334 | 349 | 328 | 340 | 323 | 303 | 314 |
| 15 | 226 | 215 | 221 | 328 | 314 | 320 | 336 | 313 | 325 | 324 | 319 | 322 |
| 16 | 225 | 213 | 219 | 344 | 316 | 327 | 318 | 298 | 312 | 326 | 297 | 315 |
| 17 | 241 | 224 | 232 | 342 | 323 | 330 | 298 | 245 | 257 | 341 | 321 | 329 |
| 18 | 243 | 234 | 239 | 335 | 308 | 321 | 285 | 240 | 251 | 342 | 249 | 333 |
| 19 | 250 | 182 | 220 | 341 | 323 | 331 | 300 | 274 | 293 | 288 | 224 | 270 |
| 20 | 234 | 182 | 217 | 345 | 322 | 336 | 299 | 279 | 287 | 283 | 176 | 242 |
| 21 | 240 | 227 | 235 | 339 | 329 | 334 | 300 | 282 | 290 | 176 | 153 | 159 |
| 22 | 241 | 208 | 231 | 347 | 289 | 336 | 312 | 295 | 302 | 187 | 165 | 178 |
| 23 | 213 | 205 | 208 | 316 | 252 | 287 | 319 | 305 | 311 | 190 | 108 | 143 |
| 24 | 230 | 212 | 223 | 353 | 314 | 338 | 305 | 293 | 300 | 184 | 134 | 164 |
| 25 | 246 | 230 | 237 | 359 | 326 | 348 | 297 | 292 | 294 | 196 | 177 | 183 |
| 26 | 264 | 246 | 255 | 339 | 329 | 334 | 301 | 281 | 297 | 215 | 196 | 208 |
| 27 | 277 | 264 | 270 | 343 | 330 | 338 | 294 | 257 | 281 | 230 | 215 | 223 |
| 28 | 288 | 277 | 284 | 346 | 329 | 338 | 297 | 245 | 269 | 244 | 229 | 237 |
| 29 | 298 | 288 | 295 | 346 | 317 | 332 | 317 | 297 | 306 | 259 | 244 | 253 |
| 30 | 298 | 272 | 289 | 355 | 336 | 342 | 320 | 285 | 315 | 259 | 227 | 248 |
| 31 | --- | --- | --- | 356 | 337 | 342 | 326 | 285 | 318 | --- | --- | --- |
| MONTH | 298 | 148 | 232 | 362 | 181 | 322 | 415 | 240 | 325 | 358 | 108 | 270 |

01646500 POTOMAC RIVER NEAR WASHINGTON, DC—Continued




DAILY MEAN SPECIFIC CONDUCTANCE - 2003 WATER YEAR

01646500 POTOMAC RIVER NEAR WASHINGTON, DC—Continued

TEMPERATURE, WATER, DEGREES CELSIUS
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

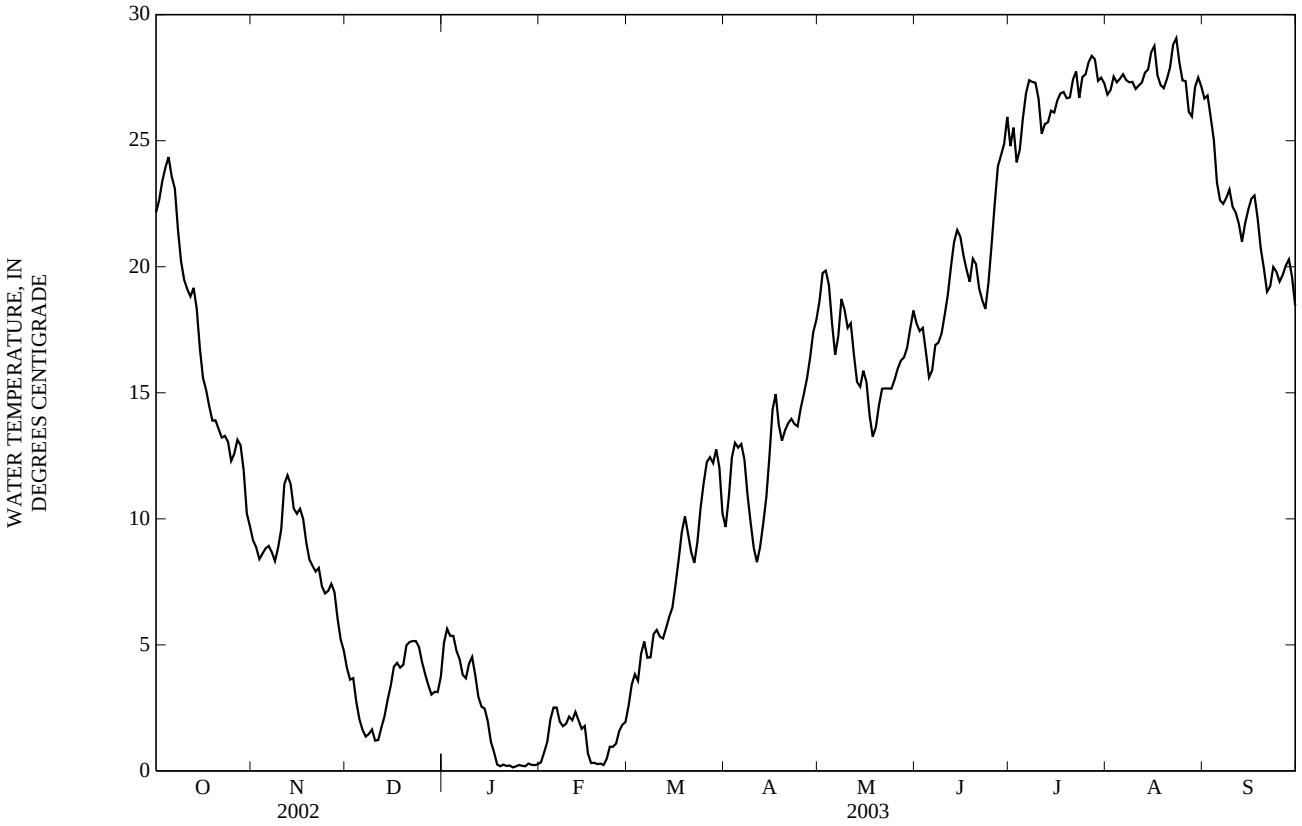
| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | |
| 1 | 23.2 | 21.2 | 22.2 | 9.5 | 8.9 | 9.1 | 4.6 | 3.7 | 4.1 | 6.9 | 3.8 | 5.1 |
| 2 | 23.9 | 21.6 | 22.6 | 9.2 | 8.6 | 8.9 | 3.9 | 3.4 | 3.6 | 6.5 | 5.5 | 5.6 |
| 3 | 24.3 | 22.4 | 23.4 | 8.7 | 8.0 | 8.4 | 4.0 | 3.2 | 3.7 | 5.7 | 5.0 | 5.4 |
| 4 | 24.6 | 23.4 | 23.9 | 9.0 | 8.4 | 8.6 | 3.7 | 2.2 | 2.7 | 5.5 | 5.0 | 5.4 |
| 5 | 25.0 | 23.9 | 24.4 | 9.1 | 8.7 | 8.8 | 2.8 | 1.5 | 2.0 | 5.0 | 4.4 | 4.8 |
| 6 | 24.3 | 23.1 | 23.6 | 9.3 | 8.6 | 8.9 | 2.7 | 0.9 | 1.6 | 4.5 | 4.3 | 4.4 |
| 7 | 23.7 | 22.7 | 23.1 | 9.0 | 8.2 | 8.7 | 2.2 | 0.6 | 1.4 | 4.3 | 3.6 | 3.8 |
| 8 | 22.7 | 20.9 | 21.5 | 9.0 | 7.9 | 8.3 | 2.4 | 0.6 | 1.5 | 4.0 | 3.3 | 3.7 |
| 9 | 20.9 | 19.9 | 20.2 | 9.4 | 8.4 | 8.9 | 2.9 | 0.9 | 1.6 | 4.8 | 3.8 | 4.2 |
| 10 | 20.0 | 19.2 | 19.5 | 10.2 | 8.9 | 9.6 | 1.7 | 0.6 | 1.2 | 4.8 | 4.2 | 4.5 |
| 11 | 19.3 | 18.9 | 19.1 | 12.3 | 10.1 | 11.4 | 1.8 | 0.9 | 1.2 | 4.4 | 3.5 | 3.8 |
| 12 | 19.3 | 18.5 | 18.8 | 12.0 | 11.6 | 11.7 | 2.3 | 1.3 | 1.7 | 3.5 | 2.6 | 2.9 |
| 13 | 19.4 | 18.9 | 19.2 | 11.8 | 10.7 | 11.4 | 2.5 | 1.7 | 2.2 | 2.8 | 2.1 | 2.6 |
| 14 | 18.9 | 17.7 | 18.3 | 10.7 | 10.0 | 10.4 | 3.2 | 2.5 | 2.8 | 2.8 | 2.2 | 2.5 |
| 15 | 18.0 | 16.2 | 16.8 | 10.6 | 9.9 | 10.2 | 3.8 | 3.1 | 3.4 | 2.5 | 1.5 | 2.0 |
| 16 | 16.7 | 14.9 | 15.6 | 10.5 | 10.3 | 10.4 | 4.5 | 3.8 | 4.1 | 1.6 | 0.8 | 1.1 |
| 17 | 15.6 | 14.8 | 15.1 | 10.4 | 9.5 | 10.0 | 4.5 | 4.1 | 4.3 | 1.1 | 0.2 | 0.7 |
| 18 | 15.0 | 14.1 | 14.5 | 9.5 | 8.7 | 9.1 | 4.3 | 3.9 | 4.1 | 0.5 | 0.0 | 0.3 |
| 19 | 14.3 | 13.7 | 13.9 | 8.7 | 8.1 | 8.4 | 4.6 | 4.0 | 4.2 | 0.5 | 0.0 | 0.2 |
| 20 | 14.0 | 13.7 | 13.9 | 8.4 | 7.8 | 8.1 | 5.3 | 4.6 | 5.0 | 0.6 | 0.0 | 0.3 |
| 21 | 14.0 | 13.1 | 13.6 | 8.2 | 7.7 | 7.9 | 5.4 | 4.7 | 5.1 | 0.4 | 0.0 | 0.2 |
| 22 | 13.8 | 12.8 | 13.2 | 8.2 | 7.7 | 8.1 | 5.4 | 4.8 | 5.2 | 0.6 | 0.0 | 0.2 |
| 23 | 14.2 | 12.6 | 13.3 | 7.7 | 7.1 | 7.3 | 5.5 | 4.7 | 5.2 | 0.4 | 0.0 | 0.1 |
| 24 | 13.6 | 12.7 | 13.1 | 7.3 | 6.6 | 7.0 | 5.3 | 4.8 | 4.9 | 0.5 | 0.0 | 0.2 |
| 25 | 12.7 | 12.1 | 12.3 | 7.5 | 6.7 | 7.1 | 4.9 | 3.7 | 4.3 | 0.5 | 0.0 | 0.2 |
| 26 | 13.4 | 12.1 | 12.6 | 7.5 | 7.2 | 7.4 | 4.1 | 3.6 | 3.8 | 0.5 | 0.1 | 0.2 |
| 27 | 13.8 | 12.5 | 13.1 | 7.4 | 6.5 | 7.1 | 3.7 | 3.2 | 3.4 | 0.4 | 0.0 | 0.2 |
| 28 | 13.6 | 12.6 | 12.9 | 6.5 | 5.5 | 6.0 | 3.3 | 2.7 | 3.0 | 0.6 | 0.1 | 0.3 |
| 29 | 12.8 | 10.8 | 11.9 | 5.5 | 4.7 | 5.2 | 3.5 | 2.8 | 3.1 | 0.4 | 0.2 | 0.2 |
| 30 | 10.8 | 9.7 | 10.2 | 5.1 | 4.6 | 4.8 | 3.4 | 2.9 | 3.1 | 0.6 | 0.1 | 0.2 |
| 31 | 10.0 | 9.5 | 9.7 | --- | --- | --- | 4.3 | 3.3 | 3.7 | 0.6 | 0.1 | 0.3 |
| MONTH | 25.0 | 9.5 | 17.0 | 12.3 | 4.6 | 8.6 | 5.5 | 0.6 | 3.3 | 6.9 | 0.0 | 2.1 |
| | | FEBRUARY | | | MARCH | | | APRIL | | | MAY | |
| 1 | 0.7 | 0.2 | 0.3 | 2.9 | 2.4 | 2.6 | 10.4 | 9.0 | 9.7 | 19.2 | 18.2 | 18.6 |
| 2 | 1.3 | 0.3 | 0.7 | 4.3 | 2.8 | 3.4 | 12.1 | 9.9 | 10.8 | 20.3 | 19.2 | 19.8 |
| 3 | 1.8 | 0.6 | 1.1 | 4.3 | 3.3 | 3.8 | 13.7 | 11.3 | 12.4 | 20.2 | 19.5 | 19.8 |
| 4 | 3.0 | 1.4 | 2.0 | 4.1 | 3.0 | 3.6 | 13.6 | 12.7 | 13.0 | 19.8 | 18.8 | 19.3 |
| 5 | 3.3 | 1.8 | 2.5 | 5.6 | 3.9 | 4.7 | 13.2 | 12.5 | 12.8 | 18.8 | 16.8 | 17.8 |
| 6 | 2.9 | 2.2 | 2.5 | 5.4 | 4.7 | 5.1 | 13.5 | 12.4 | 13.0 | 16.8 | 16.4 | 16.5 |
| 7 | 2.4 | 1.5 | 2.0 | 4.8 | 4.1 | 4.5 | 13.7 | 11.4 | 12.4 | 18.4 | 16.4 | 17.2 |
| 8 | 2.7 | 1.1 | 1.8 | 4.9 | 4.1 | 4.5 | 11.5 | 10.2 | 10.9 | 19.3 | 18.2 | 18.7 |
| 9 | 2.7 | 1.1 | 1.9 | 6.1 | 4.7 | 5.4 | 10.2 | 9.3 | 9.8 | 19.2 | 17.9 | 18.3 |
| 10 | 2.4 | 1.9 | 2.2 | 5.9 | 5.3 | 5.6 | 9.3 | 8.5 | 8.8 | 18.0 | 17.3 | 17.6 |
| 11 | 2.6 | 1.5 | 2.0 | 5.6 | 5.1 | 5.3 | 8.7 | 8.1 | 8.3 | 18.3 | 17.3 | 17.8 |
| 12 | 3.2 | 1.6 | 2.3 | 5.6 | 4.9 | 5.3 | 9.7 | 8.1 | 8.9 | 17.7 | 15.7 | 16.5 |
| 13 | 2.8 | 1.2 | 2.0 | 6.3 | 5.1 | 5.7 | 10.4 | 9.2 | 9.8 | 15.7 | 15.0 | 15.4 |
| 14 | 2.5 | 0.9 | 1.7 | 6.7 | 5.5 | 6.1 | 11.8 | 9.9 | 10.8 | 16.1 | 14.5 | 15.2 |
| 15 | 2.2 | 1.6 | 1.8 | 7.2 | 5.8 | 6.5 | 13.8 | 11.3 | 12.5 | 16.5 | 15.3 | 15.9 |
| 16 | 1.7 | 0.1 | 0.7 | 8.1 | 6.7 | 7.4 | 15.4 | 13.3 | 14.3 | 16.2 | 14.7 | 15.4 |
| 17 | 0.6 | 0.2 | 0.3 | 8.9 | 7.8 | 8.4 | 15.3 | 14.6 | 14.9 | 14.7 | 13.6 | 14.1 |
| 18 | 0.7 | 0.1 | 0.3 | 10.2 | 8.8 | 9.5 | 14.6 | 13.3 | 13.7 | 13.6 | 13.1 | 13.3 |
| 19 | 0.9 | 0.1 | 0.3 | 10.5 | 9.7 | 10.1 | 13.6 | 12.7 | 13.1 | 14.5 | 12.8 | 13.6 |
| 20 | 0.5 | 0.1 | 0.3 | 10.1 | 8.7 | 9.4 | 14.2 | 12.8 | 13.5 | 15.4 | 13.7 | 14.5 |
| 21 | 0.4 | 0.1 | 0.2 | 9.0 | 8.6 | 8.7 | 14.3 | 13.3 | 13.8 | 15.4 | 14.9 | 15.2 |
| 22 | 1.2 | 0.2 | 0.5 | 8.7 | 7.8 | 8.3 | 14.2 | 13.7 | 14.0 | 15.2 | 15.1 | 15.2 |
| 23 | 1.3 | 0.6 | 1.0 | 9.8 | 8.3 | 9.1 | 14.4 | 13.1 | 13.8 | 15.2 | 15.1 | 15.2 |
| 24 | 1.2 | 0.7 | 1.0 | 11.2 | 9.7 | 10.4 | 14.4 | 12.8 | 13.7 | 15.6 | 14.9 | 15.2 |
| 25 | 1.5 | 0.3 | 1.1 | 12.3 | 10.6 | 11.4 | 15.0 | 13.8 | 14.4 | 15.9 | 15.2 | 15.5 |
| 26 | 1.7 | 1.4 | 1.6 | 12.9 | 11.6 | 12.3 | 15.2 | 14.8 | 15.0 | 16.6 | 15.5 | 16.0 |
| 27 | 2.0 | 1.7 | 1.8 | 13.2 | 11.6 | 12.4 | 16.5 | 14.7 | 15.6 | 16.6 | 16.0 | 16.3 |
| 28 | 2.4 | 1.6 | 1.9 | 13.0 | 11.7 | 12.2 | 17.5 | 15.4 | 16.4 | 17.0 | 16.0 | 16.4 |
| 29 | --- | --- | --- | 13.5 | 12.3 | 12.8 | 17.7 | 17.0 | 17.4 | 17.2 | 16.4 | 16.8 |
| 30 | --- | --- | --- | 13.5 | 10.8 | 12.0 | 18.4 | 17.4 | 17.9 | 18.8 | 16.5 | 17.6 |
| 31 | --- | --- | --- | 10.8 | 9.8 | 10.2 | --- | --- | --- | 18.8 | 17.9 | 18.3 |
| MONTH | 3.3 | 0.1 | 1.4 | 13.5 | 2.4 | 7.6 | 18.4 | 8.1 | 12.8 | 20.3 | 12.8 | 16.5 |

01646500 POTOMAC RIVER NEAR WASHINGTON, DC—Continued

TEMPERATURE, WATER, DEGREES CELSIUS—CONTINUED
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | |
| 1 | 18.4 | 17.5 | 17.8 | 26.5 | 22.3 | 24.8 | 27.2 | 26.5 | 26.8 | 27.5 | 25.9 | 26.7 |
| 2 | 18.3 | 16.6 | 17.4 | 26.1 | 24.3 | 25.5 | 27.7 | 26.5 | 27.0 | 27.2 | 26.3 | 26.8 |
| 3 | 18.2 | 17.4 | 17.6 | 24.3 | 23.9 | 24.1 | 28.4 | 26.9 | 27.5 | 26.6 | 25.5 | 25.9 |
| 4 | 17.4 | 15.9 | 16.6 | 25.6 | 23.9 | 24.6 | 28.0 | 26.5 | 27.3 | 25.5 | 24.4 | 25.0 |
| 5 | 15.9 | 15.4 | 15.6 | 26.7 | 24.8 | 25.9 | 28.6 | 26.8 | 27.5 | 24.4 | 22.8 | 23.3 |
| 6 | 16.6 | 15.3 | 15.9 | 27.5 | 26.1 | 26.9 | 28.7 | 26.9 | 27.6 | 23.1 | 22.1 | 22.6 |
| 7 | 18.1 | 16.2 | 16.9 | 27.8 | 26.6 | 27.4 | 27.9 | 26.9 | 27.4 | 23.0 | 21.8 | 22.5 |
| 8 | 17.2 | 16.8 | 17.0 | 27.6 | 27.0 | 27.3 | 27.9 | 26.7 | 27.3 | 22.9 | 22.4 | 22.7 |
| 9 | 17.9 | 16.9 | 17.4 | 28.3 | 26.5 | 27.3 | 27.6 | 26.9 | 27.3 | 23.6 | 22.6 | 23.1 |
| 10 | 18.8 | 17.4 | 18.1 | 27.1 | 26.0 | 26.7 | 27.9 | 26.6 | 27.1 | 22.9 | 21.7 | 22.4 |
| 11 | 19.3 | 18.4 | 18.9 | 26.0 | 24.2 | 25.3 | 27.5 | 26.9 | 27.2 | 23.3 | 21.5 | 22.1 |
| 12 | 21.3 | 19.1 | 20.0 | 26.4 | 25.0 | 25.7 | 28.8 | 26.1 | 27.3 | 22.0 | 20.9 | 21.7 |
| 13 | 21.6 | 20.4 | 21.0 | 26.6 | 25.0 | 25.7 | 28.1 | 27.4 | 27.7 | 21.7 | 20.6 | 21.0 |
| 14 | 22.1 | 20.8 | 21.5 | 26.6 | 25.6 | 26.2 | 28.4 | 27.2 | 27.8 | 22.2 | 21.3 | 21.7 |
| 15 | 21.3 | 20.7 | 21.2 | 26.4 | 25.7 | 26.1 | 29.0 | 28.0 | 28.5 | 23.2 | 21.7 | 22.3 |
| 16 | 20.7 | 20.3 | 20.4 | 27.2 | 26.2 | 26.6 | 29.3 | 28.1 | 28.8 | 23.8 | 21.9 | 22.7 |
| 17 | 20.3 | 19.4 | 19.9 | 27.7 | 26.3 | 26.9 | 28.1 | 27.0 | 27.6 | 23.9 | 22.1 | 22.8 |
| 18 | 20.1 | 19.0 | 19.4 | 27.5 | 26.4 | 26.9 | 27.6 | 26.9 | 27.2 | 22.5 | 20.4 | 21.9 |
| 19 | 21.1 | 19.6 | 20.3 | 27.4 | 26.1 | 26.7 | 27.7 | 26.7 | 27.1 | 21.0 | 20.4 | 20.7 |
| 20 | 20.9 | 19.7 | 20.1 | 27.6 | 25.9 | 26.7 | 28.3 | 26.7 | 27.4 | 20.4 | 19.2 | 19.9 |
| 21 | 19.7 | 18.9 | 19.1 | 28.7 | 26.5 | 27.4 | 29.1 | 27.1 | 27.9 | 19.2 | 18.9 | 19.0 |
| 22 | 19.0 | 18.3 | 18.7 | 28.7 | 27.1 | 27.7 | 29.9 | 27.9 | 28.8 | 19.6 | 18.9 | 19.2 |
| 23 | 19.0 | 17.7 | 18.3 | 27.6 | 25.9 | 26.7 | 30.1 | 28.4 | 29.1 | 20.3 | 19.5 | 20.0 |
| 24 | 20.5 | 18.4 | 19.4 | 28.5 | 26.8 | 27.5 | 29.0 | 27.2 | 28.1 | 20.0 | 19.4 | 19.8 |
| 25 | 22.3 | 19.7 | 20.9 | 28.7 | 27.0 | 27.6 | 28.5 | 26.2 | 27.4 | 19.7 | 19.1 | 19.4 |
| 26 | 24.2 | 21.4 | 22.5 | 29.4 | 27.1 | 28.1 | 28.4 | 26.3 | 27.4 | 20.2 | 19.2 | 19.7 |
| 27 | 24.8 | 23.3 | 24.0 | 29.1 | 27.6 | 28.4 | 26.9 | 25.2 | 26.1 | 20.7 | 19.4 | 20.0 |
| 28 | 24.9 | 23.8 | 24.4 | 28.8 | 27.6 | 28.2 | 27.4 | 24.8 | 26.0 | 20.6 | 20.0 | 20.3 |
| 29 | 25.7 | 24.1 | 24.9 | 28.3 | 26.6 | 27.4 | 28.5 | 26.1 | 27.1 | 20.4 | 19.0 | 19.6 |
| 30 | 26.6 | 25.4 | 25.9 | 28.5 | 26.7 | 27.5 | 28.7 | 26.6 | 27.5 | 19.0 | 18.0 | 18.4 |
| 31 | --- | --- | --- | 27.9 | 26.6 | 27.3 | 27.7 | 26.8 | 27.2 | --- | --- | --- |
| MONTH | 26.6 | 15.3 | 19.7 | 29.4 | 22.3 | 26.7 | 30.1 | 24.8 | 27.5 | 27.5 | 18.0 | 21.8 |

01646500 POTOMAC RIVER NEAR WASHINGTON, DC—Continued




DAILY MEAN WATER TEMPERATURE - 2003 WATER YEAR

## 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 $mi^2$.

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/cm, Sept. 12, 1981; minimum, 116 microsiemens/cm, 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.

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Time | Sample type | Instantaneous discharge, cfs (00061) | Barometric pressure, mm Hg (00025) | Dissolved oxygen, mg/L (00300) | Dissolved oxygen, percent of saturation (00301) | pH, water, unfltrd field, std units (00400) | Specif. conductance, wat unf uS/cm 25 degC (00095) | Temperature, air, deg C (00020) | Temperature, water, deg C (00010) | Hardness, water, unfltrd mg/L as CaCO3 (00900) | Calcium water, fltrd, mg/L (00915) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | |
| 08... | 1030 | Environmental | 1,370 | 769 | 9.4 | 105 | 8.7 | 392 | 18.0 | 21.0 | -- | -- |
| NOV | | | | | | | | | | | | |
| 05... | 1100 | Environmental | 8,870 | 764 | 12.8 | 110 | 7.5 | 273 | 11.5 | 9.0 | -- | -- |
| DEC | | | | | | | | | | | | |
| 03... | 1015 | Environmental | 6,870 | 772 | 14.0 | 105 | 8.1 | 279 | 0.0 | 3.6 | -- | -- |
| JAN | | | | | | | | | | | | |
| 08... | 1000 | Environmental | 27,400 | 751 | 6.9 | 52 | 7.8 | 222 | -- | 3.3 | -- | -- |
| 22... | 1045 | Environmental | 5,780 | 763 | 14.9 | 102 | 8.1 | 324 | -4.0 | 0.0 | 140 | 41.0 |
| FEB | | | | | | | | | | | | |
| *04...* | *1145* | *Blank* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 04... | 1230 | Environmental | 6,230 | 751 | 13.2 | 97 | 7.9 | 359 | 12.0 | 2.1 | -- | -- |
| 23... | 1115 | Environmental | 37,700 | 739 | -- | -- | 7.9 | 322 | 7.5 | 3.0 | -- | -- |
| MAR | | | | | | | | | | | | |
| 04... | 1200 | Environmental | 34,100 | 771 | -- | -- | 7.4 | 248 | 6.0 | 3.2 | -- | -- |
| 10... | 1045 | Environmental | 74,300 | 765 | -- | -- | 7.7 | 198 | 1.0 | 6.0 | -- | -- |
| 18... | 1230 | Environmental | 38,100 | 758 | 14.5 | 128 | 6.1 | 212 | 19.5 | 9.5 | -- | -- |
| 19... | 1215 | Environmental | 36,100 | 766 | -- | -- | 8.0 | 215 | 10.0 | 10.5 | -- | -- |
| 22... | 1015 | Environmental | 119,000 | 755 | -- | -- | 7.9 | 186 | 15.0 | 9.0 | -- | -- |
| *22...* | *1016* | *Replicate* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| APR | | | | | | | | | | | | |
| 02... | 0945 | Environmental | 21,700 | 756 | 13.9 | 124 | 7.4 | 273 | -- | 10.0 | -- | -- |
| 09... | 0945 | Environmental | 34,600 | 763 | 12.3 | 109 | 8.1 | 248 | 5.5 | 10.0 | 100 | 30.4 |
| *09...* | *0950* | *Replicate* | -- | -- | -- | -- | -- | -- | -- | -- | *100* | *30.6* |
| 22... | 1015 | Environmental | 19,000 | 752 | 11.2 | 110 | 8.1 | 264 | 23.0 | 14.0 | 120 | 34.2 |
| *22...* | *1020* | *Replicate* | -- | -- | -- | -- | -- | -- | -- | -- | *110* | *33.6* |
| 23... | 1045 | Environmental | 18,100 | 764 | 11.5 | 110 | 7.7 | 266 | -- | 13.3 | -- | -- |
| MAY | | | | | | | | | | | | |
| 07... | 1030 | Environmental | 14,800 | 756 | 12.2 | 127 | 7.7 | 286 | 26.0 | 17.0 | -- | -- |
| 14... | 0915 | Environmental | 42,300 | 758 | 11.3 | 112 | 7.9 | 178 | 17.0 | 14.8 | -- | -- |
| *14...* | *0920* | *Replicate* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 20... | 1115 | Environmental | 44,700 | 773 | 12.1 | 117 | 6.9 | 204 | -- | 14.5 | -- | -- |
| 28... | 0930 | Environmental | 26,300 | 756 | -- | -- | 8.0 | 243 | 15.0 | -- | -- | -- |
| JUN | | | | | | | | | | | | |
| 04... | 0930 | Environmental | 28,100 | 757 | 9.6 | 100 | 7.2 | 246 | 16.5 | 16.8 | -- | -- |
| *04...* | *0931* | *Replicate* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 18... | 0945 | Environmental | 32,600 | 764 | 9.0 | 97 | 7.9 | 242 | 18.5 | 19.1 | -- | -- |
| *18...* | *0946* | *Replicate* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *25...* | *1055* | *Blank* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *25...* | *1056* | *Blank* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 25... | 1100 | Environmental | 30,100 | 762 | 9.6 | 106 | 8.0 | 229 | 30.0 | 20.5 | -- | -- |
| *25...* | *1101* | *Replicate* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| JUL | | | | | | | | | | | | |
| 08... | 1000 | Environmental | 13,000 | 758 | 9.8 | 124 | 8.1 | 317 | 27.5 | 27.0 | -- | -- |
| *08...* | *1002* | *Replicate* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 16... | 0945 | Environmental | 10,400 | 758 | 9.4 | -- | 8.2 | 306 | 30.0 | 26.5 | -- | -- |
| *16...* | *0946* | *Replicate* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *16...* | *0950* | *Replicate* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *16...* | *0951* | *Replicate* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 23... | 1100 | Environmental | 8,780 | 762 | 8.3 | 105 | 7.9 | 291 | 26.0 | 26.9 | -- | -- |
| AUG | | | | | | | | | | | | |
| 04... | 1030 | Environmental | 5,570 | 759 | 8.1 | 104 | 8.4 | 354 | 25.5 | 27.5 | -- | -- |
| *04...* | *1031* | *Replicate* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *04...* | *1032* | *Replicate* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | 1030 | Environmental | 5,290 | 762 | 10.6 | 134 | 8.2 | 376 | 29.5 | 27.1 | -- | -- |
| 20... | 0915 | Environmental | 7,540 | 761 | 9.9 | 126 | 7.9 | 282 | 27.0 | 27.5 | -- | -- |
| SEP | | | | | | | | | | | | |
| 03... | 0945 | Environmental | 5,080 | 761 | 8.1 | 100 | 8.2 | 329 | 23.5 | 26.0 | -- | -- |
| *03...* | *0946* | *Replicate* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | 0915 | Environmental | 38,600 | 759 | 8.8 | 103 | 7.9 | 241 | 24.0 | 23.0 | -- | -- |
| 09... | 1115 | Environmental | 9,910 | 771 | 9.1 | 105 | 7.8 | 286 | 26.5 | 23.0 | -- | -- |
| 20... | 0900 | Environmental | 82,900 | 762 | 12.4 | 142 | 7.9 | 286 | 22.5 | 22.0 | -- | -- |
| *20...* | *0905* | *Replicate* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Magnesium, water, fltrd, mg/L (00925) | Potassium, water, fltrd, mg/L (00935) | Sodium, water, fltrd, mg/L (00930) | Alkalinity, wat flt inc tit field, mg/L as CaCO3 (39086) | Bicarbonate, wat flt incrm. titr., field, mg/L (00453) | Chloride, water, fltrd, mg/L (00940) | Fluoride, water, fltrd, mg/L (00950) | Silica, water, fltrd, mg/L (00955) | Sulfate water, fltrd, mg/L (00945) | Residue on evap. at 180degC wat flt mg/L (70300) | Residue total at 105 deg. C, suspended, mg/L (00530) | Ammonia + org-N, water, fltrd, mg/L as N (00623) | Ammonia + org-N, water, unfltrd mg/L as N (00625) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 08... | -- | -- | -- | 66 | 81 | 21.9 | -- | 2.5 | 56.4 | -- | <10 | -- | 0.36 |
| NOV | | | | | | | | | | | | | |
| 05... | -- | -- | -- | 74 | 91 | 11.7 | -- | 6.9 | 28.5 | -- | <10 | 0.26 | 0.36 |
| DEC | | | | | | | | | | | | | |
| 03... | -- | -- | -- | 82 | 101 | 12.4 | -- | 6.2 | 29.5 | -- | <10 | -- | 0.18 |
| JAN | | | | | | | | | | | | | |
| 08... | -- | -- | -- | 58 | 71 | 16.0 | -- | -- | 24.7 | -- | -- | -- | 0.35 |
| 22... | 9.07 | 2.02 | 10.1 | -- | -- | 15.6 | <0.17 | 6.38 | 28.5 | 186 | <10 | 0.16 | 0.18 |
| FEB | | | | | | | | | | | | | |
| *04*... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *<0.10* |
| 04... | -- | -- | -- | 105 | 128 | 20.8 | -- | -- | 32.6 | -- | -- | -- | 0.20 |
| 23... | -- | -- | -- | -- | -- | -- | -- | 4.1 | -- | -- | 136 | 0.31 | 0.77 |
| MAR | | | | | | | | | | | | | |
| 04... | -- | -- | -- | 66 | 80 | 24.3 | -- | -- | 20.6 | -- | -- | -- | 0.65 |
| 10... | -- | -- | -- | -- | -- | -- | -- | 6.8 | -- | -- | 94 | 0.34 | 0.71 |
| 18... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.29 |
| 19... | -- | -- | -- | -- | -- | -- | -- | 6.4 | -- | -- | 23 | 0.23 | 0.33 |
| 22... | -- | -- | -- | -- | -- | -- | -- | 5.8 | -- | -- | 310 | 0.36 | 1.5 |
| *22*... | -- | -- | -- | -- | -- | -- | -- | *5.8* | -- | -- | *296* | *0.36* | *1.4* |
| APR | | | | | | | | | | | | | |
| 02... | -- | -- | -- | 81 | 98 | 13.1 | -- | -- | 21.7 | -- | -- | -- | 0.32 |
| 09... | 6.60 | 1.85 | 8.11 | 67 | 82 | 11.9 | 0.09 | 4.35 | 21.1 | 267 | 35 | 0.18 | 0.46 |
| *09*... | *6.56* | *1.78* | *7.98* | -- | -- | *12.0* | *0.09* | *4.31* | *21.2* | *139* | *37* | *0.14* | *0.36* |
| 22... | 7.44 | 1.88 | 6.90 | 76 | 92 | 10.7 | 0.09 | 5.66 | 22.2 | 149 | <10 | 0.16 | 0.28 |
| *22*... | *7.31* | *1.89* | *6.76* | -- | -- | *10.7* | *0.09* | *5.51* | *22.4* | *149* | *14* | *0.17* | *0.27* |
| 23... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.25 |
| MAY | | | | | | | | | | | | | |
| 07... | -- | -- | -- | 85 | 104 | 13.2 | -- | -- | 21.9 | -- | -- | -- | 0.45 |
| 14... | -- | -- | -- | -- | -- | -- | -- | 7.2 | -- | -- | 85 | 0.27 | 0.82 |
| *14*... | -- | -- | -- | -- | -- | -- | -- | *7.4* | -- | -- | *113* | *0.26* | *0.78* |
| 20... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.42 |
| 28... | -- | -- | -- | -- | -- | -- | -- | 8.4 | -- | -- | 41 | 0.26 | 0.51 |
| JUN | | | | | | | | | | | | | |
| 04... | -- | -- | -- | 70 | 85 | 10.7 | -- | -- | 22.6 | -- | -- | -- | 0.38 |
| *04*... | -- | -- | -- | -- | -- | *10.9* | -- | -- | *22.6* | -- | -- | -- | *0.40* |
| 18... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.55 |
| *18*... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *25*... | -- | -- | -- | -- | -- | -- | -- | *<0.2* | -- | -- | *<10* | *<0.10* | *<0.10* |
| *25*... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 25... | -- | -- | -- | -- | -- | -- | -- | 8.7 | -- | -- | 55 | 0.25 | 0.49 |
| *25*... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| JUL | | | | | | | | | | | | | |
| 08... | -- | -- | -- | 110 | 135 | 13.8 | -- | -- | 19.3 | -- | -- | -- | 0.47 |
| *08*... | -- | -- | -- | *111* | *136* | -- | -- | -- | -- | -- | -- | -- | -- |
| 16... | -- | -- | -- | -- | -- | -- | -- | 7.0 | -- | -- | 15 | 0.18 | 0.47 |
| *16*... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *16*... | -- | -- | -- | -- | -- | -- | -- | *6.9* | -- | -- | *18* | *0.21* | *0.42* |
| *16*... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 23... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.54 |
| AUG | | | | | | | | | | | | | |
| 04... | -- | -- | -- | -- | -- | -- | -- | 5.7 | -- | -- | <10 | 0.23 | 0.55 |
| *04*... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *04*... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | -- | -- | -- | 125 | 152 | 19.2 | -- | -- | 31.8 | -- | -- | -- | 0.57 |
| 20... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.47 |
| SEP | | | | | | | | | | | | | |
| 03... | -- | -- | -- | -- | -- | -- | -- | 4.3 | -- | -- | 20 | 0.27 | 0.36 |
| *03*... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | -- | -- | -- | -- | -- | -- | -- | 6.5 | -- | -- | 392 | 0.48 | 2.0 |
| 09... | -- | -- | -- | 78 | 96 | 11.1 | -- | -- | 34.6 | -- | -- | -- | 0.44 |
| 20... | -- | -- | -- | -- | -- | -- | -- | 7.1 | -- | -- | 506 | 0.39 | 2.2 |
| *20*... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Ammonia water, fltrd, mg/L as N (00608) | Nitrate water, fltrd, mg/L as N (00618) | Nitrite + nitrate water fltrd, mg/L as N (00631) | Nitrite water, fltrd, mg/L as N (00613) | Organic nitro-gen, water, fltrd, mg/L (00607) | Organic nitro-gen, water, unfltrd mg/L (00605) | Ortho-phos-phate, water, fltrd, mg/L as P (00671) | Phos-phorus, water, fltrd, mg/L (00666) | Phos-phorus, water, unfltrd mg/L (00665) | Total nitro-gen, water, fltrd, mg/L (00602) | Total nitro-gen, water, unfltrd mg/L (00600) | Organic carbon, suspnd sedimnt total, mg/L (00689) | Organic carbon, water, fltrd, mg/L (00681) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 08... | <0.04 | 0.81 | 0.82 | 0.009 | -- | -- | 0.03 | -- | 0.055 | -- | 1.2 | <0.1 | 4.1 |
| NOV | | | | | | | | | | | | | |
| 05... | <0.04 | -- | 1.73 | E.006 | -- | -- | 0.05 | 0.069 | 0.088 | 2.0 | 2.1 | 0.4 | 4.0 |
| DEC | | | | | | | | | | | | | |
| 03... | <0.04 | -- | 2.00 | E.005 | -- | -- | 0.03 | -- | 0.039 | -- | 2.2 | <0.1 | 2.0 |
| JAN | | | | | | | | | | | | | |
| 08... | 0.04 | -- | 1.88 | E.004 | -- | 0.31 | 0.07 | -- | 0.073 | -- | 2.2 | 0.8 | 3.4 |
| 22... | <0.04 | -- | 2.52 | E.006 | -- | -- | 0.02 | 0.023 | 0.039 | 2.7 | 2.7 | -- | 1.8 |
| FEB | | | | | | | | | | | | | |
| *04...* | *0.08* | -- | *<0.06* | *0.011* | -- | -- | *<0.02* | -- | *<0.004* | -- | -- | *<0.1* | *0.8* |
| 04... | E.04 | 2.58 | 2.59 | 0.010 | -- | -- | E.01 | -- | 0.029 | -- | 2.8 | <0.1 | 2.1 |
| 23... | 0.10 | 1.42 | 1.43 | 0.010 | 0.21 | 0.67 | E.01 | 0.019 | 0.19 | 1.7 | 2.2 | -- | -- |
| MAR | | | | | | | | | | | | | |
| 04... | 0.12 | 1.90 | 1.91 | 0.011 | -- | 0.52 | 0.04 | -- | 0.125 | -- | 2.6 | 1.5 | 3.6 |
| 10... | 0.07 | 1.51 | 1.52 | 0.008 | 0.26 | 0.63 | 0.03 | 0.041 | 0.166 | 1.9 | 2.2 | -- | -- |
| 18... | E.03 | 1.55 | 1.55 | 0.009 | -- | -- | 0.02 | -- | 0.065 | -- | 1.8 | -- | -- |
| 19... | E.03 | 1.55 | 1.56 | 0.009 | -- | -- | 0.02 | 0.019 | 0.060 | 1.8 | 1.9 | -- | 2.2 |
| 22... | 0.06 | 1.16 | 1.17 | 0.008 | 0.30 | 1.5 | 0.02 | 0.037 | 0.39 | 1.5 | 2.7 | -- | -- |
| *22...* | *0.06* | *1.16* | *1.17* | *0.009* | *0.30* | *1.4* | *0.02* | *0.035* | *0.37* | *1.5* | *2.6* | -- | -- |
| APR | | | | | | | | | | | | | |
| 02... | <0.04 | 1.73 | 1.73 | 0.008 | -- | -- | E.01 | -- | 0.050 | -- | 2.1 | 0.5 | 3.7 |
| 09... | <0.04 | 1.30 | 1.31 | 0.009 | -- | -- | E.01 | 0.014 | 0.064 | 1.5 | 1.8 | -- | 2.2 |
| *09...* | *<0.04* | *1.31* | *1.32* | *0.009* | -- | -- | *E.01* | *0.014* | *0.068* | *1.5* | *1.7* | -- | *2.3* |
| 22... | <0.04 | -- | 1.55 | E.004 | -- | -- | E.01 | 0.021 | 0.048 | 1.7 | 1.8 | -- | 1.9 |
| *22...* | *<0.04* | -- | *1.56* | *E.004* | -- | -- | *E.01* | *0.021* | *0.047* | *1.7* | *1.8* | -- | *2.0* |
| 23... | <0.04 | 1.26 | 1.35 | 0.086 | -- | -- | <0.02 | -- | 0.044 | -- | 1.6 | -- | -- |
| MAY | | | | | | | | | | | | | |
| 07... | <0.04 | -- | 1.34 | E.007 | -- | -- | <0.02 | -- | 0.049 | -- | 1.8 | 0.9 | 3.5 |
| 14... | E.04 | 0.91 | 0.92 | 0.010 | -- | -- | 0.02 | 0.032 | 0.181 | 1.2 | 1.7 | -- | -- |
| *14...* | *E.04* | *0.91* | *0.91* | *0.009* | -- | -- | *0.02* | *0.032* | *0.176* | *1.2* | *1.7* | -- | -- |
| 20... | <0.04 | 1.13 | 1.17 | 0.040 | -- | -- | <0.02 | -- | 0.097 | -- | 1.6 | -- | -- |
| 28... | <0.04 | 1.45 | 1.47 | 0.011 | -- | -- | 0.04 | 0.050 | 0.119 | 1.7 | 2.0 | -- | -- |
| JUN | | | | | | | | | | | | | |
| 04... | <0.04 | 0.87 | 1.03 | 0.159 | -- | -- | <0.02 | -- | 0.092 | -- | 1.4 | 1.1 | 3.2 |
| *04...* | *<0.04* | *0.87* | *1.03* | *0.162* | -- | -- | *<0.02* | -- | *0.094* | -- | *1.4* | *1.2* | *2.6* |
| 18... | <0.04 | 1.11 | 1.18 | 0.064 | -- | -- | <0.02 | -- | 0.126 | -- | 1.7 | -- | -- |
| *18...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *25...* | *<0.04* | -- | *<0.06* | *<0.008* | -- | -- | *<0.02* | *<0.004* | *<0.004* | -- | -- | -- | -- |
| *25...* | -- | -- | -- | -- | -- | -- | -- | *<0.01* | -- | -- | -- | -- | *E.2* |
| 25... | <0.04 | -- | 1.26 | E.006 | -- | -- | 0.04 | 0.049 | 0.128 | 1.5 | 1.8 | -- | -- |
| *25...* | -- | -- | -- | -- | -- | -- | -- | *0.04* | -- | -- | -- | -- | *3.1* |
| JUL | | | | | | | | | | | | | |
| 08... | <0.04 | 1.58 | 1.59 | 0.009 | -- | -- | <0.02 | -- | 0.061 | -- | 2.1 | 1.4 | 3.8 |
| *08...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 16... | <0.04 | 1.50 | 1.51 | 0.008 | -- | -- | 0.02 | 0.027 | 0.066 | 1.7 | 2.0 | -- | -- |
| *16...* | -- | -- | -- | -- | -- | -- | -- | *0.03* | -- | -- | -- | -- | *3.0* |
| *16...* | *<0.04* | *1.50* | *1.51* | *0.008* | -- | -- | *0.02* | *0.027* | *0.065* | *1.7* | *1.9* | -- | -- |
| *16...* | -- | -- | -- | -- | -- | -- | -- | *0.03* | -- | -- | -- | -- | *3.0* |
| 23... | <0.04 | 1.15 | 1.16 | 0.012 | -- | -- | <0.02 | -- | 0.075 | -- | 1.7 | -- | -- |
| AUG | | | | | | | | | | | | | |
| 04... | <0.04 | 1.21 | 1.23 | 0.012 | -- | -- | <0.02 | 0.011 | 0.056 | 1.5 | 1.8 | -- | -- |
| *04...* | -- | -- | -- | -- | -- | -- | -- | *<0.01* | -- | -- | -- | -- | *2.6* |
| *04...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | <0.04 | 1.41 | 1.42 | 0.014 | -- | -- | <0.02 | -- | 0.053 | -- | 2.0 | 1.8 | 3.0 |
| 20... | <0.04 | 0.91 | 0.94 | 0.034 | -- | -- | <0.02 | -- | 0.121 | -- | 1.4 | -- | -- |
| SEP | | | | | | | | | | | | | |
| 03... | E.03 | 1.16 | 1.17 | 0.010 | -- | -- | 0.02 | 0.030 | 0.052 | 1.4 | 1.5 | -- | -- |
| *03...* | -- | -- | -- | -- | -- | -- | -- | *0.04* | -- | -- | -- | -- | *2.5* |
| 05... | <0.41 | -- | 1.24 | <0.080 | -- | -- | E.11 | 0.124 | 0.63 | 1.7 | 3.2 | -- | -- |
| 09... | <0.04 | 1.40 | 1.41 | 0.010 | -- | -- | 0.04 | -- | 0.100 | -- | 1.8 | 1.2 | 4.2 |
| 20... | 0.04 | 1.33 | 1.34 | 0.009 | 0.34 | 2.2 | 0.05 | 0.068 | 0.70 | 1.7 | 3.5 | -- | -- |
| *20...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Organic carbon, water, unfltrd mg/L (00680) | Iron, water, fltrd, ug/L (01046) | Manganese, water, fltrd, ug/L (01056) | 2,6-Diethylaniline water fltrd 0.7u GF ug/L (82660) | CIAT, water, fltrd, ug/L (04040) | Acetochlor, water, fltrd, ug/L (49260) | Alachlor, water, fltrd, ug/L (46342) | alpha-HCH, water, fltrd, ug/L (34253) | alpha-HCH-d6, surrog, wat flt 0.7u GF percent recovry (91065) | Atrazine, water, fltrd, ug/L (39632) | Azinphosmethyl, water, fltrd 0.7u GF ug/L (82686) | Benfluralin, water, fltrd 0.7u GF ug/L (82673) | Butylate, water, fltrd, ug/L (04028) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 08... | -- | -- | -- | <0.006 | E.034 | <0.006 | <0.004 | <0.005 | 99.1 | 0.037 | <0.050 | <0.010 | <0.002 |
| NOV | | | | | | | | | | | | | |
| 05... | -- | -- | -- | <0.006 | E.021 | 0.042 | <0.004 | <0.005 | 111 | 0.038 | <0.050 | <0.010 | <0.002 |
| DEC | | | | | | | | | | | | | |
| 03... | -- | -- | -- | <0.006 | E.030 | <0.006 | <0.004 | <0.005 | 99.0 | 0.021 | <0.050 | <0.010 | <0.002 |
| JAN | | | | | | | | | | | | | |
| 08... | -- | -- | -- | <0.006 | E.019 | <0.006 | <0.004 | <0.005 | 95.5 | 0.014 | <0.050 | <0.010 | <0.002 |
| 22... | 2.0 | 19 | 14.8 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| FEB | | | | | | | | | | | | | |
| *04...* | -- | -- | -- | *<0.006* | *<0.006* | *<0.006* | *<0.004* | *<0.005* | *103* | *<0.007* | *<0.050* | *<0.010* | *<0.002* |
| 04... | -- | -- | -- | <0.006 | E.051 | <0.006 | <0.004 | <0.005 | 97.3 | 0.028 | <0.050 | <0.010 | <0.002 |
| 23... | 9.2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MAR | | | | | | | | | | | | | |
| 04... | -- | -- | -- | <0.006 | E.035 | <0.006 | <0.004 | <0.005 | 95.5 | 0.021 | <0.050 | <0.010 | <0.002 |
| 10... | 6.2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 18... | -- | -- | -- | <0.006 | E.031 | <0.006 | <0.004 | <0.005 | 92.9 | 0.015 | <0.050 | E.008 | <0.002 |
| 19... | 3.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | 15.7 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *22...* | *14.8* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| APR | | | | | | | | | | | | | |
| 02... | -- | -- | -- | <0.006 | E.044 | <0.006 | <0.004 | <0.005 | 84.7 | 0.021 | <0.050 | <0.010 | <0.002 |
| 09... | 4.4 | 29 | 2.3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *09...* | *4.3* | *31* | *2.0* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | 3.1 | 41 | 3.2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *22...* | *3.8* | *17* | *1.7* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 23... | -- | -- | -- | <0.006 | E.032 | <0.006 | <0.004 | <0.005 | 105 | 0.024 | <0.050 | <0.010 | <0.002 |
| MAY | | | | | | | | | | | | | |
| 07... | -- | -- | -- | <0.006 | E.031 | <0.006 | <0.004 | <0.005 | 99.1 | 0.096 | <0.050 | <0.010 | <0.002 |
| 14... | E7.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *14...* | *E7.4* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 20... | -- | -- | -- | <0.006 | E.043 | 0.021 | <0.004 | <0.005 | 102 | 0.449 | <0.050 | <0.010 | <0.002 |
| 28... | 5.3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| JUN | | | | | | | | | | | | | |
| 04... | -- | -- | -- | <0.006 | E.053 | 0.009 | <0.004 | <0.005 | 86.2 | 0.263 | <0.050 | <0.010 | <0.002 |
| *04...* | -- | -- | -- | *<0.006* | *E.053* | *0.008* | *<0.004* | *<0.005* | *87.6* | *0.249* | *<0.050* | *<0.010* | *<0.002* |
| 18... | -- | -- | -- | <0.006 | E.045 | <0.006 | <0.004 | <0.005 | 87.4 | 0.363 | <0.050 | <0.010 | <0.002 |
| *18...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *25...* | *<0.4* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *25...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 25... | 5.9 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *25...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| JUL | | | | | | | | | | | | | |
| 08... | -- | -- | -- | <0.006 | E.047 | 0.006 | <0.004 | <0.005 | 92.9 | 0.558 | <0.050 | <0.010 | <0.002 |
| *08...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 16... | 6.2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *16...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *16...* | *4.8* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *16...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 23... | -- | -- | -- | <0.006 | E.042 | <0.006 | <0.004 | <0.005 | 103 | 0.102 | <0.050 | <0.010 | <0.002 |
| AUG | | | | | | | | | | | | | |
| 04... | 5.2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *04...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *04...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | -- | -- | -- | <0.006 | E.072 | <0.006 | <0.004 | <0.005 | 108 | 0.121 | <0.050 | <0.010 | <0.002 |
| 20... | -- | -- | -- | <0.006 | E.053 | <0.006 | <0.004 | <0.005 | 94.6 | 0.093 | <0.050 | <0.010 | <0.002 |
| SEP | | | | | | | | | | | | | |
| 03... | 2.7 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *03...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | 26.2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 09... | -- | -- | -- | <0.006 | E.029 | <0.006 | <0.004 | <0.005 | 97.3 | 0.041 | <0.050 | <0.010 | <0.002 |
| 20... | 24.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *20...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Carbaryl, water, fltrd 0.7u GF ug/L (82680) | Carbofuran, water, fltrd 0.7u GF ug/L (82674) | Chlorpyrifos water, fltrd, ug/L (38933) | cis-Permethrin water fltrd 0.7u GF ug/L (82687) | Cyanazine, water, fltrd, ug/L (04041) | DCPA, water fltrd 0.7u GF ug/L (82682) | Diazinon, water, fltrd, ug/L (39572) | Diazinon-d10 surrog. wat flt 0.7u GF percent recovry (91063) | Dieldrin, water, fltrd, ug/L (39381) | Disulfoton, water, fltrd 0.7u GF ug/L (82677) | EPTC, water, fltrd 0.7u GF ug/L (82668) | Ethalfluralin, water, fltrd 0.7u GF ug/L (82663) | Ethoprop, water, fltrd 0.7u GF ug/L (82672) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 08... | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 120 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 |
| NOV | | | | | | | | | | | | | |
| 05... | E.010 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | 0.010 | 132 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 |
| DEC | | | | | | | | | | | | | |
| 03... | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 114 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 |
| JAN | | | | | | | | | | | | | |
| 08... | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 119 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| FEB | | | | | | | | | | | | | |
| *04...* | *<0.041* | *<0.020* | *<0.005* | *<0.006* | *<0.018* | *<0.003* | *<0.005* | *107* | *<0.005* | *<0.02* | *<0.002* | *<0.009* | *<0.005* |
| 04... | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 104 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 |
| 23... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MAR | | | | | | | | | | | | | |
| 04... | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | E.003 | 115 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 |
| 10... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 18... | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | E.003 | <0.005 | 115 | <0.005 | <0.02 | <0.040 | E.005 | <0.005 |
| 19... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *22...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| APR | | | | | | | | | | | | | |
| 02... | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 116 | <0.005 | <0.02 | <0.025 | <0.009 | <0.005 |
| 09... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *09...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *22...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 23... | E.006 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 124 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 |
| MAY | | | | | | | | | | | | | |
| 07... | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 114 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 |
| 14... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *14...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 20... | E.032 | E.012 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 111 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 |
| 28... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| JUN | | | | | | | | | | | | | |
| 04... | E.008 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 94.6 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 |
| *04...* | *E.009* | *<0.020* | *<0.005* | *<0.006* | *<0.018* | *<0.003* | *<0.005* | *90.2* | *<0.005* | *<0.02* | *<0.002* | *<0.009* | *<0.005* |
| 18... | E.007 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 114 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 |
| *18...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *25...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *25...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 25... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *25...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| JUL | | | | | | | | | | | | | |
| 08... | E.004 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | E.005 | 106 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 |
| *08...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 16... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *16...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *16...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *16...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 23... | E.023 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | 0.025 | 118 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 |
| AUG | | | | | | | | | | | | | |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *04...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *04...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 128 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 |
| 20... | E.005 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 109 | <0.005 | <0.02 | <0.004 | <0.009 | <0.005 |
| SEP | | | | | | | | | | | | | |
| 03... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *03...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 09... | <0.041 | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 110 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 |
| 20... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *20...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Fonofos water, fltrd, ug/L (04095) | Lindane water, fltrd, ug/L (39341) | Linuron water fltrd 0.7u GF ug/L (82666) | Mala-thion, water, fltrd, ug/L (39532) | Methyl para-thion, water, fltrd 0.7u GF ug/L (82667) | Metola-chlor, water, fltrd, ug/L (39415) | Metri-buzin, water, fltrd, ug/L (82630) | Moli-nate, water, fltrd 0.7u GF ug/L (82671) | Naprop-amide, water, fltrd 0.7u GF ug/L (82684) | p,p-' DDE, water, fltrd, ug/L (34653) | Para-thion, water, fltrd, ug/L (39542) | Peb-ulate, water, fltrd 0.7u GF ug/L (82669) | Pendi-meth-alin, water, fltrd 0.7u GF ug/L (82683) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 08... | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.013 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 |
| NOV | | | | | | | | | | | | | |
| 05... | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.015 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 |
| DEC | | | | | | | | | | | | | |
| 03... | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | E.007 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 |
| JAN | | | | | | | | | | | | | |
| 08... | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | E.012 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| FEB | | | | | | | | | | | | | |
| *04...* | *<0.003* | *<0.004* | *<0.035* | *<0.027* | *<0.006* | *<0.013* | *<0.006* | *<0.002* | *<0.007* | *<0.003* | *<0.010* | *<0.004* | *<0.022* |
| 04... | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.014 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 |
| 23... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MAR | | | | | | | | | | | | | |
| 04... | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.017 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 |
| 10... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 18... | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | E.010 | <0.006 | <0.002 | <0.007 | 0.008 | <0.010 | <0.004 | <0.022 |
| 19... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *22...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| APR | | | | | | | | | | | | | |
| 02... | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | E.012 | <0.006 | <0.004 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 |
| 09... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *09...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *22...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 23... | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | E.011 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 |
| MAY | | | | | | | | | | | | | |
| 07... | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.039 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 |
| 14... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *14...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 20... | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.140 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | E.006 |
| 28... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| JUN | | | | | | | | | | | | | |
| 04... | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.056 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 |
| *04...* | *<0.003* | *<0.004* | *<0.035* | *<0.027* | *<0.006* | *0.055* | *<0.006* | *<0.002* | *<0.007* | *<0.003* | *<0.010* | *<0.004* | *<0.022* |
| 18... | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.131 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 |
| *18...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *25...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *25...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 25... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *25...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| JUL | | | | | | | | | | | | | |
| 08... | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.193 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 |
| *08...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 16... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *16...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *16...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *16...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 23... | <0.003 | <0.004 | <0.035 | E.005 | <0.006 | 0.027 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 |
| AUG | | | | | | | | | | | | | |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *04...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *04...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.025 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 |
| 20... | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.045 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 |
| SEP | | | | | | | | | | | | | |
| 03... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *03...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 09... | <0.003 | <0.004 | <0.035 | <0.027 | <0.006 | 0.015 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 |
| 20... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *20...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Phorate water fltrd 0.7u GF ug/L (82664) | Prometon, water, fltrd, ug/L (04037) | Pronamide, water, fltrd 0.7u GF ug/L (82676) | Propachlor, water, fltrd, ug/L (04024) | Propanil, water, fltrd 0.7u GF ug/L (82679) | Propargite, water, fltrd 0.7u GF ug/L (82685) | Simazine, water, fltrd, ug/L (04035) | Tebuthiuron water fltrd 0.7u GF ug/L (82670) | Terbacil, water, fltrd 0.7u GF ug/L (82665) | Terbufos, water, fltrd 0.7u GF ug/L (82675) | Thiobencarb water fltrd 0.7u GF ug/L (82681) | Triallate, water, fltrd 0.7u GF ug/L (82678) | Trifluralin, water, fltrd 0.7u GF ug/L (82661) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 08... | <0.011 | 0.02 | <0.004 | <0.010 | <0.011 | <0.02 | 0.015 | <0.02 | <0.034 | <0.02 | <0.005 | <0.002 | <0.009 |
| NOV | | | | | | | | | | | | | |
| 05... | <0.011 | E.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.009 | <0.02 | <0.034 | <0.02 | <0.005 | <0.002 | <0.009 |
| DEC | | | | | | | | | | | | | |
| 03... | <0.011 | M | <0.004 | <0.010 | <0.011 | <0.02 | 0.007 | <0.02 | <0.034 | <0.02 | <0.005 | <0.002 | <0.009 |
| JAN | | | | | | | | | | | | | |
| 08... | <0.011 | M | <0.004 | <0.010 | <0.011 | <0.02 | 0.009 | <0.02 | <0.034 | <0.02 | <0.005 | <0.002 | <0.009 |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| FEB | | | | | | | | | | | | | |
| *04...* | *<0.011* | *<0.01* | *<0.004* | *<0.010* | *<0.011* | *<0.02* | *<0.005* | *<0.02* | *<0.034* | *<0.02* | *<0.005* | *<0.002* | *<0.009* |
| 04... | <0.011 | E.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.015 | <0.02 | <0.034 | <0.02 | <0.005 | <0.002 | <0.009 |
| 23... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MAR | | | | | | | | | | | | | |
| 04... | <0.011 | M | <0.004 | <0.010 | <0.011 | <0.02 | 0.015 | <0.02 | <0.034 | <0.02 | <0.005 | <0.002 | <0.009 |
| 10... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 18... | <0.011 | <0.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.009 | <0.02 | <0.034 | <0.02 | E.003 | E.002 | E.007 |
| 19... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *22...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| APR | | | | | | | | | | | | | |
| 02... | <0.011 | M | <0.004 | <0.010 | <0.011 | <0.02 | 0.011 | <0.02 | <0.034 | <0.02 | <0.005 | <0.002 | <0.009 |
| 09... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *09...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *22...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 23... | <0.011 | M | <0.004 | <0.010 | <0.011 | <0.02 | 0.022 | <0.02 | <0.034 | <0.02 | <0.005 | <0.002 | <0.009 |
| MAY | | | | | | | | | | | | | |
| 07... | <0.011 | <0.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.034 | <0.02 | <0.034 | <0.02 | <0.005 | <0.002 | <0.009 |
| 14... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *14...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 20... | <0.011 | E.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.168 | E.01 | <0.034 | <0.02 | <0.005 | <0.002 | <0.009 |
| 28... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| JUN | | | | | | | | | | | | | |
| 04... | <0.011 | E.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.076 | <0.02 | <0.034 | <0.02 | <0.005 | <0.002 | <0.009 |
| *04...* | *<0.011* | *E.01* | *<0.004* | *<0.010* | *<0.011* | *<0.02* | *0.073* | *<0.02* | *<0.034* | *<0.02* | *<0.005* | *<0.002* | *<0.009* |
| 18... | <0.011 | E.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.103 | <0.02 | <0.034 | <0.02 | <0.005 | <0.002 | <0.009 |
| *18...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *25...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *25...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 25... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *25...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| JUL | | | | | | | | | | | | | |
| 08... | <0.011 | E.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.118 | <0.02 | <0.034 | <0.02 | <0.005 | <0.002 | <0.009 |
| *08...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 16... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *16...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *16...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *16...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 23... | <0.011 | 0.02 | <0.004 | <0.010 | <0.011 | <0.02 | 0.032 | <0.02 | <0.034 | <0.02 | <0.005 | <0.002 | <0.009 |
| AUG | | | | | | | | | | | | | |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *04...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *04...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | <0.011 | 0.02 | <0.004 | <0.010 | <0.011 | <0.02 | 0.031 | M | <0.034 | <0.02 | <0.005 | <0.002 | <0.009 |
| 20... | <0.011 | 0.02 | <0.004 | <0.010 | <0.011 | <0.02 | 0.036 | E.01 | <0.034 | <0.02 | <0.005 | <0.002 | <0.009 |
| SEP | | | | | | | | | | | | | |
| 03... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *03...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 09... | <0.011 | E.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.017 | M | <0.034 | <0.02 | <0.005 | <0.002 | <0.009 |
| 20... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *20...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Suspnd. sedi-ment, sieve diametr percent <.063mm (70331) | Sus-pended sedi-ment concen-tration mg/L (80154) | Sus-pended sedi-ment load, tons/d (80155) |
|---|---|---|---|
| OCT | | | |
| 08... | -- | 1 | 4.8 |
| NOV | | | |
| 05... | -- | 5 | 125 |
| DEC | | | |
| 03... | -- | 1 | 26 |
| JAN | | | |
| 08... | -- | 25 | 1,850 |
| 22... | -- | 1 | 19 |
| FEB | | | |
| *04...* | -- | -- | -- |
| 04... | -- | 2 | 27 |
| 23... | 86 | 185 | 18,800 |
| MAR | | | |
| 04... | -- | 43 | 3,950 |
| 10... | 86 | 103 | 20,700 |
| 18... | -- | 32 | 3,260 |
| 19... | -- | 32 | 3,090 |
| 22... | 82 | 380 | 122,000 |
| *22...* | *81* | *383* | -- |
| APR | | | |
| 02... | -- | 14 | 832 |
| 09... | -- | 43 | 4,040 |
| *09...* | -- | *41* | -- |
| 22... | -- | 15 | 770 |
| *22...* | -- | *15* | -- |
| 23... | -- | 15 | 714 |
| MAY | | | |
| 07... | -- | 16 | 631 |
| 14... | -- | 121 | 13,800 |
| *14...* | -- | *126* | -- |
| 20... | -- | 44 | 5,360 |
| 28... | -- | 47 | 3,340 |
| JUN | | | |
| 04... | -- | 43 | 3,290 |
| *04...* | -- | *45* | -- |
| 18... | -- | 70 | 6,170 |
| *18...* | -- | *68* | -- |
| *25...* | -- | *0.3* | -- |
| *25...* | -- | -- | -- |
| 25... | -- | 60 | 4,860 |
| *25...* | -- | -- | -- |
| JUL | | | |
| 08... | -- | 15 | 541 |
| *08...* | -- | -- | -- |
| 16... | -- | 14 | 396 |
| *16...* | -- | -- | -- |
| *16...* | -- | *16* | -- |
| *16...* | -- | -- | -- |
| 23... | -- | 30 | 711 |
| AUG | | | |
| 04... | -- | 10 | 149 |
| *04...* | -- | -- | -- |
| *04...* | -- | -- | -- |
| 05... | -- | 10 | 140 |
| 20... | -- | 16 | 332 |
| SEP | | | |
| 03... | -- | 11 | 151 |
| *03...* | -- | -- | -- |
| 05... | -- | 390 | 40,600 |
| 09... | -- | 27 | 733 |
| 20... | 77 | 510 | 114,000 |
| *20...* | *82* | *643* | -- |

**Remark codes used in this table:**
**< -- Less than**
**E -- Estimated value**
**M-- Presence verified, not quantified**



Photo by U.S. Geological Survey Personnel

Potomac River at Chain Bridge at Washington, D.C. (01646580)

## 01652500 FOURMILE RUN AT ALEXANDRIA, VA

LOCATION.--Lat 38°50'36", long 77°04'45", NAD83, 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-395, and 2.5 mi upstream from mouth.

DRAINAGE AREA.--13.8 $mi^2$.

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

GAGE.--Water-stage recorder. Datum of gage is 28.57 ft NGVD of 1929. May 4, 1951 to Sept. 30, 1969, water stage recorder, Oct. 1, 1969 to Sept. 27, 1973, nonrecording gage, at site 0.4 mi downstream at datum 6.02 lower (annual maximum only). Sept. 28, 1973 to Sept. 26, 1975, water-stage recorder. Sept. 27, 1975 to Sept. 30, 1977, nonrecording gage, at present site and datum (annual maximum only). July 1979 to September 1982, water stage recorder. October 1982 to September 1998, nonrecording gage (annual maximum only). October 1998 to present, water stage recorder.

REMARKS.--Records good except those for periods of no gage-height record, Jan. 4-6, 15-23, and Feb. 9-11, which are poor. Maximum discharge, 14,600 $ft^3/s$, from rating curve extended above 670 $ft^3/s$ on basis of slope-area measurement of peak flow at gage height, 11.6 ft, site and datum then in use. Several measurements of water temperature were made during the year. Water-quality records for some periods have been collected at this location.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,800 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1230 | 3,740 | 9.18 | Jul 9 | 1800 | 2,390 | 7.79 |
| May 31 | 1930 | 2,620 | 8.03 | Jul 11 | 0105 | 5,250 | 10.84 |
| Jun 19 | 2050 | 2,620 | 8.03 | Jul 22 | 2255 | 3,060 | 8.48 |
| Jun 20 | 1220 | 2,650 | 8.06 | Aug 26 | 1755 | 2,210 | 7.61 |
| Jul 1 | 0205 | 2,630 | 8.04 | Sep 18 | 1940 | 2,480 | 7.88 |
| Jul 7 | 1705 | 1,840 | 7.23 | Sep 23 | 0530 | *6,040 | *11.83 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.9 | 13 | 5.1 | 320 | 32 | 27 | 14 | 32 | 40 | 217 | 19 | 20 |
| 2 | 2.9 | 11 | 5.0 | 50 | 10 | 171 | 12 | 6.6 | 14 | 124 | 8.9 | 25 |
| 3 | 1.8 | 9.7 | 6.6 | 93 | 8.7 | 36 | 11 | 5.8 | 33 | 85 | 25 | 49 |
| 4 | 1.8 | 10 | 4.2 | e40 | 32 | 22 | 10 | 5.5 | 73 | 28 | 15 | 34 |
| 5 | 1.7 | 67 | 6.7 | e21 | 7.4 | 47 | 9.8 | 12 | 50 | 22 | 14 | 10 |
| 6 | 1.6 | 80 | 14 | e35 | 6.3 | 78 | 8.6 | 13 | 18 | 19 | 9.3 | 7.6 |
| 7 | 1.9 | 13 | 9.9 | 12 | 26 | 18 | 93 | 99 | 286 | 124 | 8.0 | 7.2 |
| 8 | 2.2 | 13 | 9.9 | 12 | 14 | 14 | 13 | 32 | 31 | 13 | 7.8 | 7.5 |
| 9 | 1.8 | 14 | 7.5 | 20 | e7.4 | 18 | 93 | 39 | 56 | 164 | 7.9 | 7.3 |
| 10 | 22 | 12 | 5.0 | 8.4 | e10 | 10 | 14 | 70 | 17 | 61 | 16 | 6.9 |
| 11 | 111 | 98 | 251 | 6.2 | e8.0 | 8.7 | 52 | 12 | 82 | 390 | 35 | 6.8 |
| 12 | 4.4 | 129 | 47 | 5.3 | 8.6 | 8.6 | 13 | 8.6 | 136 | 28 | 10 | 104 |
| 13 | 5.1 | 22 | 137 | 6.2 | 6.6 | 18 | 9.1 | 7.6 | 54 | 19 | 7.3 | 69 |
| 14 | 2.5 | 14 | 62 | 6.6 | 5.1 | 11 | 8.6 | 7.1 | 24 | 19 | 7.4 | 9.9 |
| 15 | 1.2 | 11 | 19 | e7.0 | 49 | 7.6 | 8.1 | 20 | 12 | 14 | 6.9 | 36 |
| 16 | 209 | 238 | 15 | e6.6 | 4.8 | 8.1 | 7.9 | 175 | 9.8 | 13 | 17 | 12 |
| 17 | 11 | 159 | 11 | e7.2 | 6.7 | 7.4 | 7.0 | 16 | 70 | 11 | 67 | 7.7 |
| 18 | 6.1 | 40 | 8.8 | e6.6 | 13 | 7.5 | 12 | 70 | 56 | 10 | 7.1 | 304 |
| 19 | 3.0 | 13 | 8.1 | e6.4 | 36 | 6.1 | 15 | 11 | 132 | 9.7 | 6.6 | 88 |
| 20 | 2.7 | 8.5 | 47 | e6.2 | 70 | 425 | 6.7 | 8.5 | 221 | 9.4 | 6.6 | 13 |
| 21 | 2.7 | 6.3 | 9.7 | e6.0 | 110 | 58 | 6.8 | 97 | 29 | 9.5 | 6.6 | 9.7 |
| 22 | 2.7 | 5.6 | 8.5 | e5.6 | 860 | 25 | 14 | 18 | 18 | 140 | 6.8 | 91 |
| 23 | 1.3 | 5.8 | 7.8 | e4.8 | 196 | 17 | 6.4 | 22 | 12 | 63 | 6.3 | 610 |
| 24 | 1.4 | 6.1 | 14 | 4.9 | 55 | 14 | 6.1 | 18 | 11 | 11 | 5.6 | 18 |
| 25 | 13 | 6.1 | 204 | 5.8 | 27 | 11 | 18 | 16 | 10 | 9.1 | 6.0 | 11 |
| 26 | 93 | 5.8 | 26 | 5.8 | 20 | 48 | 53 | 265 | 9.9 | 8.1 | 138 | 9.7 |
| 27 | 5.5 | 11 | 16 | 6.5 | 15 | 16 | 7.1 | 23 | 9.9 | 8.2 | 96 | 9.1 |
| 28 | 7.8 | 4.6 | 14 | 6.0 | 26 | 15 | 6.2 | 49 | 8.8 | 75 | 17 | 9.9 |
| 29 | 117 | 4.5 | 11 | 12 | --- | 34 | 6.2 | 17 | 8.7 | 18 | 62 | 11 |
| 30 | 83 | 6.2 | 10 | 9.8 | --- | 103 | 9.3 | 12 | 9.8 | 12 | 70 | 7.2 |
| 31 | 22 | --- | 10 | 18 | --- | 23 | --- | 186 | --- | 9.3 | 11 | --- |
| TOTAL | 746.0 | 1,037.2 | 1,010.8 | 760.9 | 1,670.6 | 1,313.0 | 550.9 | 1,373.7 | 1,541.9 | 1,743.3 | 727.1 | 1,611.5 |
| MEAN | 24.1 | 34.6 | 32.6 | 24.5 | 59.7 | 42.4 | 18.4 | 44.3 | 51.4 | 56.2 | 23.5 | 53.7 |
| MAX | 209 | 238 | 251 | 320 | 860 | 425 | 93 | 265 | 286 | 390 | 138 | 610 |
| MIN | 1.2 | 4.5 | 4.2 | 4.8 | 4.8 | 6.1 | 6.1 | 5.5 | 8.7 | 8.1 | 5.6 | 6.8 |
| CFSM | 1.74 | 2.51 | 2.36 | 1.78 | 4.32 | 3.07 | 1.33 | 3.21 | 3.72 | 4.08 | 1.70 | 3.89 |
| IN. | 2.01 | 2.80 | 2.72 | 2.05 | 4.50 | 3.54 | 1.49 | 3.70 | 4.16 | 4.70 | 1.96 | 4.34 |

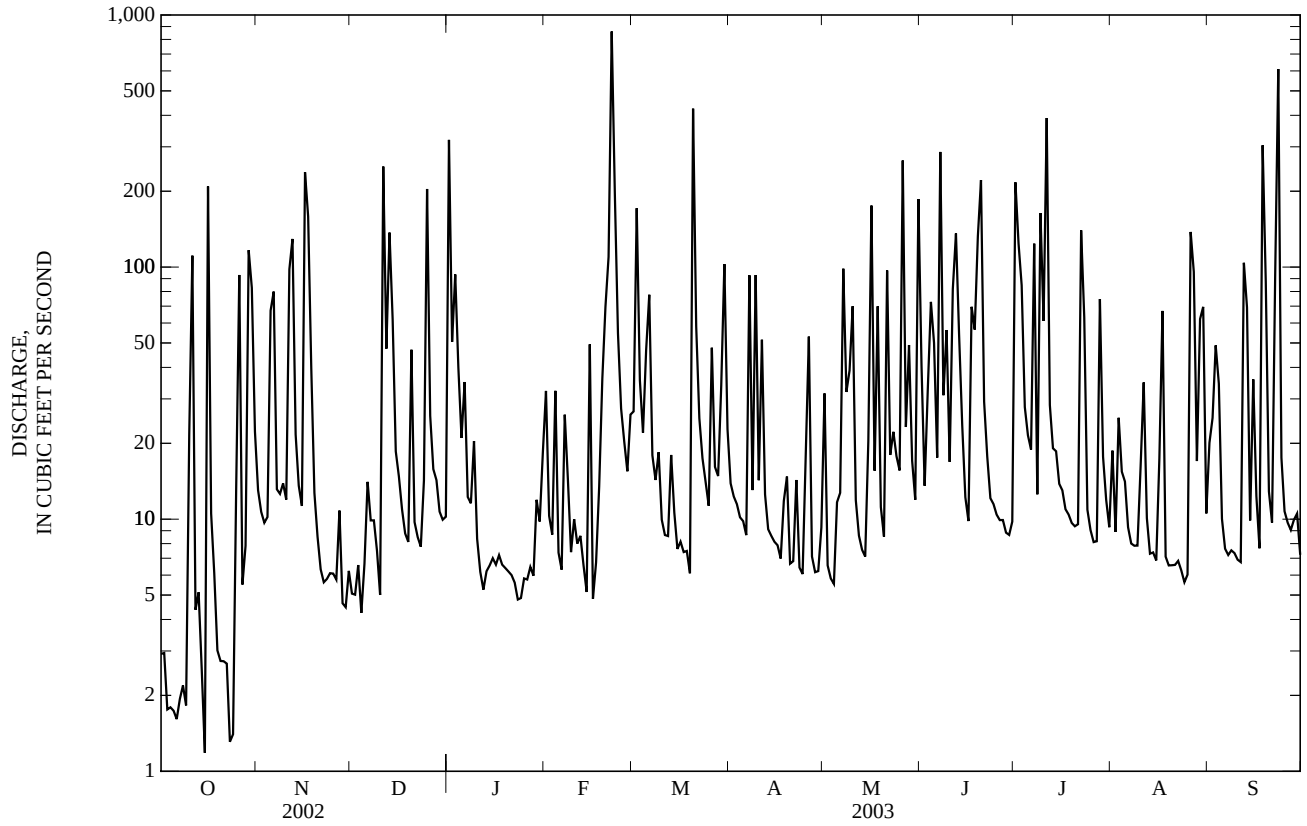
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1969, 1974 - 1975, 1979 - 1982, 1999 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 10.9 | 12.8 | 15.1 | 15.3 | 18.9 | 23.9 | 17.7 | 17.4 | 17.4 | 17.1 | 19.3 | 19.1 |
| MAX | 39.0 | 36.4 | 36.9 | 35.6 | 59.7 | 44.3 | 42.0 | 52.3 | 51.4 | 56.2 | 64.3 | 85.0 |
| (WY) | (1980) | (1953) | (1968) | (1964) | (2003) | (1953) | (1952) | (1953) | (2003) | (2003) | (1967) | (1999) |
| MIN | 2.54 | 2.57 | 3.07 | 3.84 | 4.84 | 6.05 | 6.79 | 6.90 | 5.22 | 1.78 | 2.01 | 1.94 |
| (WY) | (1964) | (1966) | (1966) | (1981) | (2002) | (1981) | (1967) | (1961) | (1954) | (1957) | (1962) | (1954) |

01652500 FOURMILE RUN AT ALEXANDRIA, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1952 - 1969, 1974 - 1975, 1979 - 1982, 1999 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 6,689.5 | | 14,086.9 | | | |
| ANNUAL MEAN | 18.3 | | 38.6 | | 16.9 | |
| HIGHEST ANNUAL MEAN | | | | | 38.6 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 7.72 | 1959 |
| HIGHEST DAILY MEAN | 287 | Apr 28 | 860 | Feb 22 | 1,060 | Sep 14, 1966 |
| LOWEST DAILY MEAN | 1.2 | Oct 15 | 1.2 | Oct 15 | 0.70 | (a) |
| ANNUAL SEVEN-DAY MINIMUM | 1.8 | Oct 3 | 1.8 | Oct 3 | 0.94 | Aug 12, 1957 |
| MAXIMUM PEAK FLOW | | | 6,040 | Sep 23 | 14,600 | Jul 22, 1969 |
| MAXIMUM PEAK STAGE | | | 11.83 | Sep 23 | b17.80 | Jun 21, 1972 |
| INSTANTANEOUS LOW FLOW | | | 0.53 | Oct 7 | 0.53 | Oct 7, 2002 |
| ANNUAL RUNOFF (CFSM) | 1.33 | | 2.80 | | 1.23 | |
| ANNUAL RUNOFF (INCHES) | 18.03 | | 37.97 | | 16.67 | |
| 10 PERCENT EXCEEDS | 39 | | 96 | | 33 | |
| 50 PERCENT EXCEEDS | 5.1 | | 12 | | 6.0 | |
| 90 PERCENT EXCEEDS | 2.7 | | 5.8 | | 2.8 | |

a Many days in August 1957.
b From floodmarks.
e Estimated.



## 01653000 CAMERON RUN AT ALEXANDRIA, VA

LOCATION.--Lat 38°48'23", long 77°06'35", NAD83, 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 $mi^2$.

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 31.74 ft NGVD of 1929. Prior to Sept. 20, 1965, at present site at datum 7.78 ft higher. Sept. 20, 1965, to Jan. 19, 1976, at present site at datum 5.44 ft higher. Jan. 20, 1976, to Nov. 8, 1976, at site 1,200 ft downstream at datum 10.00 ft lower. Nov. 9, 1976, to Mar. 31, 1979, at site 0.5 mi downstream at datum 7.22 ft lower.

REMARKS.--Records good except those for periods with ice effect, Jan. 18, 22-27, which are fair, and period of doubtful gage-height record, Mar. 31 to May 9, which is poor. 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 $ft^3/s$, from rating curve extended above 2,500 $ft^3/s$ 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.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.6 | 15 | 11 | 452 | 47 | 54 | e30 | e66 | 56 | 118 | 27 | 26 |
| 2 | 4.8 | 11 | 10 | 106 | 17 | 238 | e25 | e20 | 32 | 81 | 15 | 34 |
| 3 | 4.8 | 9.2 | 11 | 166 | 14 | 95 | e22 | e17 | 42 | 88 | 30 | 63 |
| 4 | 5.0 | 8.5 | 8.1 | 53 | 40 | 51 | e21 | e15 | 61 | 30 | 34 | 40 |
| 5 | 4.6 | 47 | 12 | 37 | 18 | 90 | e20 | e14 | 50 | 20 | 17 | 23 |
| 6 | 4.0 | 142 | 20 | 49 | 14 | 137 | e19 | e14 | 31 | 16 | 19 | 15 |
| 7 | 4.0 | 17 | 15 | 32 | 32 | 55 | e150 | e35 | 339 | 37 | 12 | 14 |
| 8 | 4.0 | 12 | 16 | 26 | 22 | 42 | e40 | e16 | 67 | 26 | 11 | 13 |
| 9 | 3.6 | 9.8 | 16 | 25 | 17 | 43 | e150 | e50 | 69 | 135 | 10 | 13 |
| 10 | 14 | 8.2 | 11 | 20 | 19 | 31 | e42 | 107 | 37 | 52 | 27 | 18 |
| 11 | 149 | 131 | 349 | 16 | 18 | 23 | e90 | 43 | 45 | 502 | 32 | 11 |
| 12 | 23 | 165 | 98 | 15 | 16 | 21 | e40 | 27 | 117 | 38 | 28 | 86 |
| 13 | 12 | 43 | 192 | 15 | 13 | 27 | e30 | 19 | 70 | 33 | 12 | 66 |
| 14 | 11 | 19 | 123 | 15 | 13 | 24 | e27 | 26 | 58 | 37 | 11 | 24 |
| 15 | 5.9 | 14 | 38 | 14 | 85 | 15 | e25 | 32 | 34 | 23 | 9.5 | 33 |
| 16 | 318 | 307 | 25 | 13 | 59 | 15 | e24 | 153 | 26 | 20 | 16 | 28 |
| 17 | 34 | 256 | 18 | 15 | 90 | 15 | e22 | 47 | 78 | 17 | 76 | 19 |
| 18 | 14 | 95 | 15 | e14 | 44 | 13 | e42 | 91 | 106 | 17 | 17 | 392 |
| 19 | 10 | 31 | 15 | 14 | 41 | 8.5 | e80 | 42 | 186 | 16 | 11 | 146 |
| 20 | 9.2 | 21 | 77 | 13 | 84 | 628 | e25 | 33 | 305 | 16 | 8.8 | 34 |
| 21 | 7.7 | 17 | 23 | 12 | 133 | 165 | e23 | 94 | 56 | 14 | 7.3 | 26 |
| 22 | 6.1 | 15 | 16 | e12 | 1,330 | 71 | e22 | 51 | 36 | 49 | 16 | 87 |
| 23 | 6.0 | 13 | 15 | e11 | 333 | 44 | e20 | 43 | 31 | 103 | 17 | 987 |
| 24 | 5.5 | 12 | 19 | e10 | 130 | 35 | e18 | 48 | 26 | 21 | 8.2 | 57 |
| 25 | 13 | 11 | 259 | e11 | 80 | 28 | e40 | 36 | 21 | 14 | 6.8 | 28 |
| 26 | 143 | 10 | 51 | e11 | 55 | 74 | e70 | 320 | 21 | 15 | 154 | 25 |
| 27 | 14 | 10 | 27 | e10 | 42 | 45 | e25 | 52 | 24 | 14 | 106 | 18 |
| 28 | 12 | 9.4 | 22 | 11 | 54 | 32 | e19 | 65 | 14 | 43 | 46 | 20 |
| 29 | 132 | 9.4 | 19 | 14 | --- | 63 | e17 | 45 | 13 | 37 | 52 | 23 |
| 30 | 133 | 16 | 16 | 13 | --- | 167 | e16 | 34 | 17 | 15 | 44 | 14 |
| 31 | 38 | --- | 16 | 15 | --- | e40 | --- | 146 | --- | 12 | 31 | --- |
| TOTAL | 1,149.8 | 1,484.5 | 1,563.1 | 1,240 | 2,860 | 2,389.5 | 1,194 | 1,801 | 2,068 | 1,659 | 911.6 | 2,383 |
| MEAN | 37.1 | 49.5 | 50.4 | 40.0 | 102 | 77.1 | 39.8 | 58.1 | 68.9 | 53.5 | 29.4 | 79.4 |
| MAX | 318 | 307 | 349 | 452 | 1,330 | 628 | 150 | 320 | 339 | 502 | 154 | 987 |
| MIN | 3.6 | 8.2 | 8.1 | 10 | 13 | 8.5 | 16 | 14 | 13 | 12 | 6.8 | 11 |
| CFSM | 1.10 | 1.47 | 1.50 | 1.19 | 3.03 | 2.29 | 1.18 | 1.72 | 2.05 | 1.59 | 0.87 | 2.36 |
| IN. | 1.27 | 1.64 | 1.73 | 1.37 | 3.16 | 2.64 | 1.32 | 1.99 | 2.28 | 1.83 | 1.01 | 2.63 |

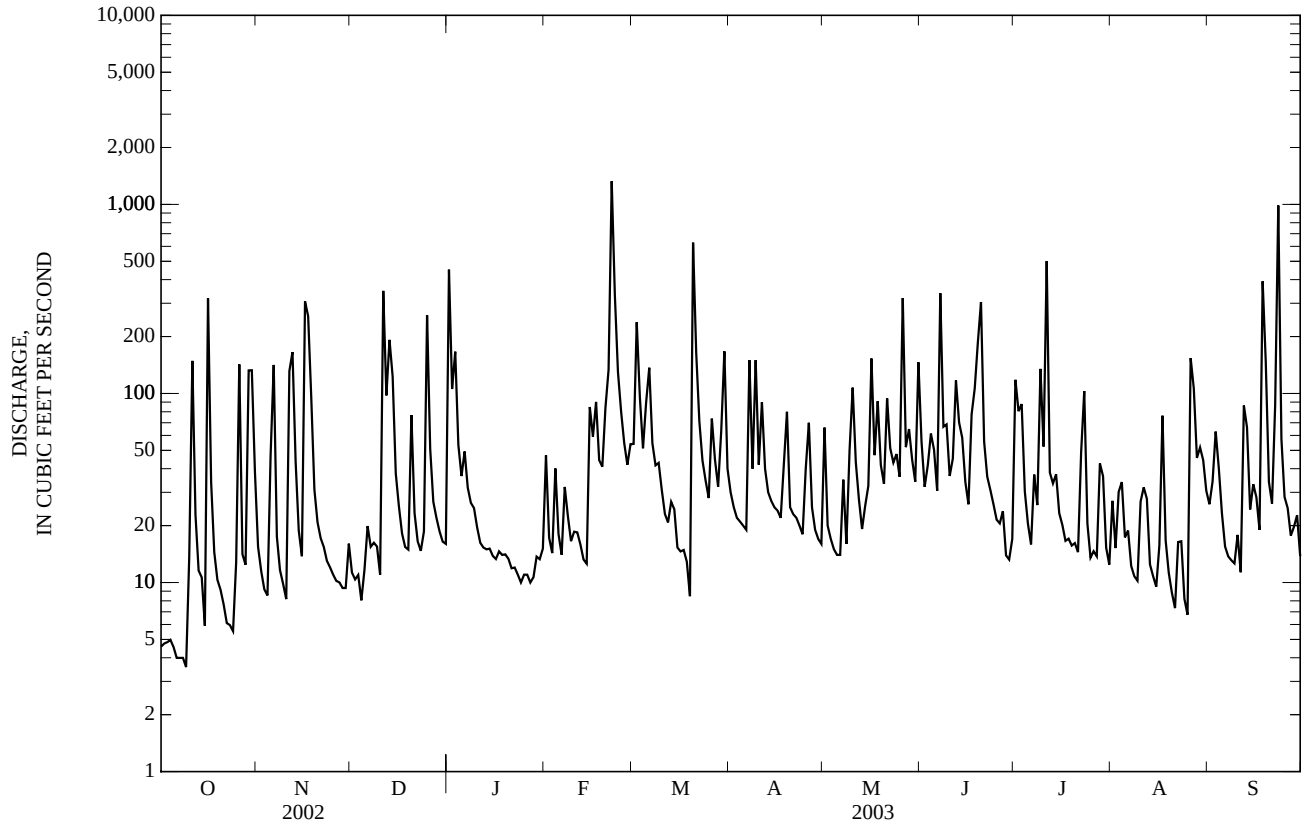
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1956 - 1980, 1987 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 30.6 | 30.5 | 38.5 | 42.8 | 46.8 | 55.8 | 41.3 | 39.2 | 37.1 | 45.7 | 35.9 | 33.2 |
| 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 | 9.10 | 19.9 | 10.6 | 8.59 | 7.93 | 2.51 | 3.85 | 5.31 |
| (WY) | (1964) | (1966) | (1966) | (1966) | (2002) | (1966) | (1969) | (1956) | (1956) | (1957) | (1957) | (1977) |

01653000 CAMERON RUN AT ALEXANDRIA, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1956 - 1980, 1987 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 9,065.3 | | 20,703.5 | | | |
| ANNUAL MEAN | 24.8 | | 56.7 | | 37.2 | |
| HIGHEST ANNUAL MEAN | | | | | 64.4 | 1972 |
| LOWEST ANNUAL MEAN | | | | | 15.6 | 2002 |
| HIGHEST DAILY MEAN | 356 | Apr 28 | 1,330 | Feb 22 | 3,680 | Jun 22, 1972 |
| LOWEST DAILY MEAN | 1.0 | aAug 11 | 3.6 | Oct 9 | 1.0 | aAug 11, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 1.1 | Aug 14 | 4.3 | Oct 3 | 1.1 | Aug 14, 2002 |
| MAXIMUM PEAK FLOW | | | 9,330 | Sep 23 | 19,900 | Jun 22, 1972 |
| MAXIMUM PEAK STAGE | | | 11.29 | Sep 23 | 18.14 | Jun 22, 1972 |
| INSTANTANEOUS LOW FLOW | | | 3.5 | Oct 9 | 1.0 | bAug 10, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.74 | | 1.68 | | 1.10 | |
| ANNUAL RUNOFF (INCHES) | 10.01 | | 22.85 | | 14.98 | |
| 10 PERCENT EXCEEDS | 51 | | 131 | | 74 | |
| 50 PERCENT EXCEEDS | 9.4 | | 25 | | 15 | |
| 90 PERCENT EXCEEDS | 2.8 | | 11 | | 4.8 | |

a Also Aug. 15-18, 2002.
b Also Aug. 11, 12, 14-19, 2002.
e Estimated.



## 01654000 ACCOTINK CREEK NEAR ANNANDALE, VA

LOCATION.--Lat 38°48'46", long 77°13'42", NAD83, 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 $mi^2$.

### 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 NGVD of 1929 (levels by Stone and Webster Engineering Corporation). Prior to May 12, 1949, nonrecording gage at site 800 ft downstream at datum 0.33 ft lower. May 12, 1949, to June 4, 1970, water-stage recorder at site 800 ft downstream at datum 0.33 ft lower.

REMARKS.--Records good except those for periods with ice effect, Dec. 5, 10, Jan. 17, 18, 27, 28, and Feb. 18-20, and periods of doubtful or no gage-height record, Dec. 6-9, Jan. 19-26, and Jan. 29 to Feb. 17, which are fair. Maximum discharge, 12,000 $ft^3/s$, from rating curve extended above 6,600 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,400 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1745 | 3,440 | 10.54 | Jul 23 | 0315 | 3,370 | 10.47 |
| Mar 20 | 1945 | 1,760 | 8.55 | Sep 18 | 2400 | 2,490 | 9.52 |
| Jun 20 | 1615 | 1,680 | 8.43 | Sep 23 | 0930 | *4,380 | *11.40 |
| Jul 11 | 0500 | 3,480 | 10.58 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.43 | 5.9 | 5.0 | 343 | e4.4 | 33 | 25 | 73 | 68 | 94 | 10 | 15 |
| 2 | 0.30 | 3.9 | 3.6 | 75 | e4.3 | 170 | 21 | 15 | 22 | 64 | 10 | 48 |
| 3 | 0.27 | 3.2 | 3.3 | 113 | e4.2 | 72 | 19 | 12 | 53 | 99 | 12 | 45 |
| 4 | 0.19 | 3.0 | 3.2 | 31 | e5.0 | 33 | 18 | 12 | 61 | 21 | 36 | 53 |
| 5 | 0.13 | 17 | e3.2 | 18 | e7.2 | 89 | 17 | 15 | 52 | 16 | 12 | 17 |
| 6 | 0.09 | 118 | e4.6 | 32 | e6.4 | 126 | 15 | 20 | 20 | 14 | 10 | 11 |
| 7 | 0.05 | 7.2 | e4.3 | 19 | e5.3 | 41 | 107 | 110 | 431 | 39 | 8.1 | 9.1 |
| 8 | 0.03 | 4.5 | e4.0 | 16 | e4.6 | 32 | 34 | 78 | 72 | 21 | 8.1 | 8.3 |
| 9 | 0.02 | 4.0 | e3.8 | 17 | e4.2 | 45 | 142 | 57 | 56 | 175 | 7.8 | 7.7 |
| 10 | 0.39 | 3.3 | e4.5 | 12 | e5.3 | 26 | 37 | 120 | 24 | 93 | 15 | 6.9 |
| 11 | 118 | 93 | 267 | 11 | e4.7 | 20 | 79 | 38 | 25 | 789 | 63 | 6.8 |
| 12 | 9.4 | 121 | 76 | 8.5 | e4.4 | 19 | 28 | 20 | 110 | 27 | 16 | 98 |
| 13 | 2.7 | 22 | 150 | 8.2 | e4.0 | 24 | 21 | 15 | 105 | 17 | 11 | 107 |
| 14 | 5.3 | 7.8 | 102 | 8.0 | e3.8 | 32 | 19 | 13 | 61 | 16 | 13 | 17 |
| 15 | 1.7 | 5.7 | 21 | 7.6 | e6.0 | 16 | 18 | 53 | 23 | 13 | 7.4 | 30 |
| 16 | 256 | 213 | 12 | 7.0 | e5.2 | 16 | 17 | 219 | 18 | 12 | 12 | 22 |
| 17 | 15 | 200 | 9.3 | e6.9 | e4.5 | 15 | 16 | 35 | 39 | 11 | 183 | 16 |
| 18 | 8.7 | 79 | 8.1 | e6.3 | e17 | 15 | 30 | 111 | 120 | 10 | 14 | 321 |
| 19 | 2.9 | 12 | 7.6 | e6.0 | e15 | 13 | 83 | 29 | 153 | 10 | 9.4 | 441 |
| 20 | 1.8 | 7.5 | 32 | e5.5 | e32 | 576 | 20 | 20 | 439 | 9.6 | 7.9 | 26 |
| 21 | 1.6 | 6.2 | 9.7 | e5.3 | 92 | 111 | 17 | 153 | 62 | 9.4 | 7.5 | 15 |
| 22 | 1.7 | 5.3 | 7.3 | e5.0 | 1,340 | 44 | 17 | 48 | 34 | 36 | 26 | 20 |
| 23 | 1.5 | 4.7 | 6.7 | e4.8 | 262 | 26 | 14 | 31 | 25 | 505 | 30 | 1,010 |
| 24 | 1.3 | 5.0 | 6.7 | e4.6 | 96 | 22 | 13 | 32 | 20 | 22 | 6.9 | 34 |
| 25 | 1.9 | 4.1 | 177 | e4.4 | 54 | 19 | 14 | 27 | 18 | 13 | 5.9 | 19 |
| 26 | 134 | 4.1 | 35 | e6.6 | 31 | 44 | 76 | 297 | 16 | 12 | 169 | 15 |
| 27 | 5.6 | 4.1 | 15 | e6.1 | 25 | 29 | 18 | 44 | 16 | 10 | 116 | 13 |
| 28 | 3.2 | 3.6 | 11 | e5.2 | e30 | 17 | 14 | 83 | 14 | 66 | 53 | 20 |
| 29 | 98 | 3.7 | 9.7 | e5.0 | --- | 30 | 13 | 32 | 14 | 52 | 82 | 18 |
| 30 | 96 | 4.5 | 8.6 | e4.8 | --- | 148 | 13 | 25 | 13 | 12 | 81 | 11 |
| 31 | 23 | --- | 8.3 | e4.6 | --- | 48 | --- | 118 | --- | 10 | 24 | --- |
| TOTAL | 791.20 | 976.3 | 1,019.5 | 807.4 | 2,077.5 | 1,951 | 975 | 1,955 | 2,184 | 2,298.0 | 1,067.0 | 2,480.8 |
| MEAN | 25.5 | 32.5 | 32.9 | 26.0 | 74.2 | 62.9 | 32.5 | 63.1 | 72.8 | 74.1 | 34.4 | 82.7 |
| MAX | 256 | 213 | 267 | 343 | 1,340 | 576 | 142 | 297 | 439 | 789 | 183 | 1,010 |
| MIN | 0.02 | 3.0 | 3.2 | 4.4 | 3.8 | 13 | 13 | 12 | 13 | 9.4 | 5.9 | 6.8 |
| CFSM | 1.09 | 1.38 | 1.40 | 1.11 | 3.16 | 2.68 | 1.38 | 2.68 | 3.10 | 3.15 | 1.46 | 3.52 |
| IN. | 1.25 | 1.55 | 1.61 | 1.28 | 3.29 | 3.09 | 1.54 | 3.09 | 3.46 | 3.64 | 1.69 | 3.93 |

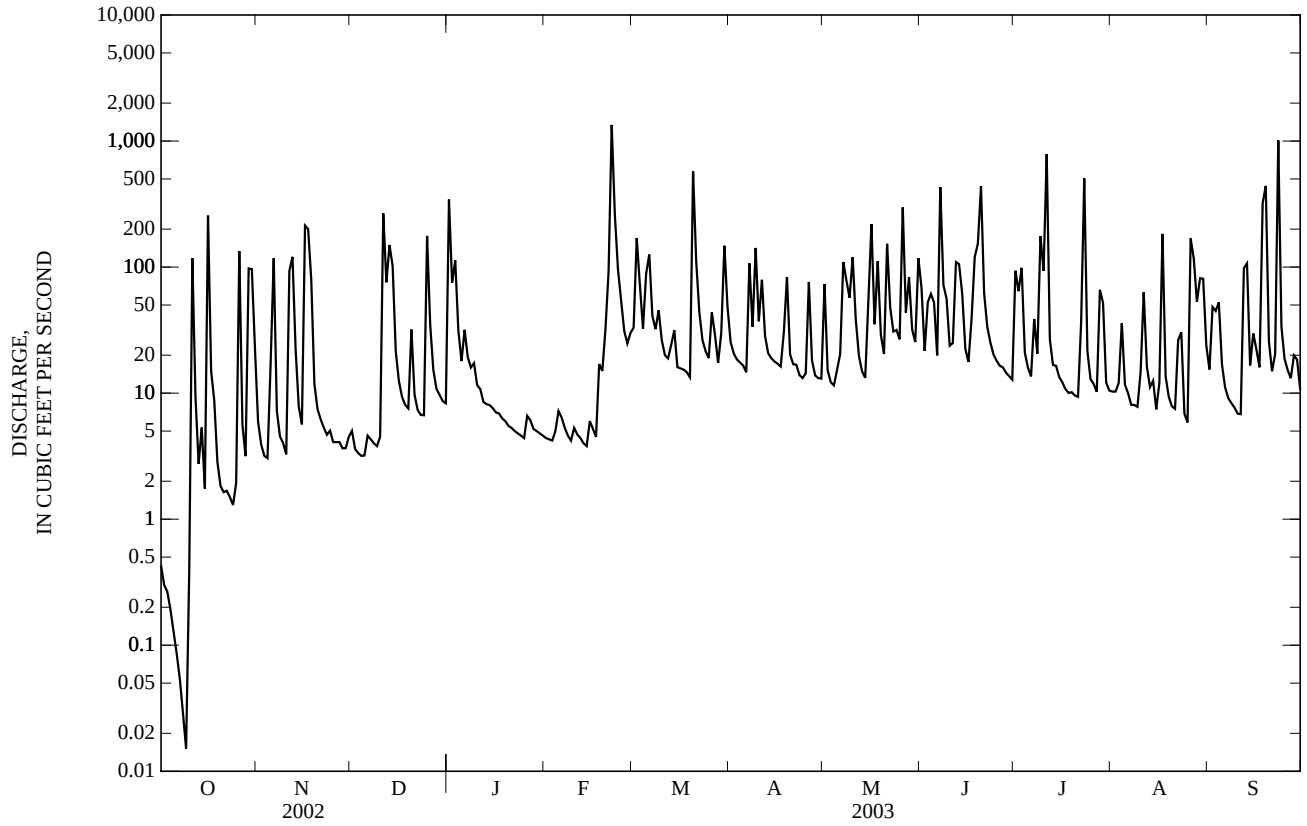
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1948 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 17.8 | 23.9 | 28.0 | 32.4 | 36.1 | 42.7 | 35.1 | 33.0 | 26.1 | 21.3 | 22.1 | 23.1 |
| 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 | 3.76 | 10.6 | 8.40 | 8.46 | 2.83 | 1.81 | 1.94 | 0.45 |
| (WY) | (1955) | (1955) | (1966) | (1981) | (2002) | (1981) | (1985) | (1986) | (1986) | (1955) | (1957) | (1954) |

01654000 ACCOTINK CREEK NEAR ANNANDALE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1948 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 6,109.43 | | 18,582.70 | | | |
| ANNUAL MEAN | 16.7 | | 50.9 | | 28.4 | |
| HIGHEST ANNUAL MEAN | | | | | 50.9 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 10.8 | 2002 |
| HIGHEST DAILY MEAN | 354 | Jun 19 | 1,340 | Feb 22 | e3,300 | Jun 22, 1972 |
| LOWEST DAILY MEAN | 0.00 | aAug 12 | 0.02 | Oct 9 | 0.00 | bAug 5, 1999 |
| ANNUAL SEVEN-DAY MINIMUM | 0.00 | Aug 17 | 0.11 | Oct 3 | 0.00 | cAug 5, 1999 |
| MAXIMUM PEAK FLOW | | | 4,380 | Sep 23 | 12,000 | Jun 22, 1972 |
| MAXIMUM PEAK STAGE | | | 11.40 | Sep 23 | d15.96 | Jun 22, 1972 |
| INSTANTANEOUS LOW FLOW | | | 0.01 | fOct 9 | 0.00 | (g) |
| ANNUAL RUNOFF (CFSM) | 0.71 | | 2.17 | | 1.21 | |
| ANNUAL RUNOFF (INCHES) | 9.67 | | 29.42 | | 16.43 | |
| 10 PERCENT EXCEEDS | 35 | | 114 | | 52 | |
| 50 PERCENT EXCEEDS | 3.3 | | 17 | | 12 | |
| 90 PERCENT EXCEEDS | 0.29 | | 4.1 | | 3.2 | |

a Also Aug. 18-23, 2002.
b Also Aug. 6-13, 1999 and Aug. 12, 18-23, 2002.
c Also Aug. 17, 2002.
d From high-water mark in gage house.
e Estimated.
f Also Oct. 10, 2002.
g No flow part or all of each day Aug. 5-14, 1999 and Aug. 12, 13, 18-24, 2002.



01654000 ACCOTINK CREEK NEAR ANNANDALE, VA--Continued

WATER-QUALITY RECORDS

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

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: January 2002 to current year.
WATER TEMPERATURE: January 2002 to current year.

INSTRUMENTATION.--Water-quality monitor January 2002 to current year.

REMARKS.--Missing record due to instrument malfunctions. Records good.

EXTREMES FOR PERIOD OF DAILY RECORD--
SPECIFIC CONDUCTANCE: Maximum, 6,450 microsiemens/cm, Dec. 11, 2002 Feb. 9, 10, Mar. 1, 2003; minimum, 54 microsiemens/cm, Oct. 26, 2002.
WATER TEMPERATURE: Maximum, 28.8°C, Aug. 24, 2002; minimum, 0.0°C, on many day during winter periods.

EXTREMES FOR JANUARY 2002 TO SEPTEMBER 2002.--
SPECIFIC CONDUCTANCE: Maximum, 1,530 microsiemens/cm, Feb. 7; minimum, 56 microsiemens/cm, Aug. 28.
WATER TEMPERATURE: Maximum, 28.8°C, Aug. 24; minimum, 1.4°C, Feb. 14.

EXTREMES FOR WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003.--
SPECIFIC CONDUCTANCE: Maximum, 6,450 microsiemens/cm, Dec. 11, Feb. 9, 10, Mar. 1; minimum, 54 microsiemens/cm, Oct. 26.
WATER TEMPERATURE: Maximum, 26.8°C, Aug. 16; minimum, 0.0°C, on many days during winter periods.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Time | Sample type | Instantaneous discharge, cfs (00061) | Barometric pressure, mm Hg (00025) | Dissolved oxygen, mg/L (00300) | Dissolved oxygen, percent of saturation (00301) | pH, water, unfltrd field, std units (00400) | Specif. conductance, wat unf uS/cm 25 degC (00095) | Temperature, air, deg C (00020) | Temperature, water, deg C (00010) | Alkalinity, wat flt inc tit field, mg/L as CaCO3 (39086) | Bicarbonate, wat flt incrm. titr., field, mg/L (00453) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | |
| 30... | 1215 | Environmental | 82 | 760 | 10.1 | 87 | 7.0 | 95 | 5.0 | 8.7 | 18 | 22 |
| NOV | | | | | | | | | | | | |
| 05... | 1315 | Environmental | 2.6 | 762 | 11.1 | 94 | 7.0 | 180 | 9.5 | 7.9 | -- | 38 |
| DEC | | | | | | | | | | | | |
| 03... | 1245 | Environmental | 3.4 | 768 | 13.2 | 95 | 7.4 | 283 | -2.0 | 2.3 | 45 | 54 |
| JAN | | | | | | | | | | | | |
| *07...* | *1110* | *Blank* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *07...* | *1259* | *Blank* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 07... | 1300 | Environmental | 15 | 761 | 11.3 | 84 | 7.0 | 5,130 | 0.8 | 2.3 | 31 | 38 |
| FEB | | | | | | | | | | | | |
| 05... | 0945 | Environmental | -- | 762 | 11.9 | 85 | 7.2 | 825 | 1.0 | 1.2 | 29 | 36 |
| MAR | | | | | | | | | | | | |
| 05... | 1045 | Environmental | 40 | 755 | 13.0 | 101 | 7.0 | 815 | 9.5 | 4.4 | 34 | 41 |
| APR | | | | | | | | | | | | |
| 01... | 1130 | Environmental | 25 | 762 | 11.9 | 98 | 7.0 | 380 | 10.0 | 6.9 | 34 | 41 |
| 22... | 1045 | Environmental | 17 | 754 | 14.8 | 147 | 7.7 | 371 | 17.0 | 14.6 | -- | -- |
| MAY | | | | | | | | | | | | |
| 14... | 0915 | Environmental | 13 | 760 | 8.8 | 86 | 6.8 | 330 | 16.5 | 13.9 | 42 | 51 |
| 21... | 1015 | Environmental | 20 | 764 | 9.8 | 98 | 6.8 | 280 | -- | 15.3 | -- | -- |
| JUN | | | | | | | | | | | | |
| 03... | 1115 | Environmental | 18 | 760 | 9.1 | 92 | 7.3 | 309 | 19.5 | 15.5 | 36 | 43 |
| 17... | 1000 | Environmental | 16 | 767 | 8.1 | 86 | 7.2 | 319 | 17.0 | 18.6 | -- | -- |
| *17...* | *1001* | *Replicate* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| JUL | | | | | | | | | | | | |
| 09... | 0915 | Environmental | 13 | 761 | 8.4 | 100 | 7.0 | 231 | 26.0 | 23.8 | 35 | 43 |
| *09...* | *0916* | *Replicate* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 09... | 1000 | Environmental | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 24... | 0815 | Environmental | 22 | 761 | 7.8 | 89 | 6.7 | 188 | 24.0 | 21.9 | -- | -- |
| AUG | | | | | | | | | | | | |
| *06...* | *0800* | *Blank* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 06... | 0900 | Environmental | 10 | 759 | 8.2 | 94 | 6.9 | 272 | 23.5 | 22.0 | 39 | 47 |
| 19... | 1200 | Environmental | 9.0 | 766 | 8.0 | 93 | 6.8 | 218 | 26.0 | 23.1 | -- | -- |
| SEP | | | | | | | | | | | | |
| 10... | 0915 | Environmental | 7.1 | 768 | 8.4 | 89 | 7.2 | 306 | 19.0 | 18.5 | 46 | 56 |
| 23... | 1110 | Environmental | 3,010 | 758 | 8.8 | 98 | 6.2 | 60 | -- | 20.4 | -- | -- |

01654000 ACCOTINK CREEK NEAR ANNANDALE, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Chloride, water, fltrd, mg/L (00940) | Sulfate water, fltrd, mg/L (00945) | Ammonia + org-N, water, unfltrd mg/L as N (00625) | Ammonia water, fltrd, mg/L as N (00608) | Nitrate water, fltrd, mg/L as N (00618) | Nitrite + nitrate water fltrd, mg/L as N (00631) | Nitrite water, fltrd, mg/L as N (00613) | Organic nitrogen, water, unfltrd mg/L (00605) | Orthophosphate, water, fltrd, mg/L as P (00671) | Phosphorus, water, unfltrd mg/L (00665) | Total nitrogen, water, unfltrd mg/L (00600) | Organic carbon, suspnd sedimnt total, mg/L (00689) | Organic carbon, water, fltrd, mg/L (00681) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 30... | 8.35 | 5.9 | 0.57 | 0.08 | 0.65 | 0.66 | 0.013 | 0.49 | 0.05 | 0.116 | 1.2 | 1.3 | 6.9 |
| NOV | | | | | | | | | | | | | |
| 05... | 23.4 | 10.4 | 0.23 | <0.04 | -- | 0.56 | E.004 | -- | <0.02 | 0.029 | 0.79 | 0.2 | 4.3 |
| DEC | | | | | | | | | | | | | |
| 03... | 49.1 | 12.1 | 0.18 | <0.04 | -- | 0.77 | E.006 | -- | <0.02 | 0.020 | 0.95 | 0.2 | 2.9 |
| JAN | | | | | | | | | | | | | |
| *07...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *07...* | *<0.20* | *<0.2* | *<0.10* | *<0.04* | -- | *<0.06* | *<0.008* | -- | *<0.02* | *<0.004* | -- | *<0.1* | *0.8* |
| 07... | 1,600 | 24.4 | 0.86 | 0.35 | 1.22 | 1.24 | 0.019 | 0.51 | <0.02 | 0.033 | 2.1 | 0.4 | 3.3 |
| FEB | | | | | | | | | | | | | |
| 05... | 217 | 12.8 | 0.53 | 0.16 | 1.13 | 1.16 | 0.024 | 0.37 | <0.02 | 0.059 | 1.7 | 1.5 | 4.6 |
| MAR | | | | | | | | | | | | | |
| 05... | 208 | 15.5 | 0.35 | <0.04 | 1.37 | 1.38 | 0.010 | -- | <0.02 | 0.043 | 1.7 | 0.2 | 3.6 |
| APR | | | | | | | | | | | | | |
| 01... | 76.4 | 12.9 | 0.31 | <0.04 | -- | 0.98 | E.005 | -- | E.01 | 0.032 | 1.3 | 0.3 | 4.4 |
| 22... | -- | -- | 0.20 | <0.04 | -- | 0.55 | E.005 | -- | <0.02 | 0.019 | 0.75 | -- | -- |
| MAY | | | | | | | | | | | | | |
| 14... | 59.8 | 11.0 | 0.32 | E.03 | 0.90 | 0.91 | 0.011 | -- | <0.02 | 0.034 | 1.2 | 0.3 | 3.9 |
| 21... | -- | -- | 0.85 | E.03 | 0.92 | 0.94 | 0.019 | -- | <0.02 | 0.156 | 1.8 | -- | -- |
| JUN | | | | | | | | | | | | | |
| 03... | 51.8 | 11.8 | 0.32 | <0.04 | 0.99 | 1.00 | 0.010 | -- | <0.02 | 0.032 | 1.3 | 0.5 | 3.8 |
| 17... | -- | -- | 0.32 | <0.04 | 1.10 | 1.12 | 0.017 | -- | <0.02 | 0.040 | 1.4 | -- | -- |
| *17...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| JUL | | | | | | | | | | | | | |
| 09... | 37.3 | 7.8 | 0.32 | <0.04 | 0.66 | 0.69 | 0.033 | -- | <0.02 | 0.035 | 1.0 | 0.1 | 4.8 |
| *09...* | -- | -- | *0.33* | *<0.04* | *0.74* | *0.75* | *0.012* | -- | *<0.02* | *0.034* | *1.1* | *0.2* | *5.0* |
| 09... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 24... | -- | -- | 0.60 | <0.04 | 0.84 | 0.86 | 0.015 | -- | <0.02 | 0.069 | 1.5 | -- | -- |
| AUG | | | | | | | | | | | | | |
| *06...* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 06... | 45.8 | 8.9 | 0.26 | <0.04 | 1.28 | 1.29 | 0.015 | -- | <0.02 | 0.032 | 1.6 | 0.2 | 4.5 |
| 19... | -- | -- | 0.38 | <0.04 | 0.84 | 0.85 | 0.017 | -- | <0.02 | 0.044 | 1.2 | -- | -- |
| SEP | | | | | | | | | | | | | |
| 10... | 53.7 | 8.7 | 0.33 | <0.04 | 1.02 | 1.03 | 0.009 | -- | <0.02 | 0.035 | 1.4 | 0.2 | 2.9 |
| 23... | -- | -- | 1.1 | <0.04 | 0.45 | 0.46 | 0.008 | -- | 0.04 | 0.31 | 1.6 | -- | -- |

01654000 ACCOTINK CREEK NEAR ANNANDALE, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Pheophytin a, periphyton, mg/m2 (62359) | Chlorophyll a periphyton, chromofluoro, mg/m2 (70957) | 2,6-Diethylaniline water fltrd 0.7u GF ug/L (82660) | CIAT, water, fltrd, ug/L (04040) | Acetochlor, water, fltrd, ug/L (49260) | Alachlor, water, fltrd, ug/L (46342) | alpha-HCH, water, fltrd, ug/L (34253) | alpha-HCH-d6, surrog, wat flt 0.7u GF percent recovry (91065) | Atrazine, water, fltrd, ug/L (39632) | Azinphosmethyl, water, fltrd 0.7u GF ug/L (82686) | Benfluralin, water, fltrd 0.7u GF ug/L (82673) | Butylate, water, fltrd, ug/L (04028) | Carbaryl, water, fltrd 0.7u GF ug/L (82680) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 30... | -- | -- | <0.006 | <0.006 | <0.006 | <0.004 | <0.005 | 93.6 | <0.007 | <0.050 | <0.010 | <0.002 | E.033 |
| NOV | | | | | | | | | | | | | |
| 05... | -- | -- | <0.006 | <0.006 | <0.006 | <0.004 | <0.005 | 105 | <0.007 | <0.050 | <0.010 | <0.002 | E.034 |
| DEC | | | | | | | | | | | | | |
| 03... | -- | -- | <0.006 | E.004 | <0.006 | <0.004 | <0.005 | 94.7 | E.007 | <0.050 | <0.010 | <0.002 | <0.041 |
| JAN | | | | | | | | | | | | | |
| *07...* | -- | -- | *<0.006* | *<0.006* | *<0.006* | *<0.004* | *<0.005* | *104* | *<0.007* | *<0.050* | *<0.010* | *<0.002* | *<0.041* |
| *07...* | -- | -- | *<0.006* | *<0.006* | *<0.006* | *<0.004* | *<0.005* | *92.8* | *<0.007* | *<0.050* | *<0.010* | *<0.002* | *<0.041* |
| 07... | -- | -- | <0.006 | <0.006 | <0.006 | <0.004 | <0.005 | 103 | <0.007 | <0.050 | <0.010 | <0.002 | E.004 |
| FEB | | | | | | | | | | | | | |
| 05... | -- | -- | <0.006 | <0.006 | <0.006 | <0.004 | <0.005 | 97.3 | <0.010 | <0.050 | <0.010 | <0.002 | <0.041 |
| MAR | | | | | | | | | | | | | |
| 05... | -- | -- | <0.006 | E.002 | <0.006 | <0.004 | <0.005 | 87.9 | E.003 | <0.050 | <0.010 | <0.002 | <0.041 |
| APR | | | | | | | | | | | | | |
| 01... | -- | -- | <0.006 | <0.006 | <0.006 | <0.004 | <0.005 | 96.4 | E.003 | <0.050 | E.004 | <0.002 | E.042 |
| 22... | -- | -- | <0.006 | E.004 | <0.006 | <0.004 | <0.005 | 107 | 0.010 | <0.050 | E.005 | <0.002 | E.018 |
| MAY | | | | | | | | | | | | | |
| 14... | -- | -- | <0.006 | E.007 | <0.006 | <0.004 | <0.005 | 101 | 0.015 | <0.050 | <0.010 | <0.002 | E.064 |
| 21... | -- | -- | <0.006 | E.009 | 0.009 | 0.006 | <0.005 | 109 | 0.030 | <0.050 | <0.010 | <0.002 | E.035 |
| JUN | | | | | | | | | | | | | |
| 03... | -- | -- | <0.006 | E.008 | <0.006 | <0.004 | <0.005 | 106 | 0.030 | <0.050 | <0.010 | <0.002 | E.248 |
| 17... | -- | -- | <0.006 | E.005 | <0.006 | <0.004 | <0.005 | 105 | 0.013 | <0.050 | <0.010 | <0.002 | E.061 |
| *17...* | -- | -- | *<0.006* | *E.005* | *<0.006* | *<0.004* | *<0.005* | *105* | *0.013* | *<0.050* | *<0.010* | *<0.002* | *E.060* |
| JUL | | | | | | | | | | | | | |
| 09... | -- | -- | <0.006 | E.012 | <0.006 | <0.004 | <0.005 | 107 | 0.036 | <0.050 | <0.010 | <0.002 | E.042 |
| *09...* | -- | -- | *<0.006* | *E.014* | *<0.006* | *<0.004* | *<0.005* | *100* | *0.039* | *<0.050* | *<0.010* | *<0.002* | *E.047* |
| 09... | 1.0 | 1.8 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 24... | -- | -- | <0.006 | <0.006 | <0.006 | <0.004 | <0.005 | 103 | 0.007 | <0.050 | <0.010 | <0.002 | E.527 |
| AUG | | | | | | | | | | | | | |
| *06...* | -- | -- | *<0.006* | *<0.006* | *<0.006* | *<0.004* | *<0.005* | *95.5* | *<0.007* | *<0.050* | *<0.010* | *<0.002* | *<0.041* |
| 06... | -- | -- | <0.006 | <0.006 | <0.006 | <0.004 | <0.005 | 83.7 | <0.007 | <0.050 | <0.010 | <0.002 | E.012 |
| 19... | -- | -- | <0.006 | <0.006 | <0.006 | <0.007 | <0.005 | 96.5 | <0.007 | <0.050 | <0.010 | <0.002 | E.190 |
| SEP | | | | | | | | | | | | | |
| 10... | -- | -- | <0.006 | <0.006 | <0.006 | <0.004 | <0.005 | 100 | 0.027 | <0.050 | <0.010 | <0.002 | E.007 |
| 23... | -- | -- | <0.006 | <0.006 | <0.006 | <0.004 | <0.005 | 81.4 | <0.007 | <0.050 | <0.010 | <0.002 | E.264 |

01654000 ACCOTINK CREEK NEAR ANNANDALE, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Carbo-furan, water, fltrd 0.7u GF ug/L (82674) | Chlor-pyrifos water, fltrd, ug/L (38933) | cis-Per-methrin water fltrd 0.7u GF ug/L (82687) | Cyana-zine, water, fltrd, ug/L (04041) | DCPA, water fltrd 0.7u GF ug/L (82682) | Diazi-non, water, fltrd, ug/L (39572) | Diazi-non-d10 surrog. wat flt 0.7u GF percent recovry (91063) | Diel-drin, water, fltrd, ug/L (39381) | Disul-foton, water, fltrd 0.7u GF ug/L (82677) | EPTC, water, fltrd 0.7u GF ug/L (82668) | Ethal-flur-alin, water, fltrd 0.7u GF ug/L (82663) | Etho-prop, water, fltrd 0.7u GF ug/L (82672) | Fonofos water, fltrd, ug/L (04095) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 30... | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | 0.035 | 128 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 |
| NOV | | | | | | | | | | | | | |
| 05... | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | 0.012 | 136 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 |
| DEC | | | | | | | | | | | | | |
| 03... | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.006 | 107 | <0.005 | <0.02 | <0.011 | <0.009 | <0.005 | <0.003 |
| JAN | | | | | | | | | | | | | |
| *07...* | *<0.020* | *<0.005* | *<0.006* | *<0.018* | *<0.003* | *<0.005* | *112* | *<0.005* | *<0.02* | *<0.002* | *<0.009* | *<0.005* | *<0.003* |
| *07...* | *<0.020* | *<0.005* | *<0.006* | *<0.018* | *<0.003* | *<0.005* | *114* | *<0.005* | *<0.02* | *<0.002* | *<0.009* | *<0.005* | *<0.003* |
| 07... | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 124 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 |
| FEB | | | | | | | | | | | | | |
| 05... | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | 0.032 | 113 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 |
| MAR | | | | | | | | | | | | | |
| 05... | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 113 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 |
| APR | | | | | | | | | | | | | |
| 01... | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | 0.054 | 125 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 |
| 22... | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | 0.012 | 127 | <0.005 | <0.02 | <0.020 | <0.009 | <0.005 | <0.003 |
| MAY | | | | | | | | | | | | | |
| 14... | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | 0.019 | 107 | <0.005 | <0.02 | <0.050 | <0.009 | <0.005 | <0.003 |
| 21... | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | 0.025 | 110 | <0.005 | <0.02 | <0.035 | <0.009 | <0.005 | <0.003 |
| JUN | | | | | | | | | | | | | |
| 03... | <0.020 | E.004 | <0.006 | <0.018 | <0.003 | 0.032 | 124 | <0.005 | <0.02 | <0.025 | <0.009 | <0.005 | <0.003 |
| 17... | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | 0.024 | 127 | <0.005 | <0.02 | <0.013 | <0.009 | <0.005 | <0.003 |
| *17...* | *<0.020* | *E.004* | *<0.006* | *<0.018* | *<0.003* | *0.023* | *127* | *<0.005* | *<0.02* | *<0.007* | *<0.009* | *<0.005* | *<0.003* |
| JUL | | | | | | | | | | | | | |
| 09... | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | 0.060 | 125 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 |
| *09...* | *<0.020* | *<0.005* | *<0.006* | *<0.018* | *<0.003* | *0.059* | *136* | *<0.005* | *<0.02* | *<0.002* | *<0.009* | *<0.005* | *<0.003* |
| 09... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 24... | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | 0.054 | 114 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 |
| AUG | | | | | | | | | | | | | |
| *06...* | *<0.020* | *<0.005* | *<0.006* | *<0.018* | *<0.003* | *<0.005* | *104* | *<0.005* | *<0.02* | *<0.002* | *<0.009* | *<0.005* | *<0.003* |
| 06... | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | <0.005 | 106 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 |
| 19... | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | 0.009 | 124 | <0.005 | <0.02 | <0.020 | <0.009 | <0.005 | <0.003 |
| SEP | | | | | | | | | | | | | |
| 10... | <0.020 | <0.005 | <0.006 | <0.018 | <0.003 | 0.006 | 107 | <0.005 | <0.02 | <0.010 | <0.009 | <0.005 | <0.003 |
| 23... | <0.020 | <0.005 | <0.006 | <0.018 | 0.003 | 0.033 | 109 | <0.005 | <0.02 | <0.002 | <0.009 | <0.005 | <0.003 |

01654000 ACCOTINK CREEK NEAR ANNANDALE, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Lindane water, fltrd, ug/L (39341) | Linuron water fltrd 0.7u GF ug/L (82666) | Mala-thion, water, fltrd, ug/L (39532) | Methyl para-thion, water, fltrd 0.7u GF ug/L (82667) | Metola-chlor, water, fltrd, ug/L (39415) | Metri-buzin, water, fltrd, ug/L (82630) | Moli-nate, water, fltrd 0.7u GF ug/L (82671) | Naprop-amide, water, fltrd 0.7u GF ug/L (82684) | p,p-' DDE, water, fltrd, ug/L (34653) | Para-thion, water, fltrd, ug/L (39542) | Peb-ulate, water, fltrd 0.7u GF ug/L (82669) | Pendi-meth-alin, water, fltrd 0.7u GF ug/L (82683) | Phorate water fltrd 0.7u GF ug/L (82664) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 30... | <0.004 | <0.035 | <0.027 | <0.006 | E.005 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 |
| NOV | | | | | | | | | | | | | |
| 05... | <0.004 | <0.035 | <0.027 | <0.006 | E.005 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 |
| DEC | | | | | | | | | | | | | |
| 03... | <0.004 | <0.035 | <0.027 | <0.006 | E.001 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 |
| JAN | | | | | | | | | | | | | |
| *07...* | *<0.004* | *<0.035* | *<0.027* | *<0.006* | *<0.013* | *<0.006* | *<0.002* | *<0.007* | *<0.003* | *<0.010* | *<0.004* | *<0.022* | *<0.011* |
| *07...* | *<0.004* | *<0.035* | *<0.027* | *<0.006* | *<0.013* | *<0.006* | *<0.002* | *<0.007* | *<0.003* | *<0.010* | *<0.004* | *<0.022* | *<0.011* |
| 07... | <0.004 | <0.035 | <0.027 | <0.006 | <0.013 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 |
| FEB | | | | | | | | | | | | | |
| 05... | <0.004 | <0.035 | <0.027 | <0.006 | <0.013 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 |
| MAR | | | | | | | | | | | | | |
| 05... | <0.004 | <0.035 | <0.027 | <0.006 | E.003 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 |
| APR | | | | | | | | | | | | | |
| 01... | <0.004 | <0.035 | <0.027 | <0.006 | E.004 | <0.006 | <0.005 | <0.007 | <0.003 | <0.010 | <0.004 | 0.032 | <0.011 |
| 22... | <0.004 | <0.035 | <0.027 | <0.006 | E.008 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | 0.023 | <0.011 |
| MAY | | | | | | | | | | | | | |
| 14... | <0.004 | <0.035 | <0.027 | <0.006 | E.011 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | E.013 | <0.011 |
| 21... | <0.004 | <0.035 | E.013 | <0.006 | 0.031 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | 0.036 | <0.011 |
| JUN | | | | | | | | | | | | | |
| 03... | <0.004 | <0.035 | <0.027 | <0.006 | E.010 | <0.006 | <0.004 | <0.007 | <0.003 | <0.010 | <0.004 | E.014 | <0.011 |
| 17... | <0.004 | <0.035 | <0.027 | <0.006 | E.011 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 |
| *17...* | *<0.004* | *<0.035* | *<0.027* | *<0.006* | *E.010* | *<0.006* | *<0.002* | *<0.007* | *<0.003* | *<0.010* | *<0.004* | *<0.022* | *<0.011* |
| JUL | | | | | | | | | | | | | |
| 09... | <0.004 | <0.035 | <0.027 | <0.006 | 0.015 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 |
| *09...* | *<0.004* | *<0.035* | *<0.027* | *<0.006* | *0.016* | *<0.006* | *<0.002* | *<0.007* | *<0.003* | *<0.010* | *<0.004* | *<0.022* | *<0.011* |
| 09... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 24... | <0.004 | <0.035 | <0.027 | <0.006 | E.007 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | E.008 | <0.011 |
| AUG | | | | | | | | | | | | | |
| *06...* | *<0.004* | *<0.035* | *<0.027* | *<0.006* | *<0.013* | *<0.006* | *<0.002* | *<0.007* | *<0.003* | *<0.010* | *<0.004* | *<0.022* | *<0.011* |
| 06... | <0.004 | <0.035 | <0.027 | <0.006 | <0.013 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 |
| 19... | <0.004 | <0.035 | <0.027 | <0.006 | E.006 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 |
| SEP | | | | | | | | | | | | | |
| 10... | <0.004 | <0.035 | <0.027 | <0.006 | E.004 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 |
| 23... | <0.004 | <0.035 | E.018 | <0.006 | <0.013 | <0.006 | <0.002 | <0.007 | <0.003 | <0.010 | <0.004 | <0.022 | <0.011 |

01654000 ACCOTINK CREEK NEAR ANNANDALE, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Prometon, water, fltrd, ug/L (04037) | Pronamide, water, fltrd 0.7u GF ug/L (82676) | Propachlor, water, fltrd, ug/L (04024) | Propanil, water, fltrd 0.7u GF ug/L (82679) | Propargite, water, fltrd 0.7u GF ug/L (82685) | Simazine, water, fltrd, ug/L (04035) | Tebuthiuron water fltrd 0.7u GF ug/L (82670) | Terbacil, water, fltrd 0.7u GF ug/L (82665) | Terbufos, water, fltrd 0.7u GF ug/L (82675) | Terbuthylazine, water, fltrd, ug/L (04022) | Thiobencarb water fltrd 0.7u GF ug/L (82681) | Triallate, water, fltrd 0.7u GF ug/L (82678) | Trifluralin, water, fltrd 0.7u GF ug/L (82661) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 30... | 0.03 | <0.004 | <0.010 | <0.011 | <0.02 | <0.007 | <0.02 | <0.034 | <0.02 | <0.01 | <0.005 | <0.002 | E.004 |
| NOV | | | | | | | | | | | | | |
| 05... | 0.02 | <0.004 | <0.010 | <0.011 | <0.02 | 0.006 | <0.02 | <0.034 | <0.02 | <0.01 | <0.005 | <0.002 | <0.009 |
| DEC | | | | | | | | | | | | | |
| 03... | E.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.010 | <0.02 | <0.034 | <0.02 | <0.01 | <0.005 | <0.002 | <0.009 |
| JAN | | | | | | | | | | | | | |
| *07...* | *<0.01* | *<0.004* | *<0.010* | *<0.011* | *<0.02* | *<0.005* | *<0.02* | *<0.034* | *<0.02* | *<0.01* | *<0.005* | *<0.002* | *<0.009* |
| *07...* | *<0.01* | *<0.004* | *<0.010* | *<0.011* | *<0.02* | *<0.005* | *<0.02* | *<0.034* | *<0.02* | *<0.01* | *<0.005* | *<0.002* | *<0.009* |
| 07... | E.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.036 | <0.02 | <0.034 | <0.02 | <0.01 | <0.005 | <0.002 | <0.009 |
| FEB | | | | | | | | | | | | | |
| 05... | E.01 | <0.004 | <0.010 | <0.011 | <0.02 | <0.010 | <0.02 | <0.034 | <0.02 | <0.01 | <0.005 | <0.002 | <0.009 |
| MAR | | | | | | | | | | | | | |
| 05... | E.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.013 | <0.02 | <0.034 | <0.02 | <0.01 | <0.005 | <0.002 | <0.009 |
| APR | | | | | | | | | | | | | |
| 01... | E.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.029 | <0.02 | <0.034 | <0.02 | <0.01 | <0.005 | <0.002 | E.005 |
| 22... | E.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.039 | <0.02 | <0.034 | <0.02 | <0.01 | <0.005 | <0.002 | E.005 |
| MAY | | | | | | | | | | | | | |
| 14... | 0.02 | <0.004 | <0.010 | <0.011 | <0.02 | 0.108 | <0.02 | <0.034 | <0.02 | <0.01 | <0.005 | <0.002 | <0.009 |
| 21... | 0.06 | <0.004 | <0.010 | <0.011 | <0.02 | 0.044 | <0.02 | <0.034 | <0.02 | <0.01 | <0.005 | <0.002 | E.001 |
| JUN | | | | | | | | | | | | | |
| 03... | 0.03 | <0.004 | <0.010 | <0.011 | <0.02 | 0.032 | <0.02 | <0.034 | <0.02 | <0.01 | <0.005 | <0.002 | <0.009 |
| 17... | 0.03 | <0.004 | <0.010 | <0.011 | <0.02 | 0.024 | <0.02 | <0.034 | <0.02 | <0.01 | <0.005 | <0.002 | <0.009 |
| *17...* | *0.02* | *<0.004* | *<0.010* | *<0.011* | *<0.02* | *0.024* | *<0.02* | *<0.034* | *<0.02* | *<0.01* | *<0.005* | *<0.002* | *<0.009* |
| JUL | | | | | | | | | | | | | |
| 09... | 0.04 | <0.004 | <0.010 | <0.011 | <0.02 | 0.016 | <0.02 | <0.034 | <0.02 | <0.01 | <0.005 | <0.002 | <0.009 |
| *09...* | *0.05* | *<0.004* | *<0.010* | *<0.011* | *<0.02* | *0.013* | *<0.02* | *<0.034* | *<0.02* | *<0.01* | *<0.005* | *<0.002* | *<0.009* |
| 09... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 24... | 0.06 | <0.004 | <0.010 | <0.011 | <0.02 | 0.007 | <0.02 | <0.034 | <0.02 | <0.01 | <0.005 | <0.002 | <0.009 |
| AUG | | | | | | | | | | | | | |
| *06...* | *<0.01* | *<0.004* | *<0.010* | *<0.011* | *<0.02* | *<0.005* | *<0.02* | *<0.034* | *<0.02* | *<0.01* | *<0.005* | *<0.002* | *<0.009* |
| 06... | 0.05 | <0.004 | <0.010 | <0.011 | <0.02 | <0.005 | <0.02 | <0.034 | <0.02 | <0.01 | <0.005 | <0.002 | <0.009 |
| 19... | 0.04 | <0.004 | <0.010 | <0.011 | <0.02 | <0.007 | <0.02 | <0.050 | <0.02 | <0.01 | <0.005 | <0.002 | <0.009 |
| SEP | | | | | | | | | | | | | |
| 10... | 0.03 | <0.004 | <0.010 | <0.011 | <0.02 | 2.46 | E.01 | <0.034 | <0.02 | <0.01 | <0.005 | <0.002 | <0.009 |
| 23... | E.01 | <0.004 | <0.010 | <0.011 | <0.02 | 0.012 | <0.02 | <0.034 | <0.02 | <0.01 | <0.005 | <0.002 | <0.009 |

01654000 ACCOTINK CREEK NEAR ANNANDALE, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Suspended sediment concentration mg/L (80154) | Suspended sediment load, tons/d (80155) |
|---|---|---|
| OCT | | |
| 30... | 24 | 5.4 |
| NOV | | |
| 05... | 3 | 0.02 |
| DEC | | |
| 03... | 2 | 0.02 |
| JAN | | |
| *07...* | -- | -- |
| *07...* | *0.0* | -- |
| 07... | 6 | 0.26 |
| FEB | | |
| 05... | 16 | -- |
| MAR | | |
| 05... | 3 | 0.37 |
| APR | | |
| 01... | 5 | 0.32 |
| 22... | 5 | 0.21 |
| MAY | | |
| 14... | 5 | 0.16 |
| 21... | 143 | 7.7 |
| JUN | | |
| 03... | 4 | 0.18 |
| 17... | 7 | 0.29 |
| *17...* | -- | -- |
| JUL | | |
| 09... | 4 | 0.14 |
| *09...* | *4* | -- |
| 09... | -- | -- |
| 24... | 17 | 1.0 |
| AUG | | |
| *06...* | -- | -- |
| 06... | 3 | 0.09 |
| 19... | 4 | 0.09 |
| SEP | | |
| 10... | 4 | 0.07 |
| 23... | 228 | 1,850 |

**Remark codes used in this table:**
**< -- Less than**
**E -- Estimated value**

01654000 ACCOTINK CREEK NEAR ANNANDALE, VA—Continued

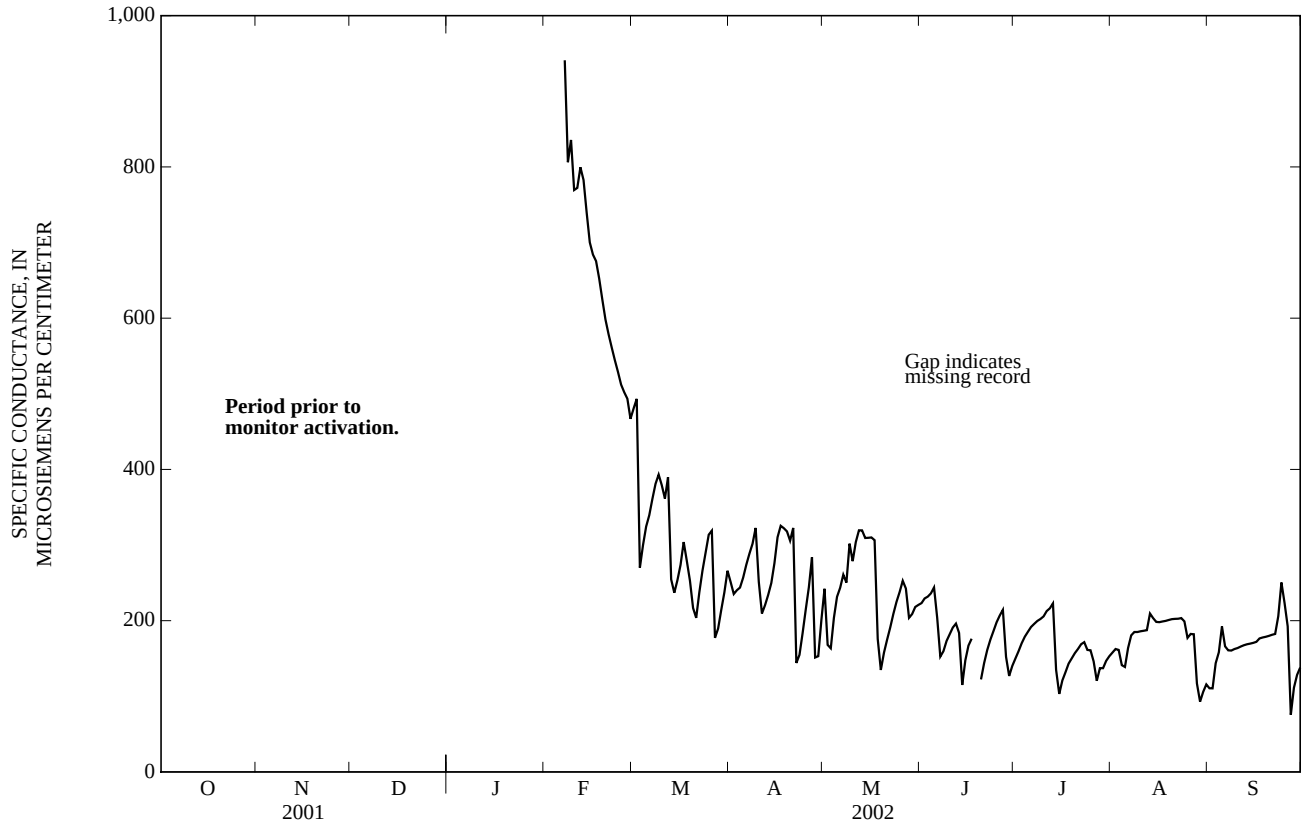
SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS
JANUARY 2002 TO SEPTEMBER 2002

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | | |
| 1 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 4 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 6 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 7 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 11 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 12 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 13 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 14 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 15 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 16 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 17 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 18 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 19 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 20 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 21 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 22 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 23 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 24 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 25 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 26 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 27 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 28 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 29 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 30 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 31 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MONTH | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | FEBRUARY | | | MARCH | | | APRIL | | | MAY | | |
| 1 | --- | --- | --- | 501 | 462 | 481 | 279 | 235 | 251 | 261 | 221 | 242 |
| 2 | --- | --- | --- | 818 | 280 | 493 | 245 | 229 | 235 | 341 | 86 | 168 |
| 3 | --- | --- | --- | 316 | 258 | 270 | 244 | 238 | 240 | 184 | 124 | 163 |
| 4 | --- | --- | --- | 315 | 280 | 300 | 252 | 240 | 244 | 239 | 184 | 204 |
| 5 | --- | --- | --- | 333 | 314 | 324 | 266 | 252 | 257 | 243 | 207 | 232 |
| 6 | --- | --- | --- | 349 | 332 | 339 | 282 | 266 | 274 | 248 | 241 | 244 |
| 7 | 1,530 | 746 | 941 | 371 | 349 | 361 | 297 | 282 | 288 | 289 | 247 | 261 |
| 8 | 846 | 745 | 806 | 390 | 371 | 381 | 308 | 297 | 302 | 261 | 246 | 250 |
| 9 | 849 | 803 | 836 | 399 | 390 | 393 | 454 | 285 | 323 | 398 | 250 | 302 |
| 10 | 803 | 756 | 769 | 410 | 337 | 379 | 404 | 207 | 251 | 292 | 268 | 279 |
| 11 | 795 | 759 | 772 | 383 | 337 | 362 | 214 | 207 | 209 | 316 | 292 | 304 |
| 12 | 803 | 795 | 800 | 547 | 357 | 390 | 229 | 214 | 221 | 322 | 316 | 319 |
| 13 | 799 | 763 | 783 | 357 | 200 | 255 | 242 | 229 | 234 | 322 | 314 | 319 |
| 14 | 763 | 715 | 739 | 245 | 225 | 237 | 262 | 242 | 250 | 314 | 308 | 309 |
| 15 | 715 | 689 | 700 | 264 | 245 | 254 | 302 | 262 | 276 | 312 | 309 | 310 |
| 16 | 690 | 679 | 684 | 286 | 264 | 274 | 325 | 298 | 310 | 312 | 308 | 310 |
| 17 | 683 | 662 | 675 | 429 | 286 | 304 | 328 | 322 | 325 | 419 | 234 | 306 |
| 18 | 662 | 642 | 652 | 333 | 235 | 279 | 328 | 315 | 322 | 278 | 116 | 176 |
| 19 | 642 | 610 | 625 | 331 | 243 | 253 | 383 | 309 | 318 | 147 | 121 | 135 |
| 20 | 610 | 587 | 598 | 314 | 169 | 217 | 315 | 296 | 306 | 167 | 147 | 158 |
| 21 | 587 | 570 | 579 | 223 | 186 | 204 | 350 | 288 | 323 | 183 | 167 | 175 |
| 22 | 571 | 553 | 561 | 253 | 223 | 238 | 291 | 115 | 144 | 200 | 183 | 191 |
| 23 | 553 | 539 | 545 | 279 | 253 | 266 | 171 | 137 | 155 | 217 | 200 | 209 |
| 24 | 540 | 518 | 529 | 302 | 278 | 290 | 196 | 171 | 183 | 231 | 217 | 225 |
| 25 | 518 | 505 | 512 | 325 | 302 | 314 | 263 | 196 | 215 | 245 | 231 | 238 |
| 26 | 506 | 497 | 502 | 422 | 206 | 319 | 269 | 223 | 244 | 257 | 245 | 253 |
| 27 | 503 | 479 | 493 | 250 | 172 | 177 | 300 | 269 | 284 | 282 | 209 | 243 |
| 28 | 479 | 459 | 467 | 202 | 176 | 190 | 335 | 77 | 151 | 215 | 189 | 204 |
| 29 | --- | --- | --- | 230 | 202 | 214 | 182 | 111 | 153 | 216 | 201 | 209 |
| 30 | --- | --- | --- | 250 | 230 | 238 | 221 | 182 | 201 | 221 | 216 | 218 |
| 31 | --- | --- | --- | 338 | 250 | 266 | --- | --- | --- | 222 | 220 | 221 |
| MONTH | 1,530 | 459 | 662 | 818 | 169 | 299 | 454 | 77 | 250 | 419 | 86 | 238 |

01654000 ACCOTINK CREEK NEAR ANNANDALE, VA—Continued

SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS—CONTINUED
JANUARY 2002 TO SEPTEMBER 2002

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | |
| 1 | 228 | 220 | 223 | 155 | 145 | 150 | 159 | 155 | 158 | 124 | 60 | 111 |
| 2 | 232 | 228 | 229 | 164 | 155 | 160 | 164 | 159 | 163 | 117 | 107 | 111 |
| 3 | 234 | 230 | 232 | 172 | 164 | 170 | 173 | 134 | 161 | 178 | 117 | 144 |
| 4 | 241 | 221 | 236 | 181 | 172 | 179 | 181 | 133 | 141 | 202 | 132 | 158 |
| 5 | 247 | 241 | 244 | 190 | 180 | 185 | 141 | 135 | 139 | 205 | 170 | 192 |
| 6 | 253 | 186 | 204 | 195 | 190 | 192 | 191 | 141 | 164 | 170 | 163 | 166 |
| 7 | 192 | 146 | 153 | 199 | 195 | 196 | 183 | 179 | 181 | 163 | 160 | 161 |
| 8 | 167 | 152 | 160 | 200 | 199 | 200 | 186 | 183 | 185 | 161 | 160 | 161 |
| 9 | 179 | 167 | 173 | 204 | 182 | 202 | 186 | 184 | 185 | 164 | 160 | 163 |
| 10 | 186 | 179 | 182 | 208 | 203 | 206 | 187 | 185 | 186 | 166 | 162 | 164 |
| 11 | 192 | 186 | 191 | 216 | 207 | 213 | 187 | 186 | 187 | 167 | 164 | 166 |
| 12 | 199 | 191 | 196 | 217 | 216 | 216 | 188 | 187 | 187 | 169 | 166 | 168 |
| 13 | 217 | 111 | 184 | 224 | 216 | 223 | 229 | 188 | 209 | 169 | 168 | 169 |
| 14 | 129 | 106 | 115 | 231 | 70 | 135 | 210 | 201 | 203 | 170 | 168 | 170 |
| 15 | 166 | 98 | 148 | 113 | 91 | 103 | 201 | 197 | 198 | 171 | 170 | 171 |
| 16 | 173 | 164 | 167 | 128 | 113 | 121 | 199 | 198 | 198 | 174 | 171 | 172 |
| 17 | 179 | 173 | 176 | 134 | 128 | 132 | 200 | 198 | 199 | 179 | 174 | 177 |
| 18 | --- | --- | --- | 145 | 134 | 143 | 201 | 199 | 200 | 179 | 177 | 178 |
| 19 | --- | --- | --- | 152 | 145 | 150 | 202 | 200 | 201 | 179 | 177 | 179 |
| 20 | 134 | 109 | 122 | 160 | 152 | 157 | 203 | 201 | 202 | 181 | 179 | 180 |
| 21 | 153 | 134 | 144 | 165 | 158 | 163 | 203 | 201 | 202 | 183 | 180 | 181 |
| 22 | 168 | 153 | 161 | 171 | 163 | 169 | 203 | 202 | 203 | 183 | 181 | 182 |
| 23 | 181 | 168 | 175 | 183 | 159 | 172 | 204 | 202 | 203 | 278 | 180 | 206 |
| 24 | 194 | 181 | 186 | 186 | 154 | 161 | 238 | 120 | 199 | 279 | 226 | 250 |
| 25 | 203 | 193 | 198 | 162 | 159 | 161 | 183 | 158 | 177 | 226 | 221 | 224 |
| 26 | 212 | 203 | 207 | 160 | 121 | 146 | 183 | 181 | 182 | 221 | 73 | 193 |
| 27 | 238 | 182 | 214 | 153 | 73 | 121 | 184 | 181 | 182 | 89 | 60 | 76 |
| 28 | 216 | 112 | 152 | 148 | 113 | 137 | 184 | 56 | 117 | 127 | 89 | 111 |
| 29 | 138 | 115 | 127 | 143 | 134 | 137 | 100 | 75 | 93 | 134 | 124 | 128 |
| 30 | 145 | 136 | 140 | 149 | 143 | 147 | 111 | 100 | 106 | 143 | 134 | 138 |
| 31 | --- | --- | --- | 155 | 149 | 153 | 120 | 111 | 116 | --- | --- | --- |
| MONTH | 253 | 98 | 180 | 231 | 70 | 165 | 238 | 56 | 175 | 279 | 60 | 165 |




DAILY MEAN SPECIFIC CONDUCTANCE - JANUARY 2002 TO SEPTEMBER 2002

01654000 ACCOTINK CREEK NEAR ANNANDALE, VA—Continued

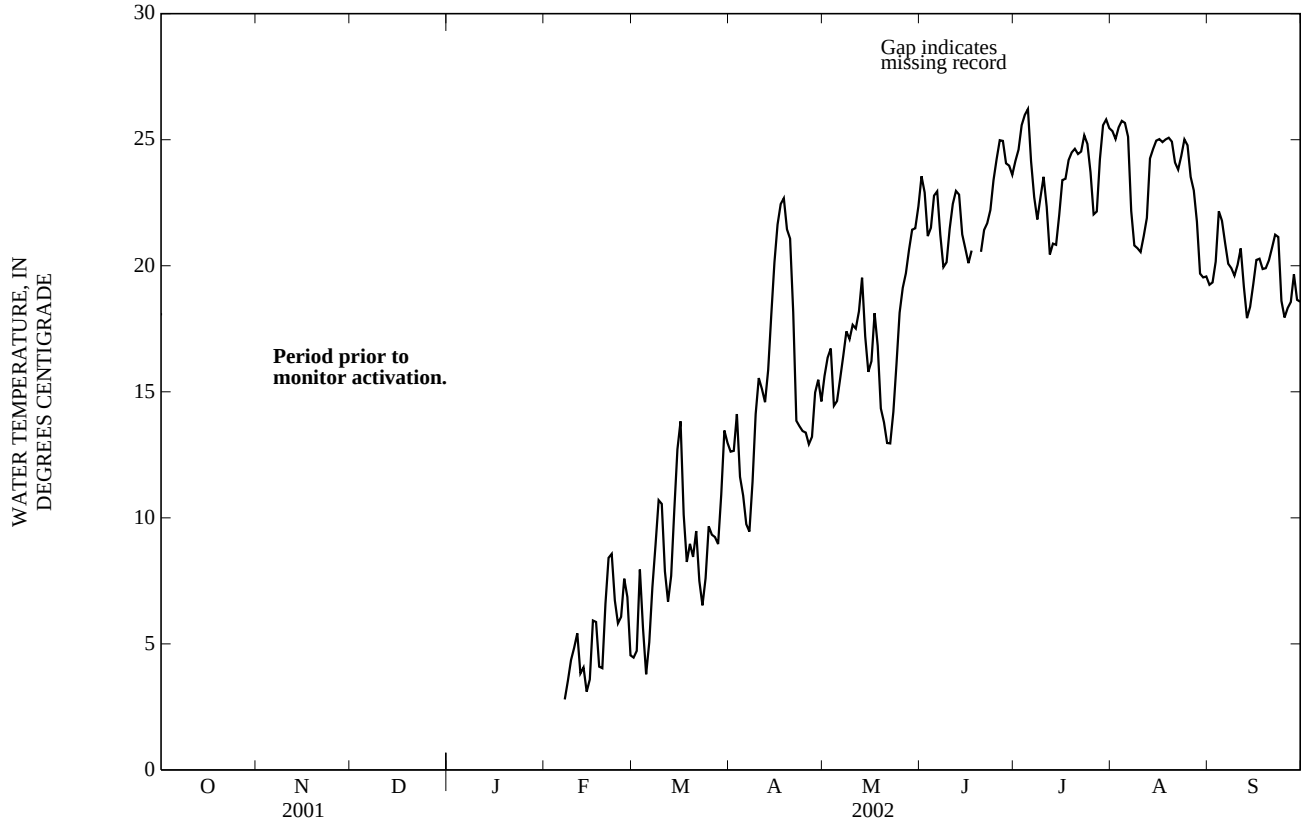
TEMPERATURE, WATER, DEGREES CELSIUS
JANUARY 2002 TO SEPTEMBER 2002

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | | |
| 1 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 4 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 6 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 7 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 11 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 12 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 13 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 14 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 15 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 16 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 17 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 4.8 | 2.7 | 3.7 |
| 18 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 4.8 | 3.4 | 4.0 |
| 19 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 3.4 | 1.3 | 2.0 |
| 20 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 2.8 | 1.0 | 1.8 |
| 21 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 3.5 | 1.5 | 2.3 |
| 22 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 4.1 | 1.5 | 2.7 |
| 23 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 4.9 | 2.7 | 3.8 |
| 24 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 6.4 | 4.2 | 5.2 |
| 25 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 7.1 | 4.9 | 6.1 |
| 26 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5.9 | 3.1 | 4.5 |
| 27 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 6.0 | 2.6 | 4.2 |
| 28 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 6.8 | 3.2 | 5.0 |
| 29 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 8.4 | 4.8 | 6.5 |
| 30 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 10.7 | 7.2 | 8.9 |
| 31 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 10.2 | 9.2 | 9.5 |
| MONTH | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | FEBRUARY | | | MARCH | | | APRIL | | | MAY | | |
| 1 | 12.2 | 9.0 | 10.2 | 6.5 | 2.1 | 4.5 | 15.2 | 10.9 | 12.6 | 17.8 | 13.9 | 15.6 |
| 2 | 9.3 | 6.2 | 7.6 | 6.8 | 3.5 | 4.7 | 15.7 | 9.9 | 12.7 | 17.3 | 15.3 | 16.4 |
| 3 | 6.2 | 4.2 | 5.1 | 9.0 | 6.5 | 7.9 | 16.4 | 12.2 | 14.1 | 17.9 | 15.8 | 16.7 |
| 4 | 5.0 | 2.3 | 3.8 | 7.3 | 3.5 | 5.6 | 13.7 | 9.8 | 11.6 | 15.8 | 13.0 | 14.4 |
| 5 | 2.7 | 0.5 | 1.7 | 6.1 | 2.0 | 3.8 | 13.2 | 9.0 | 10.9 | 16.8 | 12.9 | 14.6 |
| 6 | 2.8 | 0.5 | 1.7 | 7.9 | 2.6 | 5.1 | 11.7 | 8.0 | 9.7 | 17.0 | 14.0 | 15.5 |
| 7 | 3.4 | 2.3 | 2.8 | 10.0 | 4.8 | 7.2 | 12.7 | 6.6 | 9.5 | 17.0 | 15.8 | 16.4 |
| 8 | 5.7 | 1.9 | 3.5 | 11.6 | 6.4 | 8.9 | 15.1 | 8.6 | 11.4 | 19.4 | 16.0 | 17.4 |
| 9 | 6.1 | 2.6 | 4.4 | 12.4 | 9.0 | 10.7 | 15.9 | 12.6 | 14.1 | 17.8 | 16.7 | 17.1 |
| 10 | 5.8 | 4.1 | 4.8 | 12.1 | 8.3 | 10.6 | 17.9 | 13.8 | 15.5 | 19.8 | 16.2 | 17.7 |
| 11 | 6.3 | 4.3 | 5.4 | 9.9 | 6.0 | 7.9 | 18.2 | 12.4 | 15.1 | 19.3 | 16.0 | 17.5 |
| 12 | 5.2 | 2.3 | 3.8 | 7.3 | 6.2 | 6.7 | 15.8 | 13.6 | 14.6 | 20.6 | 16.3 | 18.2 |
| 13 | 5.1 | 3.1 | 4.1 | 8.3 | 6.9 | 7.7 | 17.8 | 14.3 | 15.9 | 20.6 | 18.5 | 19.5 |
| 14 | 4.5 | 1.4 | 3.1 | 13.2 | 8.3 | 10.3 | 20.7 | 16.0 | 18.1 | 19.1 | 16.1 | 17.2 |
| 15 | 5.1 | 2.0 | 3.6 | 15.6 | 10.4 | 12.7 | 23.3 | 17.8 | 20.1 | 17.8 | 14.1 | 15.8 |
| 16 | 7.8 | 4.3 | 5.9 | 14.8 | 12.7 | 13.8 | 24.9 | 19.2 | 21.6 | 18.7 | 14.0 | 16.2 |
| 17 | 6.9 | 4.7 | 5.9 | 12.7 | 8.5 | 10.1 | 25.2 | 20.0 | 22.4 | 19.9 | 16.7 | 18.1 |
| 18 | 5.7 | 2.3 | 4.1 | 8.6 | 7.9 | 8.3 | 24.4 | 21.1 | 22.7 | 19.6 | 14.8 | 16.8 |
| 19 | 5.8 | 1.9 | 4.0 | 10.3 | 7.9 | 9.0 | 23.0 | 20.1 | 21.4 | 15.9 | 13.0 | 14.3 |
| 20 | 8.3 | 5.2 | 6.6 | 9.1 | 8.2 | 8.4 | 22.3 | 20.0 | 21.1 | 15.6 | 12.3 | 13.8 |
| 21 | 10.1 | 6.7 | 8.4 | 12.2 | 7.6 | 9.5 | 20.7 | 15.5 | 18.2 | 14.6 | 11.4 | 13.0 |
| 22 | 10.0 | 7.4 | 8.6 | 9.6 | 5.9 | 7.5 | 15.5 | 12.5 | 13.9 | 15.5 | 10.7 | 13.0 |
| 23 | 8.1 | 5.1 | 6.7 | 9.6 | 4.2 | 6.5 | 15.6 | 12.0 | 13.6 | 17.0 | 11.9 | 14.2 |
| 24 | 7.7 | 3.6 | 5.8 | 10.7 | 5.2 | 7.6 | 16.2 | 11.3 | 13.4 | 19.0 | 13.7 | 16.1 |
| 25 | 7.8 | 3.9 | 6.1 | 12.9 | 7.4 | 9.7 | 14.5 | 12.8 | 13.4 | 19.6 | 16.8 | 18.1 |
| 26 | 9.5 | 5.5 | 7.6 | 9.9 | 9.1 | 9.3 | 15.2 | 11.2 | 12.9 | 21.0 | 17.5 | 19.1 |
| 27 | 8.6 | 4.6 | 6.9 | 9.9 | 8.5 | 9.2 | 15.2 | 11.3 | 13.2 | 21.2 | 18.4 | 19.7 |
| 28 | 6.4 | 2.6 | 4.5 | 11.9 | 6.5 | 9.0 | 16.4 | 13.6 | 15.0 | 22.3 | 19.2 | 20.6 |
| 29 | --- | --- | --- | 14.0 | 8.8 | 10.9 | 16.3 | 14.5 | 15.5 | 23.4 | 19.9 | 21.4 |
| 30 | --- | --- | --- | 16.0 | 11.6 | 13.5 | 16.8 | 12.8 | 14.6 | 23.7 | 19.6 | 21.5 |
| 31 | --- | --- | --- | 14.0 | 11.8 | 13.0 | --- | --- | --- | 24.6 | 20.4 | 22.4 |
| MONTH | 10.1 | 1.4 | 5.3 | 16.0 | 2.0 | 8.7 | 25.2 | 6.6 | 15.3 | 24.6 | 10.7 | 17.0 |

01654000 ACCOTINK CREEK NEAR ANNANDALE, VA—Continued

TEMPERATURE, WATER, DEGREES CELSIUS—CONTINUED
JANUARY 2002 TO SEPTEMBER 2002

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | |
| 1 | 25.4 | 22.0 | 23.5 | 26.1 | 22.6 | 24.2 | 25.8 | 24.9 | 25.3 | 20.0 | 18.8 | 19.2 |
| 2 | 24.3 | 21.6 | 22.9 | 26.4 | 23.3 | 24.6 | 25.6 | 24.6 | 25.0 | 20.1 | 18.8 | 19.3 |
| 3 | 22.7 | 19.8 | 21.2 | 26.7 | 24.7 | 25.6 | 27.1 | 25.1 | 25.5 | 22.4 | 18.5 | 20.2 |
| 4 | 23.7 | 20.0 | 21.5 | 26.8 | 25.5 | 26.0 | 27.7 | 24.1 | 25.7 | 23.9 | 20.9 | 22.2 |
| 5 | 24.6 | 21.7 | 22.8 | 26.6 | 25.9 | 26.2 | 26.7 | 24.8 | 25.7 | 23.2 | 20.6 | 21.8 |
| 6 | 24.4 | 22.0 | 23.0 | 26.1 | 23.3 | 24.2 | 26.1 | 23.5 | 25.1 | 22.0 | 20.2 | 20.9 |
| 7 | 22.0 | 20.1 | 21.2 | 24.1 | 22.0 | 22.7 | 23.5 | 21.0 | 22.2 | 21.4 | 19.4 | 20.1 |
| 8 | 21.7 | 18.3 | 19.9 | 22.8 | 21.2 | 21.8 | 22.3 | 20.0 | 20.8 | 20.5 | 19.4 | 19.9 |
| 9 | 22.6 | 18.2 | 20.1 | 23.2 | 22.2 | 22.7 | 21.4 | 20.1 | 20.7 | 20.3 | 19.1 | 19.6 |
| 10 | 23.9 | 19.8 | 21.5 | 23.8 | 23.2 | 23.5 | 21.2 | 20.0 | 20.5 | 20.7 | 19.6 | 20.0 |
| 11 | 23.8 | 21.4 | 22.5 | 23.8 | 21.7 | 22.3 | 21.7 | 20.8 | 21.2 | 21.0 | 20.3 | 20.7 |
| 12 | 23.7 | 22.2 | 23.0 | 21.7 | 19.7 | 20.4 | 22.4 | 21.6 | 21.9 | 20.3 | 18.7 | 19.2 |
| 13 | 23.7 | 21.8 | 22.8 | 21.1 | 20.6 | 20.9 | 26.4 | 22.4 | 24.3 | 18.8 | 17.4 | 17.9 |
| 14 | 22.2 | 20.8 | 21.2 | 21.1 | 20.0 | 20.8 | 25.5 | 24.1 | 24.6 | 18.7 | 18.1 | 18.4 |
| 15 | 21.7 | 19.4 | 20.7 | 24.2 | 20.4 | 22.0 | 25.2 | 24.7 | 25.0 | 19.8 | 18.7 | 19.3 |
| 16 | 21.6 | 18.7 | 20.1 | 25.7 | 21.6 | 23.4 | 25.2 | 24.8 | 25.0 | 20.6 | 19.8 | 20.2 |
| 17 | 22.6 | 18.8 | 20.6 | 25.0 | 22.2 | 23.5 | 25.1 | 24.6 | 24.9 | 20.8 | 20.0 | 20.3 |
| 18 | --- | --- | --- | 24.9 | 23.7 | 24.2 | 25.3 | 24.7 | 25.0 | 20.4 | 19.5 | 19.9 |
| 19 | --- | --- | --- | 25.0 | 24.1 | 24.5 | 25.4 | 24.8 | 25.1 | 20.1 | 19.7 | 19.9 |
| 20 | 22.4 | 19.1 | 20.6 | 25.0 | 24.3 | 24.6 | 25.3 | 24.6 | 24.9 | 20.5 | 20.0 | 20.2 |
| 21 | 23.5 | 19.7 | 21.4 | 24.9 | 24.0 | 24.4 | 24.9 | 23.7 | 24.1 | 21.0 | 20.5 | 20.7 |
| 22 | 24.1 | 19.6 | 21.7 | 24.8 | 24.2 | 24.5 | 24.2 | 23.5 | 23.8 | 21.5 | 21.0 | 21.2 |
| 23 | 24.5 | 20.1 | 22.2 | 26.5 | 24.8 | 25.2 | 24.8 | 24.1 | 24.4 | 21.6 | 19.9 | 21.1 |
| 24 | 25.5 | 21.5 | 23.4 | 25.6 | 24.1 | 24.8 | 28.8 | 24.4 | 25.0 | 19.9 | 17.6 | 18.6 |
| 25 | 26.3 | 22.4 | 24.2 | 24.6 | 23.2 | 23.7 | 26.0 | 23.7 | 24.8 | 19.0 | 17.4 | 17.9 |
| 26 | 26.4 | 23.7 | 25.0 | 23.6 | 21.2 | 22.0 | 24.9 | 22.9 | 23.5 | 19.3 | 17.9 | 18.3 |
| 27 | 27.0 | 23.9 | 25.0 | 24.9 | 21.1 | 22.2 | 23.5 | 22.6 | 23.0 | 19.5 | 17.9 | 18.6 |
| 28 | 25.2 | 23.5 | 24.1 | 26.0 | 22.8 | 24.2 | 23.1 | 20.5 | 21.7 | 20.7 | 19.0 | 19.7 |
| 29 | 25.5 | 22.7 | 24.0 | 27.6 | 24.1 | 25.6 | 20.5 | 19.3 | 19.7 | 19.8 | 17.6 | 18.6 |
| 30 | 25.5 | 21.8 | 23.6 | 27.0 | 25.1 | 25.8 | 20.5 | 18.6 | 19.5 | 19.4 | 18.0 | 18.6 |
| 31 | --- | --- | --- | 26.3 | 25.0 | 25.5 | 20.1 | 18.9 | 19.6 | --- | --- | --- |
| MONTH | 27.0 | 18.2 | 22.3 | 27.6 | 19.7 | 23.7 | 28.8 | 18.6 | 23.5 | 23.9 | 17.4 | 19.8 |




DAILY MEAN WATER TEMPERATURE - JANUARY 2002 TO SEPTEMBER 2002

01654000 ACCOTINK CREEK NEAR ANNANDALE, VA—Continued

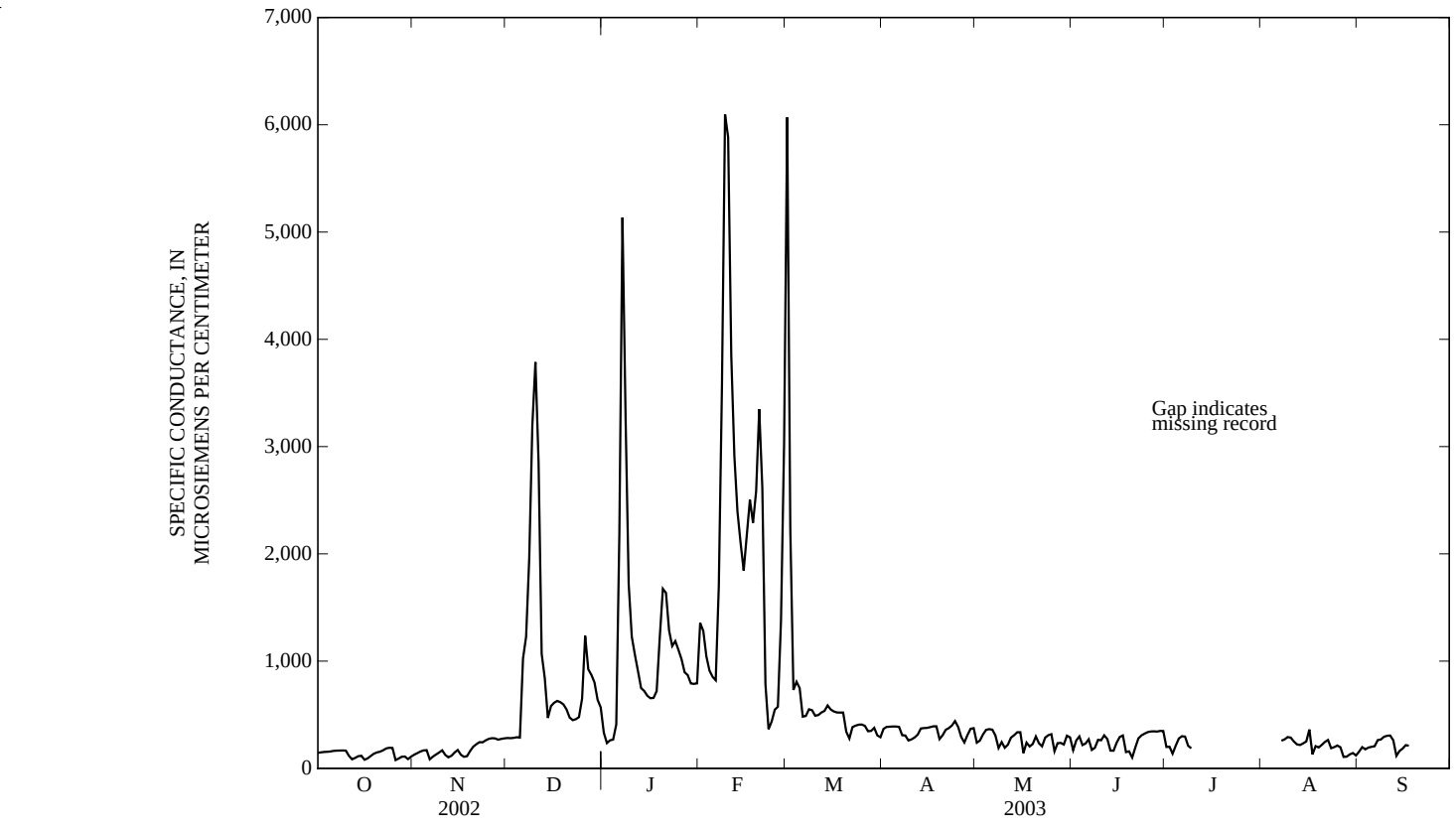
SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | |
| 1 | 146 | 143 | 145 | 135 | 120 | 127 | 285 | 281 | 283 | 644 | 152 | 332 |
| 2 | 151 | 146 | 149 | 151 | 135 | 142 | 283 | 281 | 282 | 298 | 162 | 236 |
| 3 | 154 | 150 | 153 | 161 | 151 | 157 | 289 | 283 | 284 | 338 | 208 | 262 |
| 4 | 156 | 154 | 154 | 173 | 161 | 168 | 293 | 286 | 290 | 304 | 228 | 268 |
| 5 | 160 | 156 | 157 | 180 | 116 | 170 | 357 | 274 | 287 | 1,130 | 304 | 409 |
| 6 | 164 | 159 | 163 | 156 | 65 | 84 | 1,700 | 357 | 1,020 | 4,790 | 1,130 | 2,190 |
| 7 | 166 | 164 | 165 | 119 | 96 | 109 | 1,650 | 923 | 1,230 | 6,050 | 4,220 | 5,140 |
| 8 | 167 | 166 | 166 | 139 | 119 | 129 | 2,960 | 1,100 | 1,960 | 4,220 | 2,350 | 3,270 |
| 9 | 167 | 166 | 167 | 157 | 139 | 147 | 3,490 | 2,890 | 3,200 | 2,350 | 1,360 | 1,720 |
| 10 | 167 | 122 | 165 | 176 | 157 | 169 | 3,890 | 3,490 | 3,790 | 1,360 | 1,150 | 1,230 |
| 11 | 213 | 70 | 116 | 175 | 89 | 125 | 6,450 | 932 | 2,860 | 1,150 | 994 | 1,060 |
| 12 | 91 | 76 | 84 | 144 | 86 | 103 | 1,190 | 961 | 1,070 | 994 | 793 | 905 |
| 13 | 103 | 91 | 98 | 135 | 99 | 118 | 1,200 | 402 | 842 | 793 | 713 | 748 |
| 14 | 125 | 103 | 114 | 160 | 135 | 148 | 563 | 396 | 470 | 734 | 697 | 721 |
| 15 | 121 | 114 | 117 | 183 | 160 | 171 | 596 | 563 | 581 | 697 | 658 | 677 |
| 16 | 120 | 58 | 80 | 187 | 71 | 127 | 626 | 589 | 611 | 666 | 628 | 654 |
| 17 | 103 | 81 | 93 | 132 | 71 | 108 | 636 | 625 | 629 | 711 | 616 | 657 |
| 18 | 123 | 103 | 115 | 142 | 86 | 114 | 628 | 606 | 617 | 745 | 697 | 721 |
| 19 | 144 | 123 | 137 | 184 | 142 | 163 | 606 | 583 | 596 | 1,730 | 737 | 1,220 |
| 20 | 152 | 144 | 148 | 215 | 184 | 203 | 821 | 464 | 549 | 1,800 | 1,600 | 1,670 |
| 21 | 161 | 152 | 156 | 235 | 215 | 225 | 489 | 439 | 474 | 1,850 | 1,320 | 1,640 |
| 22 | 176 | 161 | 169 | 251 | 235 | 244 | 459 | 433 | 450 | 1,320 | 1,210 | 1,280 |
| 23 | 191 | 176 | 186 | 254 | 208 | 243 | 465 | 448 | 458 | 1,210 | 1,100 | 1,140 |
| 24 | 193 | 191 | 192 | 269 | 241 | 261 | 562 | 462 | 478 | 1,240 | 1,120 | 1,190 |
| 25 | 194 | 84 | 191 | 280 | 269 | 275 | 1,400 | 422 | 649 | 1,120 | 1,090 | 1,100 |
| 26 | 167 | 54 | 77 | 284 | 280 | 281 | 1,450 | 1,030 | 1,240 | 1,100 | 920 | 1,020 |
| 27 | 101 | 81 | 92 | 285 | 269 | 280 | 1,030 | 874 | 923 | 920 | 874 | 896 |
| 28 | 120 | 101 | 108 | 271 | 266 | 268 | 891 | 852 | 872 | 887 | 826 | 869 |
| 29 | 133 | 64 | 110 | 277 | 271 | 274 | 881 | 701 | 801 | 826 | 768 | 792 |
| 30 | 104 | 64 | 86 | 282 | 277 | 280 | 701 | 599 | 640 | 845 | 732 | 788 |
| 31 | 120 | 94 | 110 | --- | --- | --- | 599 | 546 | 568 | 1,210 | 690 | 793 |
| MONTH | 213 | 54 | 134 | 285 | 65 | 180 | 6,450 | 274 | 936 | 6,050 | 152 | 1,150 |
| | | FEBRUARY | | | MARCH | | | APRIL | | | MAY | |
| 1 | 1,540 | 945 | 1,360 | 6,450 | 4,330 | 6,070 | 381 | 335 | 369 | 354 | 171 | 239 |
| 2 | 1,480 | 1,120 | 1,280 | 5,150 | 726 | 2,240 | 393 | 378 | 387 | 284 | 240 | 259 |
| 3 | 1,120 | 957 | 1,040 | 777 | 692 | 732 | 394 | 379 | 388 | 349 | 284 | 317 |
| 4 | 1,260 | 804 | 912 | 826 | 777 | 808 | 395 | 386 | 390 | 366 | 349 | 359 |
| 5 | 903 | 828 | 853 | 822 | 526 | 749 | 392 | 387 | 390 | 374 | 360 | 366 |
| 6 | 843 | 792 | 821 | 526 | 445 | 482 | 389 | 385 | 387 | 377 | 350 | 361 |
| 7 | 3,310 | 781 | 1,700 | 524 | 470 | 489 | 424 | 213 | 309 | 350 | 132 | 306 |
| 8 | 5,050 | 1,710 | 3,560 | 568 | 524 | 551 | 344 | 235 | 307 | 238 | 156 | 190 |
| 9 | 6,450 | 5,050 | 6,100 | 563 | 517 | 542 | 389 | 186 | 260 | 312 | 201 | 245 |
| 10 | 6,450 | 4,580 | 5,880 | 537 | 480 | 491 | 324 | 216 | 270 | 296 | 143 | 192 |
| 11 | 4,580 | 3,130 | 3,850 | 508 | 485 | 497 | 396 | 255 | 288 | 258 | 178 | 221 |
| 12 | 3,130 | 2,640 | 2,910 | 548 | 506 | 521 | 354 | 269 | 315 | 306 | 258 | 287 |
| 13 | 2,640 | 2,240 | 2,390 | 555 | 526 | 536 | 380 | 354 | 372 | 328 | 299 | 309 |
| 14 | 2,240 | 1,920 | 2,100 | 634 | 519 | 587 | 382 | 364 | 376 | 345 | 328 | 337 |
| 15 | 2,400 | 1,480 | 1,840 | 579 | 520 | 549 | 382 | 372 | 377 | 421 | 181 | 337 |
| 16 | 2,360 | 2,100 | 2,180 | 541 | 519 | 531 | 393 | 381 | 384 | 199 | 110 | 143 |
| 17 | 2,600 | 2,280 | 2,500 | 539 | 511 | 521 | 405 | 387 | 392 | 282 | 199 | 240 |
| 18 | 2,530 | 2,150 | 2,290 | 524 | 516 | 520 | 427 | 369 | 392 | 285 | 144 | 204 |
| 19 | 3,170 | 2,180 | 2,580 | 524 | 516 | 520 | 402 | 235 | 273 | 277 | 178 | 227 |
| 20 | 3,670 | 2,990 | 3,350 | 571 | 138 | 342 | 337 | 288 | 308 | 310 | 277 | 298 |
| 21 | 2,990 | 1,800 | 2,610 | 351 | 186 | 278 | 372 | 337 | 359 | 350 | 124 | 234 |
| 22 | 1,800 | 233 | 784 | 403 | 346 | 385 | 385 | 372 | 376 | 250 | 150 | 205 |
| 23 | 445 | 314 | 366 | 407 | 385 | 398 | 522 | 374 | 400 | 318 | 250 | 287 |
| 24 | 557 | 343 | 436 | 414 | 387 | 407 | 536 | 391 | 441 | 314 | 302 | 309 |
| 25 | 582 | 522 | 547 | 412 | 407 | 409 | 402 | 380 | 386 | 335 | 307 | 319 |
| 26 | 780 | 521 | 575 | 459 | 332 | 396 | 397 | 206 | 292 | 358 | 96 | 160 |
| 27 | 2,030 | 780 | 1,380 | 373 | 331 | 346 | 271 | 221 | 241 | 277 | 184 | 235 |
| 28 | 4,330 | 2,030 | 3,030 | 375 | 333 | 349 | 367 | 271 | 311 | 307 | 163 | 237 |
| 29 | --- | --- | --- | 454 | 338 | 378 | 382 | 364 | 369 | 267 | 176 | 222 |
| 30 | --- | --- | --- | 418 | 221 | 307 | 448 | 354 | 375 | 321 | 267 | 305 |
| 31 | --- | --- | --- | 335 | 245 | 290 | --- | --- | --- | 365 | 98 | 289 |
| MONTH | 6,450 | 233 | 2,120 | 6,450 | 138 | 717 | 536 | 186 | 349 | 421 | 96 | 266 |

01654000 ACCOTINK CREEK NEAR ANNANDALE, VA—Continued

SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS—CONTINUED
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | |
| 1 | 221 | 103 | 169 | 369 | 158 | 199 | --- | --- | --- | 199 | 136 | 156 |
| 2 | 292 | 221 | 260 | 245 | 148 | 202 | --- | --- | --- | 237 | 167 | 198 |
| 3 | 375 | 254 | 298 | 172 | 105 | 137 | --- | --- | --- | 192 | 165 | 177 |
| 4 | 254 | 187 | 217 | 251 | 172 | 212 | --- | --- | --- | 229 | 180 | 194 |
| 5 | 294 | 223 | 232 | 295 | 251 | 278 | --- | --- | --- | 207 | 191 | 201 |
| 6 | 298 | 233 | 271 | 304 | 250 | 300 | --- | --- | --- | 220 | 198 | 206 |
| 7 | 346 | 76 | 172 | 323 | 166 | 296 | 262 | 254 | 258 | 302 | 220 | 264 |
| 8 | 250 | 116 | 192 | 234 | 164 | 210 | 281 | 261 | 270 | 280 | 263 | 269 |
| 9 | 292 | 243 | 266 | 234 | 67 | 187 | 300 | 281 | 292 | 303 | 280 | 294 |
| 10 | 291 | 248 | 262 | --- | --- | --- | 304 | 223 | 287 | 306 | 302 | 304 |
| 11 | 373 | 225 | 308 | --- | --- | --- | 313 | 105 | 251 | 308 | 305 | 306 |
| 12 | 326 | 114 | 273 | --- | --- | --- | 238 | 163 | 224 | 347 | 93 | 262 |
| 13 | 227 | 91 | 165 | --- | --- | --- | 228 | 215 | 218 | 143 | 90 | 116 |
| 14 | 247 | 104 | 165 | --- | --- | --- | 247 | 213 | 233 | 178 | 143 | 162 |
| 15 | 267 | 204 | 240 | --- | --- | --- | 260 | 238 | 251 | 231 | 119 | 184 |
| 16 | 313 | 267 | 293 | --- | --- | --- | 600 | 257 | 362 | 233 | 160 | 217 |
| 17 | 353 | 162 | 307 | --- | --- | --- | 320 | 74 | 131 | 233 | 188 | 211 |
| 18 | 224 | 113 | 152 | --- | --- | --- | 328 | 147 | 207 | --- | --- | --- |
| 19 | 270 | 78 | 159 | --- | --- | --- | 217 | 181 | 195 | --- | --- | --- |
| 20 | 138 | 65 | 101 | --- | --- | --- | 234 | 205 | 219 | --- | --- | --- |
| 21 | 250 | 130 | 195 | --- | --- | --- | 261 | 234 | 247 | --- | --- | --- |
| 22 | 330 | 250 | 280 | --- | --- | --- | 447 | 150 | 265 | --- | --- | --- |
| 23 | 406 | 295 | 308 | --- | --- | --- | 223 | 146 | 188 | --- | --- | --- |
| 24 | 334 | 306 | 324 | --- | --- | --- | 206 | 191 | 198 | --- | --- | --- |
| 25 | 341 | 333 | 338 | --- | --- | --- | 222 | 206 | 213 | --- | --- | --- |
| 26 | 346 | 341 | 344 | --- | --- | --- | 305 | 74 | 197 | --- | --- | --- |
| 27 | 358 | 341 | 345 | --- | --- | --- | 132 | 70 | 107 | --- | --- | --- |
| 28 | 347 | 340 | 343 | --- | --- | --- | 129 | 81 | 109 | --- | --- | --- |
| 29 | 351 | 347 | 349 | --- | --- | --- | 156 | 98 | 130 | --- | --- | --- |
| 30 | 350 | 345 | 348 | --- | --- | --- | 182 | 86 | 143 | --- | --- | --- |
| 31 | --- | --- | --- | --- | --- | --- | 136 | 111 | 120 | --- | --- | --- |
| MONTH | 406 | 65 | 256 | --- | --- | --- | 600 | 70 | 213 | --- | --- | --- |




DAILY MEAN SPECIFIC CONDUCTANCE - 2003 WATER YEAR

01654000 ACCOTINK CREEK NEAR ANNANDALE, VA—Continued

TEMPERATURE, WATER, DEGREES CELSIUS
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

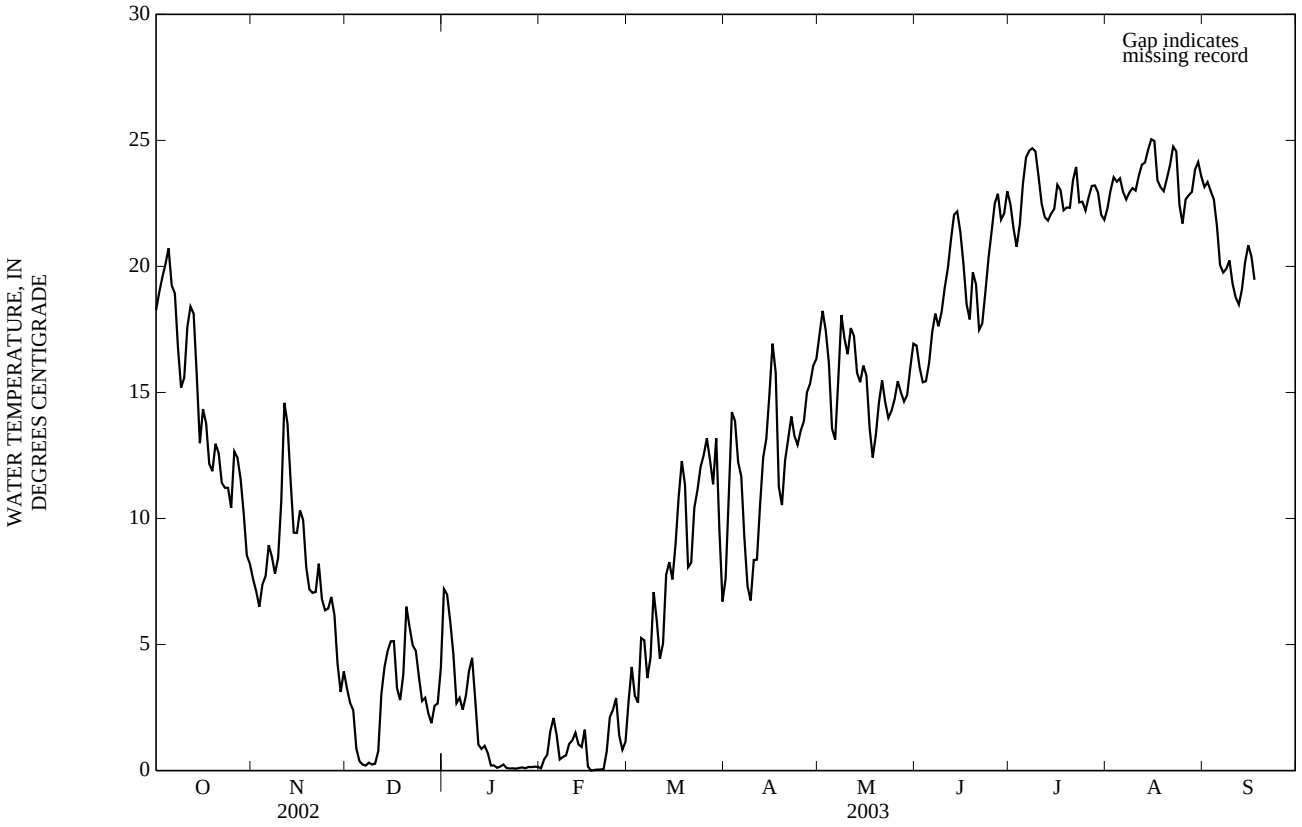
| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | |
| 1 | 19.2 | 17.7 | 18.3 | 8.5 | 6.6 | 7.6 | 4.1 | 2.4 | 3.3 | 8.4 | 5.0 | 7.2 |
| 2 | 19.3 | 18.7 | 19.0 | 7.9 | 6.4 | 7.1 | 3.8 | 1.5 | 2.7 | 7.8 | 6.5 | 7.0 |
| 3 | 19.8 | 19.3 | 19.6 | 7.6 | 5.5 | 6.5 | 3.4 | 1.2 | 2.4 | 6.5 | 5.1 | 5.9 |
| 4 | 20.5 | 19.8 | 20.1 | 8.6 | 6.5 | 7.4 | 1.2 | 0.4 | 0.9 | 5.2 | 3.7 | 4.6 |
| 5 | 21.0 | 20.5 | 20.7 | 8.5 | 7.1 | 7.7 | 1.0 | 0.1 | 0.4 | 3.7 | 2.1 | 2.7 |
| 6 | 20.7 | 18.7 | 19.2 | 9.5 | 8.2 | 8.9 | 0.6 | 0.0 | 0.2 | 3.5 | 2.2 | 2.9 |
| 7 | 19.1 | 18.5 | 18.9 | 8.9 | 7.7 | 8.5 | 0.6 | 0.0 | 0.2 | 3.2 | 1.7 | 2.4 |
| 8 | 18.5 | 15.7 | 16.8 | 9.1 | 6.7 | 7.8 | 0.7 | 0.0 | 0.3 | 4.1 | 2.1 | 3.0 |
| 9 | 15.7 | 14.9 | 15.2 | 9.7 | 7.2 | 8.4 | 0.6 | 0.0 | 0.2 | 5.3 | 2.8 | 3.9 |
| 10 | 17.0 | 15.4 | 15.6 | 12.2 | 9.3 | 10.7 | 0.7 | 0.0 | 0.3 | 5.2 | 4.0 | 4.5 |
| 11 | 18.5 | 16.5 | 17.6 | 15.9 | 12.2 | 14.6 | 1.9 | 0.1 | 0.8 | 4.1 | 1.8 | 2.8 |
| 12 | 18.8 | 18.1 | 18.4 | 15.2 | 12.5 | 13.8 | 4.4 | 1.9 | 3.0 | 1.8 | 0.3 | 1.0 |
| 13 | 18.4 | 17.5 | 18.1 | 12.5 | 9.8 | 11.5 | 4.5 | 4.0 | 4.1 | 2.0 | 0.0 | 0.9 |
| 14 | 17.5 | 14.0 | 15.7 | 10.6 | 8.3 | 9.4 | 5.3 | 4.0 | 4.7 | 1.5 | 0.4 | 1.0 |
| 15 | 14.0 | 12.1 | 13.0 | 10.4 | 8.6 | 9.4 | 5.8 | 4.4 | 5.1 | 1.5 | 0.0 | 0.7 |
| 16 | 14.8 | 13.5 | 14.3 | 11.0 | 9.4 | 10.3 | 6.0 | 4.2 | 5.1 | 0.5 | 0.0 | 0.2 |
| 17 | 14.4 | 13.1 | 13.8 | 10.7 | 8.8 | 9.9 | 4.2 | 2.6 | 3.3 | 0.6 | 0.0 | 0.2 |
| 18 | 13.1 | 11.2 | 12.2 | 8.8 | 7.4 | 8.1 | 3.5 | 2.4 | 2.8 | 0.4 | 0.0 | 0.1 |
| 19 | 12.9 | 11.1 | 11.9 | 7.9 | 6.3 | 7.2 | 4.9 | 2.9 | 3.8 | 0.6 | 0.0 | 0.2 |
| 20 | 13.2 | 12.8 | 13.0 | 8.3 | 5.9 | 7.1 | 7.8 | 4.9 | 6.5 | 0.8 | 0.0 | 0.2 |
| 21 | 13.3 | 12.1 | 12.6 | 7.7 | 6.4 | 7.1 | 6.5 | 4.9 | 5.7 | 0.5 | 0.0 | 0.1 |
| 22 | 12.3 | 10.5 | 11.4 | 8.7 | 7.5 | 8.2 | 5.9 | 4.0 | 5.0 | 0.4 | 0.0 | 0.1 |
| 23 | 12.3 | 10.2 | 11.2 | 7.5 | 5.9 | 6.8 | 5.6 | 3.9 | 4.8 | 0.4 | 0.0 | 0.1 |
| 24 | 11.9 | 10.7 | 11.2 | 7.5 | 5.2 | 6.4 | 4.3 | 2.8 | 3.7 | 0.3 | 0.0 | 0.1 |
| 25 | 12.5 | 9.9 | 10.4 | 7.7 | 5.2 | 6.4 | 3.1 | 2.2 | 2.8 | 0.4 | 0.0 | 0.1 |
| 26 | 13.4 | 11.3 | 12.7 | 7.3 | 6.5 | 6.9 | 3.7 | 2.4 | 2.9 | 0.4 | 0.0 | 0.1 |
| 27 | 13.2 | 11.6 | 12.4 | 6.8 | 5.0 | 6.2 | 3.1 | 1.7 | 2.3 | 0.4 | 0.0 | 0.1 |
| 28 | 12.1 | 11.3 | 11.6 | 5.0 | 3.5 | 4.2 | 2.7 | 0.9 | 1.9 | 0.5 | 0.0 | 0.1 |
| 29 | 11.3 | 8.9 | 10.2 | 3.7 | 2.4 | 3.1 | 3.6 | 1.7 | 2.6 | 0.3 | 0.1 | 0.1 |
| 30 | 8.9 | 8.2 | 8.5 | 4.9 | 3.2 | 3.9 | 3.6 | 1.6 | 2.7 | 0.3 | 0.1 | 0.2 |
| 31 | 8.6 | 7.7 | 8.2 | --- | --- | --- | 5.2 | 3.1 | 4.1 | 0.3 | 0.0 | 0.1 |
| MONTH | 21.0 | 7.7 | 14.6 | 15.9 | 2.4 | 8.0 | 7.8 | 0.0 | 2.9 | 8.4 | 0.0 | 1.7 |
| | | FEBRUARY | | | MARCH | | | APRIL | | | MAY | |
| 1 | 0.2 | 0.0 | 0.1 | 3.4 | 2.1 | 2.8 | 13.5 | 5.6 | 7.6 | 18.9 | 16.0 | 17.3 |
| 2 | 1.3 | 0.1 | 0.4 | 5.3 | 3.2 | 4.1 | 14.0 | 7.9 | 10.9 | 19.5 | 16.9 | 18.2 |
| 3 | 1.4 | 0.0 | 0.6 | 4.1 | 1.9 | 3.0 | 17.1 | 11.4 | 14.2 | 18.7 | 16.4 | 17.4 |
| 4 | 2.5 | 0.8 | 1.6 | 4.4 | 1.2 | 2.7 | 15.3 | 13.0 | 13.9 | 17.3 | 15.3 | 16.1 |
| 5 | 3.5 | 1.3 | 2.1 | 7.1 | 3.5 | 5.3 | 13.1 | 11.6 | 12.2 | 15.3 | 12.8 | 13.6 |
| 6 | 2.4 | 0.6 | 1.4 | 6.2 | 4.0 | 5.2 | 13.9 | 9.7 | 11.7 | 13.8 | 12.6 | 13.1 |
| 7 | 1.0 | 0.0 | 0.4 | 4.7 | 2.7 | 3.7 | 11.9 | 7.6 | 9.2 | 19.9 | 13.1 | 15.5 |
| 8 | 1.9 | 0.0 | 0.5 | 6.5 | 2.4 | 4.5 | 7.6 | 7.1 | 7.3 | 18.8 | 17.5 | 18.1 |
| 9 | 1.8 | 0.0 | 0.6 | 9.3 | 5.6 | 7.1 | 7.1 | 6.4 | 6.7 | 17.8 | 16.6 | 17.1 |
| 10 | 1.5 | 0.8 | 1.1 | 7.5 | 4.6 | 6.0 | 10.4 | 6.9 | 8.4 | 16.9 | 15.9 | 16.5 |
| 11 | 2.4 | 0.0 | 1.2 | 5.8 | 3.4 | 4.4 | 9.1 | 8.1 | 8.4 | 18.8 | 16.6 | 17.6 |
| 12 | 3.2 | 0.6 | 1.5 | 6.5 | 3.3 | 5.0 | 13.6 | 8.2 | 10.5 | 18.3 | 16.3 | 17.2 |
| 13 | 2.6 | 0.0 | 1.0 | 9.9 | 5.7 | 7.8 | 15.0 | 10.1 | 12.4 | 16.5 | 15.2 | 15.8 |
| 14 | 2.0 | 0.0 | 0.9 | 9.8 | 7.0 | 8.3 | 15.8 | 10.6 | 13.2 | 17.3 | 13.6 | 15.4 |
| 15 | 2.0 | 1.3 | 1.6 | 9.8 | 5.5 | 7.6 | 17.8 | 12.2 | 14.9 | 17.4 | 14.8 | 16.1 |
| 16 | 1.3 | 0.0 | 0.2 | 10.4 | 7.2 | 9.0 | 19.0 | 14.8 | 16.9 | 17.5 | 14.6 | 15.7 |
| 17 | 0.0 | 0.0 | 0.0 | 11.6 | 10.1 | 10.9 | 18.1 | 13.3 | 15.8 | 14.6 | 12.8 | 13.6 |
| 18 | 0.1 | 0.0 | 0.0 | 14.0 | 10.9 | 12.3 | 13.3 | 10.0 | 11.3 | 12.8 | 12.1 | 12.4 |
| 19 | 0.2 | 0.0 | 0.0 | 12.5 | 10.0 | 11.4 | 11.9 | 9.6 | 10.5 | 15.1 | 11.6 | 13.3 |
| 20 | 0.2 | 0.0 | 0.0 | 10.0 | 7.1 | 8.1 | 14.6 | 10.0 | 12.3 | 16.3 | 12.8 | 14.6 |
| 21 | 0.2 | 0.0 | 0.1 | 9.3 | 7.4 | 8.2 | 14.3 | 11.8 | 13.2 | 16.1 | 14.9 | 15.5 |
| 22 | 1.8 | 0.0 | 0.8 | 12.4 | 8.5 | 10.4 | 18.0 | 13.2 | 14.0 | 15.3 | 14.2 | 14.6 |
| 23 | 2.9 | 1.2 | 2.1 | 12.5 | 9.6 | 11.1 | 15.6 | 11.5 | 13.3 | 14.2 | 13.8 | 14.0 |
| 24 | 3.8 | 1.2 | 2.4 | 14.3 | 10.1 | 12.0 | 15.2 | 10.5 | 12.9 | 15.0 | 13.7 | 14.3 |
| 25 | 3.5 | 2.1 | 2.9 | 14.9 | 10.2 | 12.5 | 14.9 | 11.9 | 13.5 | 15.1 | 14.4 | 14.7 |
| 26 | 2.1 | 0.9 | 1.4 | 15.5 | 11.9 | 13.2 | 14.3 | 13.3 | 13.9 | 16.0 | 14.9 | 15.4 |
| 27 | 1.3 | 0.2 | 0.8 | 14.6 | 10.2 | 12.3 | 17.4 | 13.1 | 15.0 | 15.6 | 14.5 | 15.0 |
| 28 | 2.2 | 0.2 | 1.1 | 12.1 | 10.5 | 11.4 | 17.9 | 12.8 | 15.4 | 15.3 | 14.1 | 14.6 |
| 29 | --- | --- | --- | 15.4 | 11.5 | 13.2 | 17.5 | 14.6 | 16.1 | 15.5 | 14.2 | 14.9 |
| 30 | --- | --- | --- | 13.8 | 6.1 | 9.6 | 17.8 | 14.6 | 16.3 | 17.9 | 14.2 | 16.0 |
| 31 | --- | --- | --- | 8.6 | 5.1 | 6.7 | --- | --- | --- | 18.1 | 16.2 | 16.9 |
| MONTH | 3.8 | 0.0 | 1.0 | 15.5 | 1.2 | 8.1 | 19.0 | 5.6 | 12.4 | 19.9 | 11.6 | 15.5 |

01654000 ACCOTINK CREEK NEAR ANNANDALE, VA—Continued

TEMPERATURE, WATER, DEGREES CELSIUS—CONTINUED
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | |
| 1 | 17.9 | 16.1 | 16.9 | 23.4 | 21.7 | 22.5 | 22.7 | 22.0 | 22.3 | 24.4 | 22.2 | 23.1 |
| 2 | 17.5 | 14.5 | 16.0 | 22.3 | 21.0 | 21.5 | 24.1 | 22.3 | 23.0 | 23.8 | 23.0 | 23.3 |
| 3 | 16.3 | 15.0 | 15.4 | 21.2 | 20.6 | 20.8 | 24.6 | 22.9 | 23.5 | 23.2 | 22.7 | 23.0 |
| 4 | 15.8 | 15.1 | 15.4 | 23.4 | 20.1 | 21.7 | 24.0 | 22.9 | 23.4 | 22.9 | 22.4 | 22.7 |
| 5 | 17.7 | 14.8 | 16.2 | 25.0 | 21.7 | 23.3 | 24.6 | 22.9 | 23.5 | 22.4 | 20.8 | 21.6 |
| 6 | 19.1 | 15.8 | 17.4 | 26.0 | 22.9 | 24.3 | 24.3 | 21.8 | 23.0 | 21.0 | 19.0 | 20.0 |
| 7 | 19.6 | 17.1 | 18.1 | 26.1 | 23.3 | 24.6 | 23.0 | 22.3 | 22.7 | 21.1 | 18.5 | 19.8 |
| 8 | 18.5 | 17.2 | 17.6 | 25.7 | 23.9 | 24.7 | 24.0 | 22.0 | 22.9 | 20.7 | 19.0 | 19.9 |
| 9 | 19.5 | 17.1 | 18.2 | 26.2 | 23.4 | 24.6 | 23.4 | 22.8 | 23.1 | 21.3 | 19.6 | 20.2 |
| 10 | 20.8 | 17.6 | 19.1 | 24.8 | 23.0 | 23.6 | 23.7 | 22.4 | 23.0 | 20.6 | 18.4 | 19.3 |
| 11 | 21.3 | 19.0 | 19.9 | 23.0 | 22.0 | 22.5 | 24.5 | 22.8 | 23.6 | 20.5 | 17.6 | 18.8 |
| 12 | 23.1 | 19.6 | 21.1 | 23.2 | 20.7 | 22.0 | 25.2 | 23.1 | 24.0 | 18.9 | 18.2 | 18.5 |
| 13 | 22.8 | 21.4 | 22.1 | 23.2 | 20.6 | 21.8 | 25.2 | 23.3 | 24.1 | 20.0 | 18.4 | 19.1 |
| 14 | 23.3 | 21.3 | 22.2 | 23.4 | 20.9 | 22.1 | 26.2 | 23.4 | 24.6 | 20.7 | 19.7 | 20.2 |
| 15 | 21.8 | 20.9 | 21.4 | 23.6 | 21.0 | 22.3 | 26.6 | 24.0 | 25.0 | 22.0 | 19.9 | 20.8 |
| 16 | 20.9 | 19.5 | 20.1 | 24.8 | 22.1 | 23.2 | 26.8 | 24.2 | 25.0 | 21.5 | 19.6 | 20.4 |
| 17 | 19.5 | 17.6 | 18.5 | 24.6 | 21.7 | 23.0 | 24.5 | 22.5 | 23.4 | 20.9 | 18.0 | 19.5 |
| 18 | 18.7 | 17.3 | 17.9 | 23.1 | 21.2 | 22.2 | 24.1 | 22.4 | 23.1 | --- | --- | --- |
| 19 | 21.5 | 18.2 | 19.8 | 23.7 | 21.5 | 22.3 | 24.2 | 21.9 | 23.0 | --- | --- | --- |
| 20 | 21.4 | 18.3 | 19.3 | 23.9 | 20.9 | 22.3 | 24.9 | 22.4 | 23.5 | --- | --- | --- |
| 21 | 18.3 | 17.1 | 17.5 | 25.1 | 22.1 | 23.4 | 25.7 | 22.9 | 24.0 | --- | --- | --- |
| 22 | 18.9 | 16.7 | 17.7 | 25.0 | 23.0 | 23.9 | 26.4 | 23.7 | 24.8 | --- | --- | --- |
| 23 | 20.7 | 17.4 | 19.0 | 23.1 | 22.0 | 22.5 | 25.8 | 23.4 | 24.6 | --- | --- | --- |
| 24 | 22.1 | 18.7 | 20.3 | 23.5 | 21.8 | 22.6 | 23.8 | 21.3 | 22.5 | --- | --- | --- |
| 25 | 23.2 | 19.7 | 21.4 | 23.7 | 20.9 | 22.2 | 23.7 | 20.3 | 21.7 | --- | --- | --- |
| 26 | 24.3 | 20.9 | 22.5 | 24.5 | 21.2 | 22.7 | 24.4 | 21.6 | 22.7 | --- | --- | --- |
| 27 | 24.0 | 21.9 | 22.9 | 24.1 | 22.4 | 23.2 | 23.6 | 22.3 | 22.8 | --- | --- | --- |
| 28 | 23.0 | 20.8 | 21.9 | 23.6 | 22.5 | 23.2 | 23.9 | 22.0 | 23.0 | --- | --- | --- |
| 29 | 23.5 | 20.7 | 22.1 | 23.8 | 22.4 | 22.9 | 24.9 | 22.9 | 23.8 | --- | --- | --- |
| 30 | 24.5 | 21.6 | 23.0 | 22.7 | 21.4 | 22.0 | 25.6 | 23.0 | 24.1 | --- | --- | --- |
| 31 | --- | --- | --- | 22.4 | 21.3 | 21.8 | 24.8 | 22.8 | 23.6 | --- | --- | --- |
| MONTH | 24.5 | 14.5 | 19.4 | 26.2 | 20.1 | 22.8 | 26.8 | 20.3 | 23.5 | --- | --- | --- |

01654000 ACCOTINK CREEK NEAR ANNANDALE, VA—Continued




DAILY MEAN WATER TEMPERATURE - 2003 WATER YEAR

## 01656000 CEDAR RUN NEAR CATLETT, VA

LOCATION.--Lat 38°38'12", long 77°37'30", NAD83, 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 $mi^2$.

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 NGVD of 1929. July 1950 to December 1986, water-stage recorder at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Dec 5-10, Jan. 14-19, and Jan. 22 to Feb. 14, and period of doubtful gage-height record, Feb. 15-20, which are fair. Maximum discharge, 32,500 $ft^3/s$, from rating curve extended above 7,000 $ft^3/s$, 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,800 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 1 | 2300 | 2,830 | 10.26 | Jun 20 | 1730 | 2,080 | 9.04 |
| Feb 22 | 2330 | 4,210 | 12.06 | Jul 11 | 1230 | 2,500 | 9.76 |
| Mar 21 | 0030 | 3,310 | 10.94 | Sep 19 | 1130 | 3,290 | 10.91 |
| May 16 | 1000 | *5,040 | *12.98 | Sep 23 | 1100 | 3,390 | 11.05 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.4 | 31 | 25 | 1,050 | e30 | 198 | 196 | 56 | 92 | 37 | 60 | 45 |
| 2 | 0.71 | 18 | 21 | 1,290 | e28 | 713 | 147 | 45 | 67 | 35 | 53 | 51 |
| 3 | 0.50 | 13 | 18 | 601 | e27 | 736 | 117 | 38 | 64 | 267 | 33 | 168 |
| 4 | 0.49 | 11 | 17 | 347 | e40 | 377 | 98 | 28 | 175 | 127 | 28 | 104 |
| 5 | 0.97 | 10 | e16 | 211 | e48 | 624 | 87 | 26 | 176 | 69 | 25 | 86 |
| 6 | 0.73 | 144 | e25 | 177 | e41 | 816 | 77 | 29 | 93 | 51 | 21 | 49 |
| 7 | 0.75 | 45 | e22 | 151 | e37 | 472 | 196 | 175 | 926 | 38 | 17 | 34 |
| 8 | 0.70 | 23 | e18 | 151 | e32 | 314 | 226 | 395 | 485 | 31 | 14 | 26 |
| 9 | 0.59 | 16 | e17 | 191 | e29 | 329 | 571 | 247 | 286 | 35 | 41 | 21 |
| 10 | 0.85 | 12 | e16 | 151 | e33 | 251 | 346 | 330 | 159 | 107 | 35 | 18 |
| 11 | 4.6 | 225 | 194 | 106 | e30 | 181 | 619 | 271 | 113 | 1,400 | 25 | 18 |
| 12 | 18 | 353 | 340 | 83 | e27 | 158 | 307 | 142 | 486 | 261 | 19 | 25 |
| 13 | 5.4 | 199 | 453 | 71 | e26 | 154 | 183 | 86 | 500 | 110 | 13 | 245 |
| 14 | 2.7 | 91 | 828 | e69 | e23 | 164 | 135 | 60 | 349 | 70 | 11 | 97 |
| 15 | 2.6 | 62 | 377 | e63 | e70 | 124 | 115 | 193 | 714 | 54 | 9.0 | 63 |
| 16 | 34 | 304 | 204 | e57 | e58 | 107 | 99 | 3,250 | 225 | 42 | 7.5 | 50 |
| 17 | 42 | 960 | 135 | e53 | e48 | 99 | 79 | 866 | 221 | 32 | 11 | 34 |
| 18 | 15 | 631 | 107 | e51 | e165 | 91 | 68 | 1,020 | 604 | 27 | 14 | 130 |
| 19 | 9.8 | 228 | 87 | e47 | e140 | 78 | 185 | 595 | 458 | 24 | 9.8 | 2,160 |
| 20 | 4.2 | 142 | 197 | 42 | e250 | 1,280 | 156 | 299 | 998 | 20 | 7.4 | 416 |
| 21 | 3.0 | 105 | 169 | 39 | 279 | 1,380 | 107 | 536 | 504 | 16 | 6.1 | 170 |
| 22 | 2.1 | 99 | 108 | e37 | 1,820 | 415 | 92 | 392 | 233 | 14 | 5.9 | 109 |
| 23 | 1.6 | 77 | 84 | e33 | 2,530 | 234 | 74 | 289 | 146 | 21 | 12 | 2,130 |
| 24 | 1.3 | 56 | 71 | e29 | 1,110 | 173 | 58 | 376 | 105 | 19 | 7.9 | 541 |
| 25 | 1.2 | 49 | 464 | e26 | 712 | 139 | 51 | 237 | 80 | 13 | 4.7 | 207 |
| 26 | 19 | 42 | 332 | e22 | 353 | 123 | 67 | 786 | 66 | 10 | 3.4 | 128 |
| 27 | 14 | 37 | 174 | e20 | 244 | 154 | 66 | 317 | 72 | 7.9 | 3.6 | 95 |
| 28 | 7.6 | 32 | 124 | e19 | 205 | 114 | 51 | 262 | 98 | 8.4 | 26 | 103 |
| 29 | 38 | 28 | 104 | e23 | --- | 104 | 43 | 187 | 61 | 51 | 18 | 77 |
| 30 | 228 | 27 | 87 | e21 | --- | 326 | 37 | 153 | 47 | 23 | 171 | 59 |
| 31 | 93 | --- | 78 | e20 | --- | 337 | --- | 114 | --- | 14 | 109 | --- |
| TOTAL | 554.79 | 4,070 | 4,912 | 5,251 | 8,435 | 10,765 | 4,653 | 11,800 | 8,603 | 3,034.3 | 821.3 | 7,459 |
| MEAN | 17.9 | 136 | 158 | 169 | 301 | 347 | 155 | 381 | 287 | 97.9 | 26.5 | 249 |
| MAX | 228 | 960 | 828 | 1,290 | 2,530 | 1,380 | 619 | 3,250 | 998 | 1,400 | 171 | 2,160 |
| MIN | 0.49 | 10 | 16 | 19 | 23 | 78 | 37 | 26 | 47 | 7.9 | 3.4 | 18 |
| CFSM | 0.19 | 1.45 | 1.70 | 1.81 | 3.23 | 3.72 | 1.66 | 4.08 | 3.07 | 1.05 | 0.28 | 2.66 |
| IN. | 0.22 | 1.62 | 1.96 | 2.09 | 3.36 | 4.29 | 1.85 | 4.70 | 3.43 | 1.21 | 0.33 | 2.97 |

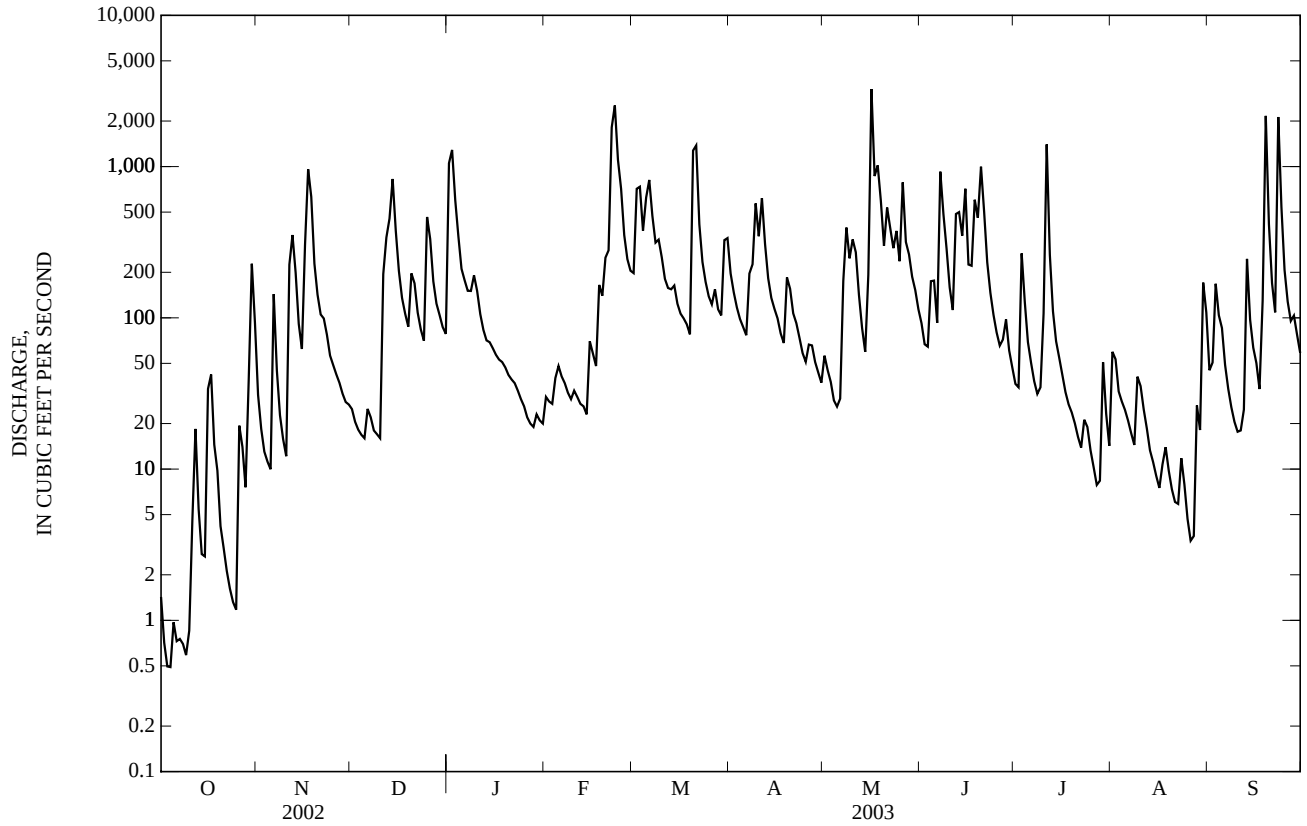
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 1986, 1990 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 43.8 | 61.8 | 106 | 141 | 164 | 177 | 122 | 78.6 | 73.4 | 30.6 | 43.2 | 42.5 |
| MAX | 450 | 248 | 379 | 467 | 501 | 531 | 544 | 381 | 917 | 323 | 407 | 388 |
| (WY) | (1980) | (1973) | (1993) | (1978) | (1998) | (1993) | (1983) | (2003) | (1972) | (1956) | (1955) | (1975) |
| MIN | 0.40 | 3.15 | 3.53 | 4.64 | 6.09 | 22.3 | 19.6 | 9.41 | 1.38 | 0.74 | 0.58 | 0.37 |
| (WY) | (1987) | (1966) | (1966) | (1981) | (2002) | (1981) | (1985) | (1956) | (1999) | (1963) | (1966) | (1954) |

01656000 CEDAR RUN NEAR CATLETT, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1951 - 1986 1990 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 14,873.63 | | 70,358.39 | | | |
| ANNUAL MEAN | 40.7 | | 193 | | 90.1 | |
| HIGHEST ANNUAL MEAN | | | | | 193 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 16.5 | 2002 |
| HIGHEST DAILY MEAN | 960 | Nov 17 | 3,250 | May 16 | e18,500 | Jun 22, 1972 |
| LOWEST DAILY MEAN | 0.02 | Aug 16 | 0.49 | Oct 4 | 0.00 | (a) |
| ANNUAL SEVEN-DAY MINIMUM | 0.07 | Aug 10 | 0.68 | Oct 3 | 0.00 | (b) |
| MAXIMUM PEAK FLOW | | | 5,040 | May 16 | 32,500 | Jun 22, 1972 |
| MAXIMUM PEAK STAGE | | | 12.98 | May 16 | c27.66 | Jun 22, 1972 |
| INSTANTANEOUS LOW FLOW | | | 0.34 | dOct 3 | 0.00 | (f) |
| ANNUAL RUNOFF (CFSM) | 0.44 | | 2.06 | | 0.96 | |
| ANNUAL RUNOFF (INCHES) | 5.92 | | 28.02 | | 13.10 | |
| 10 PERCENT EXCEEDS | 95 | | 477 | | 191 | |
| 50 PERCENT EXCEEDS | 9.7 | | 77 | | 27 | |
| 90 PERCENT EXCEEDS | 0.74 | | 11 | | 2.0 | |

a Many days in 1954, 1957, 1959, 1963-64, 1966, 1983, and 1993.
b Many days in 1954, 1957, 1959, 1963-64, 1966, and 1983.
c From floodmarks.
d Also Oct. 4, 2002.
e Estimated.
f Many days in 1954, 1957, 1959, 1963-64, 1991, and 1993.



## 01656102 GOSLIN RUN NEAR ADEN, VA

LOCATION.--Lat 38°36'40", long 77°33'03", NAD83, Prince William County, Hydrologic Unit 02070010, on left bank at upstream side of bridge on Quantico Marine Corps Base Road MCB-8, 3.5 mi south of Aden, and 0.5 mi above mouth.

DRAINAGE AREA.--4.64 $mi^2$.

### WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 2002 to current year.

GAGE.--Water stage recorder. Datum of gage is 180 ft NGVD of 1929, from topographic map.

REMARKS.-- Records fair except those for discharges greater than 75 $ft^3/s$, which are poor. Water-quality records for some prior periods have been collected at this site.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.00 | 1.9 | 2.1 | 125 | 2.5 | 11 | 17 | 7.5 | 5.8 | 1.9 | 0.49 | 0.89 |
| 2 | 0.00 | 1.5 | 2.1 | 56 | 2.2 | 44 | 11 | 4.5 | 4.4 | 4.0 | 0.44 | 1.7 |
| 3 | 0.00 | 1.1 | 2.0 | 38 | 1.9 | 38 | 8.2 | 3.4 | 4.8 | 35 | 0.36 | 4.3 |
| 4 | 0.00 | 1.0 | 1.9 | 20 | 2.9 | 21 | 6.9 | 2.7 | 7.2 | 14 | 0.51 | 2.7 |
| 5 | 0.00 | 0.95 | 2.5 | 12 | 2.7 | 47 | 6.1 | 2.5 | 9.1 | 5.3 | 0.76 | 2.1 |
| 6 | 0.00 | 6.4 | 2.4 | 9.5 | 2.0 | 65 | 5.2 | 2.8 | 4.9 | 3.3 | 4.8 | 1.2 |
| 7 | 0.00 | 2.6 | 2.2 | 7.8 | 2.5 | 34 | 15 | 15 | 96 | 2.5 | 1.3 | 0.83 |
| 8 | 0.00 | 1.4 | 2.3 | 7.3 | 2.2 | 23 | 14 | 35 | 38 | 2.0 | 0.86 | 0.65 |
| 9 | 0.00 | 1.2 | 2.5 | 7.3 | 2.1 | 28 | 45 | 16 | 36 | 2.1 | 1.1 | 0.63 |
| 10 | 0.00 | 2.2 | 2.5 | 5.5 | 2.3 | 19 | 25 | 23 | 12 | 3.0 | 0.85 | 0.50 |
| 11 | 0.00 | 13 | 18 | 4.4 | 2.3 | 13 | 60 | 18 | 7.7 | 2.8 | 0.91 | 0.41 |
| 12 | 0.00 | 31 | 18 | 3.7 | 2.2 | 11 | 24 | 9.8 | 7.2 | 1.7 | 4.5 | 3.2 |
| 13 | 0.00 | 13 | 31 | 3.6 | 2.3 | 12 | 14 | 6.4 | 5.6 | 1.8 | 1.5 | 20 |
| 14 | 0.00 | 5.5 | 55 | 3.3 | 2.2 | 11 | 9.6 | 4.8 | 23 | 1.4 | 1.00 | 5.1 |
| 15 | 0.00 | 3.6 | 23 | 3.0 | 9.3 | 8.3 | 8.0 | 5.4 | 32 | 1.2 | 0.71 | 3.2 |
| 16 | 0.32 | 37 | 12 | 2.6 | 11 | 7.5 | 6.9 | 86 | 10 | 0.96 | 0.66 | 2.2 |
| 17 | 1.2 | 82 | 7.3 | 2.6 | 21 | 7.4 | 5.6 | 21 | 15 | 0.71 | 0.58 | 1.5 |
| 18 | 0.36 | 36 | 5.5 | 2.3 | 14 | 6.5 | 5.2 | 47 | 65 | 0.60 | 0.48 | 33 |
| 19 | 0.16 | 11 | 4.8 | 2.2 | 10 | 5.4 | 23 | 24 | 27 | 0.64 | 0.63 | 95 |
| 20 | 0.06 | 6.9 | 7.1 | 2.3 | 12 | 321 | 11 | 12 | 123 | 0.52 | 0.52 | 3.7 |
| 21 | 0.02 | 5.3 | 6.0 | 2.1 | 17 | 77 | 8.2 | 35 | 42 | 0.45 | 0.41 | 0.98 |
| 22 | 0.01 | 4.4 | 4.6 | 1.9 | 612 | 20 | 7.0 | 27 | 18 | 0.41 | 0.42 | 0.53 |
| 23 | 0.00 | 3.6 | 3.9 | 1.6 | 135 | 11 | 5.2 | 19 | 9.3 | 0.47 | 0.43 | 104 |
| 24 | 0.00 | 3.0 | 3.6 | 1.4 | 54 | 8.8 | 4.3 | 17 | 5.9 | 0.39 | 0.25 | 8.8 |
| 25 | 0.00 | 2.7 | 43 | 1.4 | 34 | 7.7 | 4.0 | 12 | 4.2 | 0.30 | 0.14 | 4.3 |
| 26 | 0.03 | 2.4 | 25 | 1.4 | 21 | 8.6 | 6.4 | 76 | 3.3 | 0.25 | 0.12 | 3.2 |
| 27 | 0.52 | 2.3 | 13 | 1.2 | 15 | 10 | 5.1 | 26 | 4.5 | 0.22 | 0.27 | 2.6 |
| 28 | 0.61 | 2.1 | 8.8 | 1.2 | 12 | 7.3 | 3.9 | 21 | 3.6 | 0.35 | 1.5 | 2.9 |
| 29 | 3.6 | 2.0 | 6.9 | 1.4 | --- | 6.8 | 3.4 | 14 | 2.6 | 1.4 | 0.80 | 2.1 |
| 30 | 9.6 | 2.1 | 5.5 | 1.3 | --- | 30 | 3.1 | 10 | 3.6 | 0.58 | 2.6 | 1.7 |
| 31 | 3.8 | --- | 4.9 | 1.5 | --- | 29 | --- | 7.3 | --- | 0.45 | 1.7 | --- |
| TOTAL | 20.29 | 289.15 | 329.4 | 334.8 | 1,009.6 | 949.3 | 371.3 | 611.1 | 630.7 | 90.70 | 31.60 | 313.92 |
| MEAN | 0.65 | 9.64 | 10.6 | 10.8 | 36.1 | 30.6 | 12.4 | 19.7 | 21.0 | 2.93 | 1.02 | 10.5 |
| MAX | 9.6 | 82 | 55 | 125 | 612 | 321 | 60 | 86 | 123 | 35 | 4.8 | 104 |
| MIN | 0.00 | 0.95 | 1.9 | 1.2 | 1.9 | 5.4 | 3.1 | 2.5 | 2.6 | 0.22 | 0.12 | 0.41 |
| CFSM | 0.14 | 2.08 | 2.29 | 2.33 | 7.77 | 6.60 | 2.67 | 4.25 | 4.53 | 0.63 | 0.22 | 2.26 |
| IN. | 0.16 | 2.32 | 2.64 | 2.68 | 8.09 | 7.61 | 2.98 | 4.90 | 5.06 | 0.73 | 0.25 | 2.52 |

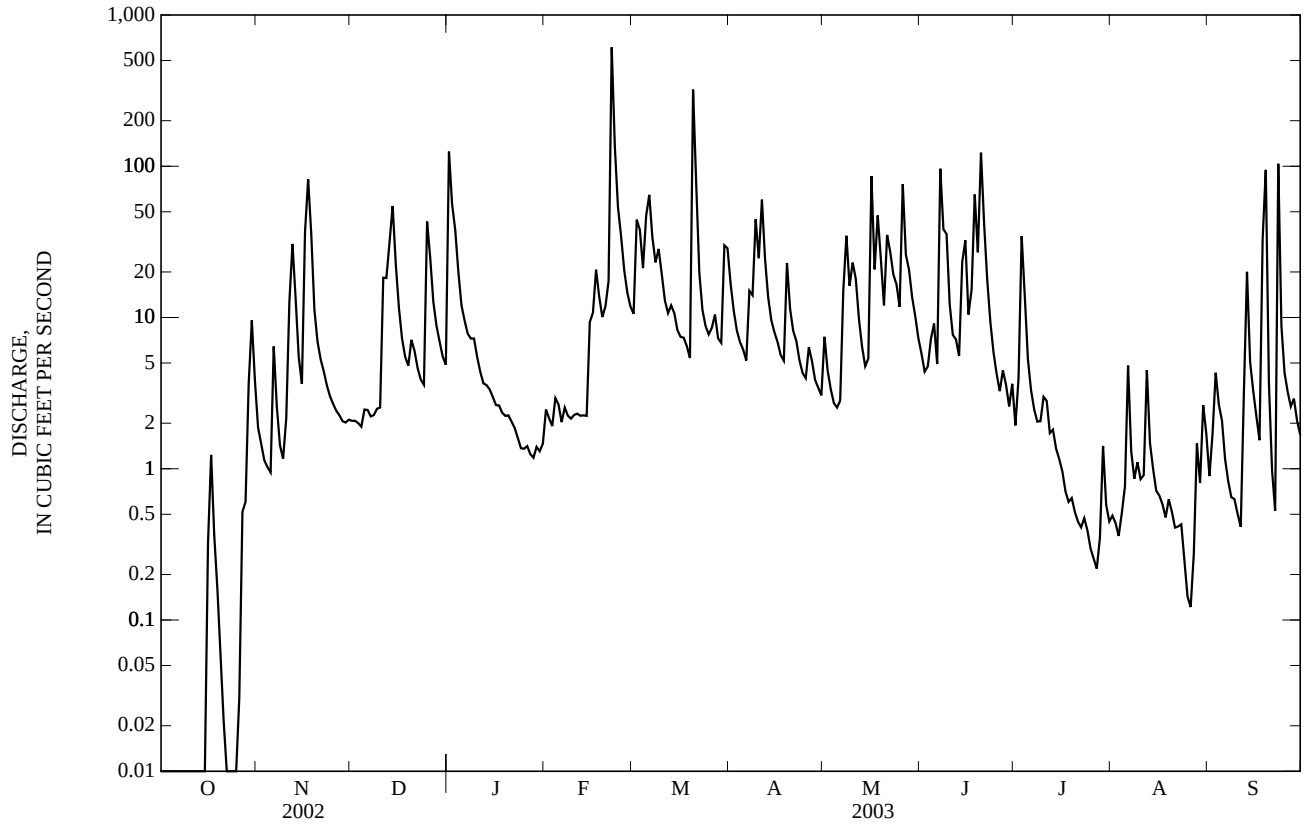
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2002 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 0.65 | 9.64 | 10.6 | 10.8 | 36.1 | 30.6 | 12.4 | 19.7 | 10.7 | 1.46 | 0.51 | 5.23 |
| MAX | 0.65 | 9.64 | 10.6 | 10.8 | 36.1 | 30.6 | 12.4 | 19.7 | 21.0 | 2.93 | 1.02 | 10.5 |
| (WY) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) |
| MIN | 0.65 | 9.64 | 10.6 | 10.8 | 36.1 | 30.6 | 12.4 | 19.7 | 0.31 | 0.000 | 0.001 | 0.000 |
| (WY) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2002) | (2002) | (2002) | (2002) |

01656102 GOSLIN RUN NEAR ADEN, VA—Continued

| SUMMARY STATISTICS | FOR 2003 WATER YEAR | | WATER YEARS 2002 - 2003 | |
|---|---|---|---|---|
| ANNUAL TOTAL | 4,981.86 | | | |
| ANNUAL MEAN | 13.6 | | 13.6 | |
| HIGHEST ANNUAL MEAN | | | 13.6 | 2003 |
| LOWEST ANNUAL MEAN | | | 13.6 | 2003 |
| HIGHEST DAILY MEAN | 612 | Feb 22 | 612 | Feb 22, 2003 |
| LOWEST DAILY MEAN | 0.00 | aOct 1 | 0.00 | (b) |
| ANNUAL SEVEN-DAY MINIMUM | 0.00 | Oct 1 | 0.00 | (b) |
| MAXIMUM PEAK FLOW | 2,200 | Feb 22 | 2,200 | Feb 22, 2003 |
| MAXIMUM PEAK STAGE | 8.96 | Feb 22 | 8.96 | Feb 22, 2003 |
| INSTANTANEOUS LOW FLOW | 0.00 | cOct 1 | 0.00 | (d) |
| ANNUAL RUNOFF (CFSM) | 2.94 | | 2.94 | |
| ANNUAL RUNOFF (INCHES) | 39.94 | | 39.97 | |
| 10 PERCENT EXCEEDS | 32 | | 32 | |
| 50 PERCENT EXCEEDS | 3.9 | | 3.9 | |
| 90 PERCENT EXCEEDS | 0.41 | | 0.41 | |

a Also Oct. 2-15, 23-25, 2002.
b Many days in June to October 2002.
c Also no flow part or all of each day Oct. 2-16, 22-26.
d No flow part or all of many days June to October, 2002.



01656102 GOSLIN RUN NEAR ADEN, VA—Continued

SUSPENDED-SEDIMENT
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Day | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OCTOBER | | NOVEMBER | | DECEMBER | | JANUARY | | FEBRUARY | | MARCH | |
| 1 | 0 | 0.00 | 7 | 0.04 | 16 | 0.09 | 165 | 136 | 5 | 0.03 | 8 | 0.23 |
| 2 | 0 | 0.00 | 7 | 0.03 | 14 | 0.08 | 52 | 11 | 5 | 0.03 | 35 | 5.4 |
| 3 | 0 | 0.00 | 5 | 0.02 | 7 | 0.04 | 24 | 2.6 | 5 | 0.03 | 23 | 2.6 |
| 4 | 0 | 0.00 | 3 | 0.00 | 6 | 0.03 | 14 | 0.80 | 10 | 0.09 | 9 | 0.51 |
| 5 | 0 | 0.00 | 2 | 0.00 | 6 | 0.04 | 11 | 0.35 | 14 | 0.10 | 36 | 7.2 |
| 6 | 0 | 0.00 | 7 | 0.12 | 6 | 0.04 | 10 | 0.26 | 12 | 0.07 | 46 | 8.4 |
| 7 | 0 | 0.00 | 9 | 0.06 | 6 | 0.03 | 9 | 0.20 | 11 | 0.08 | 13 | 1.3 |
| 8 | 0 | 0.00 | 6 | 0.02 | 6 | 0.04 | 9 | 0.18 | 12 | 0.07 | 3 | 0.17 |
| 9 | 0 | 0.00 | 6 | 0.02 | 6 | 0.04 | 5 | 0.10 | 13 | 0.08 | 12 | 0.93 |
| 10 | 0 | 0.00 | 5 | 0.03 | 6 | 0.04 | 4 | 0.06 | 14 | 0.08 | 13 | 0.72 |
| 11 | 0 | 0.00 | 17 | 0.83 | 22 | 2.0 | 4 | 0.05 | 11 | 0.07 | 9 | 0.32 |
| 12 | 0 | 0.00 | 24 | 3.1 | 35 | 1.7 | 4 | 0.04 | 7 | 0.04 | 3 | 0.08 |
| 13 | 0 | 0.00 | 9 | 0.39 | 40 | 5.4 | 3 | 0.03 | 9 | 0.06 | 4 | 0.12 |
| 14 | 0 | 0.00 | 5 | 0.08 | 28 | 5.0 | 3 | 0.03 | 9 | 0.06 | 7 | 0.20 |
| 15 | 0 | 0.00 | 4 | 0.04 | 6 | 0.44 | 3 | 0.02 | 34 | 1.0 | 7 | 0.15 |
| 16 | 1 | 0.00 | 73 | 27 | 4 | 0.12 | 3 | 0.02 | 14 | 0.40 | 7 | 0.13 |
| 17 | 11 | 0.04 | 67 | 22 | 6 | 0.11 | 3 | 0.02 | 30 | 1.7 | 7 | 0.14 |
| 18 | 6 | 0.00 | 14 | 1.8 | 7 | 0.11 | 3 | 0.02 | 34 | 1.3 | 7 | 0.13 |
| 19 | 8 | 0.00 | 7 | 0.20 | 2 | 0.03 | 3 | 0.02 | 32 | 0.87 | 5 | 0.07 |
| 20 | 6 | 0.00 | 7 | 0.12 | 4 | 0.08 | 3 | 0.02 | 29 | 0.93 | 359 | 683 |
| 21 | 6 | 0.00 | 6 | 0.09 | 2 | 0.04 | 3 | 0.02 | 43 | 2.5 | 72 | 23 |
| 22 | 3 | 0.00 | 6 | 0.07 | 2 | 0.02 | 3 | 0.02 | 554 | 1,370 | 12 | 0.70 |
| 23 | 0 | 0.00 | 4 | 0.04 | 1 | 0.00 | 3 | 0.01 | 208 | 86 | 5 | 0.14 |
| 24 | 0 | 0.00 | 6 | 0.05 | 4 | 0.04 | 4 | 0.01 | 45 | 6.8 | 4 | 0.10 |
| 25 | 0 | 0.00 | 2 | 0.02 | 42 | 7.0 | 4 | 0.01 | 27 | 2.6 | 4 | 0.09 |
| 26 | 5 | 0.00 | 2 | 0.02 | 9 | 0.74 | 4 | 0.01 | 10 | 0.56 | 5 | 0.14 |
| 27 | 5 | 0.00 | 1 | 0.00 | 6 | 0.19 | 4 | 0.01 | 9 | 0.35 | 7 | 0.19 |
| 28 | 4 | 0.00 | 5 | 0.03 | 5 | 0.12 | 4 | 0.01 | 9 | 0.27 | 5 | 0.10 |
| 29 | 20 | 0.49 | 9 | 0.05 | 4 | 0.08 | 4 | 0.01 | --- | --- | 4 | 0.07 |
| 30 | 17 | 0.53 | 12 | 0.07 | 4 | 0.06 | 4 | 0.01 | --- | --- | 45 | 5.5 |
| 31 | 9 | 0.09 | --- | --- | 3 | 0.04 | 4 | 0.02 | --- | --- | 49 | 4.0 |
| TOTAL | --- | 1.15 | --- | 56.34 | --- | 23.79 | --- | 151.96 | --- | 1,476.17 | --- | 745.83 |

01656102 GOSLIN RUN NEAR ADEN, VA—Continued

SUSPENDED-SEDIMENT—CONTINUED
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Day | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APRIL | | MAY | | JUNE | | JULY | | AUGUST | | SEPTEMBER | |
| 1 | 21 | 0.98 | 16 | 0.36 | 8 | 0.13 | 8 | 0.04 | 5 | 0.00 | 8 | 0.02 |
| 2 | 8 | 0.25 | 10 | 0.12 | 7 | 0.09 | 23 | 0.56 | 3 | 0.00 | 8 | 0.03 |
| 3 | 4 | 0.08 | 8 | 0.08 | 9 | 0.11 | 47 | 4.7 | 6 | 0.00 | 20 | 0.39 |
| 4 | 4 | 0.08 | 5 | 0.04 | 9 | 0.17 | 11 | 0.47 | 5 | 0.00 | 15 | 0.11 |
| 5 | 4 | 0.07 | 5 | 0.03 | 11 | 0.30 | 5 | 0.08 | 10 | 0.04 | 11 | 0.06 |
| 6 | 4 | 0.06 | 5 | 0.04 | 7 | 0.09 | 5 | 0.04 | 55 | 1.0 | 10 | 0.03 |
| 7 | 25 | 1.5 | 99 | 18 | 172 | 72 | 5 | 0.03 | 14 | 0.05 | 7 | 0.02 |
| 8 | 39 | 1.5 | 50 | 9.1 | 72 | 8.8 | 7 | 0.04 | 6 | 0.01 | 5 | 0.00 |
| 9 | 46 | 6.3 | 17 | 0.80 | 31 | 3.6 | 6 | 0.03 | 7 | 0.02 | 5 | 0.00 |
| 10 | 11 | 0.81 | 11 | 0.76 | 13 | 0.44 | 9 | 0.07 | 5 | 0.01 | 3 | 0.00 |
| 11 | 37 | 7.5 | 7 | 0.33 | 6 | 0.12 | 9 | 0.07 | 5 | 0.01 | 5 | 0.00 |
| 12 | 7 | 0.49 | 6 | 0.17 | 8 | 0.16 | 8 | 0.04 | 19 | 0.27 | 25 | 1.6 |
| 13 | 12 | 0.43 | 6 | 0.11 | 10 | 0.15 | 8 | 0.04 | 8 | 0.03 | 51 | 5.3 |
| 14 | 13 | 0.33 | 6 | 0.08 | 97 | 18 | 8 | 0.03 | 6 | 0.02 | 7 | 0.10 |
| 15 | 6 | 0.13 | 15 | 0.45 | 34 | 4.3 | 9 | 0.03 | 5 | 0.01 | 5 | 0.04 |
| 16 | 4 | 0.07 | 101 | 45 | 8 | 0.24 | 7 | 0.02 | 8 | 0.01 | 5 | 0.03 |
| 17 | 5 | 0.07 | 10 | 0.57 | 17 | 1.8 | 6 | 0.01 | 9 | 0.01 | 6 | 0.03 |
| 18 | 10 | 0.14 | 44 | 6.9 | 44 | 12 | 7 | 0.01 | 8 | 0.01 | 63 | 52 |
| 19 | 16 | 1.2 | 31 | 2.5 | 15 | 1.1 | 7 | 0.01 | 6 | 0.01 | 155 | 109 |
| 20 | 7 | 0.22 | 6 | 0.20 | 112 | 72 | 7 | 0.01 | 4 | 0.00 | 12 | 0.13 |
| 21 | 4 | 0.09 | 27 | 4.2 | 47 | 5.9 | 6 | 0.00 | 5 | 0.00 | 7 | 0.02 |
| 22 | 17 | 0.32 | 18 | 1.4 | 15 | 0.77 | 4 | 0.00 | 6 | 0.00 | 7 | 0.00 |
| 23 | 20 | 0.28 | 8 | 0.40 | 7 | 0.17 | 6 | 0.00 | 5 | 0.00 | 156 | 106 |
| 24 | 15 | 0.17 | 4 | 0.20 | 7 | 0.11 | 10 | 0.01 | 6 | 0.00 | 10 | 0.26 |
| 25 | 10 | 0.11 | 3 | 0.10 | 6 | 0.06 | 9 | 0.00 | 3 | 0.00 | 6 | 0.07 |
| 26 | 7 | 0.13 | 61 | 20 | 6 | 0.05 | 9 | 0.00 | 5 | 0.00 | 8 | 0.07 |
| 27 | 10 | 0.13 | 12 | 0.86 | 28 | 0.57 | 8 | 0.00 | 6 | 0.00 | 8 | 0.05 |
| 28 | 14 | 0.15 | 6 | 0.36 | 16 | 0.17 | 8 | 0.00 | 10 | 0.04 | 7 | 0.05 |
| 29 | 15 | 0.14 | 4 | 0.15 | 8 | 0.06 | 7 | 0.03 | 8 | 0.02 | 4 | 0.02 |
| 30 | 14 | 0.11 | 4 | 0.10 | 11 | 0.11 | 6 | 0.00 | 73 | 1.1 | 4 | 0.02 |
| 31 | --- | --- | 7 | 0.13 | --- | --- | 5 | 0.00 | 26 | 0.14 | --- | --- |
| TOTAL | --- | 23.84 | --- | 113.54 | --- | 203.57 | --- | 6.37 | --- | 2.81 | --- | 275.45 |
| YEAR | 3,080.82 | | | | | | | | | | | |

01656102 GOSLIN RUN NEAR ADEN, VA—Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--February 2002 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Time | Sample type | Gage height, feet (00065) | Instantaneous discharge, cfs (00061) | Barometric pressure, mm Hg (00025) | Dissolved oxygen, mg/L (00300) | Dissolved oxygen, percent of saturation (00301) | pH, water, unfltrd field, std units (00400) | Specif. conductance, wat unf uS/cm 25 degC (00095) | Temperature, air, deg C (00020) | Temperature, water, deg C (00010) | Ammonia + org-N, water, fltrd, mg/L as N (00623) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | |
| 28... | 1100 | Environmental | 2.98 | 0.49 | 760 | 9.3 | 85 | 6.9 | 86 | 12.0 | 11.4 | 0.15 |
| NOV | | | | | | | | | | | | |
| 13... | 1230 | Environmental | 3.35 | 11 | 755 | 8.7 | 80 | 6.2 | 60 | 8.5 | 11.4 | 0.26 |
| DEC | | | | | | | | | | | | |
| 16... | 1100 | Environmental | 3.34 | 12 | 751 | 12.1 | 96 | 6.5 | 54 | 4.0 | 5.6 | 0.15 |
| JAN | | | | | | | | | | | | |
| 14... | 1215 | Environmental | 3.04 | 3.4 | 760 | 14.9 | 106 | 6.6 | 55 | 1.5 | 1.8 | E.09 |
| FEB | | | | | | | | | | | | |
| 24... | 1000 | Environmental | 3.92 | 45 | 760 | 11.6 | 85 | 7.2 | 42 | 1.5 | 1.7 | 0.14 |
| MAR | | | | | | | | | | | | |
| 12... | 0945 | Environmental | 3.36 | 11 | 758 | 10.8 | 85 | 6.4 | 47 | 4.0 | 4.4 | 0.10 |
| 20... | 1458 | Blank | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.10 |
| 20... | 1500 | Environmental | 6.53 | 671 | 753 | 9.8 | 82 | 5.8 | 37 | 8.0 | 7.5 | 0.28 |
| 20... | 1502 | Replicate | 6.53 | 671 | -- | -- | -- | -- | -- | -- | -- | E.28c |
| APR | | | | | | | | | | | | |
| 16... | 1200 | Environmental | 3.24 | 7.0 | 755 | 11.2 | 101 | 6.4 | 49 | 25.5 | 15.8 | 0.14 |
| MAY | | | | | | | | | | | | |
| 14... | 1100 | Environmental | 3.14 | 5.0 | 755 | 9.4 | 90 | 6.6 | 52 | 18.0 | 13.8 | 0.18 |
| JUN | | | | | | | | | | | | |
| 25... | 1100 | Environmental | 3.14 | 4.8 | 759 | 7.6 | 85 | 6.2 | 51 | 31.0 | 20.0 | 0.19 |
| JUL | | | | | | | | | | | | |
| 22... | 1115 | Environmental | 2.81 | 0.38 | 753 | 8.0 | 99 | 6.3 | 61 | 21.5 | 23.8 | 0.19 |
| AUG | | | | | | | | | | | | |
| 12... | 1030 | Environmental | 3.12 | 4.6 | 759 | 7.5 | 88 | 7.2 | 50 | 28.0 | 22.8 | 0.26 |
| SEP | | | | | | | | | | | | |
| 10... | 1330 | Environmental | 2.83 | 0.49 | 760 | 6.4 | 67 | 7.0 | 71 | 24.0 | 18.2 | 0.18 |
| 23... | 1230 | Environmental | 4.72 | 106 | 753 | 6.7 | 74 | 6.7 | 38 | 22.5 | 20.3 | 0.43 |
| 23... | 1235 | Replicate | 4.72 | 106 | -- | -- | -- | -- | -- | -- | -- | 0.48 |
| 23... | 1240 | Blank | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.10 |

01656102 GOSLIN RUN NEAR ADEN, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Ammonia + org-N, water, unfltrd mg/L as N (00625) | Ammonia water, fltrd, mg/L as N (00608) | Nitrite + nitrate water fltrd, mg/L as N (00631) | Nitrite water, fltrd, mg/L as N (00613) | Ortho-phos-phate, water, fltrd, mg/L as P (00671) | Phos-phorus, water, fltrd, mg/L (00666) | Phos-phorus, water, unfltrd mg/L (00665) | E coli, m-TEC MF, water, col/ 100 mL (31633) | Fecal coli-form, M-FC 0.7u MF col/ 100 mL (31625) | Sus-pended sedi-ment concen-tration mg/L (80154) |
|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | |
| 28... | 0.18 | <0.04 | <0.06 | <0.008 | <0.02 | 0.006 | 0.016 | 22 | 31 | 4 |
| NOV | | | | | | | | | | |
| 13... | 0.31 | <0.04 | <0.06 | <0.008 | <0.02 | 0.010 | 0.029 | 200 | 290 | 8 |
| DEC | | | | | | | | | | |
| 16... | 0.19 | <0.04 | E.05 | <0.008 | <0.02 | 0.006 | 0.014 | 62 | 64 | 5 |
| JAN | | | | | | | | | | |
| 14... | E.09 | <0.04 | E.05 | <0.008 | <0.02 | E.004 | 0.008 | 34 | 27 | 2 |
| FEB | | | | | | | | | | |
| 24... | 0.24 | E.02 | 0.12 | <0.008 | <0.02 | 0.006 | 0.024 | 50 | 168 | 29 |
| MAR | | | | | | | | | | |
| 12... | E.10 | <0.04 | E.04 | <0.008 | <0.02 | 0.007 | 0.018 | E11k | E5k | 2 |
| 20... | E.06 | <0.04 | <0.06 | <0.008 | <0.02 | <0.004 | <0.004 | -- | -- | -- |
| 20... | 1.1 | E.02 | 0.08 | <0.008 | <0.02 | 0.014 | 0.25 | -- | -- | 1,150 |
| 20... | 1.3 | E.03 | 0.07 | <0.008 | <0.02 | 0.013 | 0.26 | -- | -- | -- |
| APR | | | | | | | | | | |
| 16... | 0.18 | <0.04 | <0.06 | <0.008 | <0.02 | 0.005 | 0.013 | 20 | E14k | 4 |
| MAY | | | | | | | | | | |
| 14... | 0.28 | <0.04 | <0.06 | <0.008 | <0.02 | 0.011 | 0.021 | 110 | 134 | 6 |
| JUN | | | | | | | | | | |
| 25... | 0.25 | <0.04 | E.03 | <0.008 | <0.02 | 0.008 | 0.020 | 510 | 350 | 6 |
| JUL | | | | | | | | | | |
| 22... | 0.31 | <0.04 | E.04 | <0.008 | <0.02 | 0.006 | 0.017 | 240 | 278 | 4 |
| AUG | | | | | | | | | | |
| 12... | 0.43 | <0.04 | <0.06 | <0.008 | <0.02 | 0.008 | 0.040 | E2400k | E2530k | 20 |
| SEP | | | | | | | | | | |
| 10... | 0.26 | <0.04 | E.04n | <0.008 | <0.02 | 0.010 | 0.014 | 140 | 109 | 2 |
| 23... | 0.68 | <0.04 | E.04n | <0.008 | <0.02 | 0.017 | 0.081 | -- | -- | 131 |
| 23... | 0.62 | <0.04 | E.03n | <0.008 | <0.02 | 0.017 | 0.081 | -- | -- | -- |
| 23... | <0.10 | <0.04 | <0.06 | <0.008 | <0.02 | <0.004 | <0.004 | -- | -- | -- |

Remark codes used in this table:
< -- Less than
E -- Estimated value

Value qualifier codes used in this table:
c -- See laboratory comment
k -- Counts outside acceptable range
n -- Below the NDV

## 01658500 SOUTH FORK QUANTICO CREEK NEAR INDEPENDENT HILL, VA

LOCATION.--Lat 38°35'14", long 77°25'43", NAD83, 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 $mi^2$.

### 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 NGVD of 1929.

REMARKS.--Records good.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 200 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 1 | 2315 | 342 | 5.63 | Jun 7 | 1730 | 200 | 4.56 |
| Feb 22 | 1700 | *1,180 | *8.19 | Jun 20 | 1645 | 311 | 5.46 |
| Mar 20 | 1900 | 572 | 6.65 | Sep 19 | 0415 | 440 | 6.11 |
| May 8 | 0030 | 471 | 6.25 | Sep 23 | 1030 | 444 | 6.13 |
| May 16 | 0545 | 387 | 5.86 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.07 | 0.82 | 2.5 | 97 | 4.5 | 9.1 | 13 | 16 | 6.3 | 3.1 | 1.3 | 1.8 |
| 2 | 0.07 | 0.52 | 2.5 | 47 | 3.9 | 35 | 9.9 | 8.0 | 5.1 | 5.2 | 1.3 | 4.4 |
| 3 | 0.07 | 0.40 | 2.5 | 25 | 3.4 | 29 | 8.3 | 5.7 | 5.3 | 60 | 1.1 | 6.8 |
| 4 | 0.07 | 0.52 | 2.6 | 13 | 4.7 | 15 | 7.4 | 4.9 | 8.0 | 23 | 1.7 | 4.3 |
| 5 | 0.08 | 0.72 | 3.3 | 7.5 | 4.6 | 33 | 6.9 | 4.8 | 10 | 7.8 | 1.7 | 3.3 |
| 6 | 0.07 | 6.3 | 3.3 | 6.5 | 3.1 | 49 | 6.2 | 5.9 | 5.8 | 5.1 | 5.0 | 1.9 |
| 7 | 0.06 | 1.4 | 3.3 | 6.2 | 3.5 | 24 | 19 | 49 | 60 | 3.8 | 1.7 | 1.4 |
| 8 | 0.06 | 0.53 | 3.4 | 5.6 | 3.1 | 16 | 15 | 96 | 23 | 3.0 | 1.4 | 1.1 |
| 9 | 0.06 | 0.41 | 3.7 | 6.2 | 3.1 | 19 | 37 | 17 | 27 | 2.9 | 1.3 | 1.1 |
| 10 | 0.07 | 0.57 | 3.9 | 4.9 | 3.2 | 14 | 19 | 20 | 10 | 4.2 | 3.4 | 1.0 |
| 11 | 0.13 | 8.0 | 23 | 4.0 | 3.2 | 10 | 43 | 15 | 7.5 | 4.0 | 1.8 | 0.98 |
| 12 | 0.14 | 22 | 19 | 3.4 | 3.2 | 9.2 | 18 | 8.0 | 8.0 | 2.5 | 2.5 | 5.5 |
| 13 | 0.14 | 11 | 26 | 3.3 | 3.1 | 10 | 12 | 5.8 | 7.9 | 2.5 | 1.6 | 17 |
| 14 | 0.17 | 3.9 | 41 | 3.2 | 3.0 | 9.5 | 9.3 | 4.5 | 13 | 2.5 | 1.3 | 4.5 |
| 15 | 0.18 | 2.6 | 15 | 3.0 | 13 | 7.6 | 8.5 | 6.8 | 22 | 2.1 | 1.1 | 2.9 |
| 16 | 1.3 | 29 | 7.7 | 2.9 | 16 | 7.3 | 7.8 | 133 | 8.5 | 1.9 | 1.0 | 2.1 |
| 17 | 0.86 | 68 | 5.2 | 2.9 | 25 | 7.4 | 7.0 | 19 | 11 | 1.7 | 2.7 | 1.4 |
| 18 | 0.35 | 29 | 4.1 | 2.7 | 14 | 6.9 | 6.8 | 36 | 55 | 1.3 | 1.3 | 12 |
| 19 | 0.29 | 7.4 | 3.7 | 2.5 | 8.5 | 6.2 | 39 | 17 | 22 | 1.6 | 0.98 | 111 |
| 20 | 0.27 | 4.5 | 6.2 | 2.5 | 9.9 | 196 | 14 | 9.5 | 86 | 1.5 | 0.91 | 7.5 |
| 21 | 0.22 | 3.7 | 6.2 | 2.5 | 16 | 64 | 10 | 29 | 26 | 1.2 | 0.78 | 3.9 |
| 22 | 0.18 | 3.6 | 4.5 | 2.5 | 393 | 19 | 8.8 | 23 | 12 | 1.1 | 0.74 | 3.1 |
| 23 | 0.16 | 2.8 | 3.8 | 2.4 | 123 | 12 | 7.5 | 13 | 7.6 | 1.4 | 0.66 | 149 |
| 24 | 0.15 | 2.6 | 3.8 | 2.3 | 36 | 9.6 | 6.6 | 12 | 5.7 | 1.3 | 0.63 | 12 |
| 25 | 0.16 | 2.6 | 27 | 2.3 | 24 | 8.1 | 6.4 | 9.8 | 4.6 | 1.1 | 0.63 | 6.3 |
| 26 | 0.31 | 2.4 | 17 | 2.4 | 15 | 8.5 | 12 | 75 | 3.9 | 0.96 | 0.59 | 4.3 |
| 27 | 0.38 | 2.4 | 8.8 | 2.2 | 11 | 12 | 9.5 | 18 | 18 | 0.82 | 0.63 | 3.3 |
| 28 | 0.43 | 2.5 | 6.2 | 2.0 | 10 | 8.3 | 7.1 | 20 | 9.5 | 1.7 | 1.6 | 3.9 |
| 29 | 1.2 | 2.4 | 5.2 | 2.4 | --- | 9.1 | 6.1 | 14 | 5.2 | 5.0 | 1.1 | 2.9 |
| 30 | 9.2 | 2.3 | 4.3 | 2.4 | --- | 25 | 5.7 | 10 | 3.9 | 1.7 | 5.0 | 2.3 |
| 31 | 4.1 | --- | 3.9 | 2.6 | --- | 21 | --- | 7.6 | --- | 1.3 | 4.2 | --- |
| TOTAL | 21.00 | 224.89 | 272.6 | 275.3 | 764.0 | 709.8 | 386.8 | 713.3 | 497.8 | 157.28 | 51.65 | 382.98 |
| MEAN | 0.68 | 7.50 | 8.79 | 8.88 | 27.3 | 22.9 | 12.9 | 23.0 | 16.6 | 5.07 | 1.67 | 12.8 |
| MAX | 9.2 | 68 | 41 | 97 | 393 | 196 | 43 | 133 | 86 | 60 | 5.0 | 149 |
| MIN | 0.06 | 0.40 | 2.5 | 2.0 | 3.0 | 6.2 | 5.7 | 4.5 | 3.9 | 0.82 | 0.59 | 0.98 |
| CFSM | 0.09 | 0.98 | 1.15 | 1.16 | 3.57 | 3.00 | 1.69 | 3.01 | 2.17 | 0.66 | 0.22 | 1.67 |
| IN. | 0.10 | 1.10 | 1.33 | 1.34 | 3.72 | 3.46 | 1.88 | 3.47 | 2.42 | 0.77 | 0.25 | 1.86 |

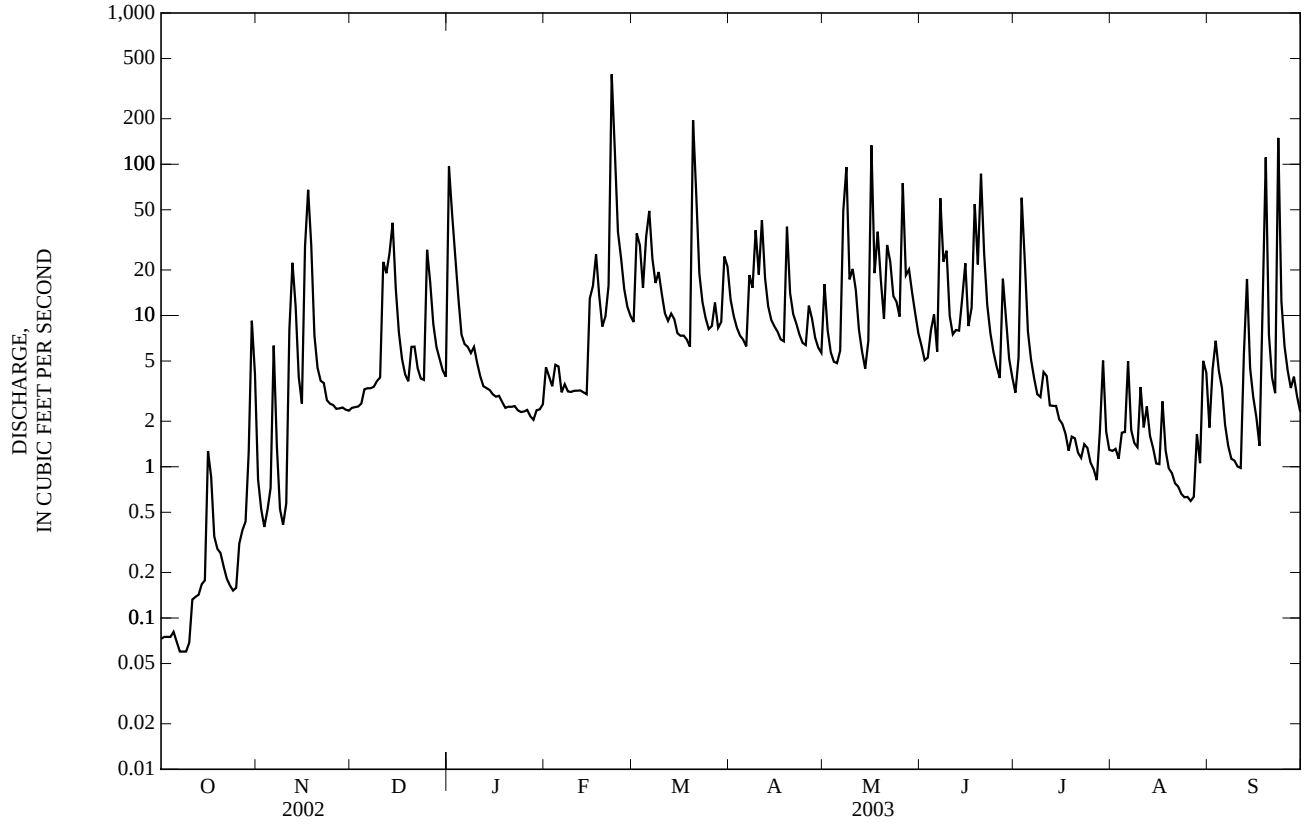
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 3.07 | 5.56 | 7.70 | 9.90 | 11.9 | 13.9 | 11.4 | 8.17 | 4.89 | 2.66 | 2.50 | 3.26 |
| 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 | 0.070 | 0.23 | 0.58 | 1.01 | 1.30 | 1.77 | 2.90 | 1.38 | 0.23 | 0.055 | 0.010 | 0.000 |
| (WY) | (1989) | (1999) | (1966) | (1981) | (2002) | (1981) | (1969) | (1999) | (1999) | (1963) | (1963) | (1964) |

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

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1951 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 931.18 | | 4,457.40 | | | |
| ANNUAL MEAN | 2.55 | | 12.2 | | 7.03 | |
| HIGHEST ANNUAL MEAN | | | | | 13.5 | 1998 |
| LOWEST ANNUAL MEAN | | | | | 1.29 | 2002 |
| HIGHEST DAILY MEAN | 68 | Nov 17 | 393 | Feb 22 | 770 | Jun 22, 1972 |
| LOWEST DAILY MEAN | 0.00 | aAug 14 | 0.06 | bOct 7 | 0.00 | (c) |
| ANNUAL SEVEN-DAY MINIMUM | 0.00 | Aug 14 | 0.07 | Oct 3 | 0.00 | (c) |
| MAXIMUM PEAK FLOW | | | 1,180 | Feb 22 | 4,160 | May 6, 1989 |
| MAXIMUM PEAK STAGE | | | 8.19 | Feb 22 | 11.62 | May 6, 1989 |
| INSTANTANEOUS LOW FLOW | | | 0.06 | dOct 1 | 0.00 | (c) |
| ANNUAL RUNOFF (CFSM) | 0.33 | | 1.60 | | 0.92 | |
| ANNUAL RUNOFF (INCHES) | 4.53 | | 21.70 | | 12.51 | |
| 10 PERCENT EXCEEDS | 4.5 | | 25 | | 14 | |
| 50 PERCENT EXCEEDS | 1.1 | | 4.7 | | 2.6 | |
| 90 PERCENT EXCEEDS | 0.04 | | 0.65 | | 0.20 | |

a Also many other days in August and September 2002.
b Also Oct. 8, 9, 2002.
c No flow at times many years.
d Also Oct. 6-10, 2002.



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

SUSPENDED-SEDIMENT
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Day | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OCTOBER | | NOVEMBER | | DECEMBER | | JANUARY | | FEBRUARY | | MARCH | |
| 1 | 6 | 0.00 | 14 | 0.03 | 14 | 0.09 | 79 | 43 | 6 | 0.08 | 6 | 0.14 |
| 2 | 6 | 0.00 | 9 | 0.01 | 13 | 0.09 | 51 | 9.1 | 7 | 0.07 | 39 | 5.6 |
| 3 | 5 | 0.00 | 5 | 0.00 | 11 | 0.08 | 25 | 1.6 | 7 | 0.07 | 27 | 2.8 |
| 4 | 8 | 0.00 | 5 | 0.00 | 10 | 0.07 | 12 | 0.44 | 10 | 0.14 | 15 | 0.60 |
| 5 | 6 | 0.00 | 4 | 0.00 | 9 | 0.08 | 14 | 0.28 | 8 | 0.10 | 18 | 2.3 |
| 6 | 7 | 0.00 | 8 | 0.17 | 9 | 0.08 | 7 | 0.12 | 7 | 0.06 | 35 | 4.7 |
| 7 | 6 | 0.00 | 6 | 0.02 | 8 | 0.07 | 7 | 0.12 | 6 | 0.06 | 12 | 0.81 |
| 8 | 6 | 0.00 | 6 | 0.00 | 7 | 0.06 | 3 | 0.05 | 5 | 0.05 | 4 | 0.16 |
| 9 | 6 | 0.00 | 6 | 0.00 | 6 | 0.06 | 2 | 0.03 | 5 | 0.04 | 4 | 0.20 |
| 10 | 7 | 0.00 | 7 | 0.01 | 5 | 0.05 | 2 | 0.03 | 4 | 0.04 | 3 | 0.11 |
| 11 | 5 | 0.00 | 26 | 0.93 | 69 | 8.9 | 3 | 0.03 | 4 | 0.03 | 2 | 0.07 |
| 12 | 7 | 0.00 | 55 | 5.3 | 41 | 2.3 | 3 | 0.03 | 3 | 0.03 | 3 | 0.08 |
| 13 | 7 | 0.00 | 17 | 0.63 | 8 | 0.68 | 3 | 0.03 | 3 | 0.02 | 4 | 0.12 |
| 14 | 6 | 0.00 | 12 | 0.13 | 32 | 4.9 | 3 | 0.03 | 2 | 0.02 | 3 | 0.09 |
| 15 | 4 | 0.00 | 8 | 0.05 | 6 | 0.27 | 4 | 0.03 | 26 | 1.1 | 4 | 0.09 |
| 16 | 6 | 0.03 | 15 | 3.4 | 4 | 0.09 | 4 | 0.03 | 18 | 1.0 | 3 | 0.06 |
| 17 | 10 | 0.02 | 106 | 32 | 5 | 0.07 | 5 | 0.04 | 38 | 2.7 | 3 | 0.06 |
| 18 | 9 | 0.00 | 21 | 2.2 | 4 | 0.05 | 5 | 0.04 | 20 | 0.75 | 4 | 0.07 |
| 19 | 6 | 0.00 | 10 | 0.20 | 3 | 0.03 | 6 | 0.04 | 14 | 0.31 | 3 | 0.05 |
| 20 | 6 | 0.00 | 9 | 0.11 | 4 | 0.06 | 6 | 0.04 | 6 | 0.15 | 187 | 198 |
| 21 | 5 | 0.00 | 12 | 0.12 | 4 | 0.07 | 7 | 0.05 | 9 | 0.41 | 78 | 18 |
| 22 | 3 | 0.00 | 10 | 0.10 | 2 | 0.02 | 8 | 0.05 | 147 | 266 | 15 | 0.78 |
| 23 | 3 | 0.00 | 8 | 0.06 | 3 | 0.03 | 8 | 0.05 | 96 | 31 | 8 | 0.27 |
| 24 | 6 | 0.00 | 9 | 0.07 | 5 | 0.05 | 9 | 0.05 | 31 | 3.1 | 4 | 0.11 |
| 25 | 4 | 0.00 | 9 | 0.06 | 13 | 1.4 | 9 | 0.06 | 29 | 1.9 | 4 | 0.08 |
| 26 | 2 | 0.00 | 9 | 0.06 | 9 | 0.41 | 10 | 0.06 | 7 | 0.31 | 3 | 0.10 |
| 27 | 4 | 0.00 | 11 | 0.07 | 5 | 0.12 | 10 | 0.06 | 4 | 0.13 | 7 | 0.23 |
| 28 | 5 | 0.00 | 11 | 0.08 | 4 | 0.07 | 11 | 0.06 | 5 | 0.13 | 5 | 0.10 |
| 29 | 5 | 0.02 | 12 | 0.08 | 2 | 0.02 | 11 | 0.07 | --- | --- | 3 | 0.08 |
| 30 | 59 | 1.6 | 13 | 0.08 | 8 | 0.09 | 12 | 0.07 | --- | --- | 23 | 2.4 |
| 31 | 17 | 0.21 | --- | --- | 3 | 0.04 | 9 | 0.06 | --- | --- | 9 | 0.59 |
| TOTAL | --- | 1.88 | --- | 45.97 | --- | 20.40 | --- | 55.75 | --- | 309.80 | --- | 238.85 |

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

SUSPENDED-SEDIMENT—CONTINUED
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Day | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APRIL | | MAY | | JUNE | | JULY | | AUGUST | | SEPTEMBER | |
| 1 | 4 | 0.14 | 27 | 1.5 | 7 | 0.12 | 4 | 0.03 | 4 | 0.01 | 10 | 0.05 |
| 2 | 5 | 0.14 | 12 | 0.26 | 7 | 0.09 | 10 | 0.44 | 2 | 0.00 | 11 | 0.15 |
| 3 | 6 | 0.13 | 13 | 0.20 | 5 | 0.08 | 65 | 11 | 4 | 0.01 | 47 | 1.2 |
| 4 | 6 | 0.11 | 13 | 0.17 | 5 | 0.11 | 24 | 2.0 | 5 | 0.02 | 14 | 0.16 |
| 5 | 4 | 0.07 | 10 | 0.12 | 8 | 0.22 | 6 | 0.12 | 5 | 0.02 | 7 | 0.06 |
| 6 | 4 | 0.06 | 10 | 0.15 | 7 | 0.10 | 5 | 0.07 | 5 | 0.07 | 5 | 0.03 |
| 7 | 19 | 1.5 | 32 | 18 | 75 | 22 | 3 | 0.04 | 5 | 0.02 | 5 | 0.02 |
| 8 | 15 | 0.67 | 97 | 56 | 21 | 1.6 | 4 | 0.04 | 5 | 0.02 | 5 | 0.02 |
| 9 | 34 | 4.1 | 24 | 1.2 | 17 | 1.4 | 6 | 0.05 | 5 | 0.02 | 4 | 0.01 |
| 10 | 10 | 0.52 | 15 | 0.86 | 8 | 0.22 | 6 | 0.07 | 7 | 0.06 | 4 | 0.01 |
| 11 | 35 | 4.9 | 14 | 0.56 | 8 | 0.16 | 6 | 0.06 | 6 | 0.03 | 3 | 0.00 |
| 12 | 8 | 0.42 | 13 | 0.29 | 7 | 0.15 | 5 | 0.03 | 6 | 0.04 | 16 | 1.0 |
| 13 | 4 | 0.11 | 9 | 0.15 | 6 | 0.13 | 5 | 0.04 | 6 | 0.02 | 71 | 5.3 |
| 14 | 4 | 0.11 | 7 | 0.09 | 6 | 0.38 | 6 | 0.04 | 5 | 0.02 | 8 | 0.10 |
| 15 | 4 | 0.08 | 14 | 0.83 | 14 | 0.98 | 6 | 0.03 | 5 | 0.01 | 5 | 0.04 |
| 16 | 4 | 0.09 | 92 | 56 | 6 | 0.13 | 3 | 0.02 | 5 | 0.01 | 4 | 0.02 |
| 17 | 3 | 0.06 | 14 | 0.73 | 15 | 0.86 | 4 | 0.02 | 5 | 0.03 | 4 | 0.01 |
| 18 | 3 | 0.06 | 30 | 3.6 | 67 | 16 | 4 | 0.01 | 4 | 0.01 | 21 | 5.0 |
| 19 | 54 | 7.3 | 19 | 0.92 | 16 | 0.93 | 4 | 0.02 | 4 | 0.01 | 139 | 96 |
| 20 | 6 | 0.24 | 8 | 0.21 | 69 | 34 | 4 | 0.02 | 4 | 0.00 | 13 | 0.27 |
| 21 | 8 | 0.23 | 23 | 2.9 | 24 | 1.9 | 7 | 0.02 | 5 | 0.01 | 6 | 0.07 |
| 22 | 10 | 0.24 | 15 | 1.0 | 7 | 0.24 | 5 | 0.01 | 4 | 0.00 | 4 | 0.04 |
| 23 | 12 | 0.24 | 10 | 0.37 | 5 | 0.10 | 4 | 0.01 | 4 | 0.00 | 62 | 38 |
| 24 | 13 | 0.23 | 9 | 0.29 | 4 | 0.07 | 4 | 0.02 | 5 | 0.00 | 13 | 0.48 |
| 25 | 10 | 0.18 | 8 | 0.20 | 5 | 0.06 | 5 | 0.01 | 3 | 0.00 | 8 | 0.13 |
| 26 | 15 | 0.53 | 67 | 20 | 5 | 0.05 | 4 | 0.01 | 3 | 0.00 | 4 | 0.05 |
| 27 | 13 | 0.35 | 10 | 0.49 | 85 | 10 | 4 | 0.00 | 3 | 0.00 | 3 | 0.02 |
| 28 | 12 | 0.24 | 7 | 0.41 | 24 | 0.79 | 5 | 0.04 | 4 | 0.02 | 4 | 0.04 |
| 29 | 13 | 0.21 | 8 | 0.31 | 6 | 0.08 | 11 | 0.16 | 3 | 0.00 | 4 | 0.03 |
| 30 | 10 | 0.15 | 8 | 0.22 | 4 | 0.05 | 7 | 0.03 | 29 | 1.5 | 4 | 0.02 |
| 31 | --- | --- | 8 | 0.15 | --- | --- | 5 | 0.02 | 30 | 0.44 | --- | --- |
| TOTAL | --- | 23.41 | --- | 168.18 | --- | 93.00 | --- | 14.48 | --- | 2.40 | --- | 148.33 |
| YEAR | 1,122.45 | | | | | | | | | | | |

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 2002 TO SEPTEMBER 2003

| Date | Time | Sample type | Gage height, feet (00065) | Instantaneous discharge, cfs (00061) | Barometric pressure, mm Hg (00025) | Dissolved oxygen, mg/L (00300) | Dissolved oxygen, percent of saturation (00301) | pH, water, unfltrd field, std units (00400) | Specif. conductance, wat unf uS/cm 25 degC (00095) | Temperature, air, deg C (00020) | Temperature, water, deg C (00010) | Ammonia + org-N, water, fltrd, mg/L as N (00623) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | |
| 28... | 1000 | Environmental | 1.49 | 0.38 | 760 | 8.2 | 86 | 6.8 | 119 | 12.5 | 11.7 | 0.23 |
| NOV | | | | | | | | | | | | |
| 13... | 1045 | Environmental | 1.86 | 11 | 755 | 8.4 | 77 | 6.3 | 70 | 9.0 | 11.4 | 0.45 |
| DEC | | | | | | | | | | | | |
| 16... | 0900 | Environmental | 1.76 | 8.2 | 751 | 12.1 | 95 | 7.0 | 76 | 4.0 | 4.9 | 0.26 |
| JAN | | | | | | | | | | | | |
| 14... | 1030 | Environmental | 1.53 | 3.1 | 760 | 13.4 | 94 | 6.5 | 99 | 1.0 | 1.0 | 0.17 |
| FEB | | | | | | | | | | | | |
| 24... | 0930 | Environmental | 2.50 | 32 | 760 | 11.0 | 87 | 7.5 | 55 | 1.5 | 2.2 | 0.20 |
| MAR | | | | | | | | | | | | |
| 12... | 1045 | Environmental | 1.76 | 9.1 | 758 | 10.4 | 79 | 6.8 | 64 | 3.5 | 3.9 | 0.11 |
| 20... | 1358 | Blank | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.10 |
| 20... | 1400 | Environmental | 4.69 | 198 | 754 | 9.4 | 80 | 5.9 | 74 | 9.5 | 7.3 | 0.30 |
| 20... | 1402 | Replicate | 4.69 | 198 | -- | -- | -- | -- | -- | -- | -- | 0.30 |
| APR | | | | | | | | | | | | |
| 16... | 1045 | Environmental | 1.71 | 7.9 | 755 | 10.6 | 107 | 6.6 | 56 | 24.0 | 15.3 | 0.14 |
| MAY | | | | | | | | | | | | |
| 14... | 1000 | Environmental | 1.62 | 4.5 | 755 | 9.2 | 88 | 6.3 | 58 | 16.5 | 13.4 | 0.23 |
| JUN | | | | | | | | | | | | |
| 25... | 1000 | Environmental | 1.62 | 4.8 | 759 | 7.6 | 88 | 6.2 | 55 | 30.0 | 20.1 | 0.24 |
| JUL | | | | | | | | | | | | |
| 22... | 1000 | Environmental | 1.42 | 1.1 | 753 | 8.5 | 90 | 6.0 | 64 | 19.0 | 23.1 | 0.20 |
| AUG | | | | | | | | | | | | |
| 12... | 0930 | Environmental | 1.54 | 2.9 | 759 | 6.7 | 79 | 6.9 | 65 | 27.0 | 21.9 | 0.20 |
| SEP | | | | | | | | | | | | |
| 10... | 1230 | Environmental | 1.41 | 1.0 | 760 | 6.5 | 70 | 6.7 | 75 | 20.5 | 19.4 | 0.20 |
| 23... | 1030 | Environmental | 6.13 | 444 | 753 | 6.4 | 70 | 6.9 | 36 | 20.5 | 19.9 | 0.55 |
| 23... | 1035 | Replicate | 6.13 | 444 | -- | -- | -- | -- | -- | -- | -- | 0.62 |
| 23... | 1040 | Blank | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.10 |

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Ammonia + org-N, water, unfltrd mg/L as N (00625) | Ammonia water, fltrd, mg/L as N (00608) | Nitrite + nitrate water fltrd, mg/L as N (00631) | Nitrite water, fltrd, mg/L as N (00613) | Ortho-phos-phate, water, fltrd, mg/L as P (00671) | Phos-phorus, water, fltrd, mg/L (00666) | Phos-phorus, water, unfltrd mg/L (00665) | E coli, m-TEC MF, water, col/ 100 mL (31633) | Fecal coli-form, M-FC 0.7u MF col/ 100 mL (31625) | Sus-pended sedi-ment concen-tration mg/L (80154) |
|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | |
| 28... | 0.32 | <0.04 | <0.06 | <0.008 | <0.02 | 0.011 | 0.028 | 41 | 56 | 4 |
| NOV | | | | | | | | | | |
| 13... | 0.51 | <0.04 | E.05 | <0.008 | <0.02 | 0.013 | 0.046 | 81 | 115 | 12 |
| DEC | | | | | | | | | | |
| 16... | 0.30 | <0.04 | E.05 | <0.008 | <0.02 | 0.022 | 0.023 | 46 | 40 | 4 |
| JAN | | | | | | | | | | |
| 14... | 0.16 | <0.04 | E.05 | <0.008 | <0.02 | 0.009 | 0.019 | E4k | E2k | 3 |
| FEB | | | | | | | | | | |
| 24... | 0.30 | E.02 | 0.07 | <0.008 | <0.02 | 0.009 | 0.033 | 30 | 77 | 25 |
| MAR | | | | | | | | | | |
| 12... | E.06 | <0.04 | E.04 | <0.008 | <0.02 | E.003 | 0.011 | E7k | E6k | 3 |
| 20... | <0.10 | <0.04 | <0.06 | <0.008 | <0.02 | <0.004 | E.002 | -- | -- | -- |
| 20... | 1.2 | 0.06 | 0.09 | <0.008 | <0.02 | 0.016 | 0.25 | -- | -- | 509 |
| 20... | 1.1 | 0.07 | 0.10 | <0.008 | <0.02 | 0.015 | 0.23 | -- | -- | -- |
| APR | | | | | | | | | | |
| 16... | 0.21 | <0.04 | <0.06 | <0.008 | <0.02 | 0.011 | 0.026 | 22 | E14k | 6 |
| MAY | | | | | | | | | | |
| 14... | 0.30 | E.03 | <0.06 | <0.008 | E.01 | 0.018 | 0.033 | 240 | 219 | 7 |
| JUN | | | | | | | | | | |
| 25... | 0.35 | <0.04 | E.04 | <0.008 | <0.02 | 0.013 | 0.029 | 160 | 102 | 5 |
| JUL | | | | | | | | | | |
| 22... | 0.29 | <0.04 | E.04 | <0.008 | <0.02 | 0.006 | 0.031 | 45 | 104 | 4 |
| AUG | | | | | | | | | | |
| 12... | 0.30 | <0.04 | <0.06 | <0.008 | <0.02 | 0.006 | 0.030 | E1500k | E442k | 7 |
| SEP | | | | | | | | | | |
| 10... | 0.26 | <0.04 | <0.06 | <0.008 | <0.02 | 0.008 | 0.025 | 45 | 46 | 4 |
| 23... | 0.72 | <0.04 | <0.06 | <0.008 | <0.02 | 0.025 | 0.098 | -- | -- | 96 |
| 23... | 0.70 | <0.04 | E.03n | <0.008 | <0.02 | 0.024 | 0.098 | -- | -- | -- |
| 23... | <0.10 | <0.04 | <0.06 | <0.008 | <0.02 | <0.004 | <0.004 | -- | -- | -- |

Remark codes used in this table:
< -- Less than
E -- Estimated value

Value qualifier codes used in this table:
k -- Counts outside acceptable range
n -- Below the NDV

## 01659000 NORTH BRANCH CHOPAWAMSIC CREEK NEAR INDEPENDENT HILL, VA

LOCATION.--Lat 38°33'58", long 77°25'48", NAD83, Prince William County, Hydrologic unit 02070011, on left bank, 10 ft downstream from Highway MCB-1, 1.0 mi upstream from Chopawamsic Creek, and 4.8 mi south of Independent Hill.

DRAINAGE AREA.--5.79 $mi^2$.

### WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1951 to June 1957, March 2000 to current year.

GAGE.--Water stage recorder. Datum of gage is 230 ft NGVD of 1929, from topographic map. May 1951 to June 1957, at site 1,000 ft uptream at different datum.

REMARKS.--No estimated daily discharges. Records good except those for discharges greater than 100 $ft^3/s$, which are poor.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.00 | 3.6 | 2.3 | 48 | 4.0 | 7.6 | 11 | 8.5 | 5.9 | 2.9 | 1.7 | 2.1 |
| 2 | 0.00 | 3.0 | 2.3 | 36 | 3.8 | 25 | 8.3 | 5.7 | 4.8 | 4.2 | 1.8 | 3.2 |
| 3 | 0.00 | 2.3 | 2.2 | 19 | 3.5 | 23 | 6.9 | 4.4 | 5.1 | 45 | 1.8 | 3.9 |
| 4 | 0.00 | 2.4 | 2.1 | 10 | 4.4 | 12 | 6.1 | 4.0 | 7.3 | 19 | 2.4 | 4.0 |
| 5 | 0.00 | 2.7 | 2.4 | 6.0 | 4.2 | 23 | 5.6 | 3.9 | 9.6 | 7.1 | 2.7 | 3.0 |
| 6 | 0.00 | 6.6 | 2.4 | 4.9 | 3.5 | 36 | 5.0 | 4.7 | 5.7 | 4.5 | 2.9 | 2.0 |
| 7 | 0.00 | 5.0 | 2.2 | 4.6 | 3.9 | 20 | 14 | 14 | 33 | 3.6 | 2.0 | 1.6 |
| 8 | 0.00 | 3.7 | 2.2 | 4.2 | 3.5 | 14 | 12 | 41 | 20 | 3.2 | 1.7 | 1.5 |
| 9 | 0.00 | 3.2 | 2.4 | 4.6 | 3.5 | 15 | 26 | 13 | 21 | 3.1 | 1.7 | 1.3 |
| 10 | 0.00 | 3.0 | 2.3 | 3.8 | 4.0 | 12 | 15 | 16 | 8.8 | 3.8 | 5.2 | 1.2 |
| 11 | 0.30 | 7.2 | 14 | 3.2 | 3.8 | 9.1 | 27 | 13 | 6.0 | 3.7 | 2.3 | 1.1 |
| 12 | 0.12 | 17 | 13 | 2.9 | 3.9 | 8.1 | 14 | 6.6 | 6.1 | 2.7 | 4.0 | 3.3 |
| 13 | 0.04 | 8.8 | 17 | 2.9 | 4.0 | 8.8 | 9.0 | 4.6 | 5.8 | 2.6 | 2.4 | 11 |
| 14 | 0.00 | 3.9 | 32 | 2.9 | 3.9 | 8.5 | 7.4 | 3.6 | 7.7 | 3.2 | 1.9 | 3.9 |
| 15 | 0.00 | 2.7 | 12 | 2.7 | 10 | 6.7 | 6.8 | 4.6 | 19 | 2.5 | 1.6 | 2.7 |
| 16 | 1.0 | 18 | 6.4 | 2.5 | 8.0 | 6.3 | 6.3 | 68 | 8.1 | 2.2 | 1.7 | 2.1 |
| 17 | 0.62 | 53 | 4.3 | 2.6 | 8.0 | 6.4 | 5.6 | 17 | 8.9 | 2.1 | 2.0 | 1.6 |
| 18 | 0.53 | 25 | 3.5 | 2.4 | 6.7 | 5.7 | 5.6 | 27 | 37 | 1.8 | 1.7 | 6.4 |
| 19 | 0.30 | 6.6 | 3.2 | 2.4 | 6.3 | 5.1 | 25 | 16 | 20 | 1.8 | 1.5 | 34 |
| 20 | 0.20 | 4.2 | 5.3 | 2.5 | 8.3 | 99 | 11 | 8.8 | 40 | 1.8 | 1.4 | 5.8 |
| 21 | 0.10 | 3.4 | 4.9 | 2.4 | 12 | 52 | 8.4 | 20 | 21 | 1.6 | 1.3 | 3.4 |
| 22 | 0.04 | 3.1 | 3.7 | 2.2 | 190 | 16 | 7.2 | 20 | 10 | 1.7 | 1.3 | 2.8 |
| 23 | 0.06 | 2.7 | 3.2 | 2.2 | 88 | 10 | 6.0 | 12 | 6.4 | 1.8 | 1.3 | 80 |
| 24 | 0.06 | 2.6 | 3.0 | 2.1 | 29 | 8.0 | 5.3 | 11 | 4.6 | 1.7 | 1.1 | 11 |
| 25 | 0.03 | 2.5 | 21 | 2.1 | 19 | 6.9 | 5.3 | 9.8 | 3.8 | 1.5 | 1.0 | 5.1 |
| 26 | 0.48 | 2.4 | 13 | 2.2 | 12 | 6.8 | 9.7 | 60 | 3.4 | 1.4 | 1.1 | 3.7 |
| 27 | 0.26 | 2.4 | 6.9 | 2.2 | 9.4 | 9.4 | 8.1 | 19 | 7.8 | 1.3 | 1.2 | 3.1 |
| 28 | 0.42 | 2.4 | 5.0 | 2.0 | 8.4 | 6.8 | 5.7 | 16 | 6.2 | 1.9 | 1.6 | 3.4 |
| 29 | 1.4 | 2.4 | 4.3 | 2.4 | --- | 7.6 | 5.0 | 12 | 3.8 | 3.4 | 1.6 | 2.8 |
| 30 | 6.1 | 2.4 | 3.7 | 2.5 | --- | 18 | 4.5 | 9.3 | 3.2 | 2.1 | 2.3 | 2.3 |
| 31 | 5.9 | --- | 3.5 | 2.7 | --- | 18 | --- | 6.9 | --- | 1.8 | 3.1 | --- |
| TOTAL | 17.96 | 208.2 | 205.7 | 193.1 | 469.0 | 510.8 | 292.8 | 480.4 | 350.0 | 141.0 | 61.3 | 213.3 |
| MEAN | 0.58 | 6.94 | 6.64 | 6.23 | 16.8 | 16.5 | 9.76 | 15.5 | 11.7 | 4.55 | 1.98 | 7.11 |
| MAX | 6.1 | 53 | 32 | 48 | 190 | 99 | 27 | 68 | 40 | 45 | 5.2 | 80 |
| MIN | 0.00 | 2.3 | 2.1 | 2.0 | 3.5 | 5.1 | 4.5 | 3.6 | 3.2 | 1.3 | 1.0 | 1.1 |
| CFSM | 0.10 | 1.20 | 1.15 | 1.08 | 2.89 | 2.85 | 1.69 | 2.68 | 2.01 | 0.79 | 0.34 | 1.23 |
| IN. | 0.12 | 1.34 | 1.32 | 1.24 | 3.01 | 3.28 | 1.88 | 3.09 | 2.25 | 0.91 | 0.39 | 1.37 |

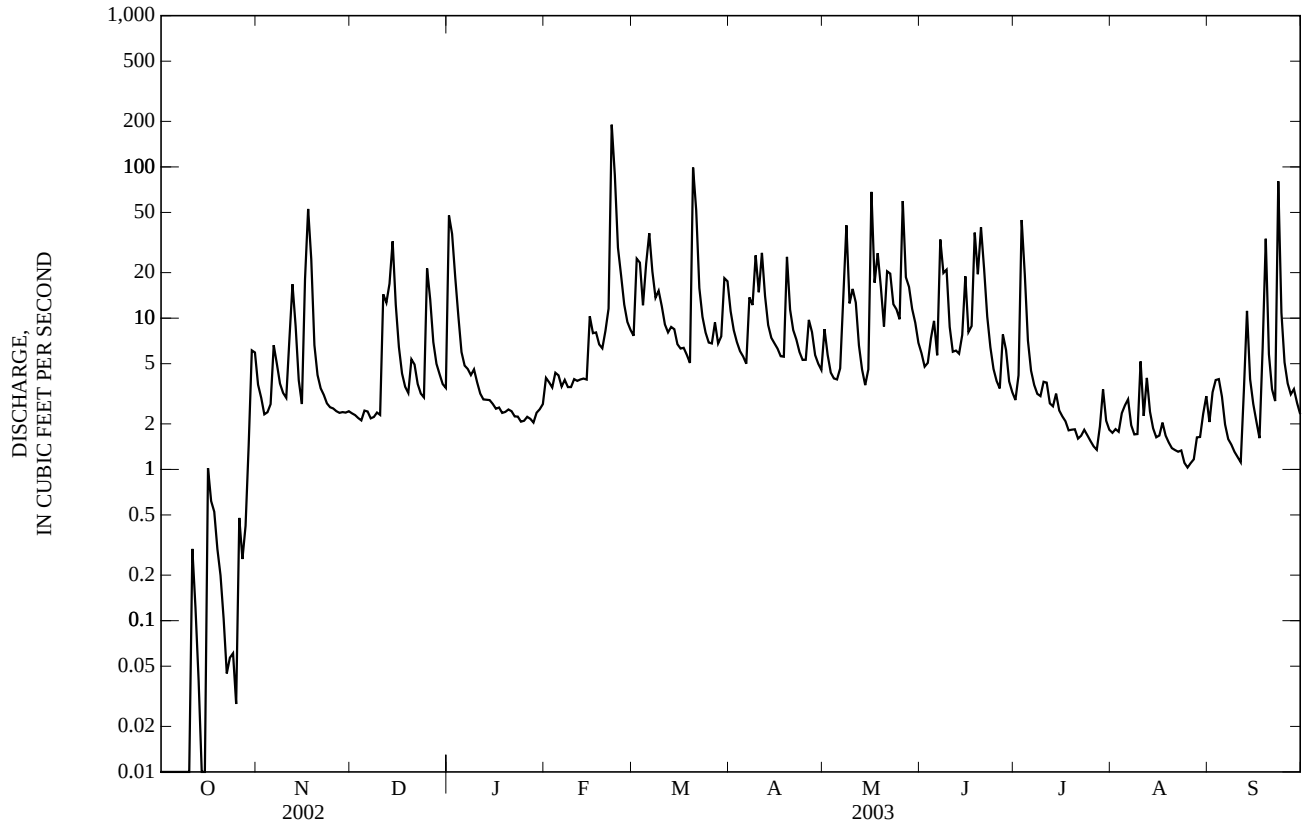
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 1.20 | 3.96 | 4.58 | 5.52 | 6.95 | 10.3 | 8.66 | 5.14 | 4.39 | 2.37 | 2.59 | 1.79 |
| MAX | 3.25 | 11.9 | 10.9 | 11.4 | 16.7 | 17.0 | 19.0 | 15.5 | 12.5 | 5.69 | 16.2 | 7.11 |
| (WY) | (1957) | (1953) | (1952) | (1953) | (2003) | (1953) | (1952) | (2003) | (1951) | (2001) | (1955) | (2003) |
| MIN | 0.30 | 0.51 | 1.22 | 1.05 | 1.51 | 4.82 | 3.69 | 1.17 | 0.58 | 0.19 | 0.033 | 0.036 |
| (WY) | (1955) | (1955) | (2002) | (1955) | (2002) | (2002) | (1955) | (2002) | (1954) | (1955) | (2002) | (1954) |

01659000 NORTH BRANCH CHOPAWAMSIC CREEK NEAR INDEPENDENT HILL, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1951 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 902.65 | | 3,143.56 | | | |
| ANNUAL MEAN | 2.47 | | 8.61 | | 4.65 | |
| HIGHEST ANNUAL MEAN | | | | | 8.61 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 1.47 | 2002 |
| HIGHEST DAILY MEAN | 53 | Nov 17 | 190 | Feb 22 | 190 | Feb 22, 2003 |
| LOWEST DAILY MEAN | 0.00 | aAug 14 | 0.00 | bOct 1 | 0.00 | (c) |
| ANNUAL SEVEN-DAY MINIMUM | 0.00 | Aug 14 | 0.00 | Oct 1 | 0.00 | (c) |
| MAXIMUM PEAK FLOW | | | 415 | Feb 22 | 415 | Feb 22, 2003 |
| MAXIMUM PEAK STAGE | | | 7.90 | Feb 22 | d8.04 | Nov 21, 1952 |
| INSTANTANEOUS LOW FLOW | | | 0.00 | fOct 1 | 0.00 | (g) |
| ANNUAL RUNOFF (CFSM) | 0.43 | | 1.49 | | 0.80 | |
| ANNUAL RUNOFF (INCHES) | 5.80 | | 20.20 | | 10.91 | |
| 10 PERCENT EXCEEDS | 6.2 | | 19 | | 9.0 | |
| 50 PERCENT EXCEEDS | 1.1 | | 4.0 | | 1.9 | |
| 90 PERCENT EXCEEDS | 0.01 | | 1.3 | | 0.22 | |

a Many days in August to October 2002.
b Also Oct. 2-10, 14, 15, 2002.
c Many days in October 1954 and August to October 2002.
d At datum then in use.
f Also no flow part or all of each day Oct. 2-10, 14, 15, 2002.
g No flow part or all of many days in October 1954, September 2000, and June to October 2002.



01659000 NORTH BRANCH CHOPAWAMSIC CREEK NEAR INDEPENDENT HILL, VA—Continued

SUSPENDED-SEDIMENT
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Day | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) | Mean concentration (mg/l) | Load (tons/day) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OCTOBER | | NOVEMBER | | DECEMBER | | JANUARY | | FEBRUARY | | MARCH | |
| 1 | 0.0 | 0.00 | 12 | 0.12 | 4 | 0.03 | 39 | 9.3 | 2 | 0.03 | 22 | 0.45 |
| 2 | 0.0 | 0.00 | 11 | 0.09 | 6 | 0.04 | 41 | 5.3 | 3 | 0.03 | 38 | 3.2 |
| 3 | 0.0 | 0.00 | 11 | 0.07 | 8 | 0.05 | 13 | 0.64 | 4 | 0.04 | 24 | 1.6 |
| 4 | 0.0 | 0.00 | 10 | 0.06 | 8 | 0.04 | 9 | 0.26 | 8 | 0.09 | 18 | 0.60 |
| 5 | 0.0 | 0.00 | 7 | 0.05 | 7 | 0.05 | 8 | 0.14 | 6 | 0.07 | 37 | 2.8 |
| 6 | 0.0 | 0.00 | 9 | 0.16 | 7 | 0.04 | 8 | 0.11 | 6 | 0.06 | 22 | 2.2 |
| 7 | 0.0 | 0.00 | 7 | 0.09 | 7 | 0.04 | 8 | 0.10 | 6 | 0.06 | 14 | 0.79 |
| 8 | 0.0 | 0.00 | 6 | 0.06 | 6 | 0.04 | 7 | 0.08 | 6 | 0.05 | 8 | 0.30 |
| 9 | 0.0 | 0.00 | 4 | 0.04 | 6 | 0.04 | 6 | 0.08 | 6 | 0.05 | 10 | 0.40 |
| 10 | 0.0 | 0.00 | 4 | 0.03 | 5 | 0.03 | 3 | 0.03 | 5 | 0.06 | 8 | 0.26 |
| 11 | 10 | 0.01 | 7 | 0.17 | 19 | 1.3 | 2 | 0.02 | 5 | 0.06 | 4 | 0.10 |
| 12 | 11 | 0.00 | 40 | 2.6 | 15 | 0.56 | 2 | 0.02 | 5 | 0.06 | 4 | 0.09 |
| 13 | 5 | 0.00 | 18 | 0.50 | 18 | 1.2 | 2 | 0.02 | 5 | 0.06 | 4 | 0.09 |
| 14 | 0.0 | 0.00 | 14 | 0.14 | 22 | 2.2 | 2 | 0.02 | 5 | 0.05 | 2 | 0.06 |
| 15 | 0.0 | 0.00 | 12 | 0.09 | 7 | 0.26 | 2 | 0.01 | 23 | 0.76 | 4 | 0.07 |
| 16 | 5 | 0.02 | 36 | 6.0 | 4 | 0.07 | 2 | 0.01 | 19 | 0.43 | 4 | 0.07 |
| 17 | 7 | 0.01 | 82 | 18 | 5 | 0.06 | 2 | 0.01 | 13 | 0.28 | 4 | 0.08 |
| 18 | 5 | 0.00 | 32 | 2.7 | 5 | 0.05 | 2 | 0.01 | 10 | 0.18 | 7 | 0.11 |
| 19 | 6 | 0.00 | 13 | 0.24 | 5 | 0.04 | 2 | 0.01 | 7 | 0.12 | 7 | 0.10 |
| 20 | 7 | 0.00 | 10 | 0.12 | 7 | 0.11 | 2 | 0.01 | 8 | 0.19 | 113 | 60 |
| 21 | 5 | 0.00 | 6 | 0.06 | 19 | 0.25 | 2 | 0.01 | 40 | 1.3 | 40 | 9.0 |
| 22 | 6 | 0.00 | 7 | 0.06 | 9 | 0.09 | 2 | 0.01 | 193 | 131 | 8 | 0.35 |
| 23 | 5 | 0.00 | 9 | 0.07 | 4 | 0.03 | 2 | 0.01 | 55 | 14 | 7 | 0.21 |
| 24 | 6 | 0.00 | 8 | 0.05 | 1 | 0.01 | 2 | 0.01 | 37 | 2.9 | 6 | 0.13 |
| 25 | 5 | 0.00 | 5 | 0.04 | 13 | 1.2 | 2 | 0.01 | 27 | 1.4 | 5 | 0.09 |
| 26 | 5 | 0.00 | 6 | 0.04 | 8 | 0.36 | 2 | 0.01 | 27 | 0.90 | 5 | 0.09 |
| 27 | 6 | 0.00 | 9 | 0.06 | 5 | 0.10 | 2 | 0.01 | 26 | 0.67 | 5 | 0.14 |
| 28 | 5 | 0.00 | 8 | 0.05 | 6 | 0.08 | 2 | 0.01 | 18 | 0.41 | 7 | 0.12 |
| 29 | 7 | 0.03 | 6 | 0.04 | 6 | 0.07 | 2 | 0.01 | --- | --- | 7 | 0.15 |
| 30 | 12 | 0.19 | 4 | 0.03 | 7 | 0.07 | 2 | 0.01 | --- | --- | 17 | 1.1 |
| 31 | 13 | 0.21 | --- | --- | 7 | 0.06 | 2 | 0.01 | --- | --- | 12 | 0.60 |
| TOTAL | --- | 0.47 | --- | 31.83 | --- | 8.57 | --- | 16.29 | --- | 155.31 | --- | 85.35 |

01659000 NORTH BRANCH CHOPAWAMSIC CREEK NEAR INDEPENDENT HILL, VA—Continued

SUSPENDED-SEDIMENT—CONTINUED
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Day | Mean concen-tration (mg/l) | Load (tons/ day) | Mean concen-tration (mg/l) | Load (tons/ day) | Mean concen-tration (mg/l) | Load (tons/ day) | Mean concen-tration (mg/l) | Load (tons/ day) | Mean concen-tration (mg/l) | Load (tons/ day) | Mean concen-tration (mg/l) | Load (tons/ day) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APRIL | | MAY | | JUNE | | JULY | | AUGUST | | SEPTEMBER | |
| 1 | 6 | 0.18 | 10 | 0.25 | 9 | 0.14 | 12 | 0.09 | 8 | 0.04 | 8 | 0.04 |
| 2 | 3 | 0.08 | 6 | 0.09 | 8 | 0.10 | 9 | 0.11 | 7 | 0.03 | 7 | 0.06 |
| 3 | 4 | 0.07 | 5 | 0.06 | 7 | 0.09 | 53 | 9.2 | 9 | 0.04 | 8 | 0.08 |
| 4 | 4 | 0.07 | 5 | 0.05 | 9 | 0.18 | 19 | 1.1 | 10 | 0.06 | 8 | 0.09 |
| 5 | 5 | 0.08 | 5 | 0.05 | 9 | 0.24 | 14 | 0.27 | 8 | 0.06 | 8 | 0.06 |
| 6 | 4 | 0.05 | 4 | 0.05 | 12 | 0.18 | 14 | 0.17 | 7 | 0.05 | 5 | 0.03 |
| 7 | 19 | 1.1 | 34 | 6.0 | 44 | 7.0 | 10 | 0.09 | 8 | 0.04 | 6 | 0.02 |
| 8 | 9 | 0.31 | 76 | 16 | 16 | 0.97 | 13 | 0.11 | 8 | 0.04 | 8 | 0.03 |
| 9 | 15 | 1.3 | 13 | 0.44 | 14 | 0.89 | 12 | 0.10 | 7 | 0.04 | 6 | 0.02 |
| 10 | 8 | 0.32 | 11 | 0.46 | 12 | 0.29 | 9 | 0.09 | 6 | 0.09 | 6 | 0.02 |
| 11 | 8 | 0.69 | 5 | 0.19 | 12 | 0.19 | 9 | 0.10 | 8 | 0.05 | 6 | 0.02 |
| 12 | 5 | 0.18 | 4 | 0.07 | 10 | 0.17 | 10 | 0.08 | 9 | 0.10 | 7 | 0.08 |
| 13 | 2 | 0.06 | 6 | 0.08 | 10 | 0.16 | 8 | 0.06 | 9 | 0.06 | 9 | 0.28 |
| 14 | 2 | 0.04 | 9 | 0.09 | 16 | 0.54 | 9 | 0.07 | 8 | 0.04 | 7 | 0.08 |
| 15 | 3 | 0.06 | 14 | 0.42 | 24 | 1.6 | 9 | 0.06 | 9 | 0.04 | 7 | 0.05 |
| 16 | 4 | 0.06 | 67 | 18 | 12 | 0.27 | 10 | 0.06 | 9 | 0.04 | 7 | 0.04 |
| 17 | 4 | 0.05 | 10 | 0.48 | 12 | 0.34 | 13 | 0.07 | 10 | 0.05 | 6 | 0.03 |
| 18 | 3 | 0.05 | 15 | 1.4 | 32 | 4.3 | 12 | 0.06 | 8 | 0.04 | 26 | 2.9 |
| 19 | 9 | 0.79 | 10 | 0.45 | 13 | 0.70 | 7 | 0.04 | 6 | 0.03 | 97 | 15 |
| 20 | 5 | 0.15 | 7 | 0.17 | 31 | 5.8 | 9 | 0.04 | 7 | 0.03 | 15 | 0.24 |
| 21 | 5 | 0.11 | 17 | 1.5 | 11 | 0.65 | 9 | 0.04 | 7 | 0.03 | 11 | 0.10 |
| 22 | 5 | 0.09 | 11 | 0.60 | 11 | 0.30 | 9 | 0.04 | 9 | 0.03 | 8 | 0.06 |
| 23 | 4 | 0.07 | 11 | 0.35 | 10 | 0.16 | 10 | 0.05 | 8 | 0.03 | 91 | 34 |
| 24 | 4 | 0.06 | 10 | 0.30 | 10 | 0.12 | 10 | 0.04 | 7 | 0.02 | 18 | 0.55 |
| 25 | 4 | 0.06 | 7 | 0.19 | 7 | 0.07 | 9 | 0.04 | 6 | 0.02 | 11 | 0.15 |
| 26 | 9 | 0.25 | 46 | 10 | 8 | 0.07 | 11 | 0.04 | 8 | 0.02 | 10 | 0.10 |
| 27 | 7 | 0.16 | 14 | 0.72 | 26 | 1.1 | 10 | 0.04 | 6 | 0.02 | 12 | 0.10 |
| 28 | 6 | 0.09 | 10 | 0.43 | 13 | 0.23 | 12 | 0.06 | 7 | 0.03 | 11 | 0.10 |
| 29 | 5 | 0.07 | 10 | 0.32 | 11 | 0.11 | 9 | 0.08 | 8 | 0.03 | 9 | 0.07 |
| 30 | 4 | 0.05 | 13 | 0.32 | 13 | 0.12 | 9 | 0.05 | 8 | 0.05 | 7 | 0.04 |
| 31 | --- | --- | 9 | 0.16 | --- | --- | 7 | 0.03 | 7 | 0.06 | --- | --- |
| TOTAL | --- | 6.70 | --- | 59.69 | --- | 27.08 | --- | 12.48 | --- | 1.31 | --- | 54.44 |
| YEAR | 459.52 | | | | | | | | | | | |

01659000 NORTH BRANCH CHOPAWAMSIC CREEK NEAR INDEPENDENT HILL, VA—Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--January 2000 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Time | Sample type | Gage height, feet (00065) | Instantaneous discharge, cfs (00061) | Barometric pressure, mm Hg (00025) | Dissolved oxygen, mg/L (00300) | Dissolved oxygen, percent of saturation (00301) | pH, water, unfltrd field, std units (00400) | Specif. conductance, wat unf uS/cm 25 degC (00095) | Temperature, air, deg C (00020) | Temperature, water, deg C (00010) | Ammonia + org-N, water, fltrd, mg/L as N (00623) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | |
| 28... | 0840 | Environmental | 3.11 | 0.22 | 760 | 6.0 | 87 | 6.5 | 56 | 13.5 | 12.4 | 0.23 |
| NOV | | | | | | | | | | | | |
| 13... | 0915 | Environmental | 3.61 | 8.8 | 755 | 8.5 | 77 | 6.3 | 57 | 9.5 | 11.2 | 0.42 |
| DEC | | | | | | | | | | | | |
| 16... | 1300 | Environmental | 3.48 | 6.2 | 751 | 10.0 | 100 | 6.7 | 47 | 4.5 | 5.7 | 0.18 |
| JAN | | | | | | | | | | | | |
| 14... | 0900 | Environmental | 3.34 | 2.8 | 760 | 13.7 | 96 | 6.4 | 48 | -1.0 | 1.0 | 0.12 |
| FEB | | | | | | | | | | | | |
| 24... | 0815 | Environmental | 4.11 | 28 | 760 | 11.7 | 85 | 7.6 | 37 | 1.0 | 0.9 | 0.23 |
| MAR | | | | | | | | | | | | |
| 12... | 0830 | Environmental | 3.45 | 8.1 | 758 | 10.3 | 77 | 7.1 | 43 | 3.0 | 3.1 | E.09 |
| 20... | 1228 | Blank | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.10 |
| 20... | 1230 | Environmental | 4.36 | 39 | 754 | 9.6 | 82 | 6.9 | 38 | 9.5 | 7.6 | 0.20 |
| 20... | 1231 | Replicate | 4.36 | 39 | -- | -- | -- | -- | -- | -- | -- | 0.18 |
| APR | | | | | | | | | | | | |
| 16... | 0830 | Environmental | 3.36 | 6.3 | 755 | 10.5 | 100 | 6.4 | 39 | 23.0 | 14.3 | 0.11 |
| MAY | | | | | | | | | | | | |
| 14... | 0900 | Environmental | 3.24 | 3.6 | 755 | 9.2 | 87 | 6.4 | 43 | 14.5 | 12.9 | 0.20 |
| JUN | | | | | | | | | | | | |
| 25... | 0830 | Environmental | 3.22 | 3.9 | 759 | 7.3 | 81 | 7.1 | 41 | 17.5 | 19.2 | 0.19 |
| JUL | | | | | | | | | | | | |
| 22... | 0830 | Environmental | 3.06 | 1.8 | 753 | 8.5 | 99 | 6.4 | 45 | 17.5 | 22.8 | 0.14 |
| AUG | | | | | | | | | | | | |
| 12... | 0805 | Environmental | 3.24 | 4.2 | 759 | 9.0 | 101 | 6.7 | 44 | 26.5 | 21.1 | 0.21 |
| SEP | | | | | | | | | | | | |
| 10... | 0815 | Environmental | 3.00 | 1.2 | 760 | 5.6 | 58 | 6.8 | 51 | 16.5 | 16.9 | 0.14 |
| 23... | 0840 | Environmental | 6.35 | 198 | 753 | 6.6 | 72 | 7.3 | 33 | 20.5 | 19.7 | 0.47 |
| 23... | 0845 | Replicate | 6.35 | 198 | -- | -- | -- | -- | -- | -- | -- | 0.44 |
| 23... | 0850 | Blank | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.10 |

01659000 NORTH BRANCH CHOPAWAMSIC CREEK NEAR INDEPENDENT HILL, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Ammonia + org-N, water, unfltrd mg/L as N (00625) | Ammonia water, fltrd, mg/L as N (00608) | Nitrite + nitrate water fltrd, mg/L as N (00631) | Nitrite water, fltrd, mg/L as N (00613) | Ortho-phos-phate, water, fltrd, mg/L as P (00671) | Phos-phorus, water, fltrd, mg/L (00666) | Phos-phorus, water, unfltrd mg/L (00665) | Sus-pended sedi-ment concen-tration mg/L (80154) |
|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | |
| 28... | 0.20 | <0.04 | <0.06 | <0.008 | <0.02 | 0.010 | 0.026 | 4 |
| NOV | | | | | | | | |
| 13... | 0.49 | <0.04 | <0.06 | <0.008 | <0.02 | 0.014 | 0.041 | 11 |
| DEC | | | | | | | | |
| 16... | 0.24 | <0.04 | <0.06 | <0.008 | <0.02 | 0.006 | 0.017 | 4 |
| JAN | | | | | | | | |
| 14... | 0.15 | <0.04 | <0.06 | <0.008 | <0.02 | 0.006 | 0.012 | 2 |
| FEB | | | | | | | | |
| 24... | 0.33 | E.02 | E.03 | <0.008 | <0.02 | 0.007 | 0.025 | 34 |
| MAR | | | | | | | | |
| 12... | 0.11 | <0.04 | <0.06 | <0.008 | <0.02 | 0.006 | 0.013 | 2 |
| 20... | E.06 | <0.04 | <0.06 | <0.008 | <0.02 | <0.004 | <0.004 | -- |
| 20... | 0.48 | <0.04 | <0.06 | <0.008 | <0.02 | 0.008 | 0.081 | 161 |
| 20... | 0.43 | <0.04 | <0.06 | <0.008 | <0.02 | 0.008 | 0.080 | -- |
| APR | | | | | | | | |
| 16... | 0.17 | <0.04 | <0.06 | <0.008 | <0.02 | 0.007 | 0.016 | 3 |
| MAY | | | | | | | | |
| 14... | 0.30 | <0.04 | <0.06 | <0.008 | <0.02 | 0.009 | 0.023 | 8 |
| JUN | | | | | | | | |
| 25... | 0.36 | <0.04 | <0.06 | <0.008 | <0.02 | 0.011 | 0.025 | 6 |
| JUL | | | | | | | | |
| 22... | 0.30 | <0.04 | <0.06 | <0.008 | <0.02 | 0.006 | 0.023 | 5 |
| AUG | | | | | | | | |
| 12... | 0.31 | <0.04 | <0.06 | <0.008 | <0.02 | 0.011 | 0.038 | 11 |
| SEP | | | | | | | | |
| 10... | 0.20 | <0.04 | <0.06 | <0.008 | <0.02 | 0.010 | 0.024 | 5 |
| 23... | 1.1 | <0.04 | <0.06 | <0.008 | <0.02 | 0.016 | 0.153 | 273 |
| 23... | 1.0 | <0.04 | <0.06 | <0.008 | <0.02 | 0.016 | 0.153 | -- |
| 23... | <0.10 | <0.04 | <0.06 | <0.008 | <0.02 | <0.004 | 0.007 | -- |

Remark codes used in this table:
< -- Less than
E -- Estimated value

## 01659500 MIDDLE BRANCH CHOPAWAMSIC CREEK NEAR GARRISONVILLE, VA

LOCATION.--Lat. 38°33'26", long 77°25'31", NAD83, Stafford County, Hydrologic Unit 02070011, on left bank 300 feet upstream from culvert on Highway MCB-1, 0.4 mi upstream from confluence with North Branch Chopawamsic Creek, and 5.8 mi north of Garrisonville.

DRAINAGE AREA.--4.51 $mi^2$.

PERIOD OF RECORD.--October 1951 to September 1956, September 1989 to September 1992 (annual maximum only), March 2000 to September 2000, October 2001 to current year.

GAGE.--Water stage recorder. Datum of gage is 192.97 ft NGVD of 1929.. Oct. 1951 to Sep. 1956, at same site and different datum.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Mar. 20 to May 13, July 30, 31, and Sept. 30, and for discharges greater than 100 $ft^3/s$, which are poor.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.00 | 1.2 | 0.59 | 22 | 2.6 | 4.7 | e7.3 | e6.2 | 4.9 | 2.7 | 1.5 | 1.7 |
| 2 | 0.00 | 0.95 | 0.59 | 27 | 2.2 | 13 | e5.5 | e3.9 | 4.2 | 3.5 | 1.5 | 2.5 |
| 3 | 0.00 | 0.83 | 0.59 | 15 | 2.0 | 14 | e4.3 | e2.6 | 4.4 | 45 | 1.5 | 2.6 |
| 4 | 0.00 | 0.72 | 0.59 | 9.2 | 2.4 | 8.0 | e3.9 | e2.3 | 5.8 | 22 | 2.1 | 2.5 |
| 5 | 0.00 | 0.91 | 0.71 | 4.4 | 2.2 | 12 | e3.5 | e2.2 | 7.0 | 7.3 | 2.3 | 2.4 |
| 6 | 0.00 | 1.7 | 0.75 | 3.8 | 1.9 | 20 | e3.2 | e2.7 | 5.1 | 5.1 | 3.6 | 1.8 |
| 7 | 0.00 | 3.0 | 0.75 | 3.5 | 2.2 | 12 | e9.5 | e13 | 13 | 3.9 | 1.9 | 1.5 |
| 8 | 0.00 | 2.5 | 0.77 | 3.1 | 2.0 | 8.7 | e8.9 | e28 | 17 | 3.4 | 1.9 | 1.4 |
| 9 | 0.00 | 2.0 | 0.81 | 2.9 | 1.8 | 9.5 | e17 | e11 | 12 | 3.2 | 1.8 | 1.4 |
| 10 | 0.00 | 1.7 | 0.78 | 2.6 | 2.0 | 8.2 | e12 | e13 | 8.6 | 3.4 | 4.9 | 1.3 |
| 11 | 0.01 | 3.1 | 6.9 | 2.3 | 2.0 | 6.3 | e18 | e9.2 | 5.2 | 3.8 | 2.5 | 1.2 |
| 12 | 0.01 | 5.8 | 7.8 | 2.1 | 2.0 | 5.5 | e11 | e6.1 | 4.7 | 3.0 | 3.0 | 2.1 |
| 13 | 0.01 | 4.1 | 8.7 | 2.0 | 2.0 | 5.8 | e8.6 | e4.6 | 4.6 | 2.9 | 2.2 | 6.9 |
| 14 | 0.01 | 1.8 | 21 | 2.0 | 1.9 | 5.2 | e6.6 | 4.5 | 7.5 | 3.2 | 1.9 | 3.2 |
| 15 | 0.01 | 1.1 | 8.8 | 1.9 | 4.5 | 6.2 | e5.2 | 4.3 | 18 | 2.6 | 1.7 | 2.3 |
| 16 | 0.21 | 6.4 | 4.4 | 1.8 | 4.5 | 4.6 | e4.6 | 34 | 7.5 | 2.4 | 1.7 | 2.0 |
| 17 | 0.13 | 29 | 2.7 | 1.8 | 4.1 | 4.0 | e4.2 | 15 | 7.0 | 2.1 | 1.9 | 1.6 |
| 18 | 0.07 | 14 | 2.2 | 1.7 | 3.2 | 3.8 | e4.0 | 16 | 23 | 2.0 | 1.6 | 2.8 |
| 19 | 0.04 | 4.4 | 1.9 | 1.6 | 2.9 | 3.3 | e18 | 13 | 12 | 2.1 | 1.5 | 20 |
| 20 | 0.04 | 2.1 | 3.7 | 1.7 | 3.7 | e82 | e8.8 | 7.7 | 14 | 2.0 | 1.4 | 5.2 |
| 21 | 0.05 | 1.4 | 3.7 | 1.7 | 5.2 | e53 | e6.0 | 10 | 13 | 1.8 | 1.4 | 3.5 |
| 22 | 0.05 | 1.2 | 2.7 | 1.7 | 177 | e14 | e4.8 | 13 | 7.5 | 1.6 | 1.4 | 3.2 |
| 23 | 0.04 | 0.95 | 2.5 | 1.6 | 60 | e7.3 | e3.9 | 9.0 | 5.3 | 1.7 | 1.6 | 39 |
| 24 | 0.04 | 0.87 | 2.3 | 1.5 | 18 | e5.5 | e3.2 | 8.5 | 4.3 | 1.6 | 1.3 | 7.9 |
| 25 | 0.06 | 0.79 | 12 | 1.6 | 12 | e4.4 | e3.1 | 7.1 | 3.6 | 1.4 | 1.3 | 4.0 |
| 26 | 0.15 | 0.71 | 8.6 | 1.7 | 7.9 | e4.5 | e6.0 | 29 | 3.2 | 1.4 | 1.2 | 2.8 |
| 27 | 0.09 | 0.64 | 4.1 | 1.6 | 6.2 | e6.1 | e5.0 | 16 | 4.4 | 1.4 | 1.3 | 2.3 |
| 28 | 0.15 | 0.60 | 2.9 | 1.5 | 5.4 | e4.5 | e3.8 | 12 | 5.2 | 1.6 | 2.1 | 2.5 |
| 29 | 0.29 | 0.59 | 2.3 | 1.8 | --- | e5.2 | e3.0 | 9.1 | 3.6 | 2.6 | 1.6 | 2.0 |
| 30 | 0.73 | 0.59 | 1.9 | 1.8 | --- | e12 | e2.8 | 7.7 | 2.9 | e1.7 | 2.1 | e1.6 |
| 31 | 1.4 | --- | 1.7 | 1.8 | --- | e11 | --- | 5.7 | --- | e1.6 | 2.0 | --- |
| TOTAL | 3.59 | 95.65 | 119.73 | 130.7 | 343.8 | 364.3 | 205.7 | 326.4 | 238.5 | 144.0 | 59.7 | 135.2 |
| MEAN | 0.12 | 3.19 | 3.86 | 4.22 | 12.3 | 11.8 | 6.86 | 10.5 | 7.95 | 4.65 | 1.93 | 4.51 |
| MAX | 1.4 | 29 | 21 | 27 | 177 | 82 | 18 | 34 | 23 | 45 | 4.9 | 39 |
| MIN | 0.00 | 0.59 | 0.59 | 1.5 | 1.8 | 3.3 | 2.8 | 2.2 | 2.9 | 1.4 | 1.2 | 1.2 |
| CFSM | 0.03 | 0.71 | 0.86 | 0.93 | 2.72 | 2.61 | 1.52 | 2.33 | 1.76 | 1.03 | 0.43 | 1.00 |
| IN. | 0.03 | 0.79 | 0.99 | 1.08 | 2.84 | 3.00 | 1.70 | 2.69 | 1.97 | 1.19 | 0.49 | 1.12 |

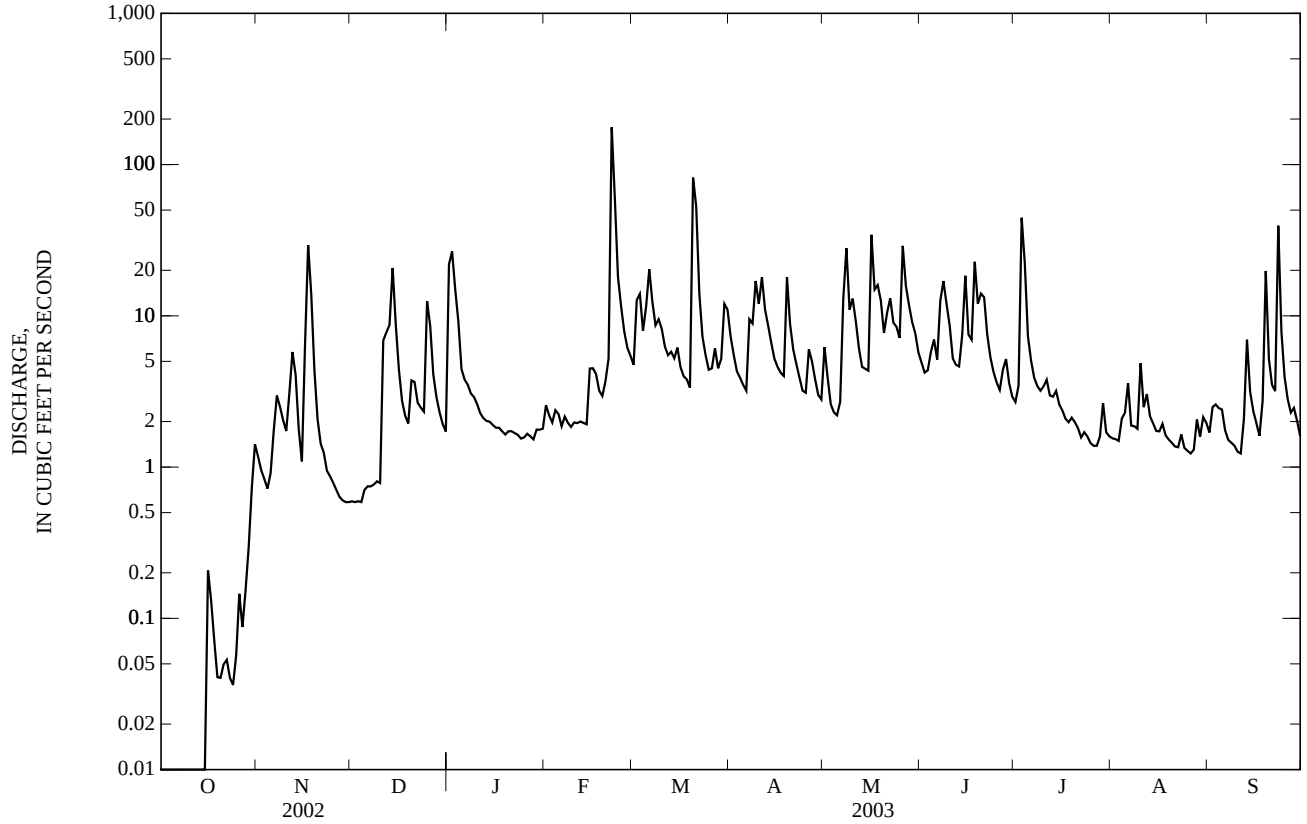
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1956, 2000, 2002 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 0.79 | 2.41 | 2.90 | 3.57 | 4.98 | 6.73 | 6.33 | 3.97 | 2.70 | 1.60 | 2.47 | 1.31 |
| MAX | 2.17 | 6.48 | 6.10 | 6.91 | 12.3 | 11.8 | 11.7 | 10.5 | 7.95 | 4.65 | 13.5 | 4.51 |
| (WY) | (1956) | (1953) | (1952) | (1952) | (2003) | (2003) | (1952) | (2003) | (2003) | (2003) | (1955) | (2003) |
| MIN | 0.093 | 0.27 | 0.75 | 0.92 | 0.81 | 1.42 | 1.83 | 1.00 | 0.71 | 0.25 | 0.026 | 0.012 |
| (WY) | (1955) | (1955) | (2002) | (1955) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) |

01659500 MIDDLE BRANCH CHOPAWAMSIC CREEK NEAR GARRISONVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1952 - 1956 2000 2002 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 431.23 | | 2,167.27 | | | |
| ANNUAL MEAN | 1.18 | | 5.94 | | 3.24 | |
| HIGHEST ANNUAL MEAN | | | | | 5.94 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 0.72 | 2002 |
| HIGHEST DAILY MEAN | 29 | Nov 17 | 177 | Feb 22 | 177 | Feb 22, 2003 |
| LOWEST DAILY MEAN | 0.00 | aAug 11 | 0.00 | bOct 1 | 0.00 | aAug 11, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.00 | Aug 11 | 0.00 | Oct 1 | 0.00 | Aug 11, 2002 |
| MAXIMUM PEAK FLOW | | | 512 | Feb 22 | 512 | Feb 22, 2003 |
| MAXIMUM PEAK STAGE | | | 4.51 | Feb 22 | 4.51 | Feb 22, 2003 |
| INSTANTANEOUS LOW FLOW | | | 0.00 | (c) | 0.00 | (d) |
| ANNUAL RUNOFF (CFSM) | 0.26 | | 1.32 | | 0.72 | |
| ANNUAL RUNOFF (INCHES) | 3.56 | | 17.88 | | 9.76 | |
| 10 PERCENT EXCEEDS | 2.3 | | 13 | | 6.6 | |
| 50 PERCENT EXCEEDS | 0.74 | | 2.9 | | 1.5 | |
| 90 PERCENT EXCEEDS | 0.00 | | 0.62 | | 0.21 | |

a Also many other days August to October 2002.
b Also Oct. 2-10, 2002.
c No flow part or all of each day Oct. 1-10, 2002.
d No flow part or all of many days August to October 2002.
e Estimated.



## 01660000 SOUTH BRANCH CHOPAWAMSIC CREEK NEAR GARRISONVILLE, VA

LOCATION.--Lat 38°32'22", long 77°25'30", NAD83, Stafford County, Hydrologic Unit 02070011, on left bank, 10 ft downstream from Highway MCB-1, 1.8 mi upstream from Chopawamsic Creek, and 4.3 mi north of Garrisonville.

DRAINAGE AREA.--2.56 $mi^2$.

PERIOD OF RECORD.--May 1951 to June 1957, September 1989 to September 1992 (annual maximum only), March 2000 to current year.

GAGE.--Water stage recorder. Datum of gage is 207.01 ft NGVD of 1929. May 1951 to September 1992, at site 200 ft downstream at different datum.

REMARKS.--Records poor.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.5 | 0.33 | 1.4 | 13 | 1.5 | 3.9 | 3.8 | 2.1 | 4.8 | 1.7 | e0.92 | 1.2 |
| 2 | 3.3 | 0.30 | 1.2 | 6.5 | 1.2 | 19 | 3.3 | 1.6 | 3.8 | 3.6 | e0.93 | 1.7 |
| 3 | 3.3 | 0.30 | 1.2 | 5.7 | 1.1 | 8.9 | 2.9 | 1.2 | 4.5 | 88 | e0.98 | 1.7 |
| 4 | 3.2 | 0.30 | 0.99 | 3.3 | 1.6 | 5.8 | 2.6 | 0.98 | 4.6 | 17 | e1.3 | 1.5 |
| 5 | 3.2 | 0.34 | 1.4 | 2.4 | 1.2 | 11 | 2.5 | 1.1 | 4.4 | 4.7 | e2.5 | 1.2 |
| 6 | 3.1 | 1.3 | 1.3 | 2.2 | 1.0 | 12 | 2.1 | 1.3 | 3.7 | 2.7 | e1.3 | 0.89 |
| 7 | 3.1 | 0.42 | 1.2 | 2.0 | 1.2 | 7.3 | 6.8 | 4.8 | 12 | 2.5 | e1.0 | 0.78 |
| 8 | 2.7 | 0.33 | 1.1 | 2.0 | 1.1 | 5.9 | 4.8 | 6.9 | 8.0 | 2.5 | e0.94 | 0.70 |
| 9 | 2.7 | 0.31 | 1.3 | 1.8 | 1.1 | 6.4 | 12 | 4.8 | 9.3 | 2.3 | e1.7 | 0.71 |
| 10 | 2.7 | 0.36 | 1.4 | 1.5 | 1.2 | 5.3 | 6.4 | 5.8 | 5.0 | 2.1 | e2.2 | 0.59 |
| 11 | 3.1 | 2.0 | 8.3 | 1.4 | 1.2 | 4.4 | 15 | 4.4 | 3.9 | 2.1 | e1.2 | 1.0 |
| 12 | 2.7 | 3.8 | 4.4 | 1.2 | 1.2 | 4.0 | 6.3 | 2.7 | 3.9 | 1.7 | e1.6 | 5.9 |
| 13 | 2.6 | 1.7 | 6.8 | 1.1 | 1.2 | 4.3 | 4.1 | 1.9 | 3.8 | 1.7 | e1.2 | 6.3 |
| 14 | 2.5 | 0.82 | 9.3 | 1.1 | 1.1 | 3.6 | 3.3 | 1.6 | 17 | 2.2 | e1.0 | 1.9 |
| 15 | 2.6 | 0.63 | 3.9 | 1.1 | 3.0 | 3.1 | 3.0 | 6.9 | 16 | 1.7 | 0.94 | 2.7 |
| 16 | 3.8 | 8.3 | 2.1 | 0.97 | 2.4 | 3.1 | 2.9 | 49 | 8.0 | 2.3 | 0.95 | 1.7 |
| 17 | 0.67 | 11 | 1.4 | 1.0 | 2.9 | 3.1 | 2.5 | 11 | 10 | 1.2 | 0.98 | 1.2 |
| 18 | 0.41 | 5.3 | 1.2 | 0.94 | 2.0 | 3.0 | 2.7 | 15 | 19 | 0.99 | 0.94 | 18 |
| 19 | 0.32 | 2.3 | 1.1 | 0.94 | 2.0 | 2.8 | 10 | 8.6 | 11 | 0.99 | 0.91 | 20 |
| 20 | 0.29 | 2.0 | 4.6 | 1.0 | 2.5 | 57 | 4.4 | 5.9 | 14 | 0.99 | 0.82 | 3.2 |
| 21 | 0.27 | 1.7 | 2.1 | 0.97 | 3.7 | 17 | 3.5 | 9.8 | 16 | 1.0 | 0.80 | 1.9 |
| 22 | 0.24 | 1.7 | 1.5 | 0.92 | 98 | 7.2 | 3.1 | 8.3 | 6.8 | e1.1 | 0.72 | 2.6 |
| 23 | 0.22 | 1.4 | 1.5 | 0.87 | 22 | 5.0 | 2.6 | 7.0 | 4.3 | e1.0 | 0.68 | 54 |
| 24 | 0.20 | 1.2 | 1.6 | 0.85 | 9.1 | 4.0 | 2.5 | 6.2 | 2.9 | e0.90 | 0.64 | 3.9 |
| 25 | 0.18 | 1.1 | 12 | 0.88 | 6.3 | 3.3 | 2.7 | 5.4 | 2.6 | e0.82 | 0.59 | 2.1 |
| 26 | 0.23 | 0.95 | 4.1 | 0.93 | 4.9 | 3.5 | 3.7 | 31 | 2.1 | e0.78 | 0.56 | 1.1 |
| 27 | 0.17 | 1.1 | 2.3 | 0.88 | 4.9 | 3.6 | 3.0 | 10 | 2.5 | e0.84 | 0.80 | 0.77 |
| 28 | 0.16 | 1.2 | 1.9 | 0.87 | 4.4 | 2.9 | 2.5 | 9.0 | 2.3 | e1.8 | 1.3 | 0.82 |
| 29 | 0.79 | 1.2 | 1.7 | 1.1 | --- | 3.0 | 2.2 | 7.2 | 1.9 | e1.3 | 0.93 | 0.60 |
| 30 | 1.4 | 1.3 | 1.5 | 0.98 | --- | 6.7 | 1.8 | 6.1 | 1.9 | e1.0 | 2.8 | 0.41 |
| 31 | 0.65 | --- | 1.4 | 1.1 | --- | 5.4 | --- | 5.4 | --- | e0.94 | 1.5 | --- |
| TOTAL | 54.30 | 54.99 | 87.19 | 61.50 | 185.0 | 235.5 | 129.0 | 242.98 | 210.0 | 154.45 | 35.63 | 141.07 |
| MEAN | 1.75 | 1.83 | 2.81 | 1.98 | 6.61 | 7.60 | 4.30 | 7.84 | 7.00 | 4.98 | 1.15 | 4.70 |
| MAX | 3.8 | 11 | 12 | 13 | 98 | 57 | 15 | 49 | 19 | 88 | 2.8 | 54 |
| MIN | 0.16 | 0.30 | 0.99 | 0.85 | 1.0 | 2.8 | 1.8 | 0.98 | 1.9 | 0.78 | 0.56 | 0.41 |
| CFSM | 0.68 | 0.72 | 1.10 | 0.77 | 2.58 | 2.97 | 1.68 | 3.06 | 2.73 | 1.95 | 0.45 | 1.84 |
| IN. | 0.79 | 0.80 | 1.27 | 0.89 | 2.69 | 3.42 | 1.87 | 3.53 | 3.05 | 2.24 | 0.52 | 2.05 |

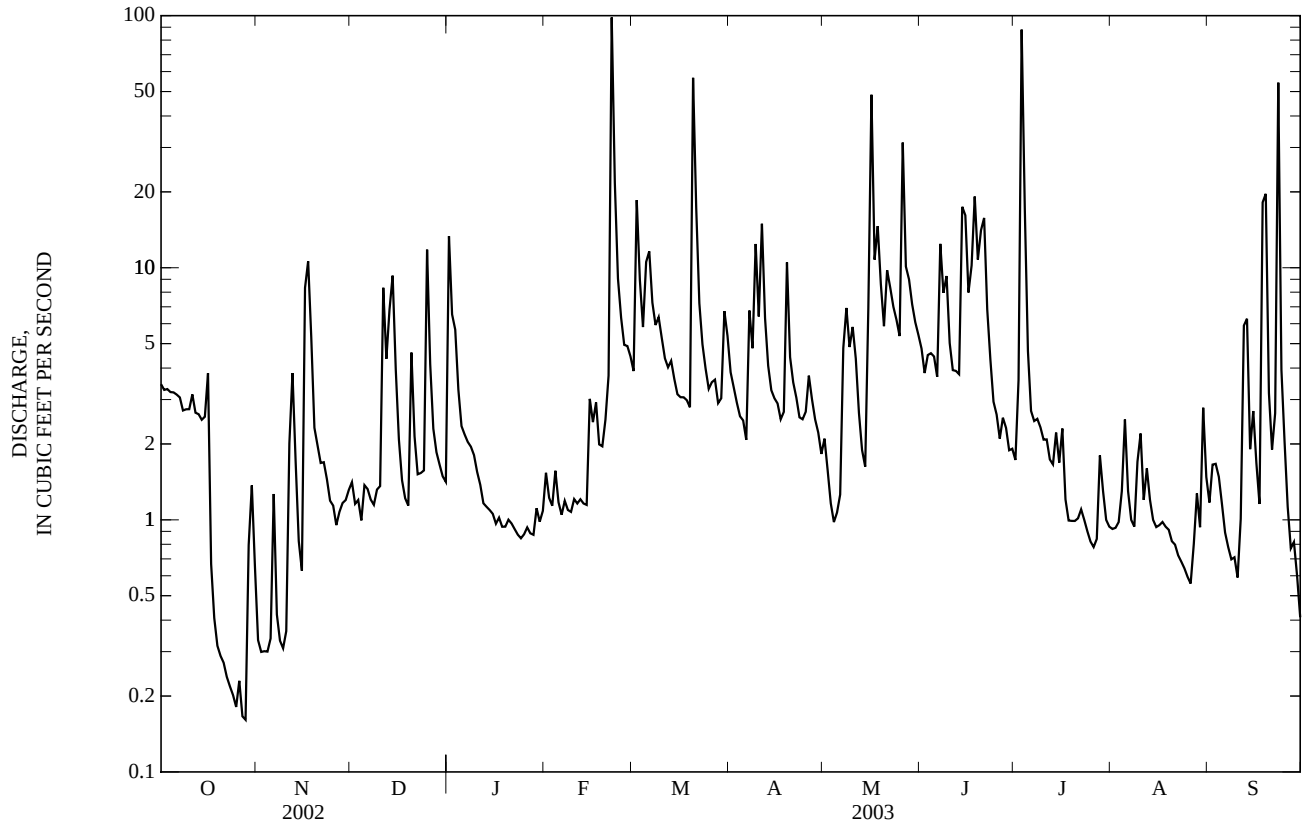
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 1957, 2000 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 1.45 | 2.01 | 1.85 | 2.36 | 2.94 | 4.85 | 3.65 | 2.34 | 2.02 | 1.68 | 1.63 | 1.88 |
| MAX | 4.01 | 5.42 | 3.71 | 4.34 | 6.61 | 9.37 | 7.48 | 7.84 | 7.00 | 4.98 | 6.58 | 5.85 |
| (WY) | (2002) | (1953) | (1952) | (1952) | (2003) | (1953) | (1952) | (2003) | (2003) | (2003) | (1955) | (2002) |
| MIN | 0.23 | 0.40 | 0.52 | 0.88 | 0.98 | 0.87 | 1.03 | 0.75 | 0.43 | 0.087 | 0.34 | 0.027 |
| (WY) | (1955) | (1955) | (2002) | (1955) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (1953) | (1954) |

01660000 SOUTH BRANCH CHOPAWAMSIC CREEK NEAR GARRISONVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1951 - 1957 2000 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 707.77 | | 1,591.61 | | | |
| ANNUAL MEAN | 1.94 | | 4.36 | | 2.40 | |
| HIGHEST ANNUAL MEAN | | | | | 4.36 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 1.29 | 1954 |
| HIGHEST DAILY MEAN | 12 | Dec 25 | 98 | Feb 22 | 98 | Feb 22, 2003 |
| LOWEST DAILY MEAN | 0.06 | aJul 22 | 0.16 | Oct 28 | 0.02 | bSep 1, 1954 |
| ANNUAL SEVEN-DAY MINIMUM | 0.07 | Jul 18 | 0.20 | Oct 22 | 0.02 | Sep 1, 1954 |
| MAXIMUM PEAK FLOW | | | 309 | Feb 22 | 438 | Jul 26, 2001 |
| MAXIMUM PEAK STAGE | | | 6.28 | Feb 22 | 7.07 | cMar 15, 1953 |
| INSTANTANEOUS LOW FLOW | | | 0.12 | Oct 28 | 0.00 | Jul 3, 1956 |
| ANNUAL RUNOFF (CFSM) | 0.76 | | 1.70 | | 0.94 | |
| ANNUAL RUNOFF (INCHES) | 10.28 | | 23.13 | | 12.74 | |
| 10 PERCENT EXCEEDS | 5.8 | | 8.9 | | 5.0 | |
| 50 PERCENT EXCEEDS | 0.82 | | 2.1 | | 1.1 | |
| 90 PERCENT EXCEEDS | 0.13 | | 0.79 | | 0.27 | |

a Also July 23, 24, 30, 2002.
b Many days in September and October 1954, and July 3, 1956.
c At site and datum then in use.
e Estimated.



## 01660400 AQUIA CREEK NEAR GARRISONVILLE, VA

LOCATION.--Lat 38°29'25", long 77°26'01", NAD83, Stafford County. Hydrologic Unit 02070011, on right bank at bridge on State Highway 641, 1.1 mi northwest of Garrisonville, and 3.0 mi upstream from Beaverdam Run.

DRAINAGE AREA.--34.9 $mi^2$.

PERIOD OF RECORD.--September 1971 to September 1997, November 1999 to current year.

GAGE.--Water-stage recorder. Datum of gage is 120 ft NGVD of 1929, from topographic map.

REMARKS.--Records good except those for periods of doubtful gage-height record, Mar. 11, 12, 24, 25, which are fair. Maximum discharge, 11,600 $ft^3/s$, from rating curve extended above 1,600 $ft^3/s$ 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 by the Virginia Department of Environmental Quality - Water Division.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 1 | 2130 | 625 | 3.78 | Jul 3 | 1830 | 785 | 4.20 |
| Feb 22 | 2330 | *1,690 | *6.09 | Aug 5 | 2245 | 907 | 4.50 |
| Mar 20 | 1730 | 1,180 | 5.10 | Aug 9 | 2400 | 654 | 3.86 |
| May 26 | 0745 | 639 | 3.82 | Sep 18 | 2345 | 1,030 | 4.79 |
| Jun 14 | 2130 | 950 | 4.60 | Sep 23 | 0830 | 1,060 | 4.84 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.45 | 11 | 7.5 | 209 | 21 | 50 | 74 | 31 | 44 | 20 | 9.9 | 17 |
| 2 | 0.38 | 6.2 | 6.5 | 235 | 18 | 266 | 55 | 31 | 36 | 37 | 10 | 88 |
| 3 | 0.33 | 4.7 | 6.3 | 110 | 15 | 179 | 45 | 25 | 34 | 364 | 12 | 76 |
| 4 | 0.28 | 3.4 | 6.0 | 66 | 21 | 79 | 41 | 23 | 45 | 140 | 22 | 40 |
| 5 | 0.22 | 3.7 | 7.7 | 39 | 21 | 135 | 39 | 23 | 47 | 53 | 113 | 29 |
| 6 | 0.17 | 29 | 8.3 | 33 | 15 | 205 | 38 | 26 | 40 | 38 | 82 | 17 |
| 7 | 0.27 | 12 | 8.2 | 30 | 17 | 114 | 90 | 27 | 142 | 30 | 25 | 14 |
| 8 | 0.25 | 7.5 | 7.9 | 26 | 18 | 69 | 86 | 57 | 124 | 27 | 16 | 12 |
| 9 | 0.19 | 5.8 | 8.8 | 25 | 19 | 69 | 173 | 40 | 110 | 24 | 29 | 10 |
| 10 | 0.21 | 5.1 | 8.4 | 21 | 16 | 56 | 107 | 56 | 59 | 23 | 103 | 8.8 |
| 11 | 7.0 | 26 | 109 | 18 | 16 | e44 | 204 | 59 | 45 | 37 | 21 | 8.4 |
| 12 | 4.2 | 82 | 80 | 16 | 16 | e40 | 95 | 38 | 38 | 24 | 14 | 34 |
| 13 | 1.5 | 63 | 85 | 16 | 16 | 38 | 59 | 26 | 36 | 19 | 11 | 130 |
| 14 | 0.80 | 23 | 173 | 15 | 16 | 37 | 49 | 22 | 210 | 23 | 10 | 41 |
| 15 | 0.46 | 14 | 79 | 14 | 48 | 31 | 45 | 27 | 303 | 20 | 9.1 | 27 |
| 16 | 27 | 100 | 39 | 15 | 36 | 30 | 42 | 201 | 75 | 17 | 15 | 19 |
| 17 | 12 | 285 | 25 | 13 | 39 | 31 | 37 | 71 | 77 | 15 | 16 | 15 |
| 18 | 3.5 | 137 | 23 | 15 | 39 | 29 | 37 | 144 | 229 | 13 | 12 | 126 |
| 19 | 1.5 | 40 | 17 | 14 | 31 | 26 | 109 | 93 | 97 | 12 | 9.8 | 493 |
| 20 | 1.4 | 26 | 53 | 13 | 40 | 531 | 62 | 52 | 135 | 12 | 8.7 | 72 |
| 21 | 1.4 | 20 | 37 | 13 | 62 | 394 | 49 | 84 | 109 | 11 | 7.9 | 40 |
| 22 | 0.96 | 15 | 24 | 13 | 908 | 134 | 44 | 116 | 61 | 10 | 7.3 | 29 |
| 23 | 0.67 | 12 | 19 | 13 | 628 | 73 | 39 | 75 | 44 | 10 | 6.6 | 532 |
| 24 | 0.54 | 10 | 17 | 12 | 188 | e55 | 34 | 73 | 33 | 9.9 | 6.0 | 100 |
| 25 | 0.56 | 10 | 208 | 13 | 130 | e46 | 33 | 80 | 29 | 9.1 | 5.2 | 47 |
| 26 | 7.6 | 9.0 | 95 | 16 | 77 | 43 | 39 | 372 | 25 | 8.2 | 4.7 | 32 |
| 27 | 2.8 | 8.3 | 40 | 14 | 59 | 57 | 44 | 122 | 33 | 8.3 | 6.2 | 27 |
| 28 | 2.9 | 7.9 | 29 | 13 | 52 | 43 | 32 | 108 | 56 | 10 | 17 | 27 |
| 29 | 15 | 7.6 | 24 | 17 | --- | 44 | 28 | 82 | 30 | 27 | 9.0 | 24 |
| 30 | 38 | 8.1 | 22 | 14 | --- | 153 | 28 | 62 | 23 | 15 | 63 | 19 |
| 31 | 23 | --- | 19 | 13 | --- | 136 | --- | 49 | --- | 9.3 | 44 | --- |
| TOTAL | 155.54 | 992.3 | 1,292.6 | 1,094 | 2,582 | 3,237 | 1,857 | 2,295 | 2,369 | 1,075.8 | 725.4 | 2,154.2 |
| MEAN | 5.02 | 33.1 | 41.7 | 35.3 | 92.2 | 104 | 61.9 | 74.0 | 79.0 | 34.7 | 23.4 | 71.8 |
| MAX | 38 | 285 | 208 | 235 | 908 | 531 | 204 | 372 | 303 | 364 | 113 | 532 |
| MIN | 0.17 | 3.4 | 6.0 | 12 | 15 | 26 | 28 | 22 | 23 | 8.2 | 4.7 | 8.4 |
| CFSM | 0.14 | 0.95 | 1.19 | 1.01 | 2.64 | 2.99 | 1.77 | 2.12 | 2.26 | 0.99 | 0.67 | 2.06 |
| IN. | 0.17 | 1.06 | 1.38 | 1.17 | 2.75 | 3.45 | 1.98 | 2.45 | 2.53 | 1.15 | 0.77 | 2.30 |

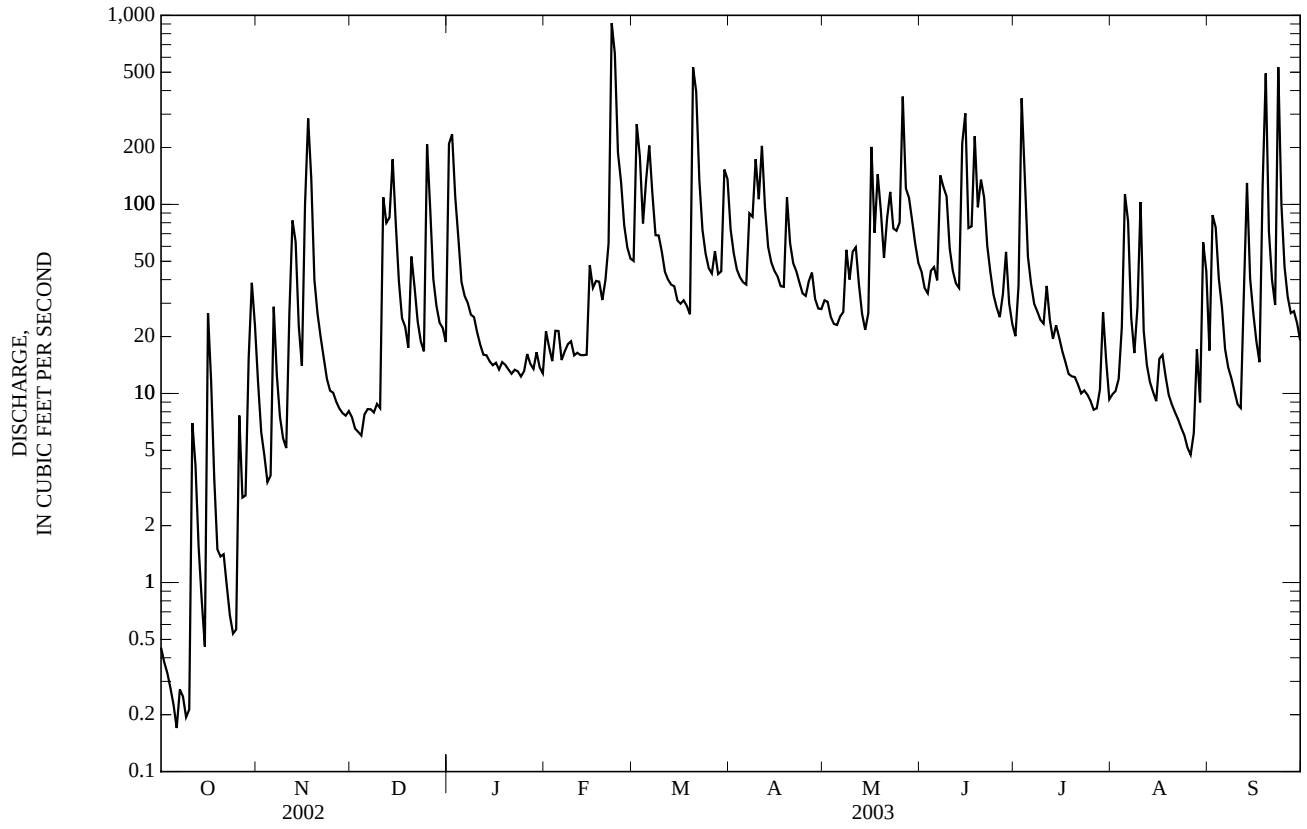
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1971 - 1997, 2000 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 21.9 | 30.5 | 41.2 | 49.2 | 51.9 | 61.1 | 53.2 | 39.0 | 26.5 | 16.4 | 12.1 | 19.5 |
| MAX | 138 | 91.3 | 105 | 118 | 124 | 175 | 141 | 144 | 234 | 103 | 65.8 | 174 |
| (WY) | (1980) | (1973) | (1975) | (1978) | (1979) | (1994) | (1973) | (1989) | (1972) | (1975) | (1984) | (1975) |
| MIN | 0.42 | 1.95 | 4.70 | 3.93 | 5.80 | 8.71 | 11.6 | 10.8 | 2.84 | 1.38 | 0.15 | 0.058 |
| (WY) | (1981) | (1992) | (2002) | (1981) | (2002) | (1981) | (1981) | (1986) | (1986) | (2002) | (1983) | (1980) |

01660400 AQUIA CREEK NEAR GARRISONVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1971 - 1997 2000 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 5,006.90 | | 19,829.84 | | | |
| ANNUAL MEAN | 13.7 | | 54.3 | | 35.4 | |
| HIGHEST ANNUAL MEAN | | | | | 58.6 | 1972 |
| LOWEST ANNUAL MEAN | | | | | 7.77 | 2002 |
| HIGHEST DAILY MEAN | 285 | Nov 17 | 908 | Feb 22 | 3,900 | Jun 22, 1972 |
| LOWEST DAILY MEAN | 0.01 | Aug 20 | 0.17 | Oct 6 | 0.00 | (a) |
| ANNUAL SEVEN-DAY MINIMUM | 0.03 | Aug 14 | 0.23 | Oct 4 | 0.01 | Sep 11, 1980 |
| MAXIMUM PEAK FLOW | | | 1,690 | Feb 22 | 11,600 | Jun 22, 1972 |
| MAXIMUM PEAK STAGE | | | 6.09 | Feb 22 | 16.32 | Jun 22, 1972 |
| INSTANTANEOUS LOW FLOW | | | 0.16 | Oct 6 | 0.00 | (b) |
| ANNUAL RUNOFF (CFSM) | 0.39 | | 1.56 | | 1.01 | |
| ANNUAL RUNOFF (INCHES) | 5.34 | | 21.14 | | 13.78 | |
| 10 PERCENT EXCEEDS | 29 | | 123 | | 70 | |
| 50 PERCENT EXCEEDS | 5.4 | | 27 | | 18 | |
| 90 PERCENT EXCEEDS | 0.32 | | 6.4 | | 1.4 | |

a No flow many days in September 1980, August 1983, August, September 1988, and September 1991.
b No flow part or all of many days in September 1980, August 1983, August, September 1988, and September 1991.
e Estimated.



## 01660500 BEAVERDAM RUN NEAR GARRISONVILLE, VA

LOCATION.--Lat 38°30'25", long 77°25'44", NAD83, Stafford County, Hydrologic unit 02070011, on right bank, 3.4 miles upstream from mouth and 2.2 miles north of Garrisonville.

DRAINAGE AREA.--12.7 $mi^2$.

PERIOD OF RECORD.--May 1951 to June 1957, March 1997 to current year.

GAGE.--Water stage recorder. Datum of gage is 150.43 ft NGVD of 1929. May 1951 to June 1957, at site 500 ft. upstream at same datum.

REMARKS.--Records good. 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 - 1957 (unregulated flow) are available in 1998 data book.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.24 | 1.3 | 1.7 | 31 | 5.9 | 33 | 38 | 17 | 29 | 11 | 2.5 | 2.9 |
| 2 | 0.16 | 1.2 | 1.7 | 59 | 5.8 | 53 | 32 | 17 | 21 | 14 | 2.4 | 4.5 |
| 3 | 0.28 | 1.3 | 1.7 | 54 | 6.6 | 57 | 27 | 15 | 20 | 61 | 3.3 | 5.3 |
| 4 | 0.22 | 1.3 | 1.9 | 45 | 8.9 | 46 | 23 | 13 | 21 | 66 | 4.7 | 5.5 |
| 5 | 0.16 | 2.0 | 2.8 | 34 | 9.0 | 46 | 20 | 12 | 22 | 46 | 12 | 6.4 |
| 6 | 0.11 | 4.6 | 2.2 | 28 | 7.8 | 64 | 18 | 12 | 21 | 32 | 9.1 | 4.8 |
| 7 | 0.04 | 1.8 | 2.0 | 23 | 12 | 61 | 25 | 13 | 32 | 23 | 4.3 | 3.8 |
| 8 | 0.34 | 1.8 | 2.2 | 19 | 11 | 49 | 32 | 26 | 48 | 18 | 3.9 | 3.4 |
| 9 | 0.14 | 1.9 | 2.4 | 17 | 9.4 | 43 | 48 | 27 | 50 | 14 | 5.0 | 2.9 |
| 10 | 0.17 | 1.8 | 2.4 | 15 | 9.0 | 36 | 50 | 32 | 41 | 12 | 21 | 2.9 |
| 11 | 1.8 | 5.2 | 10 | 13 | 9.0 | 30 | 69 | 33 | 33 | 12 | 7.5 | 2.7 |
| 12 | 0.18 | 7.5 | 4.6 | 11 | 8.9 | 26 | 60 | 28 | 28 | 10 | 6.3 | 6.8 |
| 13 | 0.08 | 3.7 | 5.8 | e9.2 | 7.7 | 24 | 45 | 22 | 24 | 9.0 | 5.0 | 15 |
| 14 | 0.06 | 1.7 | 9.5 | e8.0 | 7.0 | 22 | 35 | 18 | 31 | 9.8 | 4.5 | 11 |
| 15 | 0.09 | 1.5 | 4.0 | 7.1 | 13 | 19 | 29 | 17 | 49 | 8.0 | 3.9 | 9.5 |
| 16 | 4.1 | 9.3 | 2.5 | 6.1 | 26 | 18 | 24 | 62 | 41 | 7.1 | 3.8 | 8.1 |
| 17 | 0.59 | 12 | 2.0 | 6.2 | 57 | 18 | 20 | 55 | 36 | 6.7 | 3.7 | 6.1 |
| 18 | 0.06 | 6.5 | 1.6 | 5.5 | 30 | 17 | 18 | 58 | 58 | 5.2 | 3.1 | 15 |
| 19 | 0.09 | 1.8 | 1.7 | 5.2 | 18 | 15 | 37 | 56 | 54 | 4.8 | 2.9 | 52 |
| 20 | 0.08 | 1.4 | 5.2 | 4.6 | 16 | 71 | 35 | 42 | 56 | 4.1 | 2.6 | 38 |
| 21 | 0.16 | 1.2 | 2.7 | 4.5 | 18 | 127 | 30 | 43 | 58 | 3.7 | 2.5 | 26 |
| 22 | 0.11 | 1.1 | 1.7 | 4.5 | 127 | 91 | 27 | 53 | 46 | 3.2 | 2.4 | 21 |
| 23 | 0.16 | 1.2 | 1.5 | 5.2 | 202 | 63 | 24 | 47 | 35 | 3.8 | 2.5 | 92 |
| 24 | 0.14 | 1.3 | 1.7 | 7.0 | 136 | 46 | 20 | 42 | 27 | 3.1 | 2.4 | 73 |
| 25 | 0.23 | 1.5 | 15 | 3.2 | 95 | 34 | 18 | 37 | 21 | 2.9 | 2.4 | 47 |
| 26 | 1.5 | 1.5 | 21 | 3.1 | 67 | 29 | 20 | 76 | 18 | 2.7 | 2.4 | 31 |
| 27 | 0.42 | 1.4 | 18 | 3.2 | 51 | 28 | 21 | 69 | 20 | 2.6 | 2.8 | 21 |
| 28 | 1.1 | 1.5 | 16 | 3.0 | 42 | 24 | 19 | 59 | 20 | 3.4 | 3.6 | 17 |
| 29 | 3.1 | 1.6 | 14 | 2.7 | --- | 23 | 18 | 47 | 16 | 3.8 | 2.4 | 12 |
| 30 | 4.9 | 1.9 | 12 | 3.3 | --- | 35 | 16 | 40 | 14 | 2.3 | 5.7 | 7.9 |
| 31 | 2.3 | --- | 11 | 3.9 | --- | 44 | --- | 32 | --- | 2.2 | 4.4 | --- |
| TOTAL | 23.11 | 83.8 | 182.5 | 444.5 | 1,016.0 | 1,292 | 898 | 1,120 | 990 | 407.4 | 145.0 | 554.5 |
| MEAN | 0.75 | 2.79 | 5.89 | 14.3 | 36.3 | 41.7 | 29.9 | 36.1 | 33.0 | 13.1 | 4.68 | 18.5 |
| MAX | 4.9 | 12 | 21 | 59 | 202 | 127 | 69 | 76 | 58 | 66 | 21 | 92 |
| MIN | 0.04 | 1.1 | 1.5 | 2.7 | 5.8 | 15 | 16 | 12 | 14 | 2.2 | 2.4 | 2.7 |
| CFSM | 0.06 | 0.22 | 0.46 | 1.13 | 2.86 | 3.28 | 2.36 | 2.84 | 2.60 | 1.03 | 0.37 | 1.46 |
| IN. | 0.07 | 0.25 | 0.53 | 1.30 | 2.98 | 3.78 | 2.63 | 3.28 | 2.90 | 1.19 | 0.42 | 1.62 |

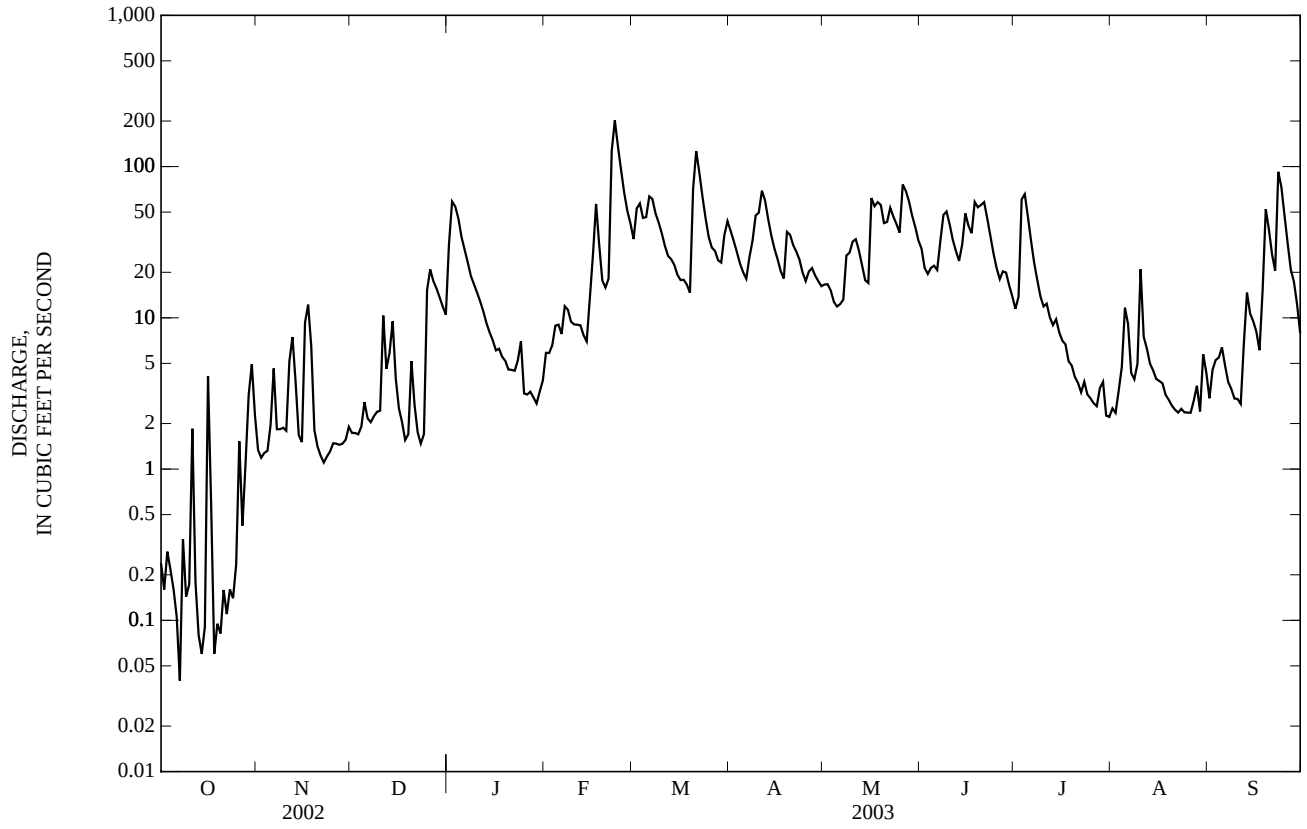
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1997 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 2.74 | 3.93 | 4.23 | 8.91 | 20.7 | 19.8 | 13.4 | 12.2 | 9.92 | 5.03 | 3.21 | 5.49 |
| MAX | 6.29 | 10.4 | 7.54 | 23.4 | 70.8 | 46.4 | 29.9 | 36.1 | 33.0 | 13.1 | 7.32 | 18.5 |
| (WY) | (1999) | (1998) | (1998) | (1998) | (1998) | (1998) | (2003) | (2003) | (2003) | (2003) | (1998) | (2003) |
| MIN | 0.75 | 0.83 | 0.89 | 0.91 | 0.88 | 1.87 | 1.70 | 1.30 | 1.28 | 0.61 | 0.53 | 0.28 |
| (WY) | (2003) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2000) | (2002) | (2002) | (2002) | (2002) |

01660500 BEAVERDAM RUN NEAR GARRISONVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1997 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 575.15 | | 7,156.81 | | | |
| ANNUAL MEAN | 1.58 | | 19.6 | | 9.13 | |
| HIGHEST ANNUAL MEAN | | | | | 20.5 | 1998 |
| LOWEST ANNUAL MEAN | | | | | 0.99 | 2002 |
| HIGHEST DAILY MEAN | 21 | Dec 26 | 202 | Feb 23 | 250 | Feb 5, 1998 |
| LOWEST DAILY MEAN | 0.04 | Oct 7 | 0.04 | Oct 7 | 0.04 | Oct 7, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.11 | Oct 18 | 0.11 | Oct 18 | 0.11 | Oct 18, 2002 |
| MAXIMUM PEAK FLOW | | | 232 | Feb 23 | a276 | Feb 5, 1998 |
| MAXIMUM PEAK STAGE | | | 2.50 | Feb 23 | a2.74 | Feb 5, 1998 |
| INSTANTANEOUS LOW FLOW | | | 0.04 | bOct 6 | c0.04 | (d) |
| ANNUAL RUNOFF (CFSM) | 0.12 | | 1.54 | | 0.72 | |
| ANNUAL RUNOFF (INCHES) | 1.68 | | 20.96 | | 9.77 | |
| 10 PERCENT EXCEEDS | 2.8 | | 50 | | 24 | |
| 50 PERCENT EXCEEDS | 0.98 | | 11 | | 3.3 | |
| 90 PERCENT EXCEEDS | 0.16 | | 1.5 | | 0.76 | |

a Prior to regulation, 1951-57, maximum peak flow, 1,370 $ft^3/s$, Aug. 15, 1955, gage height, 7.03 ft.
b Also many other days in October 2002.
c Prior to regulation, 1951-57, instantaneous low flow, 0.01 $ft^3/s$, many days in 1954 and 1955.
d Many days in August to October 2002.
e Estimated.



## 01662800 BATTLE RUN NEAR LAUREL MILLS, VA

LOCATION.--Lat 38°39'20", long 78°04'26", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 4-7 and Jan. 16-28, and period of no gage-height record, Jan. 29-31, which are fair. Maximum discharge, 9,120 $ft^3/s$, from rating curve extended above 2,500 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 310 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1530 | 713 | 6.82 | Jun 19 | 2330 | 317 | 4.50 |
| Mar 20 | 1700 | 760 | 7.06 | Jul 9 | 1930 | 832 | 7.41 |
| Jun 12 | 1800 | 449 | 5.36 | Sep 19 | 0200 | 1,950 | 10.67 |
| Jun 14 | 2230 | 451 | 5.37 | Sep 23 | 0500 | *7,130 | *12.20 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.51 | 22 | 13 | 119 | 19 | 51 | 64 | 34 | 34 | 32 | 27 | 22 |
| 2 | 0.41 | 17 | 13 | 112 | 17 | 106 | 56 | 29 | 30 | 37 | 21 | 29 |
| 3 | 0.41 | 14 | 12 | 95 | 17 | 122 | 50 | 26 | 37 | 72 | 20 | 38 |
| 4 | 0.42 | 12 | e12 | 68 | 19 | 89 | 45 | 25 | 83 | 46 | 30 | 44 |
| 5 | 0.48 | 12 | e14 | 54 | 17 | 118 | 42 | 27 | 56 | 35 | 26 | 37 |
| 6 | 0.42 | 29 | e13 | 48 | 15 | 179 | 37 | 27 | 44 | 31 | 19 | 29 |
| 7 | 0.37 | 19 | e11 | 41 | 17 | 137 | 65 | 26 | 74 | 29 | 20 | 25 |
| 8 | 0.37 | 16 | 12 | 41 | 16 | 112 | 57 | 32 | 68 | 29 | 24 | 22 |
| 9 | 0.38 | 14 | 12 | 39 | 16 | 114 | 105 | 33 | 86 | 131 | 22 | 21 |
| 10 | 0.66 | 13 | 11 | 34 | 16 | 96 | 89 | 40 | 59 | 85 | 28 | 20 |
| 11 | 7.3 | 29 | 38 | 30 | 15 | 76 | 162 | 40 | 50 | 74 | 72 | 18 |
| 12 | 11 | 52 | 40 | 27 | 15 | 64 | 107 | 31 | 93 | 41 | 34 | 20 |
| 13 | 3.8 | 47 | 65 | 27 | 15 | 61 | 84 | 27 | 96 | 33 | 75 | 42 |
| 14 | 2.7 | 31 | 133 | 26 | 14 | 61 | 69 | 25 | 145 | 39 | 35 | 31 |
| 15 | 2.1 | 25 | 77 | 24 | 16 | 50 | 61 | 33 | 141 | 45 | 28 | 51 |
| 16 | 28 | 32 | 52 | e23 | 34 | 46 | 55 | 102 | 102 | 31 | 24 | 43 |
| 17 | 21 | 131 | 39 | e22 | 59 | 42 | 50 | 79 | 115 | 27 | 22 | 29 |
| 18 | 9.8 | 80 | 33 | e20 | 50 | 39 | 48 | 133 | 133 | 24 | 20 | 78 |
| 19 | 6.6 | 49 | 30 | e18 | 29 | 35 | 64 | 109 | 125 | 24 | 19 | 646 |
| 20 | 5.3 | 37 | 37 | e19 | 23 | 289 | 49 | 77 | 174 | 21 | 17 | 124 |
| 21 | 4.5 | 33 | 30 | e18 | 27 | 209 | 45 | 72 | 118 | 20 | 16 | 74 |
| 22 | 3.9 | 31 | 27 | e17 | 301 | 118 | 45 | 63 | 117 | 19 | 23 | 56 |
| 23 | 3.4 | 24 | 24 | e16 | 285 | 88 | 39 | 59 | 82 | 45 | 27 | 1,090 |
| 24 | 3.1 | 22 | 23 | e15 | 162 | 71 | 36 | 63 | 66 | 25 | 16 | 178 |
| 25 | 3.1 | 20 | 42 | e23 | 115 | 60 | 36 | 54 | 56 | 20 | 14 | 107 |
| 26 | 16 | 18 | 39 | e19 | 85 | 58 | 41 | 60 | 49 | 18 | 13 | 77 |
| 27 | 8.7 | 17 | 33 | e17 | 66 | 52 | 35 | 52 | 47 | 17 | 21 | 63 |
| 28 | 7.3 | 16 | 30 | e18 | 57 | 45 | 31 | 51 | 43 | 17 | 33 | 74 |
| 29 | 22 | 15 | 28 | e17 | --- | 52 | 30 | 46 | 39 | 19 | 39 | 47 |
| 30 | 61 | 15 | 26 | e16 | --- | 79 | 29 | 42 | 34 | 18 | 48 | 41 |
| 31 | 33 | --- | 25 | e16 | --- | 74 | --- | 38 | --- | 22 | 24 | --- |
| TOTAL | 268.03 | 892 | 994 | 1,079 | 1,537 | 2,793 | 1,726 | 1,555 | 2,396 | 1,126 | 857 | 3,176 |
| MEAN | 8.65 | 29.7 | 32.1 | 34.8 | 54.9 | 90.1 | 57.5 | 50.2 | 79.9 | 36.3 | 27.6 | 106 |
| MAX | 61 | 131 | 133 | 119 | 301 | 289 | 162 | 133 | 174 | 131 | 75 | 1,090 |
| MIN | 0.37 | 12 | 11 | 15 | 14 | 35 | 29 | 25 | 30 | 17 | 13 | 18 |
| CFSM | 0.31 | 1.08 | 1.16 | 1.26 | 1.99 | 3.26 | 2.08 | 1.82 | 2.89 | 1.32 | 1.00 | 3.84 |
| IN. | 0.36 | 1.20 | 1.34 | 1.45 | 2.07 | 3.76 | 2.33 | 2.10 | 3.23 | 1.52 | 1.16 | 4.28 |

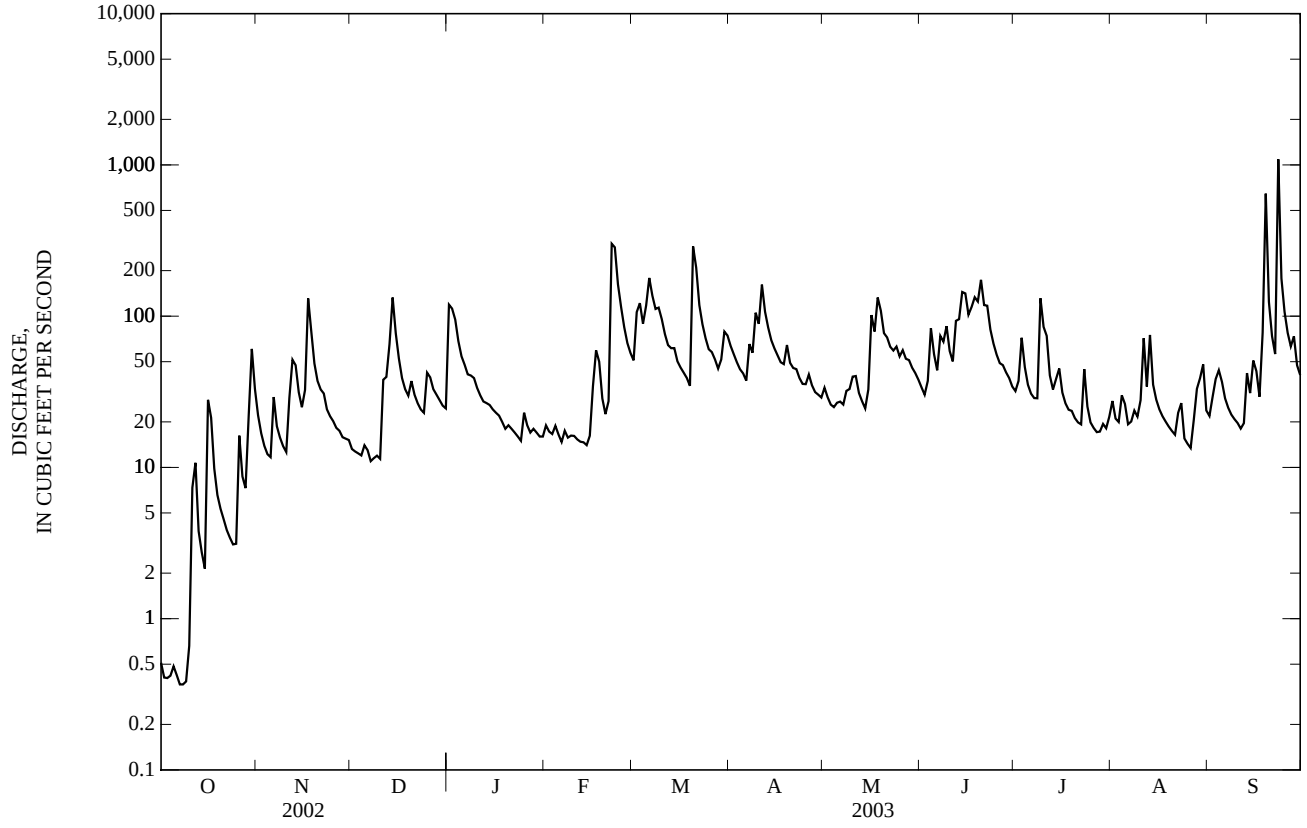
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 1995, 1997 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 16.5 | 22.4 | 25.5 | 32.9 | 39.7 | 48.1 | 40.5 | 32.3 | 23.1 | 11.7 | 11.9 | 14.9 |
| MAX | 119 | 106 | 79.9 | 116 | 132 | 144 | 150 | 85.9 | 91.8 | 39.9 | 73.8 | 106 |
| (WY) | (1980) | (1986) | (1993) | (1978) | (1998) | (1993) | (1983) | (1988) | (1972) | (1972) | (1994) | (2003) |
| MIN | 0.92 | 1.94 | 1.82 | 1.45 | 4.42 | 12.5 | 9.31 | 7.19 | 1.68 | 0.96 | 0.42 | 0.50 |
| (WY) | (1992) | (1999) | (1966) | (1966) | (2002) | (1981) | (1981) | (1999) | (1999) | (1999) | (1966) | (2002) |

01662800 BATTLE RUN NEAR LAUREL MILLS, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1958 - 1995 1997 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 4,469.37 | | 18,399.03 | | | |
| ANNUAL MEAN | 12.2 | | 50.4 | | 26.6 | |
| HIGHEST ANNUAL MEAN | | | | | 50.4 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 7.82 | 2002 |
| HIGHEST DAILY MEAN | 232 | May 27 | 1,090 | Sep 23 | 2,000 | Oct 9, 1976 |
| LOWEST DAILY MEAN | 0.06 | aSep 13 | 0.37 | bOct 7 | 0.00 | cSep 3, 1966 |
| ANNUAL SEVEN-DAY MINIMUM | 0.10 | Sep 9 | 0.41 | Oct 3 | 0.00 | dSep 6, 1966 |
| MAXIMUM PEAK FLOW | | | 7,130 | Sep 23 | 9,120 | fOct 9, 1976 |
| MAXIMUM PEAK STAGE | | | 12.20 | Sep 23 | g14.40 | Jun 27, 1995 |
| INSTANTANEOUS LOW FLOW | | | 0.34 | bOct 7 | 0.00 | Sep 3, 1966 |
| ANNUAL RUNOFF (CFSM) | 0.44 | | 1.83 | | 0.96 | |
| ANNUAL RUNOFF (INCHES) | 6.02 | | 24.80 | | 13.09 | |
| 10 PERCENT EXCEEDS | 29 | | 105 | | 55 | |
| 50 PERCENT EXCEEDS | 6.2 | | 33 | | 15 | |
| 90 PERCENT EXCEEDS | 0.34 | | 13 | | 2.5 | |

a Also Sept. 21, 2002.
b Also Oct. 8, 2002.
c Also Sept. 6-13, 1966.
d Also Sept. 7, 1966.
e Estimated.
f Also June 27, 1995.
g From high-water mark in gage house. Result of backwater from bridge collapse.



## 01663500 HAZEL RIVER AT RIXEYVILLE, VA

LOCATION.--Lat 38°35'30", long 77°57'54", NAD83, Culpeper County, Hydrologic Unit 02080103, on right bank, 40 ft upstream from bridge on State Highway 229, 0.5 mi upstream from Waterford Run, 1.2 mi northeast of Rixeyville, 2.8 mi downstream from Thornton River, and 9.1 mi upstream from mouth.

DRAINAGE AREA.--287 $mi^2$.

PERIOD OF RECORD.--August 1942 to September 1992, October 2001 to current year.

REVISED RECORDS.--WSP 971: 1942. WSP 1922: 1957-58. WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 288.30 ft NGVD of 1929. Prior to Sept. 30, 1992, water-stage recorder at site on right downstream side of bridge, Oct. 1, 2001 to current, at present site and at same datum.

REMARKS.--Records good except those for periods of no gage-height record, Dec. 14-16, 19, period with ice effect, Jan. 16-29, and discharges greater than 3,300 $ft^3/s$, which are fair. Maximum discharge, 60,000 $ft^3/s$, from rating curve extended above 27,000 $ft^3/s$. 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 Apr. 26, 1937 reached a stage of 28.4 ft, from floodmarks, discharge, 43,500 $ft^3/s$, from information by local residents.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,300 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 2030 | 5,990 | 13.56 | Sep 19 | 1330 | 11,100 | 19.14 |
| Mar 20 | 2300 | 7,990 | 15.88 | Sep 23 | 1415 | *11,400 | *19.42 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 29 | 342 | 172 | 880 | 280 | 663 | 829 | 448 | 526 | 418 | 247 | 176 |
| 2 | 21 | 254 | 158 | 1,940 | 272 | 852 | 799 | 410 | 465 | 411 | 264 | 285 |
| 3 | 19 | 203 | 151 | 1,280 | 240 | 1,260 | 736 | 370 | 451 | 1,570 | 228 | 576 |
| 4 | 17 | 174 | 136 | 1,030 | 249 | 922 | 683 | 352 | 830 | 1,200 | 447 | 406 |
| 5 | 15 | 155 | 135 | 813 | 273 | 1,020 | 645 | 357 | 755 | 807 | 338 | 404 |
| 6 | 13 | 292 | 194 | 715 | 227 | 1,710 | 593 | 381 | 594 | 667 | 257 | 279 |
| 7 | 13 | 270 | 144 | 630 | 242 | 1,550 | 754 | 349 | 766 | 652 | 217 | 226 |
| 8 | 13 | 203 | 178 | 575 | 229 | 1,230 | 870 | 362 | 916 | 584 | 321 | 198 |
| 9 | 11 | 177 | 155 | 588 | 205 | 1,230 | 1,180 | 387 | 968 | 573 | 238 | 183 |
| 10 | 12 | 160 | 149 | 516 | 234 | 1,230 | 1,180 | 477 | 791 | 731 | 339 | 170 |
| 11 | 22 | 323 | 242 | 458 | 224 | 1,010 | 1,730 | 565 | 675 | 965 | 831 | 156 |
| 12 | 191 | 475 | 648 | 411 | 216 | 885 | 1,420 | 457 | 677 | 538 | 464 | 154 |
| 13 | 122 | 670 | 546 | 384 | 194 | 827 | 1,130 | 393 | 829 | 434 | 1,050 | 628 |
| 14 | 73 | 422 | e1,280 | 371 | 204 | 942 | 947 | 354 | 847 | 385 | 441 | 581 |
| 15 | 59 | 332 | e860 | 349 | 221 | 831 | 833 | 356 | 1,210 | 498 | 310 | 479 |
| 16 | 213 | 329 | e670 | e320 | 133 | 755 | 745 | 1,400 | 855 | 367 | 253 | 464 |
| 17 | 538 | 1,120 | 524 | e290 | 345 | 704 | 672 | 1,220 | 887 | 320 | 225 | 310 |
| 18 | 224 | 1,060 | 438 | e265 | 585 | 661 | 623 | 1,870 | 1,430 | 288 | 225 | 361 |
| 19 | 143 | 676 | 382 | e240 | 544 | 612 | 861 | 1,850 | 1,250 | 292 | 192 | 8,210 |
| 20 | 110 | 528 | e460 | e290 | 435 | 2,860 | 691 | 1,280 | 2,120 | 270 | 178 | 2,410 |
| 21 | 90 | 437 | 504 | e260 | 440 | 3,700 | 626 | 1,090 | 1,420 | 252 | 163 | 1,330 |
| 22 | 75 | 420 | 414 | e230 | 2,370 | 1,870 | 604 | 1,010 | 1,190 | 237 | 159 | 965 |
| 23 | 65 | 341 | 374 | e215 | 3,080 | 1,350 | 547 | 894 | 903 | 306 | 334 | 6,370 |
| 24 | 58 | 291 | 342 | e185 | 1,910 | 1,090 | 499 | 980 | 740 | 268 | 169 | 2,450 |
| 25 | 53 | 262 | 458 | e240 | 1,420 | 915 | 479 | 864 | 638 | 234 | 142 | 1,460 |
| 26 | 110 | 238 | 564 | e225 | 1,040 | 820 | 559 | 885 | 562 | 206 | 132 | 1,090 |
| 27 | 196 | 223 | 421 | e215 | 855 | 770 | 514 | 798 | 519 | 194 | 124 | 880 |
| 28 | 130 | 201 | 373 | e195 | 754 | 667 | 453 | 769 | 517 | 200 | 224 | 841 |
| 29 | 168 | 189 | 343 | e215 | --- | 711 | 428 | 684 | 443 | 275 | 221 | 670 |
| 30 | 675 | 184 | 311 | 215 | --- | 923 | 408 | 646 | 405 | 222 | 419 | 580 |
| 31 | 568 | --- | 294 | 218 | --- | 970 | --- | 567 | --- | 199 | 235 | --- |
| TOTAL | 4,046 | 10,951 | 12,020 | 14,758 | 17,421 | 35,540 | 23,038 | 22,825 | 25,179 | 14,563 | 9,387 | 33,292 |
| MEAN | 131 | 365 | 388 | 476 | 622 | 1,146 | 768 | 736 | 839 | 470 | 303 | 1,110 |
| MAX | 675 | 1,120 | 1,280 | 1,940 | 3,080 | 3,700 | 1,730 | 1,870 | 2,120 | 1,570 | 1,050 | 8,210 |
| MIN | 11 | 155 | 135 | 185 | 133 | 612 | 408 | 349 | 405 | 194 | 124 | 154 |
| CFSM | 0.45 | 1.27 | 1.35 | 1.66 | 2.17 | 3.99 | 2.68 | 2.57 | 2.92 | 1.64 | 1.06 | 3.87 |
| IN. | 0.52 | 1.42 | 1.56 | 1.91 | 2.26 | 4.61 | 2.99 | 2.96 | 3.26 | 1.89 | 1.22 | 4.32 |

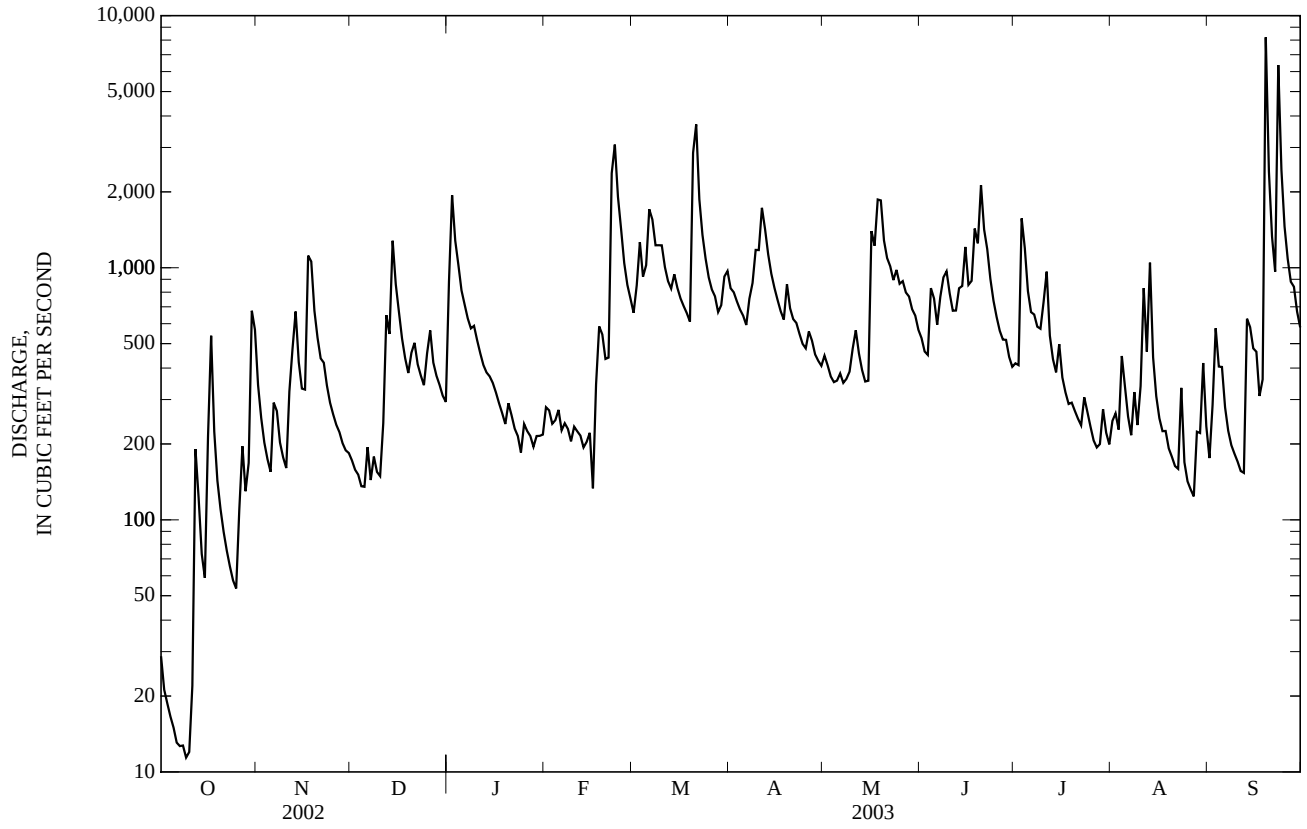
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 1992, 2002 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 275 | 299 | 334 | 376 | 465 | 552 | 524 | 418 | 292 | 168 | 183 | 193 |
| MAX | 2,587 | 1,874 | 1,168 | 1,137 | 1,397 | 1,191 | 1,787 | 910 | 1,483 | 706 | 1,539 | 1,504 |
| (WY) | (1943) | (1986) | (1951) | (1978) | (1984) | (1975) | (1983) | (1988) | (1972) | (1949) | (1955) | (1979) |
| MIN | 14.8 | 36.3 | 34.6 | 59.0 | 75.6 | 148 | 134 | 101 | 41.8 | 15.8 | 5.85 | 11.2 |
| (WY) | (1964) | (1966) | (1966) | (1981) | (2002) | (1981) | (1981) | (1977) | (1977) | (1966) | (1966) | (1985) |

01663500 HAZEL RIVER AT RIXEYVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1943 - 1992 2002 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 59,646.8 | | 223,020 | | | |
| ANNUAL MEAN | 163 | | 611 | | 339 | |
| HIGHEST ANNUAL MEAN | | | | | 633 | 1979 |
| LOWEST ANNUAL MEAN | | | | | 109 | 2002 |
| HIGHEST DAILY MEAN | 1,280 | Dec 14 | 8,210 | Sep 19 | 34,600 | Oct 15, 1942 |
| LOWEST DAILY MEAN | 1.1 | aSep 21 | 11 | Oct 9 | 1.1 | bSep 10, 1966 |
| ANNUAL SEVEN-DAY MINIMUM | 1.6 | Sep 19 | 13 | Oct 4 | 1.4 | Sep 7, 1966 |
| MAXIMUM PEAK FLOW | | | 11,400 | Sep 23 | 60,000 | Oct 15, 1942 |
| MAXIMUM PEAK STAGE | | | 19.42 | Sep 23 | 31.80 | Oct 15, 1942 |
| INSTANTANEOUS LOW FLOW | | | 11 | cOct 9 | 0.70 | Sep 22, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.57 | | 2.13 | | 1.18 | |
| ANNUAL RUNOFF (INCHES) | 7.73 | | 28.91 | | 16.05 | |
| 10 PERCENT EXCEEDS | 383 | | 1,200 | | 694 | |
| 50 PERCENT EXCEEDS | 101 | | 437 | | 209 | |
| 90 PERCENT EXCEEDS | 9.0 | | 157 | | 42 | |

a Also Sept. 22, 2002.
b Also Sept. 11, 12, 1966 and Sept. 21, 22, 2002.
c Also Oct. 10, 2002.
e Estimated.



## 01664000 RAPPAHANNOCK RIVER AT REMINGTON, VA

LOCATION.--Lat 38°31'50", long 77°48'49", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Nov. 21, 1951, nonrecording gage at bridge 80 ft downstream at same datum.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Oct. 24, Feb. 22-24, May 1, July 8, 10, 11, 29, Aug. 3-6, Aug. 23 to Sept. 1, and Sept. 3-30, and for period with ice effect, Jan. 16-25, which are fair. National Weather Service gage-height telemeter at station. Maximum discharge, 90,000 $ft^3/s$, from rating curve extended above 43,000 $ft^3/s$ on basis of slope-area measurement of peak flow. 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 2 | 0630 | 6,780 | 11.67 | Sep 20 | 0045 | 15,400 | 17.64 |
| Mar 21 | 0830 | 12,300 | 15.95 | Sep 24 | 0200 | *15,900 | *17.93 |
| Jun 20 | 2215 | 6,670 | 11.57 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 64 | 630 | 335 | 1,550 | 518 | 1,320 | 1,700 | e773 | 1,060 | 805 | 740 | e570 |
| 2 | 43 | 420 | 312 | 4,970 | 471 | 1,870 | 1,560 | 759 | 931 | 810 | 608 | 592 |
| 3 | 29 | 317 | 299 | 2,750 | 424 | 3,060 | 1,390 | 678 | 869 | 1,980 | e530 | 1,450 |
| 4 | 21 | 261 | 250 | 2,290 | 432 | 2,030 | 1,270 | 623 | 1,490 | 2,010 | e810 | 1,130 |
| 5 | 19 | 229 | 253 | 1,670 | 493 | 2,180 | 1,190 | 615 | 1,670 | 1,310 | e920 | 1,200 |
| 6 | 17 | 446 | 332 | 1,440 | 405 | 3,460 | 1,110 | 676 | 1,230 | 1,070 | e700 | 785 |
| 7 | 16 | 628 | 281 | 1,260 | 403 | 3,240 | 1,230 | 655 | 1,570 | 1,070 | 514 | 607 |
| 8 | 15 | 396 | 352 | 1,120 | 411 | 2,420 | 1,780 | 897 | 2,270 | e970 | 612 | 516 |
| 9 | 15 | 311 | 320 | 1,180 | 347 | 2,450 | 2,330 | 1,030 | 1,840 | 906 | 525 | e455 |
| 10 | 16 | 272 | 268 | 1,050 | 397 | 2,530 | 2,480 | 1,120 | 1,570 | e1,560 | 768 | e410 |
| 11 | 21 | 534 | 445 | 906 | 394 | 1,960 | 3,230 | 1,410 | 1,310 | e2,800 | 1,150 | e380 |
| 12 | 143 | 1,040 | 1,360 | 801 | 375 | 1,720 | 2,690 | 1,100 | 1,440 | 1,270 | 912 | e370 |
| 13 | 269 | 1,360 | 1,250 | 722 | 347 | 1,560 | 2,010 | 880 | 2,200 | 931 | 1,310 | 1,170 |
| 14 | 145 | 872 | 2,820 | 709 | 345 | 1,740 | 1,660 | 761 | 2,350 | 787 | 842 | 1,110 |
| 15 | 102 | 643 | 2,150 | 665 | 402 | 1,570 | 1,460 | 801 | 3,510 | 1,140 | 609 | 944 |
| 16 | 134 | 653 | 1,480 | e540 | 298 | 1,410 | 1,320 | 3,990 | 1,880 | 782 | 550 | 867 |
| 17 | 887 | 2,290 | 1,120 | e520 | 163 | 1,310 | 1,200 | 2,940 | 1,680 | 664 | 506 | 652 |
| 18 | 420 | 2,490 | 919 | e480 | 637 | 1,230 | 1,100 | 3,520 | 2,800 | 578 | 460 | 682 |
| 19 | 229 | 1,430 | 793 | e440 | 835 | 1,140 | 1,580 | 3,720 | 2,750 | 563 | 403 | e10,600 |
| 20 | 156 | 1,060 | 962 | e550 | 750 | 3,600 | 1,360 | 2,350 | 4,340 | 535 | 371 | e8,300 |
| 21 | 122 | 857 | 1,120 | e520 | 795 | 9,730 | 1,170 | 2,020 | 3,700 | 503 | 348 | 2,570 |
| 22 | 93 | 819 | 865 | e430 | e3,500 | 3,890 | 1,120 | 2,140 | 2,540 | 479 | 330 | 1,840 |
| 23 | 79 | 689 | 757 | e400 | e9,500 | 2,570 | 1,040 | 1,730 | 1,930 | 844 | 583 | e8,450 |
| 24 | e65 | 557 | 687 | e320 | e4,700 | 2,030 | 920 | 1,940 | 1,550 | 679 | e380 | 11,100 |
| 25 | 59 | 495 | 1,020 | e370 | 3,100 | 1,700 | 877 | 1,690 | 1,320 | 556 | e300 | 2,930 |
| 26 | 79 | 455 | 1,310 | 470 | 2,130 | 1,500 | 968 | 1,990 | 1,170 | 447 | e280 | 2,050 |
| 27 | 282 | 416 | 943 | 643 | 1,690 | 1,490 | 953 | 1,700 | 1,120 | 402 | e266 | 1,650 |
| 28 | 204 | 383 | 806 | 670 | 1,480 | 1,270 | 821 | 1,540 | 1,120 | 377 | e450 | 1,580 |
| 29 | 203 | 364 | 728 | 737 | --- | 1,220 | 764 | 1,390 | 939 | e500 | e750 | 1,330 |
| 30 | 945 | 353 | 655 | 626 | --- | 1,710 | 736 | 1,310 | 851 | 481 | e1,150 | 1,140 |
| 31 | 1,070 | --- | 612 | 538 | --- | 2,080 | --- | 1,140 | --- | 397 | e770 | --- |
| TOTAL | 5,962 | 21,670 | 25,804 | 31,337 | 35,742 | 70,990 | 43,019 | 47,888 | 55,000 | 28,206 | 19,447 | 67,430 |
| MEAN | 192 | 722 | 832 | 1,011 | 1,276 | 2,290 | 1,434 | 1,545 | 1,833 | 910 | 627 | 2,248 |
| MAX | 1,070 | 2,490 | 2,820 | 4,970 | 9,500 | 9,730 | 3,230 | 3,990 | 4,340 | 2,800 | 1,310 | 11,100 |
| MIN | 15 | 229 | 250 | 320 | 163 | 1,140 | 736 | 615 | 851 | 377 | 266 | 370 |
| CFSM | 0.31 | 1.17 | 1.34 | 1.63 | 2.06 | 3.69 | 2.31 | 2.49 | 2.96 | 1.47 | 1.01 | 3.63 |
| IN. | 0.36 | 1.30 | 1.55 | 1.88 | 2.14 | 4.26 | 2.58 | 2.87 | 3.30 | 1.69 | 1.17 | 4.05 |

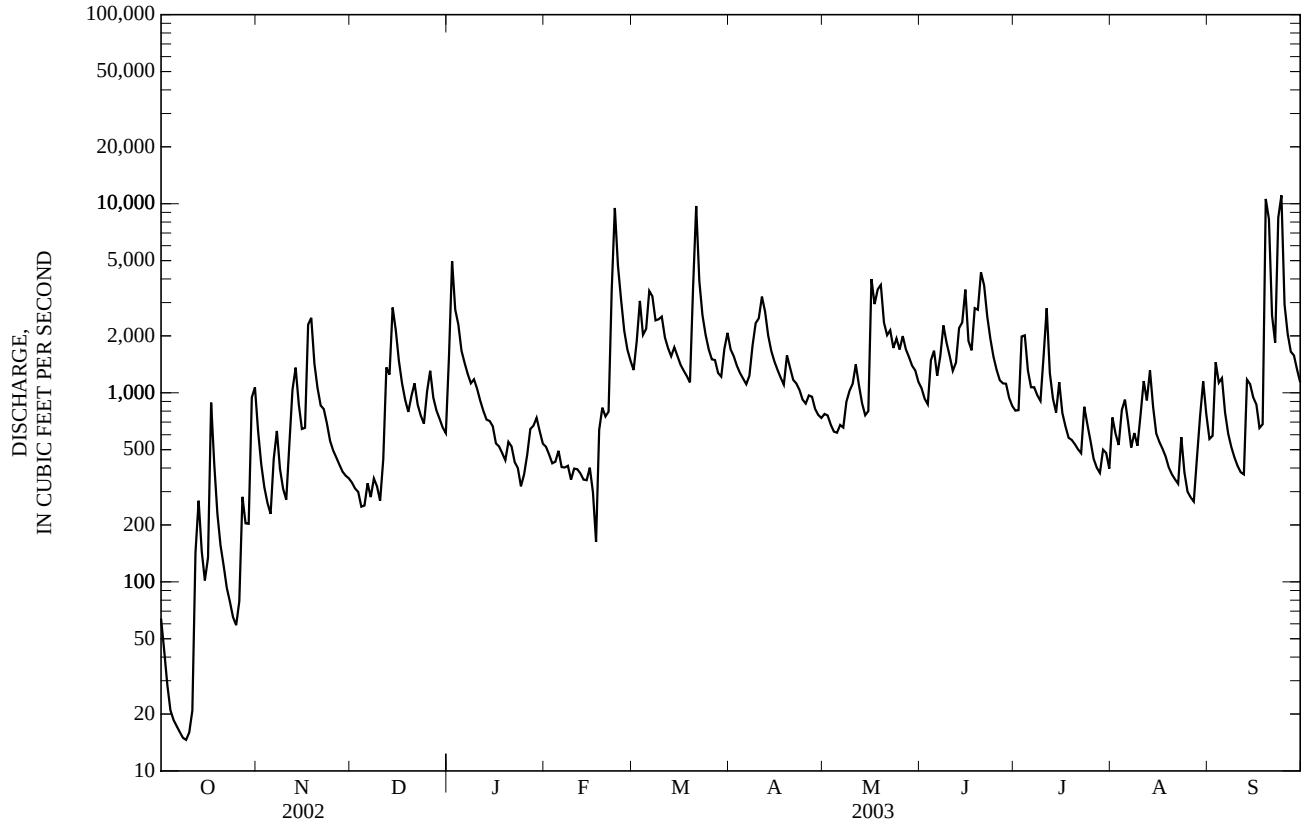
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 479 | 565 | 705 | 843 | 988 | 1,195 | 1,038 | 831 | 605 | 342 | 364 | 394 |
| MAX | 4,895 | 2,575 | 2,172 | 2,480 | 3,496 | 3,751 | 3,784 | 2,177 | 3,520 | 974 | 2,926 | 2,815 |
| (WY) | (1943) | (1986) | (1951) | (1998) | (1998) | (1993) | (1983) | (1989) | (1972) | (1949) | (1955) | (1996) |
| MIN | 27.3 | 61.8 | 61.1 | 78.3 | 143 | 292 | 248 | 198 | 54.1 | 30.1 | 13.2 | 15.4 |
| (WY) | (1987) | (1966) | (1966) | (1966) | (2002) | (1981) | (1981) | (1977) | (1999) | (1966) | (1966) | (1985) |

01664000 RAPPAHANNOCK RIVER AT REMINGTON, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1943 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 112,488.1 | | 452,495 | | | |
| ANNUAL MEAN | 308 | | 1,240 | | 694 | |
| HIGHEST ANNUAL MEAN | | | | | 1,240 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 195 | 2002 |
| HIGHEST DAILY MEAN | 2,820 | Dec 14 | 11,100 | Sep 24 | 64,000 | Oct 16, 1942 |
| LOWEST DAILY MEAN | 5.5 | Aug 17 | 15 | aOct 8 | 2.9 | Sep 12, 1966 |
| ANNUAL SEVEN-DAY MINIMUM | 6.4 | Aug 22 | 17 | Oct 4 | 3.2 | Sep 7, 1966 |
| MAXIMUM PEAK FLOW | | | 15,900 | Sep 24 | 90,000 | Oct 16, 1942 |
| MAXIMUM PEAK STAGE | | | 17.93 | Sep 24 | b30.00 | Oct 16, 1942 |
| INSTANTANEOUS LOW FLOW | | | 14 | Oct 9 | 1.1 | Sep 10, 1966 |
| ANNUAL RUNOFF (CFSM) | 0.50 | | 2.00 | | 1.12 | |
| ANNUAL RUNOFF (INCHES) | 6.75 | | 27.15 | | 15.21 | |
| 10 PERCENT EXCEEDS | 771 | | 2,460 | | 1,400 | |
| 50 PERCENT EXCEEDS | 177 | | 872 | | 414 | |
| 90 PERCENT EXCEEDS | 15 | | 282 | | 73 | |

a Also Oct. 9, 2002.
b From floodmarks.
e Estimated.



## 01665500 RAPIDAN RIVER NEAR RUCKERSVILLE, VA

LOCATION.--Lat 38°16'50", long 78°20'24", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 6, 9, and Jan. 17-20, 22-25, 28, 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 0.72 $ft^3/s$. Maximum discharge, 106,000 $ft^3/s$, from rating curve extended above 8,700 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,400 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 1 | 1845 | 2,560 | 5.86 | Jun 20 | 1145 | 1,490 | 4.76 |
| Feb 22 | 1345 | 8,310 | 8.98 | Aug 11 | 0245 | 3,010 | 6.11 |
| Feb 23 | 1500 | 2,560 | 5.86 | Sep 19 | 0400 | *20,100 | *13.26 |
| Mar 20 | 1645 | 5,520 | 7.65 | Sep 23 | 0645 | 7,180 | 8.47 |
| May 18 | 1145 | 1,860 | 5.14 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 11 | 137 | 86 | 796 | 83 | 262 | 433 | 204 | 236 | 165 | 77 | 92 |
| 2 | 11 | 111 | 81 | 911 | 78 | 371 | 404 | 204 | 208 | 208 | 98 | 124 |
| 3 | 8.1 | 95 | 76 | 620 | 76 | 377 | 366 | 184 | 212 | 655 | 102 | 122 |
| 4 | 7.4 | 82 | 71 | 460 | 84 | 305 | 336 | 198 | 251 | 368 | 188 | 121 |
| 5 | 6.7 | 79 | 82 | 365 | 85 | 308 | 310 | 195 | 222 | 276 | 133 | 122 |
| 6 | 5.9 | 129 | e70 | 309 | 76 | 406 | 279 | 188 | 196 | 243 | 120 | 101 |
| 7 | 5.1 | 105 | e63 | 265 | 81 | 416 | 352 | 179 | 405 | 214 | 109 | 93 |
| 8 | 4.8 | 91 | e66 | 239 | 76 | 362 | 330 | 170 | 342 | 188 | 113 | 87 |
| 9 | 4.9 | 82 | 67 | 221 | 71 | 327 | 533 | 176 | 312 | 171 | 120 | 83 |
| 10 | 5.3 | 76 | 63 | 198 | 76 | 300 | 512 | 211 | 260 | 163 | 132 | 79 |
| 11 | 24 | 183 | 153 | 177 | 74 | 270 | 776 | 229 | 266 | 157 | 878 | 75 |
| 12 | 65 | 339 | 200 | 160 | 72 | 245 | 573 | 198 | 373 | 135 | 284 | 73 |
| 13 | 40 | 298 | 260 | 150 | 68 | 240 | 475 | 182 | 382 | 122 | 284 | 179 |
| 14 | 27 | 209 | 483 | 141 | 70 | 239 | 407 | 171 | 418 | 127 | 211 | 242 |
| 15 | 20 | 170 | 309 | 133 | 97 | 227 | 358 | 299 | 417 | 111 | 185 | 248 |
| 16 | 106 | 186 | 242 | 123 | 83 | 216 | 321 | 735 | 342 | 105 | 156 | 232 |
| 17 | 131 | 407 | 201 | e120 | 115 | 206 | 289 | 501 | 538 | 96 | 140 | 191 |
| 18 | 71 | 378 | 174 | e110 | 135 | 198 | 274 | 1,230 | 751 | 90 | 125 | 459 |
| 19 | 52 | 280 | 159 | e100 | 112 | 187 | 324 | 998 | 696 | 90 | 129 | 9,810 |
| 20 | 43 | 230 | 229 | e112 | 115 | 2,130 | 268 | 677 | 868 | 84 | 110 | 1,830 |
| 21 | 38 | 203 | 219 | 100 | 172 | 1,520 | 255 | 566 | 588 | 79 | 101 | 888 |
| 22 | 33 | 186 | 201 | e91 | 2,770 | 786 | 254 | 466 | 432 | 78 | 95 | 609 |
| 23 | 30 | 156 | 184 | e86 | 1,940 | 552 | 229 | 418 | 345 | 100 | 89 | 3,120 |
| 24 | 26 | 141 | 172 | e79 | 1,040 | 439 | 213 | 396 | 286 | 78 | 83 | 1,340 |
| 25 | 27 | 128 | 213 | e110 | 634 | 372 | 208 | 355 | 244 | 70 | 79 | 807 |
| 26 | 52 | 118 | 201 | 105 | 433 | 333 | 234 | 352 | 213 | 66 | 76 | 571 |
| 27 | 55 | 110 | 172 | 90 | 343 | 302 | 209 | 316 | 198 | 63 | 72 | 444 |
| 28 | 51 | 102 | 159 | e86 | 292 | 275 | 193 | 331 | 175 | 62 | 77 | 406 |
| 29 | 85 | 97 | 147 | 79 | --- | 389 | 186 | 311 | 159 | 65 | 87 | 314 |
| 30 | 234 | 93 | 137 | 76 | --- | 525 | 179 | 304 | 144 | 63 | 123 | 268 |
| 31 | 186 | --- | 128 | 78 | --- | 485 | --- | 263 | --- | 60 | 115 | --- |
| TOTAL | 1,466.2 | 5,001 | 5,068 | 6,690 | 9,351 | 13,570 | 10,080 | 11,207 | 10,479 | 4,552 | 4,691 | 23,130 |
| MEAN | 47.3 | 167 | 163 | 216 | 334 | 438 | 336 | 362 | 349 | 147 | 151 | 771 |
| MAX | 234 | 407 | 483 | 911 | 2,770 | 2,130 | 776 | 1,230 | 868 | 655 | 878 | 9,810 |
| MIN | 4.8 | 76 | 63 | 76 | 68 | 187 | 179 | 170 | 144 | 60 | 72 | 73 |
| CFSM | 0.41 | 1.46 | 1.43 | 1.89 | 2.93 | 3.84 | 2.95 | 3.17 | 3.06 | 1.29 | 1.33 | 6.76 |
| IN. | 0.48 | 1.63 | 1.65 | 2.18 | 3.05 | 4.43 | 3.29 | 3.66 | 3.42 | 1.49 | 1.53 | 7.55 |

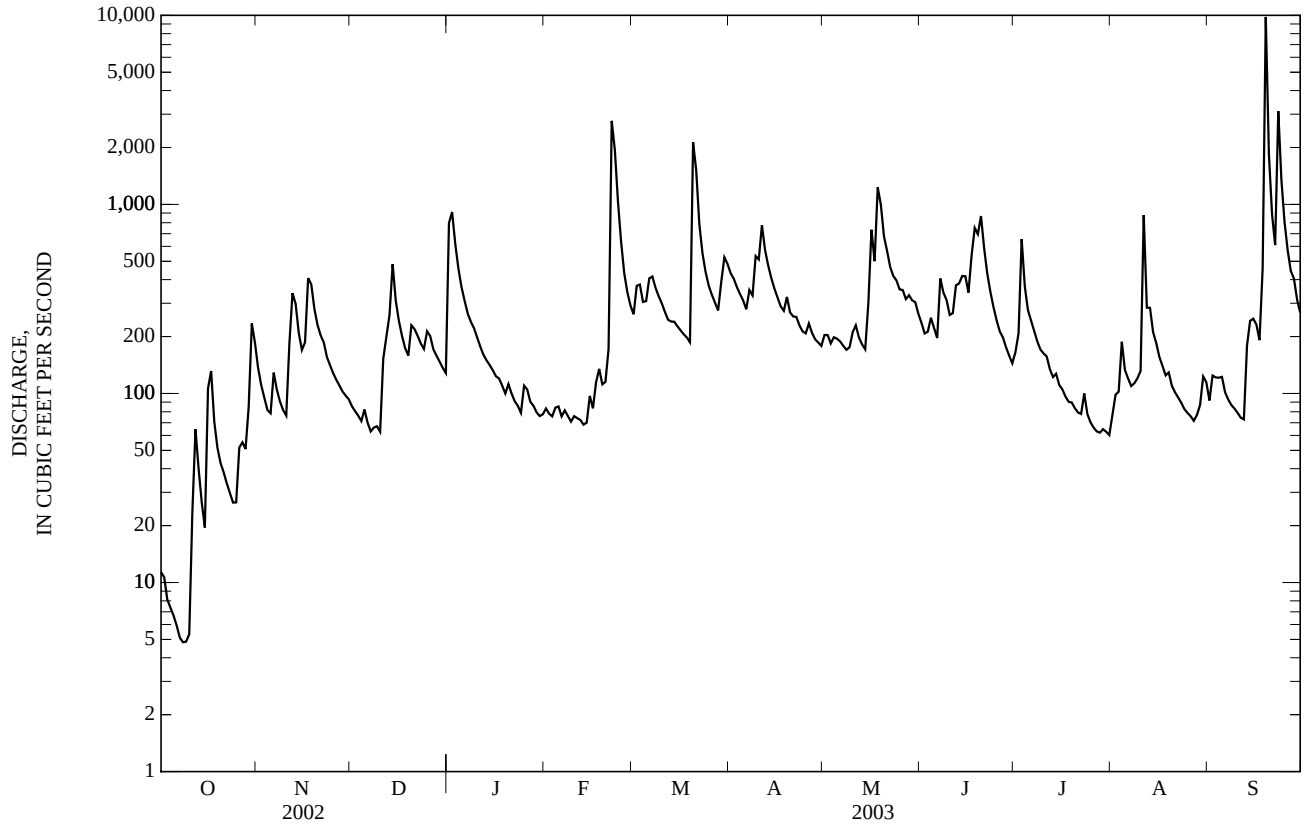
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 1995, 1999 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 127 | 135 | 156 | 170 | 193 | 243 | 225 | 176 | 164 | 78.1 | 90.5 | 98.6 |
| MAX | 976 | 798 | 465 | 483 | 485 | 570 | 692 | 376 | 1,675 | 378 | 760 | 771 |
| (WY) | (1943) | (1986) | (1951) | (1978) | (1984) | (1993) | (1983) | (1978) | (1995) | (1949) | (1955) | (2003) |
| MIN | 9.44 | 23.7 | 20.4 | 21.0 | 41.5 | 79.7 | 72.8 | 48.0 | 23.3 | 6.99 | 4.99 | 5.83 |
| (WY) | (1964) | (1999) | (1966) | (1981) | (2002) | (1981) | (1981) | (1977) | (1977) | (1977) | (2002) | (1954) |

01665500 RAPIDAN RIVER NEAR RUCKERSVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1943 - 1995, 1999 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 26,701.13 | | 105,285.2 | | | |
| ANNUAL MEAN | 73.2 | | 288 | | 153 | |
| HIGHEST ANNUAL MEAN | | | | | 337 | 1949 |
| LOWEST ANNUAL MEAN | | | | | 50.2 | 2002 |
| HIGHEST DAILY MEAN | 568 | Apr 22 | 9,810 | Sep 19 | e29,400 | Jun 27, 1995 |
| LOWEST DAILY MEAN | 0.45 | Sep 13 | 4.8 | Oct 8 | 0.45 | Sep 13, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 1.1 | Sep 9 | 5.7 | Oct 4 | 1.1 | Sep 9, 2002 |
| MAXIMUM PEAK FLOW | | | 20,100 | Sep 19 | 106,000 | Jun 27, 1995 |
| MAXIMUM PEAK STAGE | | | 13.26 | Sep 19 | a31.30 | Jun 27, 1995 |
| INSTANTANEOUS LOW FLOW | | | 3.7 | bOct 8 | 0.21 | Sep 13, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.64 | | 2.53 | | 1.34 | |
| ANNUAL RUNOFF (INCHES) | 8.71 | | 34.36 | | 18.23 | |
| 10 PERCENT EXCEEDS | 179 | | 505 | | 308 | |
| 50 PERCENT EXCEEDS | 46 | | 184 | | 95 | |
| 90 PERCENT EXCEEDS | 3.6 | | 69 | | 20 | |

a From floodmarks.
b Also Oct. 9, 2002.
e Estimated.



## 01666500 ROBINSON RIVER NEAR LOCUST DALE, VA

LOCATION.--Lat 38°19'30", long 78°05'44", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except those for periods of doubtful gage-height record, Oct. 6, 7, Feb. 26 to Mar. 19, and Mar. 22-31, and periods with ice effect, Dec. 6-9 and Jan. 19-26, 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 $ft^3/s$.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,700 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 1 | 2230 | 2,470 | 9.49 | Jul 3 | 0900 | 2,160 | 8.71 |
| Feb 22 | 1730 | 7,900 | 15.79 | Aug 30 | 0100 | 2,220 | 8.88 |
| Mar 20 | 2000 | 8,350 | 16.07 | Sep 2 | 2200 | 2,510 | 9.57 |
| Jun 15 | 0130 | 2,790 | 10.25 | Sep 19 | 1100 | *13,900 | *18.85 |
| Jun 20 | 0200 | 1,970 | 8.24 | Sep 23 | 1000 | 7,310 | 15.41 |
| Jun 20 | 1630 | 2,030 | 8.39 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 15 | 168 | 103 | 836 | 127 | e400 | 501 | 299 | 261 | 291 | 223 | 251 |
| 2 | 12 | 124 | 98 | 1,100 | 118 | e600 | 483 | 258 | 232 | 261 | 173 | 564 |
| 3 | 11 | 103 | 95 | 639 | 114 | e730 | 453 | 237 | 224 | 1,420 | 146 | 629 |
| 4 | 8.6 | 91 | 91 | 494 | 125 | e525 | 424 | 245 | 293 | 678 | 342 | 342 |
| 5 | 7.8 | 83 | 94 | 394 | 135 | e475 | 400 | 247 | 312 | 453 | 191 | 303 |
| 6 | e6.9 | 157 | e93 | 345 | 119 | e600 | 371 | 245 | 245 | 402 | 176 | 242 |
| 7 | e6.4 | 129 | e85 | 301 | 129 | e570 | 449 | 232 | 630 | 366 | 176 | 214 |
| 8 | 5.7 | 104 | e96 | 275 | 123 | e500 | 466 | 225 | 522 | 320 | 220 | 196 |
| 9 | 6.0 | 94 | e92 | 270 | 115 | e450 | 650 | 219 | 423 | 285 | 159 | 186 |
| 10 | 6.3 | 86 | 89 | 241 | 121 | e410 | 603 | 260 | 344 | 264 | 278 | 175 |
| 11 | 15 | 239 | 175 | 217 | 121 | e375 | 806 | 304 | 298 | 363 | 472 | 167 |
| 12 | 71 | 472 | 334 | 197 | 119 | e350 | 639 | 256 | 672 | 251 | 262 | 164 |
| 13 | 47 | 434 | 333 | 186 | 112 | e325 | 537 | 234 | 545 | 221 | 561 | 532 |
| 14 | 34 | 251 | 771 | 178 | 112 | e310 | 468 | 218 | 403 | 299 | 261 | 425 |
| 15 | 26 | 190 | 479 | 170 | 148 | e295 | 424 | 216 | 1,120 | 211 | 200 | 355 |
| 16 | 108 | 259 | 340 | 156 | 105 | e280 | 386 | 600 | 501 | 195 | 177 | 315 |
| 17 | 230 | 830 | 260 | e152 | 210 | e270 | 352 | 496 | 547 | 177 | 189 | 255 |
| 18 | 97 | 677 | 218 | e145 | 268 | e255 | 328 | 1,060 | 852 | 166 | 162 | 561 |
| 19 | 67 | 388 | 191 | e130 | 184 | e245 | 474 | 934 | 857 | 166 | 251 | 9,900 |
| 20 | 57 | 297 | 323 | e140 | 170 | 3,320 | 375 | 625 | 1,520 | 156 | 162 | 1,960 |
| 21 | 46 | 242 | 297 | e132 | 218 | 2,670 | 346 | 539 | 845 | 151 | 145 | 1,060 |
| 22 | 41 | 226 | 238 | e120 | 2,990 | e1,300 | 336 | 500 | 612 | 146 | 135 | 882 |
| 23 | 36 | 185 | 211 | e115 | 2,630 | e840 | 309 | 451 | 477 | 151 | 136 | 3,500 |
| 24 | 33 | 163 | 193 | e105 | 1,520 | e600 | 290 | 478 | 396 | 140 | 118 | 1,300 |
| 25 | 30 | 148 | 318 | e155 | 1,160 | e500 | 280 | 422 | 339 | 130 | 113 | 836 |
| 26 | 55 | 137 | 322 | e135 | e700 | e430 | 305 | 487 | 293 | 123 | 110 | 645 |
| 27 | 77 | 127 | 233 | 120 | e550 | e460 | 285 | 404 | 278 | 118 | 108 | 532 |
| 28 | 62 | 116 | 204 | 125 | e470 | e410 | 263 | 403 | 269 | 121 | 158 | 502 |
| 29 | 97 | 111 | 186 | 118 | --- | e380 | 254 | 350 | 234 | 148 | 213 | 403 |
| 30 | 358 | 108 | 169 | 110 | --- | e585 | 248 | 325 | 217 | 130 | 787 | 347 |
| 31 | 293 | --- | 159 | 111 | --- | e545 | --- | 286 | --- | 120 | 351 | --- |
| TOTAL | 1,965.7 | 6,739 | 6,890 | 7,912 | 13,013 | 20,005 | 12,505 | 12,055 | 14,761 | 8,423 | 7,155 | 27,743 |
| MEAN | 63.4 | 225 | 222 | 255 | 465 | 645 | 417 | 389 | 492 | 272 | 231 | 925 |
| MAX | 358 | 830 | 771 | 1,100 | 2,990 | 3,320 | 806 | 1,060 | 1,520 | 1,420 | 787 | 9,900 |
| MIN | 5.7 | 83 | 85 | 105 | 105 | 245 | 248 | 216 | 217 | 118 | 108 | 164 |
| CFSM | 0.35 | 1.25 | 1.24 | 1.43 | 2.60 | 3.61 | 2.33 | 2.17 | 2.75 | 1.52 | 1.29 | 5.17 |
| IN. | 0.41 | 1.40 | 1.43 | 1.64 | 2.70 | 4.16 | 2.60 | 2.51 | 3.07 | 1.75 | 1.49 | 5.77 |

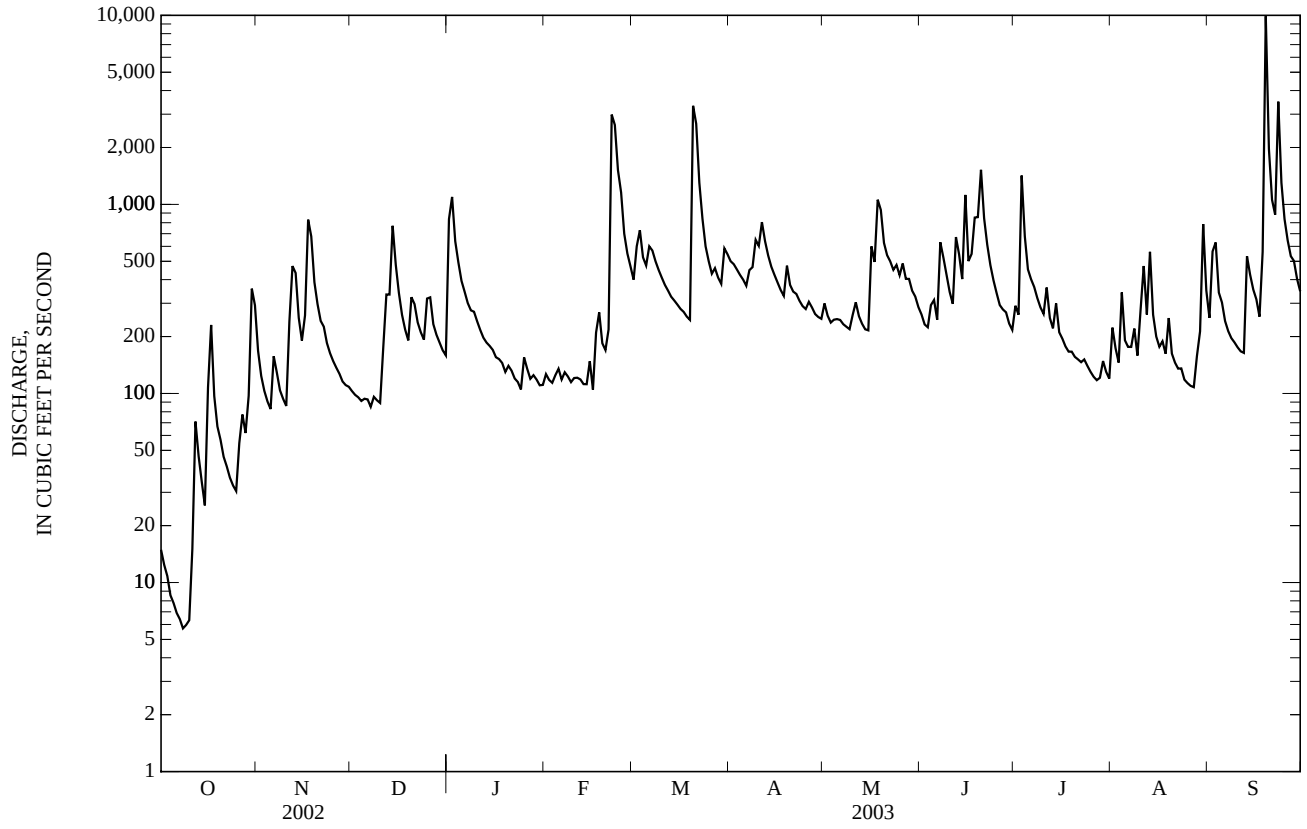
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 166 | 210 | 227 | 266 | 299 | 347 | 305 | 247 | 211 | 127 | 136 | 172 |
| MAX | 783 | 1,350 | 624 | 752 | 1,254 | 980 | 989 | 625 | 1,154 | 522 | 1,063 | 1,119 |
| (WY) | (1991) | (1986) | (1973) | (1978) | (1998) | (1993) | (1983) | (1989) | (1995) | (1949) | (1955) | (1996) |
| MIN | 18.5 | 35.1 | 32.0 | 47.5 | 52.5 | 105 | 89.3 | 70.9 | 33.4 | 21.3 | 7.34 | 8.05 |
| (WY) | (1964) | (1966) | (1966) | (1966) | (2002) | (1981) | (1981) | (1977) | (1999) | (1944) | (2002) | (1954) |

01666500 ROBINSON RIVER NEAR LOCUST DALE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1944 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 33,498.9 | | 139,166.7 | | | |
| ANNUAL MEAN | 91.8 | | 381 | | 226 | |
| HIGHEST ANNUAL MEAN | | | | | 445 | 1973 |
| LOWEST ANNUAL MEAN | | | | | 61.6 | 2002 |
| HIGHEST DAILY MEAN | 830 | Nov 17 | 9,900 | Sep 19 | 14,700 | Jun 22, 1972 |
| LOWEST DAILY MEAN | 2.0 | aAug 26 | 5.7 | Oct 8 | 1.8 | bSep 13, 1954 |
| ANNUAL SEVEN-DAY MINIMUM | 2.5 | Aug 21 | 6.8 | Oct 4 | 2.5 | Aug 21, 2002 |
| MAXIMUM PEAK FLOW | | | 13,900 | Sep 19 | 25,400 | Jun 27, 1995 |
| MAXIMUM PEAK STAGE | | | 18.85 | Sep 19 | c23.92 | Sep 6, 1996 |
| INSTANTANEOUS LOW FLOW | | | 4.7 | Oct 8 | 1.2 | dSep 7, 1954 |
| ANNUAL RUNOFF (CFSM) | 0.51 | | 2.13 | | 1.26 | |
| ANNUAL RUNOFF (INCHES) | 6.96 | | 28.92 | | 17.12 | |
| 10 PERCENT EXCEEDS | 207 | | 641 | | 427 | |
| 50 PERCENT EXCEEDS | 60 | | 254 | | 145 | |
| 90 PERCENT EXCEEDS | 5.6 | | 96 | | 39 | |

a Also Sept. 15, 16, 2002.
b Also Sept. 27, 1954.
c Backwater from debris.
d Also Sept. 12, 1954.
e Estimated.



## 01667500 RAPIDAN RIVER NEAR CULPEPER, VA

LOCATION.--Lat 38°21'01", long 77°58'30", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 7, 8, and Jan. 17-24, 27-29, and periods of no gage-height record, July 19-21 and Aug. 5-8, which are 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 $ft^3/s$, from rating curve extended above 43,000 $ft^3/s$ on basis of slope-area measurement at gage height 30.26 ft. Several measure- ments 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 2 | 0130 | 6,770 | 8.12 | Jun 20 | 1930 | 5,170 | 6.66 |
| Feb 23 | 0330 | 14,500 | 14.27 | Jul 3 | 1300 | 5,600 | 7.06 |
| Mar 21 | 0200 | 13,000 | 13.13 | Sep 19 | 2100 | *20,700 | *18.51 |
| May 18 | 1930 | 4,660 | 6.17 | Sep 23 | 1545 | 10,800 | 11.42 |
| Jun 15 | 0530 | 5,600 | 7.06 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 35 | 335 | 244 | 1,920 | 303 | 1,080 | 1,280 | 628 | 783 | 713 | 540 | 390 |
| 2 | 28 | 228 | 226 | 3,800 | 296 | 1,670 | 1,150 | 627 | 659 | 690 | 431 | 568 |
| 3 | 21 | 176 | 215 | 1,900 | 272 | 1,920 | 1,030 | 568 | 603 | 3,750 | 362 | 1,750 |
| 4 | 20 | 145 | 200 | 1,520 | 283 | 1,350 | 936 | 531 | 770 | 2,220 | 1,130 | 631 |
| 5 | 16 | 128 | 189 | 1,160 | 324 | 1,270 | 860 | 534 | 897 | 1,520 | e622 | 585 |
| 6 | 13 | 244 | 248 | 997 | 281 | 1,620 | 792 | 539 | 680 | 1,180 | e480 | 429 |
| 7 | 8.7 | 281 | e185 | 867 | 288 | 1,530 | 905 | 538 | 1,820 | 988 | e450 | 354 |
| 8 | 9.3 | 190 | e200 | 774 | 290 | 1,310 | 1,260 | 530 | 2,110 | 927 | e570 | 317 |
| 9 | 10 | 153 | 212 | 744 | 260 | 1,180 | 1,590 | 524 | 1,400 | 794 | 426 | 291 |
| 10 | 10 | 137 | 197 | 660 | 273 | 1,100 | 1,760 | 541 | 1,070 | 766 | 780 | 270 |
| 11 | 17 | 414 | 308 | 583 | 283 | 986 | 2,360 | 739 | 878 | 802 | 1,500 | 251 |
| 12 | 74 | 1,180 | 870 | 524 | 280 | 907 | 1,860 | 688 | 1,290 | 710 | 1,000 | 244 |
| 13 | 111 | 1,370 | 759 | 482 | 266 | 841 | 1,490 | 586 | 1,390 | 576 | 1,130 | 975 |
| 14 | 78 | 678 | 1,860 | 462 | 258 | 838 | 1,250 | 521 | 1,050 | 628 | 682 | 926 |
| 15 | 54 | 479 | 1,300 | 436 | 361 | 797 | 1,100 | 483 | 3,130 | 643 | 506 | 821 |
| 16 | 66 | 628 | 886 | 397 | 386 | 751 | 982 | 1,370 | 1,530 | 506 | 420 | 715 |
| 17 | 380 | 2,080 | 682 | e375 | 893 | 720 | 896 | 1,320 | 1,580 | 457 | 437 | 565 |
| 18 | 199 | 1,830 | 564 | e345 | 1,310 | 680 | 823 | 2,650 | 2,480 | 420 | 385 | 944 |
| 19 | 105 | 1,020 | 495 | e315 | 808 | 645 | 1,080 | 2,730 | 2,120 | e408 | 522 | 16,600 |
| 20 | 72 | 772 | 736 | e350 | 484 | 4,440 | 964 | 1,800 | 3,810 | e385 | 374 | 8,540 |
| 21 | 61 | 627 | 838 | e320 | 642 | 7,540 | 821 | 1,560 | 2,670 | e340 | 304 | 2,420 |
| 22 | 49 | 572 | 631 | e290 | 5,550 | 2,430 | 784 | 1,540 | 1,860 | 384 | 275 | 1,880 |
| 23 | 41 | 480 | 554 | e270 | 9,920 | 1,870 | 747 | 1,280 | 1,460 | 359 | 268 | 6,920 |
| 24 | 36 | 409 | 498 | e245 | 3,900 | 1,500 | 698 | 1,400 | 1,190 | 360 | 229 | 3,540 |
| 25 | 33 | 370 | 844 | 340 | 2,540 | 1,260 | 665 | 1,190 | 1,010 | 322 | 210 | 2,200 |
| 26 | 47 | 338 | 939 | 305 | 1,780 | 1,110 | 658 | 1,700 | 870 | 296 | 200 | 1,750 |
| 27 | 95 | 312 | 643 | e300 | 1,380 | 1,100 | 670 | 1,300 | 769 | 283 | 196 | 1,430 |
| 28 | 86 | 286 | 546 | e285 | 1,180 | 931 | 647 | 1,290 | 923 | 276 | 260 | 1,480 |
| 29 | 103 | 267 | 493 | e270 | --- | 858 | 602 | 1,080 | 696 | 281 | 239 | 1,130 |
| 30 | 481 | 258 | 441 | 260 | --- | 1,330 | 568 | 1,030 | 604 | 290 | 1,120 | 933 |
| 31 | 586 | --- | 410 | 258 | --- | 1,680 | --- | 860 | --- | 290 | 607 | --- |
| TOTAL | 2,945.0 | 16,387 | 17,413 | 21,754 | 35,091 | 47,244 | 31,228 | 32,677 | 42,102 | 22,564 | 16,655 | 59,849 |
| MEAN | 95.0 | 546 | 562 | 702 | 1,253 | 1,524 | 1,041 | 1,054 | 1,403 | 728 | 537 | 1,995 |
| MAX | 586 | 2,080 | 1,860 | 3,800 | 9,920 | 7,540 | 2,360 | 2,730 | 3,810 | 3,750 | 1,500 | 16,600 |
| MIN | 8.7 | 128 | 185 | 245 | 258 | 645 | 568 | 483 | 603 | 276 | 196 | 244 |
| CFSM | 0.20 | 1.16 | 1.19 | 1.49 | 2.66 | 3.23 | 2.21 | 2.23 | 2.97 | 1.54 | 1.14 | 4.23 |
| IN. | 0.23 | 1.29 | 1.37 | 1.71 | 2.77 | 3.72 | 2.46 | 2.58 | 3.32 | 1.78 | 1.31 | 4.72 |

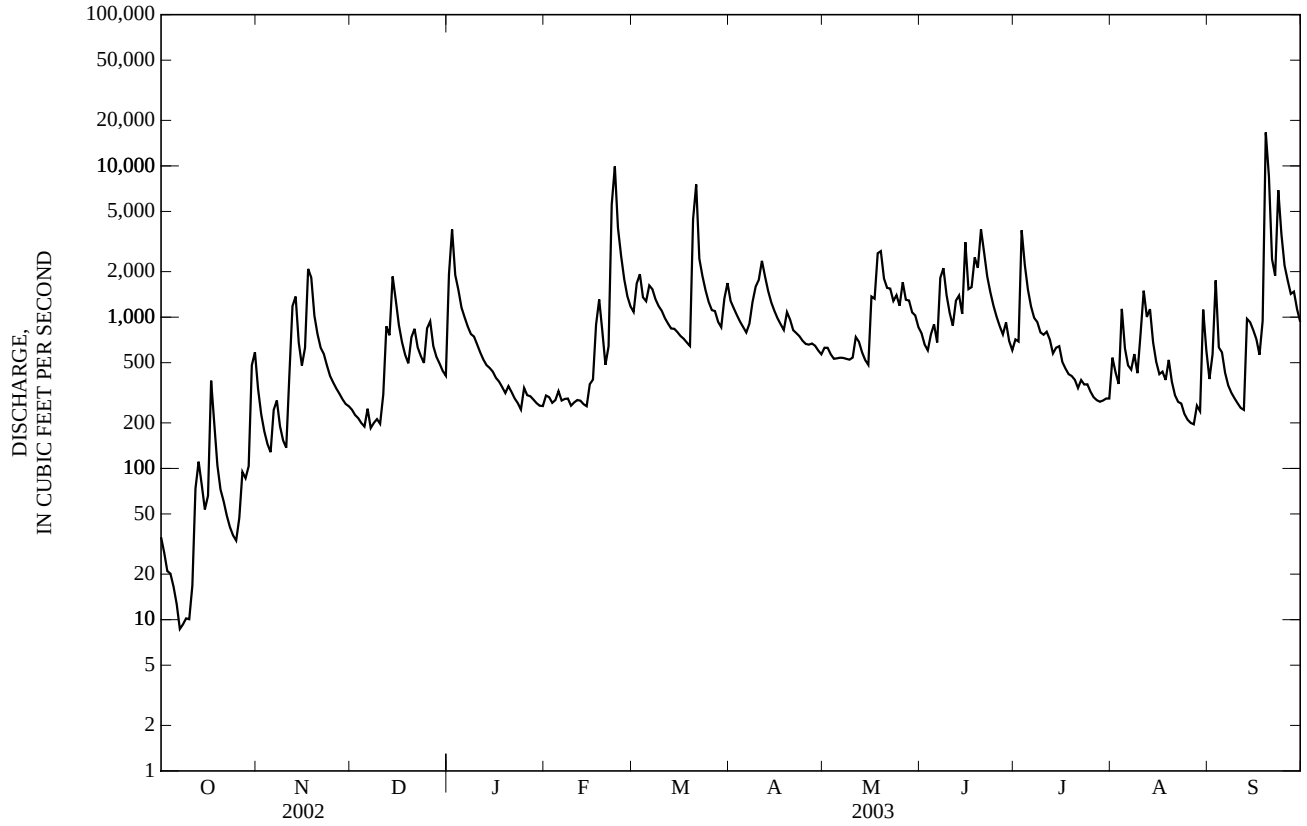
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 412 | 459 | 544 | 659 | 733 | 846 | 772 | 575 | 490 | 303 | 328 | 381 |
| MAX | 3,163 | 2,690 | 1,653 | 1,924 | 3,048 | 2,236 | 2,615 | 1,734 | 2,901 | 1,206 | 2,323 | 2,908 |
| (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 | 12.6 | 14.0 |
| (WY) | (1931) | (1931) | (1931) | (1966) | (1931) | (1931) | (1981) | (1956) | (1999) | (1999) | (2002) | (1954) |

01667500 RAPIDAN RIVER NEAR CULPEPER, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1931 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 75,915.7 | | 345,909.0 | | | |
| ANNUAL MEAN | 208 | | 948 | | 540 | |
| HIGHEST ANNUAL MEAN | | | | | 1,099 | 1973 |
| LOWEST ANNUAL MEAN | | | | | 132 | 2002 |
| HIGHEST DAILY MEAN | 2,080 | Nov 17 | 16,600 | Sep 19 | e43,500 | Jun 28, 1995 |
| LOWEST DAILY MEAN | 1.5 | Sep 18 | 8.7 | Oct 7 | 1.5 | Sep 18, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 2.1 | aSep 14 | 12 | Oct 5 | 2.1 | aSep 14, 2002 |
| MAXIMUM PEAK FLOW | | | 20,700 | Sep 19 | 59,300 | Jun 28, 1995 |
| MAXIMUM PEAK STAGE | | | 18.51 | Sep 19 | b30.40 | Jun 28, 1995 |
| INSTANTANEOUS LOW FLOW | | | 8.0 | Oct 7 | 1.2 | Sep 17, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.44 | | 2.01 | | 1.14 | |
| ANNUAL RUNOFF (INCHES) | 5.98 | | 27.26 | | 15.56 | |
| 10 PERCENT EXCEEDS | 487 | | 1,810 | | 1,070 | |
| 50 PERCENT EXCEEDS | 124 | | 631 | | 335 | |
| 90 PERCENT EXCEEDS | 10 | | 197 | | 82 | |

a Also Sept. 15, 2002.
b From high-water mark in gage house.
e Estimated.



## 01668000 RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA

LOCATION.--Lat 38°18'30", long 77°31'46", NAD83, Spotsylvania County, Hydrologic Unit 02080104, on right bank, along State Highway 618 (River Road), 3.1 mi upstream from Dominion Virginia Power dam, 0.7 mi downstream from Motts Run, and 5.3 mi upstream from Fredericksburg.

DRAINAGE AREA.--1,596 $mi^2$.

### 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 70 ft NGVD of 1929, from topographic map. Prior to Jan. 15, 1922, nonrecording gage, and Jan. 15, 1922, to Aug. 2, 1966, water-stage recorder at site 1.5 mi downstream, at datum 1.00 ft higher. Aug. 2, 1966 to Oct. 17, 2000, at same site, at datum of 55.18 ft. Oct. 17, 2000 to current year, at present site and datum.

REMARKS.--Records fair except those for periods with ice effect, Dec. 5-10 and Jan. 17-28, which are poor. Maximum discharge, 140,000 $ft^3/s$, from rating curve extended above 76,000 $ft^3/s$ on basis of flow-over-dam and slope-area measurements at gage heights 26.1 ft and 26.9 ft, site and datum then use.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1889 was probably several feet lower than that of Oct. 16, 1942.

REVISIONS.--The maximum discharges reported for water year 2001 have been revised to 22,300 $ft^3/s$, Mar. 22, 2001, gage height, 8.98 ft, and 21,200 $ft^3/s$, Mar. 30, 2001, gage height, 8.71 ft, superseding figures published in the report for 2001.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 16,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 2 | 0900 | 20,700 | 8.58 | Jun 21 | 0200 | 16,500 | 7.48 |
| Feb 23 | 1245 | 37,700 | 12.40 | Sep 20 | 1045 | *38,300 | *12.53 |
| Mar 21 | 1145 | 32,800 | 11.39 | Sep 24 | 0300 | 28,000 | 10.32 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 234 | 2,000 | 697 | 3,780 | 901 | 3,490 | 4,800 | 1,610 | 2,370 | 1,860 | 923 | 1,740 |
| 2 | 177 | 1,210 | 648 | 17,200 | 1,110 | 6,270 | 3,770 | 1,910 | 2,100 | 2,120 | 1,960 | 1,740 |
| 3 | 135 | 878 | 594 | 8,420 | 1,050 | 10,300 | 3,310 | 1,530 | 1,880 | 4,760 | 1,200 | 5,000 |
| 4 | 108 | 712 | 554 | 6,980 | 1,020 | 6,320 | 2,940 | 1,330 | 2,180 | e5,800 | 1,320 | 3,150 |
| 5 | 91 | 625 | e510 | 4,590 | 1,190 | 5,720 | 2,680 | 1,290 | 3,420 | e4,200 | 2,320 | 3,020 |
| 6 | 75 | 762 | e500 | 3,760 | 1,130 | 8,570 | 2,460 | 1,350 | 2,790 | e3,400 | 2,130 | 2,200 |
| 7 | 66 | 1,620 | e508 | 3,260 | 992 | 7,770 | 2,620 | 1,370 | 4,560 | e2,800 | 1,400 | 1,530 |
| 8 | 63 | 1,160 | e500 | 2,840 | 1,010 | 5,690 | 5,300 | 1,630 | 11,600 | 2,520 | 1,140 | 1,200 |
| 9 | 58 | 832 | e512 | 2,900 | 932 | 4,920 | 5,950 | 2,100 | 7,150 | 2,150 | 1,510 | 1,030 |
| 10 | 55 | 699 | e520 | 2,670 | 890 | 4,870 | 8,150 | 2,220 | 5,930 | 2,480 | 1,170 | 926 |
| 11 | 89 | 784 | 814 | 2,270 | 983 | 3,960 | 8,550 | 3,150 | 4,400 | 5,170 | 1,990 | 824 |
| 12 | 94 | 4,120 | 3,430 | 1,990 | 989 | 3,400 | 8,060 | 2,600 | 4,710 | 3,360 | 3,590 | 815 |
| 13 | 116 | 6,330 | 3,550 | 1,750 | 970 | 3,080 | 5,370 | 1,920 | 5,010 | 2,080 | 2,560 | 3,420 |
| 14 | 427 | 3,120 | 8,060 | 1,630 | 887 | 3,130 | 4,070 | 1,540 | 4,670 | 1,740 | 2,620 | 4,100 |
| 15 | 314 | 2,020 | 6,970 | 1,550 | 1,200 | 3,080 | 3,450 | 1,350 | 11,500 | 2,110 | 1,660 | 2,910 |
| 16 | 334 | 1,930 | 4,060 | 1,380 | 2,000 | 2,740 | 3,030 | 6,430 | 5,520 | 1,770 | 1,330 | 2,460 |
| 17 | 649 | 9,050 | 2,890 | e1,240 | 686 | 2,560 | 2,700 | 7,610 | 4,140 | 1,380 | 1,570 | 2,160 |
| 18 | 1,610 | 9,810 | 2,310 | e1,160 | 1,000 | 2,420 | 2,430 | 7,450 | 8,590 | 1,150 | 1,170 | 2,050 |
| 19 | 791 | 4,890 | 2,010 | e1,040 | 2,010 | 2,260 | 3,300 | 11,700 | 6,790 | 1,050 | 1,070 | 25,900 |
| 20 | 515 | 3,040 | 2,080 | e1,080 | 2,200 | 8,140 | 3,910 | 6,080 | 9,460 | 1,060 | 1,140 | 32,800 |
| 21 | 387 | 2,320 | 3,600 | e1,170 | 2,460 | 29,100 | 2,780 | 4,870 | 12,400 | 1,000 | 874 | 8,370 |
| 22 | 327 | 1,980 | 2,540 | e1,080 | 13,300 | 11,600 | 2,510 | 6,560 | 6,270 | 914 | 759 | 5,120 |
| 23 | 284 | 1,780 | 2,070 | e900 | 34,500 | 7,140 | 2,340 | 4,290 | 4,710 | 925 | 765 | 16,100 |
| 24 | 248 | 1,390 | 1,810 | e800 | 17,500 | 5,070 | 2,050 | 4,970 | 3,620 | 1,530 | 1,050 | 23,600 |
| 25 | 221 | 1,160 | 3,600 | e730 | 11,000 | 3,950 | 1,870 | 4,230 | 3,040 | 1,020 | 680 | 8,240 |
| 26 | 258 | 1,010 | 5,950 | e800 | 7,310 | e3,740 | 1,920 | 8,650 | 2,650 | 820 | 583 | 5,120 |
| 27 | 246 | 919 | 3,140 | e860 | 5,010 | e3,920 | 2,160 | 6,340 | 2,380 | 700 | 549 | 4,060 |
| 28 | 555 | 841 | 2,340 | e820 | 3,960 | e3,300 | 1,850 | 4,690 | 2,600 | 674 | 597 | 3,810 |
| 29 | 519 | 771 | 2,030 | 786 | --- | 2,670 | 1,600 | 3,760 | 2,320 | 977 | 1,150 | 3,440 |
| 30 | 1,150 | 726 | 1,790 | 898 | --- | 4,290 | 1,510 | 3,110 | 2,020 | 1,110 | 2,070 | 2,700 |
| 31 | 3,050 | --- | 1,600 | 837 | --- | 7,490 | --- | 2,720 | --- | 816 | 2,890 | --- |
| TOTAL | 13,246 | 68,489 | 72,187 | 81,171 | 118,190 | 180,960 | 107,440 | 120,360 | 150,780 | 63,446 | 45,740 | 179,535 |
| MEAN | 427 | 2,283 | 2,329 | 2,618 | 4,221 | 5,837 | 3,581 | 3,883 | 5,026 | 2,047 | 1,475 | 5,984 |
| MAX | 3,050 | 9,810 | 8,060 | 17,200 | 34,500 | 29,100 | 8,550 | 11,700 | 12,400 | 5,800 | 3,590 | 32,800 |
| MIN | 55 | 625 | 500 | 730 | 686 | 2,260 | 1,510 | 1,290 | 1,880 | 674 | 549 | 815 |
| CFSM | 0.27 | 1.43 | 1.46 | 1.64 | 2.64 | 3.66 | 2.24 | 2.43 | 3.15 | 1.28 | 0.92 | 3.75 |
| IN. | 0.31 | 1.60 | 1.68 | 1.89 | 2.75 | 4.22 | 2.50 | 2.81 | 3.51 | 1.48 | 1.07 | 4.18 |

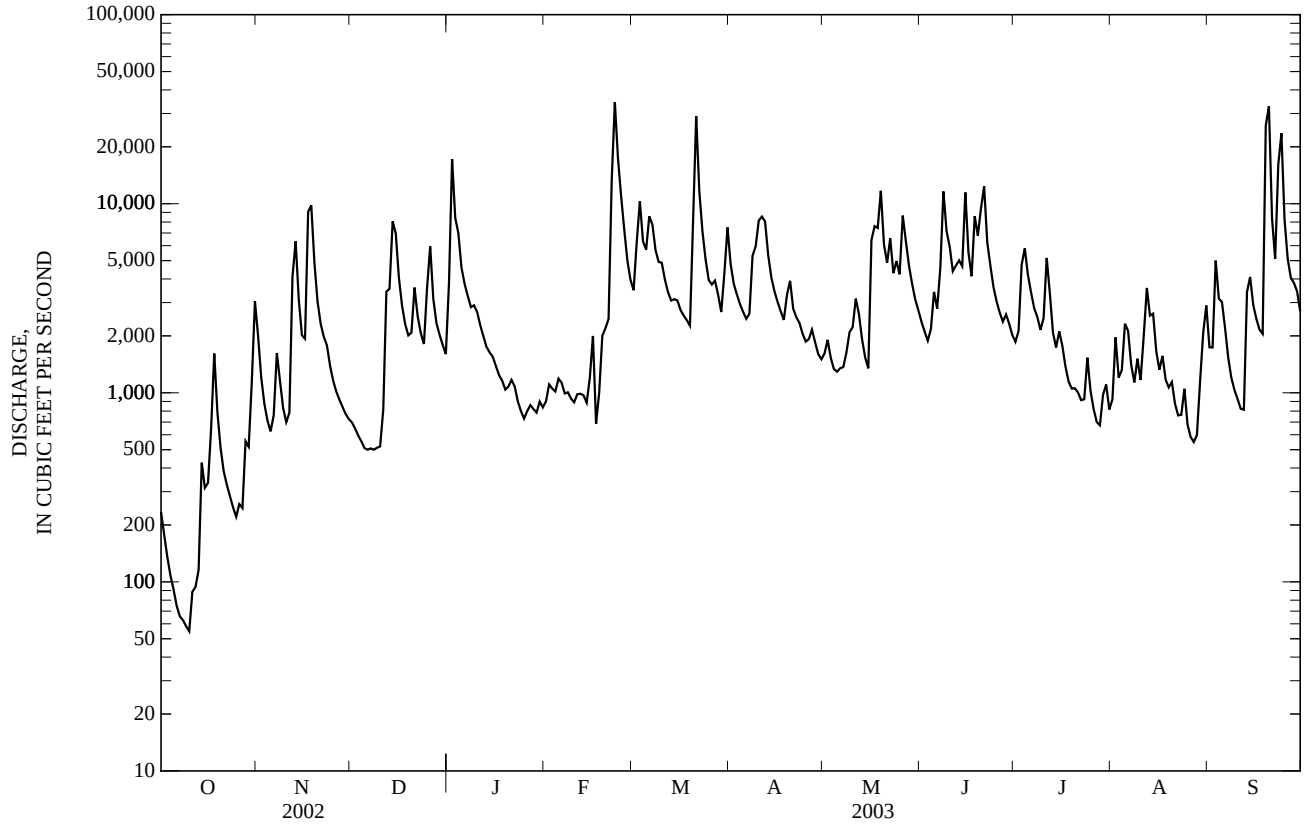
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1907 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 1,131 | 1,308 | 1,655 | 2,182 | 2,485 | 2,713 | 2,478 | 1,903 | 1,443 | 911 | 1,001 | 991 |
| MAX | 11,090 | 6,522 | 5,357 | 6,472 | 8,880 | 8,505 | 9,484 | 10,310 | 7,112 | 3,368 | 7,190 | 6,924 |
| (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) |

01668000 RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1907 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 287,246 | | 1,201,544 | | | |
| ANNUAL MEAN | 787 | | 3,292 | | 1,679 | |
| HIGHEST ANNUAL MEAN | | | | | 3,292 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 440 | 1931 |
| HIGHEST DAILY MEAN | 9,810 | Nov 18 | 34,500 | Feb 23 | 127,000 | Oct 16, 1942 |
| LOWEST DAILY MEAN | 12 | Aug 22 | 55 | Oct 10 | 5.0 | aOct 11, 1930 |
| ANNUAL SEVEN-DAY MINIMUM | 13 | Aug 19 | 71 | Oct 5 | 8.3 | Oct 9, 1930 |
| MAXIMUM PEAK FLOW | | | 38,300 | Sep 20 | 140,000 | Oct 16, 1942 |
| MAXIMUM PEAK STAGE | | | 12.53 | Sep 20 | b26.90 | Oct 16, 1942 |
| INSTANTANEOUS LOW FLOW | | | 51 | Oct 10 | 5.0 | Oct 11, 1930 |
| ANNUAL RUNOFF (CFSM) | 0.49 | | 2.06 | | 1.05 | |
| ANNUAL RUNOFF (INCHES) | 6.70 | | 28.01 | | 14.29 | |
| 10 PERCENT EXCEEDS | 1,940 | | 7,140 | | 3,330 | |
| 50 PERCENT EXCEEDS | 401 | | 2,100 | | 978 | |
| 90 PERCENT EXCEEDS | 49 | | 596 | | 230 | |

a Also Oct. 12, 1930.
b From floodmarks, site and datum then in use.
e Estimated.



01668000 RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA—Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1929-30, 1956, 1967-74, 1978 to 1999, 2001 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.

REMARKS.--Missing gage height values indicate periods that were affected by ice; for these samples only the mean daily discharge is reported.

COOPERATION.--Water samples were collected by the U.S. Geological Survey and analyzed by either the U.S. Geological Survey (Agency Code 80020) or by the Virginia Division of Consolidated Laboratory Services (VDCLS, Agency Code 85116), using analytical methods approved by the U.S. Geological Survey. Analyses performed by VDCLS are reported to U.S. Geological Survey rounding specifications. Results of chemical analyses provided by VDCLS were quality-assured and approved by the U.S. Geological Survey.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Time | Sample type | Agency analyzing sample, code (00028) | Gage height, feet (00065) | Instantaneous discharge, cfs (00061) | Turbidity, NTU (00076) | Barometric pressure, mm Hg (00025) | Dissolved oxygen, mg/L (00300) | Dissolved oxygen, percent of saturation (00301) | pH, water, unfltrd field, std units (00400) | Specif. conductance, wat unf uS/cm 25 degC (00095) | Temperature, air, deg C (00020) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | |
| 02... | 1120 | Environmental | 85116 | 1.69 | 175 | 0.80 | 760 | 8.6 | 101 | 7.9 | 225 | 25.0 |
| 15... | 1350 | Environmental | 85116 | 1.90 | 296 | 1.8 | 757 | 12.6 | 128 | 7.9 | 162 | 16.0 |
| 18... | 0900 | Environmental | 85116 | 2.83 | 1,790 | 20 | 761 | 8.1 | 77 | 7.1 | 127 | 8.0 |
| 31... | 0945 | Environmental | 85116 | 3.37 | 3,250 | 85 | 760 | 10.3 | 91 | 5.7 | 132 | 12.0 |
| NOV | | | | | | | | | | | | |
| 05... | 1215 | Environmental | 85116 | 2.22 | 601 | 2.5 | 761 | 11.9 | 103 | 6.9 | 95 | 11.0 |
| 13... | 1110 | Blank | 85116 | -- | -- | 0.50 | -- | -- | -- | -- | -- | -- |
| 13... | 1115 | Environmental | 85116 | 4.44 | 6,770 | 190 | 756 | 8.9 | 84 | 6.3 | 97 | 11.0 |
| 14... | 1115 | Environmental | 85116 | 3.32 | 3,100 | 67 | 758 | 12.1 | 109 | 6.6 | 97 | 16.0 |
| 19... | 1045 | Environmental | 85116 | 3.87 | 4,740 | 49 | 762 | 12.0 | 101 | 6.6 | 93 | 8.5 |
| DEC | | | | | | | | | | | | |
| 03... | 1115 | Environmental | 85116 | 2.27 | 601 | 6.6 | 767 | 13.3 | 97 | 6.4 | 98 | -2.0 |
| 13... | 0945 | Environmental | 85116 | 3.49 | 3,530 | 40 | 762 | -- | -- | 6.9 | 109 | 0.0 |
| 13... | 1000 | Replicate | 85116 | 3.50 | 3,560 | 41 | -- | -- | -- | -- | -- | -- |
| 18... | 1000 | Environmental | 85116 | 3.04 | 2,260 | 12 | 770 | 14.2 | 106 | 6.8 | 91 | 4.0 |
| JAN | | | | | | | | | | | | |
| 03... | 1215 | Environmental | 85116 | 4.76 | 7,700 | 72 | 753 | 10.6 | 88 | 6.4 | 74 | 5.0 |
| 07... | 1000 | Environmental | 85116 | 3.42 | 3,310 | 17 | 762 | 13.2 | 95 | 7.1 | 84 | -2.0 |
| 07... | 1015 | Replicate | 85116 | 3.42 | 3,310 | 16 | -- | -- | -- | -- | -- | -- |
| 22... | 0945 | Environmental | 85116 | -- | 1,080 | 4.9 | 759 | 14.5 | 100 | 6.2 | 96 | -6.0 |
| 22... | 1000 | Replicate | 80020 | -- | 1,080 | -- | -- | -- | -- | -- | -- | -- |
| FEB | | | | | | | | | | | | |
| 05... | 0900 | Environmental | 85116 | 2.60 | 1,150 | 3.5 | 759 | 13.9 | 99 | 7.3 | 100 | -1.0 |
| 23... | 1300 | Environmental | 85116 | 12.38 | 37,600 | 240 | 737 | 13.6 | 98 | 6.1 | 68 | 5.0 |
| 23... | 1305 | Replicate | 80020 | 12.38 | 37,500 | -- | -- | -- | -- | -- | -- | -- |
| 24... | 1100 | Environmental | 85116 | 7.82 | 17,700 | 75 | 763 | 13.2 | 96 | 6.6 | 73 | 5.5 |
| MAR | | | | | | | | | | | | |
| 11... | 0930 | Environmental | 85116 | 3.69 | 3,930 | 35 | 761 | 12.4 | 100 | 7.4 | 73 | 7.0 |
| 21... | 1100 | Environmental | 85116 | 11.34 | 32,600 | 450 | 753 | 11.4 | 95 | 6.0 | 63 | 11.0 |
| APR | | | | | | | | | | | | |
| 03... | 1000 | Environmental | 85116 | 3.51 | 3,340 | 15 | 754 | 11.6 | 110 | 7.3 | 78 | 25.0 |
| MAY | | | | | | | | | | | | |
| 27... | 1030 | Environmental | 85116 | 4.58 | 6,400 | 39 | 761 | 11.2 | 116 | 6.1 | 85 | 15.0 |
| JUN | | | | | | | | | | | | |
| 09... | 1210 | Blank | 85116 | -- | -- | 0.25 | -- | -- | -- | -- | -- | -- |
| 09... | 1215 | Environmental | 85116 | 4.75 | 7,110 | 39 | 752 | 8.9 | 99 | 7.4 | 84 | -- |
| 12... | 1045 | Environmental | 85116 | 3.94 | 4,320 | 13 | 754 | 8.6 | 99 | 7.5 | 85 | 24.5 |
| JUL | | | | | | | | | | | | |
| 02... | 1115 | Environmental | 85116 | 3.16 | 2,160 | 3.2 | 755 | 8.2 | 99 | 7.6 | 87 | 23.0 |
| AUG | | | | | | | | | | | | |
| 13... | 1100 | Environmental | 85116 | 3.10 | 2,020 | 71 | 762 | 7.5 | 90 | 7.3 | 80 | 26.0 |
| SEP | | | | | | | | | | | | |
| 11... | 1200 | Environmental | 85116 | 2.55 | 819 | 4.0 | 762 | 9.8 | 110 | 8.1 | 98 | 21.5 |
| 19... | 1230 | Environmental | 85116 | 10.55 | 29,000 | 300 | 754 | 7.8 | 86 | 6.9 | 68 | 23.5 |
| 22... | 1045 | Environmental | 85116 | 4.22 | 5,120 | 55 | 760 | 10.4 | 115 | 7.1 | 71 | 23.5 |
| 23... | 1230 | Environmental | 85116 | 8.16 | 19,000 | 130 | 752 | 8.6 | 97 | 7.0 | 74 | 23.5 |

01668000 RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Temperature, water, deg C (00010) | Silica, water, fltrd, mg/L (00955) | Residue fixed non-filterable, mg/L (00540) | Residue total at 105 deg. C, suspended, mg/L (00530) | Residue volatile, suspended, mg/L (00535) | Ammonia + org-N, water, fltrd, mg/L as N (00623) | Ammonia + org-N, water, unfltrd mg/L as N (00625) | Ammonia water, fltrd, mg/L as N (00608) | Nitrate water, fltrd, mg/L as N (00618) | Nitrite + nitrate water fltrd, mg/L as N (00631) | Nitrite water, fltrd, mg/L as N (00613) | Orthophosphate, water, fltrd, mg/L as P (00671) | Phosphorus, water, fltrd, mg/L (00666) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 02... | 23.0 | 4.00 | 3 | 3 | 3 | -- | -- | 0.004 | M | 0.004 | 0.002 | 0.009 | 0.009 |
| 15... | 16.1 | 4.30 | 3 | 3 | 3 | -- | -- | 0.004 | M | 0.004 | 0.002 | 0.006 | 0.011 |
| 18... | 12.9 | 8.00 | 19 | 24 | 5 | -- | -- | 0.016 | 0.49 | 0.491 | 0.003 | 0.015 | 0.030 |
| 31... | 10.0 | 10.1 | 78 | 95 | 17 | -- | -- | 0.060 | 0.89 | 0.893 | 0.006 | 0.033 | 0.045 |
| NOV | | | | | | | | | | | | | |
| 05... | 9.0 | 10.6 | <3 | <3 | <3 | -- | -- | <0.004 | 0.85 | 0.850 | <0.002 | 0.014 | 0.033 |
| 13... | -- | <0.100 | <3 | <3 | <3 | -- | -- | <0.004 | <0.004 | <0.004 | <0.002 | 0.004 | 0.007 |
| 13... | 12.4 | 9.90 | 151 | 180 | 29 | -- | -- | 0.032 | 0.88 | 0.883 | 0.008 | 0.034 | 0.058 |
| 14... | 10.4 | 10.8 | 44 | 53 | 9 | -- | -- | 0.030 | 0.92 | 0.922 | 0.004 | 0.024 | 0.042 |
| 19... | 8.2 | 10.8 | 40 | 47 | 7 | -- | -- | 0.028 | 1.02 | 1.02 | 0.003 | 0.029 | 0.043 |
| DEC | | | | | | | | | | | | | |
| 03... | 2.3 | 11.8 | <3 | 3 | <3 | -- | -- | <0.004 | 1.00 | 1.00 | <0.002 | 0.016 | 0.022 |
| 13... | 1.4 | 10.1 | 30 | 38 | 8 | -- | -- | 0.092 | 0.91 | 0.912 | 0.004 | 0.035 | 0.057 |
| 13... | -- | 10.1 | 31 | 38 | 7 | -- | -- | 0.093 | 0.89 | 0.894 | 0.004 | 0.034 | 0.046 |
| 18... | 3.5 | 12.2 | 8 | 10 | <3 | -- | -- | 0.007 | 1.17 | 1.18 | <0.002 | 0.016 | 0.026 |
| JAN | | | | | | | | | | | | | |
| 03... | 6.8 | 9.30 | 105 | 122 | 17 | -- | -- | 0.041 | 0.86 | 0.862 | 0.004 | 0.016 | 0.038 |
| 07... | 2.0 | 11.6 | 13 | 16 | 3 | -- | -- | 0.022 | 1.07 | 1.07 | 0.002 | 0.011 | 0.024 |
| 07... | -- | 11.7 | 14 | 17 | 3 | -- | -- | 0.022 | 1.06 | 1.06 | 0.002 | 0.011 | 0.017 |
| 22... | 0.1 | 12.6 | 3 | 3 | 3 | -- | -- | 0.019 | 1.14 | 1.14 | 0.002 | 0.013 | 0.017 |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| FEB | | | | | | | | | | | | | |
| 05... | 1.2 | 10.8 | <3 | 3 | <3 | -- | -- | 0.013 | 0.98 | 0.981 | <0.002 | 0.009 | 0.015 |
| 23... | 0.5 | 5.00 | 353 | 398 | 45 | -- | -- | 0.193 | 0.71 | 0.713 | 0.004 | 0.015 | 0.075 |
| 23... | -- | 5.0 | 252 | 300 | 48 | 0.46 | 1.7 | 0.169 | -- | 0.681 | -- | 0.013 | <0.04 |
| 24... | 2.2 | 7.20 | 144 | 163 | 19 | -- | -- | 0.128 | 0.99 | 0.991 | 0.005 | 0.028 | 0.048 |
| MAR | | | | | | | | | | | | | |
| 11... | 6.0 | 10.4 | 36 | 41 | 5 | -- | -- | 0.009 | 0.81 | 0.814 | <0.002 | 0.012 | 0.016 |
| 21... | 7.2 | 5.80 | 354 | 379 | 25 | -- | -- | 0.182 | 0.57 | 0.573 | 0.006 | 0.042 | -- |
| APR | | | | | | | | | | | | | |
| 03... | 12.5 | 10.2 | 11 | 13 | <3 | -- | -- | 0.004 | 0.65 | 0.651 | <0.002 | 0.010 | 0.013 |
| MAY | | | | | | | | | | | | | |
| 27... | 16.8 | 7.90 | 51 | 58 | 7 | -- | -- | 0.016 | 0.54 | 0.544 | 0.004 | 0.030 | 0.029 |
| JUN | | | | | | | | | | | | | |
| 09... | -- | <0.100 | <3 | <3 | <3 | -- | -- | 0.004 | <0.004 | <0.004 | <0.002 | 0.002 | 0.010 |
| 09... | 19.8 | 11.5 | 46 | 55 | 9 | -- | -- | 0.022 | 0.59 | 0.593 | 0.003 | 0.027 | 0.052 |
| 12... | 22.1 | 13.0 | 12 | 16 | 4 | -- | -- | <0.004 | 0.62 | 0.620 | <0.002 | 0.015 | 0.027 |
| JUL | | | | | | | | | | | | | |
| 02... | 24.4 | 12.2 | 3 | 4 | <3 | -- | -- | <0.004 | 0.58 | 0.582 | <0.002 | 0.014 | 0.017 |
| AUG | | | | | | | | | | | | | |
| 13... | 24.9 | 9.50 | 50 | 60 | 10 | -- | -- | 0.062 | 0.56 | 0.563 | 0.004 | 0.035 | 0.066 |
| SEP | | | | | | | | | | | | | |
| 11... | 21.1 | 12.6 | <3 | 3 | <3 | -- | -- | <0.004 | 0.45 | 0.448 | 0.002 | 0.017 | 0.026 |
| 19... | 19.5 | 6.90 | 424 | 488 | 64 | -- | -- | 0.042 | 0.43 | 0.434 | 0.007 | 0.032 | 0.065 |
| 22... | 20.1 | 12.7 | 57 | 65 | 8 | -- | -- | 0.021 | 0.67 | 0.671 | <0.002 | 0.019 | 0.034 |
| 23... | 20.6 | 11.0 | 232 | 255 | 23 | -- | -- | <0.004 | 0.50 | 0.499 | 0.002 | 0.023 | 0.048 |

01668000 RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Phosphorus, water, unfltrd mg/L (00665) | Total nitrogen, water, fltrd, mg/L (00602) | Phosphorus, suspnd sedimnt total, mg/L (00667) | Total nitrogen, suspnd sedimnt total, mg/L (00601) | Total carbon, suspnd sedimnt total, mg/L (00694) | Inorganic carbon, suspnd sedimnt total, mg/L (00688) | Organic carbon, water, fltrd, mg/L (00681) | Pheophytin a, phytoplankton, ug/L (62360) | Chlorophyll a phytoplankton, fluoro, ug/L (70953) | Suspnd. sediment, sieve diametr percent <.063mm (70331) | Suspended sediment concentration mg/L (80154) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | |
| 02... | -- | 0.29 | 0.004 | -- | 0.3 | -- | -- | -- | -- | -- | M |
| 15... | -- | 0.24 | 0.004 | 0.03 | 0.2 | -- | -- | -- | -- | -- | M |
| 18... | -- | 0.71 | 0.044 | 0.22 | 1.6 | -- | -- | -- | -- | 95 | 22 |
| 31... | -- | 1.2 | 0.150 | 0.71 | 5.5 | -- | -- | -- | -- | 94 | 95 |
| NOV | | | | | | | | | | | |
| 05... | -- | 0.99 | 0.005 | 0.03 | 0.1 | -- | -- | -- | -- | 75 | 1 |
| 13... | -- | 0.11 | 0.001 | 0.01 | M | -- | -- | -- | -- | -- | -- |
| 13... | -- | 1.6 | 0.251 | 1.2 | 10.2 | -- | -- | -- | -- | 93 | 209 |
| 14... | -- | 1.4 | 0.109 | 0.35 | 3.0 | -- | -- | -- | -- | 92 | 57 |
| 19... | -- | 1.4 | -- | 0.29 | 2.5 | -- | -- | -- | -- | 96 | 53 |
| DEC | | | | | | | | | | | |
| 03... | -- | 1.1 | 0.010 | 0.02 | 0.2 | -- | -- | -- | -- | -- | 4 |
| 13... | -- | 1.5 | 0.078 | 0.28 | 2.3 | -- | -- | -- | -- | 94 | 43 |
| 13... | -- | 1.4 | 0.076 | 0.24 | 2.3 | -- | -- | -- | -- | 96 | 43 |
| 18... | -- | 1.4 | 0.028 | 0.08 | 0.7 | -- | -- | -- | -- | -- | 12 |
| JAN | | | | | | | | | | | |
| 03... | -- | 1.5 | 0.143 | 0.53 | 5.5 | -- | -- | -- | -- | 90 | 150 |
| 07... | -- | 1.3 | 0.021 | 0.10 | 0.8 | -- | -- | -- | -- | -- | 20 |
| 07... | -- | 1.3 | 0.025 | 0.10 | 0.8 | -- | -- | -- | -- | -- | -- |
| 22... | -- | 1.3 | 0.011 | 0.02 | 0.2 | -- | -- | -- | -- | -- | 2 |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 4 |
| FEB | | | | | | | | | | | |
| 05... | -- | 1.1 | 0.015 | 0.04 | 0.3 | -- | -- | -- | -- | -- | 5 |
| 23... | -- | 1.4 | 0.825 | 1.3 | 12.6 | -- | -- | -- | -- | 50 | 749 |
| 23... | 0.63 | 1.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 24... | -- | 1.5 | 0.204 | 0.14 | 1.2 | -- | -- | -- | -- | 72 | 259 |
| MAR | | | | | | | | | | | |
| 11... | -- | 0.87 | 0.050 | 0.15 | 1.4 | -- | -- | -- | -- | -- | 85 |
| 21... | -- | 1.3 | 0.374 | 1.1 | 10.0 | -- | -- | -- | -- | 48 | 788 |
| APR | | | | | | | | | | | |
| 03... | -- | 0.76 | 0.022 | 0.08 | 0.7 | -- | -- | -- | -- | -- | 12 |
| MAY | | | | | | | | | | | |
| 27... | -- | 0.57 | 0.080 | 0.30 | 2.7 | -- | -- | 3.2 | 1.1 | 58 | 96 |
| JUN | | | | | | | | | | | |
| 09... | -- | 0.04 | 0.010 | 0.02 | 0.2 | -- | -- | <0.5 | <0.5 | 43 | 2 |
| 09... | -- | 0.88 | 0.068 | 0.29 | 3.9 | -- | -- | <0.5 | 1.7 | 80 | 72 |
| 12... | -- | 0.79 | 0.028 | 0.08 | 0.9 | -- | -- | <0.5 | 1.1 | -- | 16 |
| JUL | | | | | | | | | | | |
| 02... | -- | 0.73 | 0.013 | -- | 0.3 | -- | -- | <0.5 | 1.5 | -- | 40 |
| AUG | | | | | | | | | | | |
| 13... | -- | 0.94 | 0.109 | 0.18 | 1.5 | <0.02 | 5.5 | 2.7 | 2.2 | -- | 65 |
| SEP | | | | | | | | | | | |
| 11... | -- | 0.64 | 0.026 | <0.01 | 0.2 | M | 2.2 | <0.5 | <0.5 | -- | 3 |
| 19... | -- | 1.2 | 0.504 | 1.4 | 13.5 | M | 8.1 | 12.7 | 7.1 | 79 | 633 |
| 22... | -- | 0.76 | 0.047 | 0.23 | 2.2 | <0.02 | 2.6 | 1.2 | 1.8 | 82 | 81 |
| 23... | -- | 0.82 | 0.094 | 0.84 | 8.6 | 0.1 | 5.7 | 2.8 | 3.5 | 68 | 324 |

Remark codes used in this table:
< -- Less than
M-- Presence verified, not quantified

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## 01669000 PISCATAWAY CREEK NEAR TAPPAHANNOCK, VA

LOCATION.--Lat 37°52'37", long 76°54'02", NAD83, 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 $mi^2$.

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 0.50 ft NGVD of 1929. Prior to May 2, 2001, at same site, at datum 2.00 ft higher.

REMARKS.--Records good except those for periods of doubtful gage-height record, Oct. 3-10, 19-26, Nov. 2-6, 8-12, 15-17, Nov. 20 to Dec. 3, and Mar. 9-19, and period with ice effect, Jan. 17-30, which are fair. Maximum discharge, 2,380 $ft^3/s$, from rating curve extended above 1,400 $ft^3/s$. 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 250 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| May 26 | 1915 | 550 | 6.75 | Sep 18 | 2400 | *783 | *7.52 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.80 | 22 | e8.8 | 20 | 18 | 40 | 50 | 36 | 68 | 29 | 62 | 38 |
| 2 | 0.88 | e18 | e8.5 | 24 | 18 | 42 | 45 | 33 | 60 | 29 | 52 | 37 |
| 3 | e0.57 | e15 | e8.0 | 22 | 17 | 42 | 42 | 31 | 53 | 55 | 53 | 36 |
| 4 | e0.38 | e12 | 8.3 | 22 | 17 | 37 | 40 | 30 | 50 | 80 | 56 | 46 |
| 5 | e0.30 | e14 | 9.6 | 19 | 17 | 39 | 38 | 30 | 53 | 55 | 54 | 52 |
| 6 | e0.24 | e19 | 11 | 17 | 17 | 47 | 38 | 35 | 51 | 36 | 62 | 44 |
| 7 | e0.18 | 25 | 12 | 17 | 19 | 53 | 68 | 33 | 60 | 28 | 66 | 37 |
| 8 | e0.14 | e23 | 12 | 17 | 20 | 41 | 109 | 36 | 89 | 24 | 59 | 33 |
| 9 | e0.12 | e19 | 12 | 17 | 20 | e34 | 92 | 45 | 71 | 24 | 54 | 32 |
| 10 | e0.50 | e16 | 12 | 17 | e19 | e28 | 101 | 43 | 63 | 31 | 53 | 32 |
| 11 | 2.3 | e13 | 14 | 16 | e17 | e26 | 104 | 55 | 51 | 32 | 56 | 31 |
| 12 | 4.9 | e20 | 18 | 16 | e16 | e23 | 85 | 41 | 44 | 32 | 60 | 43 |
| 13 | 7.5 | 45 | 18 | 16 | e15 | e23 | 62 | 32 | 42 | 24 | 67 | 141 |
| 14 | 7.6 | 38 | 20 | 16 | e14 | e24 | 54 | 27 | 41 | 23 | 51 | 122 |
| 15 | 7.0 | e27 | 18 | 16 | 24 | e26 | 50 | 23 | 48 | 30 | 42 | 63 |
| 16 | 11 | e19 | 16 | 16 | 27 | e24 | 47 | 22 | 53 | 32 | 38 | 49 |
| 17 | 12 | e24 | 15 | e15 | e27 | e23 | 44 | 25 | 48 | 26 | 39 | 44 |
| 18 | 12 | 43 | 15 | e13 | e24 | e23 | 44 | 36 | 59 | 22 | 39 | 119 |
| 19 | e10 | 35 | 15 | e12 | e23 | e22 | 57 | 61 | 69 | 25 | 37 | 552 |
| 20 | e8.0 | e23 | 16 | e14 | e28 | 92 | 54 | 45 | 80 | 34 | 34 | 219 |
| 21 | e7.0 | e18 | 17 | e13 | 34 | 161 | 46 | 35 | 65 | 36 | 33 | 86 |
| 22 | e5.8 | e14 | 17 | e12 | 51 | 76 | 42 | 57 | 53 | 37 | 32 | 60 |
| 23 | e5.5 | e13 | 16 | e11 | 70 | 55 | 40 | 74 | 44 | 51 | 39 | 100 |
| 24 | e6.4 | e11 | 16 | e11 | 49 | 48 | 42 | 68 | 38 | 63 | 36 | 183 |
| 25 | e5.6 | e10 | 22 | e12 | 37 | 46 | 40 | 67 | 36 | 50 | 30 | 97 |
| 26 | e12 | e9.7 | 25 | e11 | 33 | 40 | 42 | 365 | 31 | 37 | 29 | 68 |
| 27 | 21 | e9.4 | 20 | e10 | 34 | 39 | 49 | 250 | 29 | 31 | 28 | 59 |
| 28 | 19 | e9.0 | 18 | e12 | 41 | 39 | 43 | 123 | 28 | 30 | 29 | 55 |
| 29 | 19 | e8.6 | 17 | e13 | --- | 40 | 37 | 94 | 28 | 41 | 30 | 51 |
| 30 | 24 | e9.2 | 17 | e15 | --- | 59 | 34 | 80 | 29 | 66 | 30 | 47 |
| 31 | 26 | --- | 17 | 18 | --- | 66 | --- | 68 | --- | 88 | 36 | --- |
| TOTAL | 237.71 | 581.9 | 469.2 | 480 | 746 | 1,378 | 1,639 | 2,000 | 1,534 | 1,201 | 1,386 | 2,576 |
| MEAN | 7.67 | 19.4 | 15.1 | 15.5 | 26.6 | 44.5 | 54.6 | 64.5 | 51.1 | 38.7 | 44.7 | 85.9 |
| MAX | 26 | 45 | 25 | 24 | 70 | 161 | 109 | 365 | 89 | 88 | 67 | 552 |
| MIN | 0.12 | 8.6 | 8.0 | 10 | 14 | 22 | 34 | 22 | 28 | 22 | 28 | 31 |
| CFSM | 0.27 | 0.69 | 0.54 | 0.55 | 0.95 | 1.59 | 1.95 | 2.30 | 1.83 | 1.38 | 1.60 | 3.07 |
| IN. | 0.32 | 0.77 | 0.62 | 0.64 | 0.99 | 1.83 | 2.18 | 2.66 | 2.04 | 1.60 | 1.84 | 3.42 |

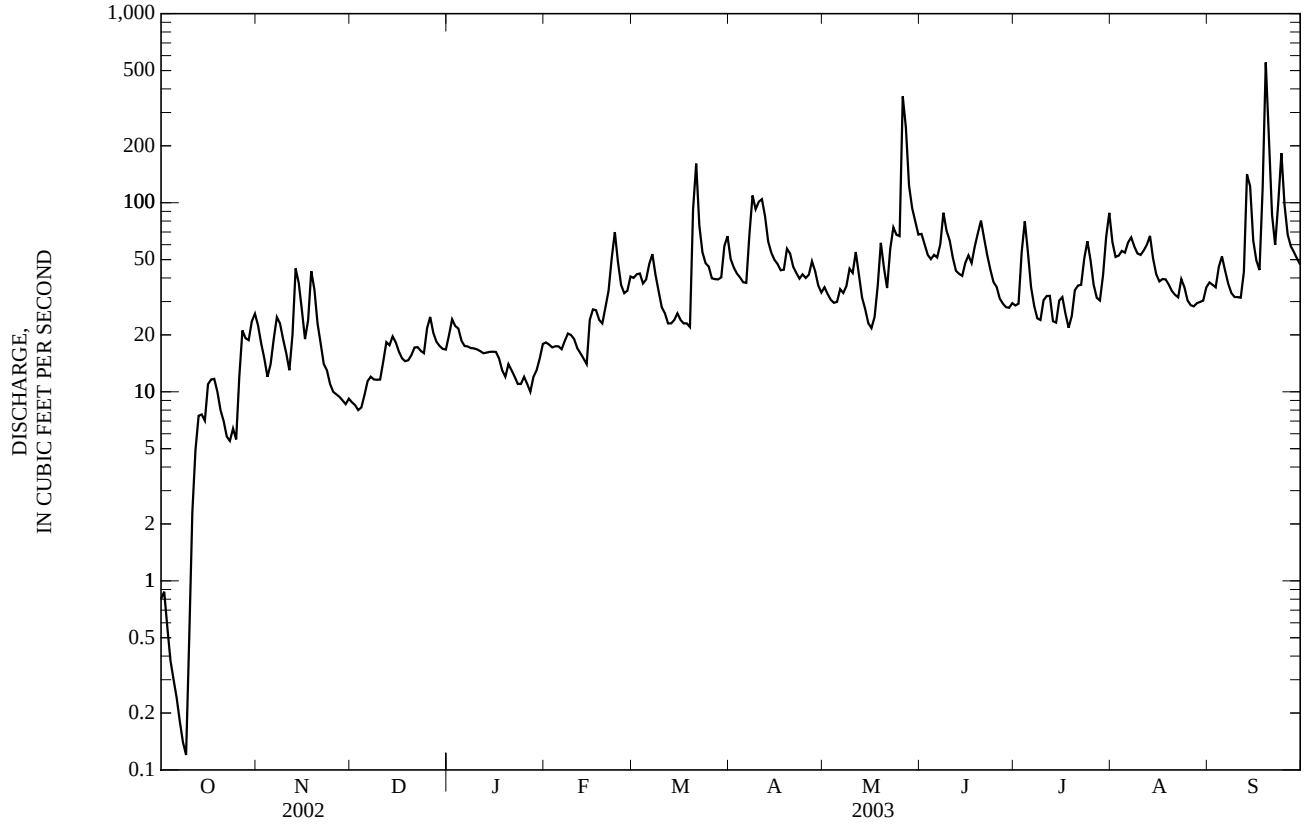
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 18.4 | 26.1 | 29.8 | 36.6 | 43.4 | 51.9 | 48.1 | 36.3 | 25.1 | 17.7 | 17.4 | 17.0 |
| MAX | 63.4 | 74.1 | 74.7 | 88.4 | 124 | 118 | 109 | 87.0 | 111 | 105 | 88.0 | 85.9 |
| (WY) | (1980) | (1980) | (1997) | (1978) | (1998) | (1994) | (1958) | (1958) | (1972) | (1975) | (1955) | (2003) |
| MIN | 1.30 | 6.30 | 9.20 | 7.93 | 14.0 | 13.5 | 13.4 | 5.19 | 1.12 | 0.74 | 0.18 | 0.28 |
| (WY) | (1955) | (1955) | (1966) | (1955) | (1955) | (1981) | (1985) | (1999) | (1999) | (2002) | (2002) | (1954) |

01669000 PISCATAWAY CREEK NEAR TAPPAHANNOCK, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1952 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 3,796.14 | | 14,228.81 | | | |
| ANNUAL MEAN | 10.4 | | 39.0 | | 30.6 | |
| HIGHEST ANNUAL MEAN | | | | | 56.8 | 1958 |
| LOWEST ANNUAL MEAN | | | | | 9.24 | 2002 |
| HIGHEST DAILY MEAN | 45 | Nov 13 | 552 | Sep 19 | 1,080 | Aug 13, 1955 |
| LOWEST DAILY MEAN | 0.00 | aAug 9 | e0.12 | Oct 9 | 0.00 | bAug 11, 1999 |
| ANNUAL SEVEN-DAY MINIMUM | 0.00 | cAug 9 | e0.27 | Oct 4 | 0.00 | cAug 9, 2002 |
| MAXIMUM PEAK FLOW | | | 783 | Sep 18 | 2,380 | Aug 20, 1969 |
| MAXIMUM PEAK STAGE | | | d7.52 | Sep 18 | f7.52 | gAug 20, 1969 |
| INSTANTANEOUS LOW FLOW | | | (h) | | 0.00 | (j) |
| ANNUAL RUNOFF (CFSM) | 0.37 | | 1.39 | | 1.09 | |
| ANNUAL RUNOFF (INCHES) | 5.04 | | 18.90 | | 14.83 | |
| 10 PERCENT EXCEEDS | 23 | | 67 | | 62 | |
| 50 PERCENT EXCEEDS | 10 | | 32 | | 22 | |
| 90 PERCENT EXCEEDS | 0.13 | | 11 | | 4.9 | |

a Also Aug. 10 to Sept. 1, 2002.
b Also Aug. 12, 13, 1999 and Aug. 9 to Sept. 1, 2002.
c Many days in August 2002.
d Backwater from beaver dam.
e Estimated.
f From high-water mark in well.
g Also Sept. 18, 2003.
h Not determined.
j No flow part or all of many days in August 1999 and July to September 2002.



## 01669520 DRAGON SWAMP AT MASCOT, VA

LOCATION.--Lat 37°38'02", long 76°41'47", NAD83, 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 $mi^2$.

PERIOD OF RECORD.--August 1981 to current year.

GAGE.--Water-stage recorder. Datum of gage is 21.60 ft NGVD of 1929.

REMARKS.--Records good except those for periods with ice effect, Jan. 18, 20, 22-25, and period of no gage-height record, July 24, 25, which are fair. Maximum discharge, 6,600 $ft^3/s$, from rating curve extended above 2,150 $ft^3/s$. 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 24 | 1400 | 1,030 | 7.04 | Aug 3 | 2230 | 725 | 6.56 |
| Mar 23 | 0500 | 769 | 6.63 | Sep 5 | 0215 | 660 | 6.45 |
| Apr 11 | 2345 | 912 | 6.86 | Sep 13 | 0815 | 1,400 | 7.57 |
| May 29 | 0200 | 1,220 | 7.31 | Sep 20 | 2330 | *2,410 | *9.02 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.4 | 118 | 53 | 175 | 134 | 370 | 250 | 148 | 539 | 84 | 208 | 141 |
| 2 | 1.2 | 107 | 49 | 215 | 138 | 357 | 230 | 140 | 408 | 94 | 261 | 139 |
| 3 | 1.1 | 89 | 46 | 258 | 139 | 392 | 235 | 137 | 326 | 143 | 567 | 129 |
| 4 | 0.97 | 82 | 42 | 288 | 144 | 373 | 219 | 133 | 282 | 156 | 668 | 290 |
| 5 | 0.88 | 79 | 54 | 293 | 136 | 388 | 196 | 126 | 309 | 152 | 524 | 562 |
| 6 | 0.77 | 131 | 80 | 255 | 124 | 444 | 180 | 120 | 328 | 141 | 431 | 267 |
| 7 | 0.74 | 137 | 80 | 223 | 141 | 424 | 239 | 114 | 332 | 130 | 371 | 186 |
| 8 | 0.67 | 131 | 84 | 201 | 148 | 412 | 402 | 119 | 464 | 115 | 387 | 169 |
| 9 | 0.59 | 108 | 97 | 180 | 147 | 382 | 545 | 127 | 430 | 110 | 382 | 145 |
| 10 | 0.73 | 91 | 98 | 158 | 139 | 305 | 761 | 150 | 461 | 117 | 537 | 122 |
| 11 | 8.1 | 82 | 107 | 145 | 136 | 247 | 863 | 212 | 507 | 112 | 519 | 108 |
| 12 | 25 | 90 | 127 | 129 | 132 | 215 | 865 | 218 | 492 | 118 | 431 | 342 |
| 13 | 26 | 117 | 145 | 116 | 124 | 196 | 689 | 209 | 420 | 145 | 360 | 1,300 |
| 14 | 19 | 137 | 172 | 107 | 116 | 187 | 524 | 189 | 320 | 175 | 308 | 1,010 |
| 15 | 14 | 150 | 186 | 103 | 135 | 181 | 373 | 164 | 265 | 170 | 273 | 818 |
| 16 | 27 | 144 | 188 | 106 | 165 | 177 | 292 | 150 | 238 | 153 | 260 | 665 |
| 17 | 40 | 214 | 175 | 93 | 186 | 180 | 252 | 140 | 220 | 129 | 254 | 494 |
| 18 | 37 | 278 | 160 | e90 | 181 | 177 | 227 | 155 | 212 | 104 | 225 | 577 |
| 19 | 34 | 255 | 147 | 81 | 191 | 172 | 224 | 186 | 250 | 98 | 210 | 1,650 |
| 20 | 31 | 218 | 144 | e77 | 243 | 213 | 216 | 177 | 330 | 89 | 219 | 2,070 |
| 21 | 32 | 197 | 139 | 88 | 301 | 338 | 210 | 171 | 309 | 77 | 197 | 2,140 |
| 22 | 31 | 197 | 134 | e85 | 426 | 538 | 202 | 225 | 273 | 75 | 167 | 1,400 |
| 23 | 26 | 184 | 125 | e79 | 794 | 726 | 191 | 265 | 256 | 167 | 144 | 986 |
| 24 | 23 | 159 | 139 | e70 | 1,000 | 473 | 182 | 290 | 237 | e180 | 125 | 720 |
| 25 | 20 | 132 | 184 | e64 | 908 | 304 | 176 | 302 | 217 | e195 | 110 | 526 |
| 26 | 39 | 110 | 214 | 67 | 620 | 238 | 179 | 557 | 194 | 202 | 99 | 382 |
| 27 | 40 | 92 | 208 | 72 | 409 | 212 | 176 | 790 | 169 | 257 | 90 | 298 |
| 28 | 41 | 77 | 205 | 68 | 386 | 194 | 168 | 1,030 | 142 | 306 | 81 | 264 |
| 29 | 56 | 66 | 218 | 75 | --- | 187 | 162 | 1,160 | 123 | 317 | 74 | 252 |
| 30 | 92 | 59 | 200 | 92 | --- | 233 | 155 | 919 | 100 | 274 | 68 | 239 |
| 31 | 122 | --- | 172 | 115 | --- | 267 | --- | 686 | --- | 232 | 103 | --- |
| TOTAL | 792.15 | 4,031 | 4,172 | 4,168 | 7,843 | 9,502 | 9,583 | 9,509 | 9,153 | 4,817 | 8,653 | 18,391 |
| MEAN | 25.6 | 134 | 135 | 134 | 280 | 307 | 319 | 307 | 305 | 155 | 279 | 613 |
| MAX | 122 | 278 | 218 | 293 | 1,000 | 726 | 865 | 1,160 | 539 | 317 | 668 | 2,140 |
| MIN | 0.59 | 59 | 42 | 64 | 116 | 172 | 155 | 114 | 100 | 75 | 68 | 108 |
| CFSM | 0.24 | 1.24 | 1.25 | 1.24 | 2.59 | 2.84 | 2.96 | 2.84 | 2.83 | 1.44 | 2.58 | 5.68 |
| IN. | 0.27 | 1.39 | 1.44 | 1.44 | 2.70 | 3.27 | 3.30 | 3.28 | 3.15 | 1.66 | 2.98 | 6.33 |

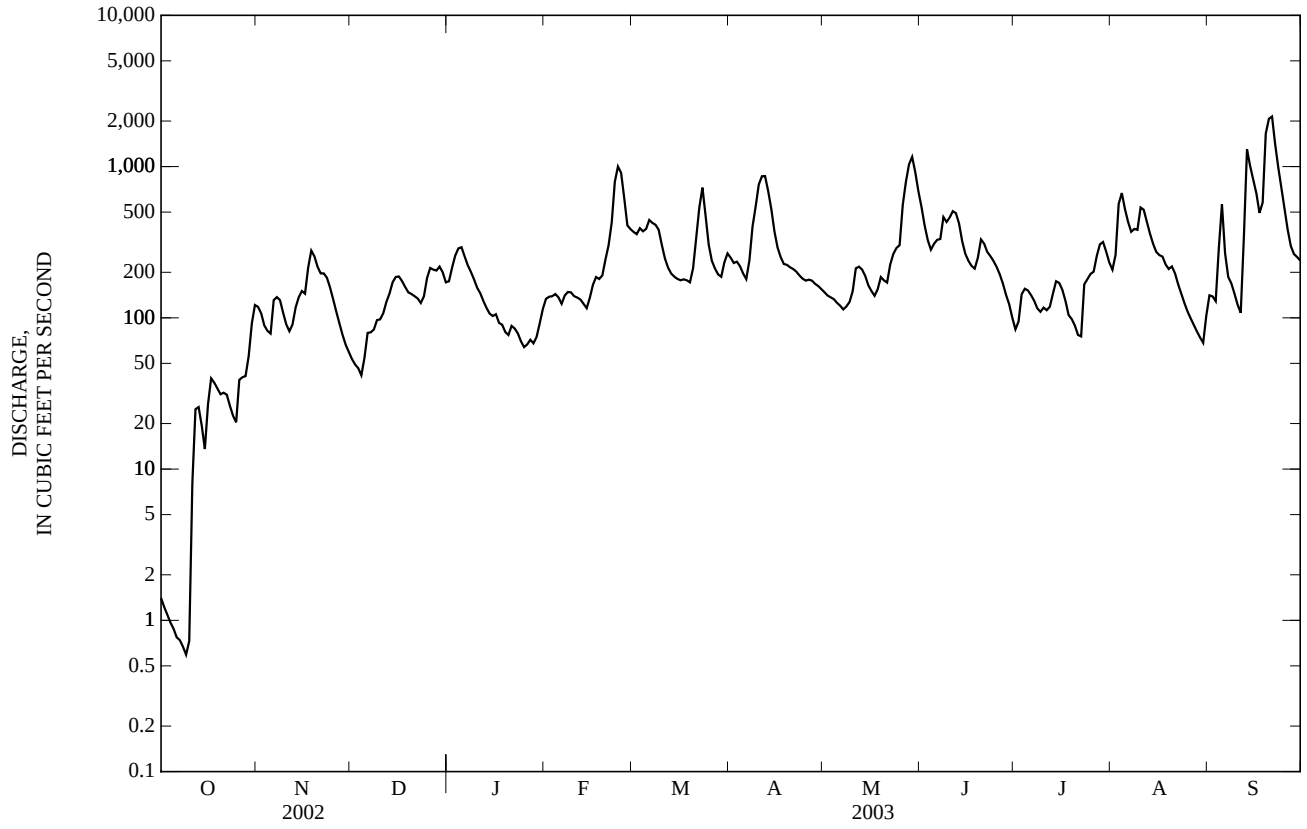
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1982 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 58.9 | 84.9 | 113 | 151 | 189 | 227 | 187 | 130 | 82.7 | 54.2 | 72.5 | 103 |
| MAX | 293 | 290 | 331 | 340 | 608 | 567 | 450 | 307 | 305 | 155 | 279 | 696 |
| (WY) | (1997) | (1986) | (1997) | (1993) | (1998) | (1994) | (1983) | (2003) | (2003) | (2003) | (2003) | (1999) |
| MIN | 0.80 | 9.22 | 39.5 | 45.9 | 44.3 | 45.7 | 31.2 | 22.5 | 2.38 | 0.20 | 0.23 | 0.79 |
| (WY) | (1999) | (1999) | (1989) | (1989) | (2002) | (2002) | (1985) | (1999) | (1999) | (2002) | (2002) | (1997) |

01669520 DRAGON SWAMP AT MASCOT, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1982 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 17,658.46 | | 90,614.15 | | | |
| ANNUAL MEAN | 48.4 | | 248 | | 121 | |
| HIGHEST ANNUAL MEAN | | | | | 248 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 31.7 | 2002 |
| HIGHEST DAILY MEAN | 278 | Nov 18 | 2,140 | Sep 21 | 6,050 | Sep 17, 1999 |
| LOWEST DAILY MEAN | 0.00 | aJul 18 | 0.59 | Oct 9 | 0.00 | aJul 18, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.00 | bJul 18 | 0.76 | Oct 4 | 0.00 | bJul 18, 2002 |
| MAXIMUM PEAK FLOW | | | 2,410 | Sep 20 | 6,600 | Sep 17, 1999 |
| MAXIMUM PEAK STAGE | | | 9.02 | Sep 20 | 13.21 | Sep 17, 1999 |
| INSTANTANEOUS LOW FLOW | | | 0.55 | cOct 9 | 0.00 | (d) |
| ANNUAL RUNOFF (CFSM) | 0.45 | | 2.30 | | 1.12 | |
| ANNUAL RUNOFF (INCHES) | 6.08 | | 31.21 | | 15.18 | |
| 10 PERCENT EXCEEDS | 132 | | 521 | | 260 | |
| 50 PERCENT EXCEEDS | 32 | | 177 | | 80 | |
| 90 PERCENT EXCEEDS | 0.02 | | 65 | | 6.5 | |

a Also July 19-25, and Aug. 6-28, 2002.
b Also July 19, and Aug 6-22, 2002.
c Also Oct. 10, 2002.
d No flow part or all of many days in August 1998 and July, August 2002.
e Estimated.



## 01671020 NORTH ANNA RIVER AT HART CORNER, NEAR DOSWELL, VA

LOCATION.--Lat 37°51'01", long 77°25'40", NAD83, 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 $mi^2$.

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

GAGE.--Water-stage recorder. Elevation of gage is 43 ft NGVD of 1929, from topographic map.

REMARKS.--Records good except those for periods of doubtful gage-height record, Dec. 4, Jan. 12, 13, 16, 18, 19, 22-28, Feb. 8, 9, 13, 16-18, 26, 27, and Mar. 4, 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 $ft^3/s$, from rating curve extended above 10,100 $ft^3/s$. 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.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 37 | 129 | 57 | 176 | 81 | 1,500 | 943 | 287 | 777 | 407 | 259 | 69 |
| 2 | 36 | 96 | 61 | 538 | 90 | 1,930 | 773 | 286 | 714 | 428 | 270 | 66 |
| 3 | 36 | 81 | 58 | 556 | 88 | 1,950 | 717 | 284 | 677 | 1,190 | 131 | 66 |
| 4 | 37 | 71 | e55 | 327 | 93 | e980 | 676 | 270 | 654 | 1,800 | 109 | 68 |
| 5 | 37 | 67 | 66 | 238 | 231 | 802 | 663 | 264 | 734 | 1,710 | 170 | 72 |
| 6 | 36 | 85 | 80 | 182 | 279 | 1,350 | 642 | 252 | 715 | 550 | 244 | 73 |
| 7 | 38 | 88 | 77 | 158 | 332 | 1,290 | 896 | 209 | 609 | 283 | 237 | 72 |
| 8 | 37 | 82 | 69 | 141 | e710 | 725 | 1,700 | 269 | 1,790 | 424 | 258 | 68 |
| 9 | 38 | 73 | 64 | 130 | e295 | 676 | 1,530 | 268 | 1,250 | 514 | 288 | 65 |
| 10 | 40 | 68 | 65 | 115 | 279 | 639 | 2,080 | 280 | 1,240 | 417 | 265 | 63 |
| 11 | 78 | 115 | 94 | 198 | 271 | 602 | 2,370 | 812 | 733 | 272 | 245 | 61 |
| 12 | 76 | 274 | 208 | e266 | 276 | 368 | 2,380 | 421 | 687 | 244 | 239 | 82 |
| 13 | 54 | 617 | 246 | e263 | e280 | 277 | 1,120 | 310 | 488 | 181 | 230 | 187 |
| 14 | 47 | 382 | 375 | 258 | 274 | 306 | 788 | 264 | 482 | 135 | 134 | 160 |
| 15 | 43 | 212 | 373 | 152 | 419 | 329 | 720 | 246 | 2,350 | 131 | 79 | 143 |
| 16 | 70 | 165 | 265 | e82 | e1,200 | 324 | 549 | 320 | 3,580 | 187 | 101 | 209 |
| 17 | 87 | 488 | 187 | 82 | e1,280 | 324 | 418 | 305 | 1,350 | 230 | 91 | 227 |
| 18 | 72 | 706 | 138 | e75 | e1,050 | 328 | 388 | 546 | 2,250 | 233 | 199 | 451 |
| 19 | 58 | 436 | 113 | e65 | 664 | 317 | 404 | 2,000 | 1,600 | 260 | 158 | 5,180 |
| 20 | 51 | 244 | 159 | 82 | 421 | 1,310 | 822 | 873 | 1,900 | 355 | 100 | 6,940 |
| 21 | 51 | 159 | 333 | 77 | 814 | 5,380 | 683 | 886 | 3,000 | 279 | 86 | 3,940 |
| 22 | 50 | 122 | 219 | e110 | 1,920 | 5,600 | 661 | 2,350 | 1,610 | 225 | 82 | 1,290 |
| 23 | 46 | 102 | 184 | e290 | 6,810 | 2,120 | 568 | 1,980 | 748 | 129 | 76 | 3,020 |
| 24 | 45 | 89 | 162 | e317 | 6,150 | 965 | 362 | 1,050 | 706 | 112 | 70 | 5,140 |
| 25 | 44 | 86 | 331 | e276 | 5,370 | 750 | 317 | 1,350 | 1,260 | 164 | 65 | 3,480 |
| 26 | 73 | 81 | 621 | e143 | e3,330 | 703 | 306 | 2,760 | 276 | 231 | 64 | 2,210 |
| 27 | 64 | 75 | 404 | e66 | e1,510 | 700 | 308 | 3,260 | 183 | 130 | 63 | 1,600 |
| 28 | 60 | 73 | 246 | e76 | 1,000 | 687 | 291 | 2,990 | 1,090 | 86 | 61 | 459 |
| 29 | 68 | 63 | 195 | 70 | --- | 685 | 282 | 1,830 | 353 | 374 | 64 | 347 |
| 30 | 121 | 62 | 179 | 68 | --- | 867 | 276 | 1,050 | 409 | 321 | 59 | 315 |
| 31 | 170 | --- | 170 | 72 | --- | 1,990 | --- | 840 | --- | 275 | 67 | --- |
| TOTAL | 1,800 | 5,391 | 5,854 | 5,649 | 35,517 | 36,774 | 24,633 | 29,112 | 34,215 | 12,277 | 4,564 | 36,123 |
| MEAN | 58.1 | 180 | 189 | 182 | 1,268 | 1,186 | 821 | 939 | 1,140 | 396 | 147 | 1,204 |
| MAX | 170 | 706 | 621 | 556 | 6,810 | 5,600 | 2,380 | 3,260 | 3,580 | 1,800 | 288 | 6,940 |
| MIN | 36 | 62 | 55 | 65 | 81 | 277 | 276 | 209 | 183 | 86 | 59 | 61 |
| (†) | 144 | 126 | 153 | 167 | 126 | 162 | 162 | 164 | 171 | 30.8 | 169 | 173 |
| MEAN‡ | 62.7 | 217 | 194 | 188 | 1,273 | 1,191 | 826 | 944 | 1,146 | 397 | 153 | 1,210 |
| CFSM‡ | .14 | .47 | .42 | .41 | 2.75 | 2.57 | 1.78 | 2.04 | 2.48 | .86 | .33 | 2.61 |
| IN.‡ | .16 | .52 | .48 | .47 | 2.86 | 2.97 | 1.99 | 2.35 | 2.76 | .99 | .38 | 2.92 |

CAL YR 2002 MEAN‡ 81.4 CFSM‡ .18 IN.‡ 2.39
WTR YR 2003 MEAN‡ 640 CFSM‡ 1.38 IN.‡ 18.77

† Total diversion, equivalent in cubic feet per second, per month, provided by Hanover County Department of Public Utilities.
‡ Adjusted for diversion.

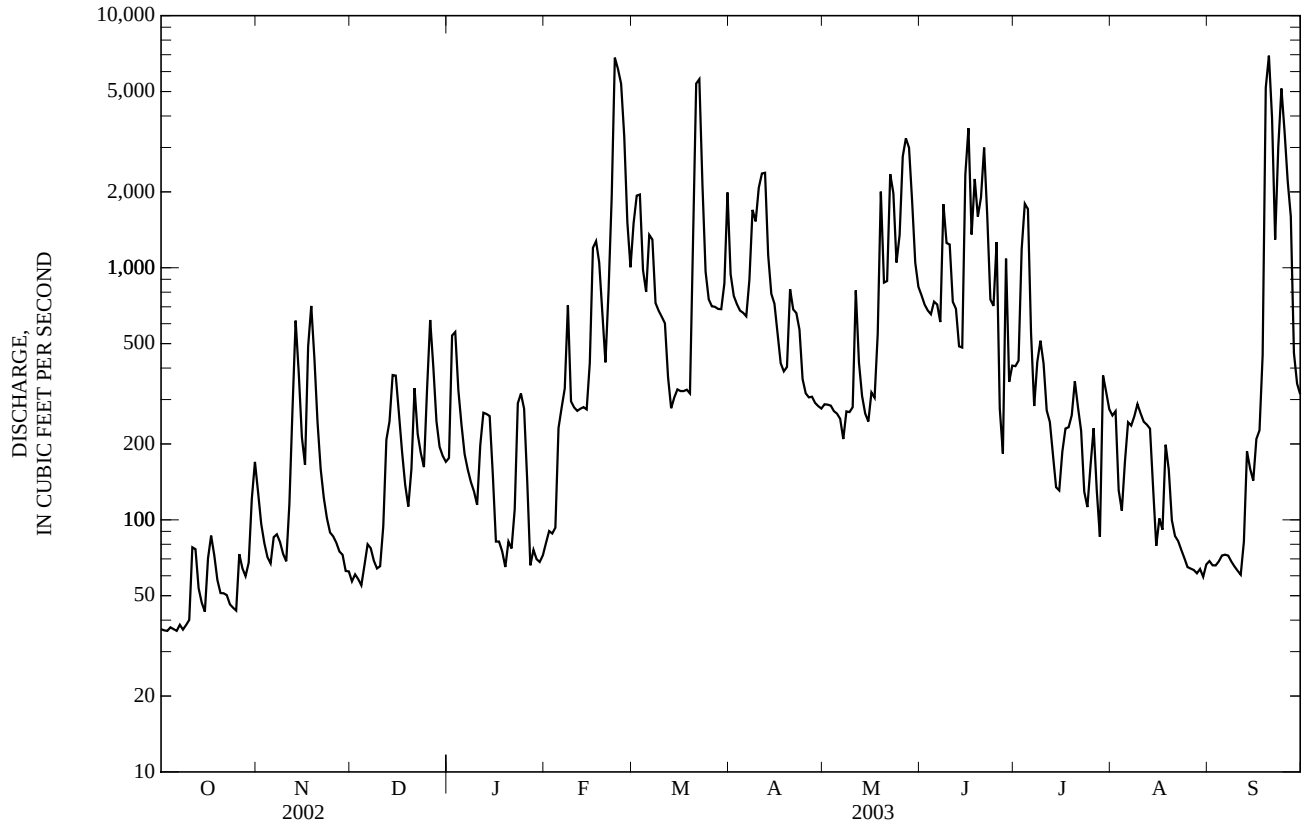
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 194 | 298 | 356 | 501 | 676 | 804 | 631 | 430 | 273 | 163 | 149 | 183 |
| MAX | 1,428 | 1,561 | 1,320 | 1,389 | 2,660 | 2,345 | 1,887 | 1,217 | 1,140 | 591 | 614 | 1,204 |
| (WY) | (1980) | (1986) | (1997) | (1998) | (1998) | (1994) | (1983) | (1990) | (2003) | (1984) | (1984) | (2003) |
| MIN | 41.7 | 39.9 | 47.4 | 57.5 | 58.6 | 72.5 | 82.7 | 61.9 | 37.9 | 36.5 | 37.3 | 39.5 |
| (WY) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (1999) | (2002) | (2002) | (2002) | (2002) |

01671020 NORTH ANNA RIVER AT HART CORNER, NEAR DOSWELL, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1980 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 27,849 | | 231,909 | | | |
| ANNUAL MEAN | 76.3 | | 635 | | 387 | |
| HIGHEST ANNUAL MEAN | | | | | 731 | 1998 |
| LOWEST ANNUAL MEAN | | | | | 51.4 | 2002 |
| HIGHEST DAILY MEAN | 706 | Nov 18 | 6,940 | Sep 20 | 10,900 | Mar 30, 1994 |
| LOWEST DAILY MEAN | 27 | Jul 12 | 36 | aOct 2 | 27 | Jul 12, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 33 | bJul 31 | 37 | cOct 1 | 33 | bJul 31, 2002 |
| MAXIMUM PEAK FLOW | | | 9,150 | Feb 24 | 12,000 | Mar 29, 1994 |
| MAXIMUM PEAK STAGE | | | 20.01 | Feb 24 | 21.80 | Mar 29, 1994 |
| INSTANTANEOUS LOW FLOW | | | 35 | dOct 3 | 25 | fJul 12, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.16 | | 1.37 | | 0.83 | |
| ANNUAL RUNOFF (INCHES) | 2.24 | | 18.63 | | 11.34 | |
| 10 PERCENT EXCEEDS | 128 | | 1,700 | | 819 | |
| 50 PERCENT EXCEEDS | 54 | | 272 | | 135 | |
| 90 PERCENT EXCEEDS | 35 | | 65 | | 53 | |

a Also Oct. 3, 6, 2002.
b Also Aug. 1, 2002.
c Also Oct. 2, 3, 2002.
d Also Oct. 6, 2002.
e Estimated.
f Also July 13, 2002.



## 01671100 LITTLE RIVER NEAR DOSWELL, VA

LOCATION.--Lat 37°52'22", long 77°30'47", NAD83, 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 $mi^2$.

PERIOD OF RECORD.--October 1961 to September 1999, October 2000 to current year.

REVISED RECORDS.--WDR VA-70-1: 1969.

GAGE.--Water-stage recorder. Datum of gage is 132.30 ft NGVD of 1929 (levels by La Prade Bros., Engineers).

REMARKS.--Records good except those for periods with ice effect, Jan. 18, 19, 21-28, which are fair. Maximum discharge, 12,000 $ft^3/s$, from rating curve extended above 7,600 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 650 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 23 | 2000 | *2,670 | *6.58 | May 27 | 1545 | 847 | 4.73 |
| Mar 21 | 2000 | 2,160 | 6.16 | Sep 20 | 0800 | 1,930 | 5.96 |
| Apr 12 | 0745 | 977 | 4.92 | Sep 25 | 0045 | 1,030 | 4.99 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.51 | 135 | 28 | 69 | 45 | 195 | 376 | 84 | 236 | 53 | 54 | 8.6 |
| 2 | 0.45 | 105 | 24 | 248 | 58 | 304 | 225 | 89 | 186 | 58 | 44 | 14 |
| 3 | 0.42 | 68 | 21 | 351 | 59 | 473 | 168 | 98 | 160 | 100 | 42 | 17 |
| 4 | 0.41 | 43 | 19 | 215 | 63 | 345 | 141 | 86 | 142 | 153 | 48 | 16 |
| 5 | 0.43 | 31 | 22 | 158 | 77 | 223 | 127 | 77 | 143 | 196 | 44 | 17 |
| 6 | 0.38 | 34 | 24 | 122 | 77 | 209 | 116 | 70 | 181 | 179 | 48 | 14 |
| 7 | 0.22 | 33 | 27 | 104 | 78 | 217 | 178 | 65 | 189 | 118 | 69 | 14 |
| 8 | 0.16 | 36 | 29 | 93 | 75 | 191 | 494 | 65 | 257 | 83 | 78 | 13 |
| 9 | 0.12 | 38 | 32 | 83 | 70 | 153 | 543 | 64 | 354 | 65 | 66 | 12 |
| 10 | 0.09 | 32 | 32 | 74 | 62 | 125 | 608 | 78 | 353 | 53 | 76 | 11 |
| 11 | 3.4 | 43 | 44 | 65 | 61 | 105 | 713 | 112 | 307 | 46 | 101 | 9.9 |
| 12 | 3.5 | 118 | 104 | 55 | 60 | 94 | 916 | 133 | 234 | 39 | 67 | 13 |
| 13 | 2.4 | 354 | 155 | 49 | 61 | 88 | 477 | 110 | 223 | 34 | 46 | 43 |
| 14 | 3.7 | 415 | 233 | 44 | 63 | 96 | 246 | 82 | 183 | 37 | 37 | 76 |
| 15 | 2.2 | 228 | 272 | 41 | 89 | 107 | 183 | 65 | 247 | 36 | 31 | 87 |
| 16 | 8.0 | 139 | 205 | 39 | 167 | 106 | 156 | 101 | 355 | 38 | 30 | 61 |
| 17 | 21 | 262 | 138 | 36 | 175 | 97 | 137 | 93 | 366 | 36 | 29 | 40 |
| 18 | 19 | 453 | 97 | e32 | 168 | 92 | 124 | 150 | 284 | 33 | 36 | 90 |
| 19 | 26 | 385 | 73 | e29 | 146 | 84 | 127 | 324 | 238 | 54 | 43 | 935 |
| 20 | 22 | 220 | 79 | 32 | 144 | 332 | 145 | 353 | 275 | 88 | 41 | 1,730 |
| 21 | 17 | 140 | 271 | e31 | 208 | 1,680 | 162 | 286 | 364 | 83 | 33 | 901 |
| 22 | 12 | 100 | 168 | e29 | 565 | 1,490 | 153 | 417 | 352 | 56 | 26 | 329 |
| 23 | 8.0 | 78 | 99 | e28 | 1,990 | 489 | 129 | 512 | 291 | 55 | 21 | 432 |
| 24 | 6.2 | 62 | 76 | e26 | 1,970 | 235 | 113 | 473 | 192 | 48 | 17 | 748 |
| 25 | 4.3 | 50 | 131 | e29 | 774 | 169 | 101 | 405 | 133 | 44 | 14 | 856 |
| 26 | 7.9 | 40 | 379 | e27 | 318 | 141 | 101 | 632 | 104 | 39 | 12 | 368 |
| 27 | 13 | 34 | 297 | e24 | 212 | 135 | 108 | 821 | 85 | 31 | 11 | 197 |
| 28 | 17 | 27 | 161 | e26 | 190 | 130 | 107 | 638 | 74 | 30 | 9.2 | 130 |
| 29 | 25 | 23 | 108 | 28 | --- | 127 | 99 | 456 | 65 | 53 | 8.0 | 100 |
| 30 | 52 | 25 | 83 | 32 | --- | 172 | 88 | 403 | 58 | 58 | 7.0 | 87 |
| 31 | 99 | --- | 70 | 36 | --- | 375 | --- | 327 | --- | 67 | 7.2 | --- |
| TOTAL | 375.79 | 3,751 | 3,501 | 2,255 | 8,025 | 8,779 | 7,361 | 7,669 | 6,631 | 2,063 | 1,195.4 | 7,369.5 |
| MEAN | 12.1 | 125 | 113 | 72.7 | 287 | 283 | 245 | 247 | 221 | 66.5 | 38.6 | 246 |
| MAX | 99 | 453 | 379 | 351 | 1,990 | 1,680 | 916 | 821 | 366 | 196 | 101 | 1,730 |
| MIN | 0.09 | 23 | 19 | 24 | 45 | 84 | 88 | 64 | 58 | 30 | 7.0 | 8.6 |
| CFSM | 0.11 | 1.17 | 1.06 | 0.68 | 2.68 | 2.65 | 2.29 | 2.31 | 2.07 | 0.62 | 0.36 | 2.30 |
| IN. | 0.13 | 1.30 | 1.22 | 0.78 | 2.79 | 3.05 | 2.56 | 2.67 | 2.31 | 0.72 | 0.42 | 2.56 |

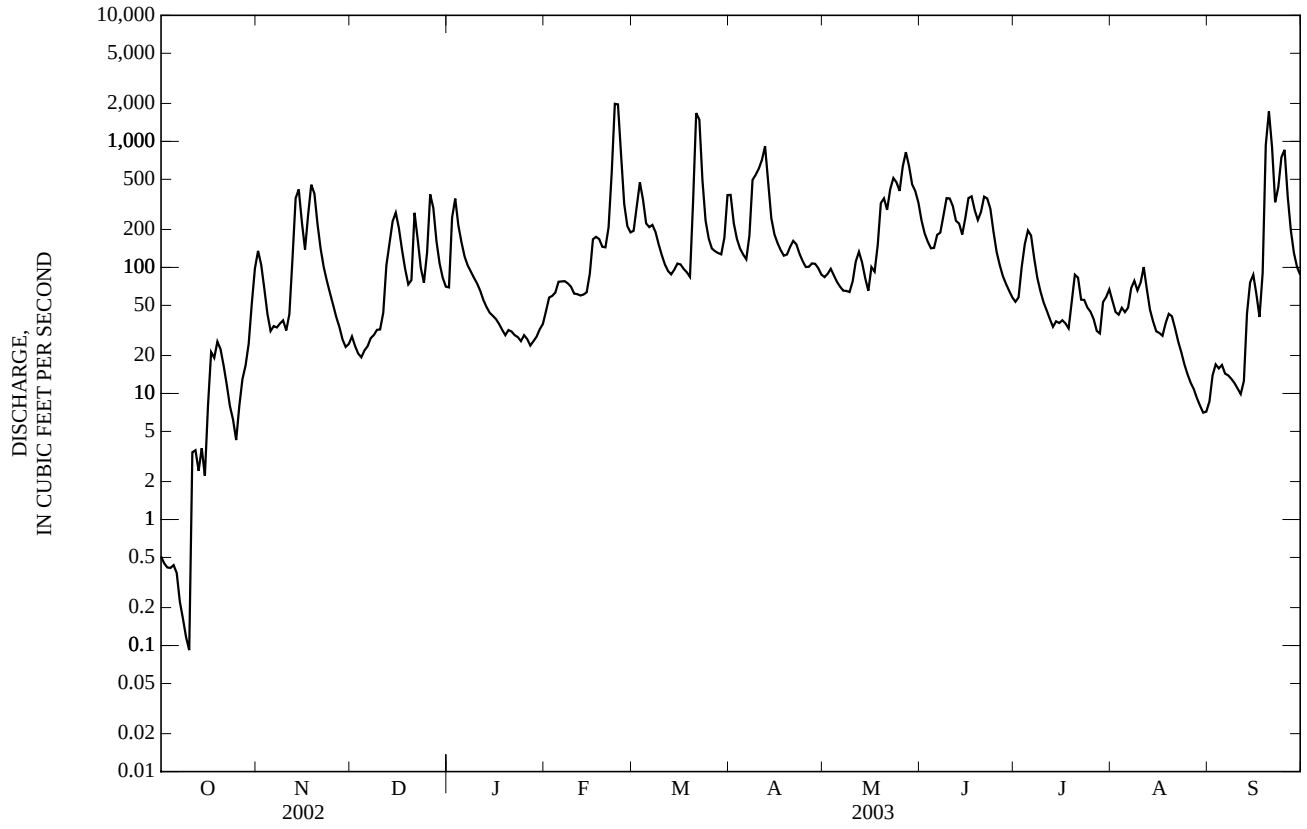
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 1999, 2001 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 51.5 | 72.9 | 99.2 | 143 | 163 | 194 | 144 | 101 | 67.8 | 38.5 | 46.8 | 40.5 |
| 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 | 2.12 | 14.8 | 20.5 | 16.9 | 31.9 | 39.9 | 18.1 | 4.14 | 1.23 | 1.04 | 0.70 |
| (WY) | (1969) | (2002) | (2002) | (1981) | (2002) | (2002) | (2002) | (1999) | (1999) | (2002) | (1999) | (1968) |

01671100 LITTLE RIVER NEAR DOSWELL, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1962 - 1999 2001 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 12,396.44 | | 58,975.69 | | | |
| ANNUAL MEAN | 34.0 | | 162 | | 96.6 | |
| HIGHEST ANNUAL MEAN | | | | | 181 | 1998 |
| LOWEST ANNUAL MEAN | | | | | 14.6 | 2002 |
| HIGHEST DAILY MEAN | 453 | Nov 18 | 1,990 | Feb 23 | 9,800 | Aug 21, 1969 |
| LOWEST DAILY MEAN | 0.05 | Aug 23 | 0.09 | Oct 10 | 0.05 | Aug 23, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.14 | Aug 17 | 0.26 | Oct 4 | 0.14 | Aug 17, 2002 |
| MAXIMUM PEAK FLOW | | | 2,670 | Feb 23 | 12,000 | Aug 21, 1969 |
| MAXIMUM PEAK STAGE | | | 6.58 | Feb 23 | 11.09 | Aug 21, 1969 |
| INSTANTANEOUS LOW FLOW | | | 0.09 | aOct 10 | 0.04 | bAug 23, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.32 | | 1.51 | | 0.90 | |
| ANNUAL RUNOFF (INCHES) | 4.31 | | 20.50 | | 12.26 | |
| 10 PERCENT EXCEEDS | 78 | | 367 | | 194 | |
| 50 PERCENT EXCEEDS | 16 | | 83 | | 48 | |
| 90 PERCENT EXCEEDS | 0.44 | | 14 | | 5.4 | |

a Also Oct. 11, 2002.
b Also Aug. 24, 2002.
e Estimated.



## 01672500 SOUTH ANNA RIVER NEAR ASHLAND, VA

LOCATION.--Lat 37°47'49", long 77°32'56", NAD83, Hanover County, Hydrologic Unit 02080106, on left bank at downstream side of bridge on State Highway 54, 4.5 mi northewst of Ashland, and 7.6 mi upstream from Newfound River.

DRAINAGE AREA.--394 $mi^2$.

PERIOD OF RECORD.--October 1930 to September 1997, October 1998 to September 2002 (annual maximum only), June to September 2003.

REVISED RECORDS.--WSP 801: 1935(M). WSP 1502: 1935, 1939. WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 83.74 ft NGVD of 1929. Prior to Jan. 6, 1997, water-stage recorder at site on right downstream side of old bridge on State Highway 54, Jan. 6 to Sept. 30, 1997, at site on right bank, 160 ft downstream, at same datum, June 27, 2003 to current year, at present site, at same datum.

REMARKS.--No estimated daily discharges. Records good. Since 1966, diversion 150 ft upstream from station for town of Ashland water supply has averaged less than 0.6 $ft^3/s$. Capicity of diversion pickup is about 1.5 $ft^3/s$. Maximum discharge, 17,100 $ft^3/s$, from rating curve extended above 12,600 $ft^3/s$. 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 Aug. 15, 1928 reached a stage of about 24 ft, discharge, about 14,500 $ft^3/s$.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,200 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Sep 19 | 0230 | *6,230 | *16.36 | Sep 23 | 1100 | 5,820 | 15.89 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 248 | 206 | 182 |
| 2 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 235 | 209 | 153 |
| 3 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 476 | 171 | 140 |
| 4 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1,160 | 270 | 175 |
| 5 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1,510 | 259 | 289 |
| 6 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 702 | 358 | 225 |
| 7 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 433 | 235 | 202 |
| 8 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 319 | 238 | 154 |
| 9 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 258 | 315 | 130 |
| 10 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 233 | 399 | 116 |
| 11 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 220 | 348 | 107 |
| 12 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 202 | 245 | 120 |
| 13 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 188 | 208 | 398 |
| 14 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 371 | 180 | 333 |
| 15 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 423 | 149 | 320 |
| 16 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 222 | 310 | 241 |
| 17 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 176 | 1,280 | 188 |
| 18 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 149 | 817 | 977 |
| 19 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 150 | 414 | 4,910 |
| 20 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 148 | 262 | 3,750 |
| 21 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 156 | 207 | 2,960 |
| 22 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 184 | 172 | 3,700 |
| 23 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 185 | 150 | 4,330 |
| 24 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 190 | 129 | 2,790 |
| 25 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 184 | 111 | 2,470 |
| 26 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 148 | 103 | 1,960 |
| 27 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 126 | 92 | 703 |
| 28 | --- | --- | --- | --- | --- | --- | --- | --- | 250 | 114 | 89 | 515 |
| 29 | --- | --- | --- | --- | --- | --- | --- | --- | 263 | 208 | 84 | 456 |
| 30 | --- | --- | --- | --- | --- | --- | --- | --- | 299 | 187 | 84 | 473 |
| 31 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 187 | 211 | --- |
| TOTAL | --- | --- | --- | --- | --- | --- | --- | --- | --- | 9,692 | 8,305 | 33,467 |
| MEAN | --- | --- | --- | --- | --- | --- | --- | --- | --- | 313 | 268 | 1,116 |
| MAX | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1,510 | 1,280 | 4,910 |
| MIN | --- | --- | --- | --- | --- | --- | --- | --- | --- | 114 | 84 | 107 |
| CFSM | --- | --- | --- | --- | --- | --- | --- | --- | --- | 0.79 | 0.68 | 2.83 |
| IN. | --- | --- | --- | --- | --- | --- | --- | --- | --- | 0.92 | 0.78 | 3.16 |

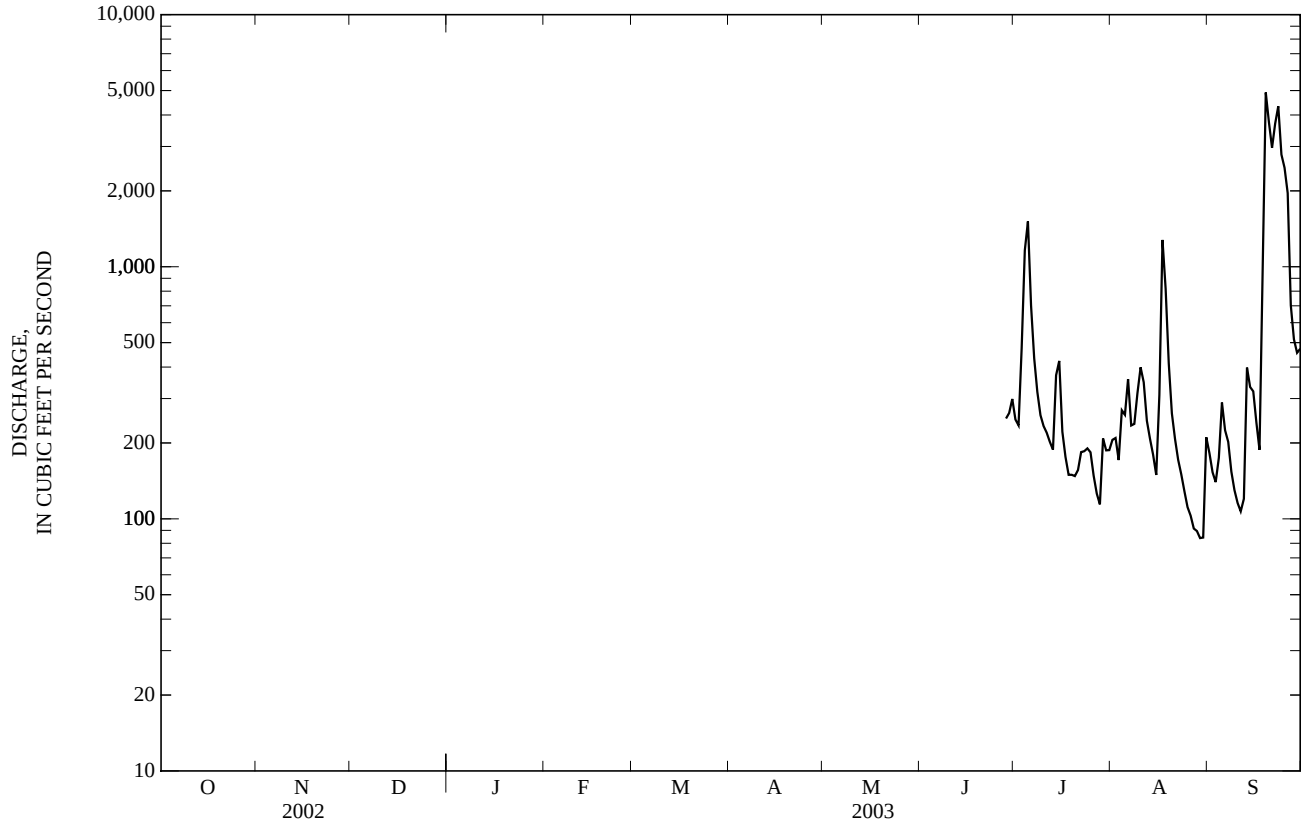
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1997, 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 227 | 271 | 390 | 535 | 579 | 652 | 571 | 354 | 242 | 195 | 236 | 186 |
| MAX | 1,434 | 1,389 | 1,375 | 1,850 | 1,436 | 1,774 | 1,968 | 963 | 1,998 | 820 | 2,349 | 1,116 |
| (WY) | (1973) | (1986) | (1949) | (1978) | (1979) | (1994) | (1937) | (1990) | (1972) | (1945) | (1969) | (2003) |
| MIN | 10.5 | 25.7 | 50.2 | 67.7 | 87.5 | 117 | 166 | 95.1 | 56.7 | 24.5 | 12.2 | 6.53 |
| (WY) | (1931) | (1931) | (1931) | (1966) | (1931) | (1981) | (1985) | (1969) | (1977) | (1977) | (1932) | (1932) |

01672500 SOUTH ANNA RIVER NEAR ASHLAND, VA—Continued

| SUMMARY STATISTICS | FOR 2003 WATER YEAR | | WATER YEARS 1931 - 1997 2003 | |
|---|---|---|---|---|
| ANNUAL MEAN | | | 368 | |
| HIGHEST ANNUAL MEAN | | | 689 | 1973 |
| LOWEST ANNUAL MEAN | | | 107 | 1981 |
| HIGHEST DAILY MEAN | 4,910 | Sep 19 | 16,000 | Aug 23, 1969 |
| LOWEST DAILY MEAN | 84 | aAug 29 | 2.3 | Sep 13, 1966 |
| ANNUAL SEVEN-DAY MINIMUM | 99 | Aug 24 | 4.4 | Sep 16, 1932 |
| MAXIMUM PEAK FLOW | 6,230 | Sep 19 | 17,100 | Aug 23, 1969 |
| MAXIMUM PEAK STAGE | 16.36 | Sep 19 | 24.99 | Aug 23, 1969 |
| INSTANTANEOUS LOW FLOW | 76 | Aug 30 | 0.10 | Sep 12, 1966 |
| ANNUAL RUNOFF (CFSM) | | | 0.93 | |
| ANNUAL RUNOFF (INCHES) | | | 12.70 | |
| 10 PERCENT EXCEEDS | | | 804 | |
| 50 PERCENT EXCEEDS | | | 193 | |
| 90 PERCENT EXCEEDS | | | 46 | |

a Also Aug. 30, 2003.



## 01673000 PAMUNKEY RIVER NEAR HANOVER, VA

LOCATION.--Lat 37°46'04", long 77°19'56", NAD83, 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 $mi^2$.

### 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 NGVD of 1929. Prior to Oct. 15 1976, nonrecording gage at same site and datum.

REMARKS.--Records 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 $ft^3/s$, from rating curve extended above 22,000 $ft^3/s$.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1928 reached a stage of 32.6 ft, from information by local residents.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 56 | 830 | 284 | 639 | e375 | 4,440 | 3,950 | 682 | 2,790 | 790 | 602 | 424 |
| 2 | 53 | 605 | 271 | 1,260 | e400 | 3,310 | 2,570 | 729 | 1,910 | 772 | 731 | 372 |
| 3 | 52 | 419 | e260 | 2,460 | e430 | 4,370 | 1,770 | 858 | 1,530 | 1,200 | 562 | 349 |
| 4 | 51 | 303 | e250 | 2,380 | 477 | 4,240 | 1,460 | 723 | 1,320 | 2,580 | 476 | 355 |
| 5 | 51 | 245 | 252 | 1,550 | 581 | 2,750 | 1,300 | 637 | 1,340 | 3,490 | 545 | 472 |
| 6 | 49 | 264 | e300 | 1,100 | 749 | 2,250 | 1,220 | 610 | 1,520 | 2,780 | 713 | 484 |
| 7 | 46 | 340 | e305 | 880 | 784 | 3,170 | 1,590 | 552 | 1,520 | 1,090 | 670 | 425 |
| 8 | 47 | 347 | e320 | 759 | 1,000 | 2,170 | 3,790 | 593 | 2,260 | 875 | 633 | 386 |
| 9 | 44 | 319 | e335 | 687 | 841 | 1,750 | 4,530 | 607 | 3,250 | 843 | 951 | 330 |
| 10 | 44 | 287 | e325 | 618 | 692 | 1,530 | 4,920 | 598 | 3,730 | 822 | 916 | 290 |
| 11 | 59 | 290 | 356 | 570 | 674 | 1,390 | 5,490 | 1,170 | 2,670 | 660 | 844 | 267 |
| 12 | 113 | 1,040 | 730 | e525 | 684 | 1,180 | 6,430 | 1,220 | 1,740 | 531 | 709 | 277 |
| 13 | 96 | e2,640 | e1,200 | e500 | 705 | 948 | 6,350 | 858 | 1,630 | 489 | 730 | 768 |
| 14 | 89 | e3,020 | 1,760 | e470 | 700 | 1,050 | 4,460 | 681 | 1,470 | 862 | 585 | 831 |
| 15 | 115 | e1,990 | e2,160 | e430 | 783 | 1,130 | 2,250 | 555 | 2,140 | 801 | 395 | 685 |
| 16 | 123 | 953 | e1,950 | e400 | 1,600 | 1,050 | 1,510 | 744 | 4,190 | 572 | 437 | 603 |
| 17 | 198 | 1,460 | e1,210 | e375 | 1,990 | 1,010 | 1,200 | 777 | 5,080 | 524 | 1,050 | 547 |
| 18 | 206 | 2,890 | e860 | e350 | 2,140 | 979 | 1,030 | 836 | 4,540 | 473 | 1,580 | 644 |
| 19 | 183 | 3,090 | e650 | e340 | 1,500 | 957 | 1,020 | 2,940 | 3,890 | 542 | 1,150 | 4,920 |
| 20 | 162 | 1,990 | 597 | e340 | 1,260 | 1,840 | 1,350 | 3,650 | 3,780 | 735 | 701 | 9,250 |
| 21 | 139 | 1,080 | e1,100 | e340 | 1,690 | 5,860 | 1,670 | 2,510 | 4,230 | 720 | 551 | 11,200 |
| 22 | 129 | 759 | e1,400 | e340 | 3,220 | 10,800 | 1,390 | 3,470 | 4,880 | 582 | 472 | 8,380 |
| 23 | 112 | 605 | e970 | e330 | 6,100 | 10,700 | 1,240 | 4,700 | 4,360 | 707 | 419 | 7,110 |
| 24 | 97 | 508 | 721 | e325 | 12,900 | 7,720 | 965 | 4,850 | 2,230 | 693 | 374 | 8,840 |
| 25 | 90 | 438 | 951 | e310 | 14,400 | 5,430 | 819 | 3,820 | 1,830 | 507 | 335 | 8,570 |
| 26 | 122 | 392 | 2,090 | e300 | 12,100 | 2,560 | 794 | 4,590 | 1,280 | 520 | 306 | 7,270 |
| 27 | 202 | 358 | 2,530 | e300 | 9,800 | 1,510 | 821 | 6,070 | 696 | 448 | 287 | 5,800 |
| 28 | 245 | 326 | 1,510 | e300 | 6,530 | 1,370 | 812 | 7,210 | 954 | 322 | 265 | 3,500 |
| 29 | 226 | 302 | 953 | e310 | --- | 1,330 | 744 | 7,160 | 1,220 | 471 | 257 | 1,380 |
| 30 | 377 | 292 | 765 | e325 | --- | 1,850 | 686 | 6,110 | 724 | 787 | 256 | 988 |
| 31 | 782 | --- | 670 | e345 | --- | 3,500 | --- | 4,350 | --- | 641 | 332 | --- |
| TOTAL | 4,358 | 28,382 | 28,035 | 20,158 | 85,105 | 94,144 | 68,131 | 74,860 | 74,704 | 27,829 | 18,834 | 85,717 |
| MEAN | 141 | 946 | 904 | 650 | 3,039 | 3,037 | 2,271 | 2,415 | 2,490 | 898 | 608 | 2,857 |
| MAX | 782 | 3,090 | 2,530 | 2,460 | 14,400 | 10,800 | 6,430 | 7,210 | 5,080 | 3,490 | 1,580 | 11,200 |
| MIN | 44 | 245 | 250 | 300 | 375 | 948 | 686 | 552 | 696 | 322 | 256 | 267 |
| CFSM | 0.13 | 0.88 | 0.84 | 0.60 | 2.81 | 2.81 | 2.10 | 2.23 | 2.30 | 0.83 | 0.56 | 2.64 |
| IN. | 0.15 | 0.98 | 0.96 | 0.69 | 2.93 | 3.24 | 2.34 | 2.58 | 2.57 | 0.96 | 0.65 | 2.95 |

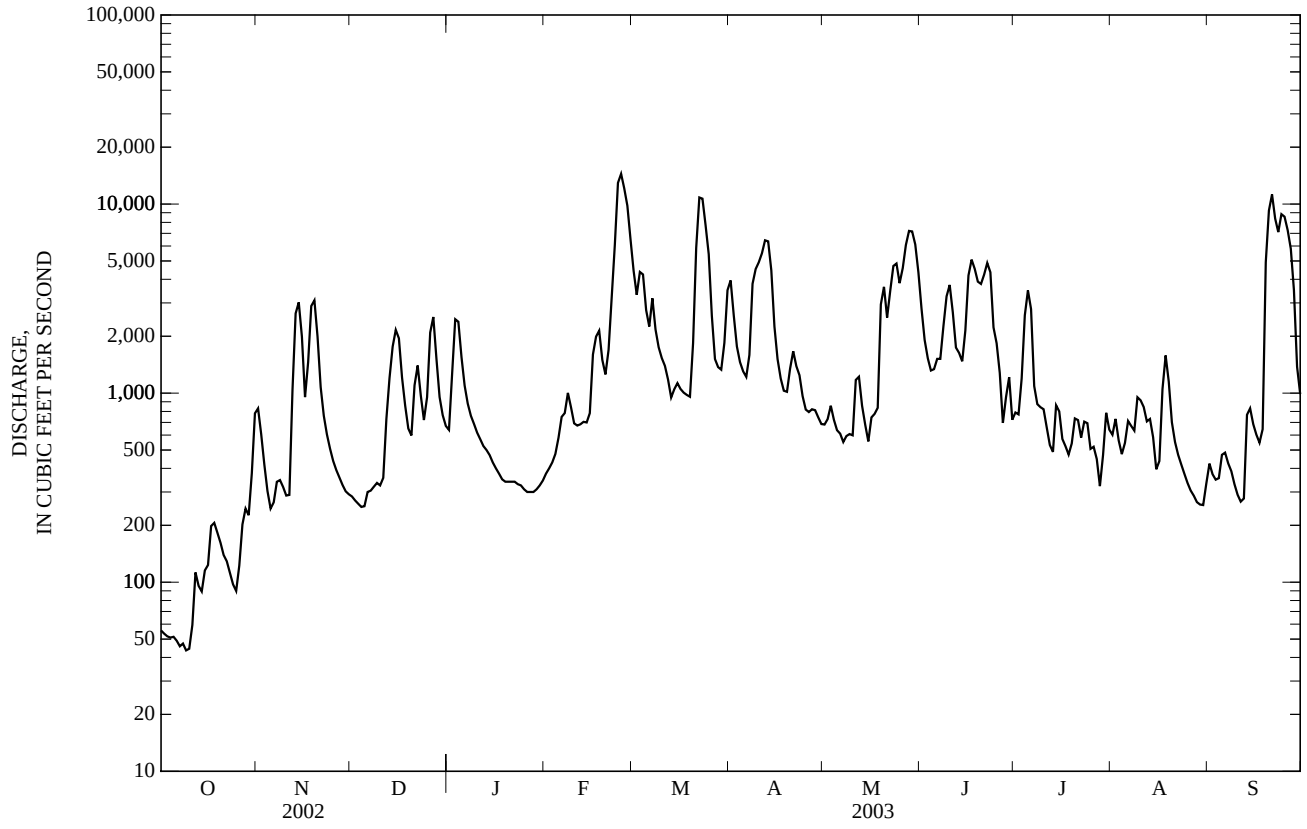
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1972 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 651 | 801 | 1,188 | 1,551 | 1,786 | 2,029 | 1,715 | 1,141 | 813 | 510 | 416 | 560 |
| MAX | 3,461 | 3,505 | 3,450 | 4,334 | 7,118 | 5,430 | 5,009 | 2,821 | 4,293 | 2,747 | 2,025 | 2,939 |
| (WY) | (1980) | (1986) | (1997) | (1978) | (1998) | (1994) | (1984) | (1978) | (1972) | (1975) | (1985) | (1975) |
| MIN | 63.7 | 67.1 | 131 | 190 | 160 | 248 | 293 | 197 | 72.2 | 48.9 | 89.5 | 60.2 |
| (WY) | (2002) | (2002) | (2002) | (2002) | (2002) | (1981) | (2002) | (1999) | (2002) | (2002) | (1999) | (1998) |

01673000 PAMUNKEY RIVER NEAR HANOVER, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1972 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 106,346 | | 610,257 | | | |
| ANNUAL MEAN | 291 | | 1,672 | | 1,093 | |
| HIGHEST ANNUAL MEAN | | | | | 1,859 | 1998 |
| LOWEST ANNUAL MEAN | | | | | 147 | 2002 |
| HIGHEST DAILY MEAN | 3,090 | Nov 19 | 14,400 | Feb 25 | 25,000 | Jun 23, 1972 |
| LOWEST DAILY MEAN | 24 | Jul 23 | 44 | aOct 9 | 24 | Jul 23, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 33 | Aug 10 | 47 | Oct 4 | 33 | Aug 10, 2002 |
| MAXIMUM PEAK FLOW | | | 15,000 | Feb 25 | b29,900 | Jun 23, 1972 |
| MAXIMUM PEAK STAGE | | | 23.06 | Feb 25 | b29.22 | Jun 23, 1972 |
| INSTANTANEOUS LOW FLOW | | | 41 | Oct 9 | c20 | Jul 23, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.27 | | 1.55 | | 1.01 | |
| ANNUAL RUNOFF (INCHES) | 3.66 | | 21.00 | | 13.74 | |
| 10 PERCENT EXCEEDS | 657 | | 4,450 | | 2,550 | |
| 50 PERCENT EXCEEDS | 153 | | 784 | | 569 | |
| 90 PERCENT EXCEEDS | 44 | | 265 | | 111 | |

a Also Oct. 10, 2002.
b Prior to regulation, 1942-71, maximum peak flow, 40,300 $ft^3/s$, Aug. 23, 1969, gage height, 31.12 ft, from flood marks.
c Prior to regulation, 1942-71, instantaneous low flow, 12 $ft^3/s$, Sept. 12, 1966.
e Estimated.



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.

REMARKS.--Missing gage height values indicate periods that were affected by ice; for these samples only the mean daily discharge is reported.

COOPERATION.--Water samples were collected by the U.S. Geological Survey and analyzed by either the U.S. Geological Survey (Agency Code 80020) or by the Virginia Division of Consolidated Laboratory Services (VDCLS, Agency Code 85116), using analytical methods approved by the U.S. Geological Survey. Analyses performed by VDCLS are reported to U.S. Geological Survey rounding specifications. Results of chemical analyses provided by VDCLS were quality-assured and approved by the U.S. Geological Survey.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Time | Sample type | Agency analyzing sample, code (00028) | Gage height, feet (00065) | Instantaneous discharge, cfs (00061) | Turbidity, NTU (00076) | Barometric pressure, mm Hg (00025) | Dissolved oxygen, mg/L (00300) | Dissolved oxygen, percent of saturation (00301) | pH, water, unfltrd field, std units (00400) | Specif. conductance, wat unf uS/cm 25 degC (00095) | Temperature, air, deg C (00020) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | |
| 22... | 0725 | Blank | 85116 | -- | -- | 0.37 | -- | -- | -- | -- | -- | -- |
| 22... | 0730 | Environmental | 85116 | 2.82 | 132 | 4.2 | 760 | 9.4 | 89 | 7.4 | 237 | 14.5 |
| 31... | 1150 | Blank | 85116 | -- | -- | 0.20 | -- | -- | -- | -- | -- | -- |
| 31... | 1155 | Environmental | 85116 | 6.16 | 805 | 31 | 760 | 9.5 | 85 | 5.8 | 124 | 12.0 |
| NOV | | | | | | | | | | | | |
| 13... | 1345 | Environmental | 85116 | 12.56 | 2,830 | 130 | 756 | 8.9 | 86 | 6.3 | 88 | 12.0 |
| 14... | 1500 | Environmental | 85116 | 13.05 | 3,060 | 91 | 758 | 10.1 | 93 | 6.2 | 79 | 20.0 |
| 19... | 1530 | Environmental | 85116 | 12.99 | 3,030 | 51 | 761 | 11.6 | 100 | 6.4 | 77 | 16.5 |
| DEC | | | | | | | | | | | | |
| 13... | 1145 | Environmental | 85116 | 7.69 | 1,210 | 26 | 761 | 14.8 | 109 | 6.1 | 111 | 4.0 |
| 13... | 1200 | Replicate | 85116 | 7.72 | 1,220 | 28 | -- | -- | -- | -- | -- | -- |
| 17... | 0845 | Environmental | 85116 | 7.81 | 1,250 | 31 | 765 | 11.2 | 85 | 6.2 | 91 | -1.0 |
| 20... | 1030 | Environmental | 85116 | 5.22 | 581 | 13 | 745 | 11.2 | 91 | 6.3 | 102 | 17.0 |
| JAN | | | | | | | | | | | | |
| 03... | 1400 | Environmental | 85116 | 12.02 | 2,610 | 71 | 753 | 10.5 | 89 | 6.8 | 71 | 6.5 |
| 09... | 0900 | Environmental | 85116 | 5.74 | 703 | 16 | 740 | 10.3 | 81 | 5.8 | 107 | 14.0 |
| 09... | 0915 | Replicate | 85116 | 5.74 | 703 | 18 | -- | -- | -- | -- | -- | -- |
| 23... | 0945 | Environmental | 85116 | -- | 330 | 6.3 | 757 | 14.6 | 100 | 6.6 | 138 | E-8.0 |
| 23... | 1000 | Replicate | 85116 | -- | 330 | 9.0 | -- | -- | -- | -- | -- | -- |
| FEB | | | | | | | | | | | | |
| 20... | 0930 | Environmental | 85116 | 7.88 | 1,270 | 15 | 769 | 14.4 | 106 | 7.0 | 109 | 7.5 |
| 23... | 0930 | Environmental | 85116 | 17.30 | 5,260 | 100 | 737 | 12.7 | 95 | 6.6 | 78 | 9.5 |
| 24... | 1645 | Environmental | 85116 | 22.70 | 14,000 | 40 | 760 | 12.2 | 93 | 6.3 | 59 | 15.5 |
| MAR | | | | | | | | | | | | |
| 10... | 1215 | Environmental | 85116 | 8.58 | 1,530 | 13 | 760 | 11.3 | 98 | 7.2 | 87 | 10.5 |
| 10... | 1220 | Replicate | 80020 | 8.58 | 1,530 | -- | -- | -- | -- | -- | -- | -- |
| 21... | 1030 | Environmental | 85116 | 17.46 | 5,370 | 120 | 750 | 10.4 | 91 | 6.5 | 62 | 13.0 |
| 26... | 1100 | Environmental | 85116 | 11.81 | 2,530 | 20 | 752 | 10.1 | 98 | 6.8 | 83 | 25.0 |
| 26... | 1105 | Replicate | 80020 | 11.79 | 2,520 | -- | -- | -- | -- | -- | -- | -- |
| APR | | | | | | | | | | | | |
| 01... | 0845 | Environmental | 85116 | 15.33 | 4,160 | 34 | 760 | 10.9 | 97 | 7.0 | 71 | 6.5 |
| 23... | 1100 | Environmental | 85116 | 8.17 | 1,260 | 11 | 755 | 8.8 | 87 | 7.0 | 83 | 16.5 |
| 23... | 1105 | Replicate | 80020 | 8.17 | 1,260 | -- | -- | -- | -- | -- | -- | -- |
| MAY | | | | | | | | | | | | |
| 28... | 1140 | Blank | 85116 | -- | -- | 0.22 | -- | -- | -- | -- | -- | -- |
| 28... | 1145 | Environmental | 85116 | 19.55 | 7,280 | 15 | 749 | 7.5 | 80 | 6.7 | 64 | 22.0 |
| JUN | | | | | | | | | | | | |
| 02... | 1045 | Environmental | 85116 | 10.13 | 1,910 | 12 | 756 | 8.0 | 86 | 6.9 | 81 | 20.0 |
| 02... | 1100 | Replicate | 85116 | 10.11 | 1,910 | 12 | -- | -- | -- | -- | -- | -- |
| 16... | 1200 | Environmental | 85116 | 15.42 | 4,210 | 18 | 759 | 7.3 | 86 | 6.8 | 75 | 25.5 |
| 24... | 1030 | Environmental | 85116 | 10.90 | 2,180 | 11 | 757 | 7.4 | 85 | 6.8 | 86 | 26.0 |
| JUL | | | | | | | | | | | | |
| 10... | 0915 | Environmental | 85116 | 6.63 | 843 | 8.8 | 755 | 6.5 | 82 | 7.0 | 97 | 26.0 |
| AUG | | | | | | | | | | | | |
| 11... | 0930 | Environmental | 85116 | 6.64 | 846 | 10 | 759 | 6.9 | 83 | 7.0 | 101 | 25.5 |
| 18... | 1130 | Environmental | 85116 | 8.86 | 1,560 | 170 | 758 | 7.9 | 94 | 6.7 | 59 | 28.0 |
| SEP | | | | | | | | | | | | |
| 09... | 1325 | Blank | 85116 | -- | -- | 0.85 | -- | -- | -- | -- | -- | -- |
| 09... | 1330 | Environmental | 85116 | 3.78 | 316 | 15 | 760 | 8.0 | 92 | 7.2 | 166 | 23.0 |
| 16... | 0930 | Environmental | 85116 | 5.52 | 604 | 25 | 765 | 7.5 | 84 | 7.1 | 120 | 17.5 |
| 20... | 0945 | Environmental | 85116 | 21.41 | 8,860 | 55 | 756 | 5.4 | 61 | 6.3 | 50 | 27.5 |
| 25... | 1530 | Environmental | 85116 | 21.16 | 8,410 | 14 | 753 | 5.4 | 63 | 6.5 | 63 | 29.5 |

01673000 PAMUNKEY RIVER NEAR HANOVER, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Temperature, water, deg C (00010) | Silica, water, fltrd, mg/L (00955) | Residue fixed non-filterable, mg/L (00540) | Residue total at 105 deg. C, suspended, mg/L (00530) | Residue volatile, suspended, mg/L (00535) | Ammonia + org-N, water, fltrd, mg/L as N (00623) | Ammonia + org-N, water, unfltrd mg/L as N (00625) | Ammonia water, fltrd, mg/L as N (00608) | Nitrate water, fltrd, mg/L as N (00618) | Nitrite + nitrate water fltrd, mg/L as N (00631) | Nitrite water, fltrd, mg/L as N (00613) | Orthophosphate, water, fltrd, mg/L as P (00671) | Phosphorus, water, fltrd, mg/L (00666) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 22... | -- | <0.100 | <3 | <3 | <3 | -- | -- | 0.006 | <0.004 | <0.004 | <0.002 | 0.003 | 0.007 |
| 22... | 13.1 | 13.9 | <3 | <3 | <3 | -- | -- | 0.020 | 0.33 | 0.331 | <0.002 | 0.095 | 0.119 |
| 31... | -- | <0.100 | <3 | <3 | <3 | -- | -- | 0.017 | <0.004 | <0.004 | <0.002 | 0.004 | 0.001 |
| 31... | 10.3 | 13.4 | 27 | 33 | 6 | -- | -- | 0.025 | 0.32 | 0.318 | <0.002 | 0.049 | 0.068 |
| NOV | | | | | | | | | | | | | |
| 13... | 13.2 | 11.3 | 149 | 177 | 28 | -- | -- | <0.004 | 0.16 | 0.159 | <0.002 | 0.021 | 0.041 |
| 14... | 11.6 | 12.4 | 106 | 127 | 20 | -- | -- | <0.004 | 0.09 | 0.090 | <0.002 | 0.012 | 0.027 |
| 19... | 8.9 | 12.0 | 53 | 64 | 11 | -- | -- | 0.006 | 0.17 | 0.167 | <0.002 | 0.015 | 0.025 |
| DEC | | | | | | | | | | | | | |
| 13... | 2.6 | 13.7 | 29 | 37 | 8 | -- | -- | 0.033 | 0.39 | 0.386 | <0.002 | 0.023 | 0.038 |
| 13... | -- | 13.5 | 27 | 34 | 7 | -- | -- | 0.034 | 0.39 | 0.388 | <0.002 | 0.024 | 0.039 |
| 17... | 3.8 | 12.5 | 22 | 26 | 4 | -- | -- | 0.018 | 0.35 | 0.354 | <0.002 | 0.019 | 0.040 |
| 20... | 5.8 | 13.9 | 7 | 9 | <3 | -- | -- | 0.037 | 0.39 | 0.396 | 0.002 | 0.024 | 0.037 |
| JAN | | | | | | | | | | | | | |
| 03... | 7.5 | 11.7 | 73 | 85 | 12 | -- | -- | 0.022 | 0.21 | 0.208 | 0.002 | 0.016 | 0.034 |
| 09... | 4.0 | 12.9 | 5 | 6 | <3 | -- | -- | 0.018 | 0.28 | 0.283 | 0.002 | 0.033 | 0.041 |
| 09... | -- | 12.9 | 6 | 8 | <3 | -- | -- | 0.019 | 0.30 | 0.296 | <0.002 | 0.030 | 0.041 |
| 23... | 0.0 | 13.8 | <3 | 4 | <3 | -- | -- | 0.025 | 0.52 | 0.519 | <0.002 | 0.049 | 0.064 |
| 23... | -- | 13.7 | 3 | 5 | <3 | -- | -- | 0.026 | 0.53 | 0.531 | <0.002 | 0.048 | 0.066 |
| FEB | | | | | | | | | | | | | |
| 20... | 3.1 | 11.0 | 18 | 22 | 4 | -- | -- | 0.021 | 0.32 | 0.323 | <0.002 | 0.015 | 0.023 |
| 23... | 2.2 | 6.90 | 125 | 142 | 17 | -- | -- | 0.070 | 0.36 | 0.363 | 0.002 | 0.014 | 0.029 |
| 24... | 3.8 | 7.00 | 27 | 33 | 6 | -- | -- | 0.036 | 0.22 | 0.222 | 0.002 | 0.009 | 0.027 |
| MAR | | | | | | | | | | | | | |
| 10... | 8.8 | 9.70 | 12 | 13 | <3 | -- | -- | 0.006 | 0.32 | 0.317 | <0.002 | 0.015 | 0.017 |
| 10... | -- | 9.8 | -- | 14 | <10 | 0.25 | 0.32 | <0.015 | -- | 0.299 | -- | 0.007 | <0.04 |
| 21... | 8.6 | 6.80 | 86 | 97 | 11 | -- | -- | 0.055 | 0.26 | 0.260 | 0.002 | 0.023 | 0.039 |
| 26... | 13.5 | 9.20 | 18 | 20 | <3 | -- | -- | 0.010 | 0.35 | 0.353 | <0.002 | 0.014 | 0.032 |
| 26... | -- | 9.2 | -- | 20 | <10 | 0.27 | 0.37 | <0.015 | -- | 0.343 | -- | 0.010 | <0.04 |
| APR | | | | | | | | | | | | | |
| 01... | 9.9 | 8.80 | 31 | 36 | 5 | -- | -- | 0.015 | 0.20 | 0.196 | <0.002 | 0.011 | 0.023 |
| 23... | 14.8 | 9.50 | 10 | 11 | <3 | -- | -- | 0.011 | 0.23 | 0.235 | <0.002 | 0.020 | 0.027 |
| 23... | -- | 9.7 | -- | 11 | <10 | 0.27 | 0.41 | E.008 | -- | 0.221 | -- | 0.013 | E.03 |
| MAY | | | | | | | | | | | | | |
| 28... | -- | <0.100 | <3 | <3 | <3 | -- | -- | <0.004 | <0.004 | <0.004 | <0.002 | 0.003 | 0.001 |
| 28... | 17.1 | 8.70 | 11 | 13 | <3 | -- | -- | 0.038 | 0.18 | 0.183 | 0.002 | 0.014 | 0.029 |
| JUN | | | | | | | | | | | | | |
| 02... | 18.5 | 11.4 | 12 | 15 | 3 | -- | -- | 0.022 | 0.27 | 0.274 | <0.002 | 0.020 | 0.040 |
| 02... | -- | 11.5 | 9 | 16 | 7 | -- | -- | 0.022 | 0.28 | 0.276 | <0.002 | 0.019 | 0.047 |
| 16... | 23.0 | 8.20 | 34 | 40 | 6 | -- | -- | 0.032 | 0.23 | 0.234 | 0.004 | 0.016 | 0.029 |
| 24... | 21.9 | 11.5 | 12 | 19 | 7 | -- | -- | 0.034 | 0.25 | 0.250 | <0.002 | 0.019 | 0.041 |
| JUL | | | | | | | | | | | | | |
| 10... | 26.5 | 11.5 | 8 | 10 | <3 | -- | -- | 0.026 | 0.31 | 0.312 | <0.002 | 0.028 | 0.032 |
| AUG | | | | | | | | | | | | | |
| 11... | 24.6 | 13.1 | 11 | 13 | <3 | -- | -- | 0.024 | 0.35 | 0.347 | <0.002 | 0.029 | 0.026 |
| 18... | 23.8 | 8.00 | 170 | 197 | 27 | -- | -- | 0.035 | 0.32 | 0.321 | 0.004 | 0.020 | 0.051 |
| SEP | | | | | | | | | | | | | |
| 09... | -- | <0.100 | <3 | <3 | <3 | -- | -- | <0.004 | <0.004 | <0.004 | <0.002 | 0.003 | -- |
| 09... | 22.0 | 10.8 | <3 | 3 | <3 | -- | -- | 0.009 | 0.40 | 0.397 | <0.002 | 0.057 | -- |
| 16... | 21.0 | 14.7 | 18 | 21 | 3 | -- | -- | 0.024 | 0.31 | 0.329 | 0.016 | 0.043 | 0.072 |
| 20... | 20.9 | 6.50 | 32 | 39 | 7 | -- | -- | 0.009 | 0.19 | 0.192 | <0.002 | 0.015 | 0.040 |
| 25... | 21.9 | 8.60 | 6 | 8 | <3 | -- | -- | <0.004 | M | 0.004 | <0.002 | 0.007 | 0.043 |

01673000 PAMUNKEY RIVER NEAR HANOVER, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Phosphorus, water, unfltrd mg/L (00665) | Total nitrogen, water, fltrd, mg/L (00602) | Phosphorus, suspnd sedimnt total, mg/L (00667) | Total nitrogen, suspnd sedimnt total, mg/L (00601) | Total carbon, suspnd sedimnt total, mg/L (00694) | Inorganic carbon, suspnd sedimnt total, mg/L (00688) | Organic carbon, water, fltrd, mg/L (00681) | Pheophytin a, phytoplankton, ug/L (62360) | Chlorophyll a phytoplankton, fluoro, ug/L (70953) | Suspnd. sediment, sieve diametr percent <.063mm (70331) | Suspended sediment concentration mg/L (80154) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | |
| 22... | -- | 0.06 | 0.001 | 0.01 | M | -- | -- | -- | -- | -- | -- |
| 22... | -- | 0.74 | 0.010 | 0.02 | 0.2 | -- | -- | -- | -- | -- | 3 |
| 31... | -- | 0.04 | 0.001 | 0.01 | M | -- | -- | -- | -- | -- | -- |
| 31... | -- | 0.73 | 0.078 | 0.23 | 1.9 | -- | -- | -- | -- | 96 | 38 |
| NOV | | | | | | | | | | | |
| 13... | -- | 0.62 | 0.227 | 0.79 | 7.8 | -- | -- | -- | -- | 83 | 189 |
| 14... | -- | 0.54 | 0.122 | 0.61 | 6.1 | -- | -- | -- | -- | 76 | 157 |
| 19... | -- | 0.59 | -- | 0.22 | 2.2 | -- | -- | -- | -- | 73 | 86 |
| DEC | | | | | | | | | | | |
| 13... | -- | 0.70 | 0.069 | 0.23 | 2.1 | -- | -- | -- | -- | 85 | 46 |
| 13... | -- | 0.71 | 0.070 | 0.24 | 2.2 | -- | -- | -- | -- | 81 | 51 |
| 17... | -- | 0.73 | 0.038 | 0.17 | 1.6 | -- | -- | -- | -- | 93 | 26 |
| 20... | -- | 0.72 | 0.026 | 0.09 | 0.7 | -- | -- | -- | -- | -- | 12 |
| JAN | | | | | | | | | | | |
| 03... | -- | 0.57 | 0.081 | 0.36 | 4.1 | -- | -- | -- | -- | 83 | 107 |
| 09... | -- | 0.69 | 0.025 | 0.08 | 0.7 | -- | -- | -- | -- | -- | 9 |
| 09... | -- | 0.68 | 0.025 | 0.09 | 0.7 | -- | -- | -- | -- | -- | 9 |
| 23... | -- | 0.78 | 0.023 | 0.05 | 0.4 | -- | -- | -- | -- | -- | 7 |
| 23... | -- | 0.78 | 0.023 | 0.04 | 0.5 | -- | -- | -- | -- | -- | 8 |
| FEB | | | | | | | | | | | |
| 20... | -- | 0.60 | 0.035 | 0.11 | 1.0 | -- | -- | -- | -- | -- | 24 |
| 23... | -- | 0.78 | 0.154 | 0.53 | 5.3 | -- | -- | -- | -- | 68 | 212 |
| 24... | -- | 0.58 | 0.053 | 0.19 | 1.6 | -- | -- | -- | -- | 44 | 80 |
| MAR | | | | | | | | | | | |
| 10... | -- | 0.57 | 0.025 | 0.09 | 0.7 | -- | -- | -- | -- | -- | 19 |
| 10... | 0.06 | 0.54 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 21... | -- | 0.69 | 0.095 | 0.39 | 3.8 | -- | -- | -- | -- | 71 | 140 |
| 26... | -- | 0.65 | 0.032 | 0.13 | 1.0 | -- | -- | -- | -- | 96 | 26 |
| 26... | 0.07 | 0.62 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| APR | | | | | | | | | | | |
| 01... | -- | 0.54 | 0.041 | 0.18 | 1.6 | -- | -- | -- | -- | 79 | 42 |
| 23... | -- | 0.51 | 0.021 | 0.09 | 0.8 | -- | -- | <0.5 | <0.5 | -- | 12 |
| 23... | 0.05 | 0.49 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MAY | | | | | | | | | | | |
| 28... | -- | <0.004 | 0.001 | 0.01 | 0.1 | -- | -- | <0.5 | <0.5 | -- | 0.0 |
| 28... | -- | 0.57 | 0.030 | 0.13 | 1.1 | -- | -- | 1.1 | <0.5 | 53 | 28 |
| JUN | | | | | | | | | | | |
| 02... | -- | 0.60 | 0.027 | 0.06 | 1.0 | -- | -- | <0.5 | 1.2 | 9 | 192 |
| 02... | -- | 0.59 | 0.028 | 0.09 | 1.0 | -- | -- | <0.5 | 1.3 | 15 | 117 |
| 16... | -- | 0.59 | 0.036 | 0.14 | 1.4 | -- | -- | <0.5 | 0.6 | -- | 46 |
| 24... | -- | 0.70 | 0.030 | 0.14 | 1.2 | -- | -- | 1.0 | <0.5 | 92 | 22 |
| JUL | | | | | | | | | | | |
| 10... | -- | 0.64 | 0.010 | 0.10 | 1.0 | <0.02 | 5.0 | <0.5 | 1.0 | -- | 11 |
| AUG | | | | | | | | | | | |
| 11... | -- | 0.57 | 0.054 | 0.06 | 0.6 | 0.1 | 6.4 | 0.7 | <0.5 | -- | 12 |
| 18... | -- | 0.81 | 0.173 | 1.8 | 10.1 | <0.02 | 9.0 | 6.6 | 2.1 | 95 | 208 |
| SEP | | | | | | | | | | | |
| 09... | -- | -- | -- | <0.01 | 0.1 | <0.02 | <2.0 | <0.5 | <0.5 | -- | 0.0 |
| 09... | -- | -- | -- | <0.01 | 0.3 | M | 5.3 | <0.5 | <0.5 | -- | 4 |
| 16... | -- | 0.71 | 0.075 | 0.02 | 0.6 | <0.02 | 5.3 | 1.7 | 0.7 | 75 | 23 |
| 20... | -- | 0.67 | 0.073 | 0.35 | 2.8 | 0.2 | 10.0 | 1.7 | 2.1 | 76 | 54 |
| 25... | -- | 0.71 | 0.036 | 0.13 | 1.2 | M | 8.6 | <0.5 | 1.3 | 76 | 13 |

Remark codes used in this table:
< -- Less than
E -- Estimated value
M -- Presence verified, not quantified

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## 01673550 TOTOPOTOMOY CREEK NEAR STUDLEY, VA

LOCATION.--Lat 37°39'46", long 77°15'28", NAD83, 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 $mi^2$.

PERIOD OF RECORD.--October 1977 to current year.

GAGE.--Water-stage recorder. Datum of gage is 38.36 ft NGVD of 1929.

REMARKS.--Records good except for period with ice effect, Jan. 17-28, which is fair. Maximum discharge, 1,620 $ft^3/s$, from rating curve extended above 783 $ft^3/s$. 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 160 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 23 | 1630 | 224 | 5.56 | Jul 22 | 2230 | 326 | 6.47 |
| Mar 21 | 0730 | 505 | 7.60 | Jul 24 | 0500 | 247 | 5.69 |
| Apr 8 | 1230 | 230 | 5.56 | Jul 30 | 1630 | 302 | 6.24 |
| Apr 10 | 0830 | 210 | 5.33 | Aug 1 | 1830 | 176 | 4.88 |
| Apr 12 | 0030 | 235 | 5.61 | Sep 13 | 2130 | 175 | 4.87 |
| May 26 | 1500 | 681 | 8.03 | Sep 19 | 0900 | *1,170 | *8.87 |
| Jul 19 | 2330 | 185 | 4.99 | Sep 24 | 0630 | 462 | 7.42 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.0 | 29 | 8.2 | 24 | 17 | 51 | 61 | 35 | 109 | 29 | 97 | 61 |
| 2 | 0.65 | 17 | 7.8 | 62 | 16 | 50 | 47 | 40 | 89 | 33 | 86 | 45 |
| 3 | 0.52 | 13 | 7.7 | 37 | 15 | 61 | 40 | 31 | 58 | 62 | 71 | 31 |
| 4 | 0.37 | 12 | 7.5 | 25 | 15 | 36 | 36 | 27 | 58 | 60 | 57 | 51 |
| 5 | 0.34 | 13 | 11 | 22 | 16 | 35 | 33 | 26 | 71 | 39 | 58 | 80 |
| 6 | 0.26 | 20 | 16 | 20 | 16 | 56 | 31 | 28 | 61 | 31 | 78 | 65 |
| 7 | 0.22 | 36 | 17 | 20 | 19 | 57 | 89 | 28 | 63 | 28 | 69 | 38 |
| 8 | 0.18 | 24 | 14 | 19 | 24 | 36 | 196 | 29 | 98 | 26 | 53 | 33 |
| 9 | 0.12 | 17 | 13 | 18 | 22 | 29 | 144 | 30 | 82 | 26 | 50 | 30 |
| 10 | 0.14 | 14 | 13 | 17 | 19 | 26 | 178 | 48 | 67 | 27 | 77 | 29 |
| 11 | 3.4 | 13 | 20 | 15 | 19 | 26 | 194 | 95 | 50 | 29 | 61 | 28 |
| 12 | 12 | 21 | 54 | 14 | 17 | 23 | 158 | 50 | 47 | 27 | 47 | 52 |
| 13 | 17 | 81 | 33 | 13 | 15 | 24 | 75 | 31 | 49 | 24 | 41 | 141 |
| 14 | 12 | 60 | 40 | 13 | 14 | 25 | 57 | 26 | 50 | 56 | 56 | 134 |
| 15 | 7.0 | 25 | 33 | 14 | 20 | 27 | 50 | 24 | 62 | 128 | 44 | 62 |
| 16 | 11 | 18 | 22 | 14 | 36 | 23 | 45 | 26 | 74 | 45 | 81 | 44 |
| 17 | 22 | 23 | 18 | e13 | 30 | 22 | 43 | 30 | 99 | 30 | 123 | 37 |
| 18 | 23 | 62 | 15 | e12 | 25 | 22 | 39 | 45 | 101 | 30 | 69 | 149 |
| 19 | 13 | 50 | 15 | e11 | 22 | 21 | 41 | 91 | 95 | 118 | 45 | 798 |
| 20 | 8.2 | 23 | 16 | e13 | 31 | 110 | 41 | 58 | 100 | 98 | 40 | 351 |
| 21 | 6.4 | 17 | 18 | e12 | 63 | 365 | 37 | 39 | 82 | 39 | 36 | 137 |
| 22 | 5.8 | 14 | 18 | e11 | 128 | 116 | 35 | 64 | 66 | 74 | 34 | 80 |
| 23 | 5.8 | 13 | 15 | e10 | 207 | 58 | 33 | 78 | 49 | 206 | 32 | 130 |
| 24 | 7.7 | 11 | 15 | e9.7 | 102 | 48 | 31 | 75 | 41 | 188 | 30 | 350 |
| 25 | 4.8 | 10 | 35 | e11 | 45 | 40 | 31 | 105 | 37 | 108 | 29 | 162 |
| 26 | 10 | 9.4 | 60 | e10 | 34 | 37 | 38 | 559 | 34 | 55 | 28 | 77 |
| 27 | 19 | 9.1 | 27 | e9.4 | 36 | 35 | 41 | 376 | 31 | 40 | 26 | 61 |
| 28 | 19 | 8.6 | 20 | e11 | 51 | 33 | 33 | 183 | 30 | 37 | 27 | 54 |
| 29 | 20 | 8.3 | 18 | 12 | --- | 34 | 29 | 125 | 31 | 50 | 27 | 50 |
| 30 | 33 | 8.4 | 16 | 14 | --- | 82 | 28 | 93 | 31 | 162 | 27 | 45 |
| 31 | 49 | --- | 16 | 16 | --- | 123 | --- | 85 | --- | 169 | 37 | --- |
| TOTAL | 312.90 | 679.8 | 639.2 | 522.1 | 1,074 | 1,731 | 1,934 | 2,580 | 1,915 | 2,074 | 1,636 | 3,405 |
| MEAN | 10.1 | 22.7 | 20.6 | 16.8 | 38.4 | 55.8 | 64.5 | 83.2 | 63.8 | 66.9 | 52.8 | 114 |
| MAX | 49 | 81 | 60 | 62 | 207 | 365 | 196 | 559 | 109 | 206 | 123 | 798 |
| MIN | 0.12 | 8.3 | 7.5 | 9.4 | 14 | 21 | 28 | 24 | 30 | 24 | 26 | 28 |
| CFSM | 0.39 | 0.86 | 0.79 | 0.64 | 1.46 | 2.13 | 2.46 | 3.18 | 2.44 | 2.55 | 2.01 | 4.33 |
| IN. | 0.44 | 0.97 | 0.91 | 0.74 | 1.52 | 2.46 | 2.75 | 3.66 | 2.72 | 2.94 | 2.32 | 4.83 |

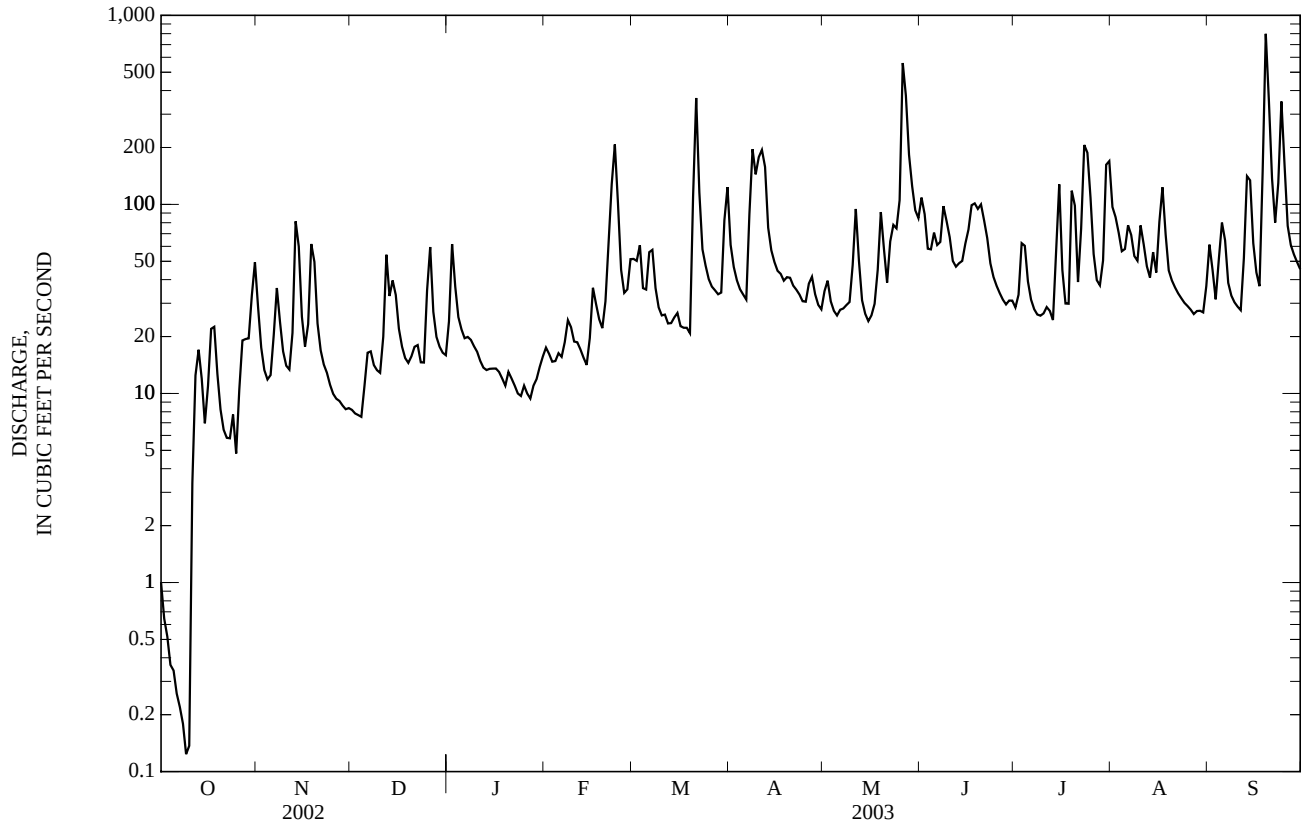
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1978 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 13.6 | 21.7 | 24.3 | 33.5 | 36.4 | 48.1 | 40.9 | 29.8 | 18.9 | 14.1 | 15.1 | 17.2 |
| MAX | 54.0 | 80.8 | 56.0 | 114 | 103 | 127 | 106 | 83.2 | 63.8 | 66.9 | 52.8 | 114 |
| (WY) | (1980) | (1986) | (1997) | (1978) | (1998) | (1984) | (1984) | (2003) | (2003) | (2003) | (2003) | (2003) |
| MIN | 2.72 | 4.04 | 9.00 | 10.3 | 9.91 | 12.7 | 12.3 | 8.46 | 2.75 | 0.20 | 0.92 | 1.18 |
| (WY) | (2002) | (2002) | (2002) | (1981) | (2002) | (1981) | (1985) | (1985) | (2002) | (2002) | (1995) | (1997) |

01673550 TOTOPOTOMOY CREEK NEAR STUDLEY, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1978 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 3,935.91 | | 18,503.00 | | | |
| ANNUAL MEAN | 10.8 | | 50.7 | | 26.1 | |
| HIGHEST ANNUAL MEAN | | | | | 50.7 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 7.64 | 2002 |
| HIGHEST DAILY MEAN | 83 | May 10 | 798 | Sep 19 | 913 | Sep 16, 1999 |
| LOWEST DAILY MEAN | e0.00 | Jul 13 | 0.12 | Oct 9 | e0.00 | aJul 13, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | e0.00 | Jul 13 | 0.23 | Oct 4 | e0.00 | bJul 13, 2002 |
| MAXIMUM PEAK FLOW | | | 1,170 | Sep 19 | 1,620 | Sep 16, 1999 |
| MAXIMUM PEAK STAGE | | | 8.87 | Sep 19 | 9.46 | Sep 16, 1999 |
| INSTANTANEOUS LOW FLOW | | | 0.10 | Oct 10 | c0.00 | dJul 13, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.41 | | 1.93 | | 1.00 | |
| ANNUAL RUNOFF (INCHES) | 5.59 | | 26.27 | | 13.52 | |
| 10 PERCENT EXCEEDS | 23 | | 100 | | 52 | |
| 50 PERCENT EXCEEDS | 8.7 | | 33 | | 16 | |
| 90 PERCENT EXCEEDS | 0.01 | | 11 | | 3.9 | |

a Also July 14-25 and Aug. 7-28, 2002.
b Also July 14-19 and Aug. 7-22, 2002.
c Observed.
d Probably no flow part or all of each day July 13-25 and Aug. 7-28, 2002.
e Estimated.



## 01673638 COHOKE MILL CREEK NEAR LESTER MANOR, VA

LOCATION.--Lat 37°37'36," long 76°57'46", NAD83, 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 $mi^2$.

PERIOD OF RECORD.--October 1998 to current year.

GAGE.--Water stage recorder. Elevation of gage is 40 ft NGVD of 1929, from topographic map.

REMARKS.--Records poor due to backwater from beaver dams.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.00 | e1.0 | 4.0 | 20 | 7.6 | 18 | 18 | 9.9 | 24 | 5.2 | 27 | 15 |
| 2 | 0.00 | e0.75 | 3.8 | 24 | 6.8 | 18 | 15 | 9.2 | 15 | 7.8 | 70 | 12 |
| 3 | 0.00 | e0.60 | 3.7 | 14 | 6.3 | 16 | 12 | 9.7 | 9.6 | 14 | 29 | 12 |
| 4 | 0.00 | e0.90 | 3.8 | 11 | 6.3 | 9.5 | 11 | 10 | 12 | 10 | 34 | 27 |
| 5 | 0.00 | e1.3 | 6.7 | 7.7 | 6.1 | 18 | 11 | 9.9 | 28 | 7.7 | 30 | 30 |
| 6 | 0.00 | 6.3 | 7.1 | 6.9 | 6.0 | 27 | 12 | 12 | 14 | 5.9 | 40 | 16 |
| 7 | 0.00 | e3.2 | 5.9 | 7.4 | 9.4 | 20 | 53 | 12 | 17 | 4.8 | 29 | 13 |
| 8 | 0.00 | e2.3 | 5.2 | 6.4 | 8.7 | 11 | 46 | 15 | 41 | 5.7 | 32 | 12 |
| 9 | 0.00 | 2.0 | 4.9 | 6.1 | 7.2 | 8.1 | 61 | 18 | 23 | 5.5 | 33 | 11 |
| 10 | 0.00 | 1.9 | 4.8 | 5.6 | 7.3 | 6.0 | 46 | 30 | 12 | 5.6 | 37 | 11 |
| 11 | 0.53 | 2.6 | 8.0 | 6.0 | 7.1 | 5.7 | 65 | 34 | 8.8 | 6.0 | 24 | 11 |
| 12 | e0.20 | 5.8 | 9.3 | 6.2 | 6.5 | 5.7 | 38 | e17 | 14 | 5.2 | 21 | 24 |
| 13 | e0.10 | 11 | 7.9 | 5.6 | 6.2 | 5.8 | 26 | e11 | 12 | 4.3 | 19 | 99 |
| 14 | e0.07 | 5.9 | 11 | 5.5 | 6.4 | 6.2 | 23 | e8.0 | 12 | 6.4 | 17 | 27 |
| 15 | e0.05 | 3.8 | 7.8 | 5.4 | 10 | 6.0 | 21 | 7.3 | 36 | 6.4 | 16 | 19 |
| 16 | e0.80 | 4.2 | 6.6 | 5.3 | 13 | 6.2 | 19 | 7.2 | 22 | 5.5 | 18 | 17 |
| 17 | e0.40 | 13 | 6.0 | 5.6 | 9.7 | 6.5 | 17 | 6.9 | 8.6 | 4.8 | 18 | 15 |
| 18 | e0.25 | 15 | 6.1 | 5.5 | 8.3 | 6.3 | 18 | 17 | 12 | 4.8 | 23 | 156 |
| 19 | e0.15 | 7.4 | 6.3 | 5.3 | 8.3 | 5.5 | 24 | 21 | 43 | 24 | 25 | 294 |
| 20 | e0.12 | 5.0 | 11 | 5.6 | 12 | 53 | 20 | 10 | 33 | 17 | 17 | 42 |
| 21 | e0.30 | 4.3 | 11 | 6.2 | 21 | 59 | 15 | 8.7 | 25 | 12 | 15 | 24 |
| 22 | e0.20 | 4.9 | 7.1 | 5.6 | 50 | 31 | 14 | 25 | 20 | 10 | 14 | 19 |
| 23 | e0.16 | 4.4 | 6.2 | 5.1 | 57 | 23 | 12 | 23 | 19 | 79 | 14 | 24 |
| 24 | e0.13 | 4.5 | 6.9 | 4.8 | 26 | 20 | 11 | 19 | 16 | 24 | 13 | 21 |
| 25 | e0.10 | 3.4 | 18 | 4.9 | 14 | 17 | 12 | 14 | 9.9 | 16 | 12 | 16 |
| 26 | e1.0 | 3.4 | 15 | 5.0 | 11 | 15 | 19 | 158 | 6.4 | 12 | 12 | 15 |
| 27 | e0.45 | 3.7 | 8.7 | 5.1 | 13 | 17 | 26 | 54 | 6.0 | 10 | 12 | 14 |
| 28 | e0.25 | 3.5 | 7.2 | 4.9 | 27 | 15 | 15 | 34 | 7.9 | 11 | 11 | 15 |
| 29 | e0.60 | 3.7 | 6.6 | 5.6 | --- | 17 | 12 | 29 | 9.4 | 34 | 11 | 14 |
| 30 | e3.0 | 3.9 | 6.4 | 7.0 | --- | 28 | 11 | 23 | 5.7 | 30 | 11 | 13 |
| 31 | e1.5 | --- | 6.1 | 8.2 | --- | 24 | --- | 18 | --- | 45 | 18 | --- |
| TOTAL | 10.36 | 133.65 | 229.1 | 227.5 | 378.2 | 524.5 | 703 | 680.8 | 522.3 | 439.6 | 702 | 1,038 |
| MEAN | 0.33 | 4.46 | 7.39 | 7.34 | 13.5 | 16.9 | 23.4 | 22.0 | 17.4 | 14.2 | 22.6 | 34.6 |
| MAX | 3.0 | 15 | 18 | 24 | 57 | 59 | 65 | 158 | 43 | 79 | 70 | 294 |
| MIN | 0.00 | 0.60 | 3.7 | 4.8 | 6.0 | 5.5 | 11 | 6.9 | 5.7 | 4.3 | 11 | 11 |
| CFSM | 0.04 | 0.49 | 0.81 | 0.81 | 1.49 | 1.87 | 2.58 | 2.42 | 1.92 | 1.56 | 2.50 | 3.81 |
| IN. | 0.04 | 0.55 | 0.94 | 0.93 | 1.55 | 2.15 | 2.88 | 2.79 | 2.14 | 1.80 | 2.88 | 4.26 |

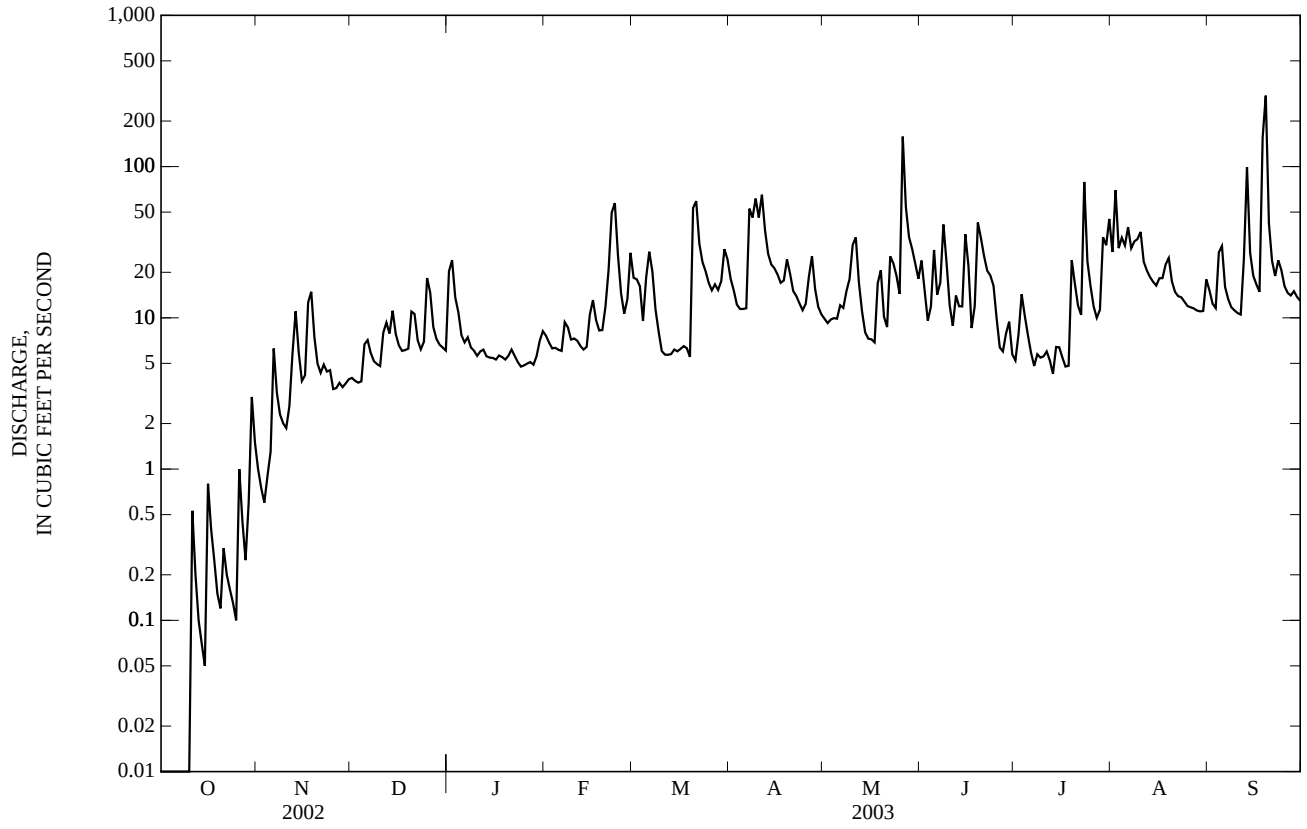
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1999 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 3.22 | 4.55 | 6.03 | 7.40 | 8.10 | 10.3 | 10.4 | 8.27 | 6.19 | 5.05 | 7.87 | 13.5 |
| MAX | 5.75 | 6.73 | 7.39 | 10.8 | 13.5 | 16.9 | 23.4 | 22.0 | 17.4 | 14.2 | 22.6 | 34.6 |
| (WY) | (2001) | (2001) | (2003) | (1999) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) |
| MIN | 0.33 | 2.90 | 4.19 | 5.77 | 4.53 | 3.15 | 4.51 | 3.46 | 0.017 | 0.000 | 0.000 | 0.000 |
| (WY) | (2003) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (1999) | (2002) | (2002) | (2002) | (2002) |

01673638 COHOKE MILL CREEK NEAR LESTER MANOR, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1999 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 1,056.94 | | 5,589.01 | | | |
| ANNUAL MEAN | 2.90 | | 15.3 | | 7.56 | |
| HIGHEST ANNUAL MEAN | | | | | 15.3 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 2.74 | 2002 |
| HIGHEST DAILY MEAN | 18 | Dec 25 | 294 | Sep 19 | 415 | Sep 16, 1999 |
| LOWEST DAILY MEAN | 0.00 | aJun 1 | b0.00 | Oct 1 | a0.00 | Jun 1, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.00 | Jun 17 | 0.00 | Oct 1 | 0.00 | Jun 17, 2002 |
| MAXIMUM PEAK FLOW | | | 826 | Sep 19 | 1,430 | Sep 16, 1999 |
| MAXIMUM PEAK STAGE | | | 9.28 | Sep 19 | c10.30 | Sep 16, 1999 |
| INSTANTANEOUS LOW FLOW | | | b0.00 | Oct 1 | d0.00 | May 29, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.32 | | 1.69 | | 0.83 | |
| ANNUAL RUNOFF (INCHES) | 4.33 | | 22.92 | | 11.33 | |
| 10 PERCENT EXCEEDS | 7.1 | | 29 | | 14 | |
| 50 PERCENT EXCEEDS | 2.0 | | 11 | | 5.3 | |
| 90 PERCENT EXCEEDS | 0.00 | | 2.0 | | 0.34 | |

a No flow part or all of many days in June to October 2002.
b No flow part or all of each day Oct. 1-11.
c From floodmarks.
d No flow part or all of many days in May to October 2002.
e Estimated.



## 01673800 PO RIVER NEAR SPOTSYLVANIA, VA

LOCATION.--Lat 38°10'17", long 77°35'41", NAD83, 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 $mi^2$.

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 those for periods with ice effect, Dec. 5-7 and Jan. 18-20, 22-24, 26-28, and period of no gage-height record, Apr. 8 to June 9, which are fair. Maximum discharge, 10,900 $ft^3/s$, from rating curve extended above 3,400 $ft^3/s$. Maximum discharge, 10,900 $ft^3/s$, from rating curve extended above 3,400 $ft^3/s$. Several measurements of water temperature were made during the year.

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

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 900 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 2 | 2300 | 1,180 | 8.21 | Apr 12 | --- | 1,340 | 8.69 |
| Feb 23 | 1600 | *3,800 | *13.11 | Sep 20 | 0300 | 2,810 | 11.68 |
| Mar 21 | 1700 | 2,630 | 11.38 | Sep 24 | 0900 | 1,580 | 9.31 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.08 | 45 | 12 | 166 | 35 | 130 | 249 | e66 | e175 | 28 | 18 | 0.27 |
| 2 | 0.07 | 24 | 11 | 885 | 43 | 320 | 178 | e74 | e130 | 29 | 17 | 1.5 |
| 3 | 0.07 | 13 | 10 | 599 | 37 | 600 | 143 | e82 | e105 | 205 | 16 | 4.2 |
| 4 | 0.07 | 9.2 | 8.9 | 266 | 52 | 240 | 122 | e70 | e90 | 290 | 15 | 12 |
| 5 | 0.07 | 6.8 | e10 | 144 | 94 | 180 | 110 | e59 | e86 | 109 | 21 | 15 |
| 6 | 0.06 | 30 | e11 | 100 | 56 | 237 | 101 | e52 | e125 | 57 | 20 | 9.9 |
| 7 | 0.05 | 63 | e12 | 84 | 49 | 191 | 161 | e51 | e140 | 39 | 21 | 6.7 |
| 8 | 0.04 | 32 | 13 | 73 | 48 | 134 | e345 | e46 | e215 | 36 | 22 | 4.0 |
| 9 | 0.05 | 20 | 14 | 64 | 43 | 110 | e400 | e43 | e170 | 36 | 39 | 2.3 |
| 10 | 0.05 | 12 | 16 | 54 | 42 | 93 | e460 | e66 | 112 | 30 | 26 | 1.3 |
| 11 | 0.11 | 23 | 44 | 44 | 46 | 78 | e550 | e100 | 66 | 29 | 22 | 0.79 |
| 12 | 0.16 | 157 | 243 | 37 | 47 | 72 | e900 | e120 | 52 | 27 | 20 | 1.5 |
| 13 | 0.18 | 372 | 175 | 33 | 48 | 69 | e400 | e84 | 45 | 22 | 16 | 65 |
| 14 | 0.16 | 115 | 344 | 33 | 47 | 66 | e210 | e64 | 48 | 22 | 14 | 62 |
| 15 | 0.13 | 55 | 277 | 32 | 107 | 60 | e155 | e50 | 405 | 22 | 11 | 28 |
| 16 | 8.3 | 53 | 130 | 30 | 210 | 58 | e130 | e80 | 218 | 19 | 10 | 16 |
| 17 | 17 | 359 | 77 | 28 | 131 | 62 | e120 | e75 | 120 | 15 | 8.6 | 11 |
| 18 | 19 | 550 | 52 | e26 | 115 | 64 | e110 | e125 | 208 | 12 | 7.1 | 118 |
| 19 | 7.8 | 199 | 42 | e22 | 89 | 58 | e115 | e235 | 202 | 10 | 6.3 | 1,090 |
| 20 | 1.7 | 74 | 57 | e24 | 102 | 358 | e125 | e285 | 262 | 9.0 | 6.3 | 1,740 |
| 21 | 0.82 | 48 | 212 | 26 | 173 | 1,880 | e140 | e240 | 521 | 8.9 | 6.2 | 130 |
| 22 | 0.30 | 36 | 101 | e23 | 715 | 820 | e110 | e300 | 171 | 8.7 | 5.6 | 70 |
| 23 | 0.20 | 27 | 60 | e21 | 2,930 | 224 | e100 | e410 | 95 | 9.5 | 4.5 | 504 |
| 24 | 0.25 | 20 | 47 | e18 | 1,550 | 167 | e90 | e365 | 64 | 12 | 3.3 | 1,200 |
| 25 | 0.19 | 16 | 222 | 19 | 448 | 137 | e84 | e335 | 48 | 12 | 2.2 | 154 |
| 26 | 3.3 | 14 | 569 | e18 | 256 | 122 | e81 | e450 | 40 | 9.1 | 1.2 | 81 |
| 27 | 16 | 13 | 162 | e17 | 170 | 152 | e89 | e730 | 33 | 6.7 | 0.65 | 57 |
| 28 | 10 | 12 | 91 | e18 | 136 | 140 | e83 | e480 | 43 | 6.5 | 0.25 | 54 |
| 29 | 11 | 11 | 67 | 19 | --- | 121 | e76 | e370 | 47 | 60 | 4.4 | 48 |
| 30 | 66 | 12 | 53 | 23 | --- | 223 | e71 | e310 | 36 | 47 | 1.3 | 36 |
| 31 | 86 | --- | 45 | 25 | --- | 453 | --- | e250 | --- | 23 | 0.28 | --- |
| TOTAL | 249.21 | 2,421.0 | 3,187.9 | 2,971 | 7,819 | 7,619 | 6,008 | 6,067 | 4,072 | 1,249.4 | 366.18 | 5,523.46 |
| MEAN | 8.04 | 80.7 | 103 | 95.8 | 279 | 246 | 200 | 196 | 136 | 40.3 | 11.8 | 184 |
| MAX | 86 | 550 | 569 | 885 | 2,930 | 1,880 | 900 | 730 | 521 | 290 | 39 | 1,740 |
| MIN | 0.04 | 6.8 | 8.9 | 17 | 35 | 58 | 71 | 43 | 33 | 6.5 | 0.25 | 0.27 |
| CFSM | 0.10 | 1.04 | 1.33 | 1.24 | 3.61 | 3.18 | 2.59 | 2.53 | 1.75 | 0.52 | 0.15 | 2.38 |
| IN. | 0.12 | 1.16 | 1.53 | 1.43 | 3.76 | 3.66 | 2.89 | 2.92 | 1.96 | 0.60 | 0.18 | 2.65 |

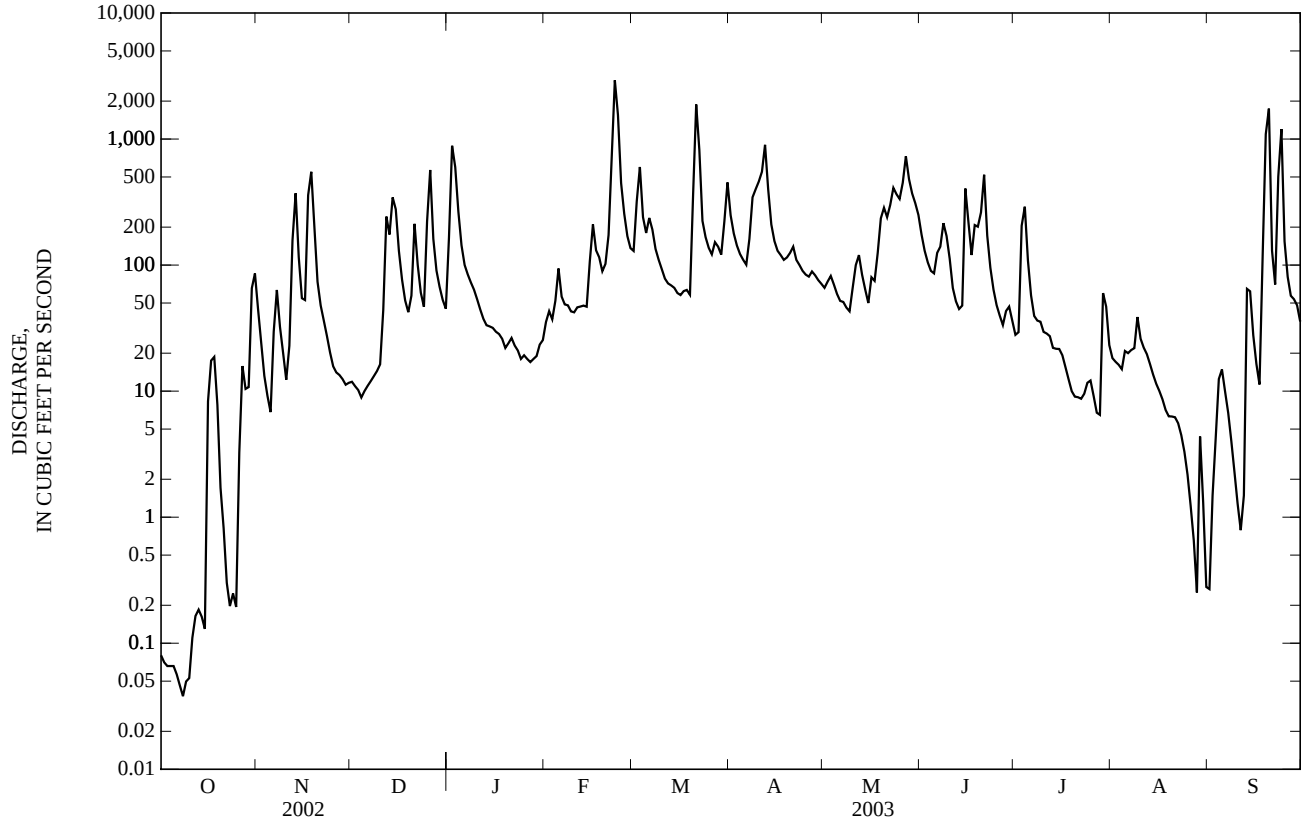
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 40.5 | 61.6 | 81.9 | 112 | 133 | 153 | 114 | 76.4 | 52.9 | 28.6 | 23.2 | 28.7 |
| 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 | 0.24 | 0.85 | 5.90 | 10.4 | 9.05 | 25.2 | 27.1 | 8.63 | 1.67 | 0.10 | 0.25 | 0.21 |
| (WY) | (1992) | (1992) | (1999) | (1981) | (2002) | (1981) | (1981) | (1999) | (1999) | (2002) | (1963) | (2002) |

01673800 PO RIVER NEAR SPOTSYLVANIA, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1963 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 9,779.88 | | 47,553.15 | | | |
| ANNUAL MEAN | 26.8 | | 130 | | 75.2 | |
| HIGHEST ANNUAL MEAN | | | | | 164 | 1972 |
| LOWEST ANNUAL MEAN | | | | | 11.8 | 2002 |
| HIGHEST DAILY MEAN | 569 | Dec 26 | 2,930 | Feb 23 | 8,160 | Jun 22, 1972 |
| LOWEST DAILY MEAN | 0.00 | aAug 20 | 0.04 | Oct 8 | 0.00 | aAug 20, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.00 | Aug 20 | 0.06 | Oct 4 | 0.00 | Aug 20, 2002 |
| MAXIMUM PEAK FLOW | | | 3,800 | Feb 23 | 10,900 | Jun 22, 1972 |
| MAXIMUM PEAK STAGE | | | 13.11 | Feb 23 | 19.03 | Jun 22, 1972 |
| INSTANTANEOUS LOW FLOW | | | 0.04 | bOct 7 | 0.00 | cAug 19, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.35 | | 1.68 | | 0.97 | |
| ANNUAL RUNOFF (INCHES) | 4.70 | | 22.86 | | 13.20 | |
| 10 PERCENT EXCEEDS | 57 | | 314 | | 148 | |
| 50 PERCENT EXCEEDS | 8.6 | | 52 | | 33 | |
| 90 PERCENT EXCEEDS | 0.05 | | 4.1 | | 2.2 | |

a Also Aug. 21-27, 2002.
b Also Oct. 8, 9, 2002.
c Also part or all of each day Aug. 20-28, 2002.
e Estimated.



## 01674000 MATTAPONI RIVER NEAR BOWLING GREEN, VA

LOCATION.--Lat 38°03'42", long 77°23'09", NAD83, 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 $mi^2$.

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 NGVD of 1929. 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, Nov. 21 to Dec. 9, and period with ice effect, Jan. 16-28, which are fair. Some diurnal fluctuation from gristmill upstream on Po River. Maximum discharge, 13,400 $ft^3/s$, from rating curve extended above 8,100 $ft^3/s$. 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 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 $ft^3/s$, from rating curve extended above 8,100 $ft^3/s$.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 24 | 1300 | *5,520 | *13.60 | Sep 21 | 1200 | 2,930 | 10.90 |
| Mar 22 | 1600 | 3,780 | 11.89 | Sep 25 | 1700 | 2,330 | 10.10 |
| May 28 | 1900 | 2,030 | 9.66 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.01 | 0.00 | e46 | 197 | 100 | 616 | 884 | 162 | 525 | 122 | 102 | 14 |
| 2 | 0.01 | 0.00 | e52 | 349 | 121 | 611 | 883 | 178 | 393 | 111 | 114 | 13 |
| 3 | 0.00 | 0.00 | e45 | 789 | 129 | 837 | 611 | 192 | 292 | 216 | 92 | 18 |
| 4 | 0.00 | 0.00 | e40 | 1,620 | 133 | 1,410 | 443 | 163 | 242 | 341 | 85 | 33 |
| 5 | 0.00 | 0.00 | e36 | 1,040 | 179 | 1,130 | 351 | 140 | 270 | 479 | 83 | 61 |
| 6 | 0.00 | 0.00 | e40 | 679 | 206 | 783 | 299 | 134 | 296 | 465 | 80 | 61 |
| 7 | 0.00 | 0.00 | e43 | 431 | 175 | 691 | 330 | 135 | 277 | 269 | 70 | 46 |
| 8 | 0.00 | 0.00 | e48 | 315 | 157 | 664 | 524 | 140 | 413 | 184 | 67 | 37 |
| 9 | 0.00 | 0.00 | e53 | 260 | 151 | 518 | 801 | 141 | 524 | 153 | 70 | 31 |
| 10 | 0.00 | 0.00 | 53 | 216 | 155 | 391 | 927 | 144 | 652 | 129 | 90 | 25 |
| 11 | 0.00 | 0.00 | 73 | 182 | 144 | 314 | 1,120 | 172 | 587 | 109 | 88 | 21 |
| 12 | 0.00 | 0.06 | 204 | 152 | 146 | 265 | 1,150 | 177 | 384 | 94 | 73 | 22 |
| 13 | 0.00 | 5.7 | 323 | 132 | 145 | 230 | 1,130 | 154 | 285 | 82 | 61 | 90 |
| 14 | 0.00 | 120 | 479 | 123 | 142 | 211 | 819 | 123 | 229 | 81 | 56 | 170 |
| 15 | 0.00 | 388 | 568 | 119 | 177 | 195 | 539 | 102 | 311 | 85 | 54 | 173 |
| 16 | 0.00 | 341 | 666 | e102 | 367 | 181 | 400 | 173 | 490 | 75 | 44 | 106 |
| 17 | 0.00 | 303 | 495 | e95 | 541 | 176 | 329 | 249 | 765 | 66 | 40 | 67 |
| 18 | 0.00 | 391 | 273 | e87 | 599 | 180 | 281 | 306 | 678 | 54 | 35 | 76 |
| 19 | 0.00 | 669 | 190 | e77 | 590 | 175 | 281 | 510 | 560 | 67 | 32 | 461 |
| 20 | 0.00 | 825 | 202 | e82 | 467 | 302 | 316 | 751 | 623 | 70 | 29 | 1,300 |
| 21 | 0.00 | e450 | 367 | e88 | 439 | 1,050 | 333 | 838 | 759 | 60 | 27 | 2,800 |
| 22 | 0.00 | e285 | 361 | e76 | 664 | 3,510 | 308 | 601 | 943 | 49 | 24 | 1,720 |
| 23 | 0.00 | e180 | 336 | e70 | 2,460 | 2,670 | 269 | 579 | 926 | 56 | 23 | 887 |
| 24 | 0.00 | e150 | 233 | e66 | 5,380 | 1,120 | 233 | 686 | 557 | 57 | 20 | 921 |
| 25 | 0.00 | e110 | 273 | e72 | 4,080 | 666 | 204 | 706 | 315 | 52 | 17 | 2,160 |
| 26 | 0.00 | e90 | 465 | e67 | 1,980 | 455 | 207 | 818 | 214 | 47 | 15 | 1,710 |
| 27 | 0.00 | e78 | 787 | e60 | 1,110 | 379 | 218 | 979 | 166 | 39 | 14 | 837 |
| 28 | 0.00 | e65 | 895 | e66 | 773 | 356 | 218 | 1,820 | 170 | 37 | 13 | 483 |
| 29 | 0.00 | e53 | 505 | 70 | --- | 346 | 193 | 1,590 | 156 | 118 | 12 | 305 |
| 30 | 0.00 | e42 | 292 | 79 | --- | 413 | 172 | 1,060 | 146 | 141 | 11 | 230 |
| 31 | 0.00 | --- | 215 | 84 | --- | 604 | --- | 738 | --- | 136 | 14 | --- |
| TOTAL | 0.02 | 4,545.76 | 8,658 | 7,845 | 21,710 | 21,449 | 14,773 | 14,661 | 13,148 | 4,044 | 1,555 | 14,878 |
| MEAN | 0.001 | 152 | 279 | 253 | 775 | 692 | 492 | 473 | 438 | 130 | 50.2 | 496 |
| MAX | 0.01 | 825 | 895 | 1,620 | 5,380 | 3,510 | 1,150 | 1,820 | 943 | 479 | 114 | 2,800 |
| MIN | 0.00 | 0.00 | 36 | 60 | 100 | 175 | 172 | 102 | 146 | 37 | 11 | 13 |
| CFSM | 0.00 | 0.59 | 1.09 | 0.98 | 3.02 | 2.69 | 1.92 | 1.84 | 1.71 | 0.51 | 0.20 | 1.93 |
| IN. | 0.00 | 0.66 | 1.25 | 1.14 | 3.14 | 3.10 | 2.14 | 2.12 | 1.90 | 0.59 | 0.23 | 2.15 |

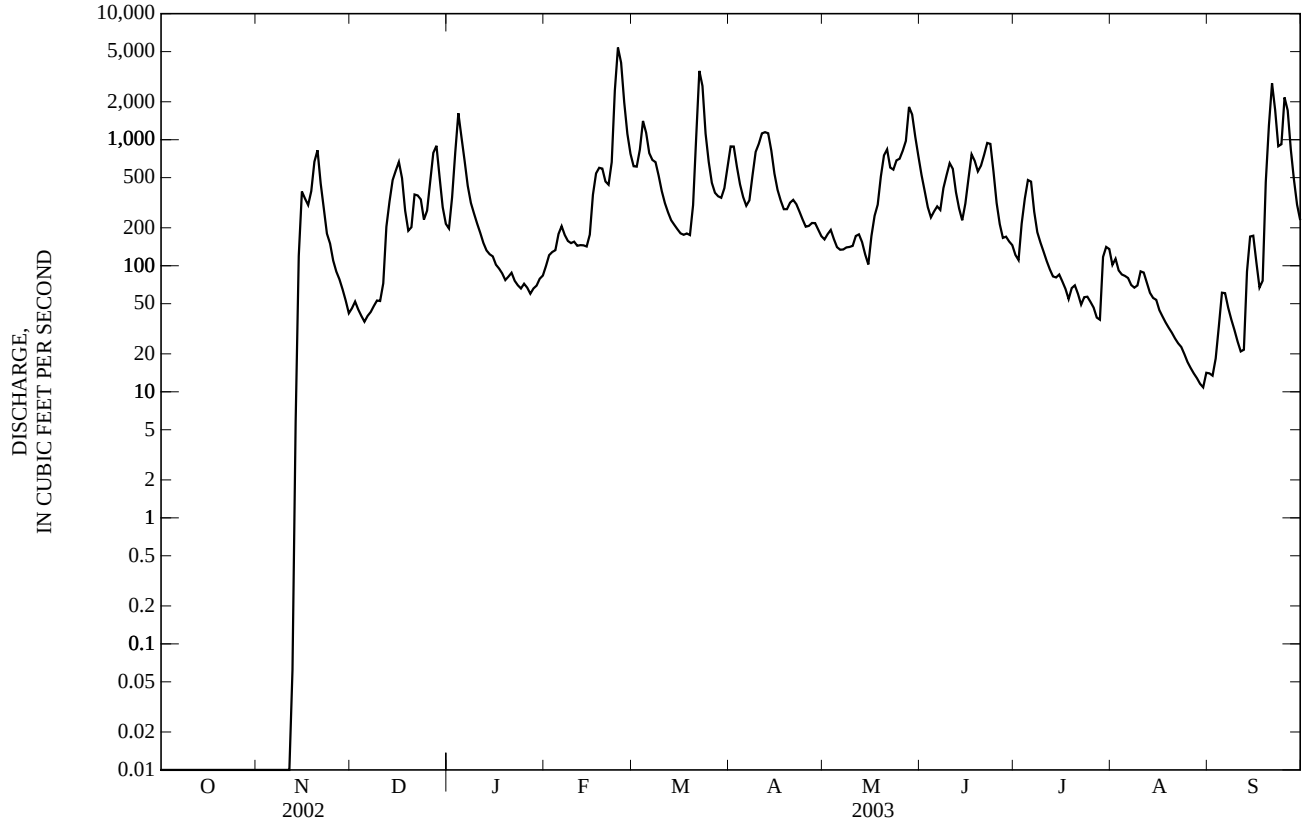
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 117 | 162 | 259 | 348 | 401 | 472 | 376 | 249 | 141 | 101 | 110 | 85.0 |
| MAX | 860 | 721 | 1,041 | 1,174 | 1,706 | 1,540 | 1,164 | 707 | 1,111 | 853 | 939 | 714 |
| (WY) | (1943) | (1973) | (1949) | (1978) | (1998) | (1994) | (1983) | (1972) | (1972) | (1945) | (1955) | (1975) |
| MIN | 0.001 | 1.13 | 15.2 | 34.7 | 26.2 | 56.4 | 69.2 | 22.9 | 5.26 | 0.45 | 0.000 | 0.43 |
| (WY) | (2003) | (2002) | (2002) | (1981) | (2002) | (2002) | (2002) | (1999) | (1999) | (2002) | (2002) | (1954) |

01674000 MATTAPONI RIVER NEAR BOWLING GREEN, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1943 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 21,185.10 | | 127,266.78 | | | |
| ANNUAL MEAN | 58.0 | | 349 | | 234 | |
| HIGHEST ANNUAL MEAN | | | | | 516 | 1972 |
| LOWEST ANNUAL MEAN | | | | | 23.3 | 2002 |
| HIGHEST DAILY MEAN | 895 | Dec 28 | 5,380 | Feb 24 | 12,200 | Jun 23, 1972 |
| LOWEST DAILY MEAN | 0.00 | aJul 31 | 0.00 | bOct 3 | 0.00 | (c) |
| ANNUAL SEVEN-DAY MINIMUM | 0.00 | dJul 31 | 0.00 | fOct 3 | 0.00 | (g) |
| MAXIMUM PEAK FLOW | | | 5,520 | Feb 24 | 13,400 | Jun 23, 1972 |
| MAXIMUM PEAK STAGE | | | 13.60 | Feb 24 | h18.95 | Jun 23, 1972 |
| INSTANTANEOUS LOW FLOW | | | 0.00 | bOct 3 | 0.00 | (j) |
| ANNUAL RUNOFF (CFSM) | 0.23 | | 1.36 | | 0.91 | |
| ANNUAL RUNOFF (INCHES) | 3.07 | | 18.42 | | 12.39 | |
| 10 PERCENT EXCEEDS | 116 | | 830 | | 534 | |
| 50 PERCENT EXCEEDS | 20 | | 172 | | 118 | |
| 90 PERCENT EXCEEDS | 0.00 | | 0.00 | | 9.6 | |

a Also Aug. 1-31 and Oct. 3 to Nov. 11, 2002.
b Also Oct. 4 to Nov. 11, 2002.
c Also many days in September, October 1954, September 1966, and July, August, October, November 2002.
d Also many days in August, October, and November 2002.
e Estimated.
f Also many days in October and November 2002.
g Many days in September, October 1954, and August, October, November 2002.
h From floodmark in well.
j Many days in September, October 1954, September 1966, and July to September, October, November 2002.



## 01674500 MATTAPONI RIVER NEAR BEULAHVILLE, VA

LOCATION.--Lat 37°53'16", long 77°09'47", NAD83, 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 $mi^2$.

### 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 NGVD of 1929 (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. Sept. 8, 1987, to Aug. 31, 1989, nonrecording gage on downstream side of bridge at same datum. Sept. 1, 1989, to Mar. 31, 1994, water-stage recorder on upstream side of bridge at same datum. Apr. 1, 1994, to Sept. 28, 1995, nonrecording gage on downstream side of bridge at same datum. Sept. 29, 1995, water-stage recorder at present site and datum.

REMARKS.--Records good except those for period with ice effect, Jan. 16-30, and discharges greater than 1,000 $ft^3/s$, which are fair. Diurnal fluctuation at times during low flow caused by gristmill on Po River. Maximum discharge, 16,900 $ft^3/s$, from rating curve extended above 11,760 $ft^3/s$.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.3 | 210 | 151 | 606 | 269 | 3,290 | 1,380 | 530 | 2,330 | 407 | 411 | 117 |
| 2 | 2.9 | 256 | 148 | 727 | 301 | 2,530 | 1,410 | 495 | 2,020 | 380 | 445 | 119 |
| 3 | 3.0 | 236 | 143 | 789 | 334 | 2,080 | 1,460 | 476 | 1,610 | 491 | 454 | 124 |
| 4 | 3.0 | 179 | 137 | 907 | 356 | 1,800 | 1,510 | 481 | 1,080 | 715 | 399 | 146 |
| 5 | 4.7 | 135 | 140 | 1,070 | 381 | 1,730 | 1,380 | 451 | 778 | 832 | 370 | 171 |
| 6 | 4.6 | 130 | 167 | 1,280 | 408 | 1,880 | 1,020 | 419 | 736 | 842 | 359 | 183 |
| 7 | 7.3 | 132 | 190 | 1,460 | 446 | 2,050 | 894 | 410 | 807 | 810 | 328 | 195 |
| 8 | 9.6 | 122 | 191 | 1,480 | 447 | 2,000 | 1,230 | 420 | 942 | 667 | 309 | 179 |
| 9 | 12 | 121 | 198 | 979 | 401 | 1,780 | 1,480 | 451 | 1,030 | 510 | 351 | 158 |
| 10 | 14 | 113 | 196 | 615 | 389 | 1,520 | 1,780 | 500 | 1,130 | 451 | 493 | 141 |
| 11 | 7.7 | 130 | 230 | 510 | 393 | 1,270 | 1,980 | 580 | 1,190 | 386 | 579 | 128 |
| 12 | 26 | 248 | 415 | 438 | 385 | 966 | 2,150 | 623 | 1,210 | 331 | 507 | 130 |
| 13 | 40 | 441 | 548 | 385 | 376 | 799 | 2,230 | 570 | 1,170 | 290 | 457 | 339 |
| 14 | 35 | 557 | 741 | 353 | 374 | 753 | 2,220 | 480 | 1,020 | 281 | 346 | 455 |
| 15 | 28 | 647 | 841 | 331 | 409 | 685 | 2,150 | 385 | 939 | 282 | 281 | 502 |
| 16 | 26 | 666 | 909 | e286 | 531 | 638 | 1,960 | 364 | 914 | 286 | 286 | 457 |
| 17 | 61 | 718 | 959 | e280 | 647 | 615 | 1,590 | 446 | 1,020 | 267 | 366 | 360 |
| 18 | 66 | 773 | 960 | e272 | 749 | 597 | 1,090 | 651 | 1,250 | 233 | 294 | 357 |
| 19 | 47 | 851 | 761 | e260 | 787 | 578 | 917 | 909 | 1,510 | 228 | 248 | 1,220 |
| 20 | 34 | 926 | 521 | e245 | 840 | 763 | 894 | 1,050 | 1,710 | 244 | 229 | 1,930 |
| 21 | 48 | 988 | 491 | e250 | 930 | 1,510 | 875 | 1,160 | 1,770 | 309 | 218 | 2,030 |
| 22 | 48 | 1,020 | 615 | e240 | 1,140 | 1,980 | 841 | 1,380 | 1,770 | 283 | 198 | 2,020 |
| 23 | 43 | 723 | 763 | e228 | 1,630 | 2,170 | 792 | 1,610 | 1,730 | 261 | 181 | 2,430 |
| 24 | 38 | 396 | 723 | e220 | 2,110 | 2,640 | 711 | 1,690 | 1,710 | 271 | 162 | 3,390 |
| 25 | 33 | 302 | 680 | e232 | 2,540 | 3,150 | 640 | 1,650 | 1,680 | 270 | 148 | 3,680 |
| 26 | 41 | 255 | 790 | e218 | 3,850 | 2,880 | 638 | 1,780 | 1,420 | 241 | 135 | 2,960 |
| 27 | 73 | 222 | 870 | e210 | 4,720 | 2,240 | 662 | 1,930 | 761 | 207 | 124 | 2,440 |
| 28 | 56 | 208 | 985 | e216 | 4,260 | 1,530 | 647 | 2,030 | 504 | 187 | 114 | 2,370 |
| 29 | 53 | 182 | 1,100 | e220 | --- | 1,040 | 610 | 2,150 | 456 | 246 | 108 | 2,280 |
| 30 | 100 | 161 | 1,170 | e224 | --- | 1,060 | 564 | 2,260 | 437 | 341 | 103 | 1,820 |
| 31 | 182 | --- | 975 | 238 | --- | 1,300 | --- | 2,390 | --- | 446 | 105 | --- |
| TOTAL | 1,150.1 | 12,048 | 17,708 | 15,769 | 30,403 | 49,824 | 37,705 | 30,721 | 36,634 | 11,995 | 9,108 | 32,831 |
| MEAN | 37.1 | 402 | 571 | 509 | 1,086 | 1,607 | 1,257 | 991 | 1,221 | 387 | 294 | 1,094 |
| MAX | 182 | 1,020 | 1,170 | 1,480 | 4,720 | 3,290 | 2,230 | 2,390 | 2,330 | 842 | 579 | 3,680 |
| MIN | 2.9 | 113 | 137 | 210 | 269 | 578 | 564 | 364 | 437 | 187 | 103 | 117 |
| CFSM | 0.06 | 0.67 | 0.95 | 0.85 | 1.81 | 2.67 | 2.09 | 1.65 | 2.03 | 0.64 | 0.49 | 1.82 |
| IN. | 0.07 | 0.75 | 1.10 | 0.98 | 1.88 | 3.08 | 2.33 | 1.90 | 2.27 | 0.74 | 0.56 | 2.03 |

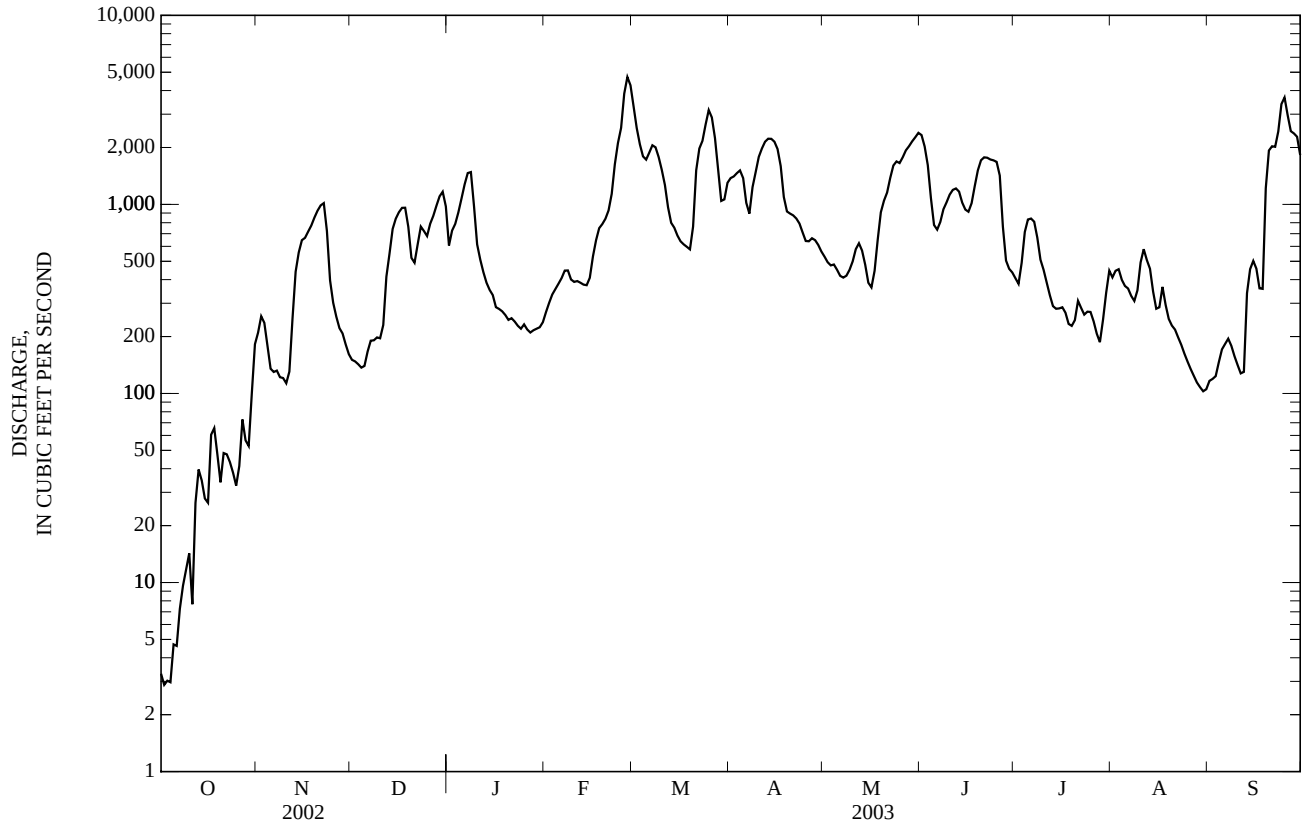
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1987, 1989 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 301 | 410 | 605 | 778 | 905 | 1,066 | 947 | 638 | 409 | 282 | 314 | 240 |
| MAX | 1,801 | 1,461 | 2,115 | 2,418 | 3,100 | 2,483 | 3,291 | 1,912 | 3,217 | 2,119 | 2,409 | 1,287 |
| (WY) | (1980) | (1973) | (1949) | (1978) | (1998) | (1979) | (1984) | (1978) | (1972) | (1945) | (1969) | (1975) |
| MIN | 19.5 | 36.3 | 86.4 | 131 | 104 | 168 | 183 | 88.5 | 22.1 | 10.8 | 3.59 | 9.90 |
| (WY) | (2002) | (2002) | (2002) | (1981) | (2002) | (2002) | (2002) | (1999) | (1999) | (2002) | (2002) | (2002) |

01674500 MATTAPONI RIVER NEAR BEULAHVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1942 - 1987 1989 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 56,418.31 | | 285,896.1 | | | |
| ANNUAL MEAN | 155 | | 783 | | 572 | |
| HIGHEST ANNUAL MEAN | | | | | 1,210 | 1972 |
| LOWEST ANNUAL MEAN | | | | | 81.9 | 2002 |
| HIGHEST DAILY MEAN | 1,170 | Dec 30 | 4,720 | Feb 27 | 16,200 | Jun 25, 1972 |
| LOWEST DAILY MEAN | 0.25 | Aug 27 | 2.9 | Oct 2 | 0.25 | Aug 27, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.34 | Aug 21 | 4.1 | Oct 1 | 0.34 | Aug 21, 2002 |
| MAXIMUM PEAK FLOW | | | 4,780 | Feb 27 | 16,900 | Jun 25, 1972 |
| MAXIMUM PEAK STAGE | | | 16.61 | Feb 27 | 24.09 | Aug 23, 1969 |
| INSTANTANEOUS LOW FLOW | | | 2.7 | aOct 2 | 0.22 | bAug 24, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.26 | | 1.30 | | 0.95 | |
| ANNUAL RUNOFF (INCHES) | 3.49 | | 17.70 | | 12.94 | |
| 10 PERCENT EXCEEDS | 404 | | 1,970 | | 1,310 | |
| 50 PERCENT EXCEEDS | 90 | | 493 | | 356 | |
| 90 PERCENT EXCEEDS | 2.9 | | 118 | | 58 | |

a Also Oct. 3, 2002.
b Also Aug. 25, 27, 2002.
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.

REMARKS.--Missing gage height values indicate periods that were affected by ice; for these samples only the mean daily discharge is reported.

COOPERATION.--Water samples were collected by the U.S. Geological Survey and analyzed by either the U.S. Geological Survey (Agency Code 80020) or by the Virginia Division of Consolidated Laboratory Services (VDCLS, Agency Code 85116), using analytical methods approved by the U.S. Geological Survey. Analyses performed by VDCLS are reported to U.S. Geological Survey rounding specifications. Results of chemical analyses provided by VDCLS were quality-assured and approved by the U.S. Geological Survey.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Time | Sample type | Agency analyzing sample, code (00028) | Gage height, feet (00065) | Instantaneous discharge, cfs (00061) | Turbidity, NTU (00076) | Barometric pressure, mm Hg (00025) | Dissolved oxygen, mg/L (00300) | Dissolved oxygen, percent of saturation (00301) | pH, water, unfltrd field, std units (00400) | Specif. conductance, wat unf uS/cm 25 degC (00095) | Temperature, air, deg C (00020) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | |
| 22... | 0925 | Blank | 85116 | -- | -- | 0.20 | -- | -- | -- | -- | -- | -- |
| 22... | 0930 | Environmental | 85116 | 2.11 | 48 | 2.5 | 761 | 8.7 | 82 | 6.9 | 68 | 15.5 |
| NOV | | | | | | | | | | | | |
| 14... | 1345 | Environmental | 85116 | 6.56 | 567 | 11 | 758 | 9.8 | 89 | 5.6 | 98 | 17.0 |
| 15... | 1045 | Environmental | 85116 | 7.03 | 646 | 14 | 758 | 9.8 | 88 | 4.8 | 98 | 14.0 |
| 19... | 1340 | Blank | 85116 | -- | -- | 1.1 | -- | -- | -- | -- | -- | -- |
| 19... | 1345 | Environmental | 85116 | 8.06 | 854 | 10 | 761 | 10.1 | 87 | 5.7 | 86 | 15.0 |
| DEC | | | | | | | | | | | | |
| 13... | 0945 | Environmental | 85116 | 6.32 | 529 | 5.2 | 761 | 14.8 | 107 | 5.6 | 90 | 1.5 |
| 17... | 1000 | Environmental | 85116 | 8.48 | 951 | 14 | 765 | 11.0 | 82 | 5.5 | 84 | 1.0 |
| 17... | 1015 | Replicate | 85116 | 8.52 | 961 | 14 | -- | -- | -- | -- | -- | -- |
| 18... | 1345 | Environmental | 85116 | 8.54 | 961 | 11 | 771 | 11.9 | 89 | 5.7 | 78 | 7.0 |
| 20... | 0930 | Environmental | 85116 | 6.28 | 523 | 6.0 | 746 | 11.5 | 92 | 5.3 | 83 | 17.0 |
| JAN | | | | | | | | | | | | |
| 07... | 1300 | Environmental | 85116 | 10.46 | 1,480 | 21 | 760 | 10.8 | 81 | 6.0 | 61 | 3.0 |
| 13... | 1045 | Environmental | 85116 | 5.40 | 387 | 8.0 | 759 | 13.1 | 95 | 5.6 | 70 | 4.0 |
| 13... | 1100 | Replicate | 85116 | 5.40 | 387 | 7.7 | -- | -- | -- | -- | -- | -- |
| 23... | 1130 | Environmental | 85116 | -- | 228 | 6.4 | 757 | 14.4 | 99 | 5.6 | 82 | -5.0 |
| 23... | 1145 | Replicate | 85116 | -- | 228 | 4.7 | -- | -- | -- | -- | -- | -- |
| FEB | | | | | | | | | | | | |
| 20... | 1100 | Environmental | 85116 | 7.98 | 836 | 10 | 769 | 14.5 | 100 | 6.2 | 84 | 7.5 |
| 24... | 1415 | Environmental | 85116 | 12.44 | 2,150 | 15 | 760 | 12.3 | 90 | 5.4 | 75 | 13.5 |
| 26... | 1100 | Environmental | 85116 | 15.47 | 3,850 | 18 | 765 | 13.7 | 99 | 5.7 | 66 | -1.5 |
| 26... | 1105 | Replicate | 80020 | 15.47 | 3,850 | -- | -- | -- | -- | -- | -- | -- |
| 28... | 0945 | Environmental | 85116 | 16.12 | 4,360 | 16 | 758 | 13.3 | 96 | 5.8 | 52 | 1.0 |
| 28... | 1000 | Replicate | 85116 | 16.13 | 4,370 | 18 | -- | -- | -- | -- | -- | -- |
| MAR | | | | | | | | | | | | |
| 03... | 1100 | Environmental | 85116 | 12.29 | 2,090 | 8.0 | 759 | 12.6 | 96 | 5.9 | 70 | 0.5 |
| 11... | 1130 | Environmental | 85116 | 9.52 | 1,270 | 6.7 | 764 | 10.9 | 91 | 6.3 | 71 | 8.0 |
| 11... | 1135 | Replicate | 80020 | 9.53 | 1,270 | -- | -- | -- | -- | -- | -- | -- |
| 24... | 1010 | Blank | 85116 | -- | -- | 0.30 | -- | -- | -- | -- | -- | -- |
| 24... | 1015 | Environmental | 85116 | 13.42 | 2,580 | -- | 757 | 8.8 | 81 | 5.8 | 58 | 24.0 |
| 26... | 1315 | Environmental | 85116 | 14.01 | 2,860 | 0.40 | 750 | 7.9 | 77 | 5.8 | 55 | 27.0 |
| APR | | | | | | | | | | | | |
| 01... | 1000 | Environmental | 85116 | 10.03 | 1,380 | 8.6 | 760 | 10.0 | 89 | 6.3 | 59 | 5.5 |
| 10... | 1615 | Environmental | 85116 | 11.61 | 1,830 | 7.9 | 752 | 9.7 | 85 | 6.0 | 53 | 10.0 |
| 10... | 1630 | Replicate | 85116 | 11.60 | 1,830 | 11 | -- | -- | -- | -- | -- | -- |
| 23... | 1330 | Environmental | 85116 | 7.51 | 788 | 7.5 | 755 | 8.6 | 87 | 6.5 | 58 | 25.0 |
| 23... | 1335 | Replicate | 80020 | 7.52 | 789 | -- | -- | -- | -- | -- | -- | -- |
| MAY | | | | | | | | | | | | |
| 27... | 1345 | Environmental | 85116 | 11.91 | 1,940 | 7.7 | 761 | 7.1 | 73 | 5.2 | 51 | 17.0 |
| JUN | | | | | | | | | | | | |
| 02... | 1330 | Environmental | 85116 | 12.08 | 2,000 | 4.9 | 756 | 6.8 | 72 | 6.3 | 55 | 24.0 |
| 16... | 1400 | Environmental | 85116 | 8.26 | 906 | 8.4 | 759 | 6.4 | 75 | 6.4 | 59 | 22.0 |
| 24... | 1215 | Environmental | 85116 | 11.23 | 1,710 | 6.2 | 757 | 6.5 | 72 | 6.3 | 53 | 29.0 |
| 24... | 1220 | Replicate | 80020 | 11.23 | 1,710 | -- | -- | -- | -- | -- | -- | -- |
| JUL | | | | | | | | | | | | |
| 10... | 1215 | Environmental | 85116 | 5.82 | 451 | 6.2 | 755 | 6.1 | 76 | 6.6 | 66 | 28.0 |
| AUG | | | | | | | | | | | | |
| 12... | 1215 | Environmental | 85116 | 6.10 | 495 | 11 | 759 | 6.8 | 82 | 6.4 | 53 | 32.0 |
| SEP | | | | | | | | | | | | |
| 09... | 1010 | Blank | 85116 | -- | -- | 0.65 | -- | -- | -- | -- | -- | -- |
| 09... | 1015 | Environmental | 85116 | 3.44 | 158 | 5.6 | 760 | 7.7 | 87 | 6.8 | 64 | 24.0 |
| 16... | 1115 | Environmental | 85116 | 5.90 | 464 | 20 | 760 | 7.5 | 85 | 6.6 | 59 | 21.5 |
| 19... | 1645 | Environmental | 85116 | 10.14 | 1,390 | 43 | 760 | 5.1 | 57 | 5.9 | 46 | 29.5 |
| 24... | 1515 | Environmental | 85116 | 15.08 | 3,560 | 12 | 760 | 4.5 | 51 | 5.8 | 43 | 23.0 |

01674500 MATTAPONI RIVER NEAR BEULAHVILLE, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Temperature, water, deg C (00010) | Silica, water, fltrd, mg/L (00955) | Residue fixed non-filterable, mg/L (00540) | Residue total at 105 deg. C, suspended, mg/L (00530) | Residue volatile, suspended, mg/L (00535) | Ammonia + org-N, water, fltrd, mg/L as N (00623) | Ammonia + org-N, water, unfltrd mg/L as N (00625) | Ammonia water, fltrd, mg/L as N (00608) | Nitrate water, fltrd, mg/L as N (00618) | Nitrite + nitrate water fltrd, mg/L as N (00631) | Nitrite water, fltrd, mg/L as N (00613) | Orthophosphate, water, fltrd, mg/L as P (00671) | Phosphorus, water, fltrd, mg/L (00666) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 22... | -- | 6.80 | <3 | <3 | <3 | -- | -- | <0.004 | <0.004 | <0.004 | <0.002 | 0.004 | 0.005 |
| 22... | 12.6 | 6.90 | <3 | <3 | <3 | -- | -- | 0.007 | 0.03 | 0.031 | <0.002 | 0.010 | 0.018 |
| NOV | | | | | | | | | | | | | |
| 14... | 10.8 | 11.1 | 13 | 17 | 4 | -- | -- | <0.004 | 0.04 | 0.036 | <0.002 | 0.005 | 0.011 |
| 15... | 10.4 | 12.2 | 16 | 21 | 5 | -- | -- | <0.004 | 0.05 | 0.050 | <0.002 | 0.010 | 0.021 |
| 19... | -- | <0.100 | <3 | <3 | <3 | -- | -- | <0.004 | <0.004 | <0.004 | <0.002 | 0.002 | <0.001 |
| 19... | 8.7 | 11.4 | 14 | 18 | 4 | -- | -- | 0.009 | 0.10 | 0.096 | <0.002 | 0.008 | 0.014 |
| DEC | | | | | | | | | | | | | |
| 13... | 1.9 | 10.1 | 7 | 11 | 4 | -- | -- | 0.030 | 0.24 | 0.242 | <0.002 | 0.011 | 0.007 |
| 17... | 3.1 | 11.9 | 10 | 12 | <3 | -- | -- | 0.005 | 0.21 | 0.212 | <0.002 | 0.008 | 0.023 |
| 17... | -- | 11.9 | 10 | 12 | <3 | -- | -- | 0.005 | 0.21 | 0.212 | <0.002 | 0.008 | 0.023 |
| 18... | 3.5 | 12.1 | 9 | 12 | 3 | -- | -- | 0.006 | 0.20 | 0.201 | <0.002 | 0.008 | 0.025 |
| 20... | 5.1 | 11.9 | 4 | 5 | <3 | -- | -- | 0.020 | 0.24 | 0.246 | <0.002 | 0.008 | 0.022 |
| JAN | | | | | | | | | | | | | |
| 07... | 3.5 | 9.40 | 8 | 10 | <3 | -- | -- | 0.014 | 0.15 | 0.152 | 0.002 | 0.009 | 0.022 |
| 13... | 1.9 | 9.50 | 3 | 3 | 3 | -- | -- | 0.020 | 0.27 | 0.270 | 0.002 | 0.005 | 0.013 |
| 13... | -- | 9.70 | <3 | 3 | <3 | -- | -- | 0.021 | 0.27 | 0.269 | <0.002 | 0.005 | 0.013 |
| 23... | 0.0 | 10.2 | <3 | <3 | <3 | -- | -- | 0.030 | 0.41 | 0.415 | <0.002 | 0.006 | 0.017 |
| 23... | -- | 10.2 | <3 | <3 | <3 | -- | -- | 0.030 | 0.42 | 0.416 | <0.002 | 0.005 | 0.016 |
| FEB | | | | | | | | | | | | | |
| 20... | 0.7 | 9.00 | 10 | 12 | <3 | -- | -- | 0.022 | 0.26 | 0.259 | <0.002 | 0.006 | 0.014 |
| 24... | 2.5 | 6.10 | 6 | 8 | <3 | -- | -- | 0.032 | 0.30 | 0.300 | <0.002 | 0.011 | 0.019 |
| 26... | 2.1 | 5.70 | 11 | 13 | <3 | -- | -- | 0.030 | 0.27 | 0.270 | <0.002 | 0.010 | 0.032 |
| 26... | -- | 6.1 | -- | <10 | <10 | 0.36 | 0.43 | 0.026 | -- | 0.270 | -- | 0.009 | <0.04 |
| 28... | 1.5 | 5.90 | 5 | 7 | <3 | -- | -- | 0.017 | 0.25 | 0.249 | <0.002 | 0.009 | 0.031 |
| 28... | -- | 5.90 | 6 | 7 | <3 | -- | -- | 0.017 | 0.24 | 0.246 | <0.002 | 0.009 | 0.039 |
| MAR | | | | | | | | | | | | | |
| 03... | 3.7 | 6.90 | 3 | 4 | <3 | -- | -- | 0.015 | 0.28 | 0.281 | <0.002 | 0.006 | 0.012 |
| 11... | 7.3 | 6.50 | 6 | 8 | <3 | -- | -- | 0.007 | 0.17 | 0.168 | <0.002 | 0.005 | 0.010 |
| 11... | -- | 6.2 | -- | 12 | <10 | 0.25 | 0.31 | <0.015 | -- | 0.163 | -- | <0.007 | <0.04 |
| 24... | -- | <0.100 | <3 | <3 | <3 | -- | -- | <0.004 | <0.004 | <0.004 | <0.002 | 0.003 | 0.004 |
| 24... | 11.2 | 5.40 | 4 | 6 | <3 | -- | -- | 0.008 | 0.11 | 0.110 | <0.002 | 0.011 | 0.028 |
| 26... | 13.8 | 5.70 | <3 | <3 | <3 | -- | -- | <0.004 | 0.06 | 0.064 | <0.002 | 0.012 | 0.028 |
| APR | | | | | | | | | | | | | |
| 01... | 9.8 | 5.40 | 7 | 10 | 3 | -- | -- | 0.016 | 0.14 | 0.145 | <0.002 | 0.008 | 0.021 |
| 10... | 9.3 | 5.00 | 4 | 6 | <3 | -- | -- | 0.014 | 0.15 | 0.147 | <0.002 | 0.010 | 0.022 |
| 10... | -- | 4.90 | 5 | 7 | <3 | -- | -- | 0.021 | 0.17 | 0.170 | <0.002 | 0.016 | 0.014 |
| 23... | 15.3 | 5.10 | 7 | 9 | <3 | -- | -- | 0.022 | 0.16 | 0.162 | <0.002 | 0.009 | 0.023 |
| 23... | -- | 5.5 | -- | <10 | <10 | 0.34 | 0.49 | 0.016 | -- | 0.150 | -- | E.006 | E.02 |
| MAY | | | | | | | | | | | | | |
| 27... | 16.6 | 10.5 | 4 | 5 | <3 | -- | -- | 0.051 | 0.13 | 0.127 | <0.002 | 0.015 | 0.033 |
| JUN | | | | | | | | | | | | | |
| 02... | 17.5 | 8.00 | 3 | 4 | <3 | -- | -- | 0.054 | 0.11 | 0.110 | <0.002 | 0.014 | 0.044 |
| 16... | 23.2 | 8.00 | 7 | 11 | 4 | -- | -- | 0.063 | 0.15 | 0.152 | 0.002 | 0.020 | 0.038 |
| 24... | 20.6 | 8.80 | <3 | 6 | 4 | -- | -- | 0.050 | 0.10 | 0.104 | <0.002 | 0.020 | 0.049 |
| 24... | -- | 9.6 | -- | <10 | <10 | 0.58 | 0.71 | 0.039 | -- | 0.109 | -- | 0.019 | E.03 |
| JUL | | | | | | | | | | | | | |
| 10... | 25.6 | 11.5 | 4 | 7 | 3 | -- | -- | 0.052 | 0.25 | 0.252 | <0.002 | 0.019 | 0.055 |
| AUG | | | | | | | | | | | | | |
| 12... | 24.7 | 8.60 | 10 | 13 | 3 | -- | -- | 0.018 | 0.16 | 0.161 | <0.002 | 0.010 | 0.050 |
| SEP | | | | | | | | | | | | | |
| 09... | -- | <0.100 | <3 | <3 | <3 | -- | -- | <0.004 | <0.004 | <0.004 | <0.002 | 0.003 | -- |
| 09... | 21.0 | 8.10 | <3 | 3 | <3 | -- | -- | 0.007 | 0.20 | 0.204 | <0.002 | 0.009 | -- |
| 16... | 21.2 | 9.10 | 10 | 14 | 4 | -- | -- | 0.010 | 0.12 | 0.115 | <0.002 | 0.007 | 0.046 |
| 19... | 20.8 | 6.50 | 31 | 40 | 9 | -- | -- | 0.019 | 0.10 | 0.102 | <0.002 | 0.009 | 0.037 |
| 24... | 21.1 | 7.20 | 5 | 8 | 3 | -- | -- | <0.004 | M | 0.004 | <0.002 | 0.007 | 0.043 |

01674500 MATTAPONI RIVER NEAR BEULAHVILLE, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Phosphorus, water, unfltrd mg/L (00665) | Total nitrogen, water, fltrd, mg/L (00602) | Phosphorus, suspnd sedimnt total, mg/L (00667) | Total nitrogen, suspnd sedimnt total, mg/L (00601) | Total carbon, suspnd sedimnt total, mg/L (00694) | Inorganic carbon, suspnd sedimnt total, mg/L (00688) | Organic carbon, water, fltrd, mg/L (00681) | Pheophytin a, phytoplankton, ug/L (62360) | Chlorophyll a phytoplankton, fluoro, ug/L (70953) | Suspnd. sediment, sieve diametr percent <.063mm (70331) | Suspended sediment concentration mg/L (80154) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | |
| 22... | -- | 0.09 | 0.001 | 0.01 | M | -- | -- | -- | -- | -- | -- |
| 22... | -- | 0.33 | 0.009 | 0.02 | 0.3 | -- | -- | -- | -- | -- | 2 |
| NOV | | | | | | | | | | | |
| 14... | -- | 0.35 | 0.035 | 0.21 | 2.1 | -- | -- | -- | -- | 64 | 19 |
| 15... | -- | 0.43 | 0.045 | 0.20 | 2.0 | -- | -- | -- | -- | 84 | 20 |
| 19... | -- | <0.004 | -- | 0.01 | M | -- | -- | -- | -- | -- | -- |
| 19... | -- | 0.49 | -- | 0.17 | 1.9 | -- | -- | -- | -- | 42 | 20 |
| DEC | | | | | | | | | | | |
| 13... | -- | 0.50 | 0.023 | 0.10 | 1.2 | -- | -- | -- | -- | 33 | 15 |
| 17... | -- | 0.54 | 0.023 | 0.13 | 1.3 | -- | -- | -- | -- | 51 | 20 |
| 17... | -- | 0.54 | 0.023 | 0.13 | 1.3 | -- | -- | -- | -- | 36 | 20 |
| 18... | -- | 0.56 | 0.024 | 0.10 | 1.2 | -- | -- | -- | -- | 28 | 32 |
| 20... | -- | 0.56 | 0.015 | 0.08 | 0.8 | -- | -- | -- | -- | -- | 10 |
| JAN | | | | | | | | | | | |
| 07... | -- | 0.58 | 0.023 | 0.12 | 1.2 | -- | -- | -- | -- | 53 | 21 |
| 13... | -- | 0.53 | 0.011 | 0.05 | 0.6 | -- | -- | -- | -- | -- | 4 |
| 13... | -- | 0.53 | 0.012 | 0.06 | 0.6 | -- | -- | -- | -- | -- | 5 |
| 23... | -- | 0.67 | 0.010 | 0.04 | 0.5 | -- | -- | -- | -- | -- | 4 |
| 23... | -- | 0.68 | 0.010 | 0.06 | 0.5 | -- | -- | -- | -- | -- | 4 |
| FEB | | | | | | | | | | | |
| 20... | -- | 0.54 | 0.021 | 0.09 | 1.0 | -- | -- | -- | -- | -- | 22 |
| 24... | -- | 0.61 | 0.028 | 0.11 | 1.0 | -- | -- | -- | -- | 24 | 56 |
| 26... | -- | 0.66 | 0.031 | 0.15 | 1.1 | -- | -- | -- | -- | 52 | 29 |
| 26... | 0.06 | 0.63 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 28... | -- | 0.60 | 0.024 | 0.12 | 1.0 | -- | -- | -- | -- | 5 | 218 |
| 28... | -- | 0.59 | 0.023 | 0.13 | 1.1 | -- | -- | -- | -- | 6 | 147 |
| MAR | | | | | | | | | | | |
| 03... | -- | 0.55 | 0.015 | 0.08 | 0.8 | -- | -- | -- | -- | 71 | 10 |
| 11... | -- | 0.40 | 0.016 | 0.08 | 0.7 | -- | -- | -- | -- | -- | 13 |
| 11... | <0.04 | 0.41 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 24... | -- | <0.004 | 0.001 | 0.01 | 0.1 | -- | -- | -- | -- | 25 | 1 |
| 24... | -- | 0.53 | 0.030 | 0.18 | 1.4 | -- | -- | -- | -- | 84 | 18 |
| 26... | -- | 0.51 | 0.019 | 0.12 | 1.0 | -- | -- | -- | -- | 79 | 10 |
| APR | | | | | | | | | | | |
| 01... | -- | 0.51 | 0.024 | 0.12 | 1.2 | -- | -- | -- | -- | 60 | 13 |
| 10... | -- | 0.51 | 0.020 | 0.11 | 1.5 | -- | -- | -- | -- | 79 | 10 |
| 10... | -- | 0.45 | 0.027 | 0.09 | 1.5 | -- | -- | -- | -- | 83 | 10 |
| 23... | -- | 0.53 | 0.023 | 0.10 | 1.1 | -- | -- | <0.5 | <0.5 | -- | 8 |
| 23... | E.04 | 0.49 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MAY | | | | | | | | | | | |
| 27... | -- | 0.58 | 0.035 | 0.12 | 1.3 | -- | -- | <0.5 | 0.6 | 80 | 8 |
| JUN | | | | | | | | | | | |
| 02... | -- | 0.61 | 0.032 | 0.10 | 1.4 | -- | -- | <0.5 | 1.0 | 78 | 7 |
| 16... | -- | 0.74 | 0.054 | 0.18 | 2.5 | -- | -- | <0.5 | <0.5 | -- | 15 |
| 24... | -- | 0.72 | 0.029 | 0.11 | 1.4 | -- | -- | <0.5 | 0.5 | 77 | 7 |
| 24... | 0.09 | 0.69 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| JUL | | | | | | | | | | | |
| 10... | -- | 0.81 | 0.019 | 0.07 | 0.6 | <0.02 | 10.2 | <0.5 | 0.5 | -- | 8 |
| AUG | | | | | | | | | | | |
| 12... | -- | 0.65 | 0.024 | -- | -- | <0.02 | 9.0 | <0.5 | 0.8 | -- | 13 |
| SEP | | | | | | | | | | | |
| 09... | -- | -- | -- | <0.01 | 0.1 | <0.02 | <2.0 | <0.5 | <0.5 | -- | 0.0 |
| 09... | -- | -- | -- | <0.01 | 0.5 | <0.02 | 6.9 | <0.5 | <0.5 | -- | 2 |
| 16... | -- | 0.50 | 0.016 | 0.10 | 1.5 | M | 7.3 | 0.9 | 1.3 | 70 | 15 |
| 19... | -- | 0.58 | 0.080 | 0.34 | 3.1 | 0.2 | 10.1 | 2.3 | 1.7 | 64 | 55 |
| 24... | -- | 0.71 | 0.028 | 0.25 | 2.4 | <0.02 | 15.0 | <0.5 | 1.0 | 81 | 15 |

Remark codes used in this table:
< -- Less than
E -- Estimated value
M -- Presence verified, not quantified

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## JAMES RIVER BASIN

### 02011400 JACKSON RIVER NEAR BACOVA, VA

LOCATION.--Lat 38°02'32", long 79°52'53", NAD83, 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 $mi^2$.

#### WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Datum of gage is 1,639.20 ft NGVD of 1929.

REMARKS.--Records good except for period with ice effect, Jan. 19-28, which is fair. U.S. Army Corps of Engineers satellite water temperature, precipitation and gage-height telemeter at station. Maximum discharge, 30,000 $ft^3/s$, from rating curve extended above 1,300 $ft^3/s$ 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 $ft^3/s$, and flood of Dec. 26, 1973, reached a stage of 13.88 ft, discharge, 7,560 $ft^3/s$, from rating curve extended as explained above.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Dec 20 | 1600 | 1,610 | 7.57 | Jun 16 | 1430 | 1,780 | 7.85 |
| Feb 23 | 1100 | *3,840 | *10.52 | Sep 19 | 1030 | 2,700 | 9.17 |
| May 18 | 1600 | 1,840 | 7.96 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 37 | 183 | 112 | 335 | 57 | 365 | 210 | 180 | 268 | 123 | 64 | 49 |
| 2 | 32 | 142 | 98 | 682 | 56 | 620 | 295 | 191 | 216 | 142 | 65 | 56 |
| 3 | 29 | 112 | 92 | 530 | 56 | 704 | 271 | 207 | 234 | 256 | 61 | 76 |
| 4 | 27 | 98 | 82 | 442 | 69 | 538 | 249 | 515 | 939 | 168 | 67 | 147 |
| 5 | 26 | 114 | 86 | 352 | 89 | 657 | 232 | 537 | 989 | 137 | 67 | 172 |
| 6 | 24 | 472 | 80 | 298 | 73 | 1,140 | 202 | 558 | 618 | 121 | 71 | 109 |
| 7 | 23 | 296 | 72 | 248 | 70 | 1,030 | 423 | 452 | 567 | 114 | 64 | 85 |
| 8 | 22 | 206 | 72 | 223 | 65 | 712 | 589 | 363 | 601 | 110 | 80 | 72 |
| 9 | 21 | 163 | 67 | 211 | 60 | 658 | 909 | 304 | 594 | 118 | 162 | 63 |
| 10 | 22 | 139 | 62 | 184 | 63 | 600 | 858 | 583 | 465 | 144 | 134 | 58 |
| 11 | 25 | 400 | 165 | 160 | 60 | 471 | 1,170 | 788 | 380 | 145 | 89 | 53 |
| 12 | 28 | 530 | 276 | 140 | 57 | 387 | 824 | 547 | 352 | 119 | 304 | 49 |
| 13 | 27 | 610 | 307 | 128 | 52 | 378 | 606 | 421 | 676 | 114 | 131 | 49 |
| 14 | 26 | 379 | 525 | 122 | 56 | 442 | 468 | 326 | 604 | 319 | 131 | 53 |
| 15 | 26 | 272 | 379 | 114 | 77 | 372 | 378 | 279 | 595 | 391 | 97 | 59 |
| 16 | 95 | 226 | 298 | 103 | 78 | 321 | 322 | 255 | 1,120 | 266 | 90 | 71 |
| 17 | 171 | 344 | 248 | 103 | 63 | 294 | 279 | 220 | 1,070 | 193 | 89 | 58 |
| 18 | 100 | 314 | 211 | 102 | 82 | 271 | 254 | 1,160 | 1,070 | 157 | 77 | 62 |
| 19 | 70 | 250 | 187 | e98 | 81 | 240 | 280 | 936 | 823 | 142 | 68 | 1,660 |
| 20 | 57 | 218 | 993 | e92 | 78 | 498 | 237 | 591 | 694 | 124 | 63 | 695 |
| 21 | 51 | 230 | 908 | e84 | 108 | 812 | 228 | 591 | 547 | 110 | 59 | 393 |
| 22 | 44 | 348 | 564 | e81 | 1,670 | 570 | 243 | 639 | 437 | 102 | 56 | 312 |
| 23 | 39 | 281 | 409 | e80 | 3,030 | 438 | 219 | 514 | 344 | 95 | 53 | 854 |
| 24 | 36 | 229 | 327 | e78 | 1,310 | 352 | 197 | 440 | 282 | 87 | 49 | 491 |
| 25 | 34 | 192 | 310 | e76 | 792 | 293 | 187 | 354 | 236 | 79 | 47 | 336 |
| 26 | 57 | 168 | 250 | e78 | 550 | 259 | 200 | 320 | 203 | 73 | 45 | 255 |
| 27 | 73 | 162 | 199 | e74 | 422 | 230 | 243 | 268 | 181 | 69 | 44 | 213 |
| 28 | 63 | 141 | 175 | e70 | 345 | 198 | 205 | 250 | 164 | 67 | 46 | 245 |
| 29 | 146 | 127 | 161 | 66 | --- | 192 | 186 | 264 | 149 | 71 | 60 | 185 |
| 30 | 465 | 121 | 151 | 62 | --- | 204 | 174 | 235 | 134 | 66 | 51 | 155 |
| 31 | 267 | --- | 145 | 57 | --- | 195 | --- | 243 | --- | 63 | 50 | --- |
| TOTAL | 2,163 | 7,467 | 8,011 | 5,473 | 9,569 | 14,441 | 11,138 | 13,531 | 15,552 | 4,285 | 2,534 | 7,135 |
| MEAN | 69.8 | 249 | 258 | 177 | 342 | 466 | 371 | 436 | 518 | 138 | 81.7 | 238 |
| MAX | 465 | 610 | 993 | 682 | 3,030 | 1,140 | 1,170 | 1,160 | 1,120 | 391 | 304 | 1,660 |
| MIN | 21 | 98 | 62 | 57 | 52 | 192 | 174 | 180 | 134 | 63 | 44 | 49 |
| CFSM | 0.44 | 1.58 | 1.64 | 1.12 | 2.16 | 2.95 | 2.35 | 2.76 | 3.28 | 0.87 | 0.52 | 1.51 |
| IN. | 0.51 | 1.76 | 1.89 | 1.29 | 2.25 | 3.40 | 2.62 | 3.19 | 3.66 | 1.01 | 0.60 | 1.68 |

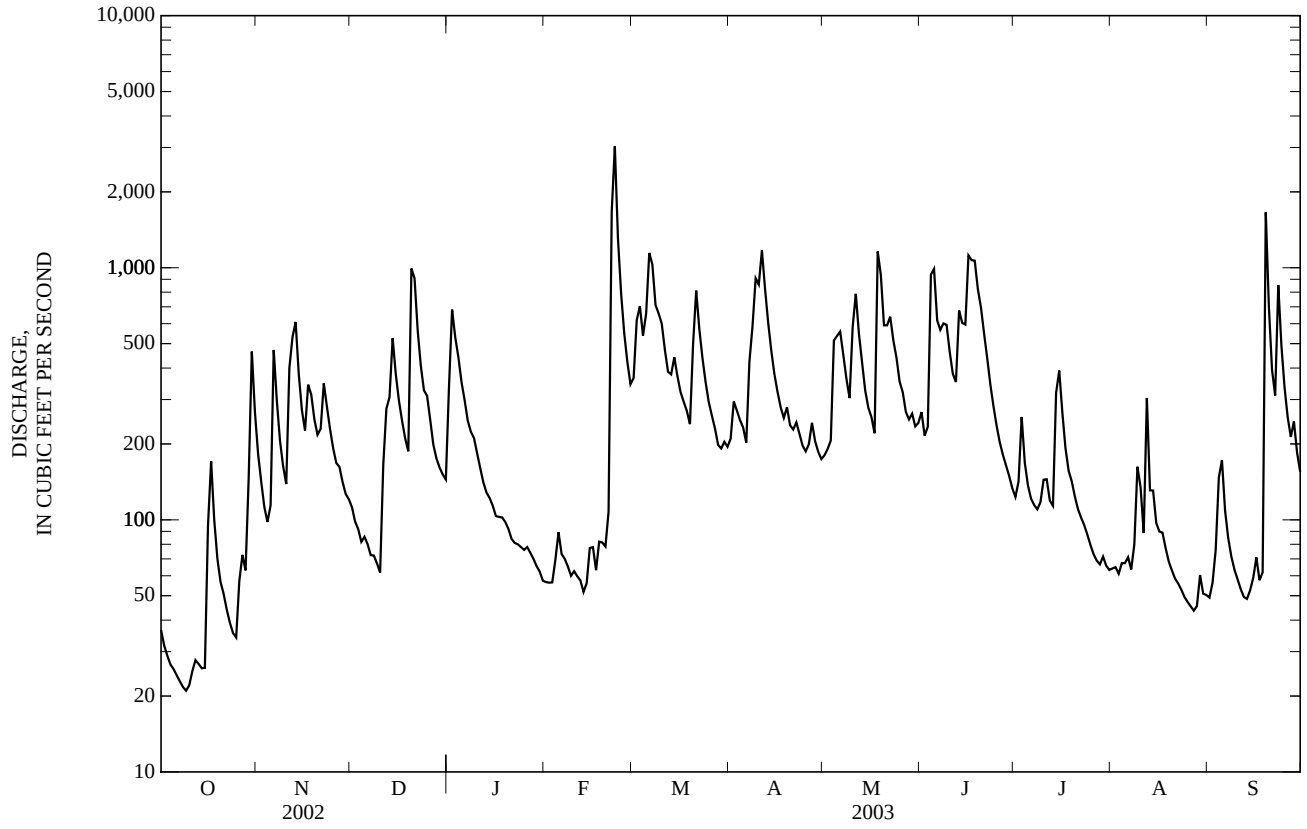
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 78.3 | 121 | 157 | 227 | 247 | 356 | 279 | 229 | 140 | 62.1 | 57.3 | 70.2 |
| MAX | 367 | 762 | 419 | 703 | 604 | 767 | 814 | 508 | 518 | 138 | 282 | 342 |
| (WY) | (1980) | (1986) | (1997) | (1996) | (1998) | (1993) | (1987) | (1989) | (2003) | (2003) | (1984) | (1979) |
| MIN | 19.6 | 16.7 | 25.4 | 31.6 | 34.7 | 68.0 | 70.3 | 52.9 | 27.6 | 19.1 | 20.6 | 20.1 |
| (WY) | (2002) | (2002) | (1999) | (1981) | (2002) | (1981) | (1999) | (1999) | (1999) | (1999) | (1988) | (1998) |

JAMES RIVER BASIN—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1975 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 47,745 | | 101,299 | | | |
| ANNUAL MEAN | 131 | | 278 | | 168 | |
| HIGHEST ANNUAL MEAN | | | | | 278 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 66.9 | 1999 |
| HIGHEST DAILY MEAN | 1,800 | Apr 22 | 3,030 | Feb 23 | 8,820 | Jan 19, 1996 |
| LOWEST DAILY MEAN | 13 | aSep 9 | 21 | Oct 9 | 13 | bAug 13, 1999 |
| ANNUAL SEVEN-DAY MINIMUM | 13 | Sep 8 | 23 | Oct 5 | 13 | Sep 8, 2002 |
| MAXIMUM PEAK FLOW | | | 3,840 | Feb 23 | 30,000 | Nov 4, 1985 |
| MAXIMUM PEAK STAGE | | | 10.52 | Feb 23 | c22.25 | Nov 4, 1985 |
| INSTANTANEOUS LOW FLOW | | | 21 | dOct 8 | 12 | fSep 11, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.83 | | 1.76 | | 1.06 | |
| ANNUAL RUNOFF (INCHES) | 11.24 | | 23.85 | | 14.47 | |
| 10 PERCENT EXCEEDS | 312 | | 608 | | 363 | |
| 50 PERCENT EXCEEDS | 52 | | 187 | | 85 | |
| 90 PERCENT EXCEEDS | 18 | | 56 | | 27 | |

a Also Sept. 10-14, 2002.
b Also Sept. 26, 1999 and Sept. 9-14, 2002.
c From floodmark.
d Also Oct. 9, 10, 2002.
e Estimated.
f Also Sept. 12-14, 2002.



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 Oct. 3, 2000. No variation of temperature was found within the cross section.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum recorded, 31.1°C, July 6, 1999; minimum recorded, 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 26.0°C, Aug. 23, 26-29; minimum, 0.0°C, on many days during winter.

TEMPERATURE, WATER, DEGREES CELSIUS
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | |
| 1 | 19.7 | 16.9 | 18.2 | 8.5 | 6.7 | 7.7 | 3.9 | 2.1 | 2.8 | 7.4 | 4.9 | 6.2 |
| 2 | 20.9 | 18.1 | 19.3 | 7.8 | 5.7 | 6.6 | 2.5 | 0.4 | 1.6 | 7.4 | 6.7 | 7.0 |
| 3 | 22.1 | 18.9 | 20.4 | 7.4 | 4.9 | 6.3 | 3.2 | 1.8 | 2.3 | 6.7 | 5.7 | 6.4 |
| 4 | 21.7 | 20.1 | 21.0 | 8.1 | 6.7 | 7.5 | 2.1 | 0.4 | 0.9 | 5.7 | 3.2 | 4.4 |
| 5 | 22.5 | 19.7 | 21.0 | 8.1 | 7.1 | 7.4 | 0.4 | 0.0 | 0.1 | 3.5 | 2.8 | 3.2 |
| 6 | 20.5 | 16.9 | 18.8 | 8.5 | 7.4 | 8.1 | 1.8 | 0.0 | 0.7 | 4.6 | 3.2 | 4.0 |
| 7 | 18.5 | 15.8 | 17.4 | 7.8 | 6.7 | 7.6 | 0.4 | 0.0 | 0.0 | 3.2 | 1.8 | 2.4 |
| 8 | 16.1 | 13.9 | 15.1 | 8.8 | 6.4 | 7.3 | 0.0 | 0.0 | 0.0 | 4.9 | 1.8 | 3.3 |
| 9 | 15.8 | 14.3 | 14.9 | 9.2 | 6.4 | 7.7 | 0.7 | 0.0 | 0.0 | 6.7 | 3.9 | 5.1 |
| 10 | 15.4 | 14.6 | 15.1 | 11.7 | 7.8 | 9.7 | 1.4 | 0.0 | 0.7 | 5.3 | 3.2 | 4.5 |
| 11 | 16.5 | 15.0 | 15.7 | 12.8 | 11.3 | 12.0 | 3.5 | 1.4 | 2.2 | 3.2 | 0.7 | 2.1 |
| 12 | 18.5 | 16.1 | 17.1 | 11.3 | 9.9 | 10.7 | 4.9 | 3.5 | 4.0 | 1.1 | 0.0 | 0.2 |
| 13 | 17.7 | 16.1 | 17.1 | 9.9 | 8.1 | 9.3 | 4.2 | 3.5 | 3.9 | 1.4 | 0.0 | 0.4 |
| 14 | 16.1 | 13.9 | 14.9 | 8.8 | 7.4 | 8.0 | 4.9 | 4.2 | 4.7 | 1.4 | 0.0 | 0.8 |
| 15 | 14.3 | 12.1 | 12.8 | 9.2 | 7.4 | 8.1 | 5.3 | 3.9 | 4.5 | 1.1 | 0.0 | 0.3 |
| 16 | 13.1 | 11.7 | 12.3 | 9.2 | 8.1 | 8.9 | 6.0 | 4.2 | 5.0 | 0.0 | 0.0 | 0.0 |
| 17 | 12.4 | 10.6 | 11.7 | 9.2 | 7.4 | 8.6 | 4.6 | 3.2 | 4.0 | 0.0 | 0.0 | 0.0 |
| 18 | 11.7 | 9.2 | 10.3 | 7.8 | 6.4 | 7.1 | 5.7 | 4.2 | 4.8 | 0.0 | 0.0 | 0.0 |
| 19 | 11.0 | 9.2 | 10.2 | 6.7 | 5.7 | 6.2 | 6.7 | 4.6 | 5.7 | 0.0 | 0.0 | 0.0 |
| 20 | 12.4 | 11.0 | 11.9 | 7.8 | 6.4 | 6.8 | 7.8 | 6.4 | 7.1 | 0.0 | 0.0 | 0.0 |
| 21 | 12.4 | 12.1 | 12.3 | 7.4 | 6.4 | 7.0 | 6.4 | 4.9 | 5.2 | 0.7 | 0.0 | 0.0 |
| 22 | 13.9 | 11.7 | 12.5 | 7.8 | 6.0 | 7.4 | 6.0 | 4.6 | 5.3 | 0.0 | 0.0 | 0.0 |
| 23 | 13.5 | 11.0 | 12.2 | 6.0 | 4.9 | 5.5 | 5.7 | 4.6 | 5.0 | 0.0 | 0.0 | 0.0 |
| 24 | 12.4 | 11.0 | 11.3 | 7.4 | 4.9 | 5.9 | 4.9 | 4.2 | 4.7 | 0.0 | 0.0 | 0.0 |
| 25 | 11.0 | 10.6 | 10.9 | 8.1 | 5.3 | 6.5 | 4.6 | 3.5 | 4.3 | 0.0 | 0.0 | 0.0 |
| 26 | 13.9 | 10.6 | 12.1 | 7.1 | 6.0 | 6.5 | 3.9 | 2.5 | 3.1 | 0.0 | 0.0 | 0.0 |
| 27 | 13.9 | 11.7 | 12.8 | 6.7 | 4.9 | 6.0 | 3.5 | 1.8 | 2.4 | 0.0 | 0.0 | 0.0 |
| 28 | 12.4 | 11.3 | 11.9 | 4.9 | 3.2 | 4.0 | 2.8 | 1.1 | 2.0 | 0.0 | 0.0 | 0.0 |
| 29 | 11.3 | 9.9 | 10.5 | 4.9 | 2.5 | 3.5 | 4.6 | 1.8 | 3.1 | 0.0 | 0.0 | 0.0 |
| 30 | 10.2 | 9.2 | 9.6 | 5.3 | 3.2 | 4.2 | 4.6 | 2.5 | 3.6 | 0.0 | 0.0 | 0.0 |
| 31 | 9.5 | 8.5 | 9.2 | --- | --- | --- | 5.7 | 2.8 | 4.3 | 0.4 | 0.0 | 0.0 |
| MONTH | 22.5 | 8.5 | 14.2 | 12.8 | 2.5 | 7.3 | 7.8 | 0.0 | 3.2 | 7.4 | 0.0 | 1.6 |

02011400 JACKSON RIVER NEAR BACOVA, VA—Continued

TEMPERATURE, WATER, DEGREES CELSIUS—CONTINUED
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | FEBRUARY | | | MARCH | | | APRIL | | | MAY | |
| 1 | 0.7 | 0.0 | 0.2 | 7.8 | 5.3 | 6.2 | 9.9 | 4.2 | 6.8 | 17.7 | 13.5 | 15.4 |
| 2 | 2.1 | 0.4 | 1.3 | 6.4 | 5.3 | 5.8 | 13.5 | 7.8 | 10.3 | 19.7 | 14.6 | 16.8 |
| 3 | 3.5 | 1.4 | 2.6 | 5.3 | 3.5 | 4.5 | 15.0 | 9.9 | 12.3 | 17.3 | 13.5 | 15.8 |
| 4 | 4.2 | 2.8 | 3.7 | 5.7 | 2.8 | 4.5 | 13.9 | 11.0 | 12.5 | 13.5 | 12.1 | 12.7 |
| 5 | 3.5 | 0.7 | 2.1 | 7.8 | 5.3 | 6.5 | 15.0 | 11.3 | 12.7 | 12.1 | 10.2 | 11.1 |
| 6 | 2.1 | 0.4 | 1.1 | 7.1 | 5.7 | 6.3 | 14.3 | 9.9 | 11.8 | 13.1 | 10.2 | 11.6 |
| 7 | 1.8 | 0.4 | 1.0 | 6.0 | 3.9 | 5.0 | 12.1 | 7.8 | 9.3 | 15.0 | 12.8 | 13.8 |
| 8 | 1.4 | 0.0 | 0.5 | 7.1 | 3.9 | 5.6 | 8.1 | 7.4 | 7.8 | 17.7 | 13.9 | 15.5 |
| 9 | 1.4 | 0.0 | 0.4 | 8.1 | 5.7 | 7.0 | 8.5 | 7.4 | 8.0 | 17.3 | 14.6 | 15.9 |
| 10 | 1.8 | 0.4 | 0.9 | 7.1 | 4.6 | 5.4 | 8.1 | 7.4 | 7.8 | 15.8 | 13.9 | 15.0 |
| 11 | 1.4 | 0.0 | 0.7 | 6.4 | 4.2 | 5.1 | 8.5 | 6.7 | 7.7 | 15.4 | 13.1 | 14.2 |
| 12 | 2.1 | 0.0 | 0.9 | 6.7 | 4.6 | 5.8 | 11.3 | 7.4 | 9.3 | 15.0 | 12.4 | 13.7 |
| 13 | 1.1 | 0.0 | 0.2 | 10.6 | 6.7 | 8.6 | 12.1 | 8.5 | 10.3 | 14.3 | 11.3 | 12.6 |
| 14 | 0.7 | 0.0 | 0.1 | 9.9 | 7.8 | 8.8 | 12.8 | 9.2 | 11.1 | 15.4 | 11.3 | 13.3 |
| 15 | 1.4 | 0.0 | 0.8 | 9.2 | 6.4 | 7.8 | 14.6 | 10.6 | 12.5 | 14.3 | 12.8 | 13.5 |
| 16 | 0.4 | 0.0 | 0.0 | 10.2 | 8.1 | 9.2 | 15.4 | 11.7 | 13.2 | 16.9 | 12.4 | 14.4 |
| 17 | 0.0 | 0.0 | 0.0 | 12.1 | 8.8 | 10.2 | 15.4 | 12.1 | 13.5 | 15.4 | 12.8 | 14.0 |
| 18 | 0.0 | 0.0 | 0.0 | 11.7 | 10.2 | 10.7 | 13.1 | 9.9 | 11.2 | 12.8 | 11.3 | 11.6 |
| 19 | 0.7 | 0.0 | 0.1 | 11.0 | 9.2 | 10.2 | 12.4 | 9.2 | 10.7 | 12.8 | 11.0 | 11.7 |
| 20 | 1.4 | 0.0 | 0.5 | 9.2 | 8.1 | 8.3 | 14.3 | 11.7 | 12.7 | 15.0 | 12.1 | 13.5 |
| 21 | 1.4 | 0.4 | 0.8 | 10.6 | 7.8 | 9.1 | 15.0 | 11.7 | 13.1 | 14.6 | 13.1 | 14.1 |
| 22 | 2.1 | 0.7 | 1.4 | 11.7 | 9.5 | 10.5 | 14.3 | 11.7 | 13.2 | 13.1 | 12.1 | 12.3 |
| 23 | 3.2 | 1.8 | 2.6 | 9.9 | 8.5 | 9.4 | 14.3 | 9.9 | 11.9 | 12.4 | 11.7 | 12.1 |
| 24 | 4.9 | 2.5 | 3.7 | 11.3 | 7.4 | 9.2 | 14.3 | 9.5 | 11.8 | 15.0 | 12.1 | 13.3 |
| 25 | 4.6 | 3.5 | 3.8 | 12.8 | 8.5 | 10.5 | 12.1 | 11.0 | 11.4 | 15.0 | 12.4 | 13.5 |
| 26 | 3.9 | 3.2 | 3.3 | 11.0 | 8.8 | 10.2 | 13.1 | 11.0 | 11.8 | 16.1 | 13.5 | 14.5 |
| 27 | 3.2 | 2.8 | 3.1 | 11.7 | 7.8 | 9.5 | 16.1 | 11.0 | 13.3 | 14.6 | 13.1 | 13.9 |
| 28 | 6.4 | 2.8 | 4.5 | 11.7 | 8.5 | 9.9 | 17.3 | 11.3 | 14.2 | 14.6 | 12.4 | 13.5 |
| 29 | --- | --- | --- | 13.1 | 11.0 | 11.9 | 16.5 | 12.8 | 14.4 | 14.3 | 12.8 | 13.5 |
| 30 | --- | --- | --- | 11.0 | 6.0 | 8.1 | 16.1 | 12.4 | 14.2 | 16.5 | 12.4 | 14.2 |
| 31 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 15.4 | 13.9 | 14.6 |
| MONTH | 6.4 | 0.0 | 1.4 | 13.1 | 2.8 | 8.0 | 17.3 | 4.2 | 11.4 | 19.7 | 10.2 | 13.7 |
| | | JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | |
| 1 | 16.1 | 12.8 | 14.0 | 21.3 | 18.9 | 20.0 | 21.7 | 19.3 | 20.3 | 24.6 | 20.9 | 22.7 |
| 2 | 16.9 | 11.7 | 14.2 | 19.7 | 17.7 | 18.5 | 24.6 | 20.1 | 22.1 | 24.6 | 22.1 | 23.4 |
| 3 | 15.0 | 13.1 | 13.9 | 19.3 | 16.5 | 17.7 | 25.1 | 21.7 | 23.0 | 23.3 | 21.7 | 22.5 |
| 4 | 15.0 | 12.8 | 13.6 | 21.7 | 16.9 | 19.3 | 24.2 | 21.3 | 22.6 | 22.1 | 19.7 | 20.8 |
| 5 | 15.0 | 12.8 | 14.1 | 23.8 | 18.9 | 21.4 | 24.6 | 20.9 | 22.6 | 21.7 | 18.1 | 19.7 |
| 6 | 16.1 | 12.8 | 14.5 | 23.8 | 20.1 | 21.9 | 23.8 | 20.9 | 22.5 | 20.9 | 16.9 | 19.0 |
| 7 | 15.4 | 14.3 | 14.9 | 24.6 | 20.5 | 22.4 | 22.9 | 21.3 | 21.7 | 20.5 | 17.3 | 19.1 |
| 8 | 15.8 | 14.3 | 14.8 | 25.1 | 20.9 | 22.9 | 22.1 | 20.1 | 20.9 | 21.3 | 18.1 | 19.6 |
| 9 | 16.9 | 13.9 | 15.5 | 23.8 | 21.3 | 22.5 | 22.5 | 19.3 | 20.6 | 20.1 | 17.7 | 19.0 |
| 10 | 16.5 | 14.3 | 15.6 | 23.8 | 20.5 | 22.0 | 23.8 | 19.3 | 21.2 | 20.9 | 16.9 | 18.6 |
| 11 | 17.7 | 15.4 | 16.3 | 23.8 | 20.1 | 21.6 | 25.1 | 20.9 | 22.9 | 20.5 | 16.1 | 18.5 |
| 12 | 18.5 | 15.8 | 17.0 | 22.1 | 18.9 | 20.7 | 23.3 | 19.3 | 20.8 | 18.9 | 16.5 | 17.9 |
| 13 | 17.3 | 15.8 | 16.7 | 22.9 | 18.5 | 20.5 | 22.5 | 20.1 | 21.2 | 18.9 | 17.3 | 18.2 |
| 14 | 18.1 | 15.4 | 16.7 | 20.9 | 18.1 | 19.5 | 25.1 | 20.5 | 22.5 | 21.3 | 18.1 | 19.5 |
| 15 | 17.7 | 16.1 | 16.5 | 19.7 | 17.7 | 18.9 | 25.1 | 21.7 | 23.3 | 20.5 | 18.1 | 19.3 |
| 16 | 16.1 | 14.3 | 15.0 | 22.5 | 18.9 | 20.2 | 24.2 | 21.7 | 23.0 | 20.5 | 16.5 | 18.2 |
| 17 | 14.3 | 13.5 | 13.6 | 23.3 | 18.9 | 21.0 | 24.6 | 21.3 | 22.9 | 20.1 | 16.1 | 18.1 |
| 18 | 15.8 | 13.1 | 14.4 | 22.1 | 18.9 | 20.7 | 25.1 | 20.9 | 22.7 | 18.1 | 15.8 | 16.5 |
| 19 | 15.8 | 14.6 | 15.3 | 21.7 | 18.5 | 20.0 | 24.6 | 21.7 | 23.1 | 15.8 | 15.0 | 15.5 |
| 20 | 16.5 | 14.6 | 15.5 | 23.3 | 17.7 | 20.5 | 25.1 | 21.3 | 23.1 | 16.1 | 14.6 | 15.4 |
| 21 | 15.4 | 13.5 | 14.1 | 23.8 | 18.9 | 21.5 | 25.5 | 21.7 | 23.6 | 17.7 | 15.8 | 16.5 |
| 22 | 17.3 | 13.1 | 14.9 | 23.8 | 20.5 | 22.1 | 25.5 | 22.5 | 24.1 | 16.9 | 16.5 | 16.8 |
| 23 | 18.9 | 15.0 | 16.7 | 22.9 | 20.1 | 21.6 | 26.0 | 22.1 | 23.8 | 16.5 | 15.0 | 15.8 |
| 24 | 20.1 | 15.8 | 17.7 | 22.5 | 19.3 | 20.9 | 24.6 | 20.5 | 22.6 | 15.8 | 13.5 | 14.7 |
| 25 | 21.7 | 16.9 | 19.1 | 23.8 | 18.5 | 21.0 | 25.1 | 20.5 | 22.8 | 16.1 | 13.9 | 15.0 |
| 26 | 22.5 | 18.1 | 20.1 | 24.2 | 19.3 | 21.9 | 26.0 | 21.3 | 23.5 | 18.1 | 15.0 | 16.2 |
| 27 | 20.5 | 18.5 | 19.5 | 24.6 | 20.9 | 22.7 | 26.0 | 22.1 | 24.0 | 18.1 | 15.8 | 16.6 |
| 28 | 18.5 | 16.5 | 17.7 | 24.2 | 21.7 | 23.0 | 26.0 | 22.5 | 24.0 | 16.5 | 14.6 | 16.0 |
| 29 | 22.5 | 16.5 | 19.1 | 22.9 | 21.7 | 22.1 | 26.0 | 22.1 | 23.8 | 14.6 | 12.4 | 13.6 |
| 30 | 22.5 | 17.7 | 20.2 | 21.7 | 20.5 | 21.2 | 25.1 | 22.5 | 23.7 | 13.9 | 11.0 | 12.3 |
| 31 | --- | --- | --- | 20.9 | 19.7 | 20.2 | 23.3 | 21.7 | 22.5 | --- | --- | --- |
| MONTH | 22.5 | 11.7 | 16.0 | 25.1 | 16.5 | 21.0 | 26.0 | 19.3 | 22.6 | 24.6 | 11.0 | 17.8 |
| YEAR | 26.0 | 0.0 | 11.6 | | | | | | | | | |

## 02011460 BACK CREEK NEAR SUNRISE, VA

LOCATION.--Lat 38°14'43", long 79°46'07", NAD83, 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 $mi^2$.

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 NGVD of 1929 (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. 16-28, which is poor. Virginia Power gage-height transmitter at station, receiver at Back Creek Dam. Maximum discharge, 17,500 $ft^3/s$, from rating curve extended above 3,800 $ft^3/s$. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 850 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|
| Oct 29 | 2330 | 913 | 3.49 |
| Dec 20 | 1030 | 1,830 | 4.47 |
| Feb 22 | 1345 | *2,710 | *5.14 |
| Feb 23 | 0730 | 2,370 | 4.90 |
| May 10 | 2130 | 1,040 | 3.66 |
| Jun 4 | 0745 | 1,390 | 4.05 |
| Sep 19 | 0545 | 1,660 | 4.32 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 20 | 128 | 66 | 284 | 20 | 138 | 82 | 84 | 121 | 41 | 14 | 8.9 |
| 2 | 16 | 91 | 57 | 535 | 20 | 290 | 214 | 89 | 121 | 45 | 13 | 17 |
| 3 | 14 | 70 | 52 | 298 | 22 | 326 | 188 | 90 | 150 | 65 | 12 | 30 |
| 4 | 13 | 61 | 43 | 208 | 58 | 240 | 142 | 197 | 1,020 | 47 | 12 | 76 |
| 5 | 11 | 70 | 48 | 161 | 95 | 332 | 113 | 249 | 511 | 39 | 17 | 78 |
| 6 | 9.5 | 530 | 44 | 131 | 75 | 674 | 90 | 260 | 275 | 34 | 15 | 46 |
| 7 | 8.5 | 255 | 35 | 105 | 67 | 553 | 239 | 206 | 258 | 38 | 15 | 33 |
| 8 | 7.7 | 145 | 37 | 96 | 53 | 329 | 387 | 156 | 329 | 52 | 18 | 23 |
| 9 | 7.2 | 105 | 32 | 92 | 54 | 338 | 531 | 162 | 326 | 78 | 18 | 17 |
| 10 | 7.6 | 85 | 30 | 87 | 47 | 333 | 462 | 641 | 240 | 98 | 15 | 14 |
| 11 | 10 | 95 | 109 | 77 | 40 | 230 | 439 | 695 | 170 | 73 | 16 | 12 |
| 12 | 13 | 249 | 201 | 64 | 38 | 177 | 402 | 352 | 172 | 55 | 75 | 11 |
| 13 | 12 | 412 | 214 | 62 | 39 | 277 | 277 | 226 | 351 | 46 | 41 | 11 |
| 14 | 12 | 221 | 365 | 59 | 32 | 462 | 195 | 159 | 313 | 62 | 30 | 12 |
| 15 | 11 | 140 | 237 | 50 | 35 | 277 | 149 | 127 | 246 | 160 | 21 | 16 |
| 16 | 148 | 109 | 170 | e45 | 19 | 222 | 122 | 105 | 278 | 96 | 18 | 27 |
| 17 | 181 | 157 | 136 | e44 | 29 | 223 | 102 | 90 | 416 | 69 | 18 | 17 |
| 18 | 88 | 183 | 114 | e41 | 41 | 200 | 96 | 310 | 529 | 54 | 15 | 18 |
| 19 | 58 | 147 | 100 | e38 | 35 | 157 | 106 | 409 | 332 | 48 | 13 | 932 |
| 20 | 43 | 121 | 1,110 | e35 | 38 | 348 | 107 | 247 | 234 | 40 | 12 | 309 |
| 21 | 33 | 130 | 562 | e33 | 67 | 589 | 107 | 212 | 176 | 34 | 11 | 154 |
| 22 | 26 | 261 | 283 | e32 | 1,390 | 318 | 126 | 215 | 144 | 30 | 10 | 115 |
| 23 | 21 | 208 | 183 | e29 | 1,640 | 211 | 121 | 192 | 117 | 27 | 9.5 | 490 |
| 24 | 18 | 145 | 140 | e27 | 554 | 158 | 105 | 160 | 95 | 23 | 8.8 | 230 |
| 25 | 17 | 111 | 122 | e25 | 293 | 126 | 94 | 130 | 81 | 19 | 8.2 | 134 |
| 26 | 62 | 92 | 96 | e23 | 204 | 109 | 96 | 112 | 71 | 16 | 7.7 | 93 |
| 27 | 74 | 89 | 78 | e22 | 158 | 93 | 137 | 94 | 64 | 14 | 7.3 | 75 |
| 28 | 69 | 79 | 71 | e21 | 129 | 80 | 113 | 89 | 58 | 13 | 7.3 | 79 |
| 29 | 251 | 76 | 68 | 21 | --- | 76 | 96 | 96 | 52 | 14 | 7.3 | 64 |
| 30 | 552 | 75 | 66 | 22 | --- | 76 | 83 | 100 | 45 | 13 | 7.2 | 52 |
| 31 | 218 | --- | 70 | 20 | --- | 71 | --- | 107 | --- | 13 | 7.8 | --- |
| TOTAL | 2,031.5 | 4,640 | 4,939 | 2,787 | 5,292 | 8,033 | 5,521 | 6,361 | 7,295 | 1,456 | 500.1 | 3,193.9 |
| MEAN | 65.5 | 155 | 159 | 89.9 | 189 | 259 | 184 | 205 | 243 | 47.0 | 16.1 | 106 |
| MAX | 552 | 530 | 1,110 | 535 | 1,640 | 674 | 531 | 695 | 1,020 | 160 | 75 | 932 |
| MIN | 7.2 | 61 | 30 | 20 | 19 | 71 | 82 | 84 | 45 | 13 | 7.2 | 8.9 |
| CFSM | 1.09 | 2.57 | 2.65 | 1.50 | 3.14 | 4.31 | 3.06 | 3.41 | 4.05 | 0.78 | 0.27 | 1.77 |
| IN. | 1.26 | 2.87 | 3.06 | 1.73 | 3.28 | 4.97 | 3.42 | 3.94 | 4.52 | 0.90 | 0.31 | 1.98 |

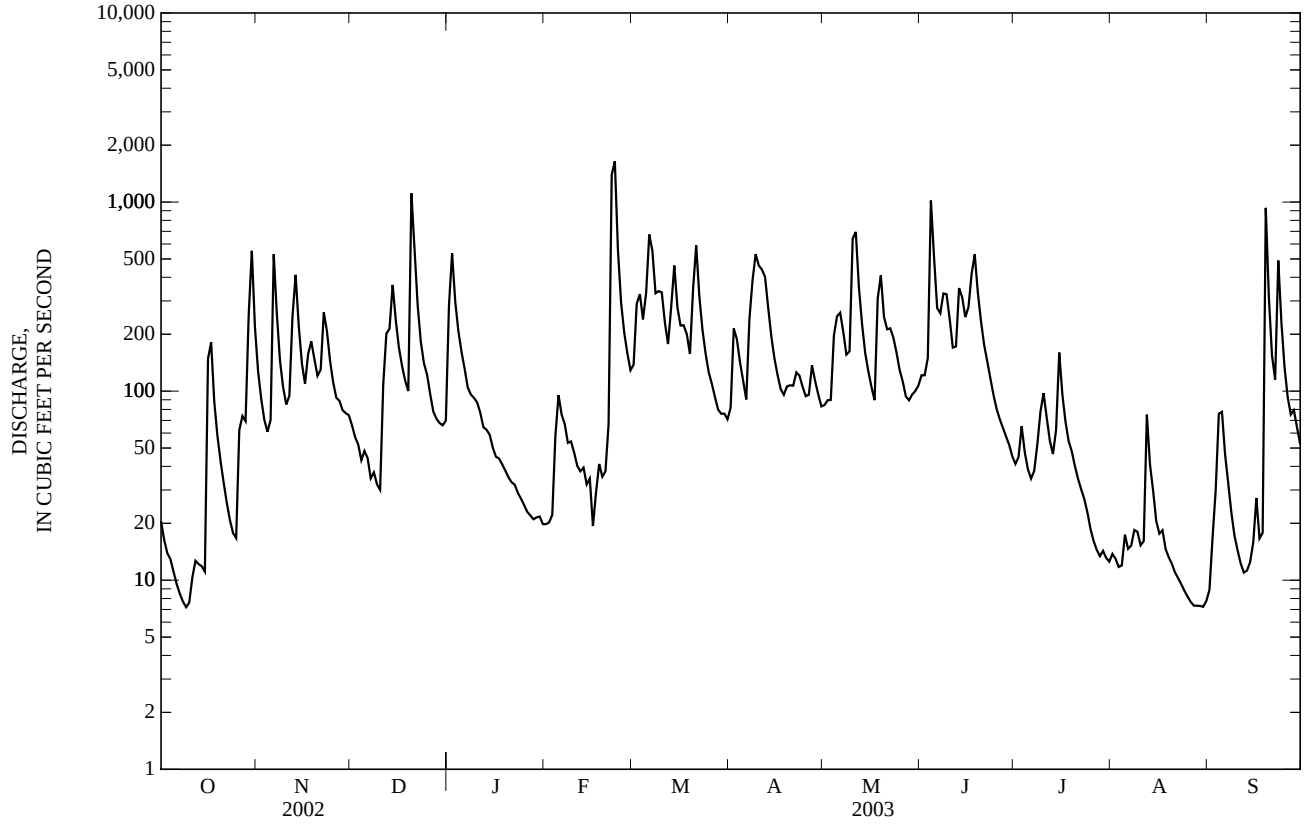
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1974 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 40.4 | 78.3 | 103 | 135 | 143 | 198 | 140 | 129 | 66.8 | 27.8 | 25.3 | 28.3 |
| MAX | 256 | 512 | 249 | 426 | 326 | 394 | 330 | 391 | 243 | 69.5 | 88.9 | 180 |
| (WY) | (1977) | (1986) | (1997) | (1996) | (1994) | (1993) | (1987) | (1996) | (2003) | (1994) | (1996) | (1996) |
| MIN | 3.46 | 4.03 | 6.23 | 8.49 | 23.6 | 54.5 | 41.9 | 31.8 | 9.42 | 2.47 | 4.41 | 2.48 |
| (WY) | (1999) | (1999) | (1999) | (1981) | (2002) | (1988) | (1999) | (1991) | (1999) | (1999) | (1987) | (1983) |

02011460 BACK CREEK NEAR SUNRISE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1974 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 30,721.0 | | 52,049.5 | | | |
| ANNUAL MEAN | 84.2 | | 143 | | 92.8 | |
| HIGHEST ANNUAL MEAN | | | | | 155 | 1996 |
| LOWEST ANNUAL MEAN | | | | | 39.1 | 1999 |
| HIGHEST DAILY MEAN | 1,480 | Apr 28 | 1,640 | Feb 23 | 6,280 | Nov 4, 1985 |
| LOWEST DAILY MEAN | 1.2 | Sep 13 | 7.2 | aOct 9 | 0.87 | Aug 12, 1999 |
| ANNUAL SEVEN-DAY MINIMUM | 1.6 | Sep 8 | 7.5 | Aug 25 | 1.0 | Aug 6, 1999 |
| MAXIMUM PEAK FLOW | | | 2,710 | Feb 22 | 17,500 | Nov 4, 1985 |
| MAXIMUM PEAK STAGE | | | 5.14 | Feb 22 | 10.01 | Nov 4, 1985 |
| INSTANTANEOUS LOW FLOW | | | 6.9 | bOct 9 | 0.73 | cAug 12, 1999 |
| ANNUAL RUNOFF (CFSM) | 1.40 | | 2.37 | | 1.54 | |
| ANNUAL RUNOFF (INCHES) | 19.02 | | 32.22 | | 20.98 | |
| 10 PERCENT EXCEEDS | 183 | | 329 | | 211 | |
| 50 PERCENT EXCEEDS | 33 | | 87 | | 43 | |
| 90 PERCENT EXCEEDS | 5.0 | | 14 | | 5.9 | |

a Also Aug. 30, 2003.
b Also Oct. 10, 2002 and Aug. 29, 30, 2003.
c Also Aug. 13, 1999.
e Estimated.



## 02011470 BACK CREEK AT SUNRISE, VA

LOCATION.--Lat 38°11'25", long 79°48'42", NAD83, 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 $mi^2$.

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 NGVD of 1929 (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 $ft^3/s$, from rating curve extended above 960 $ft^3/s$ 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.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 15 | 142 | 59 | 287 | 30 | 183 | 100 | 121 | 172 | 27 | 17 | 15 |
| 2 | 15 | 128 | 43 | 845 | 26 | 376 | 244 | 121 | 159 | 29 | 16 | 15 |
| 3 | 15 | 95 | 38 | 429 | 20 | 492 | 286 | 124 | 214 | 63 | 15 | 16 |
| 4 | 16 | 62 | 41 | 273 | 63 | 381 | 263 | 242 | 1,590 | 62 | 15 | 28 |
| 5 | 16 | 81 | 67 | 224 | 75 | 304 | 150 | 382 | 856 | 57 | 15 | 100 |
| 6 | 15 | 799 | 104 | 149 | 81 | 838 | 120 | 386 | 333 | 40 | 15 | 94 |
| 7 | 15 | 319 | 80 | 142 | 102 | 1,060 | 335 | 302 | 339 | 20 | 16 | 78 |
| 8 | 15 | 204 | 31 | 127 | 98 | 423 | 572 | 212 | 448 | 40 | 17 | 23 |
| 9 | 15 | 148 | 20 | 116 | 79 | 385 | 746 | 219 | 431 | 111 | 17 | 21 |
| 10 | 16 | 106 | 21 | 110 | 70 | 497 | 751 | 879 | 316 | 148 | 16 | 20 |
| 11 | 17 | 118 | 137 | 108 | 42 | 318 | 659 | 947 | 259 | 101 | 19 | 16 |
| 12 | 16 | 366 | 330 | 72 | 38 | 174 | 617 | 543 | 228 | 39 | 107 | 16 |
| 13 | 15 | 646 | 282 | 56 | 28 | 276 | 402 | 269 | 486 | 29 | 77 | 15 |
| 14 | 14 | 324 | 498 | 58 | 29 | 719 | 239 | 204 | 447 | 80 | 40 | 15 |
| 15 | 15 | 180 | 329 | 58 | 64 | 377 | 224 | 183 | 372 | 201 | 31 | 16 |
| 16 | 26 | 157 | 188 | 67 | 103 | 299 | 152 | 130 | 473 | 183 | 24 | 30 |
| 17 | 38 | 203 | 160 | 76 | 61 | 290 | 134 | 111 | 712 | 91 | 22 | 72 |
| 18 | 46 | 241 | 185 | 80 | 176 | 287 | 134 | 438 | 887 | 66 | 18 | 107 |
| 19 | 100 | 261 | 196 | 41 | 142 | 226 | 150 | 756 | 478 | 67 | 29 | 1,370 |
| 20 | 65 | 153 | 1,570 | 21 | 75 | 422 | 149 | 363 | 299 | 33 | 35 | 396 |
| 21 | 60 | 171 | 827 | 18 | 119 | 993 | 134 | 354 | 236 | 29 | 36 | 206 |
| 22 | 36 | 288 | 395 | 18 | 1,910 | 491 | 125 | 255 | 222 | 37 | 62 | 147 |
| 23 | 20 | 304 | 217 | 18 | 2,340 | 207 | 162 | 262 | 112 | 36 | 72 | 733 |
| 24 | 17 | 238 | 179 | 19 | 857 | 171 | 170 | 253 | 119 | 24 | 36 | 293 |
| 25 | 19 | 131 | 193 | 19 | 449 | 175 | 176 | 149 | 99 | 18 | 15 | 195 |
| 26 | 65 | 131 | 149 | 18 | 293 | 182 | 128 | 130 | 60 | 17 | 15 | 99 |
| 27 | 78 | 98 | 100 | 30 | 255 | 146 | 116 | 124 | 59 | 15 | 16 | 59 |
| 28 | 102 | 139 | 87 | 44 | 176 | 127 | 113 | 128 | 90 | 15 | 16 | 132 |
| 29 | 166 | 120 | 104 | 46 | --- | 98 | 122 | 136 | 58 | 15 | 16 | 91 |
| 30 | 926 | 83 | 103 | 46 | --- | 81 | 116 | 137 | 28 | 15 | 16 | 76 |
| 31 | 393 | --- | 84 | 30 | --- | 86 | --- | 154 | --- | 16 | 15 | --- |
| TOTAL | 2,387 | 6,436 | 6,817 | 3,645 | 7,801 | 11,084 | 7,789 | 9,014 | 10,582 | 1,724 | 876 | 4,494 |
| MEAN | 77.0 | 215 | 220 | 118 | 279 | 358 | 260 | 291 | 353 | 55.6 | 28.3 | 150 |
| MAX | 926 | 799 | 1,570 | 845 | 2,340 | 1,060 | 751 | 947 | 1,590 | 201 | 107 | 1,370 |
| MIN | 14 | 62 | 20 | 18 | 20 | 81 | 100 | 111 | 28 | 15 | 15 | 15 |

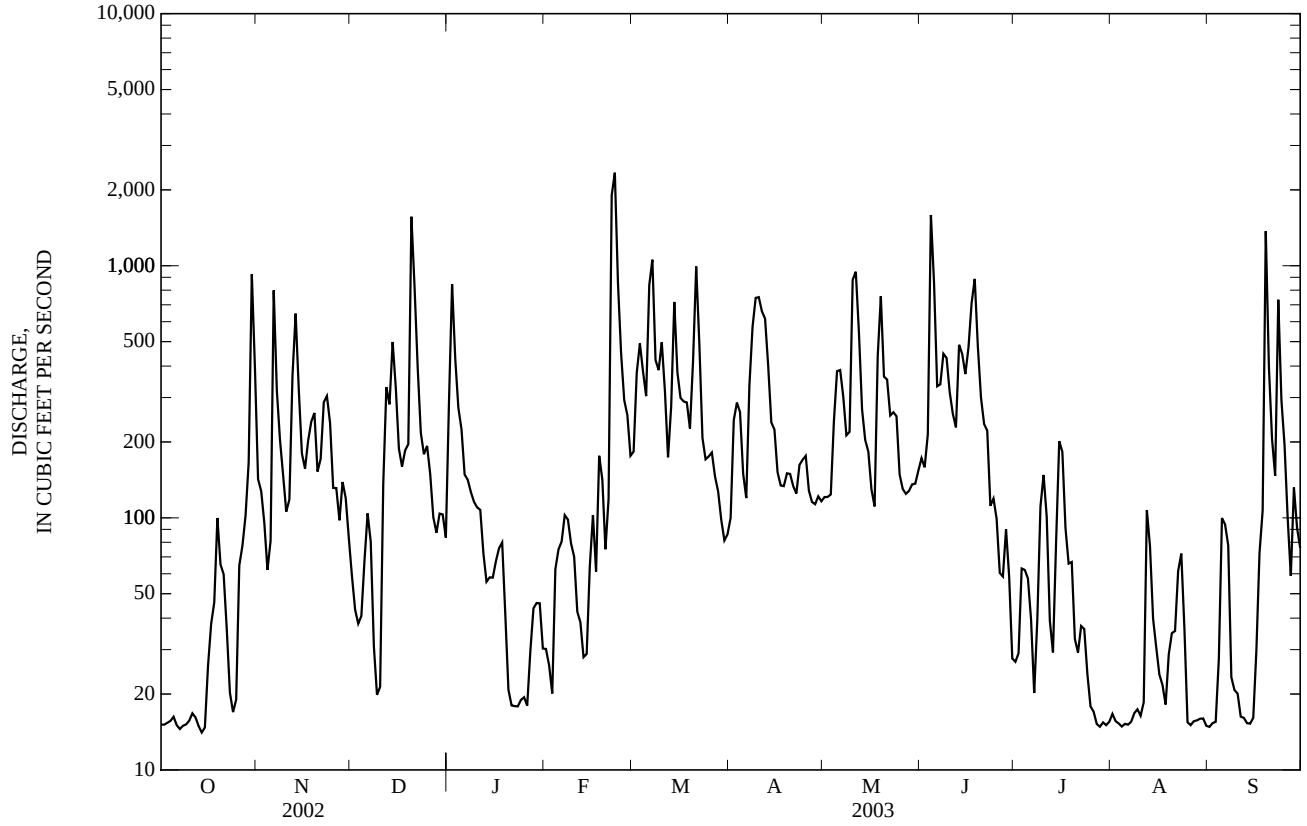
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1985 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 34.0 | 78.4 | 116 | 170 | 168 | 252 | 182 | 178 | 91.3 | 36.0 | 33.4 | 41.3 |
| MAX | 150 | 371 | 285 | 504 | 416 | 616 | 496 | 399 | 353 | 83.0 | 96.1 | 230 |
| (WY) | (1990) | (1986) | (1997) | (1996) | (1994) | (1993) | (1987) | (1989) | (2003) | (1994) | (1996) | (1996) |
| MIN | 9.31 | 3.83 | 2.51 | 11.4 | 16.5 | 61.4 | 51.1 | 37.5 | 12.3 | 10.0 | 12.1 | 11.5 |
| (WY) | (1985) | (1999) | (1999) | (2002) | (2002) | (1988) | (1986) | (1991) | (1999) | (1999) | (1999) | (1985) |

02011470 BACK CREEK AT SUNRISE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1985 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 40,741.2 | | 72,649 | | | |
| ANNUAL MEAN | 112 | | 199 | | 115 | |
| HIGHEST ANNUAL MEAN | | | | | 199 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 47.9 | 1999 |
| HIGHEST DAILY MEAN | 1,990 | Apr 22 | 2,340 | Feb 23 | 4,890 | Jan 19, 1996 |
| LOWEST DAILY MEAN | 8.5 | Jan 18 | 14 | Oct 14 | 1.7 | aDec 5, 1998 |
| ANNUAL SEVEN-DAY MINIMUM | 8.6 | Jan 15 | 15 | Oct 1 | 1.9 | Nov 30, 1998 |
| MAXIMUM PEAK FLOW | | | 3,410 | Feb 22 | 5,690 | Jan 19, 1996 |
| MAXIMUM PEAK STAGE | | | 9.19 | Feb 22 | 11.99 | Jan 19, 1996 |
| INSTANTANEOUS LOW FLOW | | | 10 | Aug 26 | 1.7 | bDec 5, 1998 |
| 10 PERCENT EXCEEDS | 277 | | 448 | | 260 | |
| 50 PERCENT EXCEEDS | 19 | | 113 | | 39 | |
| 90 PERCENT EXCEEDS | 14 | | 16 | | 13 | |

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°50'15", NAD83, 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 $mi^2$.

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 NGVD of 1929 (Virginia Power bench mark). Nov. 5, 1992, to Jan. 5, 1993, nonrecording gage at present site and datum.

REMARKS.--Records good except those for periods of no gage-height record, Jan. 14 to Feb. 20 and June 28, which are fair. Flow regulated since January 1985 by Little Back Creek Lake 1.2 mi upstream, amount unknown. Maximum discharge, 580 $ft^3/s$, from rating curve extended above 30 $ft^3/s$ 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.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.9 | 7.3 | 4.6 | 10 | e2.6 | 5.7 | 5.4 | 3.8 | 10 | 2.7 | 2.6 | 2.5 |
| 2 | 2.8 | 5.5 | 4.3 | 19 | e2.4 | 9.8 | 12 | 3.7 | 10 | 3.4 | 2.4 | 3.8 |
| 3 | 2.7 | 4.7 | 4.1 | 12 | e2.6 | 12 | 11 | 3.9 | 9.6 | 3.6 | 2.5 | 5.4 |
| 4 | 2.6 | 4.5 | 3.9 | 8.9 | e3.6 | 9.3 | 8.8 | 8.7 | 37 | 3.0 | 2.7 | 12 |
| 5 | 2.5 | 5.8 | 3.9 | 7.4 | e4.8 | 10 | 7.1 | 13 | 19 | 2.8 | 3.0 | 12 |
| 6 | 2.3 | 21 | 3.7 | 6.4 | e4.4 | 22 | 5.8 | 13 | 10 | 2.7 | 2.7 | 6.9 |
| 7 | 2.4 | 13 | 3.4 | 5.4 | e4.2 | 19 | 8.7 | 11 | 9.1 | 2.8 | 2.6 | 4.8 |
| 8 | 2.4 | 8.1 | 3.4 | 4.8 | e3.8 | 12 | 15 | 8.2 | 12 | 3.2 | 3.0 | 3.9 |
| 9 | 2.4 | 6.2 | 3.4 | 4.6 | e3.6 | 11 | 22 | 6.7 | 14 | 3.6 | 3.3 | 3.3 |
| 10 | 2.5 | 5.3 | 3.4 | 4.6 | e3.6 | 11 | 18 | 11 | 11 | 4.3 | 3.5 | 2.9 |
| 11 | 2.5 | 7.1 | 6.6 | 4.5 | e3.6 | 8.8 | 17 | 18 | 8.2 | 3.8 | 3.6 | 2.7 |
| 12 | 2.3 | 15 | 9.9 | 4.3 | e3.5 | 6.9 | 14 | 12 | 7.6 | 3.4 | 4.8 | 2.6 |
| 13 | 2.4 | 20 | 9.2 | 4.3 | e3.3 | 7.8 | 11 | 8.7 | 14 | 4.0 | 4.0 | 2.5 |
| 14 | 2.6 | 11 | 14 | e4.0 | e3.2 | 13 | 8.3 | 6.8 | 15 | 9.2 | 3.3 | 2.8 |
| 15 | 2.7 | 7.6 | 10 | e3.8 | e3.6 | 10 | 6.9 | 5.7 | 34 | 7.2 | 3.0 | 3.0 |
| 16 | 7.5 | 6.4 | 7.9 | e3.6 | e4.0 | 8.3 | 6.0 | 4.9 | 33 | 5.3 | 2.8 | 2.8 |
| 17 | 9.3 | 7.7 | 6.8 | e3.5 | e3.6 | 8.2 | 5.4 | 4.4 | 23 | 4.4 | 5.0 | 2.5 |
| 18 | 5.5 | 8.9 | 5.9 | e3.4 | e3.0 | 7.7 | 5.2 | 24 | 18 | 3.8 | 4.7 | 3.9 |
| 19 | 4.0 | 8.0 | 5.3 | e3.3 | e2.9 | 6.8 | 5.5 | 25 | 13 | 3.6 | 3.9 | 62 |
| 20 | 3.5 | 7.0 | 38 | e3.4 | e3.4 | 14 | 5.9 | 12 | 9.3 | 3.1 | 3.4 | 18 |
| 21 | 3.4 | 7.2 | 22 | e3.4 | 4.4 | 23 | 6.1 | 9.5 | 7.5 | 3.0 | 3.2 | 9.2 |
| 22 | 3.2 | 11 | 11 | e3.2 | 65 | 12 | 6.6 | 8.6 | 6.3 | 2.8 | 2.9 | 8.0 |
| 23 | 2.9 | 10 | 7.8 | e3.2 | 67 | 8.8 | 6.8 | 8.2 | 5.4 | 2.8 | 2.7 | 23 |
| 24 | 2.8 | 7.8 | 6.6 | e3.0 | 20 | 7.1 | 6.4 | 7.3 | 4.6 | 2.7 | 2.5 | 13 |
| 25 | 2.9 | 6.6 | 5.8 | e2.8 | 11 | 6.0 | 5.8 | 6.1 | 4.1 | 2.6 | 2.6 | 7.5 |
| 26 | 5.1 | 5.7 | 5.0 | e2.8 | 7.9 | 5.4 | 5.3 | 5.5 | 3.7 | 2.7 | 2.5 | 5.7 |
| 27 | 5.4 | 5.4 | 4.3 | e2.9 | 6.6 | 4.8 | 4.7 | 5.0 | 3.4 | 2.6 | 2.7 | 5.2 |
| 28 | 5.2 | 5.1 | 3.9 | e2.8 | 5.7 | 4.4 | 4.4 | 4.9 | e3.0 | 2.7 | 2.6 | 6.4 |
| 29 | 11 | 4.9 | 3.8 | e2.7 | --- | 4.4 | 4.3 | 5.1 | 2.8 | 2.8 | 2.5 | 6.2 |
| 30 | 23 | 4.9 | 3.9 | e2.6 | --- | 4.7 | 4.0 | 5.2 | 2.8 | 2.6 | 2.4 | 5.4 |
| 31 | 11 | --- | 4.2 | e2.6 | --- | 4.6 | --- | 6.4 | --- | 2.6 | 2.4 | --- |
| TOTAL | 143.7 | 248.7 | 230.0 | 153.2 | 257.3 | 298.5 | 253.4 | 276.3 | 360.4 | 109.8 | 95.8 | 249.9 |
| MEAN | 4.64 | 8.29 | 7.42 | 4.94 | 9.19 | 9.63 | 8.45 | 8.91 | 12.0 | 3.54 | 3.09 | 8.33 |
| MAX | 23 | 21 | 38 | 19 | 67 | 23 | 22 | 25 | 37 | 9.2 | 5.0 | 62 |
| MIN | 2.3 | 4.5 | 3.4 | 2.6 | 2.4 | 4.4 | 4.0 | 3.7 | 2.8 | 2.6 | 2.4 | 2.5 |

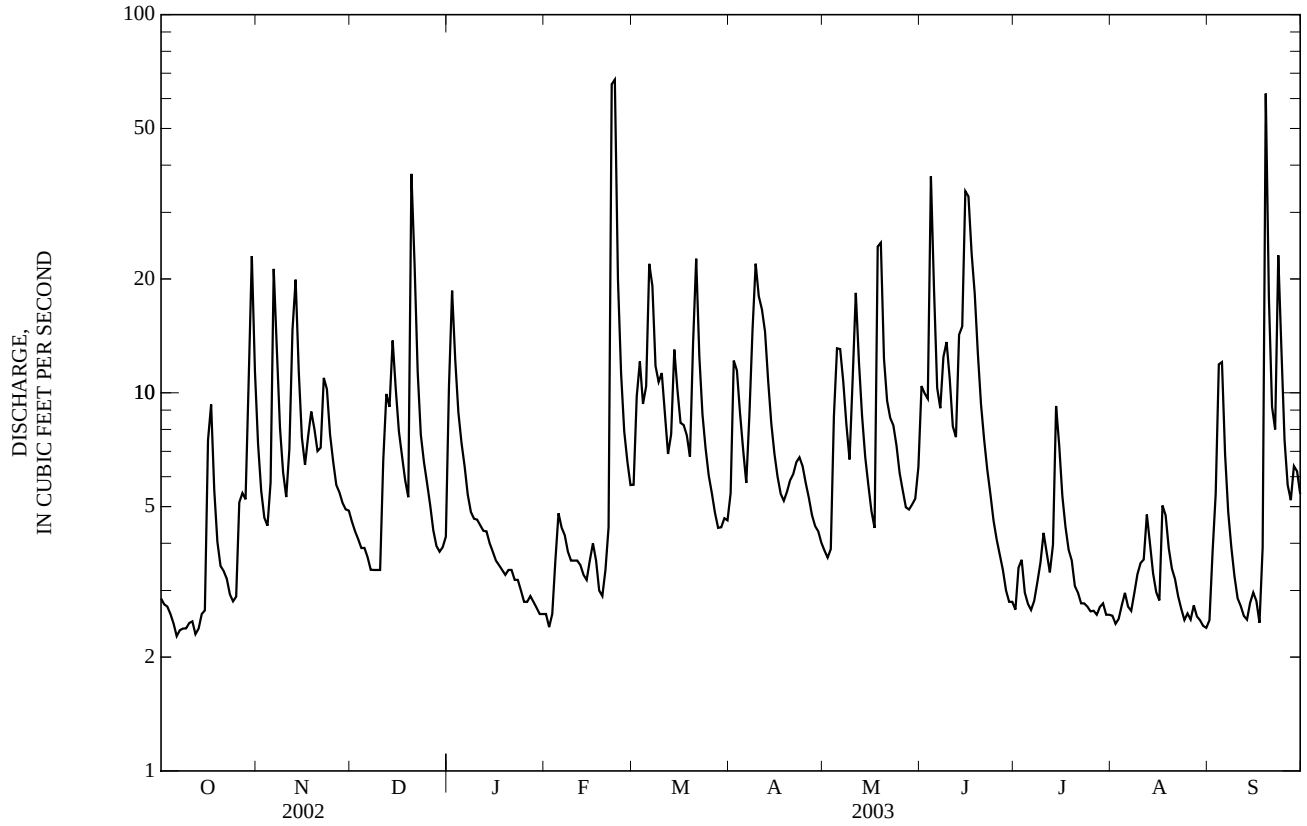
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1985 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 3.42 | 4.87 | 5.61 | 6.97 | 6.94 | 8.46 | 6.89 | 6.83 | 4.66 | 3.47 | 3.37 | 3.54 |
| MAX | 7.46 | 12.6 | 9.65 | 15.7 | 12.9 | 16.4 | 13.1 | 14.8 | 12.0 | 4.95 | 5.13 | 8.33 |
| (WY) | (1990) | (1986) | (1997) | (1996) | (1994) | (1993) | (1987) | (1985) | (2003) | (1994) | (1989) | (2003) |
| MIN | 2.00 | 1.94 | 1.99 | 3.07 | 3.20 | 3.91 | 2.78 | 3.09 | 2.08 | 1.99 | 2.22 | 2.28 |
| (WY) | (2000) | (1999) | (1999) | (2002) | (2002) | (1985) | (1999) | (1999) | (1999) | (1999) | (1999) | (1985) |

02011490 LITTLE BACK CREEK NEAR SUNRISE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1985 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 1,854.9 | | 2,677.0 | | | |
| ANNUAL MEAN | 5.08 | | 7.33 | | 5.41 | |
| HIGHEST ANNUAL MEAN | | | | | 7.33 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 3.34 | 1999 |
| HIGHEST DAILY MEAN | 38 | Dec 20 | 67 | Feb 23 | 158 | Nov 4, 1985 |
| LOWEST DAILY MEAN | 1.9 | aJan 1 | 2.3 | bOct 6 | 0.90 | Oct 13, 1984 |
| ANNUAL SEVEN-DAY MINIMUM | 2.0 | Jan 1 | 2.4 | Oct 6 | 1.2 | Jan 24, 1985 |
| MAXIMUM PEAK FLOW | | | 125 | Feb 22 | 580 | Nov 4, 1985 |
| MAXIMUM PEAK STAGE | | | 3.09 | Feb 22 | 4.06 | Nov 4, 1985 |
| INSTANTANEOUS LOW FLOW | | | 2.2 | cOct 6 | d0.73 | Oct 9, 1999 |
| 10 PERCENT EXCEEDS | 9.9 | | 13 | | 9.4 | |
| 50 PERCENT EXCEEDS | 3.4 | | 5.0 | | 3.8 | |
| 90 PERCENT EXCEEDS | 2.3 | | 2.7 | | 2.4 | |

a Also Jan. 5, 10, 2002.
b Also Oct. 12, 2002.
c Also Oct. 7, 2002.
d Result of regulation.
e Estimated.



## 02011500 BACK CREEK NEAR MOUNTAIN GROVE, VA

LOCATION.--Lat 38°04'10", long 79°53'49", NAD83, 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 $mi^2$.

### 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 NGVD of 1929.

REMARKS.--No estimated daily discharges. Records good. 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 $ft^3/s$. U.S. Army Corps of Engineers satellite water temperature and gage-height telemeter at station. Maximum discharge, 18,400 $ft^3/s$, from rating curve extended above 14,000 $ft^3/s$ on basis of slope-area measurement of peak flow.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 38 | 235 | 109 | 373 | 55 | 322 | 161 | 156 | 274 | 61 | 37 | 32 |
| 2 | 35 | 195 | 96 | 1,060 | 53 | 602 | 428 | 161 | 250 | 69 | 36 | 32 |
| 3 | 33 | 147 | 82 | 673 | 48 | 777 | 466 | 166 | 283 | 112 | 34 | 34 |
| 4 | 31 | 108 | 79 | 472 | 62 | 616 | 398 | 380 | 1,650 | 105 | 33 | 73 |
| 5 | 30 | 136 | 94 | 379 | 107 | 590 | 275 | 551 | 1,060 | 98 | 34 | 160 |
| 6 | 28 | 1,050 | 119 | 275 | 91 | 1,070 | 193 | 647 | 540 | 88 | 32 | 134 |
| 7 | 25 | 559 | 110 | 220 | 119 | 1,270 | 462 | 515 | 490 | 99 | 34 | 117 |
| 8 | 24 | 326 | 77 | 199 | 117 | 668 | 832 | 374 | 626 | 75 | 38 | 60 |
| 9 | 24 | 242 | 54 | 175 | 99 | 553 | 1,140 | 317 | 652 | 135 | 62 | 45 |
| 10 | 25 | 165 | 54 | 164 | 95 | 646 | 1,060 | 717 | 513 | 196 | 84 | 40 |
| 11 | 28 | 253 | 228 | 153 | 74 | 488 | 1,120 | 979 | 408 | 199 | 81 | 35 |
| 12 | 26 | 611 | 533 | 127 | 68 | 311 | 893 | 685 | 332 | 133 | 169 | 32 |
| 13 | 25 | 978 | 526 | 102 | 58 | 318 | 634 | 411 | 566 | 100 | 135 | 31 |
| 14 | 22 | 548 | 804 | 101 | 56 | 768 | 408 | 304 | 576 | 345 | 79 | 33 |
| 15 | 22 | 322 | 577 | 97 | 88 | 515 | 351 | 257 | 541 | 298 | 66 | 38 |
| 16 | 115 | 251 | 375 | 99 | 161 | 415 | 260 | 204 | 881 | 280 | 68 | 41 |
| 17 | 159 | 341 | 285 | 105 | 129 | 395 | 208 | 163 | 1,070 | 163 | 65 | 69 |
| 18 | 93 | 390 | 277 | 106 | 176 | 389 | 195 | 1,260 | 1,120 | 109 | 59 | 119 |
| 19 | 126 | 411 | 293 | 102 | 211 | 315 | 240 | 1,300 | 755 | 106 | 98 | 1,760 |
| 20 | 102 | 257 | 1,870 | 71 | 112 | 538 | 235 | 683 | 522 | 82 | 81 | 705 |
| 21 | 84 | 260 | 1,160 | 54 | 205 | 1,190 | 227 | 577 | 399 | 64 | 65 | 360 |
| 22 | 69 | 452 | 632 | 50 | 3,210 | 730 | 201 | 503 | 351 | 63 | 70 | 244 |
| 23 | 48 | 455 | 370 | 51 | 3,530 | 409 | 228 | 449 | 208 | 65 | 85 | 1,050 |
| 24 | 37 | 383 | 306 | 55 | 1,240 | 294 | 234 | 417 | 178 | 62 | 68 | 535 |
| 25 | 36 | 215 | 295 | 52 | 745 | 271 | 238 | 272 | 151 | 44 | 35 | 336 |
| 26 | 93 | 196 | 243 | 49 | 507 | 264 | 202 | 217 | 114 | 41 | 30 | 184 |
| 27 | 131 | 161 | 187 | 47 | 425 | 220 | 186 | 190 | 95 | 38 | 29 | 123 |
| 28 | 137 | 189 | 144 | 65 | 288 | 177 | 170 | 186 | 121 | 35 | 31 | 228 |
| 29 | 286 | 176 | 160 | 70 | --- | 155 | 170 | 199 | 107 | 37 | 29 | 181 |
| 30 | 1,030 | 142 | 156 | 69 | --- | 135 | 162 | 202 | 68 | 35 | 33 | 137 |
| 31 | 630 | --- | 148 | 60 | --- | 130 | --- | 220 | --- | 35 | 33 | --- |
| TOTAL | 3,592 | 10,154 | 10,443 | 5,675 | 12,129 | 15,541 | 11,977 | 13,662 | 14,901 | 3,372 | 1,833 | 6,968 |
| MEAN | 116 | 338 | 337 | 183 | 433 | 501 | 399 | 441 | 497 | 109 | 59.1 | 232 |
| MAX | 1,030 | 1,050 | 1,870 | 1,060 | 3,530 | 1,270 | 1,140 | 1,300 | 1,650 | 345 | 169 | 1,760 |
| MIN | 22 | 108 | 54 | 47 | 48 | 130 | 161 | 156 | 68 | 35 | 29 | 31 |

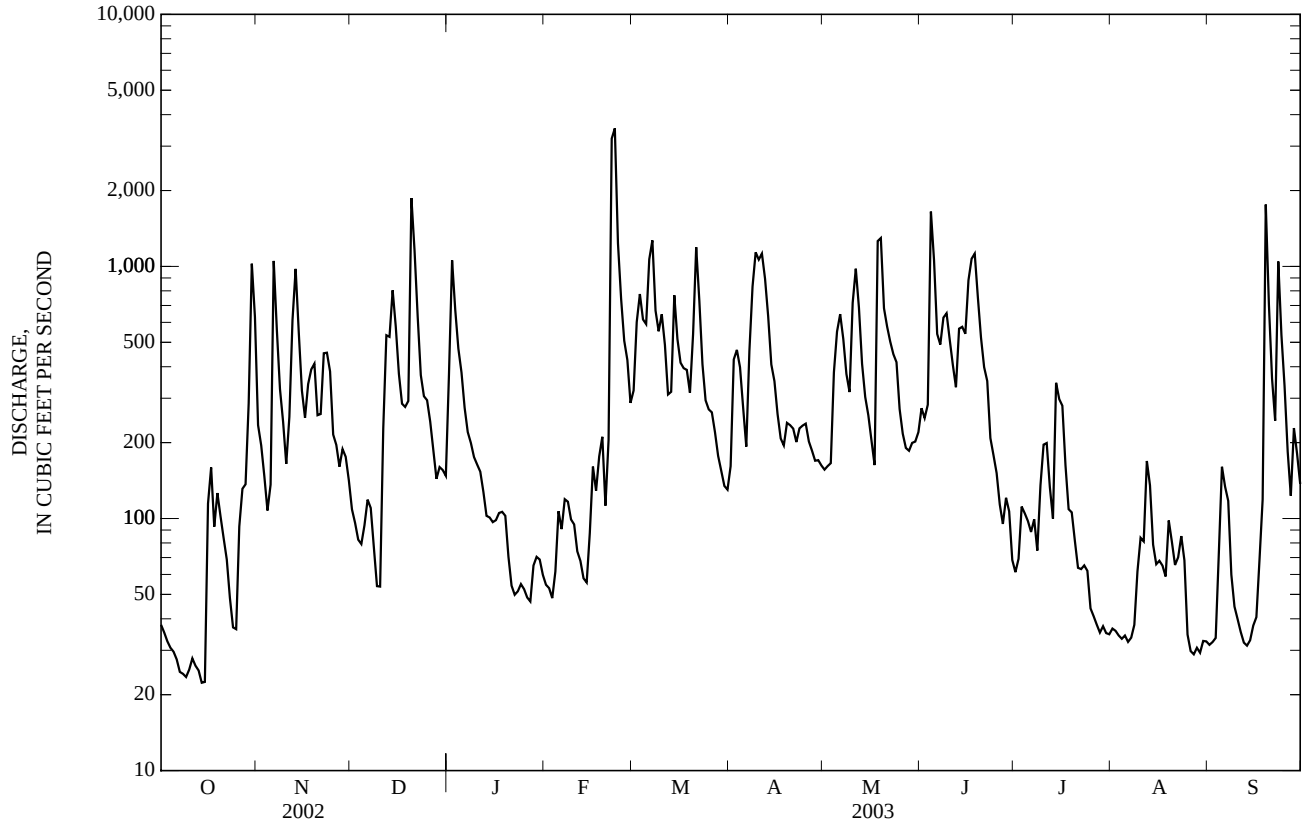
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1985 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 52.8 | 134 | 188 | 274 | 275 | 383 | 282 | 260 | 134 | 56.3 | 49.3 | 60.9 |
| MAX | 246 | 696 | 392 | 818 | 608 | 833 | 824 | 528 | 497 | 134 | 127 | 300 |
| (WY) | (1990) | (1986) | (1997) | (1996) | (1998) | (1993) | (1987) | (1996) | (2003) | (2001) | (2000) | (1996) |
| MIN | 18.9 | 11.4 | 12.6 | 37.0 | 41.2 | 92.8 | 77.6 | 62.9 | 18.2 | 14.0 | 17.9 | 16.5 |
| (WY) | (1999) | (1999) | (1999) | (2002) | (2002) | (1988) | (1999) | (1991) | (1999) | (1999) | (1987) | (1985) |

02011500 BACK CREEK NEAR MOUNTAIN GROVE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1985 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 62,230 | | 110,247 | | | |
| ANNUAL MEAN | 170 | | 302 | | 179 | |
| HIGHEST ANNUAL MEAN | | | | | 302 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 81.3 | 1999 |
| HIGHEST DAILY MEAN | 2,540 | Apr 22 | 3,530 | Feb 23 | 9,940 | Jan 19, 1996 |
| LOWEST DAILY MEAN | 14 | Sep 9 | 22 | aOct 14 | 8.4 | Nov 23, 1998 |
| ANNUAL SEVEN-DAY MINIMUM | 15 | Sep 3 | 25 | Oct 9 | 9.1 | Nov 23, 1998 |
| MAXIMUM PEAK FLOW | | | 6,400 | Feb 22 | b18,400 | Jan 19, 1996 |
| MAXIMUM PEAK STAGE | | | 8.41 | Feb 22 | b12.41 | Jan 19, 1996 |
| INSTANTANEOUS LOW FLOW | | | 18 | Oct 14 | c,d5.3 | Dec 30, 1998 |
| 10 PERCENT EXCEEDS | 462 | | 684 | | 422 | |
| 50 PERCENT EXCEEDS | 53 | | 175 | | 74 | |
| 90 PERCENT EXCEEDS | 17 | | 36 | | 20 | |

a Also Oct. 15, 2002.
b Prior to regulation, 1951-84, maximum peak flow, 12,700 $ft^3/s$, Mar. 7, 1967, gage height, 10.77 ft.
c Prior to regulation, 1951-84, instantaneous low flow, 1.5 $ft^3/s$, Aug. 18, 1967.
d Result of freezeup.



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 little or no streamflow past the temperature sensor on Oct. 14, 15, and instrument malfunction July 22, 24, 25. 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 Oct. 3, 2000. A maximum variation of 1.0°C 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, 27.8°C, Aug. 2; minimum, 0.0°C, on several days during winter.

TEMPERATURE, WATER, DEGREES CELSIUS
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | |
| 1 | 18.9 | 16.5 | 17.7 | 12.4 | 10.6 | 11.6 | 6.0 | 3.9 | 4.7 | 6.7 | 5.7 | 6.2 |
| 2 | 21.3 | 17.3 | 19.2 | 12.8 | 9.9 | 11.0 | 5.3 | 2.8 | 4.0 | 7.1 | 6.4 | 6.6 |
| 3 | 21.3 | 17.7 | 19.6 | 12.4 | 9.2 | 10.8 | 5.3 | 3.5 | 4.5 | 6.7 | 5.3 | 6.2 |
| 4 | 20.9 | 18.9 | 19.8 | 11.3 | 10.2 | 10.9 | 3.5 | 1.8 | 2.7 | 5.7 | 4.2 | 5.0 |
| 5 | 23.8 | 18.9 | 20.5 | 11.0 | 9.5 | 10.1 | 4.6 | 0.7 | 2.6 | 4.9 | 4.2 | 4.5 |
| 6 | 20.9 | 15.8 | 17.9 | 13.1 | 9.5 | 12.0 | 6.0 | 3.9 | 4.8 | 5.3 | 3.5 | 4.8 |
| 7 | 18.1 | 15.4 | 16.3 | 12.1 | 11.0 | 11.8 | 4.9 | 2.1 | 3.5 | 4.6 | 2.1 | 3.2 |
| 8 | 16.1 | 12.1 | 14.2 | 13.5 | 9.9 | 11.4 | 3.9 | 2.1 | 3.2 | 6.4 | 3.9 | 4.8 |
| 9 | 15.4 | 13.1 | 14.3 | 13.5 | 10.6 | 11.7 | 3.5 | 1.1 | 2.3 | 7.1 | 4.2 | 5.3 |
| 10 | 15.4 | 14.3 | 15.0 | 14.6 | 11.0 | 12.8 | 4.2 | 1.4 | 2.6 | 4.9 | 3.2 | 4.2 |
| 11 | 16.5 | 15.0 | 15.7 | 13.9 | 12.1 | 13.2 | 5.7 | 3.5 | 4.3 | 3.5 | 1.8 | 2.5 |
| 12 | 19.7 | 16.1 | 17.6 | 12.1 | 11.7 | 11.7 | 7.4 | 5.7 | 6.6 | 2.8 | 0.4 | 1.5 |
| 13 | 18.1 | 16.1 | 17.1 | 12.8 | 11.0 | 12.1 | 6.4 | 6.0 | 6.4 | 3.2 | 0.0 | 1.5 |
| 14 | --- | --- | --- | 12.8 | 10.6 | 11.5 | 7.1 | 6.4 | 6.8 | 2.5 | 0.7 | 1.8 |
| 15 | --- | --- | --- | 12.4 | 9.9 | 11.1 | 7.4 | 6.0 | 6.5 | 1.8 | 0.4 | 1.1 |
| 16 | 13.9 | 11.7 | 12.5 | 11.7 | 11.3 | 11.5 | 7.4 | 5.3 | 6.5 | 1.1 | 0.0 | 0.3 |
| 17 | 13.5 | 11.7 | 13.0 | 11.3 | 9.5 | 10.8 | 6.7 | 4.6 | 5.5 | 2.1 | 0.4 | 1.1 |
| 18 | 13.5 | 10.2 | 11.8 | 11.0 | 8.8 | 9.8 | 7.1 | 5.7 | 6.3 | 0.7 | 0.0 | 0.0 |
| 19 | 15.4 | 11.7 | 13.5 | 11.0 | 9.5 | 10.1 | 8.1 | 6.4 | 7.2 | 1.1 | 0.0 | 0.1 |
| 20 | 15.8 | 15.0 | 15.5 | 11.3 | 9.2 | 10 | 7.8 | 7.1 | 7.5 | 2.1 | 0.0 | 0.9 |
| 21 | 15.4 | 14.3 | 14.7 | 10.6 | 9.2 | 9.9 | 7.4 | 6.0 | 6.7 | 3.2 | 0.4 | 1.6 |
| 22 | 16.1 | 13.5 | 14.5 | 10.6 | 8.8 | 9.9 | 7.4 | 6.0 | 6.5 | 0.4 | 0.0 | 0.0 |
| 23 | 14.6 | 11.7 | 13.1 | 10.2 | 8.5 | 9.1 | 7.1 | 4.9 | 5.8 | 0.0 | 0.0 | 0.0 |
| 24 | 12.8 | 11.7 | 11.9 | 11.3 | 8.8 | 9.6 | 6.0 | 5.3 | 5.7 | 0.4 | 0.0 | 0.0 |
| 25 | 12.1 | 11.7 | 11.8 | 10.6 | 7.4 | 8.9 | 6.0 | 4.2 | 5.4 | 0.0 | 0.0 | 0.0 |
| 26 | 14.6 | 11.7 | 13.0 | 9.2 | 8.5 | 8.8 | 5.7 | 3.5 | 4.5 | 0.0 | 0.0 | 0.0 |
| 27 | 15.8 | 13.5 | 14.5 | 8.8 | 6.7 | 7.9 | 5.3 | 2.8 | 3.9 | 0.4 | 0.0 | 0.0 |
| 28 | 14.3 | 13.1 | 13.6 | 8.5 | 6.4 | 7.1 | 4.2 | 1.8 | 3.1 | 0.0 | 0.0 | 0.0 |
| 29 | 14.3 | 12.4 | 13.3 | 8.5 | 6.4 | 7.2 | 6.4 | 3.5 | 4.6 | 0.0 | 0.0 | 0.0 |
| 30 | 15.4 | 12.4 | 14.3 | 8.5 | 6.0 | 7.3 | 6.0 | 3.2 | 4.6 | 1.4 | 0.0 | 0.4 |
| 31 | 15.4 | 12.4 | 14.3 | --- | --- | --- | 6.4 | 3.9 | 5.1 | 2.8 | 1.4 | 2.0 |
| MONTH | 23.8 | 10.2 | 15.2 | 14.6 | 6.0 | 10.4 | 8.1 | 0.7 | 5.0 | 7.1 | 0.0 | 2.1 |

02011500 BACK CREEK NEAR MOUNTAIN GROVE, VA—Continued

TEMPERATURE, WATER, DEGREES CELSIUS—CONTINUED
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | FEBRUARY | | | MARCH | | | APRIL | | | MAY | |
| 1 | 3.5 | 2.1 | 2.7 | 6.7 | 2.8 | 4.5 | 11.0 | 3.9 | 7.0 | 16.5 | 11.7 | 13.8 |
| 2 | 4.9 | 1.8 | 3.2 | 4.9 | 3.5 | 4.1 | 12.1 | 5.7 | 8.4 | 18.9 | 11.7 | 14.7 |
| 3 | 4.2 | 1.8 | 3.1 | 5.3 | 2.5 | 3.5 | 12.8 | 6.7 | 9.1 | 15.4 | 11.7 | 13.1 |
| 4 | 4.2 | 2.1 | 3.5 | 6.0 | 2.1 | 3.6 | 11.0 | 7.1 | 8.9 | 12.4 | 11.3 | 11.9 |
| 5 | 3.2 | 0.4 | 1.7 | 6.7 | 3.5 | 4.8 | 12.8 | 7.8 | 9.9 | 11.3 | 10.6 | 10.9 |
| 6 | 1.8 | 0.4 | 1.2 | 5.3 | 3.5 | 4.5 | 12.4 | 6.7 | 9.4 | 13.5 | 10.6 | 11.7 |
| 7 | 3.2 | 1.1 | 2.0 | 5.3 | 3.2 | 4.0 | 9.9 | 7.1 | 7.8 | 14.6 | 11.3 | 12.6 |
| 8 | 2.8 | 0.0 | 1.2 | 7.1 | 2.8 | 4.5 | 8.5 | 7.4 | 7.8 | 16.9 | 11.7 | 13.8 |
| 9 | 2.5 | 0.0 | 0.8 | 7.4 | 3.5 | 4.9 | 8.5 | 7.4 | 7.8 | 15.8 | 11.7 | 13.6 |
| 10 | 2.8 | 1.1 | 1.9 | 6.0 | 2.8 | 4.0 | 8.5 | 7.1 | 7.8 | 13.5 | 12.4 | 12.8 |
| 11 | 1.8 | 0.4 | 1.1 | 6.7 | 3.2 | 4.3 | 8.5 | 7.1 | 7.7 | 15.0 | 12.4 | 13.2 |
| 12 | 2.5 | 0.0 | 1.1 | 6.7 | 2.8 | 4.6 | 11.3 | 7.1 | 8.6 | 14.3 | 12.1 | 12.7 |
| 13 | 0.7 | 0.0 | 0.1 | 9.2 | 4.6 | 6.2 | 12.1 | 7.1 | 9.0 | 15.8 | 11.3 | 12.9 |
| 14 | 1.8 | 0.0 | 0.5 | 7.4 | 4.2 | 5.4 | 13.1 | 7.1 | 9.6 | 17.3 | 10.6 | 13.3 |
| 15 | 1.8 | 0.7 | 1.2 | 8.5 | 3.9 | 5.7 | 14.3 | 7.8 | 10.4 | 13.9 | 11.7 | 12.7 |
| 16 | 0.7 | 0.0 | 0.0 | 7.8 | 5.3 | 6.3 | 14.6 | 8.1 | 10.9 | 18.1 | 12.1 | 14.5 |
| 17 | 0.0 | 0.0 | 0.0 | 9.5 | 5.3 | 7.1 | 14.6 | 8.8 | 11.4 | 15.0 | 12.4 | 13.0 |
| 18 | 1.4 | 0.0 | 0.6 | 8.1 | 6.0 | 6.9 | 11.0 | 8.5 | 9.2 | 12.4 | 11.0 | 11.4 |
| 19 | 4.2 | 1.4 | 2.7 | 8.1 | 6.4 | 7.1 | 12.8 | 8.8 | 10.4 | 13.5 | 11.3 | 12.1 |
| 20 | 6.0 | 1.8 | 3.7 | 7.1 | 6.0 | 6.4 | 13.1 | 9.9 | 11.1 | 15.4 | 11.3 | 13.2 |
| 21 | 3.9 | 2.5 | 3.0 | 8.5 | 6.4 | 7.1 | 13.5 | 9.2 | 11.2 | 13.9 | 12.8 | 13.2 |
| 22 | 3.2 | 0.7 | 2.1 | 9.9 | 6.4 | 7.6 | 12.1 | 9.5 | 10.7 | 12.8 | 12.1 | 12.5 |
| 23 | 3.5 | 2.8 | 3.2 | 8.5 | 6.0 | 7.0 | 14.3 | 8.5 | 10.7 | 13.5 | 12.1 | 12.7 |
| 24 | 4.6 | 2.5 | 3.3 | 11.3 | 5.3 | 7.8 | 14.3 | 7.4 | 10.4 | 15.8 | 12.4 | 13.7 |
| 25 | 3.5 | 2.5 | 2.9 | 12.1 | 5.7 | 8.4 | 10.6 | 9.2 | 10 | 16.9 | 11.3 | 13.6 |
| 26 | 2.8 | 2.1 | 2.5 | 8.8 | 6.4 | 7.5 | 12.4 | 9.9 | 10.9 | 16.1 | 12.8 | 14.3 |
| 27 | 2.8 | 2.1 | 2.3 | 11.7 | 4.9 | 8.0 | 16.5 | 9.2 | 12.3 | 14.6 | 12.4 | 13.3 |
| 28 | 6.0 | 2.1 | 3.6 | 10.6 | 6.0 | 8.2 | 17.3 | 8.5 | 12.6 | 15.4 | 12.1 | 13.6 |
| 29 | --- | --- | --- | 10.6 | 8.5 | 9.5 | 14.6 | 9.9 | 12.1 | 14.6 | 12.8 | 13.6 |
| 30 | --- | --- | --- | 8.5 | 4.2 | 5.6 | 15.0 | 9.9 | 12.5 | 17.7 | 12.1 | 14.6 |
| 31 | --- | --- | --- | 7.1 | 3.5 | 5.3 | --- | --- | --- | 15.4 | 13.1 | 14.1 |
| MONTH | 6.0 | 0.0 | 2.0 | 12.1 | 2.1 | 5.9 | 17.3 | 3.9 | 9.9 | 18.9 | 10.6 | 13.1 |
| | | JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | |
| 1 | 16.5 | 12.4 | 14.0 | 21.3 | 18.9 | 20.0 | 22.9 | 19.3 | 20.6 | 25.5 | 20.5 | 22.6 |
| 2 | 18.1 | 11.3 | 14.3 | 19.3 | 17.7 | 18.4 | 27.8 | 20.1 | 23.0 | 24.2 | 21.3 | 22.6 |
| 3 | 14.6 | 12.8 | 13.3 | 20.9 | 16.9 | 18.4 | 26.9 | 21.3 | 23.2 | 23.3 | 20.9 | 22.0 |
| 4 | 14.6 | 13.5 | 13.9 | 22.9 | 17.7 | 20.1 | 26.4 | 20.5 | 22.7 | 21.7 | 18.9 | 20.5 |
| 5 | 16.1 | 13.1 | 14.2 | 24.6 | 18.5 | 21.5 | 26.4 | 20.5 | 22.8 | 22.5 | 18.1 | 20.1 |
| 6 | 18.1 | 12.4 | 14.8 | 24.6 | 19.3 | 21.4 | 25.1 | 20.1 | 22.4 | 22.5 | 18.1 | 20.2 |
| 7 | 15.0 | 13.9 | 14.4 | 23.3 | 18.1 | 20.3 | 22.1 | 20.5 | 21.2 | 22.5 | 18.9 | 20.6 |
| 8 | 16.9 | 14.3 | 15.0 | 24.6 | 18.9 | 21.2 | 23.3 | 19.3 | 20.9 | 22.5 | 18.5 | 20.4 |
| 9 | 17.3 | 13.9 | 15.1 | 22.5 | 19.7 | 21.1 | 24.2 | 19.7 | 20.9 | 20.5 | 17.3 | 18.9 |
| 10 | 18.1 | 13.1 | 15.2 | 22.5 | 18.9 | 20.6 | 24.6 | 18.9 | 21.2 | 20.9 | 16.9 | 18.8 |
| 11 | 18.5 | 14.3 | 15.8 | 22.5 | 18.5 | 20.1 | 24.6 | 19.7 | 21.6 | 21.7 | 15.8 | 18.5 |
| 12 | 18.9 | 15.0 | 16.4 | 20.9 | 16.9 | 19.0 | 23.8 | 19.3 | 21.3 | 19.3 | 15.8 | 17.8 |
| 13 | 17.3 | 15.4 | 16.2 | 22.5 | 16.9 | 19.3 | 23.3 | 20.1 | 21.6 | 19.3 | 17.3 | 18.5 |
| 14 | 18.9 | 15.4 | 16.6 | 20.1 | 15.8 | 17.9 | 25.5 | 20.1 | 22.4 | 22.5 | 18.5 | 20.1 |
| 15 | 16.9 | 15.4 | 16.1 | 22.5 | 16.9 | 19.4 | 26.4 | 21.7 | 23.5 | 20.5 | 18.1 | 19.3 |
| 16 | 15.4 | 14.3 | 14.9 | 24.2 | 18.9 | 21.0 | 24.6 | 20.9 | 22.4 | 21.7 | 16.1 | 18.5 |
| 17 | 15.0 | 14.3 | 14.6 | 24.6 | 18.5 | 21.0 | 25.1 | 19.7 | 21.9 | 20.9 | 15.8 | 18.4 |
| 18 | 16.5 | 14.6 | 15.4 | 21.7 | 18.1 | 20.3 | 24.6 | 19.3 | 21.6 | 19.7 | 17.3 | 18.3 |
| 19 | 16.9 | 15.0 | 15.9 | 22.9 | 18.5 | 20.5 | 22.5 | 19.3 | 20.9 | 20.1 | 16.1 | 18.8 |
| 20 | 18.9 | 15.0 | 16.2 | 24.2 | 17.7 | 20.8 | 24.6 | 19.7 | 21.8 | 20.5 | 18.9 | 19.6 |
| 21 | 15.8 | 13.9 | 14.8 | 24.6 | 18.9 | 21.6 | 25.1 | 20.5 | 22.6 | 21.7 | 19.3 | 20.1 |
| 22 | 20.1 | 13.9 | 16.4 | --- | --- | --- | 25.5 | 21.3 | 23.4 | 19.7 | 18.1 | 19.1 |
| 23 | 20.9 | 13.9 | 17.1 | 23.8 | 19.7 | 21.5 | 26.0 | 21.3 | 23.3 | 19.7 | 17.7 | 18.8 |
| 24 | 22.1 | 14.6 | 18.1 | --- | --- | --- | 24.2 | 18.9 | 21.8 | 20.1 | 17.3 | 18.4 |
| 25 | 23.3 | 15.4 | 19.0 | --- | --- | --- | 26.0 | 19.3 | 22.3 | 20.5 | 17.3 | 18.5 |
| 26 | 23.3 | 16.9 | 20.0 | 25.5 | 18.1 | 21.7 | 26.9 | 20.1 | 23.1 | 20.9 | 17.7 | 19.2 |
| 27 | 20.9 | 18.1 | 19.2 | 25.5 | 19.7 | 22.4 | 26.9 | 20.5 | 23.5 | 20.1 | 17.3 | 18.5 |
| 28 | 18.9 | 16.1 | 17.8 | 25.1 | 20.5 | 22.6 | 26.0 | 20.9 | 22.9 | 18.9 | 16.5 | 17.8 |
| 29 | 23.3 | 17.3 | 19.9 | 22.9 | 20.9 | 21.9 | 26.0 | 21.3 | 23.3 | 16.5 | 14.6 | 15.7 |
| 30 | 23.3 | 17.3 | 20.3 | 22.9 | 20.1 | 21.2 | 24.2 | 21.7 | 23.0 | 16.5 | 13.1 | 14.8 |
| 31 | --- | --- | --- | 21.3 | 19.7 | 20.2 | 22.5 | 21.3 | 21.8 | --- | --- | --- |
| MONTH | 23.3 | 11.3 | 16.2 | 25.5 | 15.8 | 20.6 | 27.8 | 18.9 | 22.2 | 25.5 | 13.1 | 19.2 |
| YEAR | 27.8 | 0.0 | 11.8 | | | | | | | | | |

## 02011795 LAKE MOOMAW NEAR HOT SPRINGS, VA

LOCATION.--Lat 37°57'04", long 79°59'20", NAD83, Alleghany County, Hydrologic Unit 02080201, in control tower at Gathright Dam on Jackson River, 0.9 mi upstream from Cedar Creek, 7.6 mi southwest of Hot Springs, and 19 mi upstream from Covington.

DRAINAGE AREA.--344 $mi^2$.

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

GAGE.--Water-stage recorder. Datum of gage is at NGVD of 1929 (U.S. Army Corps of Engineers bench mark).

REMARKS.--Lake is formed by rolled rockfill dam with an impervious compacted earth (clay) core. Spillway with crest at elevation 1,667.5 ft is in a divide about 2.5 mi south of the dam, ungated, and 2,450 ft long with a base width of 100 ft. Except for flood flows, all discharge will be through a diversion tunnel with the invert of the entrance being in an intake tower 260 ft high. Elevation of invert is 1,430.5 ft. Portals in the tower at nine levels permit oxygenated water from the surface and cold water from the bottom of the lake to be mixed for water-quality control. Sluice gates in the tower control flood flow releases. Storage began Dec. 10, 1979. Total capacity at top of dam, elevation 1,684.5 ft, is 502,600 acre-ft of which 81,100 acre-ft is above spillway crest. Capacity at maximum conservation pool, elevation 1,582.0 ft, is 123,700 acre-ft; capacity at minimum conservation pool, elevation 1,554.0 ft, is 63,000 acre-ft. Lake is used for flood control, low-water augmentation for water-quality control, and recreation. 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.

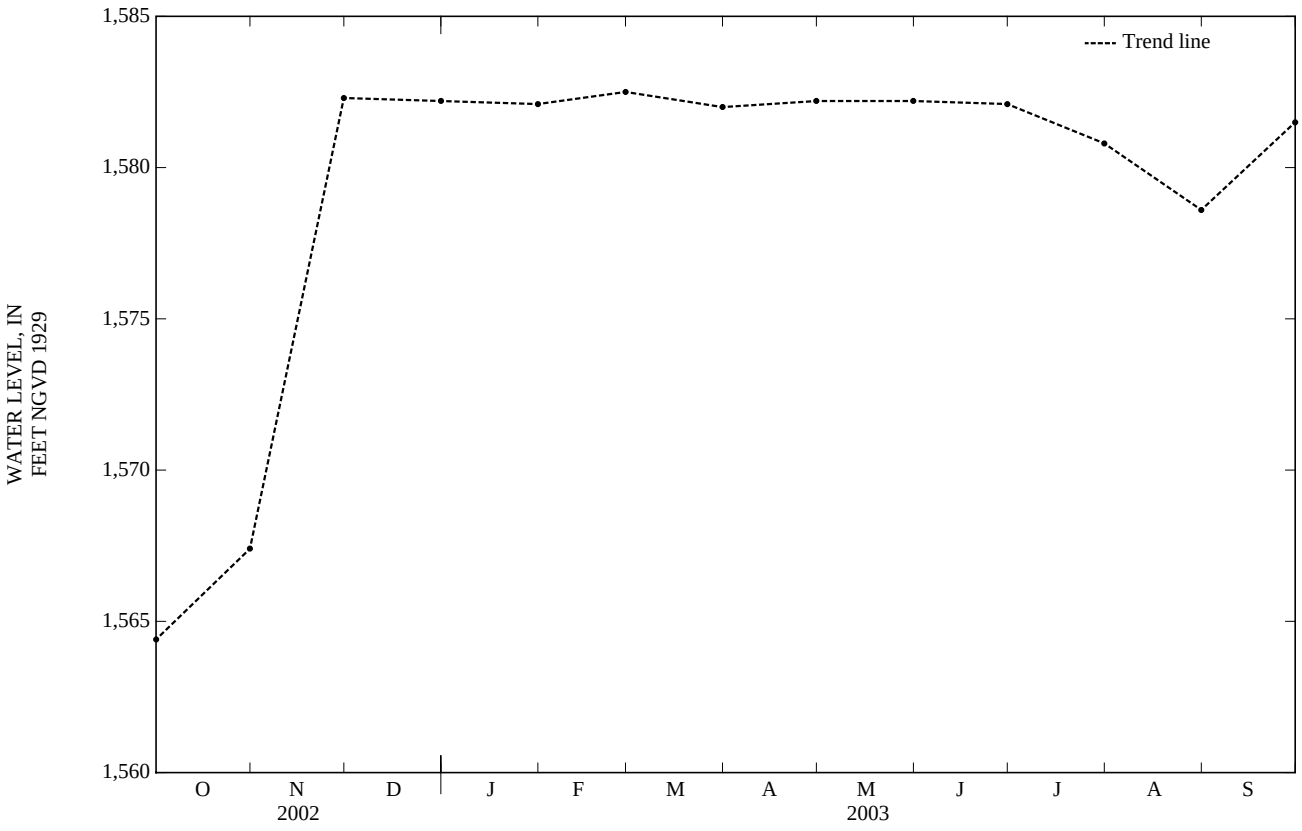
EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 168,400 acre-ft, Jan. 20, 1996, elevation, 1,598.4 ft; minimum, (after first filling to minimum conservation pool), 71,900 acre-ft, Nov. 30, Dec. 1, 1991, elevation, 1,558.8 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 152,200, acre-ft, Feb. 24, elevation, 1,592.7 ft; minimum, 81,100 acre-ft, Oct. 15-16, elevation, 1,582.2 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Elevation (feet) | Contents (acre-feet) | Change in contents (acre-feet) |
|---|---|---|---|
| Sept. 30 | 1,564.4 | 83,200 | |
| Oc.t 31 | 1,567.4 | 89,500 | +6,300 |
| Nov. 30 | 1,582.3 | 124,500 | +35,000 |
| Dec. 31 | 1,585.2 | 124,300 | -200 |
| CAL YR 2002 | | | +44,400 |
| Jan. 31 | 1,582.1 | 124,000 | -300 |
| Feb. 28 | 1,582.5 | 125,000 | +1,000 |
| Mar. 31 | 1,582.0 | 123,700 | -1,300 |
| Apr. 30 | 1,582.2 | 124,200 | +500 |
| May 31 | 1,582.2 | 124,200 | 0 |
| June 30 | 1,582.1 | 124,000 | -200 |
| July 31 | 1,580.8 | 120,700 | -3,300 |
| Aug. 31 | 1,578.6 | 115,300 | -5,400 |
| Sept. 30 | 1,581.5 | 122,500 | +7,200 |
| WTR YR 2003 | | | +39,300 |

02011795 LAKE MOOMAW NEAR HOT SPRINGS, VA—Continued



## 02011800 JACKSON RIVER BELOW GATHRIGHT DAM, NEAR HOT SPRINGS, VA

LOCATION.--Lat 37°56'54", long 79°56'57", NAD83, 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 $mi^2$.

### 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 NGVD of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Dec. 20, 1973, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods of no gage-height record, Oct. 30, May 1-5, and July 6-9, which are fair. 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-temperature and gage-height telemeter at station. Maximum discharge, 29,000 $ft^3/s$, from rating curve extended above 9,200 $ft^3/s$ on basis of slope-area measurement of peak flow.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 21, 1972, reached a stage of 17.20 ft, from floodmark.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 171 | 150 | 324 | 366 | 167 | 1,050 | 398 | e364 | 584 | 274 | 279 | 261 |
| 2 | 149 | 149 | 257 | 887 | 167 | 1,060 | 686 | e315 | 706 | 242 | 278 | 249 |
| 3 | 149 | 149 | 189 | 1,790 | 167 | 1,110 | 896 | e315 | 711 | 356 | 278 | 250 |
| 4 | 149 | 149 | 169 | 2,260 | 167 | 1,140 | 762 | e662 | 998 | 416 | 278 | 252 |
| 5 | 149 | 150 | 167 | 1,390 | 167 | 1,840 | 681 | e1,070 | 2,530 | 415 | 278 | 251 |
| 6 | 149 | 150 | 167 | 694 | 167 | 3,120 | 682 | 1,140 | 1,860 | e277 | 278 | 250 |
| 7 | 149 | 149 | 167 | 529 | 167 | 3,710 | 684 | 1,140 | 168 | e268 | 278 | 250 |
| 8 | 149 | 149 | 167 | 473 | 167 | 2,340 | 969 | 1,140 | 1,890 | e268 | 278 | 250 |
| 9 | 149 | 149 | 211 | 408 | 167 | 1,070 | 779 | 1,140 | 2,670 | e268 | 277 | 249 |
| 10 | 149 | 149 | 300 | 364 | 195 | 1,060 | 169 | 1,140 | 2,250 | 352 | 277 | 249 |
| 11 | 149 | 152 | 300 | 364 | 214 | 1,000 | 1,710 | 1,140 | 1,670 | 412 | 277 | 250 |
| 12 | 149 | 151 | 820 | 364 | 214 | 735 | 4,310 | 1,780 | 1,030 | 412 | 278 | 250 |
| 13 | 149 | 151 | 1,140 | 324 | 214 | 579 | 4,250 | 2,060 | 1,030 | 412 | 278 | 249 |
| 14 | 149 | 150 | 1,500 | 296 | 214 | 960 | 2,560 | 1,200 | 1,100 | 412 | 278 | 250 |
| 15 | 149 | 149 | 1,750 | 296 | 214 | 1,140 | 1,130 | 672 | 606 | 412 | 278 | 250 |
| 16 | 149 | 149 | 1,340 | 248 | 396 | 1,140 | 834 | 561 | 176 | 412 | 278 | 249 |
| 17 | 149 | 150 | 696 | 214 | 518 | 887 | 668 | 562 | 168 | 413 | 278 | 250 |
| 18 | 149 | 148 | 513 | 214 | 518 | 724 | 668 | 354 | 164 | 412 | 278 | 251 |
| 19 | 149 | 150 | 514 | 214 | 693 | 527 | 547 | 1,780 | 744 | 413 | 277 | 257 |
| 20 | 149 | 150 | 871 | 214 | 529 | 170 | 463 | 2,950 | 3,050 | 413 | 277 | 256 |
| 21 | 149 | 149 | 2,180 | 212 | 324 | 1,430 | 463 | 2,280 | 5,150 | 412 | 279 | 347 |
| 22 | 149 | 149 | 3,020 | 186 | 176 | 2,520 | 463 | 1,190 | 4,340 | 412 | 281 | 468 |
| 23 | 149 | 149 | 1,750 | 167 | 956 | 1,830 | 463 | 1,760 | 2,220 | 334 | 281 | 1,590 |
| 24 | 149 | 151 | 1,120 | 167 | 3,740 | 949 | 463 | 2,550 | 839 | 273 | 281 | 2,670 |
| 25 | 149 | 150 | 1,130 | 167 | 5,700 | 730 | 463 | 1,140 | 487 | 275 | 281 | 1,620 |
| 26 | 149 | 149 | 757 | 167 | 6,280 | 598 | 463 | 704 | 333 | 282 | 281 | 508 |
| 27 | 149 | 252 | 427 | 167 | 4,540 | 540 | 463 | 704 | 274 | 281 | 281 | 509 |
| 28 | 149 | 324 | 366 | 167 | 2,030 | 472 | 463 | 540 | 274 | 283 | 281 | 509 |
| 29 | 150 | 323 | 365 | 167 | --- | 440 | 463 | 412 | 274 | 285 | 281 | 509 |
| 30 | e151 | 323 | 364 | 167 | --- | 443 | 463 | 412 | 274 | 283 | 281 | 442 |
| 31 | 151 | --- | 364 | 167 | --- | 444 | --- | 412 | --- | 282 | 281 | --- |
| TOTAL | 4,646 | 5,112 | 23,405 | 13,810 | 29,168 | 35,758 | 28,476 | 33,589 | 38,570 | 10,661 | 8,645 | 14,195 |
| MEAN | 150 | 170 | 755 | 445 | 1,042 | 1,153 | 949 | 1,084 | 1,286 | 344 | 279 | 473 |
| MAX | 171 | 324 | 3,020 | 2,260 | 6,280 | 3,710 | 4,310 | 2,950 | 5,150 | 416 | 281 | 2,670 |
| MIN | 149 | 148 | 167 | 167 | 167 | 170 | 169 | 315 | 164 | 242 | 277 | 249 |
| (†) | +3,176 | +17,646 | -101 | -151 | +504 | -655 | +252 | 0 | -101 | -1,664 | -2,722 | +3,630 |
| MEAN‡ | 252 | 759 | 752 | 441 | 1,060 | 1,132 | 958 | 1,084 | 1,282 | 290 | 191 | 594 |
| CFSM‡ | .73 | 2.20 | 2.18 | 1.28 | 3.07 | 3.28 | 2.78 | 3.14 | 3.72 | .84 | .55 | 1.72 |
| IN.‡ | .84 | 2.46 | 2.51 | 1.47 | 3.20 | 3.78 | 3.10 | 3.62 | 4.15 | .97 | .64 | 1.92 |

CAL YR 2002 MEAN‡ 390 CFSM‡ 1.13 IN.‡ 15.35
WTR YR 2003 MEAN‡ 728 CFSM‡ 2.11 IN.‡ 28.65

† 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.

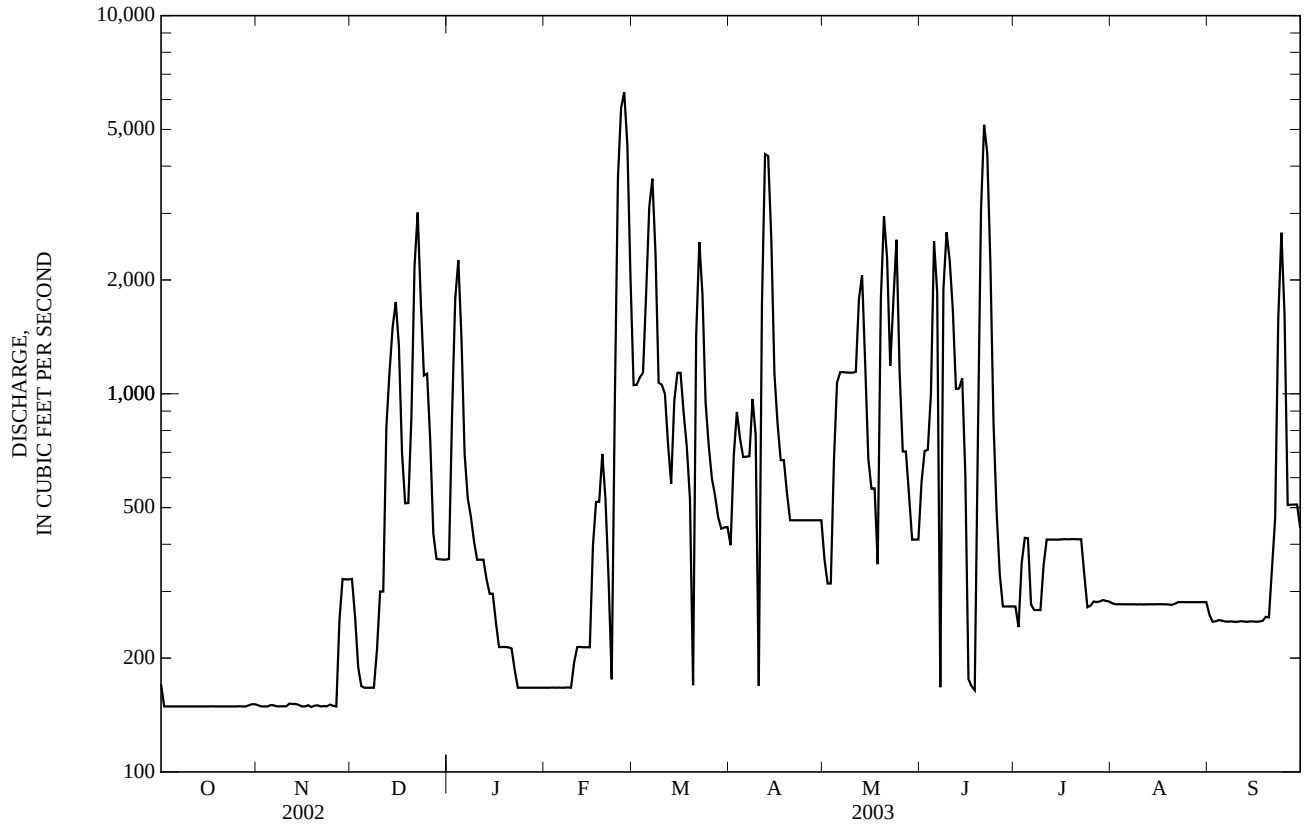
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 224 | 277 | 278 | 433 | 602 | 859 | 720 | 609 | 446 | 278 | 278 | 265 |
| MAX | 829 | 1,235 | 1,061 | 1,555 | 1,466 | 1,881 | 2,052 | 1,477 | 1,286 | 398 | 644 | 661 |
| (WY) | (1980) | (1986) | (1997) | (1996) | (1998) | (1993) | (1987) | (1989) | (2003) | (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) |

02011800 JACKSON RIVER BELOW GATHRIGHT DAM, NEAR HOT SPRINGS, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1980 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 119,921 | | 246,035 | | | |
| ANNUAL MEAN | 329 | | 674 | | 438 | |
| HIGHEST ANNUAL MEAN | | | | | 674 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 196 | 1981 |
| HIGHEST DAILY MEAN | 4,230 | Apr 30 | 6,280 | Feb 26 | 8,670 | Nov 7, 1985 |
| LOWEST DAILY MEAN | 123 | aMar 19 | 148 | Nov 18 | 47 | Sep 2, 1981 |
| ANNUAL SEVEN-DAY MINIMUM | 124 | Mar 19 | 149 | Oct 2 | 53 | Aug 29, 1981 |
| MAXIMUM PEAK FLOW | | | 6,420 | Feb 25 | b10,400 | Nov 7, 1985 |
| MAXIMUM PEAK STAGE | | | 13.97 | Feb 25 | b15.29 | Nov 7, 1985 |
| INSTANTANEOUS LOW FLOW | | | 39 | Dec 9 | c,d5.2 | May 6, 1980 |
| ANNUAL RUNOFF (CFSM) | 0.95 | | 1.95 | | 1.27 | |
| ANNUAL RUNOFF (INCHES) | 12.93 | | 26.53 | | 17.24 | |
| 10 PERCENT EXCEEDS | 461 | | 1,750 | | 879 | |
| 50 PERCENT EXCEEDS | 211 | | 324 | | 263 | |
| 90 PERCENT EXCEEDS | 124 | | 149 | | 150 | |

a Also Apr. 8, 2002.
b Prior to regulation, 1974-79, maximum peak flow, 29,000 $ft^3/s$, Dec. 26, 1973, result of cofferdam failure during construction of Gathright Dam, gage height, 18.77 ft.
c Prior to regulation, 1974-79, instantaneous low flow, 3.0 $ft^3/s$, July 12, 1979, result of gate closure at Gathright Dam.
d Result of regulation.
e Estimated.



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.--
WATER TEMPERATURE: October 1978 to current year.

INSTRUMENTATION.--Water-quality monitor October 1978 to September 2001. Water-temperature recorder since October 2001.

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 water tempertature within 0.5°C. Temperature at the sensor was compared with the average for the river by temperature cross section on Oct. 25, 2000. No variation of water temperature was found within the cross section. Daily records of specific conductance, pH, and dissolved oxygen were also collected from October 1978 to September 2001.

EXTREMES FOR PERIOD OF RECORD.--
WATER TEMPERATURE (water years 1979, 1981-02): Maximum recorded, 28.0°C, Aug. 1, 2, 1979; minimum recorded, 0.0°C, Feb. 16-19, 1979.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 17.4°C, Sept. 30; minimum, 2.7°C, Feb. 18, 19, 23-25.

TEMPERATURE, WATER, DEGREES CELSIUS
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | |
| 1 | 14.6 | 14.2 | 14.3 | 14.6 | 14.1 | 14.4 | 9.8 | 9.6 | 9.7 | 6.3 | 6.2 | 6.2 |
| 2 | 14.7 | 14.2 | 14.4 | 14.3 | 14.0 | 14.1 | 9.8 | 9.5 | 9.6 | 6.3 | 6.0 | 6.1 |
| 3 | 14.8 | 14.2 | 14.4 | 14.3 | 13.9 | 14.0 | 9.5 | 9.2 | 9.4 | 6.1 | 6.0 | 6.0 |
| 4 | 15.0 | 14.2 | 14.4 | 14.2 | 13.9 | 14.0 | 9.4 | 9.0 | 9.2 | 6.1 | 5.9 | 6.0 |
| 5 | 14.8 | 14.2 | 14.4 | 13.9 | 13.6 | 13.8 | 9.3 | 8.9 | 9.1 | 5.9 | 5.8 | 5.8 |
| 6 | 14.6 | 14.1 | 14.3 | 13.6 | 12.9 | 13.3 | 9.0 | 8.6 | 8.8 | 5.9 | 5.6 | 5.8 |
| 7 | 14.5 | 14.1 | 14.3 | 13.0 | 12.6 | 12.8 | 8.7 | 8.5 | 8.6 | 5.6 | 5.5 | 5.6 |
| 8 | 14.6 | 14.0 | 14.2 | 12.8 | 12.5 | 12.6 | 8.8 | 8.5 | 8.6 | 5.7 | 5.6 | 5.6 |
| 9 | 14.5 | 14.2 | 14.3 | 12.9 | 12.5 | 12.6 | 8.5 | 7.9 | 8.2 | 5.8 | 5.6 | 5.7 |
| 10 | 14.4 | 14.2 | 14.3 | 13.0 | 12.6 | 12.8 | 7.9 | 7.8 | 7.8 | 5.7 | 5.5 | 5.6 |
| 11 | 14.5 | 14.2 | 14.3 | 13.0 | 12.7 | 12.8 | 7.8 | 7.7 | 7.8 | 5.5 | 5.3 | 5.4 |
| 12 | 14.7 | 14.2 | 14.4 | 12.7 | 12.4 | 12.6 | 7.7 | 7.4 | 7.5 | 5.3 | 5.2 | 5.2 |
| 13 | 14.6 | 14.2 | 14.3 | 12.5 | 12.1 | 12.3 | 7.4 | 7.3 | 7.3 | 5.3 | 5.1 | 5.2 |
| 14 | 14.4 | 14.0 | 14.2 | 12.4 | 12.0 | 12.2 | 7.4 | 7.3 | 7.4 | 5.3 | 5.1 | 5.2 |
| 15 | 14.3 | 14.0 | 14.1 | 12.2 | 12.0 | 12.1 | 7.4 | 7.2 | 7.3 | 5.1 | 4.8 | 5.0 |
| 16 | 14.5 | 14.1 | 14.2 | 12.2 | 12.1 | 12.1 | 7.3 | 7.2 | 7.2 | 5.1 | 4.8 | 4.9 |
| 17 | 14.3 | 13.9 | 14.1 | 12.1 | 11.8 | 12.0 | 7.3 | 7.1 | 7.2 | 4.9 | 4.6 | 4.8 |
| 18 | 14.3 | 13.9 | 14.0 | 12.1 | 11.7 | 11.9 | 7.1 | 7.0 | 7.0 | 4.6 | 4.4 | 4.5 |
| 19 | 14.4 | 13.9 | 14.1 | 12.1 | 11.9 | 12.0 | 7.1 | 6.9 | 7.0 | 4.6 | 4.4 | 4.5 |
| 20 | 14.4 | 14.1 | 14.2 | 12.0 | 11.7 | 11.8 | 7.0 | 6.8 | 6.9 | 4.6 | 4.4 | 4.5 |
| 21 | 14.6 | 14.1 | 14.3 | 11.8 | 11.7 | 11.8 | 6.9 | 6.8 | 6.9 | 4.6 | 4.3 | 4.4 |
| 22 | 14.7 | 14.4 | 14.5 | 11.7 | 11.3 | 11.5 | 6.8 | 6.7 | 6.8 | 4.4 | 4.1 | 4.2 |
| 23 | 14.5 | 14.3 | 14.4 | 11.4 | 11.1 | 11.2 | 6.7 | 6.6 | 6.6 | 4.2 | 3.6 | 3.9 |
| 24 | 14.5 | 14.3 | 14.4 | 11.3 | 11.0 | 11.2 | 6.6 | 6.5 | 6.6 | 3.9 | 3.5 | 3.7 |
| 25 | 14.4 | 14.3 | 14.4 | 11.1 | 10.8 | 11.0 | 6.6 | 6.4 | 6.5 | 3.6 | 3.4 | 3.5 |
| 26 | 14.7 | 14.3 | 14.5 | 11.0 | 10.7 | 10.8 | 6.4 | 6.3 | 6.3 | 3.9 | 3.3 | 3.6 |
| 27 | 14.6 | 14.3 | 14.4 | 10.7 | 10.4 | 10.6 | 6.4 | 6.2 | 6.3 | 3.4 | 3.1 | 3.3 |
| 28 | 14.4 | 14.3 | 14.4 | 10.4 | 10.2 | 10.3 | 6.3 | 6.2 | 6.2 | 3.6 | 3.3 | 3.5 |
| 29 | --- | --- | --- | --- | --- | --- | 6.3 | 6.2 | 6.2 | 3.8 | 3.5 | 3.7 |
| 30 | --- | --- | --- | --- | --- | --- | 6.3 | 6.1 | 6.2 | 3.8 | 3.5 | 3.6 |
| 31 | --- | --- | --- | --- | --- | --- | 6.2 | 6.1 | 6.1 | 3.8 | 3.5 | 3.7 |
| MONTH | 15.0 | 13.9 | 14.3 | 14.6 | 10.2 | 12.3 | 9.8 | 6.1 | 7.5 | 6.3 | 3.1 | 4.8 |

02011800 JACKSON RIVER BELOW GATHRIGHT DAM, NEAR HOT SPRINGS, VA—Continued

TEMPERATURE, WATER, DEGREES CELSIUS—CONTINUED
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | FEBRUARY | | | MARCH | | | APRIL | | | MAY | |
| 1 | 3.8 | 3.5 | 3.6 | 3.0 | 2.8 | 2.9 | 6.7 | 6.0 | 6.3 | --- | --- | --- |
| 2 | 3.8 | 3.5 | 3.6 | 3.0 | 2.9 | 2.9 | 6.9 | 5.9 | 6.4 | --- | --- | --- |
| 3 | 3.8 | 3.4 | 3.6 | 3.0 | 2.8 | 2.9 | 7.2 | 5.9 | 6.6 | --- | --- | --- |
| 4 | 3.7 | 3.3 | 3.5 | 3.1 | 2.9 | 3.0 | 7.3 | 6.4 | 6.9 | --- | --- | --- |
| 5 | 3.4 | 3.2 | 3.3 | 3.1 | 3.0 | 3.0 | 7.8 | 6.6 | 7.1 | --- | --- | --- |
| 6 | 3.6 | 3.2 | 3.4 | 3.3 | 3.1 | 3.2 | 7.5 | 6.6 | 7.0 | 9.7 | 9.3 | 9.5 |
| 7 | 3.8 | 3.4 | 3.5 | 3.3 | 3.3 | 3.3 | 7.5 | 6.6 | 7.2 | 10.0 | 9.4 | 9.6 |
| 8 | 3.6 | 3.3 | 3.4 | 3.5 | 3.3 | 3.4 | 7.5 | 6.7 | 7.0 | 10.8 | 9.4 | 9.9 |
| 9 | 3.8 | 3.3 | 3.5 | 3.6 | 3.4 | 3.5 | --- | --- | --- | 10.4 | 9.7 | 9.9 |
| 10 | 3.8 | 3.5 | 3.6 | 3.6 | 3.4 | 3.5 | --- | --- | --- | 10.4 | 9.8 | 10.2 |
| 11 | 3.6 | 3.3 | 3.5 | 3.8 | 3.6 | 3.7 | 7.8 | 5.7 | 6.8 | 10.7 | 9.8 | 10.3 |
| 12 | 3.4 | 3.2 | 3.3 | 4.1 | 3.7 | 3.9 | 6.3 | 5.8 | 6.0 | 11.3 | 7.7 | 9.6 |
| 13 | 3.4 | 3.1 | 3.2 | 4.3 | 3.9 | 4.1 | 6.5 | 6.2 | 6.4 | 10.3 | 8.9 | 9.4 |
| 14 | 3.4 | 3.2 | 3.3 | 4.4 | 4.2 | 4.3 | 7.8 | 6.5 | 7.1 | 11.5 | 8.1 | 10.1 |
| 15 | 3.4 | 3.2 | 3.3 | 4.5 | 4.2 | 4.4 | 8.1 | 7.6 | 7.9 | 11.6 | 11.2 | 11.3 |
| 16 | 3.3 | 3.0 | 3.1 | 4.8 | 4.5 | 4.6 | 8.2 | 7.7 | 8.0 | 11.7 | 11.2 | 11.4 |
| 17 | 3.1 | 2.8 | 2.9 | 4.9 | 4.6 | 4.7 | 8.3 | 7.7 | 8.0 | 11.7 | 11.3 | 11.5 |
| 18 | 2.9 | 2.7 | 2.8 | 5.3 | 4.8 | 5.0 | 8.6 | 8.0 | 8.3 | 11.8 | 11.4 | 11.6 |
| 19 | 2.9 | 2.7 | 2.8 | 5.4 | 4.8 | 5.1 | 8.7 | 8.2 | 8.4 | 11.4 | 8.0 | 10.2 |
| 20 | 3.1 | 2.8 | 2.9 | 6.2 | 5.4 | 6.0 | 8.7 | 8.0 | 8.3 | 10.3 | 9.6 | 9.9 |
| 21 | 3.4 | 2.9 | 3.1 | 6.2 | 5.0 | 5.5 | 8.7 | 8.0 | 8.4 | 10.3 | 9.9 | 10.1 |
| 22 | 4.3 | 3.3 | 3.7 | 5.4 | 4.8 | 5.1 | 9.2 | 8.2 | 8.7 | 12.1 | 10.2 | 11.1 |
| 23 | 4.0 | 2.7 | 3.3 | 5.7 | 4.8 | 5.2 | 9.3 | 8.6 | 9.0 | 11.8 | 8.7 | 10.8 |
| 24 | 2.8 | 2.7 | 2.8 | 6.2 | 5.5 | 5.9 | 9.1 | 8.6 | 8.8 | 11.0 | 10.1 | 10.5 |
| 25 | 2.8 | 2.7 | 2.7 | 6.5 | 5.6 | 6.1 | 9.0 | 8.6 | 8.8 | 12.6 | 10.1 | 11.4 |
| 26 | 2.8 | 2.8 | 2.8 | 6.6 | 5.6 | 6.1 | 9.1 | 8.7 | 8.9 | 12.6 | 12.2 | 12.4 |
| 27 | 2.8 | 2.8 | 2.8 | 6.9 | 5.8 | 6.3 | 9.4 | 8.8 | 9.0 | 12.5 | 12.2 | 12.3 |
| 28 | 3.0 | 2.8 | 2.8 | 6.6 | 5.9 | 6.2 | 9.6 | 8.8 | 9.2 | 13.1 | 12.3 | 12.6 |
| 29 | --- | --- | --- | 6.9 | 5.7 | 6.3 | 9.7 | 8.8 | 9.2 | 12.6 | 12.4 | 12.5 |
| 30 | --- | --- | --- | 7.1 | 6.4 | 6.7 | 9.6 | 9.1 | 9.4 | 12.9 | 12.4 | 12.6 |
| 31 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 13.1 | 12.5 | 12.8 |
| MONTH | 4.3 | 2.7 | 3.2 | 7.1 | 2.8 | 4.6 | 9.7 | 5.7 | 7.8 | 13.1 | 7.7 | 10.9 |
| | | JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | |
| 1 | 13.6 | 12.9 | 13.2 | 15.0 | 14.5 | 14.7 | 15.7 | 15.4 | 15.5 | 16.2 | 15.7 | 15.8 |
| 2 | --- | --- | --- | 14.9 | 14.6 | 14.7 | 16.1 | 15.4 | 15.6 | 16.0 | 15.6 | 15.7 |
| 3 | --- | --- | --- | 14.9 | 14.6 | 14.7 | 16.1 | 15.4 | 15.6 | 15.9 | 15.6 | 15.7 |
| 4 | 13.1 | 12.9 | 13.0 | 15.0 | 14.6 | 14.8 | 15.9 | 15.4 | 15.6 | 15.8 | 15.6 | 15.7 |
| 5 | 13.0 | 10.6 | 12.3 | 15.2 | 14.7 | 14.8 | 16.1 | 15.5 | 15.6 | 16.0 | 15.6 | 15.7 |
| 6 | 14.1 | 11.7 | 12.9 | --- | --- | --- | 16.1 | 15.4 | 15.6 | 16.0 | 15.6 | 15.7 |
| 7 | 13.7 | 13.3 | 13.5 | --- | --- | --- | 15.7 | 15.4 | 15.5 | 16.0 | 15.6 | 15.7 |
| 8 | 13.6 | 10.9 | 12.7 | --- | --- | --- | 15.9 | 15.4 | 15.5 | 16.1 | 15.6 | 15.8 |
| 9 | 14.3 | 12.4 | 13.0 | --- | --- | --- | 15.9 | 15.4 | 15.6 | 16.0 | 15.6 | 15.7 |
| 10 | 13.5 | 13.1 | 13.3 | 15.3 | 14.9 | 15.1 | 16.0 | 15.5 | 15.6 | 16.1 | 15.6 | 15.8 |
| 11 | 14.8 | 13.3 | 13.9 | 15.5 | 14.8 | 15.1 | 16.0 | 15.5 | 15.7 | 16.1 | 15.6 | 15.8 |
| 12 | 14.8 | 14.4 | 14.5 | 15.5 | 14.9 | 15.1 | 16.0 | 15.5 | 15.7 | 16.1 | 15.7 | 15.8 |
| 13 | 14.8 | 14.4 | 14.6 | 15.6 | 15.0 | 15.2 | 16.0 | 15.6 | 15.7 | 15.9 | 15.8 | 15.8 |
| 14 | 15.0 | 14.6 | 14.8 | 15.5 | 15.1 | 15.2 | 16.1 | 15.6 | 15.7 | 16.1 | 15.8 | 15.9 |
| 15 | 15.2 | 14.6 | 14.9 | 15.5 | 15.1 | 15.3 | 16.1 | 15.5 | 15.7 | 16.0 | 15.8 | 15.9 |
| 16 | 14.8 | 14.4 | 14.6 | 15.7 | 15.1 | 15.3 | 16.1 | 15.6 | 15.7 | 16.2 | 15.8 | 15.9 |
| 17 | 14.5 | 14.4 | 14.4 | 15.6 | 15.0 | 15.2 | 16.1 | 15.6 | 15.8 | 16.2 | 15.8 | 15.9 |
| 18 | 15.1 | 14.3 | 14.5 | 15.5 | 15.0 | 15.2 | 16.2 | 15.6 | 15.8 | 16.0 | 15.8 | 15.9 |
| 19 | 14.5 | 14.2 | 14.4 | 15.5 | 15.1 | 15.2 | 16.1 | 15.6 | 15.8 | 16.1 | 15.7 | 15.9 |
| 20 | 14.5 | 13.1 | 14.0 | 15.6 | 15.1 | 15.3 | 16.1 | 15.6 | 15.7 | 16.3 | 15.9 | 16.0 |
| 21 | 14.5 | 14.0 | 14.2 | 15.6 | 15.2 | 15.3 | 16.1 | 15.4 | 15.7 | 16.2 | 16.0 | 16.1 |
| 22 | 14.8 | 14.4 | 14.6 | 15.6 | 15.2 | 15.3 | 15.9 | 15.5 | 15.6 | 16.2 | 16.1 | 16.2 |
| 23 | 15.9 | 14.3 | 15.2 | 15.8 | 15.3 | 15.4 | 15.9 | 15.5 | 15.6 | 16.5 | 16.1 | 16.3 |
| 24 | 16.2 | 14.0 | 15.1 | 15.8 | 15.3 | 15.5 | 15.9 | 15.5 | 15.6 | 17.1 | 16.5 | 16.8 |
| 25 | 15.0 | 14.0 | 14.5 | 16.0 | 15.2 | 15.5 | 16.0 | 15.5 | 15.7 | 17.3 | 16.9 | 17.1 |
| 26 | 15.2 | 14.4 | 14.7 | 15.9 | 15.2 | 15.4 | 16.0 | 15.5 | 15.7 | 17.0 | 16.8 | 16.9 |
| 27 | 14.9 | 14.5 | 14.6 | 15.9 | 15.2 | 15.5 | 16.0 | 15.6 | 15.7 | 17.1 | 16.8 | 17.0 |
| 28 | 14.8 | 14.5 | 14.6 | 15.8 | 15.3 | 15.5 | 16.1 | 15.6 | 15.7 | 17.2 | 16.9 | 17.1 |
| 29 | 15.3 | 14.5 | 14.7 | 15.6 | 15.3 | 15.4 | 16.1 | 15.6 | 15.8 | 17.2 | 17.0 | 17.1 |
| 30 | 15.3 | 14.5 | 14.7 | 15.7 | 15.3 | 15.5 | 16.1 | 15.7 | 15.8 | 17.4 | 17.2 | 17.2 |
| 31 | --- | --- | --- | 15.5 | 15.4 | 15.4 | 16.0 | 15.7 | 15.8 | --- | --- | --- |
| MONTH | 16.2 | 10.6 | 14.1 | 16.0 | 14.5 | 15.2 | 16.2 | 15.4 | 15.7 | 17.4 | 15.6 | 16.1 |
| YEAR | 17.4 | 2.7 | 10.5 | | | | | | | | | |

## 02012800 JACKSON RIVER AT FILTRATION PLANT, AT COVINGTON, VA

LOCATION.--Lat 37°48'39", long 79°59'19", NAD83, 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 $mi^2$.

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, July 21, 1980; minimum recorded, 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 21.1°C, Aug. 21; minimum, 0.6°C, Jan. 23, 24, Feb. 16, 17.

TEMPERATURE, WATER, DEGREES CELSIUS
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | |
| 1 | 18.3 | 17.1 | 17.7 | 11.4 | 10.4 | 10.9 | 7.7 | 6.5 | 6.9 | 7.5 | 6.6 | 7.0 |
| 2 | 19.7 | 17.4 | 18.4 | 11.0 | 9.5 | 10.2 | 6.9 | 5.7 | 6.4 | 7.5 | 6.7 | 7.2 |
| 3 | 20.5 | 18.5 | 19.3 | 10.9 | 9.4 | 10.2 | 7.2 | 6.3 | 6.8 | 6.7 | 6.0 | 6.4 |
| 4 | 20.4 | 18.8 | 19.5 | 11.6 | 10.7 | 11.1 | 6.3 | 3.9 | 5.1 | 6.0 | 5.4 | 5.8 |
| 5 | 21.0 | 18.8 | 19.7 | 11.3 | 10.6 | 10.9 | 4.8 | 3.0 | 3.9 | 5.5 | 5.3 | 5.4 |
| 6 | 19.0 | 17.2 | 18.1 | 11.7 | 10.6 | 11.0 | 5.9 | 4.8 | 5.3 | 5.8 | 5.0 | 5.5 |
| 7 | 17.8 | 16.3 | 17.1 | 10.9 | 9.5 | 10.3 | 4.9 | 3.6 | 4.3 | 5.0 | 4.0 | 4.6 |
| 8 | 16.3 | 14.9 | 15.6 | 13.0 | 8.8 | 10.1 | 5.4 | 4.0 | 4.7 | 6.0 | 4.7 | 5.4 |
| 9 | 16.6 | 15.3 | 15.8 | 13.9 | 8.2 | 10.7 | 5.3 | 4.3 | 4.8 | 6.6 | 5.3 | 6.0 |
| 10 | 16.5 | 15.8 | 16.1 | 16.9 | 11.3 | 14.2 | 6.2 | 4.7 | 5.4 | 6.3 | 5.0 | 5.5 |
| 11 | 17.0 | 15.9 | 16.4 | 15.5 | 13.3 | 14.2 | 6.3 | 6.0 | 6.2 | 5.0 | 3.8 | 4.3 |
| 12 | 18.5 | 16.6 | 17.4 | 13.3 | 11.8 | 12.4 | 7.1 | 6.1 | 6.5 | 3.9 | 2.7 | 3.4 |
| 13 | 18.1 | 16.8 | 17.5 | 11.8 | 10.7 | 11.3 | 6.7 | 6.4 | 6.6 | 4.0 | 2.7 | 3.5 |
| 14 | 16.8 | 14.8 | 15.8 | 10.9 | 9.6 | 10.4 | 7.0 | 6.6 | 6.8 | 4.0 | 3.4 | 3.7 |
| 15 | 14.8 | 13.7 | 14.2 | 10.9 | 9.6 | 10.3 | 7.4 | 6.6 | 6.9 | 3.8 | 2.9 | 3.4 |
| 16 | 14.7 | 13.5 | 14.0 | 11.2 | 10.9 | 11.1 | 7.5 | 6.5 | 7.0 | 2.9 | 2.2 | 2.6 |
| 17 | 14.5 | 13.2 | 14.0 | 11.2 | 9.8 | 10.7 | 6.8 | 6.2 | 6.5 | 3.4 | 2.2 | 2.8 |
| 18 | 14.1 | 12.1 | 13.0 | 9.8 | 9.0 | 9.5 | 6.9 | 6.3 | 6.7 | 2.2 | 1.0 | 1.6 |
| 19 | 13.8 | 12.7 | 13.2 | 9.4 | 8.5 | 8.7 | 8.0 | 6.4 | 7.0 | 2.6 | 1.5 | 2.0 |
| 20 | 15.1 | 13.6 | 14.4 | 9.5 | 8.8 | 9.0 | 8.0 | 6.7 | 7.6 | 3.8 | 2.2 | 3.1 |
| 21 | 14.9 | 14.0 | 14.5 | 9.7 | 9.0 | 9.3 | 7.0 | 6.2 | 6.6 | 4.4 | 3.4 | 3.7 |
| 22 | 15.1 | 13.7 | 14.2 | 9.7 | 8.4 | 9.3 | 7.2 | 6.4 | 6.7 | 3.4 | 2.2 | 2.6 |
| 23 | 15.1 | 13.5 | 14.1 | 8.4 | 7.5 | 8.1 | 6.9 | 6.3 | 6.5 | 2.2 | 0.6 | 1.4 |
| 24 | 13.7 | 13.3 | 13.5 | 9.1 | 7.7 | 8.4 | 6.5 | 6.3 | 6.4 | 0.9 | 0.6 | 0.7 |
| 25 | 13.3 | 13.0 | 13.2 | 9.2 | 8.0 | 8.7 | 6.5 | 5.8 | 6.3 | 1.9 | 0.7 | 1.2 |
| 26 | 15.1 | 13.2 | 14.1 | 9.0 | 8.6 | 8.7 | 6.1 | 5.4 | 5.8 | 2.7 | 1.6 | 2.1 |
| 27 | 15.6 | 14.2 | 14.9 | 8.8 | 7.4 | 8.2 | 5.5 | 4.5 | 5.1 | 2.1 | 0.9 | 1.4 |
| 28 | 14.6 | 13.6 | 14.1 | 7.9 | 7.0 | 7.5 | 5.3 | 4.1 | 4.8 | 2.1 | 0.8 | 1.4 |
| 29 | 13.6 | 12.3 | 13.0 | 8.3 | 6.8 | 7.6 | 6.2 | 4.9 | 5.6 | 3.9 | 2.1 | 3.2 |
| 30 | 12.5 | 12.1 | 12.3 | 8.5 | 7.7 | 8.2 | 6.1 | 4.8 | 5.6 | 4.0 | 3.5 | 3.8 |
| 31 | 12.2 | 11.4 | 11.9 | --- | --- | --- | 6.7 | 5.1 | 5.9 | 3.8 | 3.3 | 3.6 |
| MONTH | 21.0 | 11.4 | 15.4 | 16.9 | 6.8 | 10.0 | 8.0 | 3.0 | 6.0 | 7.5 | 0.6 | 3.7 |

02012800 JACKSON RIVER AT FILTRATION PLANT, AT COVINGTON, VA—Continued

TEMPERATURE, WATER, DEGREES CELSIUS—CONTINUED
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | FEBRUARY | | | MARCH | | | APRIL | | | MAY | |
| 1 | 4.8 | 3.7 | 4.1 | 5.7 | 3.9 | 4.7 | 9.6 | 6.3 | 7.8 | 13.3 | 11.0 | 12.4 |
| 2 | 5.5 | 3.7 | 4.5 | 5.1 | 4.3 | 4.6 | 11.3 | 7.9 | 9.6 | 15.0 | 12.2 | 13.5 |
| 3 | 4.9 | 3.9 | 4.5 | 5.2 | 3.8 | 4.4 | 10.9 | 7.3 | 9.1 | 14.8 | 12.6 | 13.5 |
| 4 | 5.1 | 3.7 | 4.6 | 5.5 | 3.2 | 4.3 | 10.3 | 7.7 | 9.1 | 13.2 | 11.3 | 12.2 |
| 5 | 3.9 | 2.4 | 3.2 | 5.4 | 4.3 | 4.7 | 11.0 | 8.4 | 9.7 | 11.3 | 10.2 | 10.6 |
| 6 | 3.1 | 2.4 | 2.8 | 5.2 | 4.2 | 4.6 | 10.5 | 7.9 | 9.2 | 12.0 | 10.2 | 11.0 |
| 7 | 3.4 | 2.2 | 2.7 | 5.0 | 3.9 | 4.3 | 10.1 | 7.8 | 8.3 | 12.5 | 10.5 | 11.4 |
| 8 | 3.5 | 1.9 | 2.6 | 5.7 | 3.8 | 4.7 | 8.5 | 7.9 | 8.1 | 13.7 | 10.8 | 12.1 |
| 9 | 3.0 | 1.3 | 2.2 | 6.8 | 4.6 | 5.5 | 8.5 | 7.7 | 8.0 | 13.0 | 11.1 | 12.0 |
| 10 | 3.7 | 2.8 | 3.2 | 5.8 | 4.1 | 4.9 | 9.2 | 8.3 | 8.7 | 12.4 | 11.4 | 11.9 |
| 11 | 3.4 | 2.5 | 3.0 | 6.0 | 4.0 | 4.9 | 9.5 | 7.0 | 8.3 | 13.5 | 11.7 | 12.4 |
| 12 | 4.2 | 2.7 | 3.3 | 6.4 | 4.0 | 5.2 | 8.5 | 6.7 | 7.4 | 13.1 | 10.5 | 11.6 |
| 13 | 3.2 | 1.4 | 2.5 | 7.9 | 5.5 | 6.7 | 8.8 | 6.9 | 7.7 | 12.2 | 10.1 | 10.9 |
| 14 | 3.0 | 2.5 | 2.8 | 7.4 | 5.6 | 6.6 | 9.4 | 7.1 | 8.2 | 12.8 | 9.6 | 11.0 |
| 15 | 3.5 | 2.7 | 3.2 | 6.9 | 4.7 | 5.8 | 11.6 | 8.3 | 9.8 | 12.8 | 11.8 | 12.3 |
| 16 | 2.7 | 0.6 | 1.1 | 6.9 | 5.8 | 6.3 | 12.1 | 8.6 | 10.2 | 14.7 | 12.0 | 13.2 |
| 17 | 3.2 | 0.6 | 2.0 | 8.4 | 5.9 | 7.0 | 12.2 | 9.4 | 10.9 | 14.5 | 12.4 | 12.8 |
| 18 | 3.3 | 2.6 | 3.0 | 7.9 | 6.4 | 7.2 | 11.1 | 8.8 | 9.4 | 12.5 | 12.1 | 12.2 |
| 19 | 4.2 | 2.7 | 3.5 | 7.8 | 6.8 | 7.3 | 11.4 | 9.1 | 10 | 12.6 | 10.6 | 11.8 |
| 20 | 5.0 | 3.0 | 4.0 | 7.9 | 6.8 | 7.2 | 11.8 | 10.0 | 10.9 | 12.1 | 10.5 | 11.2 |
| 21 | 4.9 | 3.6 | 4.0 | 10.2 | 6.5 | 8.3 | 11.8 | 9.6 | 10.8 | 11.6 | 11.1 | 11.4 |
| 22 | 4.7 | 3.0 | 3.6 | 7.8 | 6.2 | 6.8 | 11.8 | 10.2 | 11.0 | 11.9 | 11.2 | 11.5 |
| 23 | 5.5 | 3.6 | 4.9 | 7.3 | 5.9 | 6.6 | 12.7 | 9.3 | 11.0 | 13.3 | 10.7 | 12.3 |
| 24 | 4.3 | 3.2 | 3.7 | 9.3 | 6.1 | 7.7 | 12.2 | 9.1 | 10.9 | 13.0 | 11.1 | 11.8 |
| 25 | 3.8 | 3.1 | 3.4 | 10.0 | 6.6 | 8.3 | 12.0 | 9.7 | 10.3 | 13.7 | 10.9 | 11.9 |
| 26 | 3.7 | 3.6 | 3.7 | 9.3 | 7.3 | 8.0 | 11.4 | 9.9 | 10.6 | 14.4 | 12.8 | 13.6 |
| 27 | 3.6 | 3.2 | 3.4 | 9.9 | 6.5 | 8.2 | 13.7 | 9.9 | 11.8 | 13.8 | 12.6 | 13.2 |
| 28 | 4.5 | 3.3 | 3.8 | 9.6 | 7.1 | 8.5 | 13.7 | 9.8 | 12.1 | 14.3 | 12.6 | 13.4 |
| 29 | --- | --- | --- | 9.9 | 8.7 | 9.3 | 13.6 | 10.4 | 11.7 | 14.3 | 13.1 | 13.7 |
| 30 | --- | --- | --- | 9.0 | 6.4 | 7.1 | 13.2 | 10.6 | 12.0 | 15.4 | 12.8 | 14.0 |
| 31 | --- | --- | --- | 7.6 | 5.9 | 6.9 | --- | --- | --- | 15.0 | 13.3 | 14.1 |
| MONTH | 5.5 | 0.6 | 3.3 | 10.2 | 3.2 | 6.3 | 13.7 | 6.3 | 9.8 | 15.4 | 9.6 | 12.3 |
| | | JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | |
| 1 | 15.7 | 13.1 | 14.4 | 18.6 | 17.2 | 17.6 | 18.7 | 16.9 | 17.6 | 20.2 | 18.0 | 19.1 |
| 2 | 15.8 | 12.6 | 14.3 | 17.2 | 16.4 | 16.6 | 20.5 | 17.8 | 19.1 | 20.8 | 19.1 | 20.0 |
| 3 | 15.1 | 13.2 | 13.6 | 17.4 | 15.9 | 16.6 | 20.3 | 19.1 | 19.7 | 20.2 | 18.9 | 19.4 |
| 4 | 15.2 | 13.4 | 14.1 | 18.7 | 15.8 | 17.3 | 20.2 | 18.4 | 19.2 | 18.9 | 18.0 | 18.5 |
| 5 | 14.9 | 12.8 | 13.7 | 19.4 | 16.4 | 18.0 | 20.3 | 18.6 | 19.5 | 20.0 | 17.7 | 18.7 |
| 6 | 14.9 | 12.5 | 13.6 | 19.0 | 16.5 | 17.9 | 20.4 | 18.7 | 19.7 | 19.2 | 17.6 | 18.5 |
| 7 | 15.4 | 14.7 | 15.1 | 19.4 | 16.5 | 18.1 | 20.0 | 18.1 | 18.9 | 18.6 | 17.5 | 18.0 |
| 8 | 16.9 | 13.4 | 15.1 | 20.5 | 18.0 | 19.3 | 19.4 | 17.6 | 18.4 | 19.3 | 17.5 | 18.2 |
| 9 | 16.2 | 13.4 | 14.2 | 20.0 | 18.7 | 19.2 | 19.8 | 18.3 | 19.1 | 18.6 | 17.5 | 18.0 |
| 10 | 15.4 | 13.5 | 14.3 | 19.9 | 17.6 | 18.8 | 20.3 | 18.4 | 19.4 | 19.2 | 16.9 | 17.9 |
| 11 | 15.7 | 13.8 | 14.7 | 19.5 | 16.8 | 18.3 | 20.8 | 18.9 | 20.0 | 19.0 | 16.9 | 17.9 |
| 12 | 16.8 | 15.0 | 15.8 | 18.9 | 16.5 | 17.9 | 20.5 | 18.7 | 19.8 | 18.2 | 17.0 | 17.5 |
| 13 | 16.8 | 15.2 | 15.8 | 19.4 | 16.4 | 18.0 | 20.1 | 18.8 | 19.3 | 17.7 | 17.3 | 17.5 |
| 14 | 17.3 | 15.1 | 16.1 | 19.4 | 16.6 | 18.2 | 20.9 | 18.7 | 19.8 | 19.2 | 17.5 | 18.2 |
| 15 | 16.6 | 15.2 | 15.8 | 19.5 | 16.9 | 18.4 | 20.9 | 19.4 | 20.3 | 18.9 | 17.3 | 18.2 |
| 16 | 16.6 | 15.0 | 16.0 | 19.8 | 17.1 | 18.6 | 20.5 | 19.1 | 19.9 | 18.9 | 16.6 | 17.6 |
| 17 | 15.0 | 14.4 | 14.6 | 20.1 | 16.9 | 18.8 | 20.4 | 18.9 | 19.7 | 18.7 | 16.9 | 17.8 |
| 18 | 16.4 | 14.3 | 15.3 | 19.7 | 16.8 | 18.3 | 20.2 | 18.7 | 19.6 | 17.8 | 16.4 | 17.0 |
| 19 | 16.1 | 15.1 | 15.6 | 19.1 | 16.7 | 18.0 | 20.8 | 19.5 | 20.1 | 16.9 | 16.3 | 16.6 |
| 20 | 16.0 | 14.4 | 15.1 | 19.8 | 16.6 | 18.2 | 20.5 | 19.0 | 19.8 | 17.9 | 15.9 | 16.8 |
| 21 | 15.0 | 14.2 | 14.6 | 19.6 | 16.8 | 18.5 | 21.1 | 19.3 | 20.1 | 18.3 | 16.8 | 17.7 |
| 22 | 16.1 | 14.6 | 15.2 | 19.4 | 17.1 | 18.4 | 20.6 | 19.5 | 20.2 | 18.2 | 17.0 | 17.3 |
| 23 | 17.1 | 14.8 | 15.8 | 18.8 | 16.8 | 18.0 | 20.2 | 18.8 | 19.6 | 17.6 | 16.5 | 17.0 |
| 24 | 18.8 | 15.4 | 17.0 | 19.4 | 17.5 | 18.5 | 20.0 | 18.3 | 19.2 | 17.9 | 16.4 | 17.0 |
| 25 | 18.8 | 15.0 | 17.0 | 19.8 | 17.3 | 18.7 | 20.4 | 18.5 | 19.5 | 18.5 | 16.9 | 17.5 |
| 26 | 19.2 | 16.0 | 17.8 | 20.2 | 18.0 | 19.2 | 20.7 | 18.8 | 19.9 | 18.6 | 16.9 | 17.7 |
| 27 | 19.0 | 17.1 | 17.6 | 20.5 | 18.4 | 19.5 | 20.9 | 19.4 | 20.1 | 18.5 | 16.7 | 17.8 |
| 28 | 17.1 | 16.1 | 16.5 | 20.2 | 18.9 | 19.6 | 20.7 | 19.5 | 20.1 | 18.1 | 16.7 | 17.4 |
| 29 | 19.8 | 16.1 | 17.8 | 19.6 | 18.0 | 18.6 | 20.7 | 19.0 | 19.9 | 16.9 | 15.5 | 16.1 |
| 30 | 19.3 | 17.2 | 18.3 | 18.1 | 17.3 | 17.6 | 20.4 | 19.1 | 19.8 | 16.9 | 14.8 | 15.9 |
| 31 | --- | --- | --- | 17.9 | 17.2 | 17.5 | 20.0 | 18.6 | 19.1 | --- | --- | --- |
| MONTH | 19.8 | 12.5 | 15.5 | 20.5 | 15.8 | 18.3 | 21.1 | 16.9 | 19.6 | 20.8 | 14.8 | 17.8 |
| YEAR | 21.1 | 0.6 | 11.5 | | | | | | | | | |

## 02013000 DUNLAP CREEK NEAR COVINGTON, VA

LOCATION.--Lat 37°48'10", long 80°02'49", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Dec. 8, 1949, nonrecording gage at same site and datum.

REMARKS.--Records good. 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 $ft^3/s$, from rating curve extended above 4,500 $ft^3/s$ on basis of step-backwater computations and contracted-opening measurement at gage height 15.65 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 OUTSIDE PERIOD OF RECORD.--Flood in March 1913 reached a stage of 18 ft, from information by local residents.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1830 | *11,400 | *11.59 | May 18 | 1700 | 6,900 | 9.51 |
| Apr 9 | 1000 | 2,770 | 6.16 | Jun 16 | 1630 | 3,520 | 6.89 |
| Apr 11 | 0600 | 3,560 | 6.93 | Jul 3 | 0730 | 4,520 | 7.88 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 36 | 176 | 100 | 405 | 46 | 415 | 156 | 203 | 327 | 63 | 40 | 35 |
| 2 | 30 | 104 | 83 | 866 | 46 | 740 | 531 | 534 | 263 | 232 | 39 | 35 |
| 3 | 27 | 73 | 72 | 651 | 48 | 739 | 421 | 318 | 227 | 3,100 | 40 | 39 |
| 4 | 26 | 60 | 63 | 588 | 59 | 522 | 313 | 385 | 250 | 915 | 42 | 99 |
| 5 | 25 | 61 | 65 | 469 | 109 | 491 | 254 | 356 | 278 | 482 | 52 | 98 |
| 6 | 23 | 426 | 59 | 366 | 118 | 686 | 200 | 749 | 235 | 336 | 47 | 57 |
| 7 | 22 | 287 | 50 | 288 | 115 | 513 | 449 | 532 | 225 | 269 | 42 | 45 |
| 8 | 20 | 165 | 47 | 252 | 102 | 354 | 722 | 373 | 264 | 214 | 41 | 41 |
| 9 | 19 | 112 | 46 | 228 | 86 | 287 | 2,200 | 304 | 700 | 188 | 41 | 39 |
| 10 | 19 | 87 | 44 | 204 | 98 | 236 | 1,210 | 705 | 404 | 188 | 42 | 38 |
| 11 | 23 | 315 | 287 | 179 | 91 | 189 | 2,550 | 644 | 309 | 161 | 41 | 38 |
| 12 | 23 | 744 | 579 | 155 | 85 | 160 | 1,070 | 442 | 329 | 134 | 39 | 38 |
| 13 | 22 | 889 | 747 | 139 | 75 | 142 | 628 | 316 | 439 | 116 | 40 | 38 |
| 14 | 21 | 432 | 1,080 | 134 | 79 | 135 | 434 | 230 | 432 | 103 | 39 | 38 |
| 15 | 22 | 272 | 641 | 120 | 344 | 115 | 338 | 200 | 283 | e92 | 39 | 40 |
| 16 | 157 | 210 | 442 | 105 | 892 | 106 | 276 | 438 | 1,880 | 82 | 46 | 39 |
| 17 | 174 | 622 | 355 | 104 | 503 | 103 | 227 | 396 | 1,550 | 72 | 47 | 38 |
| 18 | 82 | 614 | 292 | 87 | 334 | 99 | 188 | 4,740 | 1,190 | 66 | 42 | 51 |
| 19 | 50 | 398 | 248 | 95 | 247 | 90 | 167 | 2,740 | 891 | 65 | 49 | 632 |
| 20 | 39 | 280 | 782 | 84 | 233 | 422 | 144 | 993 | 697 | 62 | 39 | 290 |
| 21 | 36 | 254 | 811 | 78 | 549 | 889 | 138 | 668 | 507 | 55 | 37 | 154 |
| 22 | 35 | 427 | 471 | 67 | 6,080 | 518 | 148 | 544 | 375 | 51 | 36 | 124 |
| 23 | 33 | 382 | 322 | 57 | 5,330 | 359 | 133 | 458 | 271 | 52 | 36 | 657 |
| 24 | 30 | 279 | 341 | 56 | 1,640 | 271 | 123 | 385 | 193 | 48 | 36 | 320 |
| 25 | 27 | 213 | 743 | 56 | 959 | 214 | 119 | 307 | 145 | 45 | 36 | 189 |
| 26 | 35 | 170 | 535 | 52 | 637 | 182 | 118 | 314 | 115 | 43 | 36 | 127 |
| 27 | 41 | 150 | 387 | 47 | 469 | 154 | 106 | 291 | 99 | 40 | 34 | 102 |
| 28 | 54 | 128 | 306 | 46 | 379 | 125 | 89 | 339 | 88 | 39 | 33 | 246 |
| 29 | 342 | 115 | 254 | 48 | --- | 114 | 81 | 375 | 79 | 40 | 33 | 195 |
| 30 | 674 | 109 | 212 | 49 | --- | 129 | 79 | 394 | 67 | 41 | 33 | 135 |
| 31 | 330 | --- | 191 | 47 | --- | 126 | --- | 342 | --- | 41 | 35 | --- |
| TOTAL | 2,497 | 8,554 | 10,655 | 6,122 | 19,753 | 9,625 | 13,612 | 20,015 | 13,112 | 7,435 | 1,232 | 4,017 |
| MEAN | 80.5 | 285 | 344 | 197 | 705 | 310 | 454 | 646 | 437 | 240 | 39.7 | 134 |
| MAX | 674 | 889 | 1,080 | 866 | 6,080 | 889 | 2,550 | 4,740 | 1,880 | 3,100 | 52 | 657 |
| MIN | 19 | 60 | 44 | 46 | 46 | 90 | 79 | 200 | 67 | 39 | 33 | 35 |
| CFSM | 0.49 | 1.74 | 2.10 | 1.20 | 4.30 | 1.89 | 2.77 | 3.94 | 2.67 | 1.46 | 0.24 | 0.82 |
| IN. | 0.57 | 1.94 | 2.42 | 1.39 | 4.48 | 2.18 | 3.09 | 4.54 | 2.97 | 1.69 | 0.28 | 0.91 |

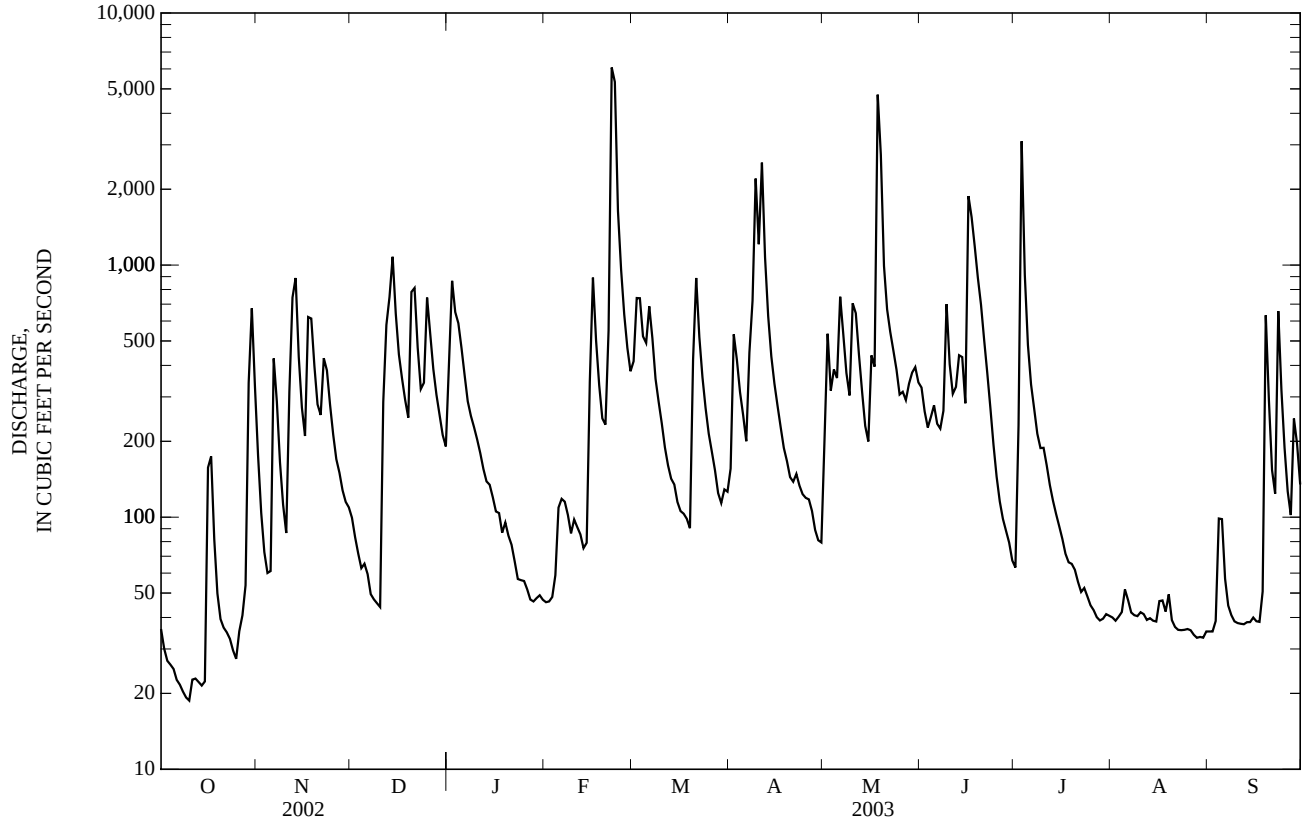
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 64.5 | 106 | 167 | 241 | 308 | 396 | 285 | 221 | 107 | 50.7 | 55.7 | 40.1 |
| MAX | 431 | 659 | 694 | 770 | 821 | 1,053 | 1,071 | 646 | 584 | 358 | 514 | 336 |
| (WY) | (1990) | (1986) | (1974) | (1996) | (1998) | (1993) | (1987) | (2003) | (1972) | (1972) | (1984) | (1989) |
| MIN | 13.4 | 14.8 | 21.4 | 24.2 | 21.5 | 59.1 | 54.7 | 43.7 | 24.2 | 13.6 | 12.5 | 11.0 |
| (WY) | (1942) | (2002) | (2002) | (1981) | (1934) | (1988) | (1986) | (1930) | (1999) | (1999) | (1932) | (1970) |

02013000 DUNLAP CREEK NEAR COVINGTON, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1929 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 48,628.2 | | 116,629 | | | |
| ANNUAL MEAN | 133 | | 320 | | 169 | |
| HIGHEST ANNUAL MEAN | | | | | 320 | a1973 |
| LOWEST ANNUAL MEAN | | | | | 67.3 | 1941 |
| HIGHEST DAILY MEAN | 2,330 | Apr 22 | 6,080 | Feb 22 | 10,400 | Jan 19, 1996 |
| LOWEST DAILY MEAN | 8.9 | bSep 10 | 19 | cOct 9 | 7.0 | Sep 9, 1966 |
| ANNUAL SEVEN-DAY MINIMUM | 9.1 | Sep 7 | 21 | Oct 8 | 7.6 | Sep 6, 1966 |
| MAXIMUM PEAK FLOW | | | 11,400 | Feb 22 | 27,400 | Jun 21, 1972 |
| MAXIMUM PEAK STAGE | | | 11.59 | Feb 22 | 15.65 | Jun 21, 1972 |
| INSTANTANEOUS LOW FLOW | | | 18 | cOct 9 | 2.0 | Jul 4, 1970 |
| ANNUAL RUNOFF (CFSM) | 0.81 | | 1.95 | | 1.03 | |
| ANNUAL RUNOFF (INCHES) | 11.03 | | 26.45 | | 14.03 | |
| 10 PERCENT EXCEEDS | 389 | | 670 | | 370 | |
| 50 PERCENT EXCEEDS | 37 | | 154 | | 66 | |
| 90 PERCENT EXCEEDS | 13 | | 38 | | 18 | |

a Also 2003.
b Also Sept. 11, 2002.
c Also Oct. 10, 2002.
e Estimated.



## 02013100 JACKSON RIVER BELOW DUNLAP CREEK, AT COVINGTON, VA

LOCATION.--Lat 37°47'19", long 80°00'02", NAD83, Covington City, Hydrologic Unit 02080201, on left bank in city recreation park and 0.5 mi downstream from Dunlap Creek.

DRAINAGE AREA.--614 $mi^2$.

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 NGVD of 1929.

REMARKS.--No estimated daily dishcarges. Records good. Small diurnal fluctuation at low flow caused by Westvaco plant 0.8 mi upstream and occasionally by dam on Dunlap Creek 12.7 mi upstream. Flow regulated since December 1979 by 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 $ft^3/s$ for industrial use of which approximately 42 $ft^3/s$ is returned upstream from station. Diversion 2.0 mi upstream from station for city of Covington water supply averages less than 4.0 $ft^3/s$. 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 $ft^3/s$, from rating curve extended above 19,000 $ft^3/s$. Several measurements of water temperature were made during the year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 21, 1972, reached a stage of 24.36 ft, discharge, 34,000 $ft^3/s$, from floodmarks, and flood of Dec. 27, 1973, reached a stage of 22.09 ft, from floodmarks, discharge, 28,300 $ft^3/s$, from rating curve extended above 19,000 $ft^3/s$.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 254 | 435 | 476 | 867 | 252 | 1,710 | 699 | 692 | 965 | 499 | 403 | 322 |
| 2 | 205 | 338 | 427 | 1,840 | 252 | 2,240 | 1,320 | 960 | 1,060 | 597 | 393 | 308 |
| 3 | 197 | 287 | 334 | 2,430 | 251 | 2,270 | 1,550 | 733 | 1,030 | 4,000 | 389 | 314 |
| 4 | 194 | 267 | 291 | 3,050 | 266 | 1,970 | 1,310 | 1,130 | 1,300 | 1,660 | 391 | 482 |
| 5 | 192 | 274 | 302 | 2,320 | 304 | 2,380 | 1,100 | 1,570 | 2,700 | 1,100 | 406 | 475 |
| 6 | 188 | 810 | 283 | 1,240 | 319 | 4,130 | 1,030 | 2,210 | 3,050 | 913 | 395 | 370 |
| 7 | 189 | 586 | 268 | 977 | 320 | 4,740 | 1,410 | 1,900 | 591 | 805 | 384 | 339 |
| 8 | 189 | 416 | 264 | 836 | 305 | 3,600 | 1,990 | 1,690 | 1,610 | 639 | 378 | 323 |
| 9 | 188 | 341 | 260 | 774 | 283 | 1,610 | 4,210 | 1,580 | 4,210 | 602 | 378 | 317 |
| 10 | 186 | 304 | 371 | 674 | 306 | 1,490 | 2,040 | 2,200 | 2,990 | 641 | 390 | 309 |
| 11 | 194 | 661 | 712 | 635 | 335 | 1,380 | 4,810 | 2,070 | 2,530 | 743 | 375 | 303 |
| 12 | 188 | 1,200 | 1,360 | 599 | 330 | 1,130 | 6,040 | 2,170 | 1,770 | 687 | 414 | 300 |
| 13 | 185 | 1,390 | 2,080 | 553 | 321 | 852 | 5,760 | 2,770 | 2,110 | 662 | 382 | 303 |
| 14 | 182 | 745 | 2,780 | 499 | 328 | 1,080 | 3,750 | 1,770 | 2,160 | 673 | 371 | 316 |
| 15 | 187 | 534 | 2,570 | 482 | 645 | 1,360 | 1,720 | 1,040 | 1,480 | 645 | 362 | 314 |
| 16 | 411 | 464 | 2,040 | 437 | 1,470 | 1,340 | 1,410 | 1,110 | 4,020 | 628 | 377 | 317 |
| 17 | 476 | 949 | 1,290 | 377 | 1,140 | 1,190 | 1,040 | 1,060 | 3,140 | 614 | 374 | 309 |
| 18 | 307 | 983 | 910 | 345 | 932 | 913 | 998 | 6,510 | 2,330 | 606 | 359 | 362 |
| 19 | 252 | 686 | 854 | 348 | 929 | 863 | 896 | 5,180 | 2,100 | 609 | 364 | 2,950 |
| 20 | 229 | 542 | 1,880 | 345 | 910 | 800 | 726 | 4,910 | 3,620 | 598 | 344 | 939 |
| 21 | 227 | 510 | 2,920 | 337 | 1,080 | 2,320 | 718 | 3,380 | 5,870 | 587 | 337 | 647 |
| 22 | 219 | 745 | 3,640 | 318 | 7,880 | 3,460 | 733 | 2,510 | 5,300 | 593 | 337 | 689 |
| 23 | 209 | 670 | 2,580 | 269 | 8,820 | 2,790 | 709 | 1,750 | 3,240 | 553 | 336 | 2,520 |
| 24 | 203 | 539 | 1,590 | 251 | 6,070 | 1,450 | 690 | 3,580 | 1,440 | 429 | 333 | 3,240 |
| 25 | 205 | 457 | 2,090 | 265 | 7,040 | 1,150 | 684 | 1,840 | 934 | 421 | 329 | 2,400 |
| 26 | 227 | 406 | 1,600 | 259 | 7,170 | 929 | 687 | 1,190 | 720 | 424 | 325 | 760 |
| 27 | 231 | 415 | 976 | 249 | 5,880 | 829 | 666 | 1,120 | 580 | 417 | 324 | 740 |
| 28 | 248 | 512 | 788 | 248 | 3,150 | 730 | 636 | 1,080 | 556 | 409 | 336 | 910 |
| 29 | 548 | 497 | 727 | 254 | --- | 666 | 631 | 947 | 534 | 429 | 339 | 814 |
| 30 | 1,240 | 491 | 676 | 255 | --- | 706 | 631 | 991 | 509 | 416 | 329 | 711 |
| 31 | 660 | --- | 644 | 253 | --- | 688 | --- | 919 | --- | 411 | 335 | --- |
| TOTAL | 8,810 | 17,454 | 37,983 | 22,586 | 57,288 | 52,766 | 50,594 | 62,562 | 64,449 | 23,010 | 11,289 | 23,403 |
| MEAN | 284 | 582 | 1,225 | 729 | 2,046 | 1,702 | 1,686 | 2,018 | 2,148 | 742 | 364 | 780 |
| MAX | 1,240 | 1,390 | 3,640 | 3,050 | 8,820 | 4,740 | 6,040 | 6,510 | 5,870 | 4,000 | 414 | 3,240 |
| MIN | 182 | 267 | 260 | 248 | 251 | 666 | 631 | 692 | 509 | 409 | 324 | 300 |
| (†) | +3,176 | +17,646 | -101 | -151 | +504 | -655 | +252 | 0 | -101 | -1,664 | -2,722 | +3,630 |
| MEAN‡ | 387 | 1,170 | 1,222 | 724 | 2,064 | 1,681 | 1,695 | 2,018 | 2,145 | 689 | 276 | 901 |
| CFSM‡ | .63 | 1.91 | 1.99 | 1.18 | 3.36 | 2.74 | 2.76 | 3.29 | 3.49 | 1.12 | .45 | 1.47 |
| IN.‡ | .73 | 2.13 | 2.30 | 1.36 | 3.50 | 3.16 | 3.08 | 3.79 | 3.90 | 1.29 | .52 | 1.64 |

CAL YR 2002 MEAN‡ 576 CFSM‡ .94 IN.‡ 12.74
WTR YR 2003 MEAN‡ 1,238 CFSM‡ 2.02 IN.‡ 27.38

† 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.

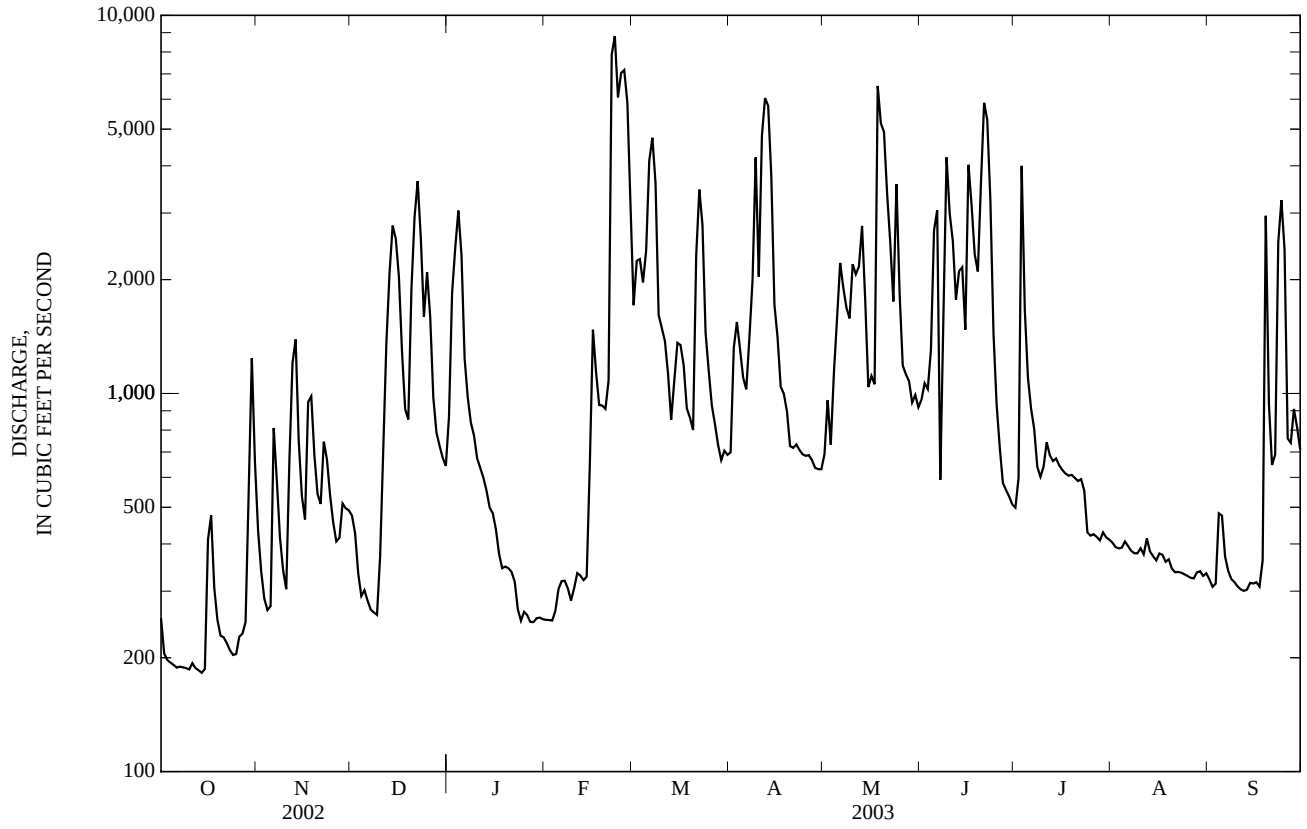
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 331 | 471 | 527 | 784 | 1,074 | 1,439 | 1,179 | 972 | 646 | 370 | 374 | 365 |
| MAX | 1,302 | 2,363 | 1,685 | 2,644 | 2,702 | 3,189 | 3,540 | 2,223 | 2,148 | 742 | 1,285 | 938 |
| (WY) | (1980) | (1986) | (1997) | (1996) | (1998) | (1993) | (1987) | (1989) | (2003) | (2003) | (1984) | (1989) |
| MIN | 111 | 114 | 130 | 119 | 176 | 211 | 356 | 397 | 303 | 190 | 117 | 87.3 |
| (WY) | (1981) | (1982) | (1981) | (1981) | (2002) | (1981) | (1986) | (1991) | (1980) | (1981) | (1981) | (1981) |

02013100 JACKSON RIVER BELOW DUNLAP CREEK, AT COVINGTON, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1980 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 187,901 | | 432,194 | | | |
| ANNUAL MEAN | 515 | | 1,184 | | 709 | |
| HIGHEST ANNUAL MEAN | | | | | 1,184 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 348 | 1981 |
| HIGHEST DAILY MEAN | 4,740 | Apr 30 | 8,820 | Feb 23 | 15,100 | Jan 19, 1996 |
| LOWEST DAILY MEAN | 156 | Jan 21 | 182 | Oct 14 | 67 | aSep 3, 1981 |
| ANNUAL SEVEN-DAY MINIMUM | 165 | Feb 23 | 187 | Oct 9 | 71 | Sep 25, 1981 |
| MAXIMUM PEAK FLOW | | | 14,300 | Feb 22 | b31,300 | Nov 4, 1985 |
| MAXIMUM PEAK STAGE | | | 14.97 | Feb 22 | b23.31 | Nov 4, 1985 |
| INSTANTANEOUS LOW FLOW | | | 171 | cOct 14 | d,f41 | Jan 5, 1981 |
| ANNUAL RUNOFF (CFSM) | 0.84 | | 1.93 | | 1.15 | |
| ANNUAL RUNOFF (INCHES) | 11.38 | | 26.19 | | 15.69 | |
| 10 PERCENT EXCEEDS | 1,000 | | 2,840 | | 1,560 | |
| 50 PERCENT EXCEEDS | 308 | | 673 | | 356 | |
| 90 PERCENT EXCEEDS | 188 | | 262 | | 210 | |

a Also Sept. 27-29, 1981.
b Prior to regulation, 1975-79, maximum peak flow, 23,200 $ft^3/s$, Apr. 5, 1977, gage height, 19.85 ft.
c Also Oct. 15, 2002.
d Prior to regulation, 1975-79, instantaneous low flow, 80 $ft^3/s$, Nov. 9, 1978.
f Result of freezeup.



## 02014000 POTTS CREEK NEAR COVINGTON, VA

LOCATION.--Lat 37°43'44", long 80°02'32", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Sept. 30, 1956, nonrecording gage at site 1.3 mi downstream at different datum.

REMARKS.--No estimated daily discharges. Records good. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Maximum discharge, 15,400 $ft^3/s$, from rating curve extended above 12,000 $ft^3/s$. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,400 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 2230 | *7,070 | *9.71 | Jul 3 | 0800 | 4,230 | 7.80 |
| Apr 11 | 0600 | 3,290 | 7.04 | Sep 19 | 0130 | 2,640 | 6.44 |
| May 18 | 2000 | 4,410 | 7.94 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 28 | 150 | 103 | 290 | 73 | 477 | 245 | 236 | 650 | 142 | 71 | 47 |
| 2 | 25 | 115 | 90 | 572 | 72 | 546 | 471 | 217 | 484 | 378 | 68 | 47 |
| 3 | 23 | 94 | 82 | 529 | 73 | 524 | 452 | 206 | 410 | 2,890 | 64 | 46 |
| 4 | 22 | 84 | 75 | 490 | 85 | 456 | 391 | 365 | 593 | 1,130 | 79 | 68 |
| 5 | 22 | 86 | 77 | 398 | 121 | 436 | 345 | 395 | 530 | 612 | 77 | 78 |
| 6 | 21 | 253 | 78 | 341 | 120 | 444 | 293 | 676 | 423 | 425 | 81 | 61 |
| 7 | 21 | 209 | 57 | 289 | 120 | 414 | 396 | 544 | 420 | 332 | 73 | 51 |
| 8 | 22 | 158 | 68 | 257 | 109 | 362 | 493 | 442 | 475 | 275 | 109 | 48 |
| 9 | 21 | 131 | 65 | 236 | 87 | 322 | 1,830 | 388 | 576 | 236 | 96 | 46 |
| 10 | 22 | 111 | 60 | 213 | 113 | 281 | 1,330 | 419 | 428 | 224 | 419 | 45 |
| 11 | 26 | 154 | 143 | 189 | 99 | 247 | 2,450 | 397 | 363 | 188 | 222 | 44 |
| 12 | 28 | 327 | 291 | 164 | 95 | 225 | 1,260 | 322 | 937 | 163 | 156 | 43 |
| 13 | 28 | 447 | 342 | 151 | 79 | 207 | 823 | 268 | 642 | 146 | 127 | 43 |
| 14 | 28 | 297 | 531 | 155 | 88 | 196 | 601 | 228 | 557 | 135 | 106 | 47 |
| 15 | 28 | 224 | 370 | 140 | 199 | 178 | 477 | 234 | 471 | 125 | 90 | 48 |
| 16 | 74 | 203 | 301 | 115 | 567 | 170 | 400 | 504 | 1,230 | 115 | 85 | 45 |
| 17 | 91 | 423 | 274 | 135 | 369 | 165 | 342 | 408 | 1,160 | 105 | 98 | 43 |
| 18 | 59 | 396 | 238 | 102 | 289 | 159 | 307 | 2,700 | 941 | 98 | 84 | 135 |
| 19 | 42 | 298 | 210 | 115 | 236 | 151 | 341 | 2,800 | 999 | 95 | 117 | 1,080 |
| 20 | 34 | 242 | 624 | 114 | 235 | 382 | 338 | 1,220 | 887 | 90 | 82 | 316 |
| 21 | 35 | 222 | 669 | 111 | 371 | 645 | 316 | 867 | 691 | 84 | 74 | 189 |
| 22 | 38 | 286 | 459 | 90 | 3,350 | 477 | 332 | 700 | 540 | 82 | 68 | 146 |
| 23 | 37 | 256 | 349 | 83 | 4,740 | 387 | 302 | 569 | 416 | 83 | 63 | 236 |
| 24 | 34 | 216 | 373 | 73 | 1,850 | 326 | 273 | 485 | 330 | 79 | 59 | 193 |
| 25 | 31 | 186 | 647 | 80 | 1,050 | 280 | 258 | 403 | 270 | 76 | 55 | 154 |
| 26 | 40 | 163 | 432 | 79 | 731 | 251 | 249 | 406 | 228 | 71 | 52 | 129 |
| 27 | 44 | 148 | 334 | 70 | 562 | 230 | 229 | 397 | 199 | 67 | 50 | 261 |
| 28 | 72 | 133 | 285 | 66 | 473 | 202 | 201 | 547 | 182 | 65 | 48 | 319 |
| 29 | 181 | 119 | 248 | 73 | --- | 195 | 185 | 481 | 170 | 65 | 46 | 191 |
| 30 | 329 | 111 | 215 | 79 | --- | 212 | 188 | 510 | 149 | 71 | 50 | 145 |
| 31 | 223 | --- | 194 | 75 | --- | 215 | --- | 464 | --- | 72 | 51 | --- |
| TOTAL | 1,729 | 6,242 | 8,284 | 5,874 | 16,356 | 9,762 | 16,118 | 18,798 | 16,351 | 8,719 | 2,920 | 4,344 |
| MEAN | 55.8 | 208 | 267 | 189 | 584 | 315 | 537 | 606 | 545 | 281 | 94.2 | 145 |
| MAX | 329 | 447 | 669 | 572 | 4,740 | 645 | 2,450 | 2,800 | 1,230 | 2,890 | 419 | 1,080 |
| MIN | 21 | 84 | 57 | 66 | 72 | 151 | 185 | 206 | 149 | 65 | 46 | 43 |
| CFSM | 0.36 | 1.36 | 1.75 | 1.24 | 3.82 | 2.06 | 3.51 | 3.96 | 3.56 | 1.84 | 0.62 | 0.95 |
| IN. | 0.42 | 1.52 | 2.01 | 1.43 | 3.98 | 2.37 | 3.92 | 4.57 | 3.98 | 2.12 | 0.71 | 1.06 |

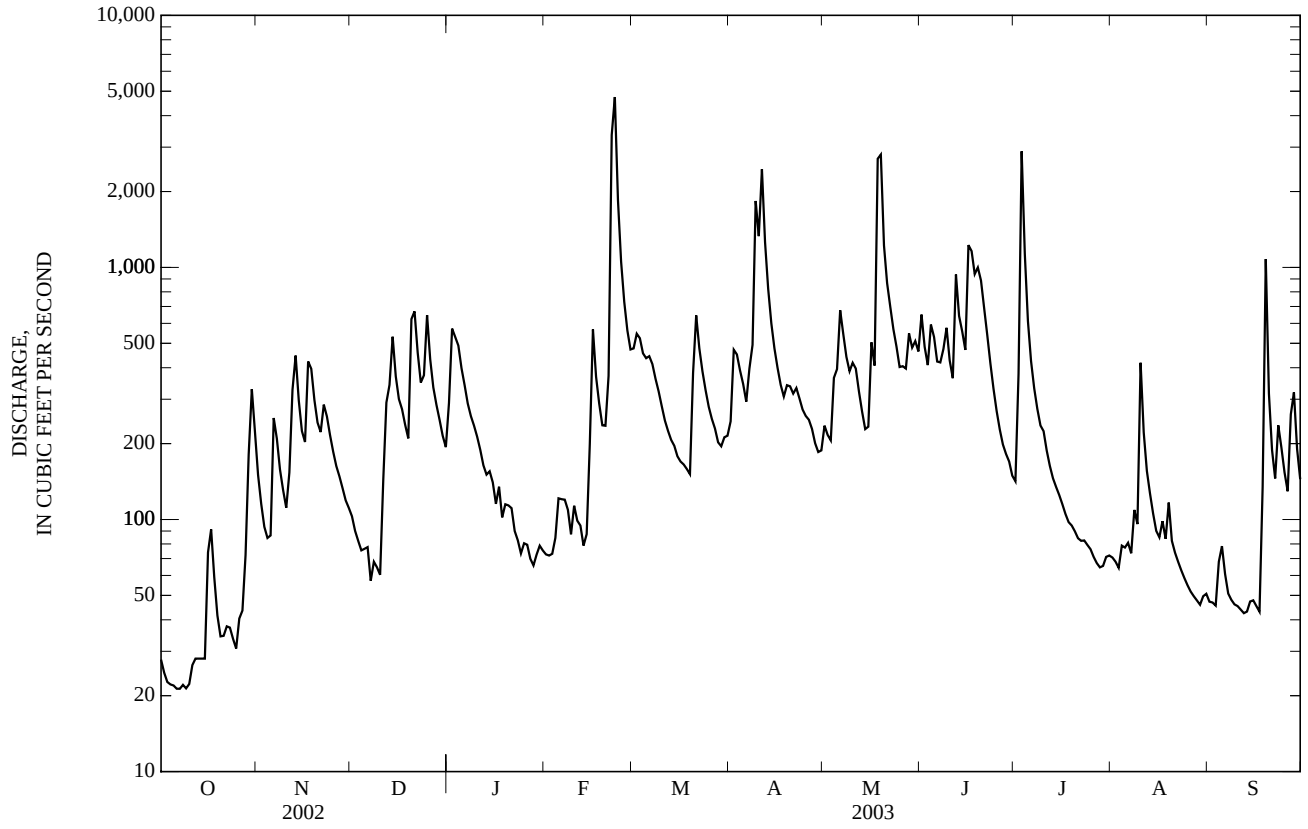
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1956, 1966 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 91.8 | 124 | 170 | 239 | 297 | 371 | 291 | 230 | 139 | 68.7 | 65.4 | 61.4 |
| MAX | 548 | 766 | 643 | 788 | 725 | 1,078 | 1,184 | 606 | 650 | 288 | 461 | 516 |
| (WY) | (1990) | (1986) | (1949) | (1937) | (1998) | (1955) | (1987) | (2003) | (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) |

02014000 POTTS CREEK NEAR COVINGTON, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1929 - 1956 1966 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 41,444 | | 115,497 | | | |
| ANNUAL MEAN | 114 | | 316 | | 178 | |
| HIGHEST ANNUAL MEAN | | | | | 320 | 1973 |
| LOWEST ANNUAL MEAN | | | | | 76.5 | 2002 |
| HIGHEST DAILY MEAN | 1,620 | May 3 | 4,740 | Feb 23 | 8,870 | Jun 21, 1972 |
| LOWEST DAILY MEAN | 19 | Aug 15 | 21 | aOct 6 | 15 | Dec 17, 1930 |
| ANNUAL SEVEN-DAY MINIMUM | 20 | Aug 11 | 22 | Oct 4 | 15 | Dec 17, 1930 |
| MAXIMUM PEAK FLOW | | | 7,070 | Feb 22 | 15,400 | Nov 4, 1985 |
| MAXIMUM PEAK STAGE | | | 9.71 | Feb 22 | 13.46 | Nov 4, 1985 |
| INSTANTANEOUS LOW FLOW | | | 20 | bOct 5 | c13 | Nov 29, 1930 |
| ANNUAL RUNOFF (CFSM) | 0.74 | | 2.07 | | 1.17 | |
| ANNUAL RUNOFF (INCHES) | 10.08 | | 28.08 | | 15.84 | |
| 10 PERCENT EXCEEDS | 291 | | 574 | | 396 | |
| 50 PERCENT EXCEEDS | 53 | | 202 | | 85 | |
| 90 PERCENT EXCEEDS | 23 | | 48 | | 27 | |

a Also Oct. 7, 9, 2002.
b Also Oct. 6-9, 2002.
c Minimum observed.



## 02015700 BULLPASTURE RIVER AT WILLIAMSVILLE, VA

LOCATION.--Lat 38°11'43", long 79°34'13", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to July 12, 1974, at site 700 ft upstream at datum 11.84 ft higher.

REMARKS.--Records good except those for periods with ice effect, Dec. 6-8, Jan. 14, 15, 17-23, 26-29, and Feb. 5-7, 12-14, 17, and period of no gage-height record, July 13-23, which are fair. Maximum discharge, 22,900 $ft^3/s$, from rating curve extended above 3,300 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Dec 20 | 0900 | 2,830 | 5.61 | Sep 19 | 0530 | *8,400 | *8.57 |
| Jun 4 | 0815 | 2,020 | 4.94 | Sep 23 | 0230 | 2,050 | 4.96 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 57 | 204 | 109 | 435 | 61 | 247 | 213 | 163 | 182 | 110 | 76 | 61 |
| 2 | 50 | 156 | 96 | 560 | 61 | 519 | 291 | 148 | 148 | 120 | 71 | 161 |
| 3 | 44 | 127 | 92 | 439 | 63 | 604 | 252 | 143 | 258 | 272 | 68 | 193 |
| 4 | 41 | 113 | 79 | 360 | 83 | 420 | 222 | 484 | 1,450 | 155 | 87 | 262 |
| 5 | 40 | 132 | 84 | 287 | e68 | 719 | 201 | 451 | 792 | 122 | 82 | 232 |
| 6 | 37 | 557 | e79 | 244 | e62 | 1,170 | 170 | 411 | 442 | 106 | 111 | 143 |
| 7 | 35 | 282 | e64 | 200 | e60 | 877 | 559 | 333 | 543 | 98 | 98 | 113 |
| 8 | 34 | 203 | e67 | 191 | 58 | 566 | 544 | 276 | 608 | 122 | 143 | 97 |
| 9 | 33 | 163 | 71 | 180 | 55 | 556 | 914 | 388 | 538 | 126 | 168 | 86 |
| 10 | 34 | 141 | 69 | 156 | 63 | 481 | 738 | 752 | 373 | 155 | 181 | 78 |
| 11 | 47 | 588 | 171 | 137 | 58 | 354 | 991 | 694 | 306 | 138 | 199 | 71 |
| 12 | 65 | 659 | 237 | 116 | e55 | 299 | 651 | 432 | 400 | 112 | 186 | 67 |
| 13 | 51 | 576 | 304 | 115 | e46 | 331 | 446 | 344 | 1,040 | e90 | 169 | 68 |
| 14 | 58 | 341 | 443 | e100 | e54 | 366 | 347 | 270 | 730 | e450 | 220 | 68 |
| 15 | 49 | 254 | 310 | e90 | 61 | 290 | 291 | 233 | 677 | e560 | 142 | 69 |
| 16 | 226 | 216 | 274 | 83 | 49 | 252 | 254 | 214 | 903 | e350 | 120 | 90 |
| 17 | 257 | 334 | 232 | e78 | e53 | 232 | 224 | 187 | 957 | e240 | 117 | 66 |
| 18 | 142 | 283 | 199 | e72 | 65 | 208 | 224 | 555 | 936 | e165 | 98 | 75 |
| 19 | 104 | 232 | 180 | e77 | 65 | 183 | 290 | 515 | 639 | e135 | 86 | 3,400 |
| 20 | 84 | 201 | 1,610 | e70 | 67 | 559 | 235 | 367 | 595 | e120 | 79 | 719 |
| 21 | 74 | 239 | 834 | e65 | 85 | 692 | 228 | 363 | 433 | e110 | 73 | 375 |
| 22 | 65 | 368 | 451 | e61 | 654 | 418 | 237 | 317 | 347 | e100 | 70 | 295 |
| 23 | 58 | 274 | 317 | e58 | 960 | 313 | 205 | 287 | 281 | e97 | 66 | 1,000 |
| 24 | 53 | 219 | 254 | 55 | 949 | 254 | 182 | 263 | 231 | 93 | 62 | 425 |
| 25 | 51 | 183 | 243 | 67 | 627 | 212 | 174 | 226 | 197 | 83 | 60 | 297 |
| 26 | 125 | 163 | 190 | e60 | 390 | 189 | 183 | 213 | 173 | 77 | 58 | 235 |
| 27 | 103 | 159 | 159 | e55 | 301 | 170 | 229 | 186 | 155 | 73 | 56 | 265 |
| 28 | 101 | 135 | 145 | e52 | 254 | 150 | 193 | 184 | 142 | 71 | 62 | 411 |
| 29 | 334 | 123 | 138 | e59 | --- | 169 | 179 | 184 | 130 | 72 | 66 | 234 |
| 30 | 643 | 119 | 133 | 63 | --- | 189 | 167 | 181 | 118 | 69 | 59 | 187 |
| 31 | 298 | --- | 129 | 60 | --- | 185 | --- | 175 | --- | 68 | 57 | --- |
| TOTAL | 3,393 | 7,744 | 7,763 | 4,645 | 5,427 | 12,174 | 10,034 | 9,939 | 14,724 | 4,659 | 3,190 | 9,843 |
| MEAN | 109 | 258 | 250 | 150 | 194 | 393 | 334 | 321 | 491 | 150 | 103 | 328 |
| MAX | 643 | 659 | 1,610 | 560 | 960 | 1,170 | 991 | 752 | 1,450 | 560 | 220 | 3,400 |
| MIN | 33 | 113 | 64 | 52 | 46 | 150 | 167 | 143 | 118 | 68 | 56 | 61 |
| CFSM | 1.00 | 2.35 | 2.28 | 1.36 | 1.76 | 3.57 | 3.04 | 2.91 | 4.46 | 1.37 | 0.94 | 2.98 |
| IN. | 1.15 | 2.62 | 2.63 | 1.57 | 1.84 | 4.12 | 3.39 | 3.36 | 4.98 | 1.58 | 1.08 | 3.33 |

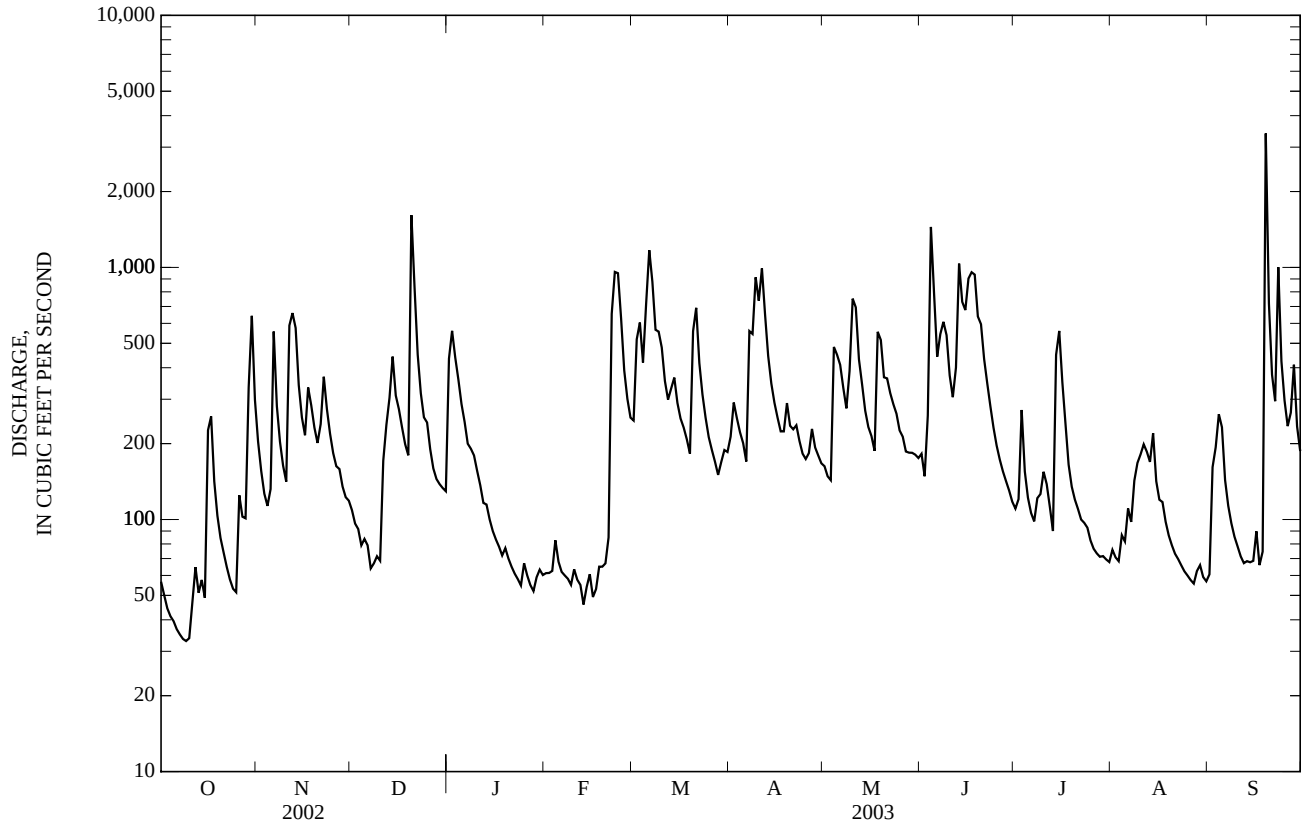
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 82.1 | 120 | 159 | 190 | 216 | 307 | 227 | 193 | 125 | 67.3 | 65.5 | 74.3 |
| MAX | 295 | 784 | 543 | 631 | 498 | 655 | 663 | 448 | 491 | 245 | 272 | 432 |
| (WY) | (1977) | (1986) | (1974) | (1996) | (1982) | (1993) | (1987) | (1996) | (2003) | (1972) | (1969) | (1996) |
| MIN | 30.1 | 33.6 | 31.9 | 34.7 | 58.4 | 62.2 | 68.0 | 65.4 | 34.8 | 26.8 | 27.7 | 28.5 |
| (WY) | (1989) | (2002) | (1966) | (1981) | (2002) | (1981) | (1999) | (1977) | (1999) | (1999) | (1964) | (1968) |

02015700 BULLPASTURE RIVER AT WILLIAMSVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1960 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 50,491 | | 93,535 | | | |
| ANNUAL MEAN | 138 | | 256 | | 152 | |
| HIGHEST ANNUAL MEAN | | | | | 256 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 71.1 | 1999 |
| HIGHEST DAILY MEAN | 2,150 | Apr 22 | 3,400 | Sep 19 | e8,700 | Nov 4, 1985 |
| LOWEST DAILY MEAN | 22 | aSep 9 | 33 | Oct 9 | 22 | aSep 9, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 22 | bSep 7 | 36 | Oct 4 | 22 | bSep 7, 2002 |
| MAXIMUM PEAK FLOW | | | 8,400 | Sep 19 | 22,900 | Nov 4, 1985 |
| MAXIMUM PEAK STAGE | | | 8.57 | Sep 19 | c12.79 | Nov 4, 1985 |
| INSTANTANEOUS LOW FLOW | | | 32 | Oct 9 | d19 | Jan 4, 1981 |
| ANNUAL RUNOFF (CFSM) | 1.26 | | 2.33 | | 1.38 | |
| ANNUAL RUNOFF (INCHES) | 17.08 | | 31.63 | | 18.77 | |
| 10 PERCENT EXCEEDS | 289 | | 562 | | 305 | |
| 50 PERCENT EXCEEDS | 71 | | 180 | | 81 | |
| 90 PERCENT EXCEEDS | 30 | | 60 | | 34 | |

a Also Sept. 10-13, 2002.
b Also Sept. 8, 2002.
c From floodmarks.
d Result of freezeup.
e Estimated.



## 02016000 COWPASTURE RIVER NEAR CLIFTON FORGE, VA

LOCATION.--Lat 37°47'30", long 79°45'34", NAD83, 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 $mi^2$.

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 NGVD of 1929 (levels by U.S. Army Corps of Engineers).Prior to October 1934, nonrecording gage at site 100 ft upstream at present datum.

REMARKS.--No estimated daily discharges. Records good. Low flow affected by springs and by occasional regulation from unknown source. Maximum discharge, 40,900 $ft^3/s$, from rating curve extended above 13,000 $ft^3/s$ on basis of slope-area measurements at gage heights 15.70 ft and 19.15 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 OUTSIDE PERIOD OF RECORD.--Flood in March 1913 reached a stage of 20.8 ft, from floodmarks, discharge, about 45,000 $ft^3/s$, from rating curve extended above 13,000 $ft^3/s$ on basis of records for other stations in James River Basin.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Dec 21 | 0000 | 7,520 | 8.55 | Jun 5 | 0345 | 6,340 | 7.89 |
| Feb 23 | 0700 | 14,700 | 11.80 | Jun 16 | 2045 | 8,110 | 8.86 |
| Apr 11 | 0930 | 5,040 | 7.09 | Sep 20 | 0145 | *17,100 | *12.68 |
| May 18 | 2100 | 8,320 | 8.97 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 192 | 792 | 321 | 710 | 171 | 1,110 | 766 | 485 | 704 | 306 | 173 | 175 |
| 2 | 153 | 539 | 292 | 2,370 | 168 | 1,500 | 1,050 | 448 | 618 | 301 | 173 | 163 |
| 3 | 131 | 407 | 261 | 1,860 | 168 | 2,510 | 1,110 | 433 | 567 | 841 | 194 | 274 |
| 4 | 119 | 331 | 241 | 1,750 | 183 | 1,860 | 922 | 841 | 2,880 | 865 | 224 | 662 |
| 5 | 111 | 318 | 239 | 1,300 | 196 | 1,660 | 793 | 1,910 | 4,590 | 559 | 302 | 772 |
| 6 | 104 | 1,510 | 230 | 1,030 | 205 | 2,990 | 686 | 1,890 | 2,180 | 429 | 259 | 557 |
| 7 | 98 | 1,400 | 215 | 840 | 189 | 3,430 | 1,080 | 1,460 | 1,660 | 356 | 285 | 374 |
| 8 | 94 | 805 | 196 | 700 | 176 | 2,130 | 2,520 | 1,110 | 2,010 | 317 | 286 | 292 |
| 9 | 90 | 571 | 201 | 647 | 162 | 1,700 | 3,430 | 875 | 2,590 | 292 | 399 | 243 |
| 10 | 89 | 451 | 196 | 580 | 165 | 1,520 | 3,610 | 1,100 | 1,750 | 319 | 810 | 213 |
| 11 | 94 | 693 | 399 | 500 | 174 | 1,240 | 4,460 | 1,910 | 1,260 | 438 | 543 | 190 |
| 12 | 97 | 2,170 | 1,180 | 429 | 170 | 996 | 3,040 | 1,390 | 1,380 | 492 | 1,280 | 173 |
| 13 | 104 | 3,120 | 1,260 | 374 | 161 | 861 | 1,950 | 998 | 2,100 | 381 | 1,270 | 165 |
| 14 | 110 | 1,570 | 2,290 | 368 | 159 | 914 | 1,380 | 793 | 2,500 | 735 | 825 | 163 |
| 15 | 100 | 981 | 1,750 | 350 | 318 | 910 | 1,070 | 652 | 1,600 | 1,770 | 639 | 162 |
| 16 | 176 | 789 | 1,220 | 306 | 697 | 770 | 890 | 625 | 4,030 | 1,240 | 467 | 156 |
| 17 | 710 | 1,410 | 993 | 300 | 391 | 685 | 763 | 550 | 4,250 | 712 | 390 | 169 |
| 18 | 585 | 1,570 | 814 | 269 | 377 | 635 | 660 | 3,780 | 3,790 | 504 | 341 | 174 |
| 19 | 348 | 1,080 | 681 | 256 | 343 | 584 | 642 | 4,700 | 2,790 | 406 | 285 | 5,970 |
| 20 | 249 | 822 | 2,480 | 296 | 349 | 1,520 | 644 | 2,150 | 1,990 | 349 | 243 | 5,680 |
| 21 | 207 | 691 | 4,430 | 273 | 682 | 3,850 | 588 | 1,560 | 1,810 | 300 | 217 | 1,480 |
| 22 | 178 | 1,040 | 1,880 | 247 | 7,460 | 2,120 | 784 | 1,510 | 1,360 | 271 | 199 | 940 |
| 23 | 154 | 1,160 | 1,230 | 200 | 12,800 | 1,390 | 721 | 1,240 | 1,070 | 256 | 185 | 3,170 |
| 24 | 138 | 877 | 1,010 | 147 | 6,000 | 1,050 | 612 | 1,100 | 831 | 236 | 170 | 2,200 |
| 25 | 129 | 691 | 1,140 | 212 | 3,000 | 849 | 563 | 929 | 656 | 218 | 158 | 1,210 |
| 26 | 160 | 568 | 950 | 223 | 1,900 | 717 | 543 | 839 | 546 | 197 | 150 | 846 |
| 27 | 269 | 492 | 733 | 212 | 1,380 | 627 | 534 | 742 | 470 | 183 | 144 | 846 |
| 28 | 299 | 441 | 613 | 196 | 1,130 | 546 | 545 | 655 | 419 | 172 | 140 | 1,930 |
| 29 | 378 | 377 | 542 | 192 | --- | 509 | 503 | 681 | 380 | 218 | 431 | 1,240 |
| 30 | 2,180 | 343 | 486 | 182 | --- | 601 | 483 | 757 | 340 | 199 | 253 | 804 |
| 31 | 1,420 | --- | 447 | 179 | --- | 696 | --- | 694 | --- | 176 | 191 | --- |
| TOTAL | 9,266 | 28,009 | 28,920 | 17,498 | 39,274 | 42,480 | 37,342 | 38,807 | 53,121 | 14,038 | 11,626 | 31,393 |
| MEAN | 299 | 934 | 933 | 564 | 1,403 | 1,370 | 1,245 | 1,252 | 1,771 | 453 | 375 | 1,046 |
| MAX | 2,180 | 3,120 | 4,430 | 2,370 | 12,800 | 3,850 | 4,460 | 4,700 | 4,590 | 1,770 | 1,280 | 5,970 |
| MIN | 89 | 318 | 196 | 147 | 159 | 509 | 483 | 433 | 340 | 172 | 140 | 156 |
| CFSM | 0.65 | 2.03 | 2.02 | 1.22 | 3.04 | 2.97 | 2.70 | 2.72 | 3.84 | 0.98 | 0.81 | 2.27 |
| IN. | 0.75 | 2.26 | 2.33 | 1.41 | 3.17 | 3.43 | 3.01 | 3.13 | 4.29 | 1.13 | 0.94 | 2.53 |

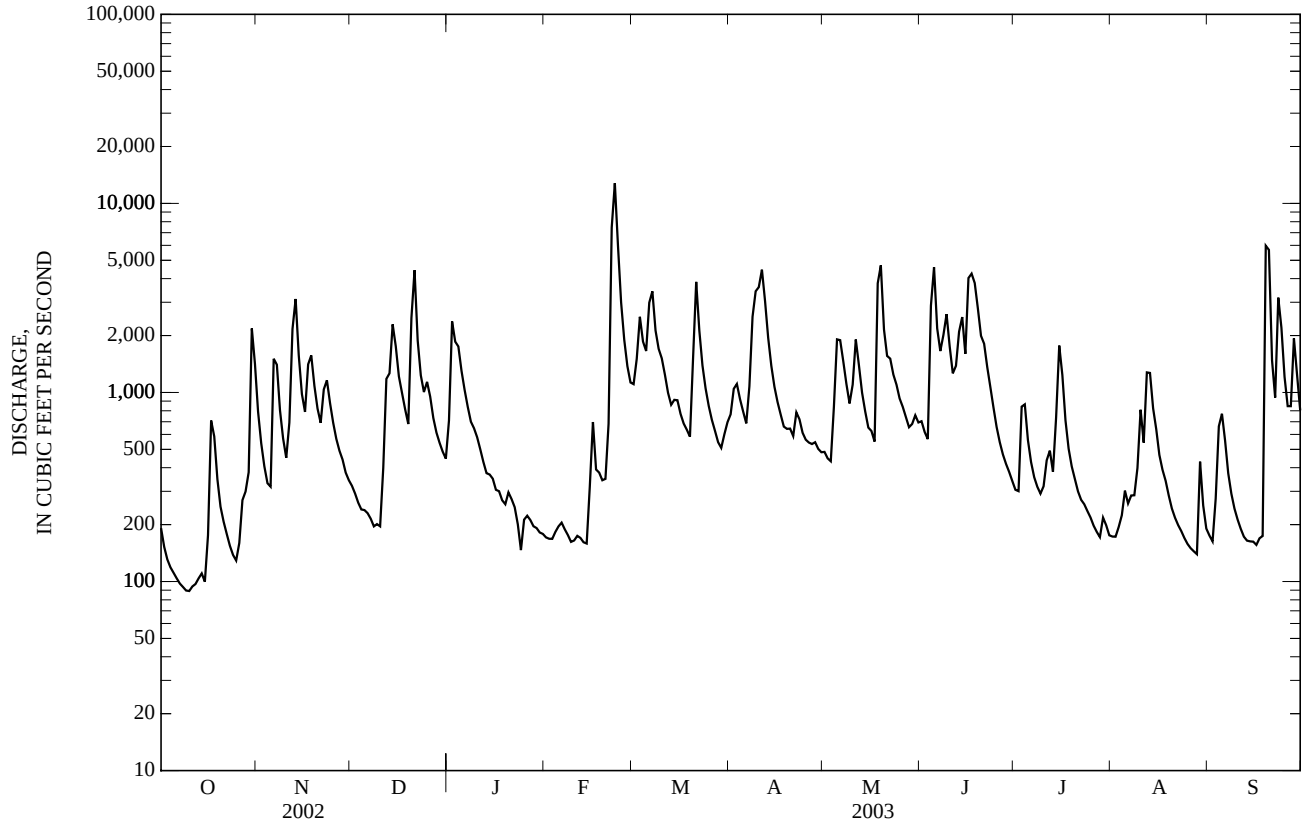
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1926 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 270 | 375 | 558 | 726 | 861 | 1,098 | 845 | 653 | 397 | 219 | 230 | 224 |
| MAX | 1,474 | 2,745 | 1,883 | 2,253 | 1,911 | 2,531 | 2,878 | 2,342 | 1,771 | 1,213 | 1,531 | 1,510 |
| (WY) | (1938) | (1986) | (1974) | (1996) | (1998) | (1993) | (1987) | (1989) | (2003) | (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) |

02016000 COWPASTURE RIVER NEAR CLIFTON FORGE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1926 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 150,653 | | 351,774 | | | |
| ANNUAL MEAN | 413 | | 964 | | 536 | |
| HIGHEST ANNUAL MEAN | | | | | 964 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 248 | 1981 |
| HIGHEST DAILY MEAN | 6,160 | Apr 22 | 12,800 | Feb 23 | 33,900 | Nov 5, 1985 |
| LOWEST DAILY MEAN | 46 | aSep 12 | 89 | Oct 10 | 40 | Sep 1, 1932 |
| ANNUAL SEVEN-DAY MINIMUM | 48 | Sep 8 | 95 | Oct 6 | 43 | Oct 8, 1930 |
| MAXIMUM PEAK FLOW | | | 17,100 | Sep 20 | 40,900 | Nov 5, 1985 |
| MAXIMUM PEAK STAGE | | | 12.68 | Sep 20 | 19.15 | Nov 5, 1985 |
| INSTANTANEOUS LOW FLOW | | | 89 | bOct 9 | 38 | Sep 2, 1932 |
| ANNUAL RUNOFF (CFSM) | 0.90 | | 2.09 | | 1.16 | |
| ANNUAL RUNOFF (INCHES) | 12.16 | | 28.39 | | 15.81 | |
| 10 PERCENT EXCEEDS | 986 | | 2,140 | | 1,160 | |
| 50 PERCENT EXCEEDS | 173 | | 612 | | 258 | |
| 90 PERCENT EXCEEDS | 68 | | 170 | | 86 | |

a Also Sept. 13, 2002.
b Also Oct. 10, 11, 2002.



## 02016500 JAMES RIVER AT LICK RUN, VA

LOCATION.--Lat 37°46'25", long 79°47'04", NAD83, 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 $mi^2$.

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 NGVD of 1929 (levels by U.S. Army Corps of Engineers). Prior to Oct. 26, 1928, nonrecording gage at same site and datum.

REMARKS.--No estimated daily discharges. Records good. 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 $ft^3/s$, from rating curve extended above 66,000 $ft^3/s$. 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 November 1877 reached a stage of about 33 ft, discharge, about 120,000 $ft^3/s$. Flood in March 1913 reached a stage of 30.4 ft, from floodmarks, discharge, about 98,000 $ft^3/s$.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 567 | 1,710 | 1,050 | 2,080 | 582 | 3,770 | 2,070 | 1,630 | 2,650 | 1,100 | 703 | 624 |
| 2 | 446 | 1,240 | 982 | 5,450 | 577 | 4,800 | 3,020 | 1,870 | 2,590 | 1,300 | 682 | 586 |
| 3 | 381 | 983 | 806 | 5,430 | 577 | 5,970 | 3,620 | 1,710 | 2,400 | 8,000 | 722 | 657 |
| 4 | 353 | 835 | 695 | 6,180 | 617 | 4,900 | 3,140 | 2,460 | 5,090 | 4,830 | 782 | 1,480 |
| 5 | 334 | 806 | 711 | 5,000 | 679 | 4,620 | 2,650 | 4,160 | 7,940 | 2,880 | 904 | 1,760 |
| 6 | 311 | 2,720 | 670 | 3,190 | 741 | 7,650 | 2,370 | 5,180 | 6,870 | 2,170 | 851 | 1,230 |
| 7 | 303 | 2,650 | 613 | 2,570 | 734 | 8,970 | 3,100 | 4,470 | 3,370 | 1,880 | 862 | 935 |
| 8 | 294 | 1,680 | 567 | 2,150 | 693 | 7,050 | 5,480 | 3,690 | 3,890 | 1,540 | 870 | 806 |
| 9 | 287 | 1,290 | 583 | 2,010 | 636 | 4,060 | 10,100 | 3,190 | 8,400 | 1,440 | 1,060 | 687 |
| 10 | 291 | 1,080 | 639 | 1,770 | 658 | 3,720 | 8,240 | 4,060 | 5,890 | 1,460 | 1,720 | 629 |
| 11 | 327 | 1,520 | 1,270 | 1,600 | 703 | 3,300 | 11,800 | 4,800 | 4,880 | 1,590 | 1,340 | 586 |
| 12 | 328 | 3,770 | 2,990 | 1,450 | 721 | 2,830 | 10,900 | 4,000 | 4,670 | 1,580 | 1,980 | 560 |
| 13 | 321 | 5,840 | 3,870 | 1,320 | 681 | 2,270 | 9,180 | 4,500 | 5,270 | 1,390 | 1,990 | 550 |
| 14 | 326 | 3,130 | 6,310 | 1,240 | 677 | 2,360 | 6,590 | 3,300 | 6,340 | 1,880 | 1,460 | 590 |
| 15 | 307 | 2,080 | 5,330 | 1,180 | 1,060 | 2,760 | 3,780 | 2,320 | 4,520 | 2,680 | 1,230 | 567 |
| 16 | 601 | 1,720 | 4,100 | 1,060 | 3,300 | 2,560 | 3,210 | 2,520 | 9,250 | 2,240 | 1,050 | 567 |
| 17 | 1,700 | 3,050 | 3,030 | 983 | 2,410 | 2,420 | 2,510 | 2,330 | 11,100 | 1,640 | 979 | 561 |
| 18 | 1,300 | 3,600 | 2,280 | 839 | 1,950 | 1,990 | 2,280 | 12,500 | 8,490 | 1,380 | 913 | 584 |
| 19 | 834 | 2,530 | 2,010 | 837 | 1,730 | 1,910 | 2,210 | 15,400 | 6,780 | 1,260 | 873 | 9,760 |
| 20 | 606 | 1,940 | 4,810 | 903 | 1,850 | 2,900 | 2,010 | 9,620 | 6,740 | 1,170 | 782 | 7,880 |
| 21 | 538 | 1,680 | 9,040 | 877 | 2,390 | 7,110 | 1,910 | 6,550 | 8,850 | 1,100 | 696 | 2,900 |
| 22 | 495 | 2,290 | 6,840 | 801 | 18,900 | 6,610 | 2,160 | 5,810 | 7,950 | 1,060 | 657 | 2,190 |
| 23 | 452 | 2,430 | 5,150 | 697 | 30,600 | 5,270 | 2,030 | 3,530 | 5,610 | 1,060 | 628 | 6,030 |
| 24 | 418 | 1,930 | 3,300 | 538 | 15,400 | 3,340 | 1,860 | 5,920 | 3,110 | 883 | 603 | 6,270 |
| 25 | 401 | 1,590 | 4,620 | 630 | 11,700 | 2,700 | 1,770 | 3,830 | 2,230 | 791 | 583 | 4,630 |
| 26 | 507 | 1,360 | 3,770 | 660 | 10,300 | 2,230 | 1,760 | 2,970 | 1,810 | 740 | 565 | 2,260 |
| 27 | 639 | 1,210 | 2,540 | 606 | 8,620 | 2,010 | 1,720 | 2,700 | 1,510 | 712 | 553 | 2,390 |
| 28 | 721 | 1,240 | 2,060 | 557 | 5,660 | 1,790 | 1,660 | 2,790 | 1,380 | 687 | 636 | 4,300 |
| 29 | 1,180 | 1,160 | 1,840 | 609 | --- | 1,690 | 1,590 | 2,550 | 1,280 | 770 | 1,020 | 2,900 |
| 30 | 4,270 | 1,100 | 1,670 | 601 | --- | 1,860 | 1,550 | 2,720 | 1,180 | 760 | 731 | 2,150 |
| 31 | 2,810 | --- | 1,540 | 597 | --- | 1,980 | --- | 2,540 | --- | 711 | 643 | --- |
| TOTAL | 22,648 | 60,164 | 85,686 | 54,415 | 125,146 | 117,400 | 116,270 | 135,620 | 152,040 | 52,684 | 29,068 | 67,619 |
| MEAN | 731 | 2,005 | 2,764 | 1,755 | 4,470 | 3,787 | 3,876 | 4,375 | 5,068 | 1,699 | 938 | 2,254 |
| MAX | 4,270 | 5,840 | 9,040 | 6,180 | 30,600 | 8,970 | 11,800 | 15,400 | 11,100 | 8,000 | 1,990 | 9,760 |
| MIN | 287 | 806 | 567 | 538 | 577 | 1,690 | 1,550 | 1,630 | 1,180 | 687 | 553 | 550 |
| (†) | +3,176 | +17,646 | -101 | -151 | +504 | -655 | +252 | 0 | -101 | -1,664 | -2,722 | +3,630 |
| MEAN‡ | 833 | 2,594 | 2,761 | 1,750 | 4,488 | 3,766 | 3,884 | 4,375 | 5,065 | 1,646 | 850 | 2,375 |
| CFSM‡ | .61 | 1.89 | 2.01 | 1.27 | 3.27 | 2.74 | 2.83 | 3.19 | 3.69 | 1.20 | .62 | 1.73 |
| IN.‡ | .70 | 2.11 | 2.32 | 1.47 | 3.40 | 3.16 | 3.16 | 3.67 | 4.12 | 1.38 | .71 | 1.93 |

| | | | | | | |
|---|---|---|---|---|---|---|
| CAL YR | 2002 | MEAN‡ | 1,290 | CFSM‡ | .94 | IN.‡ 12.76 |
| WTR YR | 2003 | MEAN‡ | 2,845 | CFSM‡ | 2.07 | IN.‡ 28.14 |

† 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.

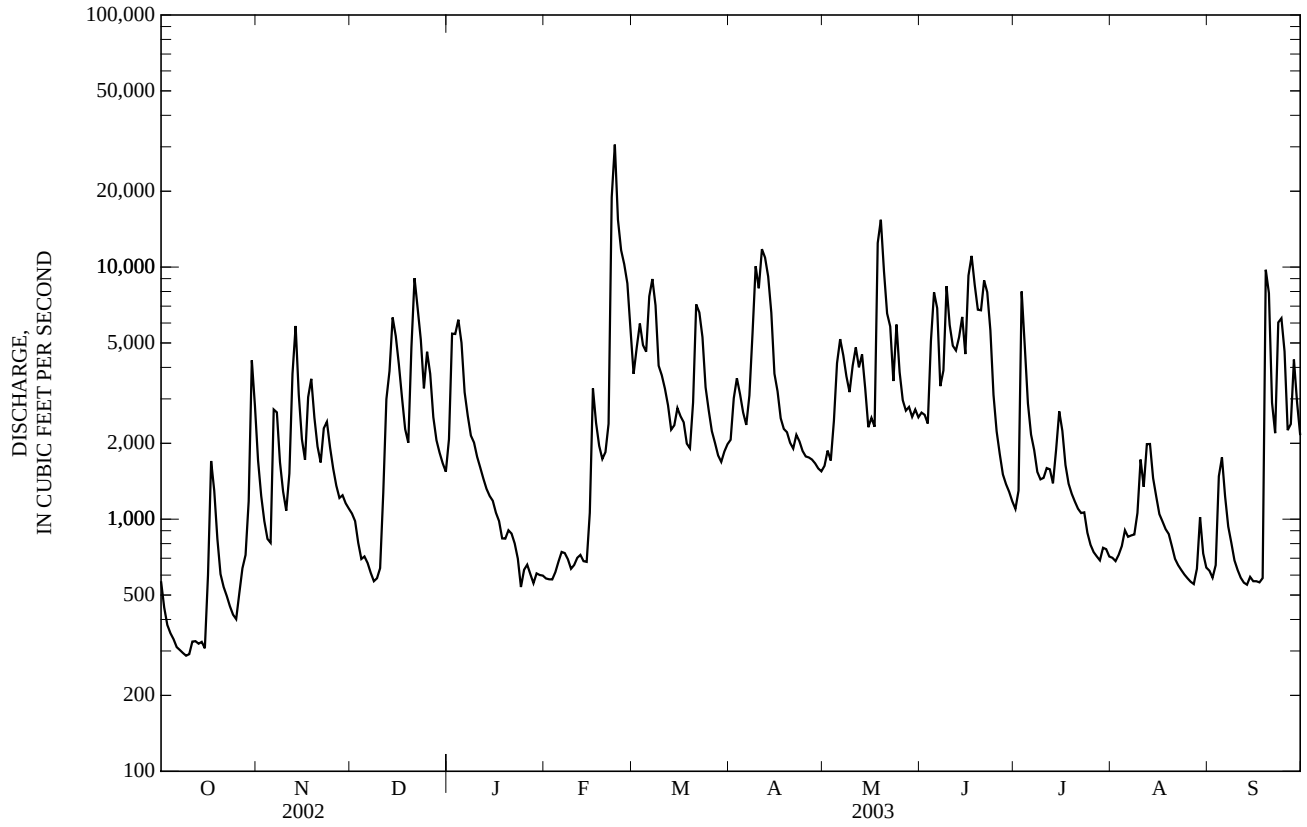
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 765 | 1,251 | 1,446 | 2,002 | 2,542 | 3,387 | 2,857 | 2,242 | 1,477 | 735 | 708 | 793 |
| MAX | 3,495 | 7,206 | 4,206 | 5,302 | 6,425 | 8,083 | 9,349 | 5,639 | 5,068 | 1,699 | 2,704 | 2,839 |
| (WY) | (1990) | (1986) | (1997) | (1996) | (1998) | (1993) | (1987) | (1989) | (2003) | (2003) | (1984) | (1996) |
| MIN | 270 | 325 | 328 | 268 | 429 | 623 | 755 | 940 | 526 | 479 | 264 | 269 |
| (WY) | (1981) | (2002) | (1981) | (1981) | (2002) | (1981) | (1986) | (1991) | (2002) | (1981) | (1981) | (1981) |

02016500 JAMES RIVER AT LICK RUN, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1980 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 448,390 | | 1,018,760 | | | |
| ANNUAL MEAN | 1,228 | | 2,791 | | 1,678 | |
| HIGHEST ANNUAL MEAN | | | | | 2,791 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 789 | 1981 |
| HIGHEST DAILY MEAN | 12,000 | Apr 22 | 30,600 | Feb 23 | 67,500 | Nov 5, 1985 |
| LOWEST DAILY MEAN | 250 | Sep 12 | 287 | Oct 9 | 180 | Jan 5, 1981 |
| ANNUAL SEVEN-DAY MINIMUM | 260 | Sep 8 | 306 | Oct 6 | 202 | Sep 28, 1981 |
| MAXIMUM PEAK FLOW | | | 37,600 | Feb 22 | a87,500 | Nov 5, 1985 |
| MAXIMUM PEAK STAGE | | | 19.92 | Feb 22 | a30.22 | Nov 5, 1985 |
| INSTANTANEOUS LOW FLOW | | | 281 | bOct 9 | c,d133 | Jan 6, 1981 |
| ANNUAL RUNOFF (CFSM) | 0.89 | | 2.03 | | 1.22 | |
| ANNUAL RUNOFF (INCHES) | 12.15 | | 27.60 | | 16.61 | |
| 10 PERCENT EXCEEDS | 2,760 | | 6,420 | | 3,660 | |
| 50 PERCENT EXCEEDS | 601 | | 1,840 | | 820 | |
| 90 PERCENT EXCEEDS | 334 | | 584 | | 392 | |

a Prior to regulation, 1925-79, maximum peak flow, 66,600 $ft^3/s$, Mar. 18, 1936, gage height, 27.01 ft.
b Also Oct. 10, 2002.
c Prior to regulation, 1925-79, instantaneous low flow, 148 $ft^3/s$, Sept. 7, 1966.
d Result of freezeup.



## 02017500 JOHNS CREEK AT NEW CASTLE, VA

LOCATION.--Lat 37°30'22", long 80°06'24", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Jun. 7, 1937, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 4-7, 9, 10, and Jan. 16-25, 27, 28, and period of doubtful gage-height record, Feb. 6-13, which are fair. Maximum discharge, 8,000 $ft^3/s$, from rating curve extended above 3,200 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,100 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1915 | *5,620 | *11.05 | Jul 3 | 0700 | 3,200 | 9.38 |
| May 18 | 1645 | 4,480 | 10.29 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 13 | 151 | 71 | 198 | 44 | 473 | 159 | 172 | 472 | 108 | 46 | 26 |
| 2 | 12 | 118 | 63 | 384 | 44 | 504 | 234 | 155 | 362 | 585 | 44 | 32 |
| 3 | 11 | 88 | 57 | 397 | 43 | 437 | 224 | 164 | 328 | 2,140 | 39 | 27 |
| 4 | 10 | 68 | e49 | 395 | 49 | 376 | 211 | 590 | 432 | 890 | 43 | 32 |
| 5 | 10 | 60 | e45 | 347 | 55 | 361 | 196 | 446 | 401 | 573 | 53 | 50 |
| 6 | 9.7 | 177 | e55 | 309 | e50 | 339 | 171 | 644 | 328 | 423 | 60 | 40 |
| 7 | 9.5 | 149 | e48 | 266 | e53 | 303 | 216 | 465 | 415 | 404 | 49 | 33 |
| 8 | 9.4 | 119 | 53 | 236 | e48 | 277 | 301 | 392 | 526 | 360 | 54 | 30 |
| 9 | 9.5 | 98 | e44 | 205 | e45 | 251 | 1,010 | 326 | 475 | 314 | 115 | 28 |
| 10 | 9.8 | 81 | e42 | 179 | e49 | 220 | 803 | 280 | 381 | 280 | 200 | 26 |
| 11 | 12 | 136 | 110 | 154 | e52 | 187 | 1,480 | 243 | 422 | 225 | 289 | 24 |
| 12 | 13 | 349 | 269 | 133 | e50 | 166 | 768 | 205 | 986 | 179 | 171 | 23 |
| 13 | 12 | 378 | 360 | 120 | e47 | 146 | 569 | 173 | 625 | 142 | 143 | 24 |
| 14 | 10 | 259 | 500 | 111 | 57 | 132 | 453 | 147 | 495 | 110 | 124 | 29 |
| 15 | 10 | 198 | 343 | 99 | 212 | 115 | 380 | 140 | 486 | 89 | 109 | 25 |
| 16 | 32 | 210 | 274 | e84 | 576 | 107 | 323 | 293 | 946 | 74 | 116 | 24 |
| 17 | 41 | 516 | 247 | e75 | 380 | 100 | 274 | 276 | 889 | 62 | 147 | 23 |
| 18 | 36 | 361 | 210 | e66 | 293 | 94 | 244 | 2,040 | 861 | 54 | 145 | 26 |
| 19 | 28 | 266 | 181 | e69 | 240 | 88 | 308 | 1,520 | 1,340 | 52 | 126 | 93 |
| 20 | 23 | 211 | 732 | e72 | 242 | 321 | 293 | 783 | 833 | 49 | 104 | 57 |
| 21 | 24 | 193 | 562 | e65 | 415 | 443 | 273 | 663 | 608 | 44 | 85 | 45 |
| 22 | 24 | 232 | 422 | e60 | 3,380 | 338 | 272 | 569 | 494 | 40 | 67 | 40 |
| 23 | 21 | 222 | 339 | e53 | 2,380 | 283 | 240 | 471 | 417 | 40 | 55 | 76 |
| 24 | 18 | 195 | 437 | e45 | 1,200 | 240 | 213 | 399 | 361 | 40 | 47 | 66 |
| 25 | 18 | 170 | 633 | e52 | 909 | 207 | 197 | 332 | 298 | 35 | 41 | 56 |
| 26 | 32 | 146 | 414 | 55 | 669 | 185 | 184 | 306 | 243 | 32 | 36 | 49 |
| 27 | 35 | 124 | 325 | e52 | 530 | 163 | 161 | 304 | 192 | 30 | 33 | 45 |
| 28 | 67 | 105 | 269 | e41 | 469 | 141 | 138 | 347 | 152 | 28 | 30 | 48 |
| 29 | 152 | 88 | 224 | 49 | --- | 128 | 123 | 325 | 127 | 35 | 29 | 42 |
| 30 | 302 | 80 | 190 | 46 | --- | 138 | 117 | 327 | 103 | 54 | 28 | 37 |
| 31 | 206 | --- | 167 | 45 | --- | 134 | --- | 389 | --- | 47 | 26 | --- |
| TOTAL | 1,219.9 | 5,548 | 7,735 | 4,462 | 12,581 | 7,397 | 10,535 | 13,886 | 14,998 | 7,538 | 2,654 | 1,176 |
| MEAN | 39.4 | 185 | 250 | 144 | 449 | 239 | 351 | 448 | 500 | 243 | 85.6 | 39.2 |
| MAX | 302 | 516 | 732 | 397 | 3,380 | 504 | 1,480 | 2,040 | 1,340 | 2,140 | 289 | 93 |
| MIN | 9.4 | 60 | 42 | 41 | 43 | 88 | 117 | 140 | 103 | 28 | 26 | 23 |
| CFSM | 0.38 | 1.78 | 2.40 | 1.38 | 4.32 | 2.29 | 3.38 | 4.31 | 4.81 | 2.34 | 0.82 | 0.38 |
| IN. | 0.44 | 1.98 | 2.77 | 1.60 | 4.50 | 2.65 | 3.77 | 4.97 | 5.36 | 2.70 | 0.95 | 0.42 |

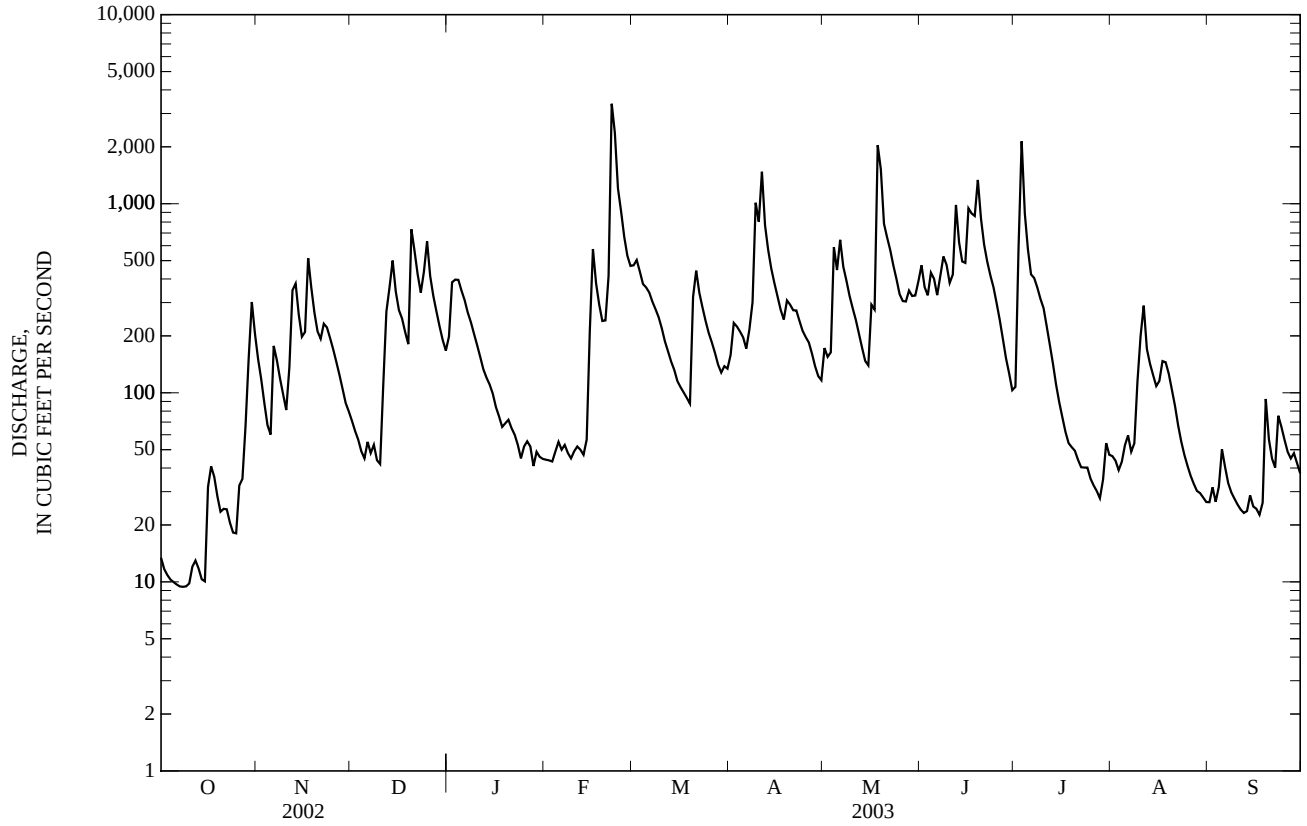
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1927 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 55.3 | 87.1 | 131 | 183 | 223 | 272 | 223 | 165 | 92.8 | 42.1 | 42.5 | 39.6 |
| MAX | 396 | 445 | 514 | 546 | 542 | 730 | 820 | 448 | 500 | 291 | 364 | 353 |
| (WY) | (1930) | (1986) | (1949) | (1996) | (1998) | (1955) | (1987) | (2003) | (2003) | (1941) | (1940) | (1989) |
| MIN | 9.81 | 12.3 | 15.7 | 16.2 | 18.0 | 51.9 | 47.8 | 33.5 | 14.3 | 8.90 | 9.04 | 8.99 |
| (WY) | (1992) | (2002) | (1940) | (1956) | (1934) | (1988) | (1995) | (1930) | (2002) | (1930) | (2002) | (2002) |

02017500 JOHNS CREEK AT NEW CASTLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1927 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 31,858.7 | | 89,729.9 | | | |
| ANNUAL MEAN | 87.3 | | 246 | | 129 | |
| HIGHEST ANNUAL MEAN | | | | | 246 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 51.1 | 2002 |
| HIGHEST DAILY MEAN | 1,210 | May 3 | 3,380 | Feb 22 | 6,040 | Jun 21, 1972 |
| LOWEST DAILY MEAN | 5.2 | aSep 12 | 9.4 | Oct 8 | 5.2 | aSep 12, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 5.6 | Sep 8 | 9.7 | Oct 4 | 5.6 | Sep 8, 2002 |
| MAXIMUM PEAK FLOW | | | 5,620 | Feb 22 | 8,000 | Jan 23, 1935 |
| MAXIMUM PEAK STAGE | | | 11.05 | Feb 22 | 12.48 | Jun 21, 1972 |
| INSTANTANEOUS LOW FLOW | | | 9.2 | Oct 7 | 5.1 | bSep 11, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.84 | | 2.36 | | 1.24 | |
| ANNUAL RUNOFF (INCHES) | 11.40 | | 32.10 | | 16.89 | |
| 10 PERCENT EXCEEDS | 244 | | 509 | | 301 | |
| 50 PERCENT EXCEEDS | 29 | | 149 | | 58 | |
| 90 PERCENT EXCEEDS | 8.2 | | 29 | | 13 | |

a Also Sept. 13, 2002.
b Also Sept. 12,2002.
e Estimated.



## 02018000 CRAIG CREEK AT PARR, VA

LOCATION.--Lat 37°39'57", long 79°54'41", NAD83, 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 $mi^2$.

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 NGVD of 1929 (levels by U.S. Army Corps of Engineers). Prior to June 7, 1937, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods of no gage-height record, Oct. 14, 15, Feb. 17, 18, Aug. 29 to Sept. 2, and Sept. 27-29, which are fair. Maximum discharge, 58,500 $ft^3/s$, from rating curve extended above 11,000 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,200 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 23 | 0530 | *19,200 | *15.94 | Jun 17 | 0145 | 5,610 | 9.85 |
| Apr 9 | 1845 | 4,510 | 9.06 | Jun 19 | 0730 | 6,370 | 10.35 |
| Apr 11 | 1245 | 6,620 | 10.51 | Jul 3 | 1715 | 7,170 | 10.85 |
| May 19 | 0615 | 9,950 | 12.39 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 62 | 473 | 217 | 552 | 138 | 1,250 | 510 | 456 | 1,530 | 296 | 162 | e105 |
| 2 | 55 | 327 | 197 | 1,170 | 136 | 1,440 | 869 | 517 | 1,180 | 473 | 155 | e102 |
| 3 | 49 | 254 | 182 | 1,160 | 135 | 1,470 | 922 | 484 | 947 | 5,430 | 151 | 97 |
| 4 | 44 | 211 | 169 | 1,260 | 141 | 1,200 | 778 | 1,430 | 1,060 | 3,180 | 181 | 101 |
| 5 | 41 | 187 | 174 | 1,080 | 152 | 1,060 | 666 | 1,540 | 1,230 | 1,780 | 150 | 124 |
| 6 | 39 | 422 | 170 | 916 | 154 | 1,000 | 567 | 1,910 | 1,010 | 1,190 | 154 | 140 |
| 7 | 37 | 572 | 155 | 747 | 160 | 903 | 547 | 1,640 | 926 | 1,170 | 187 | 118 |
| 8 | 35 | 408 | 142 | 622 | 163 | 781 | 930 | 1,230 | 1,760 | 977 | 170 | 102 |
| 9 | 34 | 315 | 143 | 545 | 154 | 694 | 3,510 | 990 | 2,150 | 784 | 173 | 92 |
| 10 | 35 | 260 | 144 | 470 | 153 | 603 | 3,120 | 937 | 1,670 | 692 | 354 | 85 |
| 11 | 41 | 265 | 187 | 401 | 164 | 513 | 5,130 | 828 | 1,170 | 733 | 494 | 80 |
| 12 | 45 | 907 | 641 | 351 | 162 | 450 | 3,040 | 654 | 2,040 | 610 | 404 | 75 |
| 13 | 48 | 1,860 | 957 | 310 | 161 | 416 | 1,960 | 522 | 2,730 | 448 | 313 | 74 |
| 14 | e48 | 1,010 | 1,860 | 295 | 156 | 412 | 1,420 | 434 | 1,940 | 389 | 273 | 77 |
| 15 | e46 | 650 | 1,340 | 275 | 230 | 394 | 1,120 | 413 | 1,560 | 325 | 245 | 85 |
| 16 | 56 | 557 | 969 | 247 | 1,930 | 368 | 939 | 578 | 3,010 | 286 | 221 | 80 |
| 17 | 134 | 1,740 | 790 | 247 | e900 | 352 | 782 | 712 | 4,160 | 252 | 530 | 73 |
| 18 | 147 | 1,710 | 666 | 246 | e800 | 330 | 660 | 3,620 | 3,020 | 226 | 366 | 73 |
| 19 | 112 | 1,030 | 546 | 307 | 701 | 312 | 691 | 7,090 | 5,470 | 206 | 303 | 815 |
| 20 | 90 | 721 | 1,760 | 272 | 610 | 735 | 725 | 2,980 | 3,320 | 195 | 253 | 681 |
| 21 | 83 | 560 | 2,590 | 213 | 1,260 | 2,390 | 689 | 2,060 | 2,130 | 182 | 215 | 341 |
| 22 | 75 | 610 | 1,450 | 194 | 5,440 | 1,410 | 675 | 2,040 | 1,560 | 172 | 183 | 248 |
| 23 | 75 | 674 | 1,050 | 189 | 12,500 | 1,030 | 607 | 1,650 | 1,190 | 162 | 157 | 303 |
| 24 | 67 | 571 | 904 | 340 | 4,170 | 817 | 527 | 1,380 | 951 | 159 | 137 | 499 |
| 25 | 64 | 466 | 2,340 | 253 | 2,660 | 661 | 479 | 1,130 | 757 | 149 | 124 | 339 |
| 26 | 77 | 392 | 1,610 | 224 | 1,920 | 561 | 464 | 1,000 | 597 | 138 | 113 | 267 |
| 27 | 151 | 339 | 1,100 | 163 | 1,460 | 496 | 435 | 929 | 484 | 132 | 103 | e225 |
| 28 | 188 | 296 | 865 | 135 | 1,240 | 426 | 401 | 1,550 | 415 | 126 | 96 | e600 |
| 29 | 401 | 260 | 687 | 159 | --- | 413 | 369 | 1,260 | 373 | 125 | e92 | e350 |
| 30 | 1,220 | 236 | 559 | 149 | --- | 422 | 345 | 1,270 | 329 | 154 | e100 | 262 |
| 31 | 894 | --- | 470 | 144 | --- | 467 | --- | 1,110 | --- | 186 | e110 | --- |
| TOTAL | 4,493 | 18,283 | 25,034 | 13,636 | 37,950 | 23,776 | 33,877 | 44,344 | 50,669 | 21,327 | 6,669 | 6,613 |
| MEAN | 145 | 609 | 808 | 440 | 1,355 | 767 | 1,129 | 1,430 | 1,689 | 688 | 215 | 220 |
| MAX | 1,220 | 1,860 | 2,590 | 1,260 | 12,500 | 2,390 | 5,130 | 7,090 | 5,470 | 5,430 | 530 | 815 |
| MIN | 34 | 187 | 142 | 135 | 135 | 312 | 345 | 413 | 329 | 125 | 92 | 73 |
| CFSM | 0.44 | 1.85 | 2.45 | 1.34 | 4.12 | 2.33 | 3.43 | 4.35 | 5.13 | 2.09 | 0.65 | 0.67 |
| IN. | 0.51 | 2.07 | 2.83 | 1.54 | 4.29 | 2.69 | 3.83 | 5.01 | 5.73 | 2.41 | 0.75 | 0.75 |

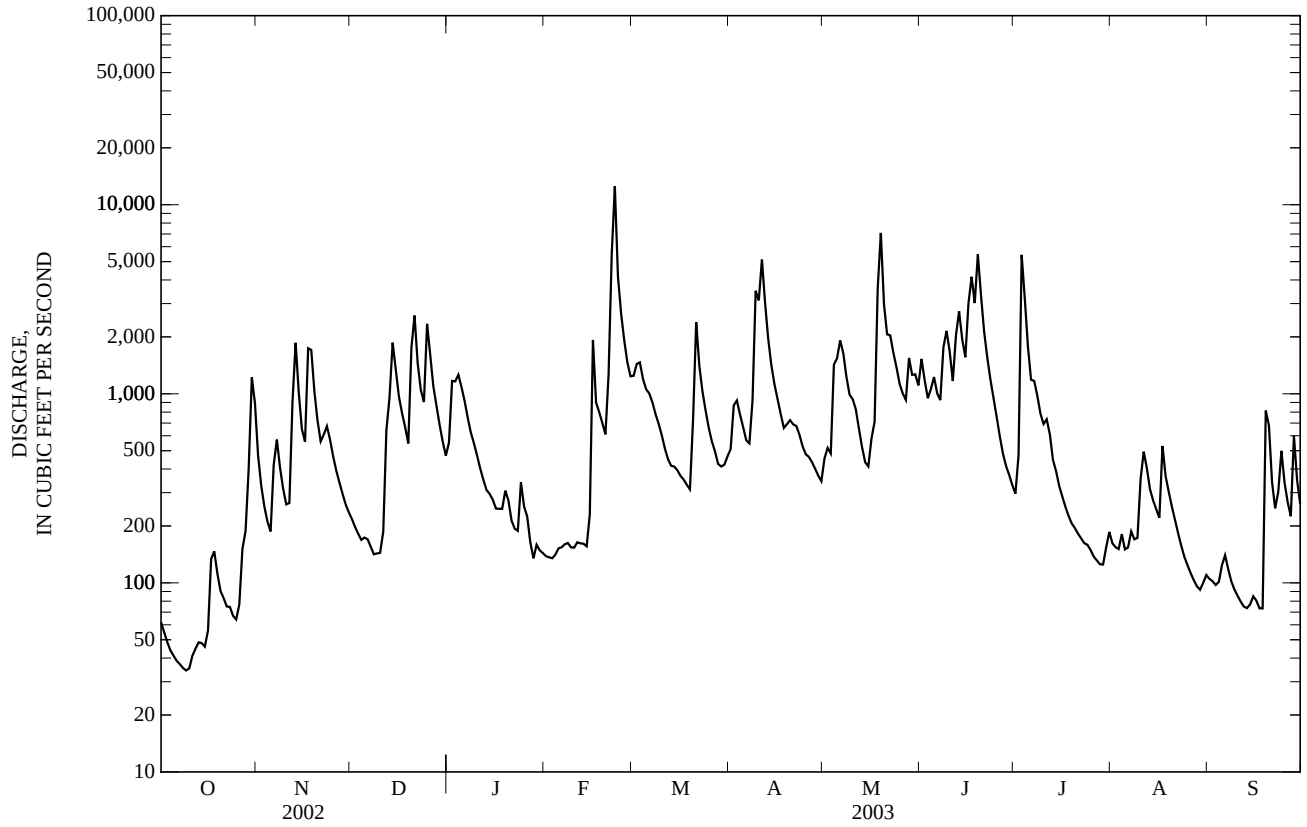
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1925 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 185 | 278 | 385 | 546 | 658 | 783 | 654 | 471 | 281 | 140 | 158 | 143 |
| MAX | 1,093 | 2,112 | 1,519 | 1,642 | 1,757 | 2,116 | 2,427 | 1,430 | 1,689 | 979 | 1,290 | 974 |
| (WY) | (1938) | (1986) | (1949) | (1937) | (1998) | (1993) | (1987) | (2003) | (2003) | (1941) | (1940) | (1928) |
| MIN | 34.9 | 41.0 | 48.9 | 51.2 | 55.6 | 141 | 143 | 93.2 | 51.4 | 33.5 | 33.9 | 34.1 |
| (WY) | (1931) | (2002) | (1966) | (1956) | (1934) | (1988) | (1995) | (1930) | (2002) | (1966) | (2002) | (1968) |

02018000 CRAIG CREEK AT PARR, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1925 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 94,673 | | 286,671 | | | |
| ANNUAL MEAN | 259 | | 785 | | 390 | |
| HIGHEST ANNUAL MEAN | | | | | 785 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 140 | 2002 |
| HIGHEST DAILY MEAN | 2,590 | Dec 21 | 12,500 | Feb 23 | 21,000 | Nov 4, 1985 |
| LOWEST DAILY MEAN | 23 | aSep 11 | 34 | Oct 9 | 23 | aSep 11, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 24 | Sep 8 | 37 | Oct 5 | 24 | Sep 8, 2002 |
| MAXIMUM PEAK FLOW | | | 19,200 | Feb 23 | 58,500 | Nov 4, 1985 |
| MAXIMUM PEAK STAGE | | | 15.94 | Feb 23 | b24.76 | Nov 4, 1985 |
| INSTANTANEOUS LOW FLOW | | | 34 | cOct 8 | d20 | fDec 21, 1980 |
| ANNUAL RUNOFF (CFSM) | 0.79 | | 2.39 | | 1.18 | |
| ANNUAL RUNOFF (INCHES) | 10.70 | | 32.41 | | 16.10 | |
| 10 PERCENT EXCEEDS | 701 | | 1,760 | | 870 | |
| 50 PERCENT EXCEEDS | 84 | | 435 | | 180 | |
| 90 PERCENT EXCEEDS | 32 | | 99 | | 49 | |

a Also Sept. 12-14, 2002.
b From floodmarks.
c Also Oct. 9, 10, 2002.
d Result of freezeup.
e Estimated.
f Also probably occurred Dec. 25, 1980, and Jan. 4, 1981.



## 02018500 CATAWBA CREEK NEAR CATAWBA, VA

LOCATION.--Lat 37°28'05", long 80°00'19", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Aug. 1, 1953, nonrecording gage at site 80 ft downstream at same datum.

REMARKS.--Records good except those for periods with ice effect, Jan. 17-24 and Feb. 8-10, which are 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. Statistics of monthly mean data and summary statistics for water years 1944-1952 (unregulated flow) are available in previous data books, water years 1991-1998. Maximum discharge, 21,200 $ft^3/s$, from rating curve extended above 1,700 $ft^3/s$ on basis of slope-area measurements at gage heights 10.35 ft and 19.19 ft. Minimum discharge, 0.28 $ft^3/s$, 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.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.7 | 6.7 | 6.2 | 34 | 5.2 | 109 | 85 | 86 | 147 | 39 | 27 | 15 |
| 2 | 2.0 | 4.5 | 5.0 | 37 | 4.7 | 141 | 119 | 67 | 125 | 185 | 23 | 16 |
| 3 | 1.4 | 3.2 | 5.5 | 37 | 4.5 | 125 | 97 | 66 | 112 | 375 | 22 | 15 |
| 4 | 1.4 | 2.8 | 4.2 | 36 | 5.2 | 102 | 82 | 198 | 134 | 173 | 23 | 19 |
| 5 | 1.5 | 3.4 | 5.1 | 30 | 5.0 | 94 | 72 | 167 | 116 | 124 | 119 | 18 |
| 6 | 1.5 | 9.7 | 3.7 | 31 | 4.8 | 85 | 62 | 192 | 103 | 86 | 85 | 15 |
| 7 | 1.5 | 9.1 | 3.3 | 29 | 5.1 | 71 | 84 | 144 | 141 | 76 | 46 | 14 |
| 8 | 1.5 | 6.6 | 3.4 | 24 | e4.5 | 64 | 117 | 118 | 175 | 64 | 40 | 13 |
| 9 | 1.9 | 5.0 | 4.6 | 21 | e4.2 | 59 | 422 | 97 | 243 | 58 | 72 | 13 |
| 10 | 2.7 | 6.9 | 4.7 | 17 | e4.7 | 54 | 389 | 85 | 163 | 131 | 48 | 12 |
| 11 | 3.1 | 19 | 8.6 | 13 | 5.0 | 50 | 590 | 77 | 137 | 164 | 61 | 12 |
| 12 | 2.1 | 34 | 17 | 12 | 4.9 | 46 | 265 | 67 | 140 | 83 | 43 | 11 |
| 13 | 1.7 | 30 | 30 | 14 | 4.7 | 44 | 178 | 61 | 135 | 65 | 36 | 12 |
| 14 | 2.2 | 23 | 38 | 11 | 5.1 | 42 | 137 | 57 | 146 | 56 | 32 | 16 |
| 15 | 2.5 | 16 | 28 | 9.0 | 13 | 39 | 115 | 69 | 166 | 48 | 27 | 13 |
| 16 | 6.4 | 21 | 24 | 8.2 | 33 | 39 | 99 | 94 | 674 | 43 | 63 | 12 |
| 17 | 4.4 | 46 | 21 | e7.3 | 24 | 37 | 89 | 86 | 415 | 39 | 47 | 11 |
| 18 | 2.8 | 34 | 17 | e6.2 | 18 | 36 | 85 | 880 | 352 | 35 | 33 | 18 |
| 19 | 1.9 | 24 | 14 | e6.5 | 15 | 34 | 82 | 565 | 488 | 33 | 28 | 74 |
| 20 | 1.7 | 18 | 56 | e7.0 | 18 | 216 | 77 | 294 | 257 | 31 | 24 | 35 |
| 21 | 3.1 | 16 | 39 | e6.4 | 42 | 200 | 76 | 265 | 166 | 29 | 22 | 25 |
| 22 | 3.2 | 13 | 32 | e6.0 | 1,230 | 123 | 74 | 343 | 123 | 28 | 22 | 23 |
| 23 | 2.6 | 13 | 25 | e5.5 | 666 | 94 | 67 | 256 | 96 | 27 | 21 | 49 |
| 24 | 2.2 | 12 | 36 | e5.0 | 244 | 77 | 63 | 207 | 78 | 25 | 20 | 33 |
| 25 | 2.8 | 10 | 50 | 5.7 | 139 | 66 | 61 | 162 | 67 | 23 | 19 | 27 |
| 26 | 13 | 9.9 | 38 | 5.3 | 130 | 61 | 59 | 146 | 57 | 22 | 17 | 24 |
| 27 | 13 | 8.4 | 33 | 4.6 | 112 | 56 | 55 | 211 | 52 | 21 | 16 | 23 |
| 28 | 11 | 6.6 | 27 | 4.5 | 102 | 50 | 51 | 220 | 48 | 20 | 16 | 28 |
| 29 | 18 | 6.1 | 23 | 5.2 | --- | 50 | 49 | 188 | 43 | 33 | 17 | 23 |
| 30 | 26 | 6.1 | 19 | 5.5 | --- | 59 | 56 | 160 | 40 | 36 | 16 | 21 |
| 31 | 18 | --- | 16 | 5.4 | --- | 63 | --- | 158 | --- | 30 | 15 | --- |
| TOTAL | 158.8 | 424.0 | 637.3 | 449.3 | 2,853.6 | 2,386 | 3,857 | 5,786 | 5,139 | 2,202 | 1,100 | 640 |
| MEAN | 5.12 | 14.1 | 20.6 | 14.5 | 102 | 77.0 | 129 | 187 | 171 | 71.0 | 35.5 | 21.3 |
| MAX | 26 | 46 | 56 | 37 | 1,230 | 216 | 590 | 880 | 674 | 375 | 119 | 74 |
| MIN | 1.4 | 2.8 | 3.3 | 4.5 | 4.2 | 34 | 49 | 57 | 40 | 20 | 15 | 11 |
| (†) | 201 | 672 | 1,110 | 576 | 656 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MEAN‡ | 11.6 | 36.5 | 56.4 | 33.1 | 125 | 77.0 | 129 | 187 | 171 | 71.0 | 35.5 | 21.3 |
| CFSM‡ | .34 | 1.06 | 1.64 | .97 | 3.64 | 2.24 | 3.76 | 5.45 | 4.99 | 2.07 | 1.03 | .62 |
| IN.‡ | .39 | 1.19 | 1.90 | 1.11 | 3.80 | 2.59 | 4.20 | 6.29 | 5.56 | 2.39 | 1.19 | .69 |

CAL YR 2002 MEAN‡ 13.2 CFSM‡ .38 IN.‡ 5.23
WTR YR 2003 MEAN‡ 79.0 CFSM‡ 2.30 IN.‡ 31.3

† Total diversion, equivalent in cubic feet per second, per month, provided by City of Roanoke.
‡ Adjusted for diversion.

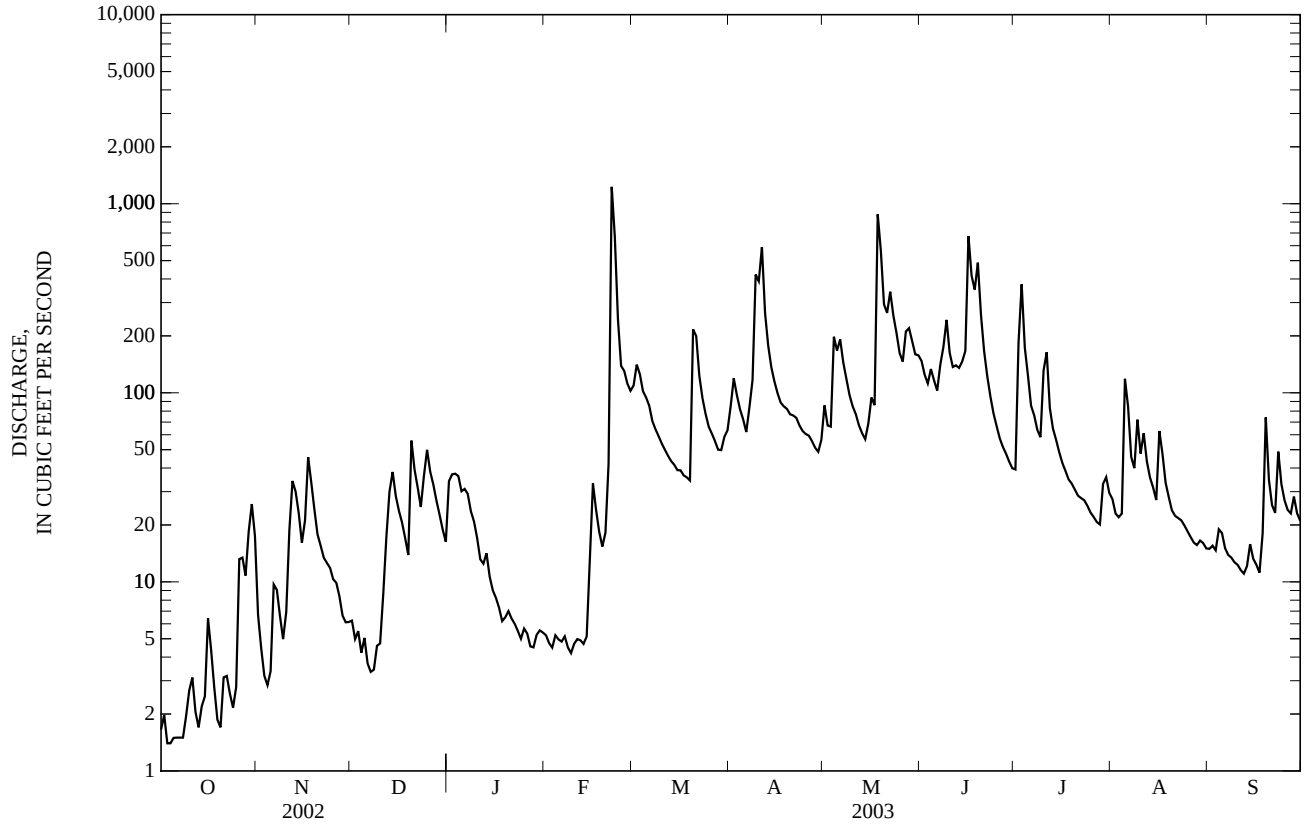
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 13.8 | 28.8 | 20.9 | 35.0 | 52.9 | 76.8 | 71.2 | 42.9 | 33.7 | 12.7 | 11.7 | 16.9 |
| MAX | 82.2 | 390 | 105 | 131 | 221 | 278 | 337 | 187 | 171 | 71.0 | 75.5 | 105 |
| (WY) | (1990) | (1986) | (1997) | (1996) | (1998) | (1993) | (1987) | (2003) | (2003) | (2003) | (1985) | (1979) |
| MIN | 3.41 | 2.01 | 3.16 | 3.45 | 2.07 | 4.51 | 3.79 | 4.88 | 2.29 | 2.10 | 1.06 | 1.53 |
| (WY) | (1999) | (1982) | (1982) | (1981) | (2002) | (2002) | (2002) | (1999) | (1999) | (2002) | (2002) | (2002) |

02018500 CATAWBA CREEK NEAR CATAWBA, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1975 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 2,106.71 | | 25,633.0 | | | |
| ANNUAL MEAN | 5.77 | | 70.2 | | 34.6 | |
| HIGHEST ANNUAL MEAN | | | | | 70.2 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 3.95 | 2002 |
| HIGHEST DAILY MEAN | 56 | Dec 20 | 1,230 | Feb 22 | 7,400 | Nov 4, 1985 |
| LOWEST DAILY MEAN | 0.25 | Sep 13 | 1.4 | aOct 3 | 0.25 | Sep 13, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.36 | Sep 8 | 1.5 | Oct 3 | 0.36 | Sep 8, 2002 |
| MAXIMUM PEAK FLOW | | | 3,420 | Feb 22 | 21,200 | Nov 4, 1985 |
| MAXIMUM PEAK STAGE | | | 7.68 | Feb 22 | b19.19 | Nov 4, 1985 |
| INSTANTANEOUS LOW FLOW | | | 1.4 | cOct 1 | 0.24 | dSep 12, 2002 |
| 10 PERCENT EXCEEDS | 15 | | 163 | | 70 | |
| 50 PERCENT EXCEEDS | 2.9 | | 32 | | 11 | |
| 90 PERCENT EXCEEDS | 1.2 | | 4.6 | | 3.8 | |

a Also Oct. 4, 2002.
b From high-water mark.
c Also Oct. 2-5, 2002 and Feb. 13, 2003.
d Also Sept. 13, 14, 2002.
e Estimated.



## 02019500 JAMES RIVER AT BUCHANAN, VA

LOCATION.--Lat 37°31'50", long 79°40'44", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to July 1, 1927, nonrecording gage at same site and datum.

REMARKS.--No estimated daily discharges. Records good. 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 $ft^3/s$, from rating curve extended above 110,000 $ft^3/s$. 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 November 1877 reached a stage of 34.9 ft, from floodmark, discharge, about 142,000 $ft^3/s$, from rating curve extended above 110,000 $ft^3/s$.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 819 | 2,980 | 1,490 | 2,710 | 877 | 6,400 | 3,320 | 2,430 | 5,250 | 1,850 | 1,160 | 967 |
| 2 | 686 | 2,060 | 1,400 | 6,590 | 855 | 6,910 | 4,090 | 2,660 | 4,840 | 2,050 | 1,120 | 1,020 |
| 3 | 561 | 1,580 | 1,270 | 7,630 | 847 | 8,580 | 5,330 | 2,690 | 4,190 | 12,100 | 1,160 | 946 |
| 4 | 505 | 1,320 | 1,100 | 8,510 | 876 | 7,570 | 4,750 | 4,260 | 5,340 | 12,900 | 1,450 | 1,780 |
| 5 | 473 | 1,160 | 1,080 | 7,510 | 932 | 6,410 | 4,070 | 6,340 | 10,900 | 6,300 | 1,700 | 2,680 |
| 6 | 446 | 2,540 | 1,050 | 5,270 | 1,010 | 8,510 | 3,610 | 8,150 | 9,540 | 4,320 | 1,610 | 2,020 |
| 7 | 425 | 4,230 | 966 | 4,080 | 1,050 | 10,900 | 3,590 | 7,660 | 6,080 | 3,610 | 1,400 | 1,500 |
| 8 | 414 | 2,790 | 898 | 3,410 | 1,020 | 9,440 | 6,830 | 5,930 | 6,470 | 3,200 | 1,370 | 1,240 |
| 9 | 407 | 2,060 | 891 | 3,070 | 960 | 6,060 | 16,200 | 4,930 | 11,100 | 2,730 | 1,520 | 1,090 |
| 10 | 404 | 1,670 | 893 | 2,780 | 920 | 4,870 | 17,300 | 6,040 | 9,650 | 2,700 | 2,430 | 998 |
| 11 | 436 | 1,780 | 1,160 | 2,460 | 985 | 4,410 | 21,700 | 7,010 | 7,250 | 2,890 | 2,770 | 928 |
| 12 | 470 | 4,400 | 3,440 | 2,210 | 1,020 | 3,840 | 19,000 | 5,850 | 7,420 | 2,800 | 2,440 | 881 |
| 13 | 461 | 9,140 | 5,110 | 1,990 | 988 | 3,270 | 14,100 | 5,520 | 9,780 | 2,410 | 3,060 | 859 |
| 14 | 449 | 5,790 | 8,770 | 1,850 | 952 | 2,990 | 10,300 | 4,680 | 11,200 | 2,280 | 2,320 | 893 |
| 15 | 448 | 3,600 | 8,430 | 1,760 | 1,150 | 3,330 | 6,790 | 3,500 | 8,350 | 2,900 | 1,990 | 899 |
| 16 | 502 | 2,940 | 6,320 | 1,620 | 4,730 | 3,240 | 5,130 | 3,400 | 11,300 | 3,420 | 1,710 | 880 |
| 17 | 1,330 | 4,930 | 4,760 | 1,520 | 5,000 | 3,090 | 4,200 | 3,630 | 23,900 | 2,390 | 1,790 | 855 |
| 18 | 1,840 | 6,990 | 3,680 | 1,350 | 3,500 | 2,740 | 3,670 | 15,700 | 15,900 | 1,990 | 1,760 | 909 |
| 19 | 1,230 | 4,690 | 3,110 | 1,200 | 2,890 | 2,500 | 3,470 | 36,900 | 20,400 | 1,800 | 1,540 | 8,390 |
| 20 | 914 | 3,440 | 4,120 | 1,290 | 2,770 | 3,810 | 3,350 | 17,200 | 14,500 | 1,680 | 1,440 | 13,000 |
| 21 | 777 | 2,810 | 13,900 | 1,340 | 3,570 | 11,200 | 3,100 | 11,300 | 13,400 | 1,570 | 1,270 | 4,400 |
| 22 | 715 | 3,000 | 9,720 | 1,210 | 24,200 | 9,870 | 3,190 | 11,200 | 11,800 | 1,490 | 1,170 | 3,030 |
| 23 | 654 | 3,690 | 7,640 | 1,120 | 64,800 | 7,780 | 3,180 | 7,560 | 8,760 | 1,480 | 1,100 | 6,000 |
| 24 | 606 | 3,120 | 5,010 | 843 | 31,300 | 5,510 | 2,890 | 8,080 | 5,630 | 1,370 | 1,030 | 8,260 |
| 25 | 579 | 2,580 | 7,640 | 834 | 18,000 | 4,170 | 2,700 | 6,670 | 4,010 | 1,180 | 970 | 6,040 |
| 26 | 686 | 2,190 | 7,130 | 988 | 14,900 | 3,530 | 2,620 | 5,140 | 3,220 | 1,120 | 930 | 3,810 |
| 27 | 822 | 1,920 | 4,750 | 952 | 12,500 | 3,130 | 2,610 | 4,740 | 2,720 | 1,070 | 897 | 2,720 |
| 28 | 1,070 | 1,780 | 3,670 | 851 | 8,900 | 2,790 | 2,460 | 5,640 | 2,380 | 1,040 | 882 | 7,580 |
| 29 | 1,610 | 1,710 | 3,140 | 904 | --- | 2,580 | 2,310 | 5,280 | 2,190 | 1,050 | 1,030 | 4,680 |
| 30 | 4,970 | 1,580 | 2,780 | 911 | --- | 2,720 | 2,230 | 5,490 | 2,010 | 1,180 | 1,330 | 3,280 |
| 31 | 5,160 | --- | 2,490 | 897 | --- | 3,260 | --- | 4,980 | --- | 1,180 | 989 | --- |
| TOTAL | 30,869 | 94,470 | 127,808 | 79,660 | 211,502 | 165,410 | 188,090 | 230,560 | 259,480 | 90,050 | 47,338 | 92,535 |
| MEAN | 996 | 3,149 | 4,123 | 2,570 | 7,554 | 5,336 | 6,270 | 7,437 | 8,649 | 2,905 | 1,527 | 3,084 |
| MAX | 5,160 | 9,140 | 13,900 | 8,510 | 64,800 | 11,200 | 21,700 | 36,900 | 23,900 | 12,900 | 3,060 | 13,000 |
| MIN | 404 | 1,160 | 891 | 834 | 847 | 2,500 | 2,230 | 2,430 | 2,010 | 1,040 | 882 | 855 |
| (†) | +3,176 | +17,646 | -101 | -151 | +504 | -655 | +252 | 0 | -101 | -1,664 | -2,722 | +3,630 |
| MEAN‡ | 1,098 | 3,737 | 4,120 | 2,565 | 7,572 | 5,315 | 6,278 | 7,437 | 8,646 | 2,851 | 1,439 | 3,206 |
| CFSM‡ | .53 | 1.80 | 1.99 | 1.24 | 3.65 | 2.56 | 3.03 | 3.58 | 4.17 | 1.37 | .69 | 1.55 |
| IN.‡ | .61 | 2.01 | 2.29 | 1.43 | 3.80 | 2.95 | 3.38 | 4.13 | 4.65 | 1.58 | .80 | 1.72 |

| | | | | | | |
|---|---|---|---|---|---|---|
| CAL YR | 2002 | MEAN‡ | 1,733 | CFSM‡ | .84 | IN.‡ 11.34 |
| WTR YR | 2003 | MEAN‡ | 4,487 | CFSM‡ | 2.16 | IN.‡ 29.36 |

† 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.

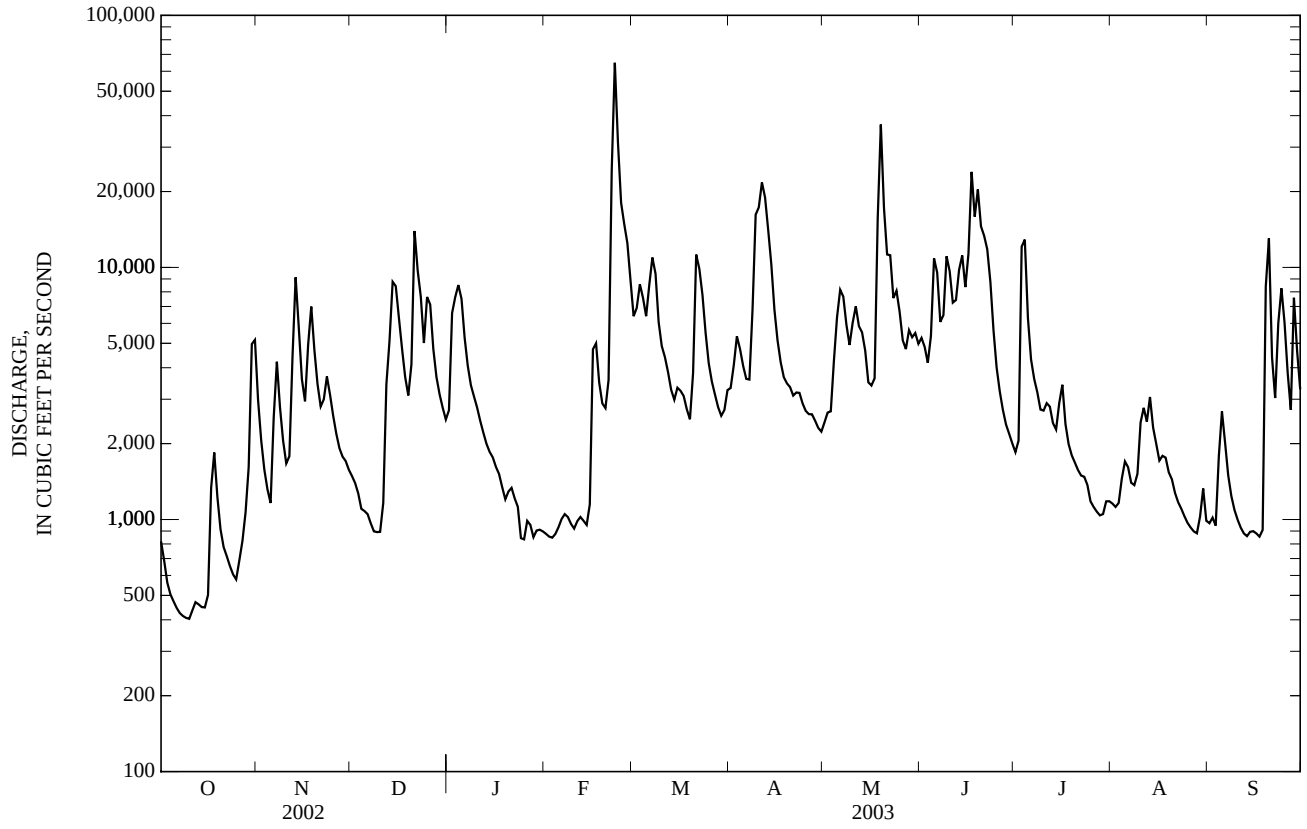
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 1,154 | 1,845 | 2,189 | 3,243 | 3,971 | 5,017 | 4,502 | 3,335 | 2,272 | 1,101 | 1,046 | 1,193 |
| MAX | 5,679 | 10,190 | 6,450 | 10,310 | 11,270 | 12,790 | 16,170 | 8,908 | 8,649 | 2,905 | 3,834 | 4,288 |
| (WY) | (1990) | (1986) | (1997) | (1996) | (1998) | (1993) | (1987) | (1989) | (2003) | (2003) | (1984) | (1996) |
| MIN | 419 | 452 | 453 | 396 | 604 | 922 | 1,081 | 1,457 | 626 | 553 | 338 | 361 |
| (WY) | (1981) | (2002) | (1981) | (1981) | (2002) | (1981) | (1995) | (2000) | (1999) | (1999) | (1981) | (1981) |

02019500 JAMES RIVER AT BUCHANAN, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1980 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 610,119 | | 1,617,772 | | | |
| ANNUAL MEAN | 1,672 | | 4,432 | | 2,563 | |
| HIGHEST ANNUAL MEAN | | | | | 4,432 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 1,092 | 1981 |
| HIGHEST DAILY MEAN | 14,400 | Apr 23 | 64,800 | Feb 23 | 102,000 | Nov 5, 1985 |
| LOWEST DAILY MEAN | 321 | Sep 13 | 404 | Oct 10 | 257 | Oct 1, 1981 |
| ANNUAL SEVEN-DAY MINIMUM | 333 | Sep 8 | 429 | Oct 6 | 268 | Sep 29, 1981 |
| MAXIMUM PEAK FLOW | | | 72,000 | Feb 23 | a179,000 | Nov 5, 1985 |
| MAXIMUM PEAK STAGE | | | 24.03 | Feb 23 | a,b38.84 | Nov 5, 1985 |
| INSTANTANEOUS LOW FLOW | | | 398 | Oct 10 | c,d230 | fJan 11, 1981 |
| ANNUAL RUNOFF (CFSM) | 0.81 | | 2.14 | | 1.24 | |
| ANNUAL RUNOFF (INCHES) | 10.94 | | 29.00 | | 16.78 | |
| 10 PERCENT EXCEEDS | 4,270 | | 9,680 | | 5,610 | |
| 50 PERCENT EXCEEDS | 771 | | 2,790 | | 1,240 | |
| 90 PERCENT EXCEEDS | 438 | | 892 | | 535 | |

a Prior to regulation, 1898-1979, maximum peak flow, 115,000 $ft^3/s$, Mar. 27, 1913, gage height, 31.00 ft, from floodmarks.
b From floodmarks.
c Prior to regulation, 1898-1979, instantaneous low flow, 202 $ft^3/s$, Sept. 8, 1966.
d Result of freezeup.
f Also Jan. 12, 1981.



## 02020500 CALFPASTURE RIVER ABOVE MILL CREEK, AT GOSHEN, VA

LOCATION.--Lat 37°59'16", long 79°29'37", NAD83, Rockbridge County, Hydrologic Unit 02080202, on left bank 20 ft upstream from bridge on State Highway 42, at Goshen and 400 ft upstream from Mill Creek.

DRAINAGE AREA.--144 $mi^2$.

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 NGVD of 1929. Prior to Oct. 1, 1998, at datum 2.0 ft higher.

REMARKS.--Records good except those for periods with ice effect, Dec. 6-8, Jan. 16-20, 22-28, and Feb. 6-17, and periods of doubtful or no gage-height record, Mar. 14-19, Mar. 23 to Apr. 7, and July 18-23, which are fair. Virginia Department of Emergency Services gage-height radio transmitter at station. Maximum discharge, 56,300 $ft^3/s$, from rating curve extended above 9,200 $ft^3/s$ on basis of slope-area measurement at gage heights 12.78 ft and 20.23 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Dec 20 | 1445 | 3,530 | 7.41 | Jul 15 | 0400 | 2,730 | 6.66 |
| Feb 22 | 2130 | *6,590 | *9.51 | Sep 19 | 1330 | 4,860 | 8.43 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 25 | 256 | 92 | 190 | 37 | 307 | e280 | 141 | 175 | 63 | 35 | 28 |
| 2 | 19 | 170 | 81 | 664 | 36 | 523 | e348 | 124 | 151 | 69 | 34 | 26 |
| 3 | 16 | 124 | 73 | 615 | 36 | 1,060 | e365 | 118 | 148 | 139 | 38 | 46 |
| 4 | 13 | 99 | 65 | 547 | 40 | 700 | e285 | 540 | 1,100 | 140 | 77 | 90 |
| 5 | 12 | 86 | 69 | 407 | 45 | 637 | e240 | 863 | 1,830 | 111 | 60 | 87 |
| 6 | 10 | 505 | e58 | 317 | e39 | 1,290 | e220 | 635 | 888 | 88 | 64 | 84 |
| 7 | 9.0 | 457 | e50 | 248 | e35 | 1,260 | e400 | 454 | 562 | 73 | 74 | 67 |
| 8 | 8.1 | 270 | e53 | 208 | e33 | 704 | e820 | 339 | 619 | 66 | 119 | 54 |
| 9 | 7.5 | 187 | 49 | 185 | e31 | 481 | e1,200 | 268 | 927 | 69 | 125 | 46 |
| 10 | 7.6 | 142 | 45 | 160 | e35 | 420 | e1,000 | 751 | 654 | 77 | 109 | 41 |
| 11 | 9.2 | 251 | 127 | 138 | e33 | 340 | e1,400 | 1,020 | 422 | 100 | 98 | 36 |
| 12 | 9.3 | 873 | 328 | 122 | e30 | 273 | e900 | 616 | 352 | 116 | 622 | 32 |
| 13 | 7.9 | 1,340 | 444 | 116 | e28 | 235 | e670 | 385 | 480 | 97 | 442 | 31 |
| 14 | 6.7 | 604 | 796 | 101 | e35 | e300 | e410 | 275 | 812 | 1,210 | 248 | 31 |
| 15 | 6.6 | 343 | 652 | 89 | e40 | e260 | e320 | 215 | 587 | 1,510 | 181 | 29 |
| 16 | 34 | 254 | 453 | e86 | e34 | e235 | e250 | 203 | 1,040 | 538 | 141 | 27 |
| 17 | 126 | 491 | 344 | e80 | e45 | e215 | e210 | 168 | 1,190 | 277 | 115 | 26 |
| 18 | 122 | 690 | 277 | e72 | 67 | e190 | 180 | 842 | 1,660 | e190 | 97 | 28 |
| 19 | 78 | 458 | 229 | e80 | 64 | e165 | 171 | 1,380 | 1,000 | e130 | 80 | 2,680 |
| 20 | 55 | 324 | 1,850 | e68 | 62 | 382 | 152 | 756 | 724 | e100 | 68 | 1,190 |
| 21 | 46 | 259 | 1,500 | 64 | 88 | 1,260 | 149 | 498 | 815 | e86 | 59 | 502 |
| 22 | 37 | 319 | 679 | e63 | 2,600 | 547 | 223 | 399 | 543 | e75 | 52 | 279 |
| 23 | 30 | 360 | 389 | e60 | 3,640 | e400 | 215 | 349 | 352 | e68 | 46 | 1,100 |
| 24 | 26 | 300 | 286 | e57 | 1,760 | e300 | 189 | 312 | 246 | 61 | 42 | 838 |
| 25 | 24 | 237 | 255 | e67 | 1,060 | e260 | 172 | 264 | 181 | 53 | 38 | 407 |
| 26 | 32 | 191 | 211 | e60 | 634 | e210 | 167 | 232 | 141 | 47 | 34 | 241 |
| 27 | 49 | 161 | 167 | e52 | 425 | e190 | 158 | 194 | 114 | 42 | 32 | 170 |
| 28 | 68 | 135 | 144 | e46 | 335 | e180 | 155 | 172 | 97 | 39 | 32 | 367 |
| 29 | 101 | 115 | 131 | 42 | --- | e170 | 150 | 161 | 84 | 44 | 34 | 321 |
| 30 | 692 | 102 | 120 | 39 | --- | e200 | 142 | 168 | 72 | 36 | 29 | 218 |
| 31 | 438 | --- | 112 | 38 | --- | e215 | --- | 162 | --- | 35 | 31 | --- |
| TOTAL | 2,124.9 | 10,103 | 10,129 | 5,081 | 11,347 | 13,909 | 11,541 | 13,004 | 17,966 | 5,749 | 3,256 | 9,122 |
| MEAN | 68.5 | 337 | 327 | 164 | 405 | 449 | 385 | 419 | 599 | 185 | 105 | 304 |
| MAX | 692 | 1,340 | 1,850 | 664 | 3,640 | 1,290 | 1,400 | 1,380 | 1,830 | 1,510 | 622 | 2,680 |
| MIN | 6.6 | 86 | 45 | 38 | 28 | 165 | 142 | 118 | 72 | 35 | 29 | 26 |
| CFSM | 0.48 | 2.34 | 2.27 | 1.14 | 2.81 | 3.12 | 2.67 | 2.91 | 4.16 | 1.29 | 0.73 | 2.11 |
| IN. | 0.55 | 2.61 | 2.62 | 1.31 | 2.93 | 3.59 | 2.98 | 3.36 | 4.64 | 1.49 | 0.84 | 2.36 |

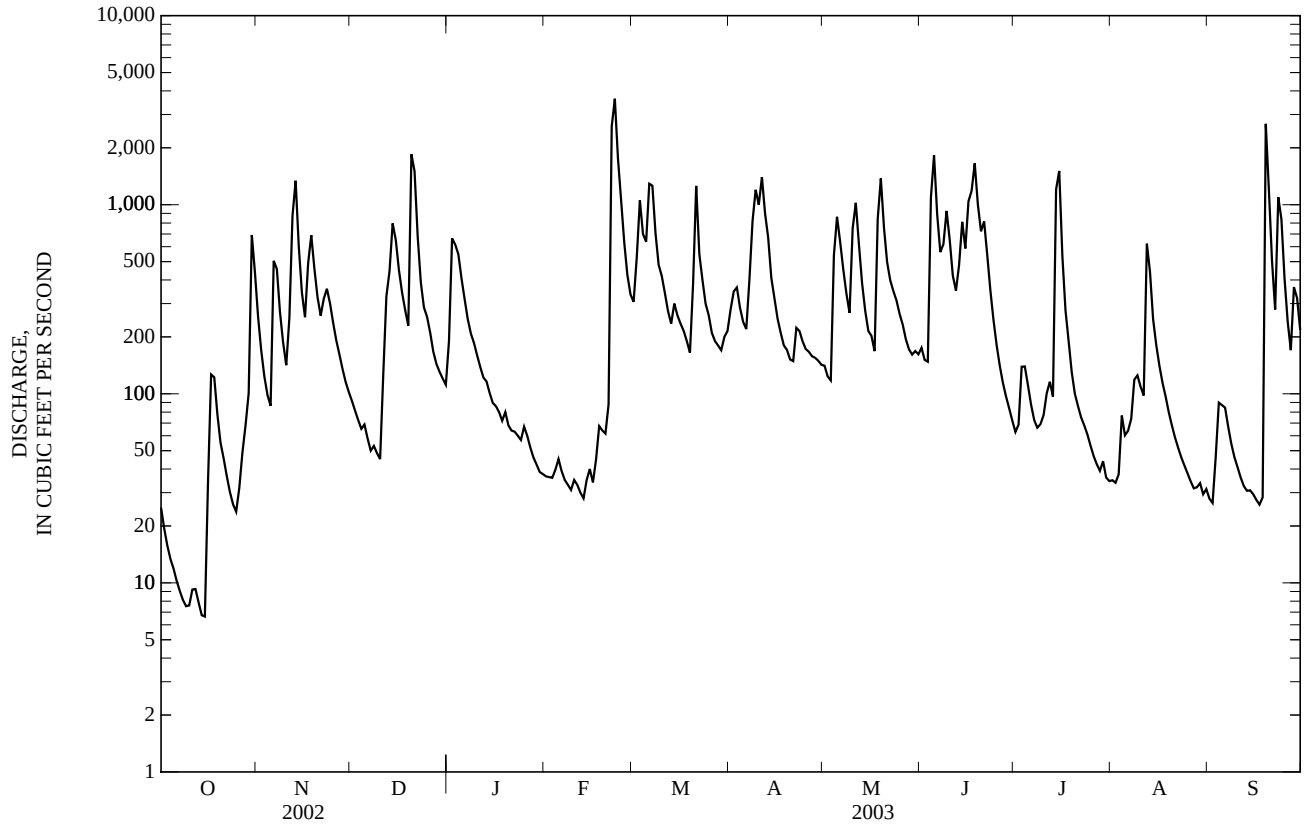
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 1996, 1999 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 73.0 | 124 | 186 | 224 | 260 | 357 | 266 | 223 | 139 | 48.7 | 57.1 | 62.8 |
| MAX | 469 | 1,540 | 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 | 5.52 | 8.38 | 7.82 | 22.4 | 50.9 | 47.3 | 29.0 | 10.2 | 3.77 | 2.73 | 2.08 |
| (WY) | (1942) | (2002) | (1999) | (1981) | (2002) | (1981) | (1995) | (1977) | (1964) | (1966) | (1999) | (1970) |

02020500 CALFPASTURE RIVER ABOVE MILL CREEK, AT GOSHEN, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1939 - 1996 1999 - 2003 | | |
|---|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 45,037.96 | | 113,331.9 | | | | |
| ANNUAL MEAN | 123 | | 310 | | 168 | | |
| HIGHEST ANNUAL MEAN | | | | | 310 | | 2003 |
| LOWEST ANNUAL MEAN | | | | | 64.1 | | 2002 |
| HIGHEST DAILY MEAN | 2,470 | Apr 22 | 3,640 | Feb 23 | 21,900 | Nov 5, 1985 | |
| LOWEST DAILY MEAN | 0.41 | Sep 14 | 6.6 | Oct 15 | a0.00 | bSep 5, 1957 | |
| ANNUAL SEVEN-DAY MINIMUM | 0.67 | Sep 9 | 7.8 | Oct 9 | 0.67 | Sep 9, 2002 | |
| MAXIMUM PEAK FLOW | | | 6,590 | Feb 22 | 56,300 | Nov 4, 1985 | |
| MAXIMUM PEAK STAGE | | | 9.51 | Feb 22 | 20.23 | Nov 4, 1985 | |
| INSTANTANEOUS LOW FLOW | | | 6.5 | cOct 14 | a0.00 | bSep 5, 1957 | |
| ANNUAL RUNOFF (CFSM) | 0.86 | | 2.16 | | 1.17 | | |
| ANNUAL RUNOFF (INCHES) | 11.63 | | 29.28 | | 15.84 | | |
| 10 PERCENT EXCEEDS | 322 | | 813 | | 379 | | |
| 50 PERCENT EXCEEDS | 28 | | 161 | | 62 | | |
| 90 PERCENT EXCEEDS | 3.3 | | 33 | | 7.5 | | |

a Result of diversion.
b Also Sept. 6, 1957, and Sept. 28, 1959.
c Also Oct. 15, 2002.
e Estimated.



## 02021500 MAURY RIVER AT ROCKBRIDGE BATHS, VA

LOCATION.--Lat 37°54'26", long 79°25'19", NAD83, 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 $mi^2$.

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 NGVD of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--Records good except those for periods with ice effect, Dec. 4-6 and Jan. 12 to Feb. 15, 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 $ft^3/s$, from rating curve extended above 16,000 $ft^3/s$ on basis of slope-area measurement 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Dec 20 | 1845 | 4,950 | 6.66 | May 18 | 2130 | 4,700 | 6.46 |
| Feb 22 | 2115 | *12,600 | *9.34 | Sep 19 | 1430 | 6,840 | 7.53 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 49 | 423 | 191 | 670 | e92 | 948 | 554 | 419 | 584 | 172 | 92 | 65 |
| 2 | 39 | 276 | 168 | 1,500 | e90 | 1,450 | 833 | 374 | 488 | 200 | 82 | 60 |
| 3 | 33 | 203 | 153 | 1,410 | e90 | 2,160 | 909 | 344 | 455 | 584 | 85 | 56 |
| 4 | 30 | 166 | e130 | 1,300 | e95 | 1,610 | 781 | 772 | 1,900 | 481 | 223 | 167 |
| 5 | 29 | 148 | e125 | 1,030 | e95 | 1,500 | 679 | 1,600 | 3,440 | 334 | 207 | 205 |
| 6 | 27 | 739 | e120 | 839 | e95 | 2,220 | 576 | 1,350 | 1,880 | 247 | 195 | 170 |
| 7 | 25 | 775 | 122 | 675 | e90 | 2,160 | 1,030 | 1,080 | 1,520 | 200 | 180 | 133 |
| 8 | 23 | 481 | 117 | 580 | e90 | 1,490 | 2,030 | 855 | 1,640 | 177 | 213 | 109 |
| 9 | 22 | 327 | 113 | 525 | e90 | 1,160 | 2,710 | 680 | 2,280 | 181 | 294 | 92 |
| 10 | 22 | 248 | 108 | 444 | e87 | 989 | 2,860 | 1,020 | 1,550 | 212 | 519 | 75 |
| 11 | 27 | 431 | 287 | 375 | e85 | 830 | 3,420 | 1,500 | 1,080 | 246 | 383 | 64 |
| 12 | 28 | 1,390 | 794 | e300 | e80 | 693 | 2,450 | 1,110 | 1,520 | 245 | 1,080 | 57 |
| 13 | 26 | 2,140 | 977 | e270 | e75 | 606 | 1,640 | 797 | 1,470 | 204 | 904 | 55 |
| 14 | 23 | 1,070 | 1,570 | e250 | e70 | 580 | 1,150 | 599 | 2,190 | 1,470 | 511 | 56 |
| 15 | 21 | 668 | 1,290 | e220 | e100 | 552 | 875 | 484 | 1,420 | 2,020 | 370 | 55 |
| 16 | 50 | 541 | 963 | e190 | 277 | 490 | 752 | 519 | 2,080 | 972 | 295 | 109 |
| 17 | 166 | 1,160 | 755 | e180 | 235 | 447 | 641 | 428 | 2,490 | 519 | 238 | 323 |
| 18 | 175 | 1,380 | 618 | e170 | 234 | 413 | 558 | 2,510 | 2,800 | 357 | 197 | 387 |
| 19 | 119 | 954 | 522 | e160 | 208 | 378 | 534 | 3,280 | 2,180 | 270 | 163 | 4,160 |
| 20 | 88 | 692 | 2,460 | e150 | 200 | 1,240 | 465 | 1,870 | 1,660 | 217 | 138 | 1,790 |
| 21 | 70 | 562 | 2,500 | e140 | 352 | 3,130 | 435 | 1,410 | 1,630 | 178 | 119 | 997 |
| 22 | 60 | 698 | 1,320 | e130 | 5,770 | 1,820 | 779 | 1,190 | 1,310 | 153 | 105 | 685 |
| 23 | 53 | 729 | 897 | e125 | 8,430 | 1,230 | 818 | 1,020 | 881 | 145 | 93 | 2,830 |
| 24 | 47 | 609 | 709 | e120 | 3,900 | 926 | 663 | 853 | 569 | 131 | 76 | 1,730 |
| 25 | 43 | 489 | 716 | e115 | 2,440 | 739 | 583 | 703 | 484 | 113 | 66 | 936 |
| 26 | 54 | 393 | 619 | e105 | 1,690 | 631 | 552 | 696 | 392 | 99 | 60 | 685 |
| 27 | 69 | 332 | 499 | e100 | 1,260 | 550 | 491 | 601 | 314 | 84 | 56 | 782 |
| 28 | 103 | 276 | 426 | e100 | 1,010 | 457 | 432 | 561 | 261 | 70 | 63 | 1,000 |
| 29 | 138 | 235 | 383 | e96 | --- | 428 | 395 | 550 | 228 | 156 | 112 | 722 |
| 30 | 899 | 211 | 347 | e95 | --- | 483 | 370 | 582 | 196 | 112 | 84 | 599 |
| 31 | 691 | --- | 319 | e94 | --- | 516 | --- | 526 | --- | 90 | 77 | --- |
| TOTAL | 3,249 | 18,746 | 20,318 | 12,458 | 27,330 | 32,826 | 30,965 | 30,283 | 40,892 | 10,639 | 7,280 | 19,154 |
| MEAN | 105 | 625 | 655 | 402 | 976 | 1,059 | 1,032 | 977 | 1,363 | 343 | 235 | 638 |
| MAX | 899 | 2,140 | 2,500 | 1,500 | 8,430 | 3,130 | 3,420 | 3,280 | 3,440 | 2,020 | 1,080 | 4,160 |
| MIN | 21 | 148 | 108 | 94 | 70 | 378 | 370 | 344 | 196 | 70 | 56 | 55 |
| CFSM | 0.32 | 1.90 | 1.99 | 1.22 | 2.97 | 3.22 | 3.14 | 2.97 | 4.14 | 1.04 | 0.71 | 1.94 |
| IN. | 0.37 | 2.12 | 2.30 | 1.41 | 3.09 | 3.71 | 3.50 | 3.42 | 4.62 | 1.20 | 0.82 | 2.17 |

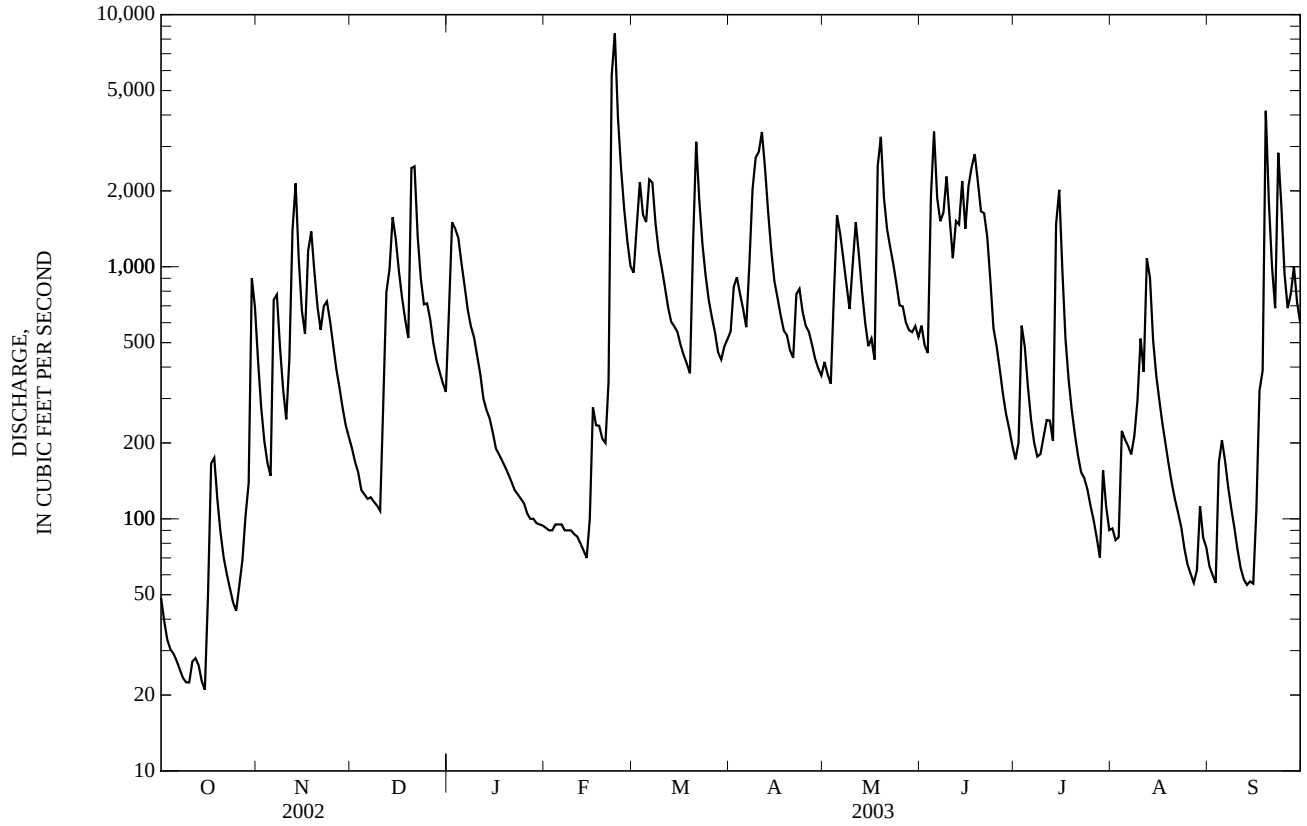
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 187 | 269 | 400 | 539 | 611 | 838 | 624 | 472 | 280 | 120 | 135 | 140 |
| MAX | 1,254 | 2,689 | 1,450 | 1,895 | 1,530 | 2,017 | 2,245 | 1,463 | 1,374 | 807 | 1,016 | 1,388 |
| (WY) | (1980) | (1986) | (1974) | (1998) | (1998) | (1936) | (1987) | (1989) | (1995) | (1972) | (1969) | (1996) |
| MIN | 16.5 | 20.9 | 26.6 | 32.3 | 50.9 | 117 | 122 | 81.0 | 34.7 | 14.6 | 14.9 | 16.1 |
| (WY) | (1931) | (2002) | (1966) | (1981) | (1934) | (1981) | (1995) | (1930) | (1964) | (1966) | (1964) | (1930) |

02021500 MAURY RIVER AT ROCKBRIDGE BATHS, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1929 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 88,170.9 | | 254,140 | | | |
| ANNUAL MEAN | 242 | | 696 | | 384 | |
| HIGHEST ANNUAL MEAN | | | | | 696 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 132 | 2002 |
| HIGHEST DAILY MEAN | 4,530 | Apr 22 | 8,430 | Feb 23 | 41,500 | Nov 5, 1985 |
| LOWEST DAILY MEAN | 9.6 | aSep 12 | 21 | Oct 15 | 7.1 | Sep 10, 1966 |
| ANNUAL SEVEN-DAY MINIMUM | 10 | Sep 8 | 24 | Oct 9 | 8.2 | Sep 7, 1966 |
| MAXIMUM PEAK FLOW | | | 12,600 | Feb 22 | 87,700 | Nov 5, 1985 |
| MAXIMUM PEAK STAGE | | | 9.34 | Feb 22 | b19.19 | Nov 5, 1985 |
| INSTANTANEOUS LOW FLOW | | | 21 | Oct 15 | 5.8 | Sep 10, 1966 |
| ANNUAL RUNOFF (CFSM) | 0.73 | | 2.12 | | 1.17 | |
| ANNUAL RUNOFF (INCHES) | 9.97 | | 28.74 | | 15.84 | |
| 10 PERCENT EXCEEDS | 691 | | 1,650 | | 899 | |
| 50 PERCENT EXCEEDS | 64 | | 431 | | 153 | |
| 90 PERCENT EXCEEDS | 16 | | 70 | | 30 | |

a Also Sept. 13, 2002.
b From floodmarks.
e Estimated.



## 02022500 KERRS CREEK NEAR LEXINGTON, VA

LOCATION.--Lat 37°49'32", long 79°26'35", NAD83, 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 $mi^2$.

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 NGVD of 1929 (levels by U.S. Army Corps of Engineers). Jan. 27, 1927, to Sept. 30, 1953, nonrecording gage at site 1,000 ft downstream at different datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 7, 8, and Jan. 17-19, 21-24, 28, which are fair. Maximum discharge, 23,000 $ft^3/s$, from rating curve extended above 800 $ft^3/s$ on basis of contracted-opening and slope-area measurements of peak flow. Minimum discharge, 0.90 $ft^3/s$, 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1215 | *3,980 | *9.41 | Aug 8 | 1930 | 1,050 | 6.41 |
| Feb 23 | 0815 | 1,070 | 6.45 | Sep 19 | 0215 | 1,520 | 7.17 |
| Mar 20 | 1245 | 627 | 5.54 | Sep 23 | 0115 | 1,760 | 7.51 |
| May 18 | 1200 | 831 | 5.99 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.7 | 11 | 11 | 134 | 11 | 82 | 51 | 24 | 45 | 26 | 15 | 15 |
| 2 | 4.5 | 9.7 | 11 | 117 | 11 | 156 | 63 | 21 | 37 | 42 | 14 | 14 |
| 3 | 4.4 | 8.0 | 11 | 124 | 11 | 138 | 53 | 23 | 68 | 88 | 14 | 12 |
| 4 | 4.4 | 7.6 | 9.9 | 95 | 13 | 97 | 46 | 92 | 205 | 46 | 16 | 37 |
| 5 | 4.3 | 8.7 | 12 | 68 | 12 | 96 | 41 | 76 | 184 | 35 | 29 | 29 |
| 6 | 3.9 | 36 | 10 | 53 | 11 | 112 | 33 | 74 | 105 | 30 | 17 | 20 |
| 7 | 3.8 | 17 | e8.2 | 42 | 12 | 88 | 98 | 57 | 206 | 27 | 15 | 17 |
| 8 | 3.7 | 13 | e8.5 | 37 | 11 | 66 | 98 | 45 | 179 | 25 | 87 | 16 |
| 9 | 3.7 | 11 | 9.4 | 32 | 9.9 | 53 | 337 | 36 | 243 | 26 | 28 | 14 |
| 10 | 3.3 | 9.6 | 8.6 | 28 | 11 | 44 | 210 | 34 | 129 | 26 | 27 | 13 |
| 11 | 4.7 | 16 | 31 | 24 | 11 | 37 | 306 | 31 | 98 | 27 | 26 | 12 |
| 12 | 4.6 | 81 | 42 | 22 | 10 | 33 | 164 | 25 | 84 | 22 | 20 | 12 |
| 13 | 3.7 | 55 | 75 | 21 | 9.4 | 31 | 112 | 22 | 104 | 23 | 19 | 12 |
| 14 | 3.4 | 28 | 110 | 20 | 9.9 | 28 | 84 | 20 | 88 | 22 | 18 | 13 |
| 15 | 3.3 | 21 | 63 | 19 | 30 | 25 | 67 | 22 | 67 | 20 | 16 | 12 |
| 16 | 12 | 34 | 44 | 18 | 49 | 24 | 56 | 26 | 185 | 19 | 15 | 11 |
| 17 | 9.5 | 125 | 33 | e17 | 34 | 23 | 47 | 22 | 189 | 18 | 14 | 11 |
| 18 | 5.8 | 70 | 28 | e14 | 25 | 22 | 44 | 470 | 173 | 17 | 13 | 18 |
| 19 | 4.5 | 40 | 24 | e15 | 21 | 21 | 40 | 287 | 168 | 17 | 13 | 379 |
| 20 | 4.0 | 29 | 94 | 15 | 25 | 277 | 34 | 143 | 144 | 16 | 12 | 73 |
| 21 | 4.6 | 27 | 64 | e14 | 78 | 190 | 33 | 115 | 112 | 15 | 12 | 42 |
| 22 | 4.5 | 36 | 42 | e13 | 1,330 | 108 | 44 | 91 | 87 | 16 | 12 | 48 |
| 23 | 4.0 | 28 | 32 | e12 | 729 | 75 | 35 | 79 | 68 | 16 | 11 | 392 |
| 24 | 3.8 | 23 | 39 | e11 | 261 | 58 | 32 | 68 | 56 | 15 | 11 | 93 |
| 25 | 4.2 | 21 | 74 | 13 | 168 | 47 | 31 | 56 | 47 | 14 | 11 | 57 |
| 26 | 7.8 | 18 | 54 | 12 | 119 | 41 | 30 | 56 | 41 | 13 | 10 | 42 |
| 27 | 6.4 | 16 | 38 | 11 | 91 | 35 | 27 | 53 | 37 | 13 | 10 | 55 |
| 28 | 7.3 | 14 | 32 | e11 | 79 | 31 | 24 | 51 | 33 | 13 | 23 | 94 |
| 29 | 15 | 13 | 29 | 12 | --- | 30 | 23 | 56 | 30 | 15 | 31 | 47 |
| 30 | 27 | 13 | 25 | 12 | --- | 44 | 22 | 53 | 28 | 14 | 17 | 37 |
| 31 | 15 | --- | 23 | 11 | --- | 45 | --- | 52 | --- | 13 | 19 | --- |
| TOTAL | 195.8 | 839.6 | 1,095.6 | 1,047 | 3,192.2 | 2,157 | 2,285 | 2,280 | 3,240 | 729 | 595 | 1,647 |
| MEAN | 6.32 | 28.0 | 35.3 | 33.8 | 114 | 69.6 | 76.2 | 73.5 | 108 | 23.5 | 19.2 | 54.9 |
| MAX | 27 | 125 | 110 | 134 | 1,330 | 277 | 337 | 470 | 243 | 88 | 87 | 392 |
| MIN | 3.3 | 7.6 | 8.2 | 11 | 9.4 | 21 | 22 | 20 | 28 | 13 | 10 | 11 |
| CFSM | 0.18 | 0.80 | 1.01 | 0.96 | 3.26 | 1.99 | 2.18 | 2.10 | 3.09 | 0.67 | 0.55 | 1.57 |
| IN. | 0.21 | 0.89 | 1.16 | 1.11 | 3.39 | 2.29 | 2.43 | 2.42 | 3.44 | 0.77 | 0.63 | 1.75 |

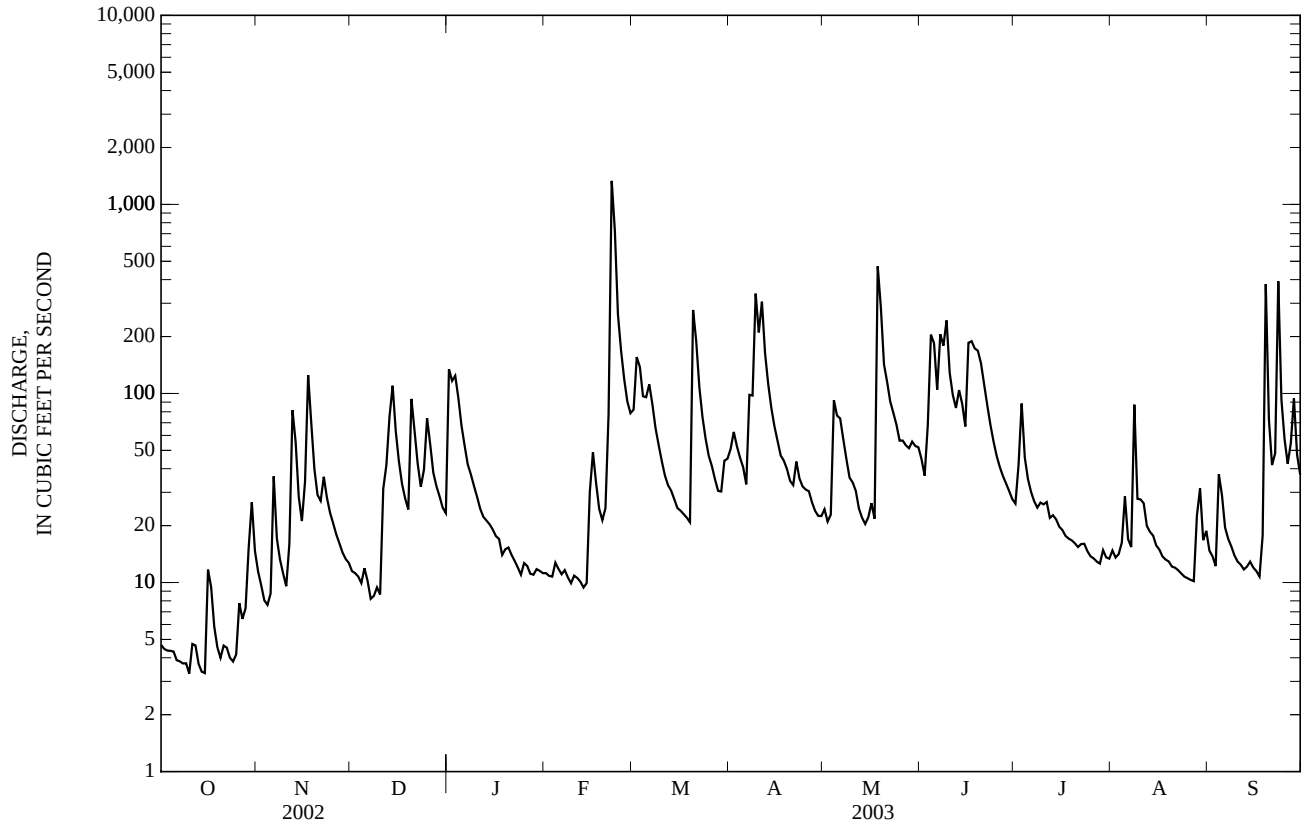
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1927 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 22.2 | 23.5 | 32.0 | 45.2 | 54.4 | 72.3 | 57.5 | 38.7 | 28.3 | 17.4 | 23.0 | 19.4 |
| 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 | 6.34 | 5.88 | 5.15 | 5.46 | 11.6 | 10.3 | 12.0 | 6.42 | 5.56 | 4.11 | 4.36 |
| (WY) | (1964) | (2002) | (1966) | (1966) | (2002) | (2002) | (1942) | (1956) | (2002) | (1966) | (2002) | (2002) |

02022500 KERRS CREEK NEAR LEXINGTON, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1927 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 5,353.9 | | 19,303.2 | | | |
| ANNUAL MEAN | 14.7 | | 52.9 | | 36.1 | |
| HIGHEST ANNUAL MEAN | | | | | 75.5 | 1936 |
| LOWEST ANNUAL MEAN | | | | | 10.4 | 2002 |
| HIGHEST DAILY MEAN | 336 | Apr 22 | 1,330 | Feb 22 | e4,840 | Mar 17, 1936 |
| LOWEST DAILY MEAN | 3.3 | aOct 10 | 3.3 | aOct 10 | 3.3 | aOct 10, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 3.5 | bSep 1 | 3.8 | Oct 9 | 3.5 | bSep 1, 2002 |
| MAXIMUM PEAK FLOW | | | 3,980 | Feb 22 | 23,000 | Sep 10, 1950 |
| MAXIMUM PEAK STAGE | | | 9.41 | Feb 22 | c15.44 | Jun 28, 1995 |
| INSTANTANEOUS LOW FLOW | | | 2.7 | Oct 10 | d0.90 | Jul 22, 1966 |
| ANNUAL RUNOFF (CFSM) | 0.42 | | 1.51 | | 1.03 | |
| ANNUAL RUNOFF (INCHES) | 5.69 | | 20.52 | | 14.00 | |
| 10 PERCENT EXCEEDS | 32 | | 112 | | 68 | |
| 50 PERCENT EXCEEDS | 7.3 | | 27 | | 17 | |
| 90 PERCENT EXCEEDS | 3.8 | | 9.7 | | 7.4 | |

a Also Oct. 15, 2002.
b Also Sept. 2-8, 2002.
c From high-water mark in gage house.
d Result of temporary dam upstream.
e Estimated.



## 02024000 MAURY RIVER NEAR BUENA VISTA, VA

LOCATION.--Lat 37°45'45", long 79°23'29", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 5, 6, and Jan. 13-28, which are fair. Since 1966, some regulation at times by Lake Merriweather on Little Calfpasture River. Maximum discharge, 105,000 $ft^3/s$, from rating curve extended above 17,000 $ft^3/s$ 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 Mar. 18, 1936, reached a stage of about 22 ft, from information by local residents.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,200 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1930 | 17,100 | 13.20 | Sep 19 | 0315 | *23,000 | *15.36 |
| May 18 | 2130 | 6,800 | 7.89 | Sep 23 | 0615 | 9,180 | 9.41 |
| Jun 5 | 0415 | 6,750 | 7.85 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 103 | 598 | 320 | 1,020 | 219 | 1,730 | 1,120 | 722 | 1,230 | 537 | 257 | 228 |
| 2 | 88 | 390 | 292 | 2,440 | 218 | 2,280 | 1,410 | 662 | 1,070 | 637 | 272 | 244 |
| 3 | 80 | 299 | 268 | 2,350 | 214 | 3,260 | 1,560 | 606 | 1,000 | 1,130 | 282 | 227 |
| 4 | 74 | 248 | 247 | 2,180 | 233 | 2,610 | 1,380 | 867 | 2,180 | 1,080 | 557 | 510 |
| 5 | 72 | 233 | e240 | 1,790 | 252 | 2,290 | 1,220 | 2,000 | 5,220 | 837 | 840 | 647 |
| 6 | 69 | 679 | e230 | 1,490 | 238 | 2,940 | 1,060 | 1,790 | 2,930 | 669 | 573 | 423 |
| 7 | 68 | 1,120 | 222 | 1,230 | 239 | 3,060 | 1,310 | 1,500 | 2,780 | 564 | 535 | 337 |
| 8 | 66 | 692 | 215 | 1,040 | 230 | 2,300 | 2,730 | 1,230 | 2,730 | 497 | 889 | 283 |
| 9 | 65 | 465 | 216 | 940 | 209 | 1,820 | 4,010 | 1,010 | 3,690 | 481 | 1,250 | 245 |
| 10 | 68 | 358 | 205 | 828 | 216 | 1,570 | 4,490 | 1,100 | 2,760 | e580 | 1,710 | 221 |
| 11 | 86 | 599 | 295 | 711 | 217 | 1,360 | 5,330 | 1,840 | 2,110 | 546 | 1,250 | 200 |
| 12 | 91 | 1,620 | 1,020 | 594 | 209 | 1,170 | 4,130 | 1,490 | 2,390 | 531 | 1,380 | 184 |
| 13 | 84 | 3,170 | 1,340 | e500 | 195 | 1,040 | 2,930 | 1,110 | 2,270 | 467 | 1,580 | 187 |
| 14 | 75 | 1,710 | 2,300 | e470 | 200 | 961 | 2,210 | 876 | 3,150 | 1,500 | 1,100 | 188 |
| 15 | 71 | 1,060 | 2,020 | e410 | 290 | 917 | 1,710 | 741 | 2,470 | 2,420 | 802 | 177 |
| 16 | 109 | 934 | 1,550 | e390 | 561 | 852 | 1,510 | 813 | 3,030 | 1,490 | 697 | 170 |
| 17 | 191 | 1,800 | 1,220 | e350 | 458 | 787 | 1,310 | 704 | 3,920 | 836 | 660 | 257 |
| 18 | 234 | 2,280 | 1,000 | e320 | 466 | 731 | 1,150 | 3,360 | 3,950 | 630 | 613 | 760 |
| 19 | 190 | 1,630 | 852 | e330 | 415 | 684 | 1,100 | 5,240 | 3,540 | 509 | 488 | 11,500 |
| 20 | 150 | 1,180 | 2,420 | e320 | 404 | 2,090 | 977 | 3,110 | 2,850 | 434 | 416 | 4,020 |
| 21 | 139 | 925 | 3,890 | e300 | 668 | 4,670 | 906 | 2,360 | 2,760 | 373 | 367 | 2,250 |
| 22 | 127 | 983 | 2,150 | e280 | 8,940 | 3,040 | 1,120 | 2,050 | 2,320 | 360 | 335 | 1,740 |
| 23 | 114 | 1,060 | 1,500 | e260 | 12,700 | 2,120 | 1,280 | 1,770 | 1,820 | 358 | 307 | 7,190 |
| 24 | 105 | 916 | 1,240 | e250 | 6,300 | 1,670 | 1,090 | 1,580 | 1,310 | 318 | 280 | 3,870 |
| 25 | 102 | 752 | 1,330 | e250 | 4,000 | 1,380 | 966 | 1,310 | 1,130 | 285 | 256 | 2,280 |
| 26 | 131 | 611 | 1,190 | e230 | 2,900 | 1,190 | 929 | 1,310 | 978 | 255 | 240 | 1,730 |
| 27 | 133 | 517 | 969 | e220 | 2,230 | 1,070 | 856 | 1,190 | 860 | 237 | 227 | 1,520 |
| 28 | 165 | 447 | 841 | e210 | 1,860 | 923 | 759 | 1,150 | 763 | 221 | 215 | 2,460 |
| 29 | 228 | 384 | 744 | 236 | --- | 879 | 699 | 1,230 | 680 | 320 | 330 | 1,640 |
| 30 | 889 | 349 | 667 | 231 | --- | 1,040 | 660 | 1,410 | 592 | 319 | 279 | 1,360 |
| 31 | 997 | --- | 601 | 222 | --- | 1,120 | --- | 1,300 | --- | 258 | 315 | --- |
| TOTAL | 5,164 | 28,009 | 31,594 | 22,392 | 45,281 | 53,554 | 51,912 | 47,431 | 68,483 | 19,679 | 19,302 | 47,048 |
| MEAN | 167 | 934 | 1,019 | 722 | 1,617 | 1,728 | 1,730 | 1,530 | 2,283 | 635 | 623 | 1,568 |
| MAX | 997 | 3,170 | 3,890 | 2,440 | 12,700 | 4,670 | 5,330 | 5,240 | 5,220 | 2,420 | 1,710 | 11,500 |
| MIN | 65 | 233 | 205 | 210 | 195 | 684 | 660 | 606 | 592 | 221 | 215 | 170 |
| CFSM | 0.26 | 1.45 | 1.58 | 1.12 | 2.50 | 2.67 | 2.68 | 2.37 | 3.53 | 0.98 | 0.96 | 2.43 |
| IN. | 0.30 | 1.61 | 1.82 | 1.29 | 2.61 | 3.08 | 2.99 | 2.73 | 3.94 | 1.13 | 1.11 | 2.71 |

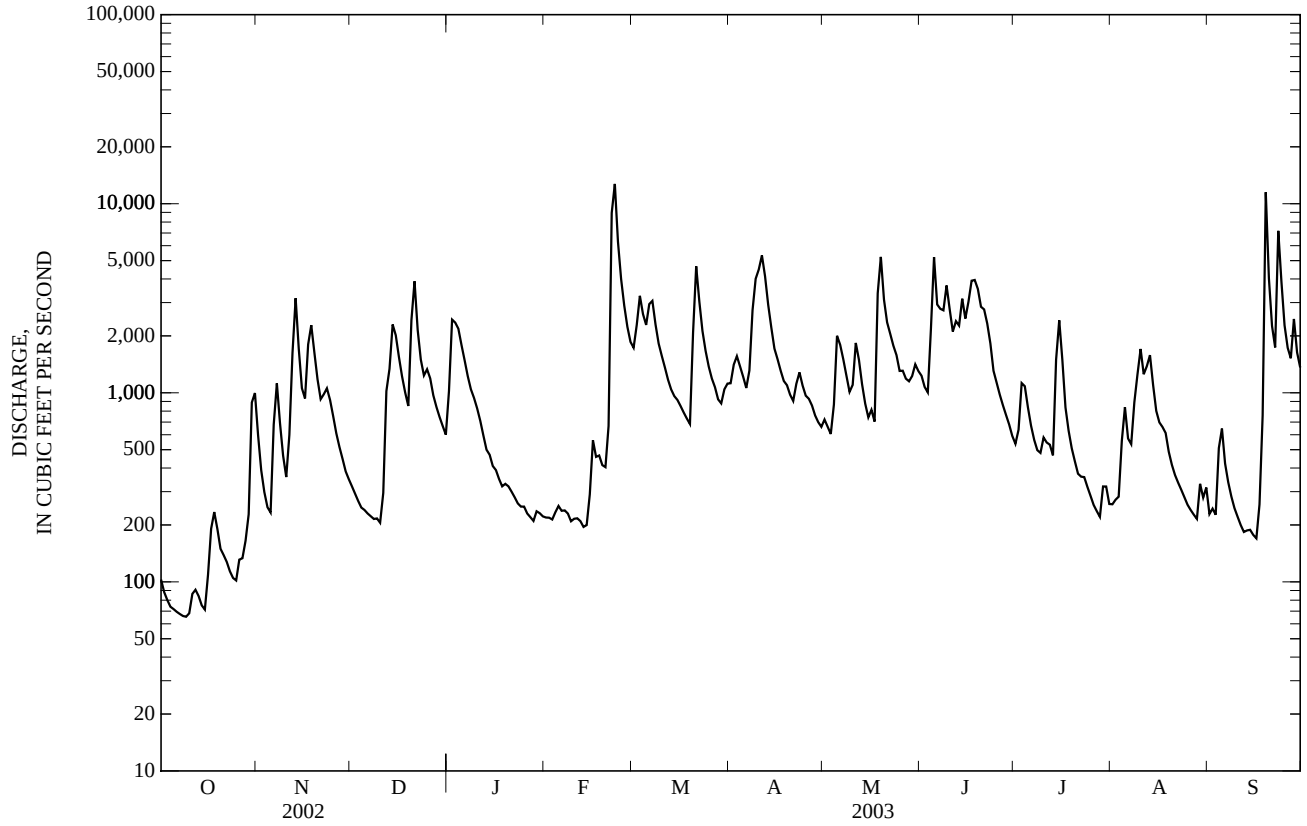
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 351 | 464 | 684 | 884 | 1,050 | 1,348 | 1,060 | 818 | 559 | 277 | 319 | 308 |
| MAX | 1,997 | 3,400 | 2,430 | 2,891 | 3,140 | 3,187 | 3,672 | 2,373 | 2,647 | 1,351 | 3,060 | 2,087 |
| (WY) | (1980) | (1986) | (1949) | (1998) | (1998) | (1993) | (1987) | (1989) | (1995) | (1972) | (1969) | (1996) |
| MIN | 66.0 | 79.6 | 76.4 | 100 | 111 | 240 | 276 | 224 | 81.1 | 53.7 | 47.9 | 59.2 |
| (WY) | (2002) | (2002) | (1966) | (1981) | (2002) | (1981) | (1995) | (1941) | (2002) | (1966) | (2002) | (2002) |

02024000 MAURY RIVER NEAR BUENA VISTA, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1939 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 133,619 | | 439,849 | | | |
| ANNUAL MEAN | 366 | | 1,205 | | 675 | |
| HIGHEST ANNUAL MEAN | | | | | 1,205 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 210 | 2002 |
| HIGHEST DAILY MEAN | 4,600 | Apr 22 | 12,700 | Feb 23 | 56,000 | Aug 20, 1969 |
| LOWEST DAILY MEAN | 38 | aSep 12 | 65 | Oct 9 | 22 | Oct 10, 1941 |
| ANNUAL SEVEN-DAY MINIMUM | 40 | Sep 8 | 69 | Oct 4 | 40 | Sep 8, 2002 |
| MAXIMUM PEAK FLOW | | | 23,000 | Sep 19 | 105,000 | Aug 20, 1969 |
| MAXIMUM PEAK STAGE | | | 15.36 | Sep 19 | 31.23 | Aug 20, 1969 |
| INSTANTANEOUS LOW FLOW | | | 62 | Oct 9 | b20 | Oct 10, 1941 |
| ANNUAL RUNOFF (CFSM) | 0.57 | | 1.87 | | 1.04 | |
| ANNUAL RUNOFF (INCHES) | 7.69 | | 25.33 | | 14.19 | |
| 10 PERCENT EXCEEDS | 975 | | 2,740 | | 1,510 | |
| 50 PERCENT EXCEEDS | 130 | | 836 | | 340 | |
| 90 PERCENT EXCEEDS | 48 | | 207 | | 105 | |

a Also Sept. 13, 2002.
b Occurred during filling of small reservoir 2 mi upstream, otherwise, minimum discharge, 36 $ft^3/s$, Sept. 12-14, 2002.
e Estimated.



## 02024915 PEDLAR RIVER AT FOREST ROAD NEAR BUENA VISTA , VA

LOCATION.--Lat 37°41'51", long 79°16'42", NAD83, Amherst County, Hydrologic Unit Code 02080203, on right bank at bridge on Forest Road, 0.6 mi upstream from Lynchburg Reservoir and 5 mi southeast of Buena Vista.

DRAINAGE AREA.--27.1 $mi^2$.

PERIOD OF RECORD.--November 2002 to September 2003.

GAGE.--Water stage recorder. Datum of gage is 1,135 ft NGVD of 1929, from topographic map.

REMARKS.--Records good except those for periods with ice effect, Jan. 19-30 and Feb. 7-12, which are fair, and for period of doubtful gage-height record, Sept. 2-15, which is poor.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | --- | --- | 15 | 80 | 18 | 75 | 95 | 45 | 101 | 41 | 23 | 21 |
| 2 | --- | --- | 14 | 99 | 17 | 89 | 104 | 40 | 85 | 54 | 20 | e19 |
| 3 | --- | --- | 13 | 89 | 17 | 103 | 94 | 39 | 84 | 59 | 43 | e17 |
| 4 | --- | --- | 11 | 75 | 26 | 91 | 85 | 50 | 93 | 49 | 66 | e45 |
| 5 | --- | --- | 14 | 67 | 24 | 99 | 79 | 46 | 135 | 42 | 81 | e35 |
| 6 | --- | --- | 16 | 61 | 19 | 126 | 70 | 54 | 101 | 37 | 48 | e24 |
| 7 | --- | --- | 11 | 54 | e18 | 117 | 93 | 48 | 139 | 35 | 55 | e21 |
| 8 | --- | 12 | 12 | 51 | e14 | 98 | 93 | 44 | 161 | 36 | 59 | e20 |
| 9 | --- | 9.6 | 13 | 47 | e13 | 86 | 213 | 41 | 164 | 38 | 51 | e18 |
| 10 | --- | 8.3 | 11 | 42 | e13 | 75 | 195 | 40 | 131 | 42 | 64 | e17 |
| 11 | --- | 31 | 26 | 38 | e14 | 68 | 217 | 41 | 112 | 41 | 71 | e16 |
| 12 | --- | 77 | 33 | 33 | e14 | 63 | 176 | 36 | 111 | 33 | 57 | e15 |
| 13 | --- | 70 | 38 | 34 | 15 | 59 | 141 | 33 | 126 | 30 | 49 | e17 |
| 14 | --- | 45 | 62 | 31 | 17 | 56 | 118 | 32 | 103 | 29 | 46 | e20 |
| 15 | --- | 35 | 52 | 28 | 31 | 52 | 103 | 35 | 97 | 28 | 41 | e18 |
| 16 | --- | 54 | 44 | 30 | 38 | 50 | 91 | 45 | 106 | 26 | 36 | 17 |
| 17 | --- | 90 | 38 | 29 | 33 | 48 | 82 | 38 | 110 | 24 | 33 | 14 |
| 18 | --- | 75 | 34 | 23 | 32 | 45 | 77 | 199 | 103 | 22 | 31 | 51 |
| 19 | --- | 57 | 32 | e19 | 29 | 42 | 73 | 218 | 105 | 22 | 29 | 605 |
| 20 | --- | 46 | 67 | e17 | 32 | 160 | 66 | 143 | 102 | 21 | 27 | 224 |
| 21 | --- | 40 | 67 | e16 | 41 | 190 | 64 | 119 | 91 | 19 | 24 | 139 |
| 22 | --- | 36 | 58 | e16 | 327 | 134 | 60 | 99 | 81 | 22 | 23 | 109 |
| 23 | --- | 31 | 50 | e14 | 395 | 106 | 56 | 96 | 72 | 29 | 23 | 327 |
| 24 | --- | 27 | 52 | e14 | 241 | 88 | 52 | 89 | 64 | 21 | 19 | 210 |
| 25 | --- | 24 | 64 | e15 | 165 | 77 | 52 | 81 | 59 | 17 | 18 | 151 |
| 26 | --- | 22 | 59 | e15 | 124 | 74 | 52 | 88 | 55 | 15 | 16 | 117 |
| 27 | --- | 20 | 52 | e16 | 100 | 70 | 48 | 88 | 51 | 14 | 15 | 116 |
| 28 | --- | 19 | 47 | e16 | 84 | 63 | 44 | 91 | 49 | 13 | 18 | 155 |
| 29 | --- | 17 | 43 | e17 | --- | 78 | 43 | 114 | 46 | 16 | 19 | 105 |
| 30 | --- | 17 | 39 | e18 | --- | 94 | 42 | 129 | 43 | 18 | 17 | 85 |
| 31 | --- | --- | 36 | 18 | --- | 93 | --- | 120 | --- | 17 | 28 | --- |
| TOTAL | --- | --- | 1,123 | 1,122 | 1,911 | 2,669 | 2,778 | 2,381 | 2,880 | 910 | 1,150 | 2,748 |
| MEAN | --- | --- | 36.2 | 36.2 | 68.2 | 86.1 | 92.6 | 76.8 | 96.0 | 29.4 | 37.1 | 91.6 |
| MAX | --- | --- | 67 | 99 | 395 | 190 | 217 | 218 | 164 | 59 | 81 | 605 |
| MIN | --- | --- | 11 | 14 | 13 | 42 | 42 | 32 | 43 | 13 | 15 | 14 |
| CFSM | --- | --- | 1.34 | 1.34 | 2.52 | 3.18 | 3.42 | 2.83 | 3.54 | 1.08 | 1.37 | 3.38 |
| IN. | --- | --- | 1.54 | 1.54 | 2.62 | 3.66 | 3.81 | 3.27 | 3.95 | 1.25 | 1.58 | 3.77 |

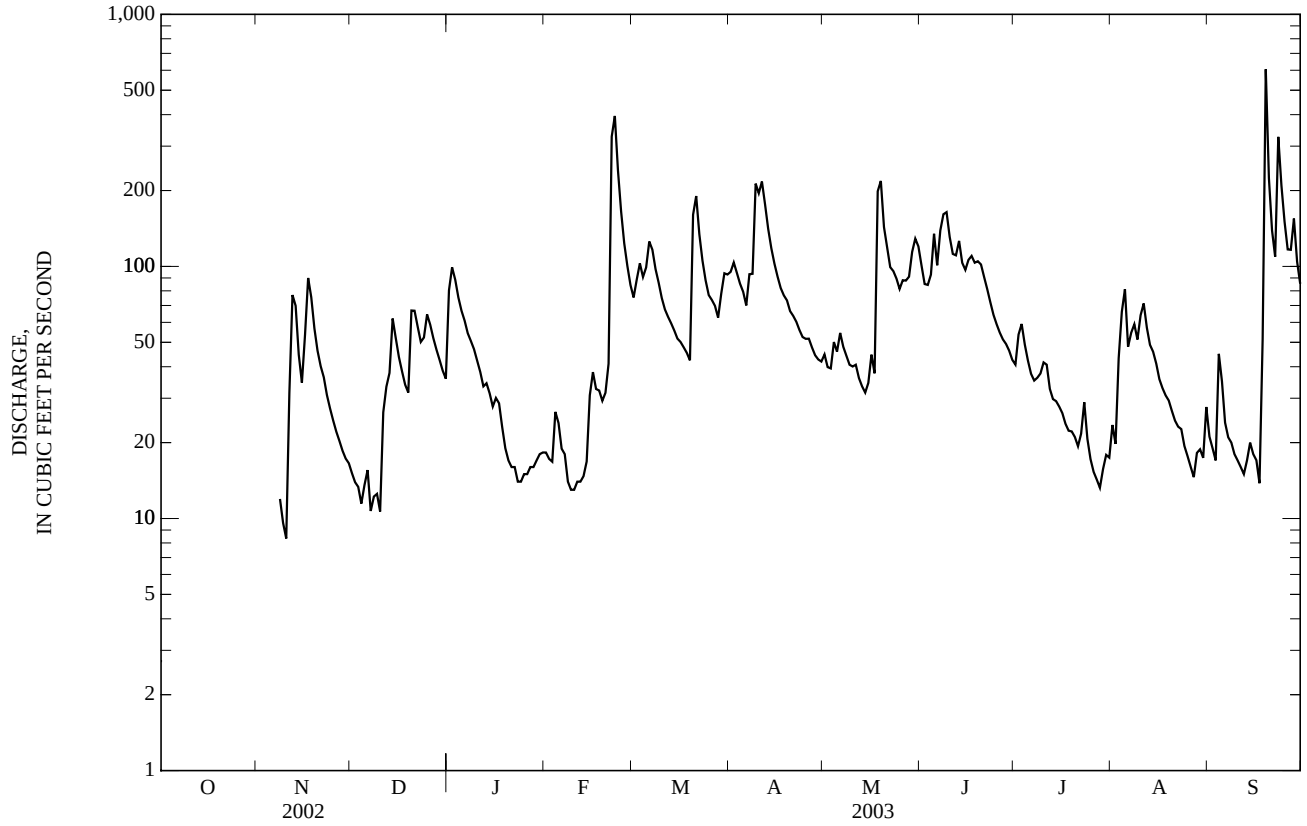
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEAR 2003

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | --- | --- | 36.2 | 36.2 | 68.2 | 86.1 | 92.6 | 76.8 | 96.0 | 29.4 | 37.1 | 91.6 |
| MAX | --- | --- | 36.2 | 36.2 | 68.2 | 86.1 | 92.6 | 76.8 | 96.0 | 29.4 | 37.1 | 91.6 |
| (WY) | --- | --- | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) |
| MIN | --- | --- | 36.2 | 36.2 | 68.2 | 86.1 | 92.6 | 76.8 | 96.0 | 29.4 | 37.1 | 91.6 |
| (WY) | --- | --- | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) |

02024915 PEDLAR RIVER AT FOREST ROAD NEAR BUENA VISTA , VA—Continued

| SUMMARY STATISTICS | FOR 2003 WATER YEAR | |
|---|---|---|
| HIGHEST DAILY MEAN | 605 | Sep 19 |
| LOWEST DAILY MEAN | 8.3 | Nov 10 |
| ANNUAL SEVEN-DAY MINIMUM | 13 | Dec 4 |
| MAXIMUM PEAK FLOW | 1,180 | Sep 19 |
| MAXIMUM PEAK STAGE | 7.27 | Sep 19 |
| INSTANTANEOUS LOW FLOW | 7.6 | Nov 10 |

e Estimated.



## 02025500 JAMES RIVER AT HOLCOMB ROCK, VA

LOCATION.--Lat 37°30'05", long 79°15'45", NAD83, 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 $mi^2$.

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 NGVD of 1929. January 1900 to September 1915, nonrecording gage in powerhouse of Owens Illinois Glass Company 1,000 ft upstream at different datum. December 1926 to June 1931, water-stage recorder at site 2 mi downstream at different datum.

REMARKS.--Records fair except for period of doubtful gage-height record, Feb. 22 to Mar. 28, which is poor. 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 $ft^3/s$, from rating curve extended above 73,000 $ft^3/s$ on basis of records for other stations in James 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 OUTSIDE PERIOD OF RECORD.--Flood in March 1913 reached a stage of 31.3 ft, from floodmarks, discharge, 118,000 $ft^3/s$, from rating curve extended as explained above.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 25,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 23 | --- | *78,600 | *25.43 | Jun 17 | 1100 | 32,300 | 16.34 |
| Apr 11 | 2300 | 31,500 | 16.13 | Sep 19 | 0845 | 37,300 | 17.56 |
| May 19 | 0615 | 43,900 | 19.08 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1,160 | 4,330 | 1,800 | 4,090 | 1,250 | e9,000 | 5,280 | 3,290 | 8,010 | 2,860 | 1,920 | 1,700 |
| 2 | 883 | 2,720 | 1,710 | 8,590 | 1,230 | e8,500 | 5,830 | 3,340 | 7,490 | 3,080 | 1,850 | 1,760 |
| 3 | 835 | 2,020 | 1,620 | 11,000 | 1,220 | e10,000 | 7,550 | 3,530 | 6,530 | 7,750 | 1,890 | 1,850 |
| 4 | 784 | 1,680 | 1,470 | 11,000 | 1,260 | e10,000 | 7,170 | 4,560 | 7,030 | 16,400 | 2,430 | 1,940 |
| 5 | 762 | 1,470 | 1,460 | 10,300 | 1,290 | e9,000 | 6,240 | 7,960 | 16,300 | 8,980 | 4,430 | 3,890 |
| 6 | 728 | 1,950 | 1,400 | 8,180 | 1,310 | e9,800 | 5,460 | 9,930 | 13,700 | 6,230 | 3,060 | 3,150 |
| 7 | 551 | 5,260 | 1,280 | 6,200 | 1,400 | e12,000 | 5,290 | 10,200 | 11,600 | 5,020 | 2,630 | 2,460 |
| 8 | 512 | 4,030 | 1,240 | 5,170 | 1,330 | e12,000 | 8,930 | 8,180 | 11,000 | 4,540 | 2,750 | 2,110 |
| 9 | e500 | 2,710 | 1,220 | 4,440 | 1,330 | e9,600 | e18,200 | 6,770 | 14,600 | 3,850 | 2,980 | 1,890 |
| 10 | e470 | 2,120 | 1,220 | 3,980 | 1,300 | e7,000 | 24,200 | 7,030 | 14,800 | 3,710 | 4,370 | 1,740 |
| 11 | e490 | 2,130 | 1,390 | 3,390 | 1,280 | e6,000 | 26,000 | 9,160 | 11,100 | 3,880 | 6,600 | 1,640 |
| 12 | e680 | 4,910 | 3,100 | 2,960 | 1,320 | e5,200 | 25,500 | 8,400 | 10,600 | 3,790 | 4,540 | 1,560 |
| 13 | e590 | 11,500 | 6,230 | 2,650 | 1,310 | e4,400 | 18,100 | 7,040 | 12,200 | 3,370 | 5,300 | 1,530 |
| 14 | e540 | 9,400 | 10,200 | 2,410 | 1,270 | e4,000 | 14,100 | 6,520 | 14,700 | 3,360 | 4,420 | 1,590 |
| 15 | e540 | 5,640 | 11,400 | 2,310 | 1,390 | e4,000 | 10,600 | 6,050 | 12,300 | 5,240 | 3,440 | 1,590 |
| 16 | e600 | 4,350 | 8,810 | 2,150 | 3,410 | e4,200 | 7,930 | 5,580 | 12,400 | 5,340 | 2,970 | 1,530 |
| 17 | e800 | 6,360 | 6,890 | 2,010 | 6,600 | e3,900 | 6,790 | 5,290 | 26,700 | 3,840 | 2,750 | 1,510 |
| 18 | 1,890 | 9,920 | 5,420 | 1,830 | 4,710 | e3,800 | 5,800 | 14,300 | 20,200 | 2,960 | 2,840 | 1,890 |
| 19 | 1,620 | 7,720 | 4,330 | 1,600 | 3,670 | e3,500 | 5,400 | 41,900 | 23,500 | 2,680 | 2,540 | 23,100 |
| 20 | 1,250 | 5,500 | 5,020 | 1,670 | 3,240 | e6,000 | 5,100 | 23,400 | 19,100 | 2,470 | 2,320 | 20,700 |
| 21 | 1,090 | 4,210 | 15,800 | 1,740 | 4,120 | e12,000 | 4,570 | 15,800 | 16,100 | 2,350 | 2,170 | 9,140 |
| 22 | 978 | 3,740 | 12,600 | 1,660 | e20,000 | e14,000 | 4,490 | 14,200 | 14,800 | 2,190 | 2,000 | 6,060 |
| 23 | 913 | 4,680 | 9,940 | 1,530 | e68,100 | e10,000 | 4,930 | 11,800 | 12,100 | 2,300 | 1,880 | 15,500 |
| 24 | 849 | 4,370 | 7,490 | 1,180 | e51,000 | e8,000 | 4,440 | 10,200 | 8,820 | 2,140 | 1,780 | 14,900 |
| 25 | 835 | 3,500 | 8,390 | 1,230 | e22,500 | e6,800 | 4,060 | 10,100 | 6,380 | 1,930 | 1,700 | 10,500 |
| 26 | 1,030 | 2,900 | 9,700 | 1,310 | e17,000 | e5,500 | 3,830 | 8,500 | 5,170 | 1,780 | 1,630 | e7,300 |
| 27 | 1,030 | 2,470 | 7,080 | 1,330 | e14,500 | e5,000 | 3,730 | 7,650 | 4,320 | 1,730 | e1,580 | 5,210 |
| 28 | 1,180 | 2,180 | 5,360 | 1,240 | e12,000 | e4,500 | 3,470 | 8,440 | 3,730 | 1,690 | e1,550 | 9,760 |
| 29 | 1,750 | 2,090 | 4,430 | 1,270 | --- | 3,910 | 3,220 | 8,380 | 3,380 | 1,720 | 1,770 | 7,890 |
| 30 | 3,970 | 1,940 | 3,790 | 1,290 | --- | 4,320 | 3,050 | 8,970 | 3,090 | 1,910 | 2,020 | 5,740 |
| 31 | 7,290 | --- | 3,340 | 1,300 | --- | 5,280 | --- | 8,200 | --- | 1,870 | 1,910 | --- |
| TOTAL | 37,100 | 127,800 | 165,130 | 111,010 | 250,340 | 221,210 | 259,260 | 304,670 | 351,750 | 120,960 | 86,020 | 171,130 |
| MEAN | 1,197 | 4,260 | 5,327 | 3,581 | 8,941 | 7,136 | 8,642 | 9,828 | 11,720 | 3,902 | 2,775 | 5,704 |
| MAX | 7,290 | 11,500 | 15,800 | 11,000 | 68,100 | 14,000 | 26,000 | 41,900 | 26,700 | 16,400 | 6,600 | 23,100 |
| MIN | 470 | 1,470 | 1,220 | 1,180 | 1,220 | 3,500 | 3,050 | 3,290 | 3,090 | 1,690 | 1,550 | 1,510 |
| (†) | +3,176 | +17,646 | -101 | -151 | +504 | -655 | +252 | 0 | -101 | -1,664 | -2,722 | +3,630 |
| MEAN‡ | 1,299 | 4,848 | 5,324 | 3,576 | 8,959 | 7,115 | 8,650 | 9,828 | 11,722 | 3,848 | 2,687 | 5,825 |
| CFSM‡ | .40 | 1.49 | 1.63 | 1.10 | 2.75 | 2.18 | 2.65 | 3.02 | 3.60 | 1.18 | .82 | 1.79 |
| IN.‡ | .46 | 1.66 | 1.88 | 1.27 | 2.86 | 2.52 | 2.96 | 3.48 | 4.01 | 1.36 | .95 | 1.99 |

CAL YR 2002 MEAN‡ 2,150 CFSM‡ .66 IN.‡ 8.96
WTR YR 2003 MEAN‡ 6,099 CFSM‡ 1.87 IN.‡ 25.39

† 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

DISCHARGE, CUBIC FEET PER SECOND—CONTINUED
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

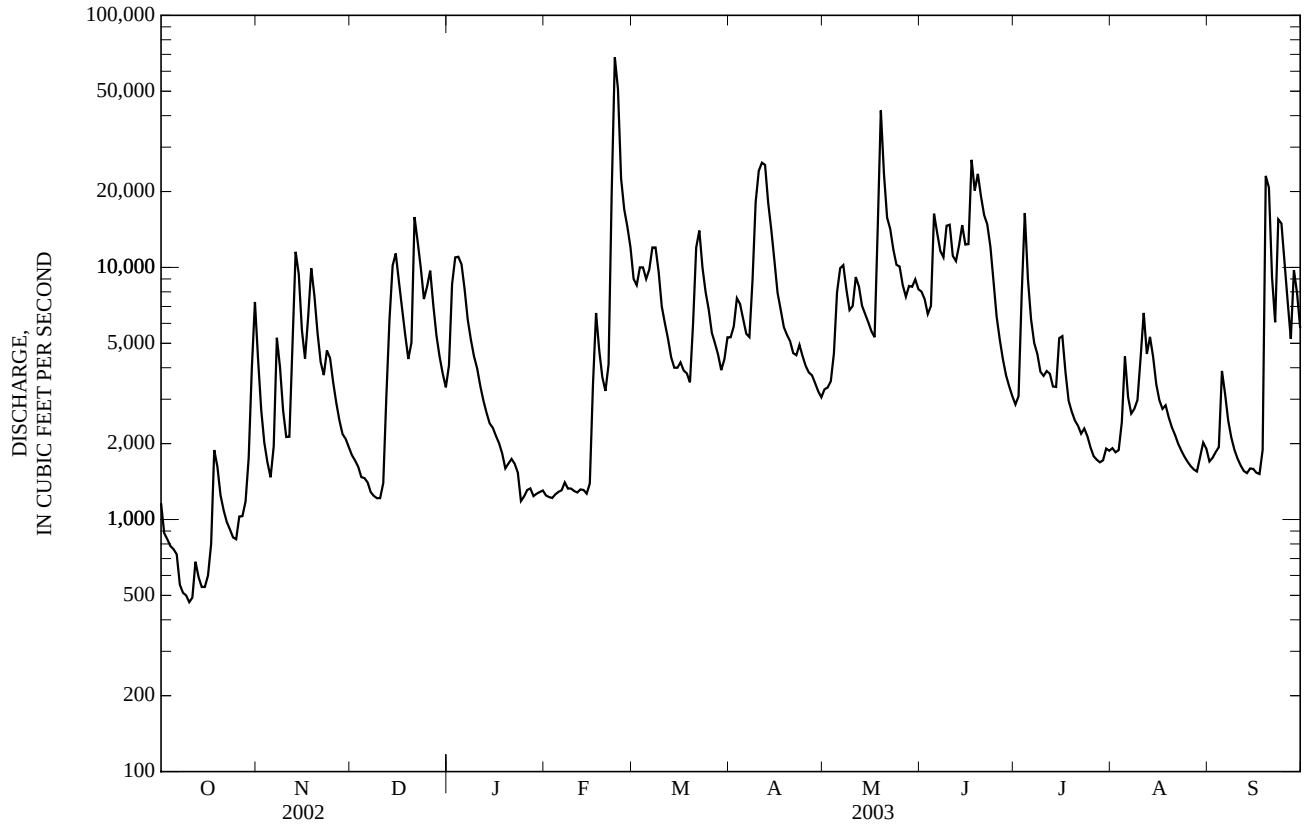
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 1,786 | 2,787 | 3,177 | 4,501 | 5,422 | 6,903 | 6,358 | 4,545 | 3,274 | 1,588 | 1,492 | 1,815 |
| MAX | 7,966 | 17,270 | 9,246 | 13,540 | 16,260 | 16,910 | 21,670 | 12,380 | 11,720 | 4,562 | 5,640 | 7,233 |
| (WY) | (1980) | (1986) | (1997) | (1996) | (1998) | (1993) | (1987) | (1989) | (2003) | (1995) | (1984) | (1996) |
| MIN | 630 | 635 | 839 | 730 | 851 | 1,472 | 1,616 | 1,959 | 796 | 750 | 581 | 637 |
| (WY) | (2002) | (2002) | (2002) | (1981) | (2002) | (1981) | (1995) | (2000) | (2002) | (1999) | (2002) | (2002) |

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1980 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 762,352 | | 2,206,380 | | | |
| ANNUAL MEAN | 2,089 | | 6,045 | | 3,625 | |
| HIGHEST ANNUAL MEAN | | | | | 6,045 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 1,361 | 2002 |
| HIGHEST DAILY MEAN | 18,700 | Apr 23 | 68,100 | Feb 23 | 180,000 | Nov 5, 1985 |
| LOWEST DAILY MEAN | 360 | Sep 13 | 470 | Oct 10 | 244 | Aug 28, 1981 |
| ANNUAL SEVEN-DAY MINIMUM | 409 | Sep 9 | 540 | Oct 8 | 401 | Aug 26, 1981 |
| MAXIMUM PEAK FLOW | | | 78,600 | Feb 23 | a207,000 | Nov 5, 1985 |
| MAXIMUM PEAK STAGE | | | b25.43 | Feb 23 | a,b42.15 | Nov 5, 1985 |
| INSTANTANEOUS LOW FLOW | | | c319 | Oct 7 | d,c20 | Oct 29, 1987 |
| ANNUAL RUNOFF (CFSM) | 0.64 | | 1.85 | | 1.11 | |
| ANNUAL RUNOFF (INCHES) | 8.70 | | 25.18 | | 15.11 | |
| 10 PERCENT EXCEEDS | 5,380 | | 12,500 | | 7,990 | |
| 50 PERCENT EXCEEDS | 1,010 | | 4,030 | | 1,840 | |
| 90 PERCENT EXCEEDS | 531 | | 1,270 | | 791 | |

a Prior to regulation, 1927-79, maximum peak flow, 150,000 $ft^3/s$, Aug. 20, 1969, gage height, 35.50 ft.
b From high-water mark in gage house.
c Result of regulation.
d Prior to regulation, 1927-79, instantaneous low flow, 71 $ft^3/s$, Oct. 24, 1963.
e Estimated.



## 02026000 JAMES RIVER AT BENT CREEK, VA

LOCATION.--Lat 37°32'11", long 78°49'46", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Sept. 12, 1930, nonrecording gage at same site and datum.

REMARKS.--Records poor. 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 $ft^3/s$, from rating curve extended above 177,000 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 26,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 23 | 2215 | *79,800 | *17.97 | Jun 17 | 1715 | 32,300 | 11.38 |
| Apr 12 | 0345 | 31,200 | 11.19 | Sep 19 | 1500 | 38,300 | 12.39 |
| May 19 | 1600 | 49,100 | 14.06 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1,510 | 5,860 | 2,280 | 4,300 | 1,600 | 10,600 | 5,950 | 4,210 | 9,030 | 4,750 | 2,760 | 2,240 |
| 2 | 1,080 | 3,950 | 2,190 | 7,190 | 1,750 | 9,670 | 6,120 | 4,300 | 8,370 | 6,060 | 2,610 | 2,110 |
| 3 | e1,000 | 2,990 | 2,060 | 10,900 | 1,460 | 12,000 | 7,380 | 4,450 | 7,490 | 10,200 | 2,540 | 2,160 |
| 4 | e1,050 | 2,340 | 1,960 | 10,900 | 1,660 | 12,400 | 7,860 | 4,960 | 7,330 | 18,400 | 3,180 | 2,520 |
| 5 | e900 | 2,050 | 1,950 | 10,800 | 1,760 | 10,400 | 7,010 | 7,120 | 14,100 | 12,100 | 3,930 | 3,260 |
| 6 | e780 | 2,260 | 1,880 | 9,130 | 1,720 | 10,300 | 6,170 | 9,740 | 15,200 | 8,880 | 4,190 | 3,980 |
| 7 | e680 | 4,140 | 1,760 | 6,930 | 1,860 | 13,200 | 6,150 | 10,700 | 14,900 | 8,400 | 3,340 | 3,280 |
| 8 | e700 | 5,280 | 1,560 | 5,790 | 1,920 | 13,300 | 8,060 | 9,130 | 13,100 | 6,460 | 3,240 | 2,590 |
| 9 | e600 | 3,850 | 1,620 | 5,030 | 1,620 | 10,800 | 17,700 | 7,580 | 14,900 | 5,460 | 3,900 | 2,250 |
| 10 | e500 | 2,990 | 1,560 | 4,660 | 1,760 | 7,840 | 25,700 | 6,930 | 17,000 | 5,370 | 4,070 | 2,260 |
| 11 | e540 | 4,480 | 1,880 | 4,070 | 1,770 | 7,090 | 25,300 | 9,000 | 12,700 | 5,410 | 6,710 | 2,100 |
| 12 | e750 | 5,570 | 2,670 | 3,720 | 1,800 | 6,400 | 27,900 | 9,190 | 11,700 | 5,400 | 5,970 | 2,020 |
| 13 | e650 | 11,000 | 5,760 | 3,320 | 1,800 | 5,690 | 19,600 | 7,540 | 12,700 | 5,210 | 5,100 | 2,030 |
| 14 | e590 | 11,500 | 9,740 | 3,050 | 1,590 | 4,960 | 15,500 | 7,310 | 14,900 | 4,650 | 5,560 | 1,890 |
| 15 | e590 | 7,110 | 12,200 | 2,900 | 1,810 | 4,650 | 12,100 | 6,090 | 14,000 | 5,420 | 4,300 | 1,920 |
| 16 | e700 | 5,300 | 9,920 | 2,810 | 2,950 | 5,050 | 8,880 | 7,120 | 11,700 | 6,960 | 3,880 | 1,880 |
| 17 | e900 | 6,680 | 7,780 | 2,600 | 6,480 | 4,730 | 7,670 | 5,770 | 24,800 | 6,010 | 3,560 | 1,850 |
| 18 | 2,080 | 10,000 | 6,200 | 2,360 | 5,500 | 4,510 | 6,530 | 13,500 | 22,500 | 4,840 | 3,460 | 2,260 |
| 19 | 1,870 | 9,190 | 4,990 | 2,260 | 4,510 | 4,080 | 6,160 | 43,200 | 23,300 | 3,880 | 3,180 | 23,900 |
| 20 | 1,220 | 6,630 | 5,030 | 2,010 | 4,240 | 8,480 | 5,720 | 28,400 | 22,100 | 3,520 | 3,020 | 23,000 |
| 21 | 1,250 | 5,130 | 12,200 | 2,140 | 5,010 | 16,300 | 5,400 | 17,800 | 17,400 | 3,330 | 2,590 | 12,300 |
| 22 | 1,110 | 4,370 | 14,100 | 2,290 | 22,000 | 16,300 | 5,110 | 14,700 | 16,300 | 3,160 | 2,590 | 7,340 |
| 23 | 900 | 4,640 | 10,600 | 2,040 | 73,400 | 12,400 | 5,430 | 13,400 | 13,900 | 3,380 | 2,420 | 14,400 |
| 24 | 850 | 5,050 | 8,590 | 2,000 | 57,100 | 9,930 | 5,240 | 10,400 | 10,900 | 2,940 | 2,300 | 16,300 |
| 25 | 814 | 4,300 | 8,360 | 1,810 | 25,400 | 7,570 | 4,870 | 11,500 | 8,070 | 2,760 | 2,210 | 12,000 |
| 26 | 1,020 | 3,690 | 10,500 | 1,670 | 19,200 | 6,420 | 4,730 | 11,700 | 6,670 | 2,660 | 2,130 | 9,070 |
| 27 | 1,150 | 3,350 | 8,250 | 1,700 | 16,100 | 5,680 | 4,610 | 9,270 | 5,800 | 2,390 | 2,110 | 6,340 |
| 28 | 1,170 | 2,910 | 6,170 | 1,540 | 13,500 | 5,120 | 4,430 | 9,980 | 5,280 | 2,480 | 2,050 | 8,280 |
| 29 | 1,940 | 2,510 | 5,140 | 1,570 | --- | 4,640 | 4,080 | 9,370 | 4,920 | 2,530 | 2,530 | 10,100 |
| 30 | 3,570 | 2,500 | 4,490 | 1,630 | --- | 5,040 | 3,940 | 9,750 | 4,840 | 2,600 | 2,230 | 6,990 |
| 31 | 7,580 | --- | 3,970 | 1,680 | --- | 6,090 | --- | 9,200 | --- | 2,510 | 2,470 | --- |
| TOTAL | 40,044 | 151,620 | 177,360 | 124,800 | 281,270 | 261,640 | 281,300 | 333,310 | 385,900 | 168,120 | 104,130 | 192,620 |
| MEAN | 1,292 | 5,054 | 5,721 | 4,026 | 10,050 | 8,440 | 9,377 | 10,750 | 12,860 | 5,423 | 3,359 | 6,421 |
| MAX | 7,580 | 11,500 | 14,100 | 10,900 | 73,400 | 16,300 | 27,900 | 43,200 | 24,800 | 18,400 | 6,710 | 23,900 |
| MIN | 500 | 2,050 | 1,560 | 1,540 | 1,460 | 4,080 | 3,940 | 4,210 | 4,840 | 2,390 | 2,050 | 1,850 |
| (†) | +3,176 | +17,646 | -101 | -151 | +504 | -655 | +252 | 0 | -101 | -1,664 | -2,722 | +3,630 |
| MEAN‡ | 1,394 | 5,642 | 5,718 | 4,020 | 10,063 | 8,419 | 9,385 | 10,750 | 12,860 | 5,370 | 3,271 | 6,542 |
| CFSM‡ | .38 | 1.53 | 1.55 | 1.09 | 2.73 | 2.29 | 2.55 | 2.92 | 3.49 | 1.46 | .89 | 1.78 |
| IN.‡ | .44 | 1.71 | 1.79 | 1.26 | 2.85 | 2.64 | 2.84 | 3.37 | 3.90 | 1.68 | 1.02 | 1.98 |

| | | | | | | |
|---|---|---|---|---|---|---|
| CAL YR | 2002 | MEAN‡ | 2,416 | CFSM‡ | .66 | IN.‡ 8.91 |
| WTR YR | 2003 | MEAN‡ | 6,909 | CFSM‡ | 1.88 | IN.‡ 25.47 |

† 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.

02026000 JAMES RIVER AT BENT CREEK, VA—Continued

DISCHARGE, CUBIC FEET PER SECOND—CONTINUED
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

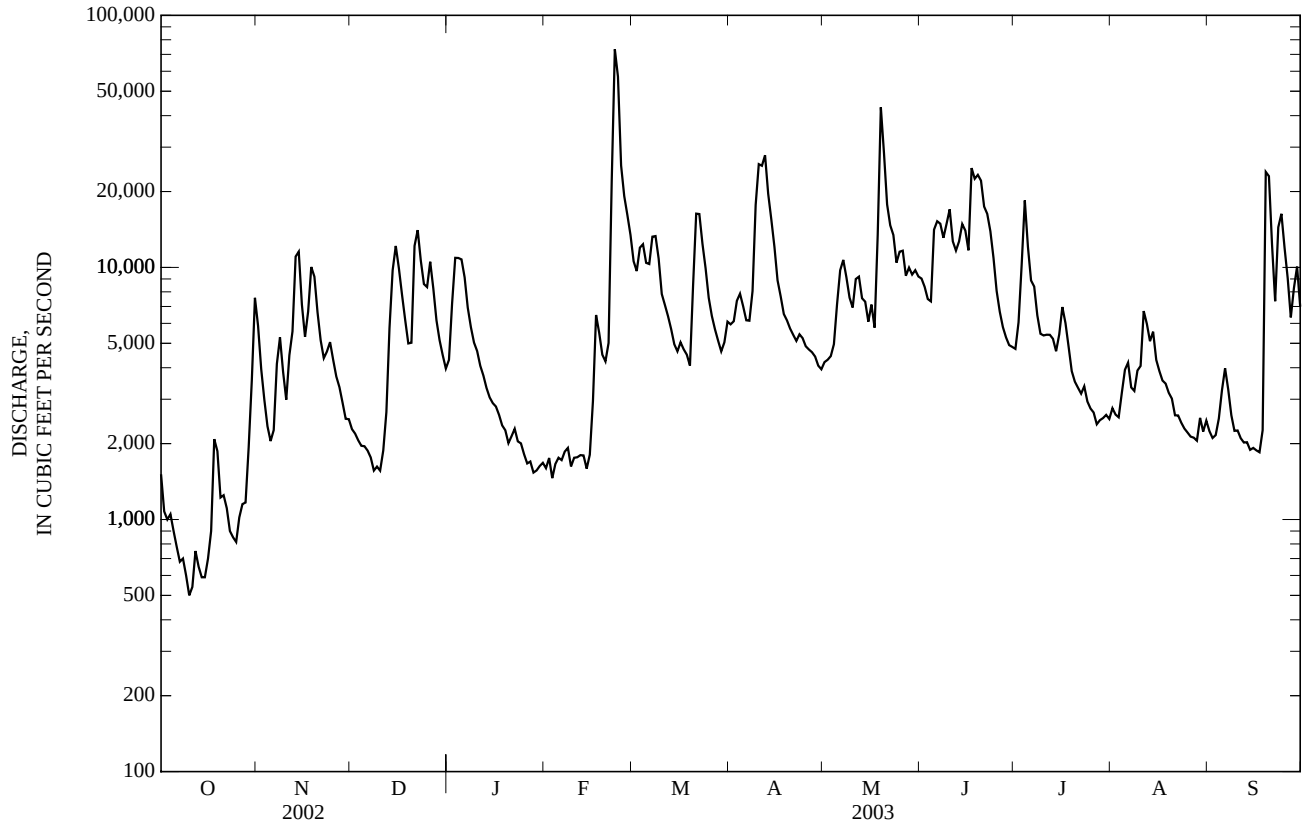
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 2,163 | 3,114 | 3,789 | 5,073 | 6,192 | 7,777 | 7,145 | 5,244 | 3,845 | 2,015 | 1,851 | 2,331 |
| MAX | 9,173 | 16,910 | 10,380 | 11,680 | 17,200 | 18,860 | 24,090 | 13,990 | 12,860 | 5,423 | 6,027 | 9,873 |
| (WY) | (1980) | (1986) | (1997) | (1991) | (1998) | (1993) | (1987) | (1989) | (2003) | (2003) | (1984) | (1996) |
| MIN | 716 | 750 | 987 | 858 | 1,125 | 1,626 | 1,842 | 2,286 | 963 | 904 | 632 | 727 |
| (WY) | (2002) | (2002) | (1981) | (1981) | (2002) | (1981) | (1995) | (2000) | (2002) | (1999) | (2002) | (2002) |

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1980 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 859,397 | | 2,502,114 | | | |
| ANNUAL MEAN | 2,355 | | 6,855 | | 4,198 | |
| HIGHEST ANNUAL MEAN | | | | | 6,855 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 1,562 | 2002 |
| HIGHEST DAILY MEAN | 17,000 | Apr 23 | 73,400 | Feb 23 | 142,000 | Nov 5, 1985 |
| LOWEST DAILY MEAN | a409 | Sep 12 | 500 | Oct 10 | a409 | Sep 12, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 460 | Sep 8 | 603 | Oct 9 | 460 | Sep 8, 2002 |
| MAXIMUM PEAK FLOW | | | 79,800 | Feb 23 | b226,000 | Nov 5, 1985 |
| MAXIMUM PEAK STAGE | | | 17.97 | Feb 23 | b,c30.76 | Nov 5, 1985 |
| INSTANTANEOUS LOW FLOW | | | a357 | Oct 9 | d,a338 | Oct 17, 2001 |
| ANNUAL RUNOFF (CFSM) | 0.64 | | 1.86 | | 1.14 | |
| ANNUAL RUNOFF (INCHES) | 8.68 | | 25.27 | | 15.49 | |
| 10 PERCENT EXCEEDS | 5,760 | | 14,000 | | 9,110 | |
| 50 PERCENT EXCEEDS | 1,250 | | 5,010 | | 2,370 | |
| 90 PERCENT EXCEEDS | 591 | | 1,650 | | 932 | |

a Result of regulation.
b Prior to regulation, 1925-79, maximum peak flow, 176,000 $ft^3/s$, June 21, 1972, gage height, 27.13 ft, from floodmark.
c From floodmarks.
d Prior to regulation, 1925-79, instantaneous low flow, 222 $ft^3/s$, Oct. 13, 14, 1930.
e Estimated.



## 02027000 TYE RIVER NEAR LOVINGSTON, VA

LOCATION.--Lat 37°42'56", long 78°58'54", NAD83, 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 $mi^2$.

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 NGVD of 1929. Sept. 15, 1969, to Oct. 15, 1970, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods of doubtful gage-height record, Oct. 6-17 and Mar. 20, and periods with ice effect, Dec. 6, 7, and Jan. 17-26, which are fair. Maximum discharge, 80,000 $ft^3/s$, from rating curve extended above 7,600 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,600 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1515 | 4,010 | 6.52 | Sep 19 | 0400 | *12,400 | *13.24 |
| Aug 9 | 2330 | 3,030 | 5.44 | Sep 23 | 0545 | 2,680 | 5.02 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8.2 | 89 | 60 | 498 | 56 | 342 | 310 | 136 | 296 | 127 | 78 | 128 |
| 2 | 7.1 | 73 | 56 | 601 | 55 | 408 | 315 | 117 | 251 | 206 | 99 | 153 |
| 3 | 6.2 | 62 | 54 | 441 | 54 | 445 | 294 | 111 | 248 | 429 | 129 | 159 |
| 4 | 5.8 | 57 | 50 | 343 | 70 | 378 | 267 | 134 | 275 | 331 | 331 | 180 |
| 5 | 5.6 | 58 | 58 | 288 | 70 | 376 | 247 | 126 | 344 | 260 | 641 | 189 |
| 6 | e4.7 | 108 | e50 | 248 | 58 | 469 | 232 | 133 | 248 | 357 | 300 | 142 |
| 7 | e4.2 | 86 | e45 | 213 | 63 | 501 | 302 | 122 | 754 | 251 | 259 | 125 |
| 8 | e3.6 | 73 | 49 | 192 | 58 | 430 | 285 | 115 | 757 | 190 | 216 | 116 |
| 9 | e3.4 | 66 | 52 | 170 | 54 | 374 | 629 | 110 | 854 | 168 | 537 | 107 |
| 10 | e4.6 | 60 | 48 | 153 | 61 | 334 | 662 | 111 | 578 | 168 | 931 | 99 |
| 11 | e15 | 131 | 88 | 135 | 57 | 296 | 1,060 | 115 | 471 | 150 | 920 | 93 |
| 12 | e25 | 279 | 111 | 121 | 58 | 267 | 790 | 100 | 437 | 125 | 503 | 88 |
| 13 | e16 | 305 | 129 | 114 | 52 | 246 | 593 | 94 | 441 | 116 | 418 | 105 |
| 14 | e11 | 200 | 203 | 108 | 58 | 230 | 462 | 88 | 384 | 128 | 351 | 112 |
| 15 | e9.2 | 153 | 180 | 99 | 92 | 214 | 394 | 183 | 355 | 111 | 279 | 98 |
| 16 | 70 | 186 | 154 | 90 | 132 | 204 | 334 | 236 | 398 | 104 | 281 | 91 |
| 17 | e52 | 310 | 133 | e85 | 93 | 192 | 294 | 161 | 425 | 92 | 363 | 85 |
| 18 | 31 | 305 | 120 | e75 | 92 | 176 | 274 | 957 | 412 | 87 | 320 | 522 |
| 19 | 24 | 235 | 110 | e72 | 77 | 165 | 261 | 821 | 406 | 85 | 298 | 5,380 |
| 20 | 21 | 189 | 285 | e76 | 92 | e800 | 230 | 486 | 411 | 81 | 248 | 1,380 |
| 21 | 23 | 160 | 276 | e70 | 147 | 919 | 217 | 403 | 371 | 79 | 213 | 820 |
| 22 | 23 | 142 | 227 | e67 | 1,830 | 631 | 203 | 339 | 319 | 80 | 191 | 586 |
| 23 | 20 | 119 | 192 | e63 | 1,830 | 459 | 181 | 330 | 272 | 87 | 174 | 1,770 |
| 24 | 17 | 104 | 186 | e61 | 1,130 | 372 | 164 | 307 | 237 | 76 | 155 | 1,100 |
| 25 | 19 | 95 | 240 | e68 | 804 | 319 | 162 | 283 | 209 | 68 | 141 | 741 |
| 26 | 67 | 86 | 199 | e60 | 586 | 281 | 169 | 340 | 185 | 63 | 128 | 597 |
| 27 | 54 | 79 | 168 | 58 | 450 | 265 | 153 | 354 | 167 | 59 | 115 | 463 |
| 28 | 52 | 73 | 151 | 55 | 370 | 235 | 135 | 352 | 155 | 56 | 118 | 438 |
| 29 | 90 | 68 | 137 | 57 | --- | 279 | 123 | 371 | 144 | 85 | 176 | 338 |
| 30 | 182 | 65 | 125 | 58 | --- | 350 | 119 | 373 | 132 | 74 | 118 | 281 |
| 31 | 120 | --- | 119 | 56 | --- | 325 | --- | 340 | --- | 68 | 131 | --- |
| TOTAL | 994.6 | 4,016 | 4,055 | 4,795 | 8,549 | 11,282 | 9,861 | 8,248 | 10,936 | 4,361 | 9,162 | 16,486 |
| MEAN | 32.1 | 134 | 131 | 155 | 305 | 364 | 329 | 266 | 365 | 141 | 296 | 550 |
| MAX | 182 | 310 | 285 | 601 | 1,830 | 919 | 1,060 | 957 | 854 | 429 | 931 | 5,380 |
| MIN | 3.4 | 57 | 45 | 55 | 52 | 165 | 119 | 88 | 132 | 56 | 78 | 85 |
| CFSM | 0.35 | 1.44 | 1.41 | 1.67 | 3.29 | 3.92 | 3.54 | 2.87 | 3.93 | 1.52 | 3.18 | 5.92 |
| IN. | 0.40 | 1.61 | 1.63 | 1.92 | 3.43 | 4.52 | 3.95 | 3.31 | 4.38 | 1.75 | 3.67 | 6.61 |

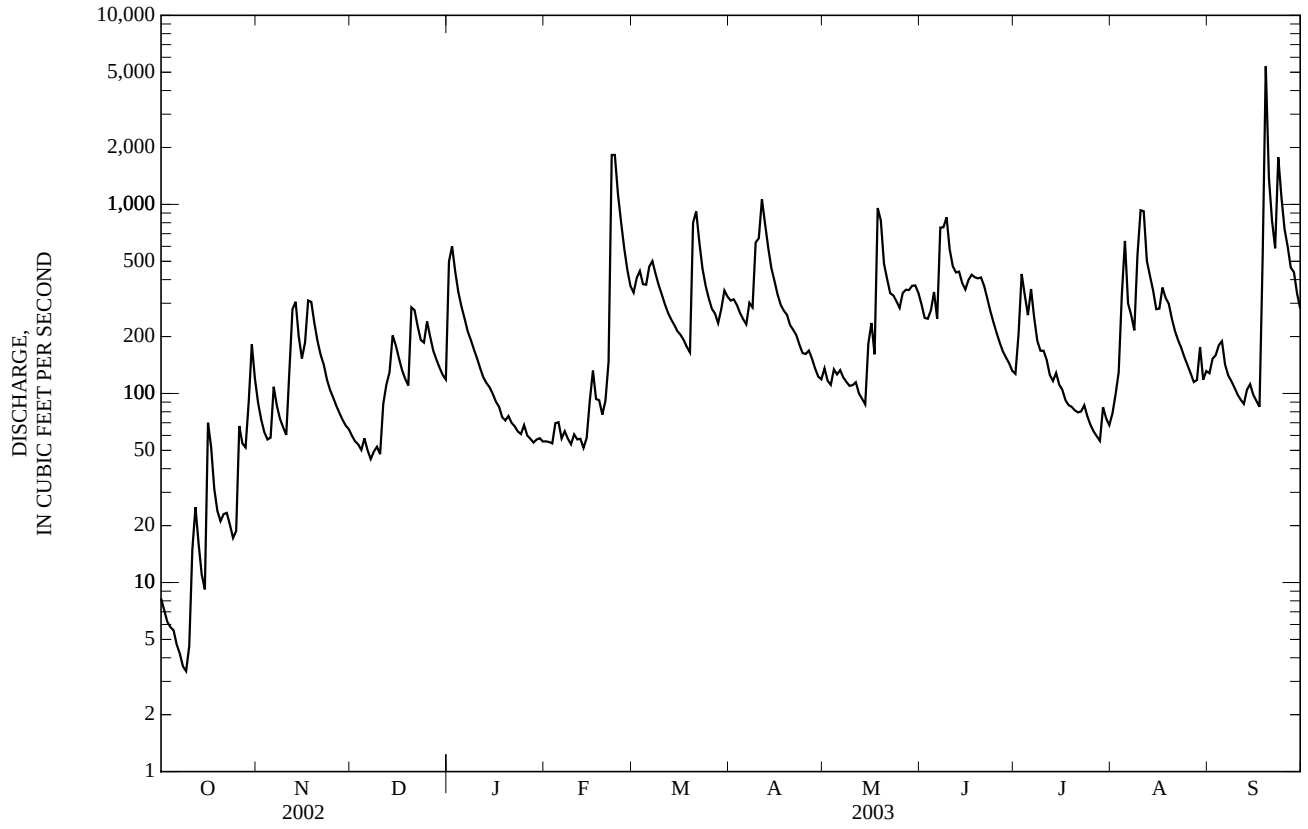
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 101 | 130 | 166 | 188 | 215 | 259 | 236 | 179 | 136 | 77.2 | 105 | 100 |
| MAX | 550 | 765 | 499 | 568 | 773 | 568 | 692 | 492 | 676 | 382 | 1,541 | 556 |
| (WY) | (1943) | (1986) | (1997) | (1998) | (1998) | (1993) | (1987) | (1989) | (1972) | (1972) | (1969) | (1979) |
| MIN | 8.69 | 15.3 | 23.7 | 14.7 | 34.1 | 64.0 | 63.1 | 53.1 | 19.2 | 8.46 | 1.56 | 6.46 |
| (WY) | (1942) | (1942) | (1981) | (1981) | (2002) | (1981) | (1966) | (1941) | (2002) | (2002) | (2002) | (2002) |

02027000 TYE RIVER NEAR LOVINGSTON, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1939 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 22,971.91 | | 92,745.6 | | | |
| ANNUAL MEAN | 62.9 | | 254 | | 157 | |
| HIGHEST ANNUAL MEAN | | | | | 280 | 1973 |
| LOWEST ANNUAL MEAN | | | | | 44.5 | 2002 |
| HIGHEST DAILY MEAN | 516 | Apr 22 | 5,380 | Sep 19 | e32,600 | Aug 20, 1969 |
| LOWEST DAILY MEAN | 0.53 | eAug 25 | e3.4 | Oct 9 | e0.53 | Aug 25, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.61 | eAug 20 | e4.6 | Oct 4 | e0.61 | Aug 20, 2002 |
| MAXIMUM PEAK FLOW | | | 12,400 | Sep 19 | 80,000 | Aug 20, 1969 |
| MAXIMUM PEAK STAGE | | | 13.24 | Sep 19 | a29.00 | Aug 20, 1969 |
| INSTANTANEOUS LOW FLOW | | | (b) | (c) | 0.50 | dSep 10, 1966 |
| ANNUAL RUNOFF (CFSM) | 0.68 | | 2.74 | | 1.70 | |
| ANNUAL RUNOFF (INCHES) | 9.21 | | 37.18 | | 23.03 | |
| 10 PERCENT EXCEEDS | 159 | | 491 | | 321 | |
| 50 PERCENT EXCEEDS | 35 | | 159 | | 100 | |
| 90 PERCENT EXCEEDS | 2.5 | | 55 | | 22 | |

a From floodmarks.
b Not determined.
c Probably occurred Oct. 9, 2002.
d Also Sept. 11, 1966.
e Estimated.



## 02027500 PINEY RIVER AT PINEY RIVER, VA

LOCATION.--Lat 37°42'09", long 79°01'39", NAD83, 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 $mi^2$.

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 631.58 ft NGVD of 1929. Prior to May 27, 1969, water-stage recorder, and Nov. 4, 1969, to Feb. 26, 1970, nonrecording gage at site 20 ft downstream from former highway bridge at same datum. Feb. 26, 1970, to Sept. 20, 1973, on right bank 20 ft upstream from bridge at same datum. Sept. 20, 1973 to Apr. 29, 1999, at same site, at datum 2.00 ft higher.

REMARKS.--Records good except those for period of no gage-height record, Oct. 25, 26, and periods with ice effect, Dec. 6, 8, and Jan. 16-28, which are fair. Periodic dewatering of upstream quarries adds small amount of inflow at times. Maximum discharge, 38,000 $ft^3/s$, from rating curve extended above 6,000 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 650 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1300 | 1,800 | 6.80 | Jun 9 | 0030 | 691 | 4.79 |
| May 18 | 1600 | 708 | 4.83 | Sep 19 | 0300 | *2,340 | *7.54 |
| Jun 4 | 2315 | 691 | 4.79 | Sep 23 | 0515 | 1,010 | 5.48 |
| Jun 7 | 1630 | 671 | 4.74 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.1 | 83 | 47 | 232 | 36 | 199 | 159 | 84 | 198 | 71 | 40 | 39 |
| 2 | 5.3 | 65 | 44 | 317 | 35 | 217 | 160 | 71 | 175 | 109 | 40 | 57 |
| 3 | 4.8 | 55 | 42 | 289 | 34 | 218 | 155 | 69 | 173 | 142 | 51 | 53 |
| 4 | 4.6 | 50 | 39 | 244 | 43 | 207 | 151 | 84 | 203 | 107 | 78 | 55 |
| 5 | 4.2 | 51 | 44 | 213 | 39 | 212 | 144 | 84 | 257 | 91 | 80 | 55 |
| 6 | 3.5 | 68 | e36 | 187 | 35 | 247 | 131 | 92 | 204 | 79 | 70 | 47 |
| 7 | 3.1 | 58 | e32 | 161 | 37 | 275 | 158 | 91 | 470 | 72 | 89 | 44 |
| 8 | 2.6 | 57 | e34 | 143 | 34 | 251 | 151 | 91 | 565 | 67 | 82 | 42 |
| 9 | 2.6 | 54 | 35 | 126 | 32 | 223 | 289 | 88 | 503 | 65 | 86 | 39 |
| 10 | 2.9 | 51 | 32 | 110 | 35 | 198 | 326 | 86 | 381 | 65 | 141 | 37 |
| 11 | 9.1 | 93 | 62 | 97 | 34 | 177 | 388 | 82 | 322 | 59 | 272 | 35 |
| 12 | 16 | 161 | 64 | 86 | 34 | 158 | 341 | 74 | 286 | 53 | 213 | 34 |
| 13 | 9.3 | 195 | 81 | 79 | 32 | 144 | 293 | 68 | 266 | 50 | 191 | 38 |
| 14 | 6.6 | 160 | 119 | 73 | 34 | 132 | 252 | 64 | 233 | 58 | 157 | 43 |
| 15 | 6.0 | 130 | 116 | 68 | 56 | 121 | 220 | 115 | 220 | 50 | 130 | 38 |
| 16 | 16 | 148 | 111 | e60 | 61 | 114 | 192 | 118 | 223 | 46 | 110 | 36 |
| 17 | 29 | 195 | 99 | e55 | 57 | 106 | 169 | 98 | 232 | 43 | 96 | 34 |
| 18 | 19 | 194 | 89 | e49 | 51 | 100 | 155 | 486 | 243 | 41 | 86 | 101 |
| 19 | 15 | 174 | 83 | e44 | 50 | 92 | 147 | 524 | 251 | 40 | 76 | 1,270 |
| 20 | 12 | 148 | 168 | e47 | 59 | 314 | 129 | 376 | 246 | 39 | 68 | 501 |
| 21 | 15 | 129 | 172 | e44 | 87 | 395 | 118 | 310 | 218 | 40 | 62 | 331 |
| 22 | 15 | 110 | 165 | e42 | 888 | 319 | 109 | 255 | 193 | 39 | 57 | 257 |
| 23 | 13 | 93 | 147 | e41 | 962 | 265 | 101 | 240 | 169 | 40 | 53 | 734 |
| 24 | 13 | 82 | 150 | e38 | 625 | 224 | 94 | 220 | 148 | 38 | 49 | 498 |
| 25 | e14 | 74 | 180 | e41 | 429 | 193 | 92 | 204 | 131 | 35 | 46 | 357 |
| 26 | e52 | 67 | 145 | e38 | 328 | 176 | 92 | 229 | 114 | 32 | 43 | 272 |
| 27 | 44 | 61 | 125 | e37 | 268 | 156 | 83 | 233 | 102 | 29 | 41 | 223 |
| 28 | 46 | 57 | 112 | e36 | 224 | 139 | 78 | 223 | 93 | 26 | 44 | 200 |
| 29 | 77 | 54 | 101 | 39 | --- | 149 | 74 | 236 | 85 | 29 | 44 | 156 |
| 30 | 143 | 51 | 91 | 38 | --- | 168 | 73 | 227 | 77 | 30 | 38 | 134 |
| 31 | 109 | --- | 84 | 37 | --- | 161 | --- | 222 | --- | 29 | 42 | --- |
| TOTAL | 718.7 | 2,968 | 2,849 | 3,111 | 4,639 | 6,050 | 5,024 | 5,444 | 6,981 | 1,714 | 2,675 | 5,760 |
| MEAN | 23.2 | 98.9 | 91.9 | 100 | 166 | 195 | 167 | 176 | 233 | 55.3 | 86.3 | 192 |
| MAX | 143 | 195 | 180 | 317 | 962 | 395 | 388 | 524 | 565 | 142 | 272 | 1,270 |
| MIN | 2.6 | 50 | 32 | 36 | 32 | 92 | 73 | 64 | 77 | 26 | 38 | 34 |
| CFSM | 0.49 | 2.08 | 1.93 | 2.11 | 3.48 | 4.10 | 3.52 | 3.69 | 4.89 | 1.16 | 1.81 | 4.03 |
| IN. | 0.56 | 2.32 | 2.23 | 2.43 | 3.63 | 4.73 | 3.93 | 4.25 | 5.46 | 1.34 | 2.09 | 4.50 |

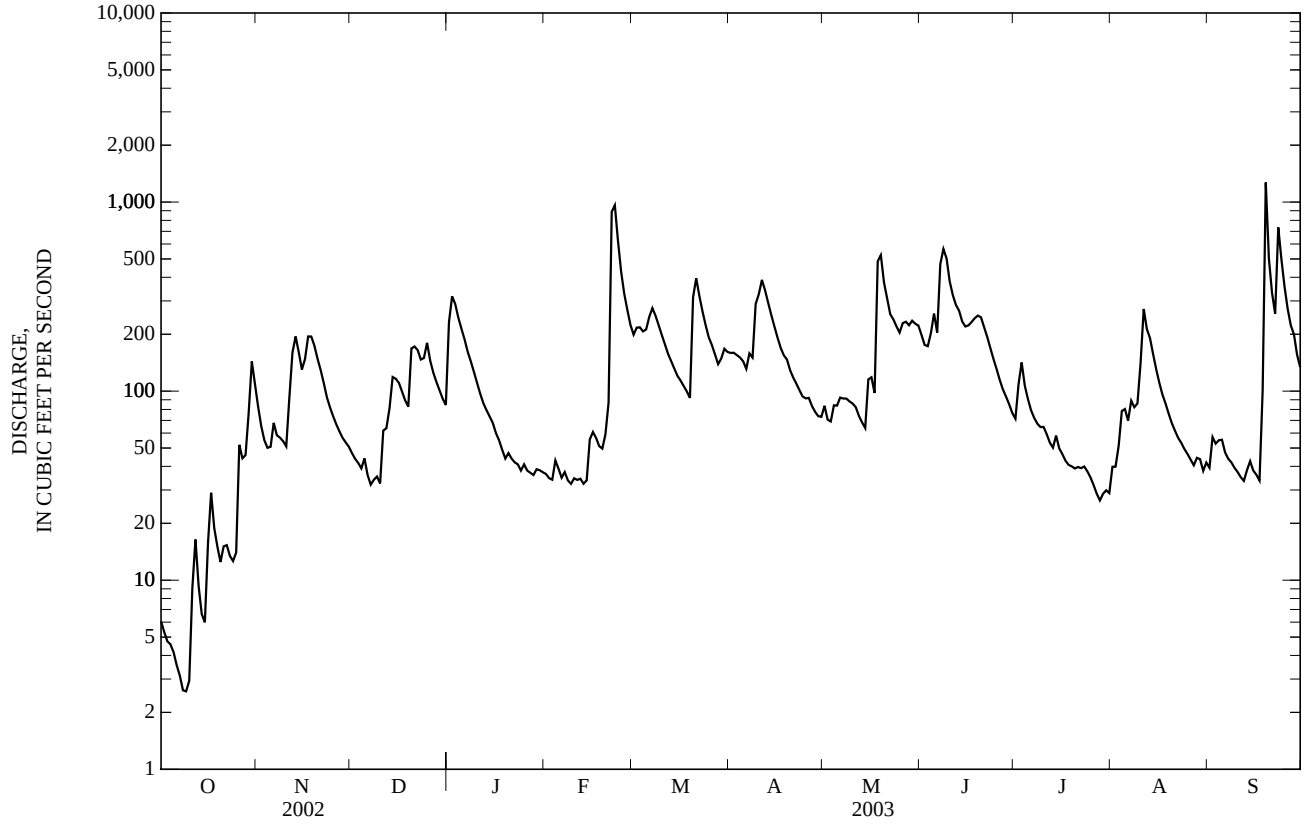
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 63.0 | 87.3 | 104 | 114 | 127 | 157 | 144 | 109 | 89.3 | 39.0 | 57.4 | 54.3 |
| MAX | 313 | 644 | 297 | 339 | 347 | 311 | 417 | 352 | 541 | 213 | 1,239 | 388 |
| (WY) | (1991) | (1986) | (1997) | (1998) | (1998) | (1993) | (1987) | (1989) | (1972) | (1972) | (1969) | (1996) |
| MIN | 4.75 | 7.75 | 10.3 | 7.94 | 26.5 | 37.8 | 38.4 | 35.8 | 14.6 | 8.93 | 2.51 | 3.75 |
| (WY) | (1964) | (1999) | (1999) | (1981) | (2002) | (1981) | (1966) | (1963) | (1999) | (1999) | (2002) | (1998) |

02027500 PINEY RIVER AT PINEY RIVER, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1950 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 15,737.70 | | 47,933.7 | | | |
| ANNUAL MEAN | 43.1 | | 131 | | 95.2 | |
| HIGHEST ANNUAL MEAN | | | | | 188 | 1969 |
| LOWEST ANNUAL MEAN | | | | | 29.3 | 2002 |
| HIGHEST DAILY MEAN | 200 | Apr 23 | 1,270 | Sep 19 | 25,000 | Aug 20, 1969 |
| LOWEST DAILY MEAN | 0.31 | Sep 14 | 2.6 | aOct 8 | 0.31 | Sep 14, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.66 | Sep 9 | 3.4 | Oct 4 | 0.66 | Sep 9, 2002 |
| MAXIMUM PEAK FLOW | | | 2,340 | Sep 19 | 38,000 | Aug 20, 1969 |
| MAXIMUM PEAK STAGE | | | 7.54 | Sep 19 | b13.80 | Aug 20, 1969 |
| INSTANTANEOUS LOW FLOW | | | 2.3 | cOct 8 | 0.29 | Sep 14, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.91 | | 2.76 | | 2.00 | |
| ANNUAL RUNOFF (INCHES) | 12.30 | | 37.46 | | 27.18 | |
| 10 PERCENT EXCEEDS | 101 | | 265 | | 200 | |
| 50 PERCENT EXCEEDS | 28 | | 86 | | 59 | |
| 90 PERCENT EXCEEDS | 2.4 | | 34 | | 11 | |

a Also Oct. 9, 2002.
b From floodmarks.
c Also Oct. 9, 10, 2002.
e Estimated.



## 02028500 ROCKFISH RIVER NEAR GREENFIELD, VA

LOCATION.--Lat 37°52'11", long 78°49'24", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Aug. 21, 1943, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 6, 7, Jan. 17-19, 24-29, and Feb. 16-18, which are fair. Maximum discharge, 70,000 $ft^3/s$, from rating curve extended above 8,500 $ft^3/s$ 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 $ft^3/s$.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1500 | 3,810 | 8.06 | Aug 11 | 0300 | 1,680 | 5.16 |
| Mar 20 | 1700 | 1,580 | 4.99 | Sep 19 | 0445 | *8,610 | *12.32 |
| Aug 9 | 2245 | 1,860 | 5.47 | Sep 23 | 0645 | 1,850 | 5.45 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.1 | 66 | 51 | 445 | 57 | 310 | 298 | 210 | 295 | 149 | 78 | 111 |
| 2 | 3.4 | 50 | 48 | 496 | 55 | 470 | 286 | 159 | 238 | 245 | 82 | 124 |
| 3 | 2.7 | 43 | 46 | 410 | 53 | 492 | 268 | 146 | 226 | 925 | 164 | 113 |
| 4 | 2.3 | 39 | 41 | 310 | 63 | 400 | 246 | 157 | 227 | 629 | 389 | 134 |
| 5 | 2.0 | 37 | 50 | 255 | 59 | 388 | 225 | 145 | 258 | 402 | 231 | 124 |
| 6 | 2.0 | 95 | e46 | 227 | 52 | 454 | 197 | 142 | 197 | 292 | 164 | 98 |
| 7 | 1.9 | 68 | e41 | 191 | 60 | 453 | 306 | 129 | 484 | 236 | 155 | 90 |
| 8 | 1.7 | 57 | 45 | 176 | 54 | 388 | 283 | 119 | 558 | 196 | 150 | 86 |
| 9 | 1.7 | 50 | 52 | 157 | 51 | 335 | 571 | 308 | 656 | 175 | 392 | 81 |
| 10 | 1.9 | 45 | 45 | 140 | 57 | 290 | 586 | 404 | 490 | 167 | 763 | 75 |
| 11 | 9.0 | 123 | 108 | 120 | 54 | 253 | 817 | 323 | 416 | 148 | 971 | 70 |
| 12 | 18 | 336 | 122 | 107 | 55 | 227 | 637 | 246 | 392 | 125 | 532 | 69 |
| 13 | 11 | 283 | 149 | 103 | 50 | 206 | 507 | 197 | 363 | 113 | 580 | 120 |
| 14 | 9.5 | 178 | 261 | 98 | 51 | 190 | 410 | 167 | 315 | 113 | 424 | 130 |
| 15 | 7.4 | 136 | 191 | 90 | 80 | 174 | 340 | 303 | 300 | 105 | 328 | 104 |
| 16 | 72 | 194 | 160 | 82 | e120 | 166 | 290 | 579 | 323 | 97 | 297 | 90 |
| 17 | 52 | 388 | 132 | e76 | e98 | 156 | 251 | 397 | 361 | 85 | 312 | 80 |
| 18 | 28 | 357 | 119 | e72 | e102 | 146 | 235 | 937 | 406 | 81 | 266 | 513 |
| 19 | 21 | 236 | 111 | e69 | 89 | 135 | 241 | 845 | 400 | 78 | 233 | 3,920 |
| 20 | 17 | 184 | 227 | 72 | 92 | 753 | 205 | 591 | 460 | 75 | 200 | 1,010 |
| 21 | 18 | 154 | 214 | 71 | 146 | 766 | 190 | 499 | 409 | 72 | 177 | 656 |
| 22 | 18 | 133 | 187 | 64 | 1,520 | 534 | 176 | 430 | 352 | 84 | 160 | 517 |
| 23 | 14 | 110 | 161 | 61 | 1,320 | 407 | 159 | 435 | 301 | 96 | 145 | 1,160 |
| 24 | 13 | 100 | 153 | e58 | 893 | 328 | 146 | 411 | 263 | 72 | 129 | 780 |
| 25 | 13 | 90 | 204 | e63 | 673 | 277 | 144 | 370 | 232 | 65 | 121 | 583 |
| 26 | 44 | 83 | 177 | e56 | 502 | 256 | 161 | 424 | 207 | 60 | 111 | 462 |
| 27 | 33 | 74 | 148 | e53 | 402 | 233 | 140 | 410 | 187 | 55 | 102 | 392 |
| 28 | 33 | 64 | 131 | e51 | 333 | 199 | 127 | 402 | 172 | 52 | 105 | 453 |
| 29 | 54 | 61 | 124 | e53 | --- | 220 | 120 | 416 | 163 | 112 | 146 | 313 |
| 30 | 156 | 61 | 114 | 55 | --- | 363 | 116 | 402 | 158 | 77 | 105 | 267 |
| 31 | 95 | --- | 107 | 55 | --- | 338 | --- | 351 | --- | 69 | 101 | --- |
| TOTAL | 759.6 | 3,895 | 3,765 | 4,336 | 7,141 | 10,307 | 8,678 | 11,054 | 9,809 | 5,250 | 8,113 | 12,725 |
| MEAN | 24.5 | 130 | 121 | 140 | 255 | 332 | 289 | 357 | 327 | 169 | 262 | 424 |
| MAX | 156 | 388 | 261 | 496 | 1,520 | 766 | 817 | 937 | 656 | 925 | 971 | 3,920 |
| MIN | 1.7 | 37 | 41 | 51 | 50 | 135 | 116 | 119 | 158 | 52 | 78 | 69 |
| CFSM | 0.26 | 1.37 | 1.28 | 1.48 | 2.70 | 3.51 | 3.06 | 3.77 | 3.46 | 1.79 | 2.77 | 4.48 |
| IN. | 0.30 | 1.53 | 1.48 | 1.71 | 2.81 | 4.05 | 3.41 | 4.35 | 3.86 | 2.06 | 3.19 | 5.00 |

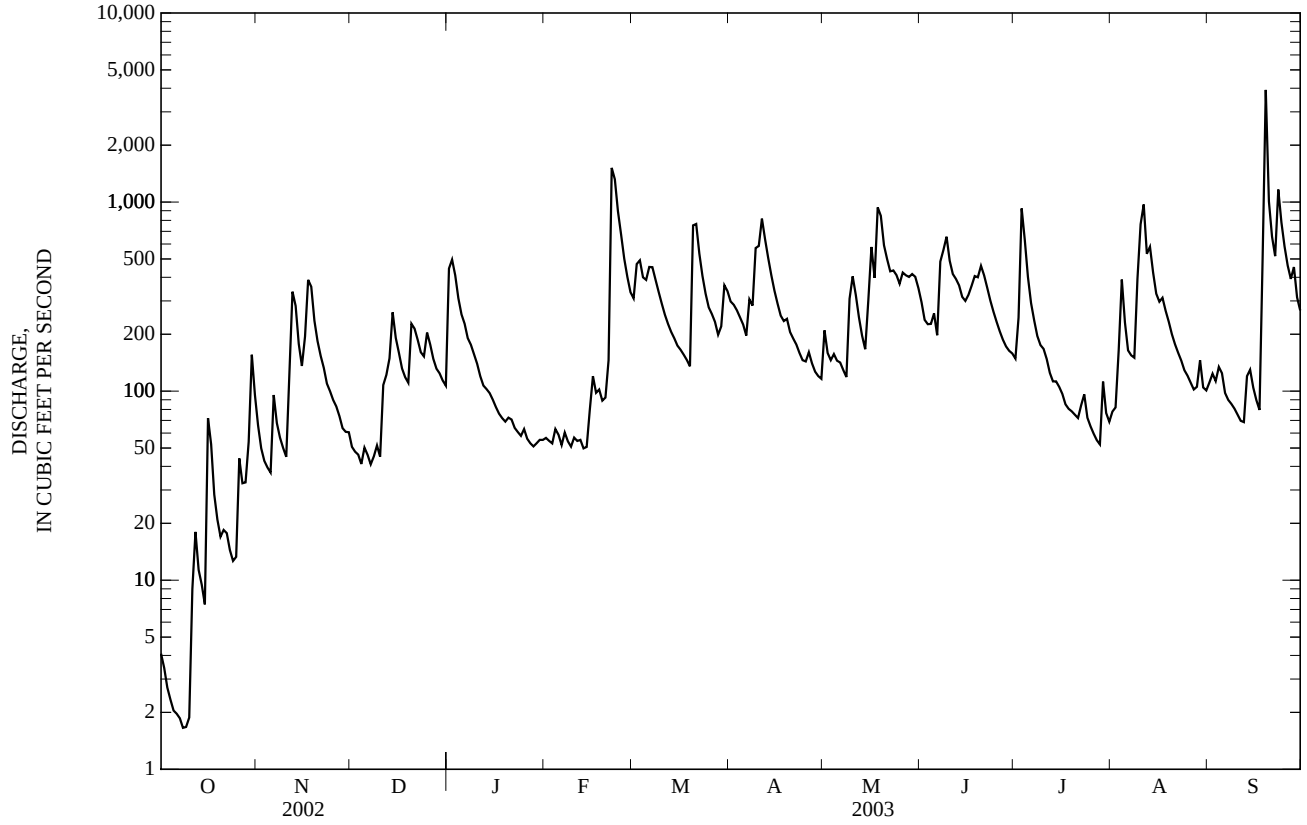
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 91.0 | 121 | 145 | 166 | 192 | 242 | 217 | 159 | 122 | 72.0 | 84.8 | 89.7 |
| MAX | 394 | 733 | 445 | 480 | 723 | 629 | 698 | 369 | 696 | 327 | 1,246 | 506 |
| (WY) | (1991) | (1986) | (1951) | (1996) | (1998) | (1993) | (1983) | (1990) | (1995) | (1972) | (1969) | (1979) |
| MIN | 7.35 | 10.0 | 18.5 | 22.2 | 23.4 | 55.9 | 52.5 | 39.5 | 6.53 | 2.60 | 0.74 | 2.52 |
| (WY) | (2002) | (2002) | (1966) | (2002) | (2002) | (1981) | (1981) | (2002) | (2002) | (2002) | (2002) | (2002) |

02028500 ROCKFISH RIVER NEAR GREENFIELD, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1943 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 15,492.69 | | 85,832.6 | | | |
| ANNUAL MEAN | 42.4 | | 235 | | 142 | |
| HIGHEST ANNUAL MEAN | | | | | 290 | 1973 |
| LOWEST ANNUAL MEAN | | | | | 22.5 | 2002 |
| HIGHEST DAILY MEAN | 388 | Nov 17 | 3,920 | Sep 19 | e28,800 | Aug 20, 1969 |
| LOWEST DAILY MEAN | 0.07 | Sep 14 | 1.7 | aOct 8 | 0.07 | Sep 14, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.12 | Sep 11 | 1.9 | Oct 4 | 0.12 | Sep 11, 2002 |
| MAXIMUM PEAK FLOW | | | 8,610 | Sep 19 | 70,000 | Aug 20, 1969 |
| MAXIMUM PEAK STAGE | | | 12.32 | Sep 19 | b31.20 | Aug 20, 1969 |
| INSTANTANEOUS LOW FLOW | | | 1.4 | Oct 9 | 0.07 | cAug 14, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.45 | | 2.49 | | 1.50 | |
| ANNUAL RUNOFF (INCHES) | 6.09 | | 33.75 | | 20.36 | |
| 10 PERCENT EXCEEDS | 112 | | 491 | | 300 | |
| 50 PERCENT EXCEEDS | 23 | | 156 | | 84 | |
| 90 PERCENT EXCEEDS | 0.48 | | 47 | | 17 | |

a Also Oct. 9, 2002.
b From floodmarks.
c Also Aug. 15, 18, 26-28 and Sept. 13-15, 2002.
e Estimated.



## 02029000 JAMES RIVER AT SCOTTSVILLE, VA

LOCATION.--Lat 37°47'51", long 78°29'29", NAD83, 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 $mi^2$.

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 NGVD of 1929. 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 $ft^3/s$, from rating curve extended above 120,000 $ft^3/s$ 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 $ft^3/s$, and flood in November 1877 reached a stage of 27.9 ft, discharge, about 160,000 $ft^3/s$, from information by local resident. Flood in March 1913 reached a stage of 25.16 ft, from floodmarks, discharge, 121,000 $ft^3/s$.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 35,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 24 | 0700 | *92,800 | *22.58 | May 19 | 2215 | 54,400 | 17.93 |
| Apr 12 | 1230 | 36,800 | 14.79 | Sep 19 | 1145 | 64,100 | 19.31 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1,870 | 8,440 | 2,700 | 6,030 | 2,170 | 14,600 | 8,440 | 5,210 | 11,900 | 4,890 | 3,370 | 3,110 |
| 2 | 1,520 | 5,610 | 2,440 | 9,380 | 2,060 | 13,600 | 8,040 | 5,360 | 10,800 | 5,620 | 3,120 | 2,760 |
| 3 | 1,210 | 4,200 | 2,260 | 12,700 | 2,150 | 15,400 | 8,580 | 5,180 | 9,820 | 20,200 | 2,890 | 2,810 |
| 4 | 1,010 | 2,940 | 2,180 | 13,800 | 2,020 | 16,400 | 9,980 | 5,510 | 9,280 | 22,200 | 4,070 | 3,380 |
| 5 | 1,060 | 2,440 | 2,180 | 13,400 | 2,360 | 14,400 | 9,160 | 6,650 | 13,100 | 17,400 | 4,680 | 4,150 |
| 6 | 821 | 2,580 | 2,150 | 11,900 | 2,310 | 13,100 | 8,180 | 10,300 | 20,200 | 11,100 | 6,100 | 5,200 |
| 7 | 755 | 3,210 | 1,950 | 9,510 | 2,400 | 15,600 | 7,960 | 11,900 | 19,300 | 10,300 | 4,950 | 4,690 |
| 8 | 739 | 6,230 | 1,850 | 7,810 | 2,530 | 17,200 | 9,560 | 11,200 | 21,900 | 7,620 | 4,440 | 3,590 |
| 9 | 668 | 5,260 | 1,670 | 6,810 | 2,210 | 14,700 | 18,700 | 9,520 | 21,900 | 6,830 | 4,420 | 3,160 |
| 10 | 528 | 4,090 | 1,660 | 6,110 | 2,160 | 11,100 | 31,000 | 8,750 | 22,600 | 6,010 | 8,230 | 2,730 |
| 11 | 589 | 4,360 | 2,020 | 5,660 | 2,300 | 9,310 | 32,300 | 9,620 | 17,700 | 5,960 | 9,200 | 2,570 |
| 12 | 751 | 8,070 | 3,420 | 4,910 | 2,310 | 8,510 | 34,500 | 11,100 | 15,700 | 5,800 | 9,410 | 2,270 |
| 13 | 924 | 13,100 | 4,910 | 4,630 | 2,300 | 7,680 | 26,700 | 9,450 | 15,500 | 5,590 | 7,290 | 2,440 |
| 14 | 768 | 14,700 | 10,600 | 4,150 | 2,290 | 6,970 | 21,100 | 8,310 | 17,800 | 5,230 | 7,600 | 2,480 |
| 15 | 666 | 10,100 | 13,900 | 3,820 | 2,310 | 6,260 | 16,500 | 7,640 | 18,200 | 5,020 | 6,350 | 2,530 |
| 16 | 776 | 7,170 | 12,700 | 3,630 | 3,590 | 6,280 | 12,600 | 9,170 | 14,900 | 6,760 | 5,360 | 2,370 |
| 17 | 1,080 | 8,510 | 10,100 | 3,450 | 5,280 | 6,370 | 10,300 | 7,650 | 21,600 | 6,720 | 5,330 | 2,340 |
| 18 | 1,420 | 11,800 | 8,120 | 3,190 | 7,910 | 5,980 | 8,880 | 14,600 | 29,000 | 5,320 | 4,910 | 2,430 |
| 19 | 2,510 | 12,400 | 6,750 | 2,880 | 6,150 | 5,750 | 8,260 | 44,100 | 25,300 | 4,600 | 4,750 | 46,000 |
| 20 | 1,810 | 9,160 | 6,240 | 2,760 | 5,670 | 12,000 | 7,680 | 42,000 | 27,800 | 3,880 | 4,180 | 32,600 |
| 21 | 1,530 | 7,110 | 9,310 | 2,710 | 6,690 | 24,100 | 7,270 | 24,600 | 22,200 | 3,760 | 3,600 | 21,200 |
| 22 | 1,450 | 5,850 | 18,300 | 2,740 | 23,700 | 22,800 | 6,760 | 19,200 | 20,000 | 3,470 | 3,270 | 11,500 |
| 23 | 1,280 | 5,280 | 13,400 | 2,850 | 80,200 | 17,500 | 6,570 | 18,700 | 17,400 | 3,640 | 3,220 | 17,000 |
| 24 | 1,050 | 5,990 | 10,900 | 2,320 | 83,600 | 13,800 | 6,780 | 15,300 | 13,900 | 3,570 | 2,680 | 24,200 |
| 25 | 1,000 | 5,590 | 10,200 | 2,250 | 38,400 | 10,900 | 6,340 | 15,400 | 10,500 | 2,910 | 2,660 | 17,700 |
| 26 | 1,220 | 4,780 | 12,900 | 2,220 | 26,100 | 8,960 | 6,140 | 19,200 | 8,270 | 2,930 | 2,510 | 12,800 |
| 27 | 1,660 | 4,140 | 11,200 | 2,140 | 21,600 | 8,020 | 6,030 | 14,800 | 7,090 | 2,390 | 2,410 | 9,910 |
| 28 | 1,580 | 3,750 | 8,540 | 2,180 | 18,300 | 7,140 | 5,650 | 15,200 | 6,230 | 2,460 | 2,410 | 8,090 |
| 29 | 2,030 | 3,110 | 6,950 | 2,010 | --- | 6,600 | 5,280 | 13,000 | 5,640 | 2,600 | 3,620 | 13,400 |
| 30 | 4,140 | 2,840 | 6,050 | 2,050 | --- | 7,020 | 5,040 | 13,100 | 5,240 | 2,750 | 3,310 | 9,510 |
| 31 | 6,690 | --- | 5,410 | 2,120 | --- | 8,910 | --- | 12,500 | --- | 2,790 | 3,040 | --- |
| TOTAL | 45,105 | 192,810 | 212,960 | 162,120 | 361,070 | 356,960 | 360,280 | 424,220 | 480,770 | 200,320 | 143,380 | 278,920 |
| MEAN | 1,455 | 6,427 | 6,870 | 5,230 | 12,900 | 11,510 | 12,010 | 13,680 | 16,030 | 6,462 | 4,625 | 9,297 |
| MAX | 6,690 | 14,700 | 18,300 | 13,800 | 83,600 | 24,100 | 34,500 | 44,100 | 29,000 | 22,200 | 9,410 | 46,000 |
| MIN | 528 | 2,440 | 1,660 | 2,010 | 2,020 | 5,750 | 5,040 | 5,180 | 5,240 | 2,390 | 2,410 | 2,270 |
| (†) | +3,176 | +17,646 | -101 | -151 | +504 | -655 | +252 | 0 | -101 | -1,664 | -2,722 | +3,630 |
| MEAN‡ | 1,557 | 7,015 | 6,866 | 5,225 | 12,913 | 11,494 | 12,018 | 13,680 | 16,022 | 6,408 | 4,537 | 9,418 |
| CFSM‡ | .34 | 1.53 | 1.50 | 1.14 | 2.82 | 2.51 | 2.62 | 2.98 | 3.50 | 1.40 | .99 | 2.29 |
| IN.‡ | .39 | 1.71 | 1.73 | 1.31 | 2.93 | 2.89 | 2.93 | 3.44 | 3.90 | 1.61 | 1.14 | 2.29 |

CAL YR 2002 MEAN‡ 2,887 CFSM‡ .63 IN.‡ 8.55
WTR YR 2003 MEAN‡ 8,873 CFSM‡ 1.94 IN.‡ 26.28

† 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

DISCHARGE, CUBIC FEET PER SECOND—CONTINUED
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

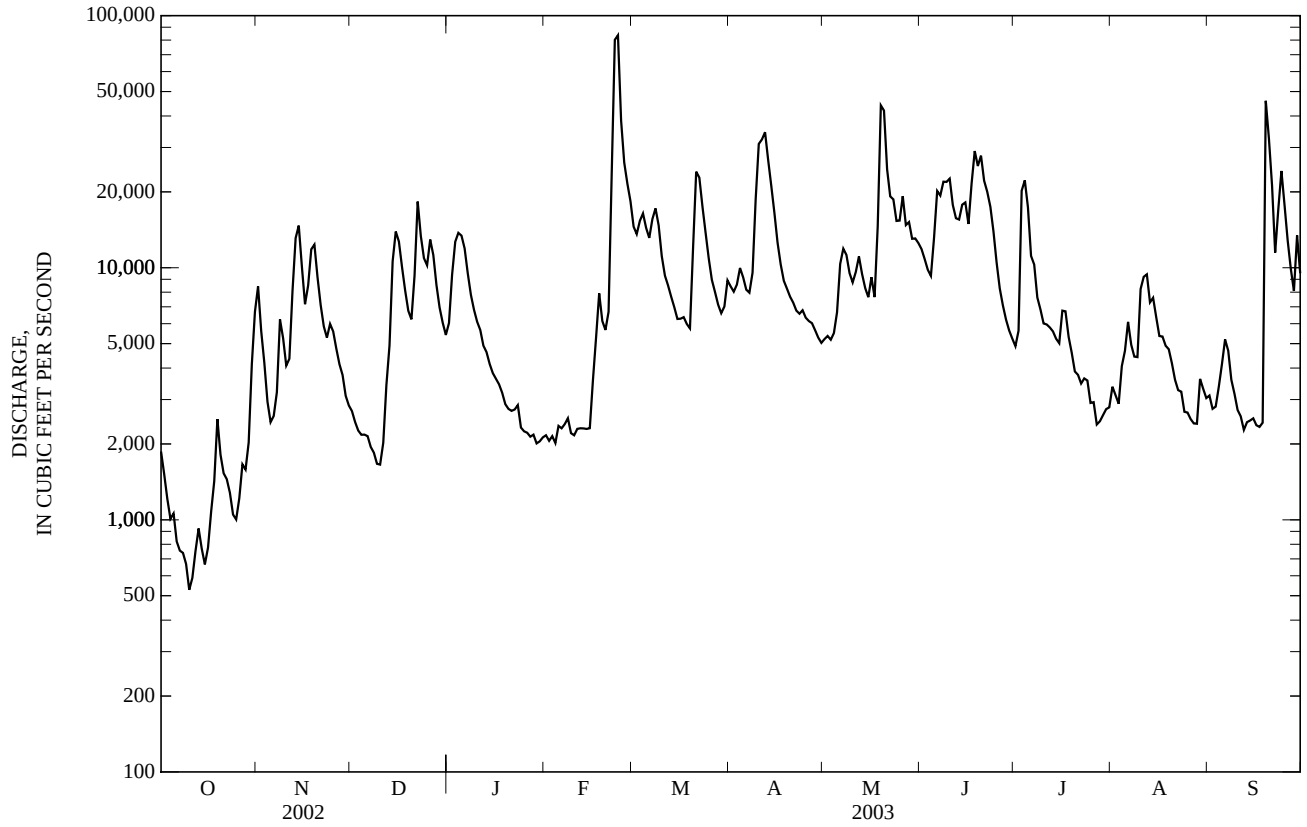
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 2,765 | 4,117 | 4,808 | 6,556 | 7,794 | 9,729 | 9,171 | 6,673 | 4,850 | 2,572 | 2,375 | 3,083 |
| MAX | 11,990 | 25,090 | 13,450 | 18,230 | 22,960 | 23,820 | 28,930 | 18,230 | 16,030 | 6,941 | 7,934 | 13,180 |
| (WY) | (1980) | (1986) | (1997) | (1996) | (1998) | (1993) | (1987) | (1989) | (2003) | (1995) | (1984) | (1996) |
| MIN | 875 | 883 | 1,318 | 1,165 | 1,274 | 1,961 | 2,493 | 3,309 | 1,028 | 981 | 800 | 754 |
| (WY) | (2002) | (2002) | (1981) | (1981) | (2002) | (1981) | (1995) | (2000) | (2002) | (1999) | (2002) | (2002) |

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1980 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 1,031,317 | | 3,218,915 | | | |
| ANNUAL MEAN | 2,826 | | 8,819 | | 5,357 | |
| HIGHEST ANNUAL MEAN | | | | | 8,819 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 1,852 | 2002 |
| HIGHEST DAILY MEAN | 18,300 | Dec 22 | 83,600 | Feb 24 | 199,000 | Nov 6, 1985 |
| LOWEST DAILY MEAN | 452 | Sep 14 | 528 | Oct 10 | 452 | Sep 14, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 499 | Sep 9 | 693 | Oct 6 | 499 | Sep 9, 2002 |
| MAXIMUM PEAK FLOW | | | 92,800 | Feb 24 | a243,000 | Nov 6, 1985 |
| MAXIMUM PEAK STAGE | | | 22.58 | Feb 24 | a31.77 | Nov 6, 1985 |
| INSTANTANEOUS LOW FLOW | | | 446 | Oct 11 | b418 | cSep 13, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.62 | | 1.92 | | 1.17 | |
| ANNUAL RUNOFF (INCHES) | 8.37 | | 26.12 | | 15.88 | |
| 10 PERCENT EXCEEDS | 7,200 | | 18,700 | | 11,500 | |
| 50 PERCENT EXCEEDS | 1,490 | | 6,150 | | 3,060 | |
| 90 PERCENT EXCEEDS | 669 | | 2,060 | | 1,110 | |

a Prior to regulation, 1925-79, maximum peak flow, 301,000 $ft^3/s$, June 22, 1972, gage height, 34.02 ft, from floodmarks.
b Prior to regulation, 1925-79, instantaneous low flow, 302 $ft^3/s$, Oct. 1, 1930, probably lower during period of doubtful record in September 1966.
c Also Sept. 14, 2002.



## 02030000 HARDWARE RIVER BELOW BRIERY CREEK, NEAR SCOTTSVILLE, VA

LOCATION.--Lat 37°48'46", long 78°27'19", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Oct. 21-23, 25, and June 30 to July 1, and periods with ice effect, Dec. 6-8, Jan. 17-29, and Feb. 16, 17, which are fair. Maximum discharge, 52,000 $ft^3/s$, from rating curve extended above 18,000 $ft^3/s$ on basis of slope-area measurements at gage heights 23.8 ft and 31.0 ft. Several measurements of water temperature were made during the year.

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

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 2145 | 4,500 | 14.00 | Aug 11 | 1345 | 1,660 | 9.04 |
| Mar 20 | 1345 | 1,650 | 9.05 | Sep 19 | 1145 | 9,520 | 17.20 |
| May 26 | 0830 | 1,820 | 9.49 | Sep 23 | 1115 | 1,630 | 9.00 |
| Jul 3 | 1145 | *9,760 | *17.36 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.6 | 51 | 36 | 427 | 62 | 239 | 228 | 130 | 260 | e93 | 238 | 138 |
| 2 | 3.6 | 36 | 34 | 673 | 58 | 442 | 196 | 108 | 212 | 130 | 161 | 186 |
| 3 | 3.0 | 28 | 33 | 304 | 55 | 427 | 172 | 99 | 183 | 5,560 | 173 | 179 |
| 4 | 2.7 | 25 | 30 | 227 | 64 | 282 | 156 | 97 | 201 | 1,760 | 445 | 197 |
| 5 | 2.7 | 25 | 37 | 160 | 68 | 249 | 147 | 94 | 217 | 492 | 255 | 226 |
| 6 | 2.2 | 68 | e42 | 131 | 58 | 251 | 136 | 100 | 169 | 331 | 207 | 169 |
| 7 | 1.5 | 64 | e33 | 115 | 64 | 217 | 256 | 93 | 644 | 318 | 205 | 149 |
| 8 | 1.6 | 40 | e35 | 107 | 62 | 191 | 278 | 91 | 585 | 246 | 227 | 142 |
| 9 | 1.7 | 32 | 42 | 98 | 56 | 176 | 564 | 313 | 722 | 234 | 179 | 141 |
| 10 | 1.8 | 27 | 40 | 89 | 63 | 158 | 457 | 562 | 327 | 223 | 576 | 133 |
| 11 | 5.1 | 75 | 128 | 80 | 67 | 143 | 598 | 337 | 248 | 222 | 950 | 125 |
| 12 | 17 | 428 | 224 | 75 | 73 | 136 | 373 | 211 | 247 | 184 | 422 | 117 |
| 13 | 14 | 334 | 202 | 72 | 68 | 131 | 279 | 157 | 238 | 171 | 360 | 226 |
| 14 | 7.6 | 110 | 441 | 72 | 65 | 123 | 230 | 127 | 219 | 178 | 254 | 209 |
| 15 | 6.1 | 74 | 255 | 69 | 128 | 116 | 203 | 128 | 185 | 167 | 210 | 164 |
| 16 | 19 | 89 | 144 | 65 | e150 | 115 | 183 | 380 | 182 | 155 | 190 | 144 |
| 17 | 77 | 447 | 98 | e64 | e115 | 114 | 168 | 230 | 205 | 142 | 181 | 142 |
| 18 | 30 | 346 | 82 | e62 | 119 | 111 | 162 | 713 | 236 | 137 | 178 | 413 |
| 19 | 16 | 140 | 72 | e60 | 111 | 107 | 200 | 693 | 233 | 153 | 167 | 6,510 |
| 20 | 11 | 92 | 184 | e69 | 149 | 896 | 174 | 374 | 328 | 158 | 149 | 1,050 |
| 21 | e10 | 75 | 182 | e60 | 305 | 1,020 | 161 | 332 | 316 | 137 | 144 | 446 |
| 22 | e9.8 | 67 | 107 | e55 | 2,170 | 401 | 153 | 332 | 209 | 141 | 142 | 340 |
| 23 | e9.2 | 60 | 87 | e52 | 2,260 | 268 | 142 | 402 | 163 | 159 | 133 | 1,110 |
| 24 | 8.6 | 52 | 82 | e47 | 725 | 215 | 121 | 418 | 132 | 126 | 118 | 484 |
| 25 | e8.4 | 49 | 298 | e50 | 501 | 182 | 119 | 345 | 118 | 110 | 114 | 337 |
| 26 | 36 | 46 | 253 | e53 | 352 | 167 | 139 | 1,030 | 111 | 99 | 110 | 277 |
| 27 | 42 | 43 | 143 | e49 | 280 | 173 | 129 | 497 | 106 | 94 | 106 | 259 |
| 28 | 27 | 40 | 109 | e46 | 240 | 150 | 116 | 438 | 106 | 92 | 120 | 299 |
| 29 | 39 | 39 | 95 | e48 | --- | 149 | 112 | 345 | 100 | 169 | 354 | 224 |
| 30 | 136 | 39 | 82 | 54 | --- | 274 | 109 | 361 | e98 | 127 | 171 | 196 |
| 31 | 103 | --- | 75 | 56 | --- | 324 | --- | 286 | --- | 108 | 141 | --- |
| TOTAL | 657.2 | 3,041 | 3,705 | 3,589 | 8,488 | 7,947 | 6,461 | 9,823 | 7,300 | 12,416 | 7,380 | 14,732 |
| MEAN | 21.2 | 101 | 120 | 116 | 303 | 256 | 215 | 317 | 243 | 401 | 238 | 491 |
| MAX | 136 | 447 | 441 | 673 | 2,260 | 1,020 | 598 | 1,030 | 722 | 5,560 | 950 | 6,510 |
| MIN | 1.5 | 25 | 30 | 46 | 55 | 107 | 109 | 91 | 98 | 92 | 106 | 117 |
| CFSM | 0.18 | 0.87 | 1.03 | 1.00 | 2.61 | 2.21 | 1.86 | 2.73 | 2.10 | 3.45 | 2.05 | 4.23 |
| IN. | 0.21 | 0.98 | 1.19 | 1.15 | 2.72 | 2.55 | 2.07 | 3.15 | 2.34 | 3.98 | 2.37 | 4.72 |

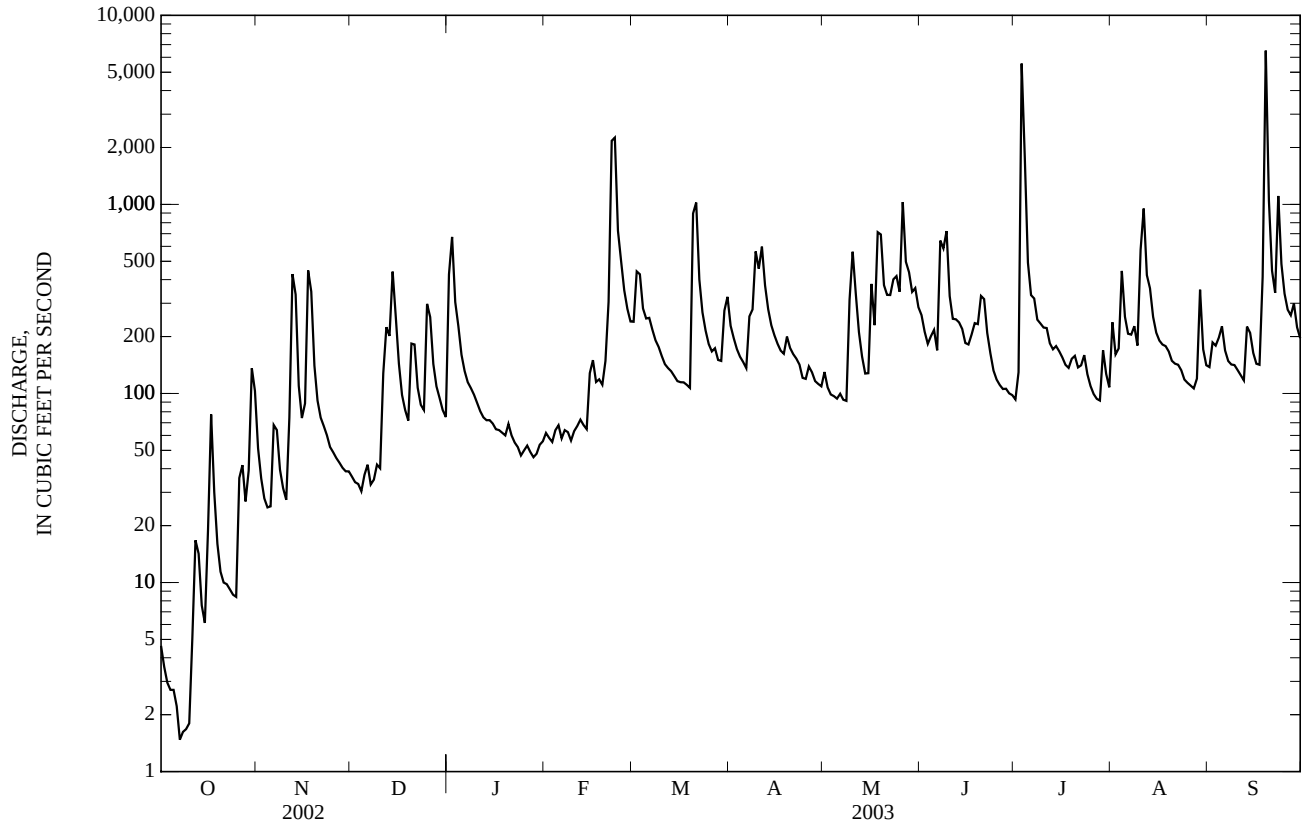
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 1995, 1997 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 86.8 | 97.2 | 129 | 151 | 184 | 213 | 180 | 136 | 107 | 79.6 | 95.9 | 88.0 |
| MAX | 370 | 514 | 514 | 448 | 664 | 613 | 604 | 398 | 560 | 401 | 1,155 | 750 |
| (WY) | (1977) | (1986) | (1949) | (1998) | (1998) | (1993) | (1983) | (1989) | (1972) | (2003) | (1969) | (1944) |
| MIN | 11.3 | 12.0 | 20.5 | 24.1 | 23.3 | 35.1 | 39.5 | 21.9 | 4.27 | 1.69 | 0.46 | 2.66 |
| (WY) | (2002) | (2002) | (1966) | (2002) | (2002) | (1981) | (1981) | (2002) | (2002) | (2002) | (2002) | (2002) |

02030000 HARDWARE RIVER BELOW BRIERY CREEK, NEAR SCOTTSVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1939 - 1995 1997 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 12,254.44 | | 85,539.2 | | | |
| ANNUAL MEAN | 33.6 | | 234 | | 129 | |
| HIGHEST ANNUAL MEAN | | | | | 249 | 1973 |
| LOWEST ANNUAL MEAN | | | | | 17.4 | 2002 |
| HIGHEST DAILY MEAN | 447 | Nov 17 | 6,510 | Sep 19 | 28,400 | Aug 20, 1969 |
| LOWEST DAILY MEAN | 0.00 | Aug 27 | 1.5 | Oct 7 | 0.00 | Aug 27, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.01 | Aug 21 | 2.0 | Oct 4 | 0.01 | Aug 21, 2002 |
| MAXIMUM PEAK FLOW | | | 9,760 | Jul 3 | 52,000 | Aug 20, 1969 |
| MAXIMUM PEAK STAGE | | | 17.36 | Jul 3 | a31.00 | Aug 20, 1969 |
| INSTANTANEOUS LOW FLOW | | | 1.3 | Oct 7 | 0.00 | bAug 26, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.29 | | 2.02 | | 1.11 | |
| ANNUAL RUNOFF (INCHES) | 3.93 | | 27.43 | | 15.07 | |
| 10 PERCENT EXCEEDS | 75 | | 424 | | 237 | |
| 50 PERCENT EXCEEDS | 21 | | 142 | | 80 | |
| 90 PERCENT EXCEEDS | 0.48 | | 36 | | 24 | |

a From floodmarks.
b Also part or all of each day Aug. 27, 28, 2002.
e Estimated.



## 02031000 MECHUMS RIVER NEAR WHITE HALL, VA

LOCATION.--Lat 38°06'09", long 78°35'34", NAD83, 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 $mi^2$.

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 NGVD of 1929. Oct. 1, 1942, to Sept. 30, 1951, on right bank 20 ft downstream from former highway bridge at different datum.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Oct. 3-8, 10, 13-17, 20, 23-26, Mar. 26-28, Apr. 27, 28, May 11, 24-27, and June 18, 19, and periods with ice effect, Dec. 6, 7, Jan. 17-25, 27-29, and Feb. 16-18, which are fair. Maximum discharge, 20,000 $ft^3/s$, from rating curve extended above 8,000 $ft^3/s$. 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 Sept. 6, 1979, reached a stage of 24.5 ft, from floodmarks, discharge, about 13,500 $ft^3/s$, from rating curve extended above 8,300 $ft^3/s$.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1830 | 4,740 | 14.90 | Aug 3 | 1815 | 1,450 | 8.49 |
| Mar 20 | 1745 | 2,040 | 10.48 | Sep 19 | 0700 | *9,620 | *19.43 |
| Jul 3 | 1015 | 2,360 | 9.93 | Sep 23 | 0815 | 1,930 | 9.27 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.91 | 24 | 30 | 309 | 45 | 191 | 198 | 120 | 217 | 77 | 85 | 66 |
| 2 | 0.60 | 17 | 28 | 307 | 42 | 337 | 180 | 98 | 170 | 112 | 71 | 105 |
| 3 | e0.50 | 14 | 28 | 214 | 40 | 386 | 168 | 87 | 160 | 1,420 | 394 | 93 |
| 4 | e0.40 | 13 | 26 | 172 | 44 | 271 | 159 | 92 | 170 | 543 | 363 | 93 |
| 5 | e0.35 | 13 | 30 | 141 | 45 | 245 | 143 | 90 | 202 | 299 | 208 | 94 |
| 6 | e0.33 | 41 | e35 | 125 | 39 | 280 | 126 | 91 | 155 | 200 | 137 | 71 |
| 7 | e0.24 | 31 | e28 | 108 | 45 | 244 | 193 | 86 | 253 | 155 | 110 | 64 |
| 8 | e0.18 | 21 | 30 | 96 | 43 | 211 | 212 | 82 | 284 | 133 | 108 | 61 |
| 9 | 0.11 | 17 | 34 | 86 | 39 | 184 | 403 | 176 | 450 | 142 | 140 | 59 |
| 10 | e0.10 | 15 | 30 | 76 | 42 | 162 | 387 | 324 | 249 | 153 | 267 | 56 |
| 11 | 2.4 | 51 | 104 | 67 | 42 | 146 | 584 | e270 | 194 | 126 | 541 | 53 |
| 12 | 11 | 224 | 136 | 61 | 42 | 134 | 388 | 191 | 184 | 103 | 243 | 52 |
| 13 | e7.0 | 190 | 142 | 58 | 38 | 124 | 292 | 150 | 173 | 92 | 177 | 128 |
| 14 | e4.0 | 91 | 300 | 57 | 38 | 115 | 236 | 128 | 155 | 86 | 141 | 116 |
| 15 | e2.8 | 62 | 178 | 54 | 55 | 107 | 204 | 148 | 182 | 85 | 118 | 91 |
| 16 | e25 | 90 | 129 | 53 | e74 | 104 | 176 | 519 | 163 | 79 | 110 | 76 |
| 17 | e22 | 267 | 100 | e48 | e72 | 102 | 158 | 279 | 202 | 73 | 153 | 66 |
| 18 | 14 | 225 | 83 | e47 | e82 | 100 | 151 | 617 | e265 | 69 | 126 | 322 |
| 19 | 9.2 | 127 | 73 | e45 | 70 | 94 | 168 | 572 | e230 | 69 | 111 | 4,630 |
| 20 | e6.3 | 91 | 117 | e50 | 73 | 800 | 150 | 374 | 317 | 82 | 97 | 759 |
| 21 | 6.9 | 74 | 116 | e44 | 129 | 606 | 144 | 326 | 326 | 68 | 88 | 396 |
| 22 | 7.2 | 63 | 94 | e42 | 1,820 | 335 | 144 | 291 | 216 | 68 | 81 | 280 |
| 23 | e5.8 | 51 | 81 | e40 | 1,150 | 247 | 131 | 283 | 171 | 81 | 75 | 947 |
| 24 | e5.0 | 45 | 76 | e37 | 604 | 204 | 117 | e280 | 143 | 73 | 70 | 488 |
| 25 | e4.6 | 41 | 110 | e39 | 451 | 172 | 115 | e245 | 125 | 66 | 66 | 346 |
| 26 | e17 | 38 | 116 | 39 | 318 | e140 | 125 | e265 | 113 | 59 | 63 | 262 |
| 27 | 14 | 36 | 90 | e37 | 245 | e145 | e110 | e250 | 101 | 55 | 60 | 231 |
| 28 | 11 | 34 | 78 | e35 | 210 | e121 | e93 | 248 | 94 | 54 | 60 | 281 |
| 29 | 15 | 32 | 70 | e38 | --- | 139 | 88 | 249 | 87 | 78 | 92 | 197 |
| 30 | 68 | 32 | 62 | 38 | --- | 205 | 85 | 291 | 81 | 67 | 66 | 171 |
| 31 | 41 | --- | 59 | 42 | --- | 246 | --- | 235 | --- | 61 | 72 | --- |
| TOTAL | 302.92 | 2,070 | 2,613 | 2,605 | 5,937 | 6,897 | 5,828 | 7,457 | 5,832 | 4,828 | 4,493 | 10,654 |
| MEAN | 9.77 | 69.0 | 84.3 | 84.0 | 212 | 222 | 194 | 241 | 194 | 156 | 145 | 355 |
| MAX | 68 | 267 | 300 | 309 | 1,820 | 800 | 584 | 617 | 450 | 1,420 | 541 | 4,630 |
| MIN | 0.10 | 13 | 26 | 35 | 38 | 94 | 85 | 82 | 81 | 54 | 60 | 52 |
| CFSM | 0.10 | 0.72 | 0.88 | 0.88 | 2.22 | 2.33 | 2.04 | 2.52 | 2.04 | 1.63 | 1.52 | 3.72 |
| IN. | 0.12 | 0.81 | 1.02 | 1.02 | 2.32 | 2.69 | 2.27 | 2.91 | 2.27 | 1.88 | 1.75 | 4.15 |

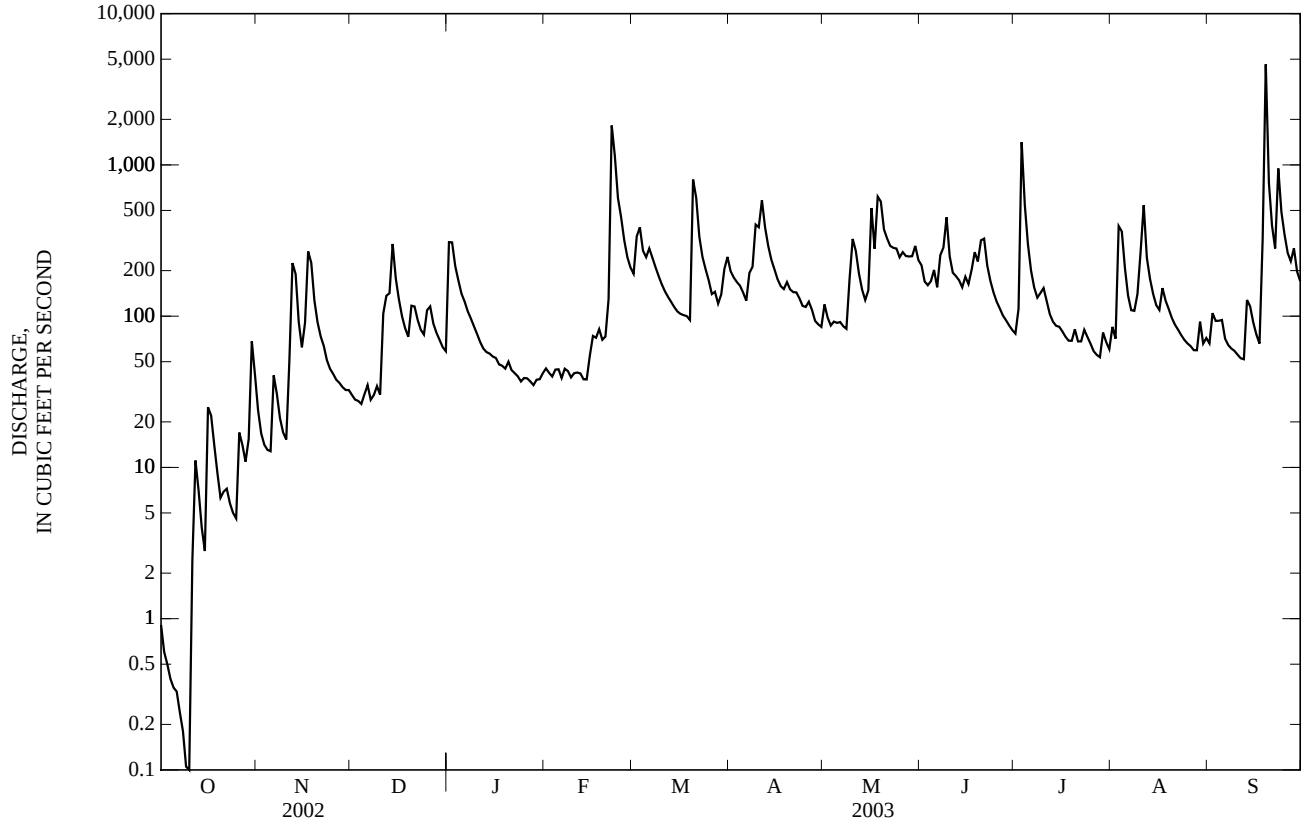
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 1951, 1979 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 80.2 | 95.6 | 110 | 123 | 143 | 163 | 163 | 118 | 89.7 | 61.1 | 55.2 | 91.1 |
| 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 | 13.1 | 17.2 | 16.2 | 14.6 | 34.5 | 37.1 | 24.4 | 5.95 | 1.98 | 0.29 | 0.34 |
| (WY) | (1944) | (2002) | (2002) | (2002) | (2002) | (2002) | (1981) | (2002) | (2002) | (2002) | (2002) | (2002) |

02031000 MECHUMS RIVER NEAR WHITE HALL, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1943 - 1951, 1979 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 9,208.72 | | 59,516.92 | | | |
| ANNUAL MEAN | 25.2 | | 163 | | 107 | |
| HIGHEST ANNUAL MEAN | | | | | 178 | 1996 |
| LOWEST ANNUAL MEAN | | | | | 15.0 | 2002 |
| HIGHEST DAILY MEAN | 300 | Dec 14 | 4,630 | Sep 19 | 10,600 | Oct 15, 1942 |
| LOWEST DAILY MEAN | 0.00 | aAug 24 | e0.10 | Oct 10 | 0.00 | aAug 24, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.00 | bSep 4 | e0.24 | Oct 4 | 0.00 | bSep 4, 2002 |
| MAXIMUM PEAK FLOW | | | 9,620 | Sep 19 | 20,000 | Oct 15, 1942 |
| MAXIMUM PEAK STAGE | | | 19.43 | Sep 19 | c30.30 | Oct 15, 1942 |
| INSTANTANEOUS LOW FLOW | | | (d) | (f) | 0.00 | gAug 18, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.26 | | 1.71 | | 1.13 | |
| ANNUAL RUNOFF (INCHES) | 3.59 | | 23.21 | | 15.31 | |
| 10 PERCENT EXCEEDS | 62 | | 308 | | 196 | |
| 50 PERCENT EXCEEDS | 15 | | 100 | | 66 | |
| 90 PERCENT EXCEEDS | 0.09 | | 25 | | 18 | |

a Also Aug. 25-27 and Sept. 4-25, 2002.
b Many days in September 2002.
c From floodmarks, datum then in use.
d Not determined.
e Estimated.
f Probably occurred Oct. 10, 2002.
g Also no flow part or all of each day Aug. 23-28 and Sept. 3-26, 2002.



## 02032640 NORTH FORK RIVANNA RIVER NEAR EARLYSVILLE, VA

LOCATION.--Lat 38°09'48", long 78°25'29", NAD83, 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 $mi^2$.

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

GAGE.--Water-stage recorder. Elevation of gage is 365 ft NGVD of 1929, from topographic map.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Oct. 3-10, 17, 18, Nov. 8-10, 27, Jan. 3-15, Mar. 5-15, and Mar. 26 to Apr. 1, and periods with ice effect, Dec. 5-8, Jan. 17-19, 22-29, and Feb. 16-19, which are fair. Maximum discharge, 30,100 $ft^3/s$, from rating curve extended above 2,150 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 1 | 1945 | 3,920 | 9.48 | Aug 11 | 0445 | 2,140 | 7.05 |
| Feb 22 | 1630 | 7,230 | 13.16 | Sep 19 | 0530 | *8,340 | *14.24 |
| Mar 20 | 1730 | 3,900 | 9.46 | Sep 23 | 0645 | 3,740 | 9.26 |
| Jun 20 | 2100 | 2,580 | 7.71 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.4 | 63 | 45 | 976 | 60 | 260 | e300 | 136 | 179 | 88 | 63 | 58 |
| 2 | 2.1 | 43 | 42 | 1,060 | 56 | 447 | 319 | 121 | 147 | 128 | 61 | 70 |
| 3 | e2.0 | 34 | 40 | e490 | 52 | 467 | 281 | 106 | 148 | 840 | 149 | 63 |
| 4 | e2.0 | 29 | 37 | e320 | 62 | 348 | 240 | 111 | 187 | 434 | 336 | 70 |
| 5 | e1.9 | 27 | e43 | e235 | 63 | e300 | 204 | 115 | 183 | 267 | 155 | 69 |
| 6 | e1.9 | 81 | e47 | e195 | 54 | e380 | 170 | 115 | 139 | 189 | 157 | 52 |
| 7 | e1.8 | 66 | e41 | e170 | 61 | e325 | 274 | 107 | 397 | 148 | 117 | 46 |
| 8 | e1.8 | e43 | e44 | e150 | 58 | e285 | 290 | 100 | 388 | 133 | 113 | 44 |
| 9 | e1.7 | e35 | 42 | e140 | 52 | e245 | 589 | 97 | 299 | 126 | 134 | 41 |
| 10 | e1.7 | e31 | 46 | e120 | 58 | e220 | 537 | 172 | 212 | 122 | 246 | 37 |
| 11 | 3.1 | 155 | 178 | e100 | 58 | e195 | 931 | 171 | 171 | 108 | 899 | 33 |
| 12 | 10 | 468 | 219 | e90 | 56 | e180 | 566 | 136 | 317 | 88 | 355 | 32 |
| 13 | 10 | 357 | 298 | e85 | 51 | e165 | 389 | 116 | 479 | 77 | 364 | 79 |
| 14 | 7.3 | 184 | 626 | e80 | 51 | e150 | 300 | 98 | 425 | 120 | 194 | 121 |
| 15 | 5.5 | 126 | 355 | e74 | 90 | e145 | 246 | 155 | 329 | 82 | 142 | 121 |
| 16 | 64 | 150 | 232 | 77 | e155 | 142 | 208 | 637 | 284 | 74 | 120 | 83 |
| 17 | e69 | 465 | 168 | e73 | e110 | 133 | 176 | 353 | 388 | 65 | 112 | 63 |
| 18 | e30 | 410 | 135 | e70 | e120 | 124 | 158 | 1,070 | 653 | 59 | 100 | 517 |
| 19 | 18 | 238 | 116 | e62 | e90 | 114 | 195 | 869 | 511 | 58 | 146 | 4,470 |
| 20 | 13 | 166 | 192 | 65 | 112 | 1,530 | 162 | 510 | 933 | 75 | 94 | 934 |
| 21 | 11 | 134 | 186 | 63 | 228 | 1,130 | 150 | 436 | 770 | 60 | 78 | 517 |
| 22 | 11 | 119 | 157 | e58 | 2,940 | 581 | 155 | 364 | 441 | 59 | 72 | 358 |
| 23 | 8.8 | 93 | 134 | e53 | 1,890 | 391 | 135 | 315 | 303 | 67 | 66 | 1,820 |
| 24 | 7.9 | 79 | 121 | e50 | 996 | 300 | 121 | 310 | 225 | 57 | 59 | 774 |
| 25 | 7.6 | 70 | 169 | e52 | 671 | 247 | 116 | 293 | 176 | 50 | 55 | 477 |
| 26 | 17 | 62 | 162 | e56 | 460 | e205 | 139 | 302 | 147 | 45 | 53 | 331 |
| 27 | 19 | e60 | 127 | e50 | 355 | e175 | 124 | 262 | 153 | 43 | 49 | 257 |
| 28 | 17 | 55 | 111 | e47 | 296 | e144 | 109 | 261 | 137 | 46 | 47 | 279 |
| 29 | 31 | 51 | 100 | e45 | --- | e200 | 102 | 240 | 108 | 53 | 49 | 183 |
| 30 | 147 | 49 | 90 | 48 | --- | e290 | 100 | 253 | 96 | 48 | 47 | 146 |
| 31 | 110 | --- | 85 | 52 | --- | e380 | --- | 207 | --- | 44 | 53 | --- |
| TOTAL | 636.5 | 3,943 | 4,388 | 5,206 | 9,305 | 10,198 | 7,786 | 8,538 | 9,325 | 3,853 | 4,685 | 12,145 |
| MEAN | 20.5 | 131 | 142 | 168 | 332 | 329 | 260 | 275 | 311 | 124 | 151 | 405 |
| MAX | 147 | 468 | 626 | 1,060 | 2,940 | 1,530 | 931 | 1,070 | 933 | 840 | 899 | 4,470 |
| MIN | 1.7 | 27 | 37 | 45 | 51 | 114 | 100 | 97 | 96 | 43 | 47 | 32 |
| CFSM | 0.19 | 1.22 | 1.31 | 1.55 | 3.07 | 3.04 | 2.40 | 2.55 | 2.87 | 1.15 | 1.40 | 3.74 |
| IN. | 0.22 | 1.36 | 1.51 | 1.79 | 3.20 | 3.51 | 2.68 | 2.94 | 3.21 | 1.33 | 1.61 | 4.18 |

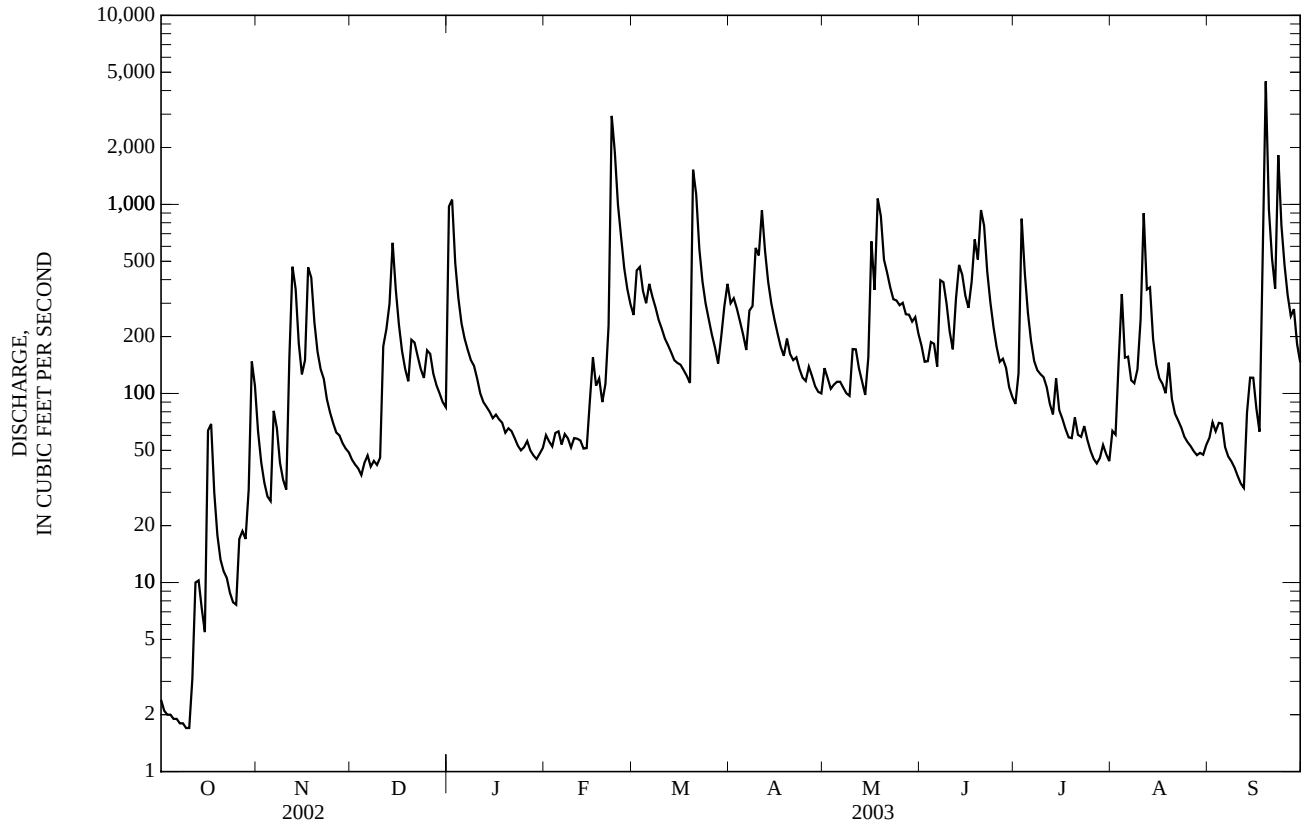
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 57.6 | 105 | 125 | 225 | 198 | 213 | 152 | 131 | 125 | 68.1 | 48.4 | 177 |
| MAX | 195 | 233 | 367 | 574 | 624 | 406 | 260 | 421 | 316 | 195 | 151 | 682 |
| (WY) | (1996) | (1998) | (1997) | (1996) | (1998) | (1994) | (2003) | (1998) | (1995) | (1995) | (2003) | (1996) |
| MIN | 12.8 | 16.7 | 27.7 | 28.2 | 26.8 | 74.3 | 60.1 | 47.4 | 11.4 | 9.62 | 1.63 | 1.40 |
| (WY) | (2002) | (1999) | (1999) | (2002) | (2002) | (2002) | (1995) | (1999) | (1999) | (1999) | (2002) | (2002) |

02032640 NORTH FORK RIVANNA RIVER NEAR EARLYSVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1994 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 19,808.56 | | 80,008.5 | | | |
| ANNUAL MEAN | 54.3 | | 219 | | 135 | |
| HIGHEST ANNUAL MEAN | | | | | 246 | 1996 |
| LOWEST ANNUAL MEAN | | | | | 34.9 | 2002 |
| HIGHEST DAILY MEAN | 696 | Apr 22 | 4,470 | Sep 19 | e11,000 | Sep 6, 1996 |
| LOWEST DAILY MEAN | 0.28 | Sep 14 | e1.7 | aOct 9 | 0.28 | Sep 14, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.40 | Sep 9 | e1.8 | Oct 4 | 0.40 | Sep 9, 2002 |
| MAXIMUM PEAK FLOW | | | 8,340 | Sep 19 | 30,100 | Sep 6, 1996 |
| MAXIMUM PEAK STAGE | | | 14.24 | Sep 19 | b23.56 | Sep 6, 1996 |
| INSTANTANEOUS LOW FLOW | | | (c) | (d) | 0.25 | Sep 14, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.50 | | 2.03 | | 1.25 | |
| ANNUAL RUNOFF (INCHES) | 6.81 | | 27.52 | | 16.93 | |
| 10 PERCENT EXCEEDS | 131 | | 462 | | 278 | |
| 50 PERCENT EXCEEDS | 27 | | 122 | | 63 | |
| 90 PERCENT EXCEEDS | 1.2 | | 39 | | 12 | |

a Also Oct. 10, 2002.
b From floodmarks.
c Not determined.
d Probably occurred Oct. 7, 2002.
e Estimated.



## 02034000 RIVANNA RIVER AT PALMYRA, VA

LOCATION.--Lat 37°51'29", long 78°15'57", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Oct. 24, 1942, water-stage recorder at site 200 ft downstream at same datum. Oct. 24, 1942, to Dec. 18, 1947, nonrecording gage 10 ft downstream at same datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 4 and Jan. 20-29, and period of no gage-height record, Apr. 16, 17, which are fair. Some diurnal fluctuation at times mostly at low and medium flow caused by South Fork Rivanna River Reservoir, diversions for water supply and discharge from wastewater treatment plants upstream at Charlottesville. National Weather Service gage-height telemeter at station. Maximum discharge, 86,000 $ft^3/s$, from rating curve extended above 76,000 $ft^3/s$ on basis of contracted-opening 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.

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

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Jan 2 | 0500 | 8,200 | 13.21 | Jun 21 | 0130 | 7,200 | 11.98 |
| Feb 23 | 0530 | 24,000 | 23.78 | Jul 3 | 2000 | 18,000 | 21.32 |
| Mar 21 | 0400 | 16,600 | 20.68 | Sep 19 | 2330 | *30,000 | *25.91 |
| May 19 | 0100 | 7,250 | 12.04 | Sep 23 | 1815 | 10,600 | 16.19 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 36 | 385 | 234 | 1,460 | 353 | 1,380 | 1,720 | 1,040 | 1,460 | 761 | 707 | 437 |
| 2 | 26 | 230 | 212 | 5,460 | 340 | 1,990 | 1,510 | 904 | 1,210 | 837 | 617 | 610 |
| 3 | 31 | 191 | 199 | 2,180 | 313 | 2,610 | 1,370 | 763 | 1,070 | 11,600 | 582 | 1,110 |
| 4 | 32 | 162 | e180 | 1,550 | 282 | 1,860 | 1,250 | 672 | 1,200 | 6,490 | 3,040 | 740 |
| 5 | 26 | 151 | 189 | 1,160 | 428 | 1,580 | 1,150 | 665 | 1,310 | 2,100 | 1,270 | 764 |
| 6 | 24 | 271 | 224 | 971 | 344 | 1,770 | 1,040 | 723 | 1,140 | 1,340 | 986 | 576 |
| 7 | 20 | 408 | 233 | 871 | 299 | 1,840 | 1,260 | 700 | 2,440 | 1,260 | 746 | 460 |
| 8 | 18 | 273 | 205 | 805 | 362 | 1,570 | 1,750 | 677 | 3,500 | 945 | 820 | 412 |
| 9 | 19 | 215 | 223 | 736 | 325 | 1,370 | 2,700 | 668 | 2,840 | 863 | 766 | 392 |
| 10 | 18 | 186 | 211 | 637 | 324 | 1,200 | 3,170 | 1,370 | 1,860 | 858 | 1,440 | 366 |
| 11 | 26 | 264 | 413 | 549 | 363 | 1,130 | 4,470 | 1,550 | 1,380 | 784 | 2,420 | 336 |
| 12 | 153 | 1,180 | 1,100 | 500 | 375 | 1,060 | 3,130 | 1,190 | 1,350 | 678 | 1,720 | 319 |
| 13 | 83 | 2,010 | 993 | 470 | 361 | 967 | 2,090 | 961 | 1,470 | 596 | 1,440 | 634 |
| 14 | 53 | 925 | 2,250 | 450 | 334 | 912 | 1,630 | 837 | 1,630 | 829 | 1,040 | 765 |
| 15 | 48 | 652 | 1,630 | 442 | 507 | 852 | 1,400 | 775 | 2,300 | 648 | 829 | 700 |
| 16 | 99 | 615 | 1,130 | 390 | 789 | 820 | e1,320 | 2,440 | 1,580 | 550 | 652 | 643 |
| 17 | 303 | 2,070 | 876 | 379 | 644 | 794 | e1,150 | 1,890 | 1,470 | 499 | 1,130 | 541 |
| 18 | 179 | 2,160 | 724 | 366 | 682 | 762 | 1,050 | 3,420 | 2,180 | 451 | 929 | 976 |
| 19 | 105 | 1,180 | 602 | 331 | 628 | 715 | 1,240 | 5,540 | 2,090 | 430 | 748 | 23,200 |
| 20 | 76 | 852 | 786 | e350 | 719 | 5,650 | 1,140 | 2,850 | 2,990 | 462 | 660 | 15,600 |
| 21 | 64 | 681 | 1,030 | e335 | 1,040 | 11,200 | 1,030 | 2,210 | 5,150 | 482 | 564 | 2,410 |
| 22 | 62 | 586 | 820 | e310 | 8,410 | 3,150 | 990 | 2,340 | 2,410 | 467 | 492 | 1,590 |
| 23 | 55 | 495 | 718 | e280 | 19,400 | 1,970 | 936 | 1,960 | 1,740 | 510 | 429 | 6,770 |
| 24 | 47 | 416 | 630 | e255 | 6,260 | 1,540 | 859 | 2,050 | 1,400 | 492 | 431 | 4,140 |
| 25 | 45 | 319 | 999 | e270 | 3,570 | 1,330 | 818 | 1,740 | 1,200 | 408 | 394 | 2,000 |
| 26 | 113 | 320 | 1,120 | e290 | 2,350 | 1,210 | 860 | 3,900 | 1,060 | 357 | 372 | 1,420 |
| 27 | 147 | 332 | 830 | e275 | 1,740 | 1,210 | 871 | 2,290 | 1,170 | 329 | 356 | 1,130 |
| 28 | 96 | 241 | 680 | e255 | 1,500 | 1,060 | 792 | 2,080 | 1,220 | 314 | 354 | 1,350 |
| 29 | 100 | 246 | 601 | e260 | --- | 987 | 741 | 1,660 | 897 | 464 | 678 | 1,050 |
| 30 | 371 | 238 | 542 | 277 | --- | 1,660 | 716 | 1,890 | 819 | 488 | 487 | 828 |
| 31 | 584 | --- | 496 | 311 | --- | 2,360 | --- | 1,510 | --- | 406 | 550 | --- |
| TOTAL | 3,059 | 18,254 | 21,080 | 23,175 | 53,042 | 58,509 | 44,153 | 53,265 | 53,536 | 37,698 | 27,649 | 72,269 |
| MEAN | 98.7 | 608 | 680 | 748 | 1,894 | 1,887 | 1,472 | 1,718 | 1,785 | 1,216 | 892 | 2,409 |
| MAX | 584 | 2,160 | 2,250 | 5,460 | 19,400 | 11,200 | 4,470 | 5,540 | 5,150 | 11,600 | 3,040 | 23,200 |
| MIN | 18 | 151 | 180 | 255 | 282 | 715 | 716 | 665 | 819 | 314 | 354 | 319 |
| CFSM | 0.15 | 0.92 | 1.02 | 1.13 | 2.85 | 2.84 | 2.22 | 2.59 | 2.69 | 1.83 | 1.34 | 3.63 |
| IN. | 0.17 | 1.02 | 1.18 | 1.30 | 2.97 | 3.28 | 2.47 | 2.98 | 3.00 | 2.11 | 1.55 | 4.05 |

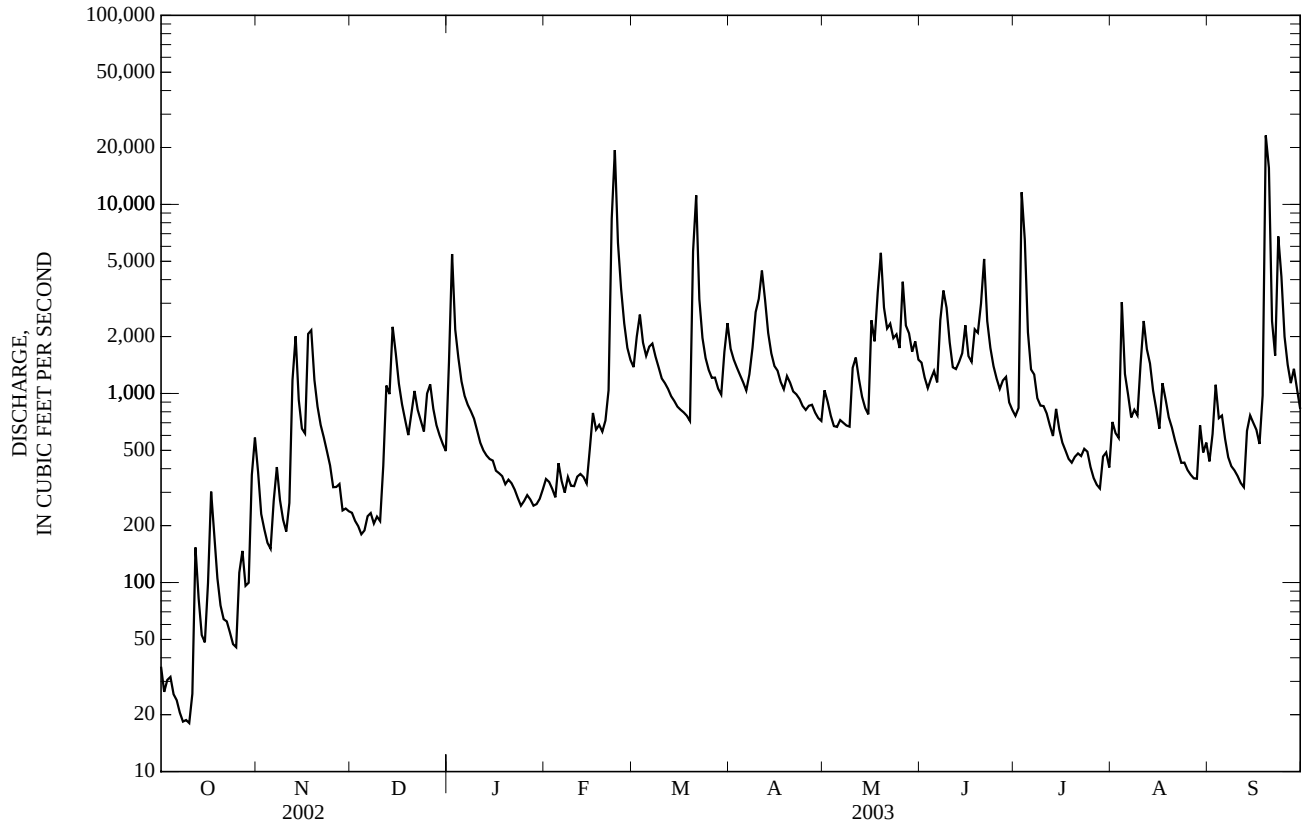
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1935 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 539 | 571 | 742 | 919 | 1,034 | 1,190 | 1,037 | 761 | 595 | 396 | 455 | 490 |
| MAX | 3,535 | 3,521 | 2,667 | 2,620 | 3,468 | 3,415 | 3,662 | 2,472 | 4,473 | 1,524 | 3,404 | 2,915 |
| (WY) | (1943) | (1986) | (1949) | (1936) | (1998) | (1993) | (1937) | (1989) | (1972) | (1975) | (1969) | (1979) |
| MIN | 46.4 | 64.7 | 88.9 | 104 | 103 | 225 | 214 | 204 | 95.9 | 39.0 | 20.2 | 19.1 |
| (WY) | (1942) | (2002) | (1966) | (1966) | (2002) | (1981) | (1981) | (2002) | (1999) | (1966) | (1966) | (1954) |

02034000 RIVANNA RIVER AT PALMYRA, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1935 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 81,560 | | 465,689 | | | |
| ANNUAL MEAN | 223 | | 1,276 | | 726 | |
| HIGHEST ANNUAL MEAN | | | | | 1,401 | 1973 |
| LOWEST ANNUAL MEAN | | | | | 129 | 2002 |
| HIGHEST DAILY MEAN | 2,250 | Dec 14 | 23,200 | Sep 19 | 68,000 | Jun 22, 1972 |
| LOWEST DAILY MEAN | 18 | aSep 12 | 18 | bOct 8 | 5.2 | cSep 9, 1966 |
| ANNUAL SEVEN-DAY MINIMUM | 18 | Sep 10 | 22 | Oct 5 | 5.6 | Sep 7, 1966 |
| MAXIMUM PEAK FLOW | | | 30,000 | Sep 19 | 86,000 | Aug 20, 1969 |
| MAXIMUM PEAK STAGE | | | 25.91 | Sep 19 | 39.85 | Aug 20, 1969 |
| INSTANTANEOUS LOW FLOW | | | 17 | dOct 7 | 5.2 | cSep 9, 1966 |
| ANNUAL RUNOFF (CFSM) | 0.34 | | 1.92 | | 1.09 | |
| ANNUAL RUNOFF (INCHES) | 4.57 | | 26.09 | | 14.85 | |
| 10 PERCENT EXCEEDS | 568 | | 2,320 | | 1,400 | |
| 50 PERCENT EXCEEDS | 110 | | 784 | | 411 | |
| 90 PERCENT EXCEEDS | 24 | | 209 | | 104 | |

a Also Sept. 13-15 and Oct. 8, 10, 2002.
b Also Oct. 10, 2002.
c Also Sept. 10, 11, 1966.
d Also Oct. 8, 9, 2002.
e Estimated.



## 02035000 JAMES RIVER AT CARTERSVILLE, VA

LOCATION.--Lat 37°40'16", long 78°05'09", NAD83, 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 $mi^2$.

### 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 NGVD of 1929. Prior to June 4, 1927, nonrecording gage at same site and datum.

REMARKS.--Records fair. Moderate diurnal fluctuation caused by powerplants upstream from station. Since 1982, low flows during summer months are augmented by releases from Lake Moomaw, station 02011795. National Weather Service gage-height telemeter at station. Maximum discharge, 362,000 $ft^3/s$, from rating curve extended above 160,000 $ft^3/s$ on basis of slope-conveyance study.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 40,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 24 | 0615 | *104,000 | *24.47 | Jul 4 | 0145 | 53,900 | 16.90 |
| Mar 21 | 1015 | 59,200 | 17.95 | Sep 20 | 0500 | 89,700 | 22.87 |
| Apr 11 | 1830 | 47,100 | 15.49 | Sep 24 | 0445 | 47,000 | 15.48 |
| May 20 | 0645 | 63,200 | 18.72 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2,630 | 9,850 | 3,470 | 6,840 | 2,970 | 20,400 | 13,400 | 7,020 | 16,600 | 6,520 | 3,970 | 4,360 |
| 2 | 1,970 | 7,090 | 3,250 | 18,800 | 3,050 | 20,400 | 11,700 | 7,570 | 15,000 | 6,380 | 5,090 | 4,050 |
| 3 | 1,560 | 4,720 | 2,980 | 17,300 | 2,920 | 22,400 | 11,100 | 6,940 | 13,300 | 28,200 | 4,260 | 4,270 |
| 4 | 1,240 | 3,690 | 2,810 | 19,000 | 2,810 | 22,100 | 12,200 | 6,750 | 12,300 | 45,800 | 6,780 | 4,680 |
| 5 | 1,000 | 2,980 | 2,890 | e18,500 | 3,500 | 20,100 | 12,000 | 7,380 | 14,200 | 28,700 | 7,640 | 5,920 |
| 6 | 1,030 | 3,150 | 2,770 | e16,800 | 3,470 | 18,300 | 10,700 | 10,600 | 24,400 | 17,600 | 7,640 | 6,160 |
| 7 | 807 | 3,970 | 2,860 | 12,900 | 3,290 | 19,400 | 11,000 | 13,500 | 22,100 | 15,400 | 7,320 | 6,330 |
| 8 | 769 | 5,120 | 2,590 | 10,200 | 3,370 | 21,500 | 15,600 | 14,100 | 33,900 | 12,200 | 6,480 | 5,280 |
| 9 | 724 | 6,600 | 2,390 | 8,660 | 3,500 | 19,600 | 21,300 | 12,300 | 28,900 | 9,760 | 6,100 | 4,270 |
| 10 | 723 | 5,040 | 2,360 | 7,670 | 2,880 | 15,900 | 39,600 | 14,000 | 28,900 | 8,590 | 9,520 | 3,720 |
| 11 | 744 | 5,120 | 2,640 | 7,000 | 3,120 | 12,400 | 44,900 | 13,100 | 24,200 | 8,310 | 11,700 | 3,460 |
| 12 | 826 | 12,200 | 5,650 | 6,200 | 3,330 | 11,300 | 45,000 | 14,100 | 20,800 | 7,730 | 15,100 | 3,150 |
| 13 | 1,110 | 20,000 | 6,870 | 5,670 | 3,470 | 10,200 | 37,500 | 12,700 | 19,300 | 7,260 | 11,000 | 3,450 |
| 14 | 1,190 | 18,300 | 14,900 | 5,190 | 3,290 | 9,440 | 28,000 | 10,400 | 21,600 | 8,020 | 9,840 | 4,470 |
| 15 | 1,010 | 14,500 | 19,100 | 4,840 | 3,470 | 8,350 | 22,100 | 9,840 | 23,300 | 7,450 | 9,220 | 4,020 |
| 16 | 971 | 9,690 | 17,900 | 4,500 | 5,860 | 7,740 | 17,500 | 10,600 | 20,100 | 7,500 | 7,420 | 3,830 |
| 17 | 1,280 | 12,100 | 13,700 | 4,350 | 6,500 | 8,090 | 13,700 | 13,000 | 20,100 | 8,600 | 7,220 | 3,500 |
| 18 | 1,790 | 17,700 | 10,700 | 4,030 | 10,300 | 7,730 | 12,000 | 15,600 | 36,400 | 7,370 | 7,540 | 3,900 |
| 19 | 1,990 | 16,400 | 8,600 | 3,710 | 8,910 | 7,310 | 11,300 | 51,100 | 30,300 | 6,390 | 6,520 | 53,700 |
| 20 | 2,770 | 12,800 | 7,760 | 3,650 | 8,070 | 17,600 | 10,800 | 58,800 | 34,000 | 5,370 | 5,970 | 81,800 |
| 21 | 1,870 | 9,400 | 10,200 | 3,380 | 10,500 | 54,600 | 9,710 | 35,700 | e27,900 | 5,120 | 5,320 | 40,300 |
| 22 | 1,750 | 7,490 | 19,500 | 3,430 | 26,300 | 37,300 | 9,020 | 29,000 | 26,200 | 4,750 | 4,580 | 20,500 |
| 23 | 1,680 | 6,420 | 17,000 | 3,420 | 86,500 | 27,100 | 8,460 | 25,700 | 22,400 | 4,810 | 4,200 | 26,700 |
| 24 | 1,470 | 6,300 | 13,500 | 3,130 | 101,000 | 20,400 | 8,490 | 24,300 | e18,400 | 5,030 | 4,060 | 40,300 |
| 25 | 1,290 | 6,550 | 14,500 | 2,780 | 71,800 | 16,100 | 8,110 | 23,700 | e14,600 | 4,530 | 3,530 | 27,700 |
| 26 | 1,560 | 5,740 | 18,100 | 2,870 | 37,200 | 12,700 | 7,820 | 30,100 | e11,700 | 3,810 | 3,420 | 20,100 |
| 27 | 1,920 | 5,030 | 16,000 | 2,610 | 28,800 | 11,200 | 7,800 | 26,600 | e10,200 | 3,800 | 3,220 | 15,900 |
| 28 | 2,210 | 4,580 | 11,900 | 2,430 | 24,300 | 9,800 | 7,360 | 25,500 | 8,830 | 3,220 | 3,180 | 12,300 |
| 29 | 2,300 | 4,150 | 9,010 | 2,790 | --- | 8,760 | 6,860 | 20,500 | 7,680 | 3,410 | 3,580 | 15,600 |
| 30 | 4,560 | 3,510 | 7,660 | 2,650 | --- | 9,570 | 6,430 | 19,800 | 7,010 | 3,820 | 5,460 | 14,200 |
| 31 | 7,080 | --- | 6,770 | 2,740 | --- | 15,100 | --- | 18,400 | --- | 3,930 | 4,190 | --- |
| TOTAL | 53,824 | 250,190 | 280,330 | 218,040 | 474,480 | 522,890 | 481,460 | 588,700 | 614,620 | 299,380 | 201,070 | 447,920 |
| MEAN | 1,736 | 8,340 | 9,043 | 7,034 | 16,950 | 16,870 | 16,050 | 18,990 | 20,490 | 9,657 | 6,486 | 14,930 |
| MAX | 7,080 | 20,000 | 19,500 | 19,000 | 101,000 | 54,600 | 45,000 | 58,800 | 36,400 | 45,800 | 15,100 | 81,800 |
| MIN | 723 | 2,980 | 2,360 | 2,430 | 2,810 | 7,310 | 6,430 | 6,750 | 7,010 | 3,220 | 3,180 | 3,150 |
| CFSM | 0.28 | 1.33 | 1.45 | 1.12 | 2.71 | 2.70 | 2.56 | 3.04 | 3.27 | 1.54 | 1.04 | 2.39 |
| IN. | 0.32 | 1.49 | 1.67 | 1.30 | 2.82 | 3.11 | 2.86 | 3.50 | 3.65 | 1.78 | 1.20 | 2.66 |

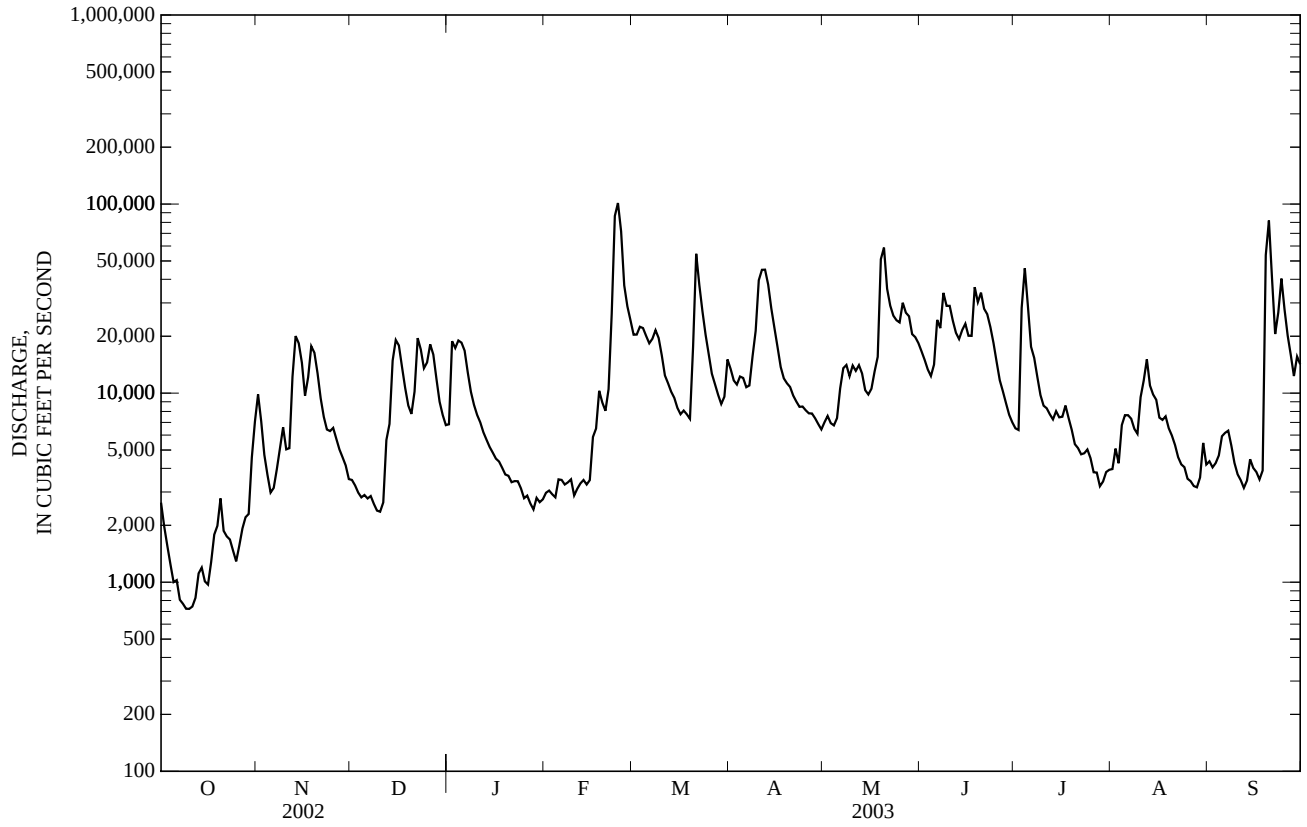
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1899 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 4,160 | 4,718 | 6,908 | 9,416 | 10,780 | 13,000 | 11,030 | 8,005 | 6,101 | 3,796 | 3,973 | 3,641 |
| MAX | 20,830 | 28,210 | 25,990 | 26,480 | 33,750 | 31,810 | 33,500 | 23,530 | 30,330 | 15,070 | 20,490 | 18,140 |
| (WY) | (1907) | (1986) | (1949) | (1936) | (1998) | (1993) | (1987) | (1989) | (1972) | (1919) | (1969) | (1996) |
| MIN | 528 | 924 | 1,054 | 1,353 | 1,528 | 2,646 | 3,286 | 2,710 | 1,162 | 605 | 652 | 561 |
| (WY) | (1931) | (1931) | (1966) | (1956) | (2002) | (1981) | (1995) | (1930) | (2002) | (1966) | (1930) | (1930) |

02035000 JAMES RIVER AT CARTERSVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1899 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 1,253,980 | | 4,432,904 | | | |
| ANNUAL MEAN | 3,436 | | 12,140 | | 7,108 | |
| HIGHEST ANNUAL MEAN | | | | | 12,410 | 1973 |
| LOWEST ANNUAL MEAN | | | | | 2,126 | 2002 |
| HIGHEST DAILY MEAN | 23,400 | Apr 24 | 101,000 | Feb 24 | 280,000 | Jun 22, 1972 |
| LOWEST DAILY MEAN | 447 | Sep 15 | a723 | Oct 10 | 330 | Sep 14, 1966 |
| ANNUAL SEVEN-DAY MINIMUM | 497 | Sep 11 | 803 | Oct 6 | 386 | Sep 8, 1966 |
| MAXIMUM PEAK FLOW | | | 104,000 | Feb 24 | 362,000 | Jun 22, 1972 |
| MAXIMUM PEAK STAGE | | | 24.47 | Feb 24 | b37.87 | Jun 22, 1972 |
| INSTANTANEOUS LOW FLOW | | | a695 | cOct 8 | 316 | Sep 13, 1966 |
| ANNUAL RUNOFF (CFSM) | 0.55 | | 1.94 | | 1.14 | |
| ANNUAL RUNOFF (INCHES) | 7.46 | | 26.36 | | 15.43 | |
| 10 PERCENT EXCEEDS | 8,950 | | 26,200 | | 15,000 | |
| 50 PERCENT EXCEEDS | 1,720 | | 7,800 | | 4,400 | |
| 90 PERCENT EXCEEDS | 678 | | 2,760 | | 1,420 | |

a May have been affected by regulation.
b From floodmarks.
c Also Oct. 10, 2002.
e Estimated.



02035000 JAMES RIVER AT CARTERSVILLE, VA—Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1930, 1948, 1967 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: April 1968 to January 1976, October 1980 to May 1981, 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.--Water samples were collected by the U.S. Geological Survey and analyzed by either the U.S. Geological Survey (Agency Code 80020) or by the Virginia Division of Consolidated Laboratory Services (VDCLS, Agency Code 85116), using analytical methods approved by the U.S. Geological Survey. Analyses performed by VDCLS are reported to U.S. Geological Survey rounding specifications. Results of chemical analyses provided by VDCLS were quality-assured and approved by the U.S. Geological Survey.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Time | Sample type | Agency analyzing sample, code (00028) | Gage height, feet (00065) | Instantaneous discharge, cfs (00061) | Turbidity, NTU (00076) | Barometric pressure, mm Hg (00025) | Dissolved oxygen, mg/L (00300) | Dissolved oxygen, percent of saturation (00301) | pH, water, unfltrd field, std units (00400) | Specif. conductance, wat unf uS/cm 25 degC (00095) | Temperature, air, deg C (00020) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | |
| 01... | 0930 | Environmental | 85116 | 2.85 | 2,740 | 1.0 | 759 | 7.3 | 85 | 7.8 | 507 | -- |
| 08... | 0935 | Blank | 85116 | -- | -- | 0.30 | -- | -- | -- | -- | -- | -- |
| 08... | 0940 | Environmental | 85116 | 1.21 | 777 | 1.0 | 761 | 7.3 | 86 | 8.0 | 644 | 14.0 |
| 21... | 0830 | Environmental | 85116 | 2.26 | 1,930 | 1.2 | 756 | 8.4 | 86 | 8.1 | 300 | 14.3 |
| 30... | 1010 | Blank | 85116 | -- | -- | 0.20 | -- | -- | -- | -- | -- | -- |
| 30... | 1015 | Environmental | 85116 | 3.64 | 3,960 | 12 | 751 | 8.2 | 77 | 7.5 | 317 | 7.0 |
| NOV | | | | | | | | | | | | |
| 01... | 1245 | Environmental | 85116 | 6.66 | 10,900 | 44 | 755 | 6.6 | 61 | 7.2 | 221 | 16.0 |
| 05... | 0900 | Environmental | 85116 | 2.85 | 3,040 | 2.9 | 762 | 12.2 | 111 | 8.1 | 260 | 8.5 |
| 13... | 1045 | Environmental | 85116 | 9.73 | 21,000 | 130 | 754 | 9.2 | 88 | 7.0 | 104 | 14.0 |
| 14... | 1115 | Environmental | 85116 | 8.97 | 18,400 | 85 | 759 | 12.2 | 113 | 7.3 | 123 | 16.0 |
| 14... | 1130 | Replicate | 85116 | 8.97 | 18,400 | 94 | -- | -- | -- | -- | -- | -- |
| 20... | 0945 | Environmental | 85116 | 7.15 | 13,100 | 22 | 762 | 10.4 | 90 | 6.6 | 151 | 9.0 |
| DEC | | | | | | | | | | | | |
| 02... | 0915 | Environmental | 85116 | 2.48 | 3,380 | 5.6 | 758 | 11.9 | 93 | 7.7 | 171 | 5.0 |
| 16... | 1015 | Environmental | 85116 | 8.51 | 18,200 | 45 | 750 | 13.5 | 106 | 7.3 | 193 | 11.0 |
| 30... | 1015 | Environmental | 85116 | 4.78 | 7,750 | 6.5 | 763 | 12.8 | 98 | 7.5 | 132 | 7.5 |
| JAN | | | | | | | | | | | | |
| 06... | 1400 | Environmental | 85116 | 7.49 | 15,200 | 19 | 753 | 13.0 | 104 | 7.4 | 128 | 8.0 |
| 06... | 1405 | Replicate | 80020 | 7.49 | 15,200 | -- | -- | -- | -- | -- | -- | -- |
| 13... | 1400 | Environmental | 85116 | 3.70 | 5,650 | 7.0 | 751 | 13.7 | 104 | 7.8 | 144 | 12.0 |
| 13... | 1415 | Replicate | 85116 | 3.70 | 5,650 | 5.2 | -- | -- | -- | -- | -- | -- |
| 21... | 0815 | Environmental | 85116 | 2.38 | 3,330 | 2.4 | 758 | 10.9 | 79 | 6.4 | 192 | -1.0 |
| FEB | | | | | | | | | | | | |
| 04... | 1000 | Environmental | 85116 | 2.02 | 2,700 | 1.9 | 741 | 12.6 | 100 | 8.0 | 227 | 13.0 |
| 19... | 1030 | Environmental | 85116 | 5.08 | 8,980 | 15 | 762 | 14.6 | 105 | 8.0 | 265 | 5.0 |
| 23... | 1415 | Environmental | 85116 | 23.17 | 92,100 | 220 | 743 | 12.3 | 95 | 7.2 | 100 | 7.5 |
| 24... | 1345 | Environmental | 85116 | 24.32 | 102,000 | 270 | 751 | 12.0 | 94 | 7.6 | 101 | 16.5 |
| 27... | 1025 | Blank | 85116 | -- | -- | 2.0 | -- | -- | -- | -- | -- | -- |
| 27... | 1030 | Environmental | 85116 | 11.28 | 28,900 | 40 | 757 | 12.0 | 92 | 7.7 | 114 | -1.5 |
| MAR | | | | | | | | | | | | |
| 04... | 0945 | Environmental | 85116 | 9.45 | 22,200 | 23 | 757 | 13.7 | 110 | 7.8 | 134 | 0.5 |
| 12... | 1030 | Environmental | 85116 | 5.90 | 11,300 | 8.3 | 755 | 12.1 | 101 | 7.8 | 125 | 13.0 |
| 21... | 1400 | Environmental | 85116 | 17.74 | 58,100 | 180 | 741 | 10.9 | 97 | 7.0 | 72 | 20.0 |
| APR | | | | | | | | | | | | |
| 10... | 1030 | Environmental | 85116 | 13.94 | 40,000 | 75 | 751 | 10.2 | 91 | 7.6 | 119 | 7.5 |
| 10... | 1045 | Replicate | 85116 | 13.94 | 40,000 | 65 | -- | -- | -- | -- | -- | -- |
| 24... | 1015 | Environmental | 85116 | 4.82 | 8,590 | 5.8 | 754 | 9.4 | 95 | 8.1 | 167 | 16.5 |
| MAY | | | | | | | | | | | | |
| 27... | 1345 | Environmental | 85116 | 9.88 | 23,700 | 70 | 752 | 9.1 | 95 | 7.4 | 104 | 17.0 |
| JUN | | | | | | | | | | | | |
| 10... | 1100 | Environmental | 85116 | 11.01 | 27,900 | 59 | 755 | 8.8 | 96 | 7.6 | 120 | 28.5 |
| 19... | 1015 | Environmental | 85116 | 11.52 | 29,900 | 130 | 747 | 9.1 | 99 | 7.6 | 114 | 24.0 |
| 19... | 1020 | Replicate | 80020 | 11.52 | 29,900 | -- | -- | -- | -- | -- | -- | -- |
| JUL | | | | | | | | | | | | |
| 15... | 1030 | Environmental | 85116 | 4.26 | 7,440 | 5.3 | 756 | 8.0 | 100 | 8.3 | 153 | 26.0 |
| AUG | | | | | | | | | | | | |
| 26... | 1015 | Environmental | 85116 | 2.14 | 3,350 | 4.4 | 758 | 7.3 | 92 | 8.2 | 180 | 32.0 |
| SEP | | | | | | | | | | | | |
| 19... | 1200 | Environmental | 85116 | 18.36 | 61,300 | 300 | 747 | 7.4 | 82 | 7.1 | 85 | 31.5 |
| 25... | 1230 | Environmental | 85116 | 10.87 | 27,300 | 240 | 748 | -- | -- | 6.7 | 133 | 28.0 |

02035000 JAMES RIVER AT CARTERSVILLE, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Temperature, water, deg C (00010) | Silica, water, fltrd, mg/L (00955) | Residue fixed non-filterable, mg/L (00540) | Residue total at 105 deg. C, suspended, mg/L (00530) | Residue volatile, suspended, mg/L (00535) | Ammonia + org-N, water, fltrd, mg/L as N (00623) | Ammonia + org-N, water, unfltrd mg/L as N (00625) | Ammonia water, fltrd, mg/L as N (00608) | Nitrate water, fltrd, mg/L as N (00618) | Nitrite + nitrate water fltrd, mg/L as N (00631) | Nitrite water, fltrd, mg/L as N (00613) | Orthophosphate, water, fltrd, mg/L as P (00671) | Phosphorus, water, fltrd, mg/L (00666) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 01... | 22.7 | 1.30 | 3 | 3 | 3 | -- | -- | 0.004 | 0.07 | 0.065 | 0.002 | 0.072 | 0.074 |
| 08... | -- | <0.100 | 6 | 8 | <3 | -- | -- | <0.004 | <0.004 | <0.004 | <0.002 | 0.004 | 0.015 |
| 08... | 23.0 | 0.500 | 3 | 3 | 3 | -- | -- | 0.004 | 0.01 | 0.006 | 0.002 | 0.098 | 0.102 |
| 21... | 15.9 | 3.20 | 3 | 3 | 3 | -- | -- | 0.004 | 0.11 | 0.108 | 0.002 | 0.085 | 0.108 |
| 30... | -- | <0.100 | <3 | <3 | <3 | -- | -- | <0.004 | <0.004 | <0.004 | <0.002 | 0.003 | 0.005 |
| 30... | 11.5 | 6.80 | 11 | 13 | <3 | -- | -- | 0.006 | 0.16 | 0.164 | <0.002 | 0.072 | 0.083 |
| NOV | | | | | | | | | | | | | |
| 01... | 11.1 | 7.00 | 47 | 61 | 14 | -- | -- | 0.005 | 0.35 | 0.351 | <0.002 | 0.055 | 0.068 |
| 05... | 11.2 | 6.80 | <3 | <3 | <3 | -- | -- | <0.004 | 0.30 | 0.300 | <0.002 | 0.065 | 0.089 |
| 13... | 12.9 | 8.00 | 117 | 139 | 22 | -- | -- | <0.004 | 0.32 | 0.319 | <0.002 | 0.023 | 0.037 |
| 14... | 11.7 | 7.70 | 81 | 98 | 17 | -- | -- | 0.014 | 0.38 | 0.378 | 0.002 | 0.025 | 0.039 |
| 14... | -- | 7.80 | 77 | 93 | 16 | -- | -- | 0.014 | 0.38 | 0.379 | <0.002 | 0.025 | 0.039 |
| 20... | 9.0 | 8.90 | 19 | 24 | 5 | -- | -- | 0.084 | 0.89 | 0.892 | 0.006 | 0.016 | 0.034 |
| DEC | | | | | | | | | | | | | |
| 02... | 4.7 | 8.20 | <3 | <3 | <3 | -- | -- | <0.004 | 0.45 | 0.445 | <0.002 | 0.035 | 0.060 |
| 16... | 4.7 | 6.50 | 41 | 50 | 9 | -- | -- | 0.012 | 0.33 | 0.325 | <0.002 | 0.025 | 0.042 |
| 30... | 4.0 | 7.90 | 6 | 8 | <3 | -- | -- | 0.014 | 0.39 | 0.385 | <0.002 | 0.022 | 0.031 |
| JAN | | | | | | | | | | | | | |
| 06... | 5.6 | 7.80 | 20 | 24 | 4 | -- | -- | 0.027 | 0.38 | 0.381 | 0.003 | 0.030 | 0.031 |
| 06... | -- | 7.4 | -- | 21 | <10 | 0.14 | 0.28 | 0.028 | -- | 0.369 | -- | 0.026 | E.03 |
| 13... | 3.4 | 7.60 | 3 | 4 | 3 | -- | -- | 0.006 | 0.41 | 0.409 | 0.002 | 0.020 | 0.022 |
| 13... | -- | 7.20 | 3 | 4 | <3 | -- | -- | 0.006 | 0.41 | 0.408 | <0.002 | 0.020 | 0.023 |
| 21... | 2.0 | 6.60 | <3 | 3 | <3 | -- | -- | 0.008 | 0.36 | 0.372 | 0.008 | 0.034 | 0.042 |
| FEB | | | | | | | | | | | | | |
| 04... | 4.5 | 4.80 | <3 | <3 | <3 | -- | -- | 0.004 | 0.29 | 0.294 | 0.003 | 0.031 | 0.041 |
| 19... | 1.8 | 3.70 | 19 | 24 | 5 | -- | -- | <0.004 | 0.20 | 0.203 | 0.002 | 0.038 | 0.047 |
| 23... | 3.6 | 4.90 | 427 | 487 | 60 | -- | -- | 0.097 | 0.34 | 0.347 | 0.002 | 0.010 | 0.031 |
| 24... | 4.5 | 2.60 | 431 | 499 | 68 | -- | -- | 0.172 | 0.40 | 0.403 | 0.004 | 0.014 | 0.026 |
| 27... | -- | <0.100 | 7 | 9 | <3 | -- | -- | 0.005 | <0.004 | <0.004 | <0.002 | <0.002 | 0.010 |
| 27... | 3.9 | 7.10 | 32 | 53 | 21 | -- | -- | 0.032 | 0.60 | 0.604 | 0.003 | 0.015 | 0.028 |
| MAR | | | | | | | | | | | | | |
| 04... | 5.6 | 7.70 | 27 | 31 | 4 | -- | -- | 0.015 | 0.57 | 0.576 | 0.002 | 0.015 | 0.023 |
| 12... | 7.2 | 7.20 | 15 | 16 | <3 | -- | -- | 0.007 | 0.44 | 0.442 | <0.002 | 0.022 | 0.027 |
| 21... | 9.0 | 5.90 | 170 | 184 | 14 | -- | -- | 0.054 | 0.28 | 0.280 | 0.002 | 0.019 | 0.036 |
| APR | | | | | | | | | | | | | |
| 10... | 9.7 | 6.20 | 103 | 116 | 13 | -- | -- | 0.027 | 0.20 | 0.198 | <0.002 | 0.024 | 0.030 |
| 10... | -- | 6.50 | 98 | 108 | 10 | -- | -- | 0.028 | 0.20 | 0.198 | <0.002 | 0.023 | 0.031 |
| 24... | 15.4 | 6.70 | 8 | 9 | <3 | -- | -- | <0.004 | 0.31 | 0.310 | <0.002 | 0.024 | 0.026 |
| MAY | | | | | | | | | | | | | |
| 27... | 17.0 | 8.50 | 83 | 96 | 13 | -- | -- | 0.014 | 0.25 | 0.246 | <0.002 | 0.020 | 0.026 |
| JUN | | | | | | | | | | | | | |
| 10... | 18.9 | 8.40 | 88 | 101 | 13 | -- | -- | 0.013 | 0.27 | 0.268 | <0.002 | 0.023 | 0.032 |
| 19... | 18.5 | -- | 121 | 138 | 17 | -- | -- | -- | -- | -- | -- | -- | 0.036 |
| 19... | -- | 8.2 | 110 | 132 | 22 | 0.17 | 0.81 | <0.015 | -- | 0.226 | -- | 0.022 | E.02n |
| JUL | | | | | | | | | | | | | |
| 15... | 26.2 | 8.00 | 12 | 16 | 4 | -- | -- | <0.004 | 0.08 | 0.079 | <0.002 | 0.016 | 0.022 |
| AUG | | | | | | | | | | | | | |
| 26... | 27.2 | 8.30 | 3 | 4 | <3 | -- | -- | 0.008 | 0.12 | 0.117 | <0.002 | 0.032 | 0.035 |
| SEP | | | | | | | | | | | | | |
| 19... | 19.8 | 5.80 | 377 | 434 | 57 | -- | -- | 0.029 | 0.27 | 0.268 | <0.002 | 0.021 | 0.041 |
| 25... | 21.0 | 8.40 | 123 | 138 | 15 | -- | -- | 0.013 | 0.35 | 0.350 | <0.002 | 0.034 | 0.043 |

02035000 JAMES RIVER AT CARTERSVILLE, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Phosphorus, water, unfltrd mg/L (00665) | Total nitrogen, water, fltrd, mg/L (00602) | Phosphorus, suspnd sedimnt total, mg/L (00667) | Total nitrogen, suspnd sedimnt total, mg/L (00601) | Total carbon, suspnd sedimnt total, mg/L (00694) | Inorganic carbon, suspnd sedimnt total, mg/L (00688) | Organic carbon, water, fltrd, mg/L (00681) | Pheophytin a, phytoplankton, ug/L (62360) | Chlorophyll a phytoplankton, fluoro, ug/L (70953) | Suspnd. sediment, sieve diametr percent <.063mm (70331) | Suspended sediment concentration mg/L (80154) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | |
| 01... | -- | 0.32 | 0.007 | -- | 0.3 | -- | -- | -- | -- | 40 | 1 |
| 08... | -- | 0.07 | 0.003 | 0.01 | 0.1 | -- | -- | -- | -- | -- | -- |
| 08... | -- | 0.28 | 0.006 | 0.03 | 0.2 | -- | -- | -- | -- | -- | M |
| 21... | -- | 0.32 | 0.006 | 0.04 | 0.2 | -- | -- | -- | -- | -- | 1 |
| 30... | -- | 0.03 | 0.002 | 0.01 | M | -- | -- | -- | -- | -- | -- |
| 30... | -- | 0.45 | 0.018 | 0.08 | 0.8 | -- | -- | -- | -- | 96 | 13 |
| NOV | | | | | | | | | | | |
| 01... | -- | 0.60 | 0.135 | 0.57 | 4.8 | -- | -- | -- | -- | 90 | 61 |
| 05... | -- | 0.50 | 0.008 | 0.04 | 0.3 | -- | -- | -- | -- | -- | 1 |
| 13... | -- | 0.68 | 0.173 | 0.74 | 7.2 | -- | -- | -- | -- | 87 | 155 |
| 14... | -- | 0.70 | 0.170 | 0.60 | 5.5 | -- | -- | -- | -- | 88 | 108 |
| 14... | -- | 0.69 | 0.162 | 0.51 | 4.6 | -- | -- | -- | -- | 97 | 109 |
| 20... | -- | 0.59 | -- | 0.17 | 1.6 | -- | -- | -- | -- | 90 | 24 |
| DEC | | | | | | | | | | | |
| 02... | -- | 0.60 | 0.009 | 0.02 | 0.2 | -- | -- | -- | -- | -- | 3 |
| 16... | -- | 0.51 | 0.086 | 0.31 | 2.9 | -- | -- | -- | -- | 39 | 117 |
| 30... | -- | 0.57 | 0.018 | 0.07 | 0.7 | -- | -- | -- | -- | -- | 8 |
| JAN | | | | | | | | | | | |
| 06... | -- | 0.52 | 0.037 | 0.15 | 1.5 | -- | -- | -- | -- | 64 | 39 |
| 06... | 0.07 | 0.50 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 13... | -- | 0.52 | 0.013 | 0.05 | 0.4 | -- | -- | -- | -- | -- | 4 |
| 13... | -- | 0.52 | 0.013 | 0.03 | 0.4 | -- | -- | -- | -- | -- | 4 |
| 21... | -- | 0.49 | 0.015 | 0.04 | 0.4 | -- | -- | -- | -- | -- | 3 |
| FEB | | | | | | | | | | | |
| 04... | -- | 0.43 | 0.015 | 0.05 | 0.4 | -- | -- | -- | -- | -- | 3 |
| 19... | -- | 0.36 | 0.054 | 0.26 | 1.9 | -- | -- | -- | -- | 81 | 23 |
| 23... | -- | 0.65 | 0.653 | 1.9 | 19.7 | -- | -- | -- | -- | 67 | 745 |
| 24... | -- | 0.73 | 0.491 | 1.7 | 17.5 | -- | -- | -- | -- | 78 | 586 |
| 27... | -- | 0.04 | 0.001 | 0.03 | 0.2 | -- | -- | -- | -- | -- | -- |
| 27... | -- | 0.75 | 0.089 | 0.34 | 3.5 | -- | -- | -- | -- | 68 | 113 |
| MAR | | | | | | | | | | | |
| 04... | -- | 0.72 | 0.045 | 0.14 | 1.4 | -- | -- | -- | -- | 63 | 53 |
| 12... | -- | 0.52 | 0.027 | 0.10 | 0.9 | -- | -- | -- | -- | -- | 21 |
| 21... | -- | 0.67 | 0.183 | 0.80 | 5.6 | -- | -- | -- | -- | 63 | 298 |
| APR | | | | | | | | | | | |
| 10... | -- | 0.44 | 0.089 | 0.32 | 4.0 | -- | -- | -- | -- | 60 | 149 |
| 10... | -- | 0.45 | 0.086 | 0.32 | 3.9 | -- | -- | -- | -- | 62 | 145 |
| 24... | -- | 0.41 | 0.020 | 0.09 | 0.7 | -- | -- | <0.5 | 2.0 | -- | 9 |
| MAY | | | | | | | | | | | |
| 27... | -- | 0.47 | 0.081 | 0.35 | 3.9 | -- | -- | 3.6 | 0.7 | 85 | 112 |
| JUN | | | | | | | | | | | |
| 10... | -- | 0.45 | 0.106 | 0.32 | 3.3 | -- | -- | 0.6 | 1.6 | 65 | 142 |
| 19... | -- | 0.44 | 0.114 | -- | 4.9 | -- | -- | 1.9 | 2.1 | -- | 270 |
| 19... | 0.20 | 0.40 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| JUL | | | | | | | | | | | |
| 15... | -- | 0.26 | 0.016 | 0.16 | 1.0 | <0.02 | 2.9 | 4.8 | 9.5 | -- | 17 |
| AUG | | | | | | | | | | | |
| 26... | -- | 0.27 | 0.011 | 0.04 | 0.4 | <0.02 | 2.3 | <0.5 | <0.5 | -- | 13 |
| SEP | | | | | | | | | | | |
| 19... | -- | 0.60 | 0.475 | 1.2 | 12.2 | 0.1 | 7.0 | 12.3 | 10.1 | 63 | 653 |
| 25... | -- | 0.67 | 0.142 | 0.50 | 5.3 | 0.1 | 4.6 | 2.3 | 1.0 | 68 | 196 |

Remark codes used in this table:
< -- Less than
E -- Estimated value
M -- Presence verified, not quantified

Value qualifier codes used in this table:
n -- Below the NDV

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## 02036500 FINE CREEK AT FINE CREEK MILLS, VA

LOCATION.--Lat 37°35'53", long 77°49'11", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Oct. 28, 1953, nonrecording gage and crest-stage gage at site 75 ft upstream at same datum.

REMARKS.--Records good except those for period with ice effect, Jan. 17-29, and period of doubtful gage-height record, Sept. 18, 19, which are fair. Maximum discharge, 4,180 $ft^3/s$, from rating curve extended above 2,600 $ft^3/s$. 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 200 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Nov 13 | 0900 | 267 | 3.08 | May 27 | 0015 | 389 | 3.42 |
| Feb 23 | 0600 | 621 | 3.90 | Jul 14 | 1730 | 626 | 3.91 |
| Mar 21 | 0300 | 711 | 4.08 | Sep 19 | 1030 | *1,160 | *4.89 |
| Apr 8 | 0745 | 210 | 2.97 | Sep 23 | 2145 | 763 | 4.18 |
| Apr 10 | 0045 | 227 | 3.02 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.40 | 34 | 5.4 | 21 | 18 | 54 | 36 | 27 | 41 | 6.7 | 21 | 11 |
| 2 | 0.40 | 22 | 4.8 | 49 | 19 | 75 | 28 | 26 | 30 | 25 | 23 | 7.7 |
| 3 | 0.40 | 13 | 4.7 | 37 | 15 | 73 | 24 | 19 | 24 | 95 | 32 | 6.9 |
| 4 | 0.40 | 9.6 | 4.4 | 29 | 16 | 42 | 21 | 14 | 24 | 141 | 166 | 28 |
| 5 | 0.39 | 9.4 | 5.6 | 21 | 16 | 37 | 19 | 13 | 29 | 57 | 123 | 62 |
| 6 | 0.33 | 21 | 9.0 | 18 | 13 | 50 | 17 | 18 | 29 | 27 | 55 | 28 |
| 7 | 0.30 | 20 | 9.8 | 17 | 15 | 47 | 80 | 17 | 29 | 22 | 32 | 14 |
| 8 | 0.24 | 15 | 9.5 | 15 | 19 | 32 | 163 | 17 | 40 | 16 | 30 | 9.6 |
| 9 | 0.24 | 11 | 9.4 | 13 | 15 | 26 | 158 | 19 | 34 | 13 | 52 | 8.4 |
| 10 | 0.33 | 8.0 | 8.4 | 12 | 15 | 21 | 171 | 22 | 26 | 12 | 36 | 7.5 |
| 11 | 1.8 | 26 | 17 | 11 | 16 | 18 | 153 | 23 | 22 | 14 | 27 | 6.6 |
| 12 | 1.7 | 132 | 34 | 9.6 | 17 | 17 | 101 | 19 | 27 | 12 | 21 | 13 |
| 13 | 1.6 | 214 | 41 | 9.2 | 15 | 16 | 50 | 13 | 32 | 9.8 | 17 | 52 |
| 14 | 0.97 | 85 | 87 | 9.2 | 13 | 18 | 34 | 10 | 30 | 306 | 15 | 40 |
| 15 | 0.54 | 36 | 72 | 9.2 | 22 | 15 | 30 | 8.8 | 24 | 226 | 12 | 23 |
| 16 | 11 | 33 | 37 | 8.4 | 39 | 14 | 25 | 14 | 20 | 74 | 11 | 16 |
| 17 | 8.1 | 107 | 23 | e8.3 | 35 | 14 | 21 | 15 | 22 | 37 | 10 | 11 |
| 18 | 4.4 | 136 | 16 | e7.8 | 30 | 14 | 19 | 67 | 27 | 23 | 8.8 | e99 |
| 19 | 2.1 | 71 | 14 | e7.2 | 26 | 14 | 44 | 138 | 33 | 16 | 8.2 | e813 |
| 20 | 1.4 | 34 | 27 | e8.0 | 34 | 203 | 40 | 58 | 35 | 13 | 7.7 | 286 |
| 21 | 1.4 | 23 | 58 | e8.5 | 66 | 452 | 28 | 36 | 40 | 10 | 7.1 | 109 |
| 22 | 1.5 | 18 | 32 | e7.5 | 230 | 132 | 24 | 81 | 29 | 13 | 6.3 | 58 |
| 23 | 1.2 | 13 | 21 | e6.3 | 451 | 59 | 20 | 98 | 22 | 31 | 6.0 | 402 |
| 24 | 0.86 | 11 | 18 | e5.3 | 177 | 35 | 17 | 91 | 17 | 35 | 5.0 | 380 |
| 25 | 0.72 | 9.3 | 68 | e5.8 | 79 | 26 | 16 | 65 | 13 | 26 | 4.4 | 133 |
| 26 | 9.8 | 8.4 | 106 | e6.6 | 43 | 22 | 21 | 227 | 11 | 18 | 4.1 | 71 |
| 27 | 9.1 | 7.7 | 48 | e6.0 | 35 | 22 | 20 | 216 | 9.3 | 13 | 3.9 | 44 |
| 28 | 12 | 6.8 | 29 | e6.2 | 46 | 19 | 16 | 136 | 7.5 | 9.3 | 3.7 | 32 |
| 29 | 20 | 6.3 | 22 | e7.3 | --- | 19 | 14 | 91 | 7.1 | 8.2 | 3.7 | 24 |
| 30 | 39 | 5.7 | 17 | 9.5 | --- | 44 | 13 | 61 | 6.5 | 14 | 20 | 19 |
| 31 | 41 | --- | 14 | 12 | --- | 63 | --- | 43 | --- | 16 | 27 | --- |
| TOTAL | 173.62 | 1,146.2 | 872.0 | 400.9 | 1,535 | 1,693 | 1,423 | 1,702.8 | 740.4 | 1,339.0 | 798.9 | 2,814.7 |
| MEAN | 5.60 | 38.2 | 28.1 | 12.9 | 54.8 | 54.6 | 47.4 | 54.9 | 24.7 | 43.2 | 25.8 | 93.8 |
| MAX | 41 | 214 | 106 | 49 | 451 | 452 | 171 | 227 | 41 | 306 | 166 | 813 |
| MIN | 0.24 | 5.7 | 4.4 | 5.3 | 13 | 14 | 13 | 8.8 | 6.5 | 6.7 | 3.7 | 6.6 |
| CFSM | 0.25 | 1.73 | 1.27 | 0.59 | 2.48 | 2.47 | 2.15 | 2.49 | 1.12 | 1.95 | 1.17 | 4.25 |
| IN. | 0.29 | 1.93 | 1.47 | 0.67 | 2.58 | 2.85 | 2.40 | 2.87 | 1.25 | 2.25 | 1.34 | 4.74 |

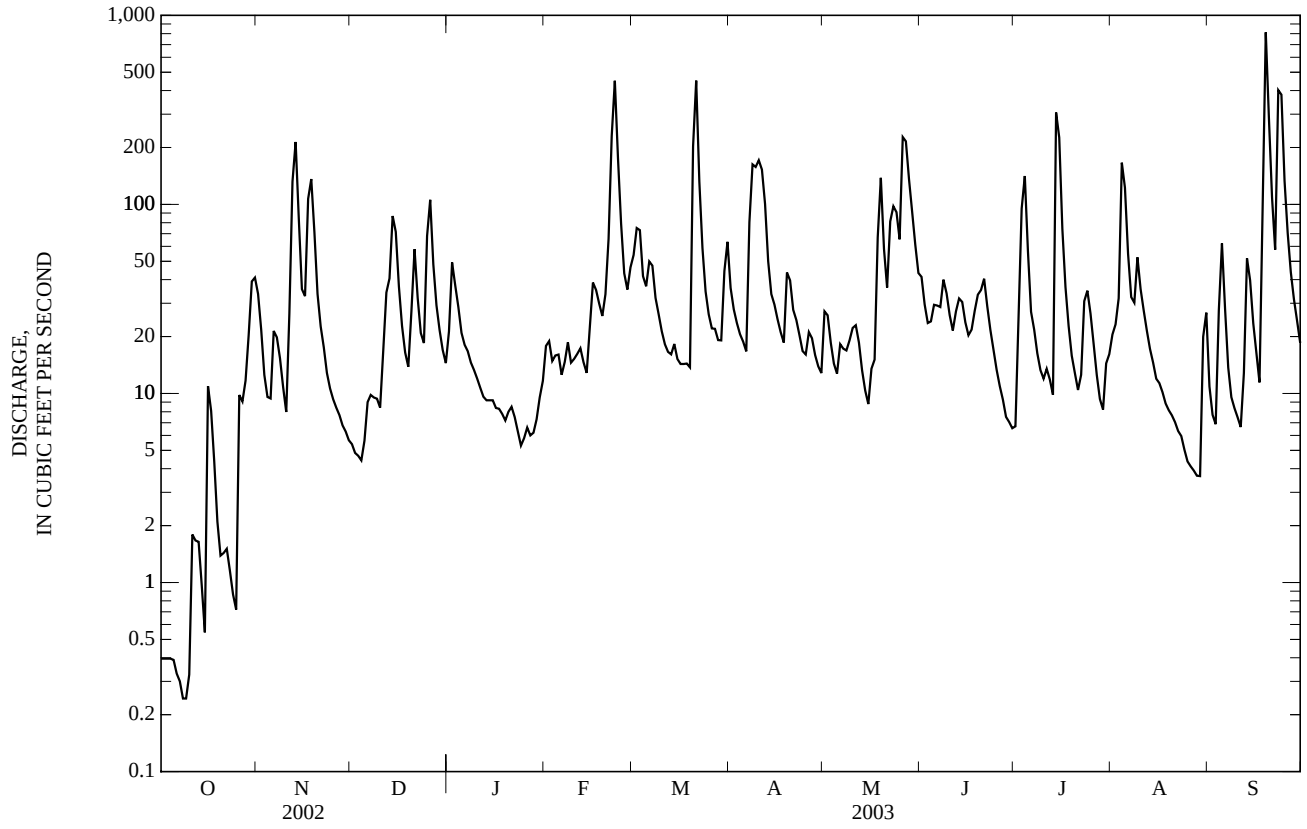
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 13.8 | 17.1 | 21.1 | 26.6 | 31.1 | 35.0 | 29.4 | 20.5 | 11.7 | 8.42 | 11.1 | 10.0 |
| MAX | 119 | 104 | 53.9 | 92.5 | 92.7 | 99.1 | 84.1 | 54.9 | 60.8 | 43.2 | 83.3 | 93.8 |
| (WY) | (1973) | (1986) | (1949) | (1978) | (1979) | (1994) | (1983) | (2003) | (1972) | (2003) | (1955) | (2003) |
| MIN | 0.47 | 2.46 | 3.86 | 6.38 | 3.93 | 9.21 | 5.58 | 3.21 | 0.77 | 0.43 | 0.55 | 0.31 |
| (WY) | (1969) | (2002) | (2002) | (1955) | (2002) | (2002) | (2002) | (1991) | (2002) | (2002) | (2002) | (1968) |

02036500 FINE CREEK AT FINE CREEK MILLS, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1945 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 3,282.28 | | 14,639.52 | | | |
| ANNUAL MEAN | 8.99 | | 40.1 | | 19.6 | |
| HIGHEST ANNUAL MEAN | | | | | 40.7 | 1973 |
| LOWEST ANNUAL MEAN | | | | | 3.67 | 2002 |
| HIGHEST DAILY MEAN | 214 | Nov 13 | 813 | Sep 19 | 1,880 | Oct 21, 1961 |
| LOWEST DAILY MEAN | 0.01 | aAug 7 | 0.24 | bOct 8 | 0.01 | aAug 7, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.02 | Aug 5 | 0.32 | Oct 4 | 0.02 | Aug 5, 2002 |
| MAXIMUM PEAK FLOW | | | 1,160 | Sep 19 | 4,180 | Oct 6, 1972 |
| MAXIMUM PEAK STAGE | | | 4.89 | Sep 19 | 9.02 | Oct 6, 1972 |
| INSTANTANEOUS LOW FLOW | | | 0.24 | cOct 7 | 0.00 | dAug 10, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.41 | | 1.81 | | 0.89 | |
| ANNUAL RUNOFF (INCHES) | 5.52 | | 24.64 | | 12.05 | |
| 10 PERCENT EXCEEDS | 20 | | 89 | | 38 | |
| 50 PERCENT EXCEEDS | 2.9 | | 19 | | 11 | |
| 90 PERCENT EXCEEDS | 0.24 | | 5.8 | | 2.1 | |

a Also Aug. 8-11, 14, 2002.
b Also Oct. 9, 2002.
c Also Oct. 8-10, 2002.
d Also part or all of each day Aug. 11-15, 2002.
e Estimated.



## 02037000 JAMES RIVER AND KANAWHA CANAL NEAR RICHMOND, VA

LOCATION.--Lat 37°33'53", long 77°34'27", NAD83, 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 Bosher 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 NGVD of 1929. Prior to Oct. 1, 1938, at datum 3.06 ft higher.

REMARKS.--No estimated daily discharges. Records fair. Canal diverts from James River 1,200 ft upstream from Bosher 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 $ft^3/s$, gage height, 14.5 ft, there is interchange of flow with the James River and that discharge above 2,540 $ft^3/s$ is included in discharge for the James River near Richmond (station 02037500) has been used. Daily discharges in excess of 2,540 $ft^3/s$ 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. 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.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 28 | 17 | 1.9 | 1.9 | 82 | 82 | 14 | 89 | 51 | 52 | 99 | 99 |
| 2 | 28 | 1.9 | 1.9 | 1.9 | 82 | 82 | 14 | 89 | 51 | 52 | 99 | 99 |
| 3 | 28 | 1.9 | 1.9 | 1.9 | 82 | 82 | 14 | 89 | 51 | 52 | 99 | 99 |
| 4 | 28 | 1.9 | 1.9 | 1.9 | 82 | 82 | 14 | 89 | 51 | 52 | 99 | 99 |
| 5 | 28 | 1.9 | 1.9 | 1.9 | 82 | 82 | 14 | 89 | 51 | 52 | 99 | 99 |
| 6 | 28 | 1.9 | 1.9 | 1.9 | 82 | 82 | 14 | 89 | 30 | 52 | 99 | 99 |
| 7 | 28 | 1.9 | 1.9 | 1.9 | 82 | 82 | 14 | 89 | 17 | 52 | 99 | 99 |
| 8 | 28 | 1.9 | 1.9 | 43 | 82 | 82 | 14 | 81 | 17 | 52 | 99 | 99 |
| 9 | 28 | 1.9 | 1.9 | 82 | 82 | 82 | 14 | 51 | 17 | 35 | 99 | 99 |
| 10 | 28 | 1.9 | 1.9 | 82 | 82 | 82 | 14 | 51 | 17 | 10 | 99 | 99 |
| 11 | 28 | 1.9 | 1.9 | 82 | 82 | 82 | 14 | 51 | 17 | 10 | 99 | 99 |
| 12 | 28 | 1.9 | 1.9 | 82 | 82 | 82 | 14 | 51 | 17 | 10 | 99 | 99 |
| 13 | 28 | 1.9 | 1.9 | 82 | 82 | 82 | 14 | 51 | 17 | 10 | 99 | 99 |
| 14 | 28 | 1.9 | 1.9 | 82 | 82 | 82 | 14 | 51 | 17 | 10 | 99 | 99 |
| 15 | 28 | 1.9 | 1.9 | 82 | 82 | 82 | 14 | 51 | 17 | 10 | 99 | 51 |
| 16 | 28 | 1.9 | 1.9 | 82 | 82 | 82 | 14 | 51 | 17 | 10 | 99 | 0.30 |
| 17 | 28 | 1.9 | 1.9 | 82 | 82 | 82 | 14 | 51 | 17 | 10 | 99 | 0.30 |
| 18 | 28 | 1.9 | 1.9 | 82 | 82 | 82 | 14 | 51 | 17 | 10 | 99 | 0.30 |
| 19 | 28 | 1.9 | 1.9 | 82 | 82 | 82 | 14 | 51 | 17 | 10 | 99 | 0.30 |
| 20 | 28 | 1.9 | 1.9 | 82 | 82 | 82 | 14 | 51 | 17 | 10 | 99 | 0.30 |
| 21 | 28 | 1.9 | 1.9 | 82 | 82 | 82 | 14 | 51 | 17 | 10 | 99 | 0.30 |
| 22 | 28 | 1.9 | 1.9 | 82 | 82 | 82 | 46 | 51 | 17 | 10 | 99 | 0.30 |
| 23 | 28 | 1.9 | 1.9 | 82 | 82 | 82 | 89 | 51 | 17 | 10 | 99 | 0.30 |
| 24 | 28 | 1.9 | 1.9 | 82 | 709 | 82 | 89 | 51 | 17 | 10 | 99 | 0.30 |
| 25 | 28 | 1.9 | 1.9 | 82 | 1,090 | 82 | 89 | 51 | 37 | 10 | 99 | 0.30 |
| 26 | 28 | 1.9 | 1.9 | 82 | 82 | 44 | 89 | 51 | 52 | 10 | 99 | 0.30 |
| 27 | 28 | 1.9 | 1.9 | 82 | 82 | 14 | 89 | 51 | 52 | 10 | 99 | 0.30 |
| 28 | 28 | 1.9 | 1.9 | 82 | 82 | 14 | 89 | 51 | 52 | 66 | 99 | 0.30 |
| 29 | 28 | 1.9 | 1.9 | 82 | --- | 14 | 89 | 51 | 52 | 99 | 99 | 0.30 |
| 30 | 28 | 1.9 | 1.9 | 82 | --- | 14 | 89 | 51 | 52 | 99 | 99 | 0.30 |
| 31 | 28 | --- | 1.9 | 82 | --- | 14 | --- | 51 | --- | 99 | 99 | --- |
| TOTAL | 868 | 72.1 | 58.9 | 1,942.3 | 3,931 | 2,164 | 1,052 | 1,877 | 888 | 994 | 3,069 | 1,441.50 |
| MEAN | 28.0 | 2.40 | 1.90 | 62.7 | 140 | 69.8 | 35.1 | 60.5 | 29.6 | 32.1 | 99.0 | 48.0 |
| MAX | 28 | 17 | 1.9 | 82 | 1,090 | 82 | 89 | 89 | 52 | 99 | 99 | 99 |
| MIN | 28 | 1.9 | 1.9 | 1.9 | 82 | 14 | 14 | 51 | 17 | 10 | 99 | 0.30 |

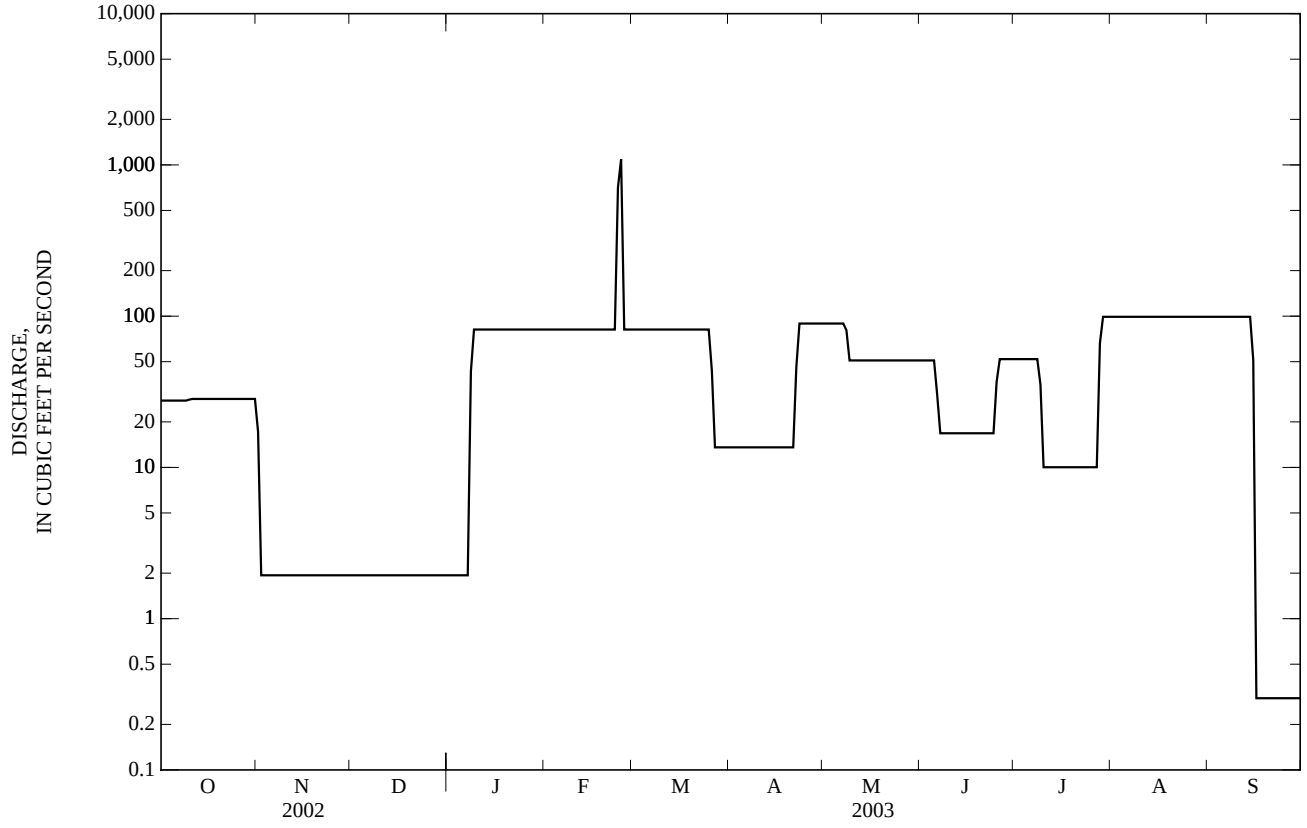
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 555 | 582 | 603 | 622 | 636 | 624 | 638 | 621 | 630 | 571 | 558 | 534 |
| MAX | 1,078 | 1,014 | 1,220 | 1,145 | 1,086 | 1,094 | 1,108 | 1,086 | 1,061 | 956 | 1,108 | 937 |
| (WY) | (1949) | (1948) | (1949) | (1949) | (1979) | (1951) | (1951) | (1952) | (1951) | (1940) | (1940) | (1949) |
| MIN | a0.60 | a0.60 | a0.60 | a0.60 | a0.60 | a0.60 | a0.60 | a0.60 | a0.60 | a0.60 | a0.60 | a0.60 |
| (WY) | (b1981) | (b1980) | (b1980) | (b1980) | (b1980) | (b1980) | (b1980) | (b1980) | (b1980) | (b1980) | (b1980) | (b1980) |

02037000 JAMES RIVER AND KANAWHA CANAL NEAR RICHMOND, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1937 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 17,604.6 | | 18,357.80 | | | |
| ANNUAL MEAN | 48.2 | | 50.3 | | 598 | |
| HIGHEST ANNUAL MEAN | | | | | 1,023 | 1949 |
| LOWEST ANNUAL MEAN | | | | | 1.48 | 1980 |
| HIGHEST DAILY MEAN | 153 | Jun 27 | 1,090 | Feb 25 | c3,860 | Aug 18, 1940 |
| LOWEST DAILY MEAN | 1.9 | dNov 2 | 0.30 | fSep 16 | (g) | (h) |
| ANNUAL SEVEN-DAY MINIMUM | 1.9 | jNov 2 | 0.30 | kSep 16 | c0.30 | kSep 16, 2003 |
| MAXIMUM PEAK FLOW | | | (l) | | (l) | |
| MAXIMUM PEAK STAGE | | | 14.88 | Feb 25 | m29.10 | Jun 23, 1972 |
| INSTANTANEOUS LOW FLOW | | | c0.30 | fSep 16 | (g) | (h) |
| 10 PERCENT EXCEEDS | 144 | | 99 | | 980 | |
| 50 PERCENT EXCEEDS | 28 | | 51 | | 785 | |
| 90 PERCENT EXCEEDS | 1.9 | | 1.9 | | 15 | |

a Estimated, leakage through head gates.
b Also 1983.
c See REMARKS.
d Also Nov. 3 to Dec. 31, 2002.
f Also Sept. 17-30, 2003.
g Probably no flow at times when headgates were closed.
h Many days in some years.
j Also many days in November and December 2002.
k Also Sept. 17-23, 2002.
l Interchange of flow with James River makes maximum discharge indeterminate.
m From floodmarks.



## 02037500 JAMES RIVER NEAR RICHMOND, VA

LOCATION.--Lat 37°33'48", long 77°32'49", NAD83, 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 Bosher Dam, 3.3 mi upstream from Powhite Creek, and at mile 116.6.

DRAINAGE AREA.--6,758 $mi^2$.

PERIOD OF RECORD.--October 1934 to current year. Gage-height records collected in vicinity of Mayós 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 NGVD of 1929.

REMARKS.--Records good except those for periods with ice effect, Jan. 23, 24, 27, 28, which are fair. City of Richmond takes from 40 $ft^3/s$ to 90 $ft^3/s$ 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 $ft^3/s$, includes canal flow. Minimum daily discharge of James River and James River and Kanawha Canal combined, 214 $ft^3/s$, Oct. 5, 1941, caused by recharging of the pool above Bosher Dam after the canal gates were closed. Since 1982, low flows during summer months are augmented by releases from Lake Moomaw, station 02011795. 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 50,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 25 | 0145 | *113,000 | *18.73 | Jul 4 | 1215 | 51,700 | 13.28 |
| Mar 21 | 2000 | 61,000 | 14.42 | Sep 20 | 2230 | 90,900 | 17.08 |
| May 20 | 1800 | 61,700 | 14.50 | Sep 24 | 1215 | 50,700 | 13.15 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2,260 | 9,020 | 3,630 | 7,100 | 3,000 | 22,400 | 15,500 | 6,890 | 18,100 | 6,830 | 4,290 | 4,270 |
| 2 | 2,230 | 9,950 | 3,600 | 14,500 | 3,280 | 20,500 | 13,000 | 7,840 | 16,400 | 6,430 | 5,310 | 4,220 |
| 3 | 1,850 | 6,670 | 3,360 | 19,200 | 3,250 | 22,800 | 11,700 | 7,570 | 14,400 | 12,800 | 5,000 | 3,960 |
| 4 | 1,510 | 4,920 | 3,170 | 19,600 | 3,230 | 22,500 | 11,900 | 6,920 | 13,000 | 47,900 | 5,380 | 4,650 |
| 5 | 1,200 | 3,900 | 3,220 | 18,200 | 3,290 | 21,100 | 12,700 | 7,040 | 13,300 | 35,600 | 8,940 | 5,600 |
| 6 | 1,010 | 3,760 | 3,190 | 16,900 | 3,830 | 19,400 | 11,600 | 8,420 | 20,600 | 21,200 | 7,430 | 6,150 |
| 7 | 984 | 4,090 | 3,130 | 14,700 | 3,780 | 19,000 | 12,200 | 12,500 | 23,400 | 15,500 | 8,060 | 6,350 |
| 8 | 862 | 4,610 | 3,110 | 11,800 | 3,710 | 21,000 | 17,800 | 14,000 | 31,600 | 14,600 | 6,890 | 5,720 |
| 9 | 790 | 6,440 | 2,930 | 9,870 | 3,720 | 20,700 | 19,700 | 12,900 | 29,400 | 10,700 | 6,630 | 4,680 |
| 10 | 717 | 6,140 | 2,740 | 8,570 | 3,740 | 17,500 | 38,000 | 13,500 | 30,500 | 9,410 | 6,390 | 4,050 |
| 11 | 898 | 5,310 | 2,950 | 7,570 | 3,270 | 13,600 | 46,000 | 13,700 | 27,100 | 8,410 | 11,300 | 3,500 |
| 12 | 971 | 10,300 | 4,480 | 6,880 | 3,550 | 11,700 | 47,400 | 13,800 | 21,900 | 8,140 | 14,400 | 3,500 |
| 13 | 900 | 24,200 | 7,640 | 6,010 | 3,680 | 10,700 | 42,300 | 13,600 | 20,500 | 7,560 | 12,500 | 4,230 |
| 14 | 1,070 | 21,800 | 12,200 | 5,660 | 3,700 | 9,930 | 31,100 | 11,300 | 21,100 | 9,470 | 10,300 | 4,640 |
| 15 | 1,160 | 18,700 | 20,000 | 5,150 | 3,810 | 9,100 | 24,600 | 10,000 | 22,800 | 10,000 | 9,810 | 4,830 |
| 16 | 1,320 | 13,100 | 19,900 | 4,790 | 5,600 | 8,140 | 19,500 | 9,530 | 22,100 | 7,500 | 8,250 | 4,280 |
| 17 | 1,280 | 12,600 | 16,200 | 4,520 | 7,230 | 8,030 | 15,400 | 13,300 | 18,600 | 8,420 | 7,090 | 3,930 |
| 18 | 1,350 | 20,500 | 12,600 | 4,310 | 8,450 | 8,150 | 13,000 | 12,200 | 31,800 | 8,280 | 7,710 | 4,670 |
| 19 | 1,800 | 19,800 | 10,100 | 3,950 | 10,500 | 7,650 | 11,900 | 38,900 | 32,700 | 6,960 | 7,030 | 38,100 |
| 20 | 2,060 | 16,400 | 8,710 | 3,660 | 8,600 | 12,100 | 11,800 | 59,400 | 33,000 | 6,110 | 6,330 | 82,500 |
| 21 | 2,670 | 12,000 | 9,950 | 3,710 | 10,200 | 52,800 | 10,700 | 45,500 | 37,500 | 5,230 | 5,510 | 69,700 |
| 22 | 1,890 | 9,170 | 15,100 | 3,470 | 19,300 | 47,100 | 9,860 | 32,800 | 29,600 | 5,180 | 4,860 | 27,600 |
| 23 | 1,720 | 7,430 | 20,000 | e3,400 | 67,300 | 31,200 | 9,070 | 27,500 | 24,400 | 6,120 | 4,350 | 27,400 |
| 24 | 1,660 | 6,520 | 15,400 | e3,150 | 103,000 | 23,100 | 8,510 | 27,000 | 20,600 | 6,370 | 4,090 | 46,800 |
| 25 | 1,460 | 6,900 | 14,800 | 3,070 | 106,000 | 18,100 | 8,550 | 23,500 | 16,400 | 5,520 | 3,650 | 33,200 |
| 26 | 1,500 | 6,490 | 19,700 | 2,880 | 54,800 | 14,400 | 8,220 | 31,700 | 12,600 | 4,380 | 3,410 | 23,500 |
| 27 | 1,850 | 5,660 | 18,400 | e2,800 | 31,400 | 12,200 | 8,130 | 34,000 | 10,400 | 3,980 | 3,230 | 17,600 |
| 28 | 2,310 | 5,050 | 14,400 | e2,500 | 26,100 | 11,000 | 7,940 | 26,900 | 9,230 | 3,620 | 3,110 | 13,600 |
| 29 | 2,850 | 4,610 | 10,900 | 2,590 | --- | 9,740 | 7,310 | 23,900 | 8,450 | 3,330 | 3,140 | 13,300 |
| 30 | 3,920 | 4,100 | 8,830 | 2,910 | --- | 9,900 | 6,810 | 20,600 | 7,400 | 3,880 | 4,440 | 16,000 |
| 31 | 7,360 | --- | 7,590 | 2,850 | --- | 14,500 | --- | 20,000 | --- | 4,130 | 4,950 | --- |
| TOTAL | 55,412 | 290,140 | 301,930 | 226,270 | 511,320 | 550,040 | 512,200 | 606,710 | 638,880 | 313,560 | 203,780 | 492,530 |
| MEAN | 1,787 | 9,671 | 9,740 | 7,299 | 18,260 | 17,740 | 17,070 | 19,570 | 21,300 | 10,110 | 6,574 | 16,420 |
| MAX | 7,360 | 24,200 | 20,000 | 19,600 | 106,000 | 52,800 | 47,400 | 59,400 | 37,500 | 47,900 | 14,400 | 82,500 |
| MIN | 717 | 3,760 | 2,740 | 2,500 | 3,000 | 7,650 | 6,810 | 6,890 | 7,400 | 3,330 | 3,110 | 3,500 |
| (†) | 868 | 72.1 | 58.9 | 1,942 | 3,931 | 2,164 | 1,052 | 1,877 | 888 | 994 | 3,069 | 1,442 |
| MEAN‡ | 1,815 | 9,674 | 9,742 | 7,362 | 18,402 | 17,813 | 17,108 | 19,632 | 21,326 | 10,147 | 6,673 | 16,466 |
| CFSM‡ | .27 | 1.43 | 1.44 | 1.09 | 2.72 | 2.64 | 2.53 | 2.90 | 3.16 | 1.50 | .99 | 2.44 |
| IN.‡ | .31 | 1.60 | 1.66 | 1.26 | 2.84 | 3.04 | 2.83 | 3.35 | 3.52 | 1.73 | 1.14 | 2.72 |

CAL YR 2002 MEAN‡ 3,640 CFSM‡ .54 IN.‡ 7.31
WTR YR 2003 MEAN‡ 12,935 CFSM‡ 1.91 IN.‡ 25.99

† Total diversion in cubic feet per second, per month, by James River and Kanawha Canal.
‡ Adjusted for diversion.

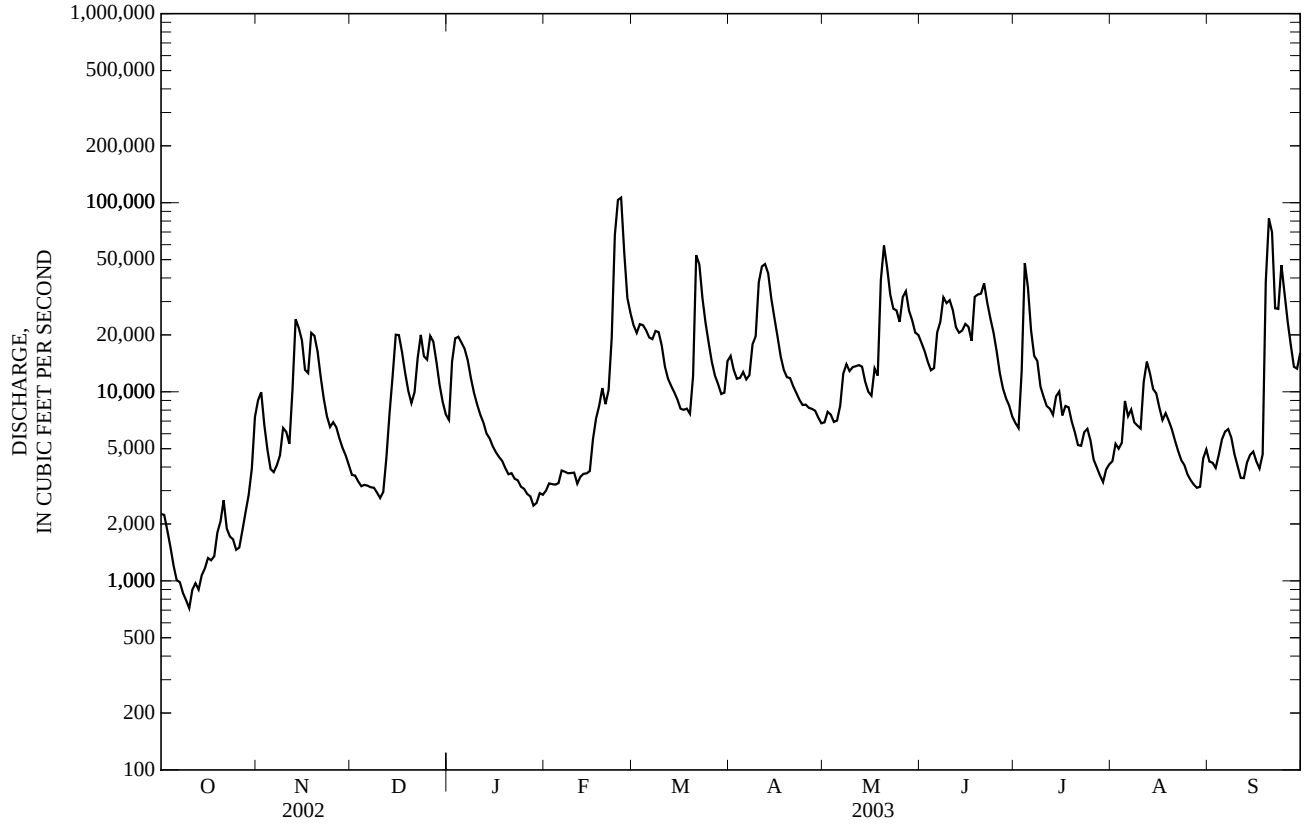
02037500 JAMES RIVER NEAR RICHMOND, VA—Continued

DISCHARGE, CUBIC FEET PER SECOND—CONTINUED
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 2003, BY WATER YEAR (WY) | | | | | | | | | | | | |
| MEAN | 3,935 | 4,641 | 6,684 | 8,977 | 10,750 | 12,750 | 10,880 | 7,878 | 5,670 | 3,216 | 3,601 | 3,388 |
| MAX | 19,090 | 30,480 | 26,480 | 25,300 | 34,960 | 32,740 | 35,900 | 24,280 | 30,910 | 11,300 | 21,710 | 18,390 |
| (WY) | (1938) | (1986) | (1949) | (1937) | (1998) | (1993) | (1987) | (1989) | (1972) | (1972) | (1969) | (1996) |
| MIN | 177 | 338 | 450 | 837 | 1,652 | 2,988 | 2,766 | 2,137 | 904 | 76.1 | 149 | 125 |
| (WY) | (1942) | (1942) | (1966) | (1966) | (2002) | (1981) | (1966) | (1941) | (1964) | (1966) | (1966) | (1963) |

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1937 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 1,310,946 | | 4,702,772 | | | |
| ANNUAL MEAN | 3,592 | | 12,880 | | 6,843 | |
| HIGHEST ANNUAL MEAN | | | | | 13,540 | 1973 |
| LOWEST ANNUAL MEAN | | | | | 2,110 | 2002 |
| HIGHEST DAILY MEAN | 24,200 | Nov 13 | 106,000 | Feb 25 | a296,000 | Jun 23, 1972 |
| LOWEST DAILY MEAN | 328 | Sep 14 | 717 | Oct 10 | b10 | cSep 8, 1966 |
| ANNUAL SEVEN-DAY MINIMUM | 392 | Sep 12 | 875 | Oct 7 | b10 | dSep 8, 1966 |
| MAXIMUM PEAK FLOW | | | 113,000 | Feb 25 | a313,000 | Jun 23, 1972 |
| MAXIMUM PEAK STAGE | | | 18.73 | Feb 25 | 28.62 | Jun 23, 1972 |
| INSTANTANEOUS LOW FLOW | | | 706 | Oct 10 | (f) | (g) |
| ANNUAL RUNOFF (CFSM) | 0.53 | | 1.91 | | 1.01 | |
| ANNUAL RUNOFF (INCHES) | 7.22 | | 25.89 | | 13.76 | |
| 10 PERCENT EXCEEDS | 9,650 | | 27,400 | | 15,000 | |
| 50 PERCENT EXCEEDS | 1,800 | | 8,450 | | 4,070 | |
| 90 PERCENT EXCEEDS | 568 | | 2,920 | | 950 | |

a Includes canal flow.
b Result of diversion by Bosher Dam construction.
c Also Sept. 9-15, 1966, Sept. 30, Oct. 5, 6, 1968, and Oct. 8-10, 1970.
d Also Sept. 9, 1966.
e Estimated.
f Not determined.
g Probably occurred Sept. 8-15, 1966.



## 02038850 HOLIDAY CREEK NEAR ANDERSONVILLE, VA

LOCATION.--Lat 37°24'56", long 78°38'09", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except those for period with ice effect, Jan. 12 to Feb. 21, and period of doubtful gage-height record, Sept. 24-30, which are poor. Maximum discharge, 9,640 $ft^3/s$, from rating curve extended above 4,200 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 150 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Nov 12 | 1345 | 159 | 2.36 | Jul 3 | 0145 | 234 | 2.85 |
| Feb 22 | 1315 | 607 | 4.79 | Jul 3 | 1900 | 183 | 2.51 |
| Mar 20 | 1345 | 543 | 4.52 | Sep 19 | 0045 | *1,450 | *7.40 |
| May 18 | 1545 | 227 | 2.80 | Sep 23 | 0645 | 175 | 2.46 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.43 | 2.9 | 2.2 | 12 | e4.3 | 11 | 12 | 9.2 | 14 | 5.1 | 6.0 | 4.4 |
| 2 | 0.43 | 2.2 | 2.1 | 12 | e4.3 | 27 | 9.3 | 6.8 | 9.5 | 18 | 5.7 | 3.9 |
| 3 | 0.42 | 2.0 | 2.1 | 10 | e3.8 | 17 | 8.0 | 7.4 | 9.5 | 119 | 9.3 | 4.0 |
| 4 | 0.40 | 2.1 | 2.1 | 8.5 | e6.0 | 10 | 7.3 | 7.5 | 11 | 49 | 14 | 5.9 |
| 5 | 0.39 | 2.8 | 6.3 | 6.3 | e6.7 | 11 | 7.0 | 6.5 | 30 | 18 | 6.9 | 5.1 |
| 6 | 0.36 | 8.7 | 3.2 | 5.5 | e4.4 | 12 | 6.2 | 6.4 | 11 | 11 | 5.5 | 4.1 |
| 7 | 0.35 | 4.0 | 2.6 | 4.7 | e4.8 | 9.8 | 43 | 5.8 | 49 | 9.2 | 8.2 | 4.0 |
| 8 | 0.35 | 2.9 | 2.8 | 4.5 | e4.3 | 8.1 | 23 | 5.4 | 39 | 7.5 | 9.2 | 3.9 |
| 9 | 0.35 | 2.4 | 3.1 | 4.3 | e3.9 | 7.2 | 101 | 5.0 | 18 | 7.5 | 7.3 | 3.9 |
| 10 | 0.40 | 2.2 | 2.6 | 3.9 | e4.5 | 6.4 | 49 | 5.1 | 11 | 7.9 | 6.3 | 3.7 |
| 11 | 3.9 | 34 | 8.7 | 3.6 | e4.8 | 6.0 | 71 | 5.3 | 11 | 8.5 | 5.6 | 3.4 |
| 12 | 1.8 | 66 | 9.1 | e3.4 | e5.4 | 5.7 | 26 | 4.6 | 22 | 6.3 | 5.0 | 3.6 |
| 13 | 0.83 | 20 | 24 | e3.3 | e5.4 | 5.7 | 15 | 4.2 | 17 | 5.9 | 6.3 | 9.8 |
| 14 | 0.68 | 6.5 | 31 | e3.2 | e4.7 | 5.4 | 11 | 4.0 | 12 | 6.5 | 6.6 | 6.8 |
| 15 | 0.62 | 4.4 | 14 | e3.1 | e9.1 | 5.1 | 9.6 | 4.3 | 9.9 | 5.9 | 5.0 | 5.2 |
| 16 | 3.4 | 11 | 8.0 | e3.0 | e15 | 7.4 | 8.7 | 5.4 | 10 | 5.5 | 8.0 | 4.4 |
| 17 | 2.2 | 47 | 5.8 | e3.4 | e11 | 8.7 | 8.0 | 5.7 | 15 | 5.2 | 11 | 3.9 |
| 18 | 1.0 | 21 | 4.8 | e3.0 | e6.6 | 6.7 | 7.9 | 111 | 14 | 5.0 | 6.7 | 139 |
| 19 | 0.83 | 7.4 | 4.4 | e3.2 | e7.3 | 6.0 | 9.2 | 56 | 13 | 5.0 | 5.5 | 303 |
| 20 | 0.77 | 5.1 | 11 | e3.1 | e18 | 214 | 8.1 | 22 | 12 | 4.9 | 5.0 | 30 |
| 21 | 0.92 | 4.2 | 8.5 | e3.0 | e37 | 66 | 7.8 | 25 | 11 | 5.5 | 4.7 | 14 |
| 22 | 0.95 | 3.7 | 5.6 | e2.9 | 212 | 26 | 7.3 | 26 | 8.5 | 5.6 | 4.4 | 11 |
| 23 | 0.81 | 3.2 | 4.6 | e2.8 | 81 | 14 | 6.7 | 29 | 7.1 | 6.2 | 4.2 | 70 |
| 24 | 0.75 | 2.9 | 6.7 | e2.7 | 41 | 9.9 | 6.3 | 21 | 6.3 | 6.0 | 3.9 | e178 |
| 25 | 0.80 | 2.7 | 64 | e4.0 | 20 | 8.3 | 6.7 | 25 | 5.8 | 4.9 | 3.7 | e49 |
| 26 | 3.9 | 2.5 | 20 | e3.8 | 9.9 | 7.7 | 9.5 | 40 | 5.5 | 4.5 | 3.6 | e30 |
| 27 | 1.9 | 2.4 | 8.4 | e3.3 | 8.9 | 7.4 | 8.0 | 56 | 5.3 | 4.3 | 3.8 | e23 |
| 28 | 3.0 | 2.3 | 6.1 | e3.0 | 9.2 | 6.7 | 6.5 | 60 | 5.3 | 7.0 | 5.9 | e21 |
| 29 | 7.1 | 2.3 | 5.1 | e3.2 | --- | 7.1 | 6.0 | 26 | 5.3 | 6.9 | 6.7 | e17 |
| 30 | 13 | 2.3 | 4.5 | e3.7 | --- | 22 | 6.0 | 21 | 4.9 | 7.7 | 4.6 | e12 |
| 31 | 5.2 | --- | 4.2 | e4.0 | --- | 19 | --- | 16 | --- | 6.1 | 4.3 | --- |
| TOTAL | 58.24 | 283.1 | 287.6 | 140.4 | 553.3 | 584.3 | 511.1 | 632.6 | 402.9 | 375.6 | 192.9 | 977.0 |
| MEAN | 1.88 | 9.44 | 9.28 | 4.53 | 19.8 | 18.8 | 17.0 | 20.4 | 13.4 | 12.1 | 6.22 | 32.6 |
| MAX | 13 | 66 | 64 | 12 | 212 | 214 | 101 | 111 | 49 | 119 | 14 | 303 |
| MIN | 0.35 | 2.0 | 2.1 | 2.7 | 3.8 | 5.1 | 6.0 | 4.0 | 4.9 | 4.3 | 3.6 | 3.4 |
| CFSM | 0.22 | 1.11 | 1.09 | 0.53 | 2.32 | 2.21 | 2.00 | 2.39 | 1.57 | 1.42 | 0.73 | 3.82 |
| IN. | 0.25 | 1.23 | 1.25 | 0.61 | 2.41 | 2.55 | 2.23 | 2.76 | 1.76 | 1.64 | 0.84 | 4.26 |

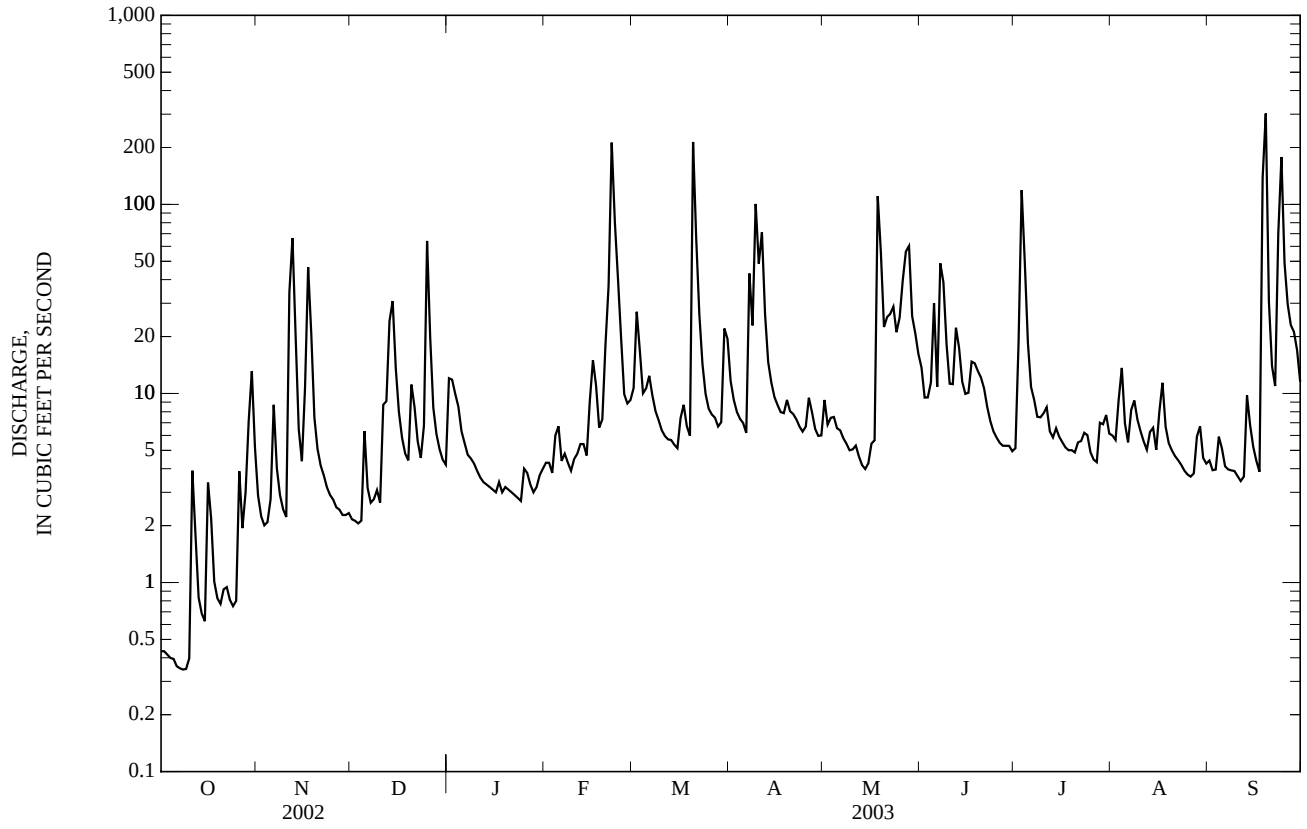
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 5.65 | 7.22 | 8.37 | 10.5 | 12.3 | 13.8 | 11.5 | 9.65 | 7.98 | 4.55 | 4.33 | 6.64 |
| 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 | 0.47 | 0.83 | 1.45 | 2.04 | 2.05 | 4.12 | 3.15 | 2.64 | 0.56 | 0.36 | 0.13 | 0.32 |
| (WY) | (2002) | (2002) | (2002) | (2002) | (2002) | (1981) | (2002) | (2002) | (2002) | (2002) | (2002) | (2001) |

02038850 HOLIDAY CREEK NEAR ANDERSONVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1966 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 1,110.32 | | 4,999.04 | | | |
| ANNUAL MEAN | 3.04 | | 13.7 | | 8.56 | |
| HIGHEST ANNUAL MEAN | | | | | 18.6 | 1973 |
| LOWEST ANNUAL MEAN | | | | | 1.55 | 2002 |
| HIGHEST DAILY MEAN | 66 | Nov 12 | 303 | Sep 19 | 1,740 | Jun 21, 1972 |
| LOWEST DAILY MEAN | 0.03 | aAug 6 | 0.35 | bOct 7 | 0.03 | aAug 6, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.03 | Aug 6 | 0.37 | Oct 4 | 0.03 | Aug 6, 2002 |
| MAXIMUM PEAK FLOW | | | 1,450 | Sep 19 | 9,640 | Jun 21, 1972 |
| MAXIMUM PEAK STAGE | | | 7.40 | Sep 19 | 14.64 | Jun 21, 1972 |
| INSTANTANEOUS LOW FLOW | | | 0.34 | cOct 6 | d0.02 | Aug 7, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.36 | | 1.61 | | 1.00 | |
| ANNUAL RUNOFF (INCHES) | 4.84 | | 21.80 | | 13.64 | |
| 10 PERCENT EXCEEDS | 6.0 | | 26 | | 15 | |
| 50 PERCENT EXCEEDS | 1.6 | | 6.3 | | 5.1 | |
| 90 PERCENT EXCEEDS | 0.23 | | 2.4 | | 1.7 | |

a Also Aug. 7-25, 2002.
b Also Oct. 8, 9, 2002.
c Also Oct. 7-9, 2002.
d Also Aug. 8, 10, 12, 23, 2002.
e Estimated.



## 02039000 BUFFALO CREEK NEAR HAMPDEN SYDNEY, VA

LOCATION.--Lat 37°15'26", long 78°29'11", NAD83, 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 $mi^2$.

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 NGVD of 1929 (levels by Virginia Department of Transportation). Prior to Aug. 19, 1953, nonrecording gage at same site and datum.

REMARKS.-Records good except for period with ice effect, Jan. 16-28, which is fair. Maximum discharge, 9,160 $ft^3/s$, from rating curve extended above 1,600 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Nov 13 | 0100 | 918 | 6.62 | May 19 | 0400 | 1,020 | 6.81 |
| Feb 22 | 2400 | 1,400 | 7.40 | May 26 | 1430 | 831 | 6.45 |
| Mar 20 | 1800 | 3,750 | 9.65 | Jun 1 | 0900 | 506 | 5.68 |
| Apr 8 | 0030 | 731 | 6.24 | Sep 19 | 0530 | *5,660 | *10.82 |
| Apr 9 | 1600 | 967 | 6.71 | Sep 23 | 1200 | 4,420 | 10.10 |
| Apr 11 | 0900 | 749 | 6.28 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.8 | 80 | 28 | 101 | 38 | 143 | 125 | 93 | 382 | 50 | 112 | 34 |
| 2 | 5.2 | 57 | 26 | 105 | 40 | 219 | 94 | 77 | 179 | 108 | 103 | 33 |
| 3 | 4.8 | 47 | 26 | 90 | 38 | 221 | 77 | 64 | 110 | 206 | 82 | 32 |
| 4 | 4.5 | 45 | 24 | 84 | 56 | 131 | 67 | 64 | 104 | 320 | 73 | 69 |
| 5 | 4.2 | 46 | 51 | 70 | 64 | 109 | 61 | 57 | 155 | 193 | 65 | 77 |
| 6 | 3.6 | 157 | 45 | 63 | 52 | 145 | 56 | 56 | 114 | 148 | 58 | 58 |
| 7 | 3.3 | 123 | 36 | 57 | 54 | 156 | 244 | 53 | 168 | 99 | 54 | 47 |
| 8 | 3.4 | 73 | 28 | 54 | 52 | 111 | 456 | 51 | 397 | 77 | 53 | 43 |
| 9 | 2.8 | 56 | 28 | 50 | 48 | 90 | 669 | 48 | 205 | 66 | 55 | 40 |
| 10 | 3.0 | 48 | 27 | 48 | 51 | 76 | 478 | 46 | 128 | 65 | 55 | 39 |
| 11 | 90 | 99 | 63 | 45 | 54 | 67 | 577 | 45 | 97 | 62 | 50 | 37 |
| 12 | 151 | 321 | 111 | 43 | 55 | 61 | 327 | 43 | 151 | 55 | 46 | 36 |
| 13 | 80 | 618 | 144 | 41 | 52 | 57 | 199 | 40 | 137 | 51 | 46 | 51 |
| 14 | 113 | 249 | 361 | 41 | 47 | 61 | 133 | 39 | 110 | 48 | 45 | 52 |
| 15 | 54 | 130 | 234 | 40 | 66 | 56 | 101 | 38 | 91 | 47 | 43 | 49 |
| 16 | 65 | 107 | 136 | e36 | 145 | 59 | 85 | 49 | 85 | 45 | 41 | 44 |
| 17 | 64 | 258 | 93 | e38 | 110 | 74 | 74 | 48 | 116 | 43 | 50 | 40 |
| 18 | 42 | 382 | 72 | e35 | 81 | 67 | 69 | 232 | 146 | 41 | 52 | 152 |
| 19 | 33 | 177 | 62 | e37 | 84 | 59 | 79 | 744 | 161 | 41 | 56 | 2,700 |
| 20 | 27 | 98 | 74 | e34 | 144 | 1,530 | 72 | 317 | 189 | 40 | 46 | 590 |
| 21 | 30 | 70 | 81 | e32 | 188 | 1,060 | 68 | 179 | 128 | 43 | 43 | 387 |
| 22 | 31 | 57 | 67 | e30 | 449 | 528 | 65 | 143 | 95 | 64 | 40 | 245 |
| 23 | 27 | 47 | 58 | e28 | 810 | 368 | 59 | 165 | 77 | 93 | 38 | 2,110 |
| 24 | 23 | 42 | 79 | e27 | 344 | 248 | 55 | 172 | 66 | 161 | 37 | 813 |
| 25 | 22 | 39 | 315 | e37 | 197 | 162 | 54 | 278 | 60 | 96 | 35 | 500 |
| 26 | 36 | 36 | 346 | e34 | 128 | 109 | 60 | 698 | 55 | 67 | 34 | 366 |
| 27 | 35 | 34 | 161 | e30 | 105 | 84 | 60 | 397 | 52 | 55 | 33 | 255 |
| 28 | 57 | 32 | 105 | e28 | 120 | 70 | 54 | 357 | 57 | 53 | 38 | 164 |
| 29 | 118 | 31 | 81 | 31 | --- | 68 | 50 | 227 | 53 | 62 | 36 | 111 |
| 30 | 188 | 30 | 67 | 34 | --- | 119 | 49 | 169 | 50 | 128 | 33 | 82 |
| 31 | 152 | --- | 60 | 35 | --- | 178 | --- | 149 | --- | 134 | 32 | --- |
| TOTAL | 1,478.6 | 3,589 | 3,089 | 1,458 | 3,672 | 6,486 | 4,617 | 5,138 | 3,918 | 2,761 | 1,584 | 9,256 |
| MEAN | 47.7 | 120 | 99.6 | 47.0 | 131 | 209 | 154 | 166 | 131 | 89.1 | 51.1 | 309 |
| MAX | 188 | 618 | 361 | 105 | 810 | 1,530 | 669 | 744 | 397 | 320 | 112 | 2,700 |
| MIN | 2.8 | 30 | 24 | 27 | 38 | 56 | 49 | 38 | 50 | 40 | 32 | 32 |
| CFSM | 0.68 | 1.72 | 1.43 | 0.67 | 1.88 | 3.00 | 2.21 | 2.38 | 1.87 | 1.28 | 0.73 | 4.43 |
| IN. | 0.79 | 1.92 | 1.65 | 0.78 | 1.96 | 3.46 | 2.46 | 2.74 | 2.09 | 1.47 | 0.85 | 4.94 |

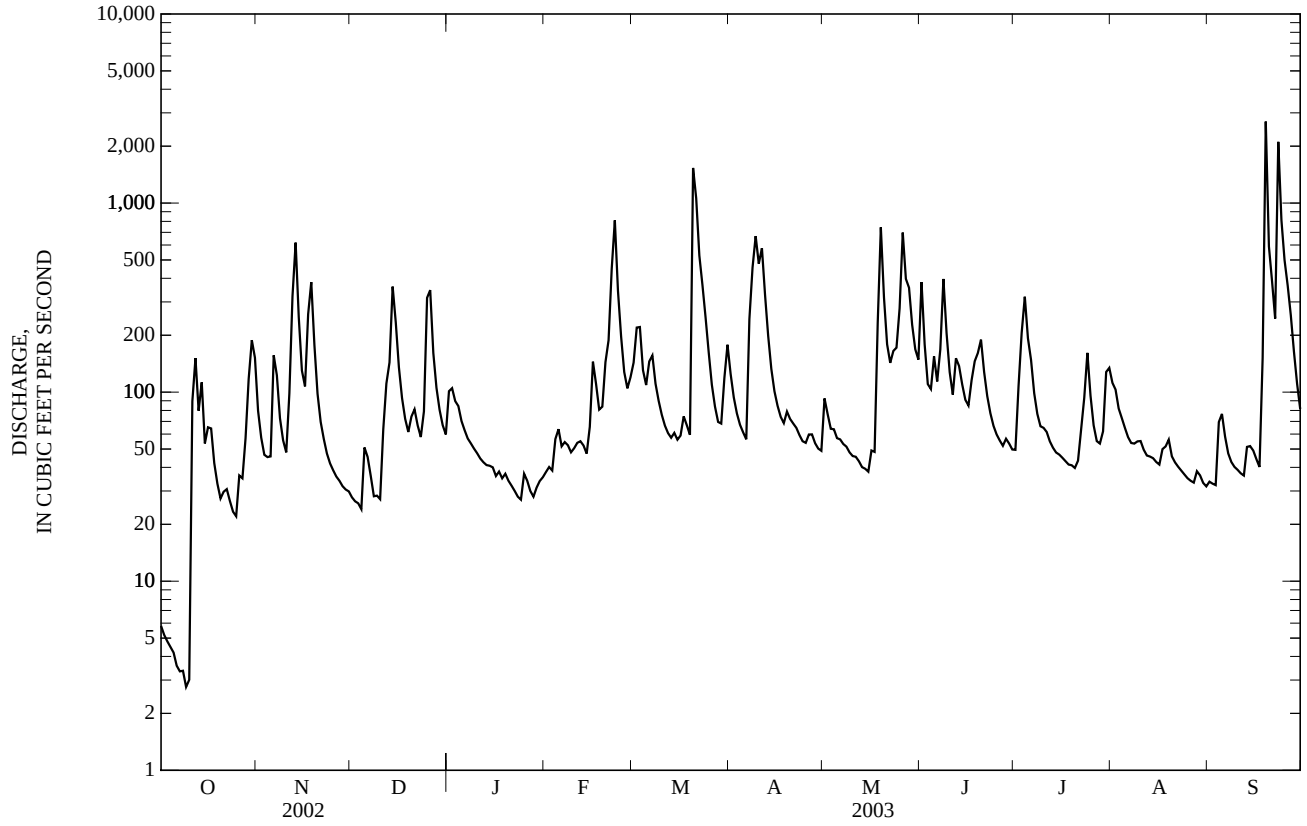
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 48.4 | 62.9 | 70.5 | 88.7 | 98.1 | 113 | 91.7 | 66.5 | 50.6 | 39.0 | 39.6 | 44.8 |
| MAX | 365 | 315 | 157 | 313 | 295 | 324 | 256 | 173 | 294 | 129 | 260 | 309 |
| (WY) | (1972) | (1986) | (1997) | (1978) | (1979) | (1993) | (1983) | (1978) | (1972) | (1989) | (1955) | (2003) |
| MIN | 9.94 | 14.4 | 18.7 | 25.3 | 29.4 | 37.5 | 25.1 | 23.4 | 8.60 | 5.60 | 2.44 | 6.34 |
| (WY) | (1971) | (2002) | (1966) | (1966) | (2002) | (1981) | (2002) | (1969) | (2002) | (2002) | (2002) | (2002) |

02039000 BUFFALO CREEK NEAR HAMPDEN SYDNEY, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1947 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 14,273.88 | | 47,046.6 | | | |
| ANNUAL MEAN | 39.1 | | 129 | | 67.6 | |
| HIGHEST ANNUAL MEAN | | | | | 134 | 1972 |
| LOWEST ANNUAL MEAN | | | | | 21.2 | 2002 |
| HIGHEST DAILY MEAN | 618 | Nov 13 | 2,700 | Sep 19 | 4,940 | Aug 18, 1955 |
| LOWEST DAILY MEAN | 0.13 | Aug 23 | 2.8 | Oct 9 | 0.13 | Aug 23, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.22 | Aug 11 | 3.5 | Oct 4 | 0.22 | Aug 11, 2002 |
| MAXIMUM PEAK FLOW | | | 5,660 | Sep 19 | 9,160 | Jun 21, 1972 |
| MAXIMUM PEAK STAGE | | | 10.82 | Sep 19 | 12.38 | Jun 21, 1972 |
| INSTANTANEOUS LOW FLOW | | | 2.4 | Oct 8 | 0.09 | Aug 24, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.56 | | 1.85 | | 0.97 | |
| ANNUAL RUNOFF (INCHES) | 7.62 | | 25.11 | | 13.18 | |
| 10 PERCENT EXCEEDS | 80 | | 251 | | 119 | |
| 50 PERCENT EXCEEDS | 24 | | 64 | | 42 | |
| 90 PERCENT EXCEEDS | 2.9 | | 33 | | 17 | |

e Estimated.



## 02039500 APPOMATTOX RIVER AT FARMVILLE, VA

LOCATION.--Lat 37°18'26", long 78°23'19", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Nov. 29, 1928, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 7, 8, and Jan. 14, 15, 19-29, which are fair. Maximum discharge, 33,100 $ft^3/s$, from rating curve extended above 12,000 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,900 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Nov 13 | 1300 | 2,690 | 13.55 | May 28 | 1815 | 3,280 | 14.34 |
| Feb 23 | 1545 | 6,660 | 17.44 | Jun 6 | 0030 | 2,310 | 12.80 |
| Mar 21 | 1030 | 8,630 | 18.82 | Jun 8 | 1415 | 1,960 | 12.02 |
| Apr 8 | 1000 | 2,090 | 12.31 | Jul 4 | 1400 | 5,100 | 16.23 |
| Apr 10 | 0430 | 4,260 | 15.45 | Sep 19 | 2230 | *9,800 | *19.58 |
| May 19 | 1715 | 5,140 | 16.27 | Sep 23 | 2315 | 7,030 | 17.70 |
| May 26 | 1400 | 2,850 | 13.78 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 24 | 305 | 102 | 296 | 140 | 656 | 602 | 275 | 852 | 168 | 368 | 125 |
| 2 | 21 | 172 | 95 | 542 | 153 | 932 | 410 | 287 | 722 | 373 | 330 | 128 |
| 3 | 20 | 122 | 91 | 412 | 152 | 966 | 331 | 229 | 434 | 1,560 | 267 | 125 |
| 4 | 18 | 109 | 88 | 419 | 184 | 580 | 291 | 233 | 413 | 4,760 | 684 | 196 |
| 5 | 18 | 122 | 89 | 328 | 272 | 436 | 268 | 229 | 1,650 | 1,810 | 427 | 286 |
| 6 | 17 | 395 | 138 | 270 | 217 | 585 | 248 | 204 | 1,280 | 655 | 263 | 200 |
| 7 | 16 | 471 | e126 | 236 | 208 | 689 | 969 | 195 | 766 | 485 | 233 | 157 |
| 8 | 16 | 251 | e112 | 210 | 211 | 456 | 1,860 | 185 | 1,740 | 361 | 218 | 142 |
| 9 | 15 | 160 | 109 | 197 | 189 | 359 | 2,330 | 170 | 1,030 | 280 | 224 | 139 |
| 10 | 15 | 123 | 106 | 181 | 196 | 301 | 3,460 | 162 | 593 | 254 | 274 | 136 |
| 11 | 120 | 474 | 219 | 164 | 222 | 254 | 2,530 | 161 | 410 | 244 | 213 | 130 |
| 12 | 236 | 1,800 | 532 | 151 | 244 | 232 | 1,730 | 155 | 497 | 217 | 188 | 126 |
| 13 | 230 | 2,450 | 692 | 144 | 238 | 217 | 826 | 140 | 736 | 187 | 227 | 168 |
| 14 | 157 | 968 | 1,520 | e140 | 210 | 219 | 559 | 129 | 511 | 184 | 218 | 216 |
| 15 | 146 | 493 | 1,020 | e135 | 257 | 205 | 421 | 128 | 381 | 181 | 190 | 183 |
| 16 | 130 | 373 | 573 | 131 | 626 | 195 | 352 | 143 | 334 | 164 | 172 | 161 |
| 17 | 174 | 1,140 | 367 | 140 | 460 | 244 | 306 | 163 | 374 | 152 | 418 | 150 |
| 18 | 159 | 1,550 | 278 | 125 | 377 | 240 | 276 | 882 | 631 | 144 | 297 | 429 |
| 19 | 91 | 775 | 232 | e140 | 346 | 210 | 318 | 4,140 | 622 | 139 | 223 | 6,900 |
| 20 | 68 | 421 | 278 | e130 | 632 | 2,840 | 300 | 2,280 | 654 | 133 | 195 | 6,150 |
| 21 | 67 | 289 | 420 | e125 | 1,210 | 7,670 | 268 | 732 | 538 | 129 | 168 | 1,190 |
| 22 | 68 | 231 | 299 | e120 | 2,240 | 2,610 | 251 | 945 | 387 | 190 | 157 | 705 |
| 23 | 62 | 191 | 231 | e115 | 5,830 | 1,010 | 226 | 842 | 305 | 289 | 149 | 4,150 |
| 24 | 56 | 161 | 261 | e110 | 2,640 | 742 | 205 | 943 | 256 | 463 | 142 | 4,520 |
| 25 | 51 | 145 | 1,170 | e135 | 847 | 567 | 194 | 1,150 | 224 | 333 | 136 | 1,270 |
| 26 | 75 | 134 | 1,560 | e128 | 558 | 415 | 215 | 2,660 | 203 | 206 | 131 | 811 |
| 27 | 91 | 124 | 691 | e120 | 450 | 341 | 247 | 2,020 | 189 | 166 | 127 | 643 |
| 28 | 131 | 114 | 405 | e115 | 527 | 287 | 210 | 2,750 | 184 | 158 | 132 | 571 |
| 29 | 259 | 108 | 304 | e127 | --- | 268 | 185 | 1,570 | 184 | 309 | 135 | 493 |
| 30 | 567 | 105 | 254 | 129 | --- | 494 | 175 | 900 | 175 | 346 | 128 | 340 |
| 31 | 620 | --- | 221 | 135 | --- | 994 | --- | 654 | --- | 470 | 122 | --- |
| TOTAL | 3,738 | 14,276 | 12,583 | 5,850 | 19,836 | 26,214 | 20,563 | 25,656 | 17,275 | 15,510 | 7,156 | 30,940 |
| MEAN | 121 | 476 | 406 | 189 | 708 | 846 | 685 | 828 | 576 | 500 | 231 | 1,031 |
| MAX | 620 | 2,450 | 1,560 | 542 | 5,830 | 7,670 | 3,460 | 4,140 | 1,740 | 4,760 | 684 | 6,900 |
| MIN | 15 | 105 | 88 | 110 | 140 | 195 | 175 | 128 | 175 | 129 | 122 | 125 |
| CFSM | 0.40 | 1.57 | 1.34 | 0.62 | 2.34 | 2.79 | 2.26 | 2.73 | 1.90 | 1.65 | 0.76 | 3.40 |
| IN. | 0.46 | 1.75 | 1.54 | 0.72 | 2.44 | 3.22 | 2.52 | 3.15 | 2.12 | 1.90 | 0.88 | 3.80 |

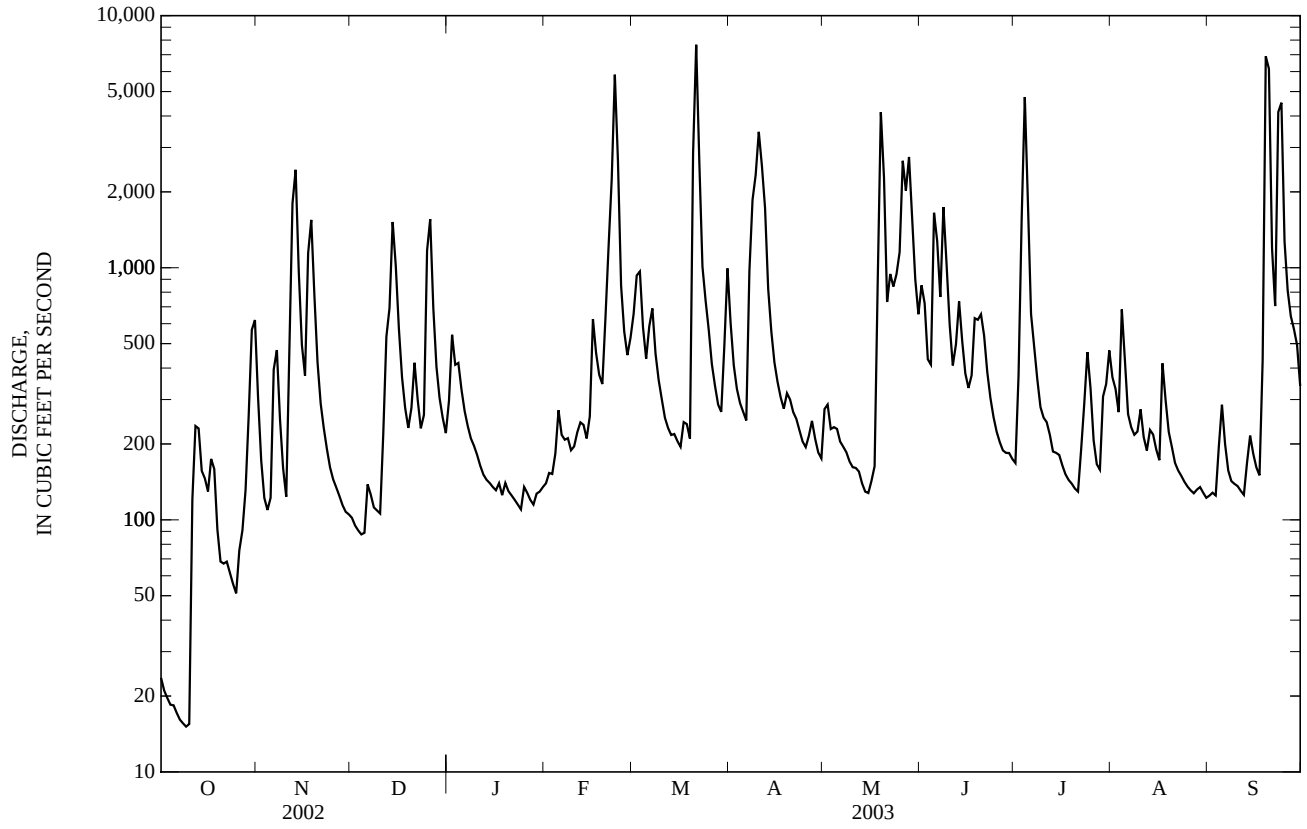
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1926 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 188 | 243 | 300 | 395 | 437 | 484 | 406 | 278 | 210 | 162 | 190 | 202 |
| MAX | 1,190 | 1,287 | 961 | 1,430 | 1,402 | 1,518 | 1,155 | 872 | 1,866 | 518 | 1,783 | 1,140 |
| (WY) | (1972) | (1986) | (1997) | (1978) | (1979) | (1993) | (1983) | (1978) | (1972) | (1972) | (1940) | (1996) |
| MIN | 30.3 | 45.5 | 61.6 | 96.3 | 97.1 | 126 | 105 | 95.2 | 27.5 | 18.6 | 11.8 | 16.7 |
| (WY) | (1931) | (2002) | (1966) | (1966) | (2002) | (1981) | (2002) | (1969) | (2002) | (2002) | (2002) | (1968) |

02039500 APPOMATTOX RIVER AT FARMVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1926 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 52,751.60 | | 199,597 | | | |
| ANNUAL MEAN | 145 | | 547 | | 291 | |
| HIGHEST ANNUAL MEAN | | | | | 584 | 1972 |
| LOWEST ANNUAL MEAN | | | | | 74.0 | 2002 |
| HIGHEST DAILY MEAN | 2,450 | Nov 13 | 7,670 | Mar 21 | 28,000 | Jun 22, 1972 |
| LOWEST DAILY MEAN | 0.07 | aAug 22 | 15 | bOct 9 | 0.07 | aAug 22, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.09 | Aug 19 | 16 | Oct 4 | 0.09 | Aug 19, 2002 |
| MAXIMUM PEAK FLOW | | | 9,800 | Sep 19 | 33,100 | Jun 22, 1972 |
| MAXIMUM PEAK STAGE | | | 19.58 | Sep 19 | c29.70 | Jun 22, 1972 |
| INSTANTANEOUS LOW FLOW | | | 15 | dOct 7 | 0.07 | fAug 21, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.48 | | 1.80 | | 0.96 | |
| ANNUAL RUNOFF (INCHES) | 6.48 | | 24.50 | | 13.07 | |
| 10 PERCENT EXCEEDS | 268 | | 1,160 | | 528 | |
| 50 PERCENT EXCEEDS | 82 | | 244 | | 165 | |
| 90 PERCENT EXCEEDS | 14 | | 120 | | 61 | |

a Also Aug. 23-25, 2002.
b Also Oct. 10, 2002.
c From floodmarks.
d Also Oct. 8-10, 2002.
e Estimated.
f Also Aug. 22-26, 2002.



## 02040000 APPOMATTOX RIVER AT MATTOAX, VA

LOCATION.--Lat 37°25'18", long 77°51'32", NAD83, 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 $mi^2$.

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 NGVD of 1929. 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 or no gage-height record, Nov. 21 to Dec. 2, Jan. 27-30, Feb. 2, 3, 17, 18, July 15-21, 27-29, Aug. 5-10, 12-17, 19-22, Aug. 30 to Sept. 3, and Sept. 9-14, 16, 17, 26-30, and periods with ice effect, Jan. 18, 20, 22, 23, 25, which are fair. National Weather Service gage-height telemeter at station. Maximum discharge, 35,000 $ft^3/s$, from rating curve extended above 20,000 $ft^3/s$ on basis of records for stations at Farmville and near Petersburg. 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 26 | 2000 | 5,960 | 21.93 | May 23 | 1200 | 4,880 | 20.14 |
| Mar 24 | 0900 | 9,900 | 25.19 | May 30 | 0430 | 5,330 | 20.96 |
| Apr 13 | 0730 | 6,440 | 22.54 | Sep 23 | 1730 | *13,500 | *27.33 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 44 | 1,460 | e320 | 718 | 358 | 1,690 | 2,250 | 685 | 3,900 | 400 | 1,260 | e290 |
| 2 | 38 | 791 | e301 | 1,860 | e370 | 2,260 | 1,490 | 917 | 2,420 | 491 | 1,680 | e280 |
| 3 | 34 | 510 | 289 | 1,970 | e386 | 2,760 | 1,010 | 951 | 1,940 | 947 | 1,390 | e300 |
| 4 | 29 | 404 | 277 | 1,330 | 404 | 2,570 | 833 | 784 | 1,190 | 1,990 | 2,200 | 414 |
| 5 | 26 | 365 | 281 | 1,050 | 463 | 1,540 | 731 | 615 | 1,310 | 2,610 | e1,320 | 685 |
| 6 | 23 | 637 | 290 | 859 | 540 | 1,390 | 673 | 579 | 2,180 | 3,040 | e900 | 847 |
| 7 | 21 | 1,310 | 330 | 729 | 521 | 1,900 | 1,440 | 517 | 2,450 | 3,140 | e650 | 640 |
| 8 | 20 | 1,190 | 330 | 650 | 533 | 1,750 | 3,380 | 479 | 2,260 | 1,130 | e580 | 481 |
| 9 | 18 | 756 | 309 | 587 | 572 | 1,160 | 4,180 | 468 | 2,740 | 794 | e520 | e390 |
| 10 | 18 | 559 | 303 | 541 | 548 | 920 | 4,780 | 743 | 2,720 | 638 | e560 | e340 |
| 11 | 39 | 558 | 350 | 500 | 560 | 778 | 5,430 | 591 | 1,390 | 644 | 775 | e315 |
| 12 | 85 | 1,990 | 743 | 462 | 585 | 684 | 6,000 | 470 | 1,150 | 585 | e600 | e295 |
| 13 | 433 | 3,320 | 1,410 | 434 | 571 | 626 | 6,340 | 405 | 1,230 | 502 | e460 | e330 |
| 14 | 369 | 3,460 | 2,660 | 413 | 526 | 622 | 5,750 | 352 | 1,340 | 648 | e620 | e430 |
| 15 | 258 | 3,670 | 2,940 | 401 | 517 | 615 | 4,100 | 319 | 1,030 | e510 | e570 | 560 |
| 16 | 302 | 2,730 | 2,860 | 386 | 881 | 566 | 1,280 | 332 | 830 | e488 | e500 | e400 |
| 17 | 288 | 2,010 | 1,520 | 373 | e1,300 | 539 | 996 | 354 | 784 | 524 | e430 | e350 |
| 18 | 381 | 3,020 | 885 | e362 | e1,000 | 544 | 851 | 1,290 | 926 | e498 | 725 | 1,100 |
| 19 | 337 | 3,160 | 705 | 356 | 792 | 554 | 895 | 3,530 | 1,500 | e445 | e500 | 6,220 |
| 20 | 245 | 2,830 | 736 | e350 | 889 | 2,230 | 919 | 3,680 | 1,670 | e400 | e450 | 6,240 |
| 21 | 180 | e1,000 | 1,330 | 389 | 2,100 | 4,980 | 819 | 3,810 | 1,810 | e370 | e400 | 7,610 |
| 22 | 149 | e750 | 1,270 | e342 | 3,620 | 5,440 | 737 | 4,390 | 1,260 | 427 | e370 | 9,960 |
| 23 | 144 | e630 | 861 | e327 | 4,820 | 7,760 | 680 | 4,830 | 902 | 876 | 355 | 12,400 |
| 24 | 140 | e530 | 685 | 320 | 5,010 | 9,630 | 604 | 4,060 | 715 | 1,360 | 332 | 11,000 |
| 25 | 142 | e475 | 1,460 | e261 | 5,340 | 7,310 | 547 | 2,910 | 603 | 1,290 | 315 | 8,030 |
| 26 | 195 | e430 | 2,980 | 343 | 5,820 | 3,850 | 551 | 4,800 | 529 | 861 | 300 | e7,400 |
| 27 | 243 | e405 | 3,210 | e346 | 5,340 | 1,190 | 566 | 4,940 | 477 | e560 | 295 | e6,000 |
| 28 | 261 | e385 | 3,010 | e290 | 1,910 | 956 | 561 | 4,980 | 449 | e420 | 300 | e4,600 |
| 29 | 392 | e365 | 1,120 | e296 | --- | 820 | 508 | 5,190 | 425 | e390 | 317 | e2,500 |
| 30 | 1,030 | e350 | 809 | e330 | --- | 972 | 457 | 5,290 | 417 | 1,290 | e300 | e950 |
| 31 | 1,670 | --- | 691 | 340 | --- | 1,890 | --- | 5,010 | --- | 1,480 | e275 | --- |
| TOTAL | 7,554 | 40,050 | 35,265 | 17,915 | 46,276 | 70,496 | 59,358 | 68,271 | 42,547 | 29,748 | 20,249 | 91,357 |
| MEAN | 244 | 1,335 | 1,138 | 578 | 1,653 | 2,274 | 1,979 | 2,202 | 1,418 | 960 | 653 | 3,045 |
| MAX | 1,670 | 3,670 | 3,210 | 1,970 | 5,820 | 9,630 | 6,340 | 5,290 | 3,900 | 3,140 | 2,200 | 12,400 |
| MIN | 18 | 350 | 277 | 261 | 358 | 539 | 457 | 319 | 417 | 370 | 275 | 280 |
| CFSM | 0.34 | 1.84 | 1.57 | 0.80 | 2.28 | 3.13 | 2.73 | 3.03 | 1.95 | 1.32 | 0.90 | 4.19 |
| IN. | 0.39 | 2.05 | 1.81 | 0.92 | 2.37 | 3.61 | 3.04 | 3.50 | 2.18 | 1.52 | 1.04 | 4.68 |

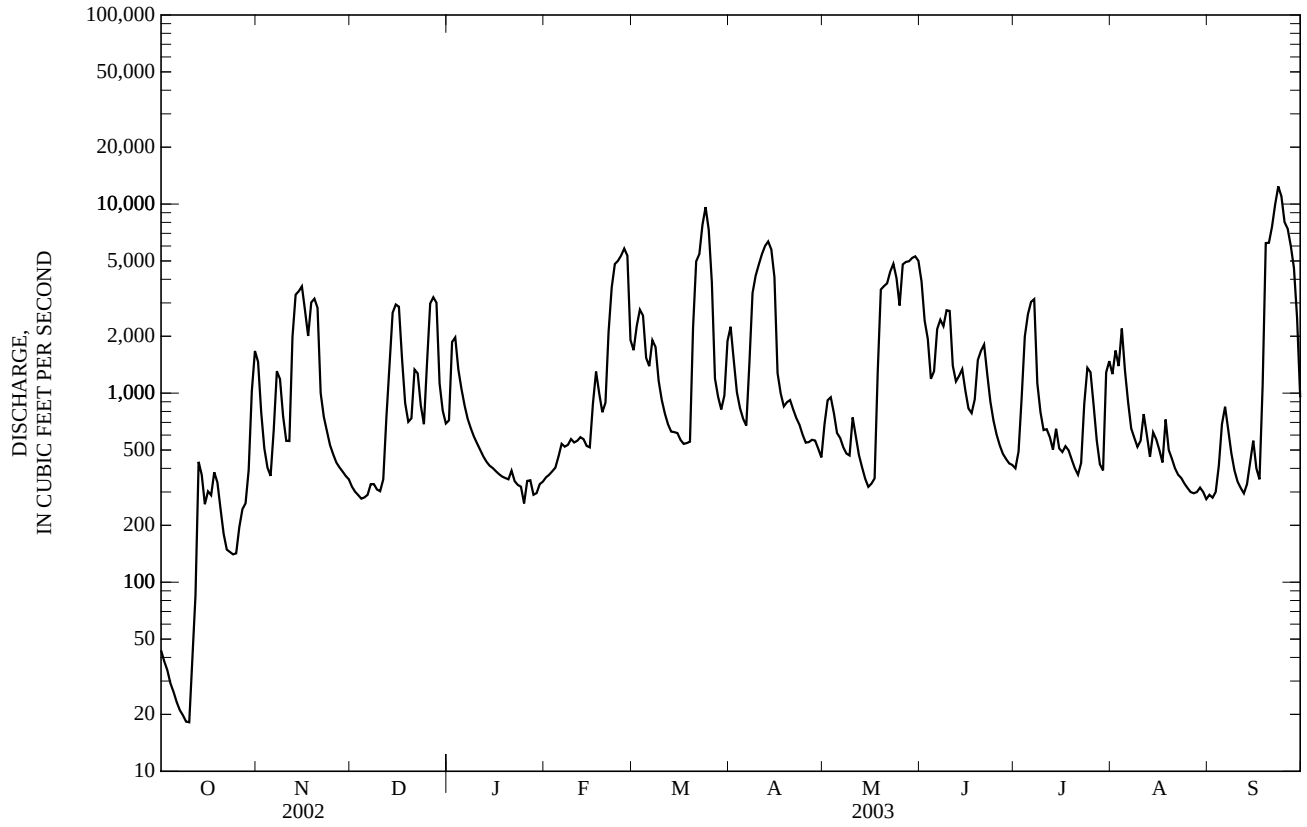
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1926 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 456 | 539 | 727 | 997 | 1,121 | 1,240 | 1,060 | 673 | 490 | 373 | 419 | 421 |
| MAX | 3,932 | 2,728 | 2,620 | 3,650 | 3,605 | 3,566 | 2,975 | 2,202 | 4,369 | 1,918 | 4,566 | 3,045 |
| (WY) | (1972) | (1986) | (1994) | (1978) | (1998) | (1993) | (1983) | (2003) | (1972) | (1938) | (1940) | (2003) |
| MIN | 32.7 | 79.1 | 123 | 207 | 200 | 309 | 246 | 208 | 50.2 | 25.7 | 15.0 | 30.0 |
| (WY) | (1931) | (2002) | (1966) | (1966) | (2002) | (1981) | (2002) | (1926) | (2002) | (2002) | (2002) | (1932) |

02040000 APPOMATTOX RIVER AT MATTOAX, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1926 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 130,707.6 | | 529,086 | | | |
| ANNUAL MEAN | 358 | | 1,450 | | 709 | |
| HIGHEST ANNUAL MEAN | | | | | 1,553 | 1972 |
| LOWEST ANNUAL MEAN | | | | | 154 | 2002 |
| HIGHEST DAILY MEAN | 3,670 | Nov 15 | 12,400 | Sep 23 | 34,300 | Aug 18, 1940 |
| LOWEST DAILY MEAN | 2.6 | Aug 25 | 18 | aOct 9 | 2.6 | Aug 25, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 4.0 | Aug 21 | 22 | Oct 4 | 4.0 | Aug 21, 2002 |
| MAXIMUM PEAK FLOW | | | 13,500 | Sep 23 | 35,000 | Aug 18, 1940 |
| MAXIMUM PEAK STAGE | | | 27.33 | Sep 23 | b35.30 | Aug 18, 1940 |
| INSTANTANEOUS LOW FLOW | | | 17 | Oct 10 | 2.4 | cAug 25, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.49 | | 2.00 | | 0.98 | |
| ANNUAL RUNOFF (INCHES) | 6.70 | | 27.11 | | 13.27 | |
| 10 PERCENT EXCEEDS | 770 | | 3,960 | | 1,590 | |
| 50 PERCENT EXCEEDS | 184 | | 680 | | 379 | |
| 90 PERCENT EXCEEDS | 20 | | 300 | | 114 | |

a Also Oct. 10, 2002.
b From floodmark in gage house.
c Also Aug. 26, 2002.
e Estimated.



## 02041000 DEEP CREEK NEAR MANNBORO, VA

LOCATION.--Lat 37°17'00", long 77°52'11", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Sep. 2, 1949, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Dec. 1, 2, May 19, May 26 to June 2, and Sept. 19-30, and period with ice effect, Jan. 17-28, which are fair. Maximum discharge, 15,000 $ft^3/s$, from rating curve extended above 3,900 $ft^3/s$. 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 23 | 2100 | 2,090 | 8.48 | May 19 | --- | Unknown | Unknown |
| Mar 21 | 1300 | 6,730 | 12.68 | May 23 | 1700 | 1,250 | 7.21 |
| Apr 8 | 1630 | 2,330 | 8.78 | May 26 | --- | 11,000 | 15.66 |
| Apr 10 | 0930 | 2,580 | 9.06 | Sep 19 | --- | *13,100 | *16.87 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.6 | 295 | e45 | 174 | 122 | 469 | 490 | 147 | e860 | 109 | 265 | 45 |
| 2 | 1.4 | 149 | e42 | 381 | 133 | 516 | 264 | 260 | e790 | 218 | 178 | 43 |
| 3 | 1.2 | 91 | 41 | 570 | 134 | 577 | 207 | 381 | 426 | 236 | 147 | 41 |
| 4 | 1.0 | 71 | 39 | 313 | 132 | 465 | 178 | 287 | 247 | 240 | 341 | 72 |
| 5 | 0.92 | 67 | 40 | 220 | 151 | 280 | 161 | 208 | 259 | 187 | 857 | 131 |
| 6 | 0.72 | 160 | 47 | 178 | 149 | 277 | 151 | 172 | 304 | 134 | 545 | 150 |
| 7 | 0.50 | 274 | 61 | 159 | 171 | 322 | 404 | 153 | 282 | 118 | 242 | 111 |
| 8 | 0.35 | 273 | 60 | 147 | 275 | 310 | 1,750 | 143 | 302 | 135 | 270 | 78 |
| 9 | 0.33 | 146 | 60 | 134 | 288 | 233 | 1,620 | 217 | 373 | 109 | 277 | 65 |
| 10 | 0.29 | 97 | 59 | 122 | 208 | 194 | 2,240 | 712 | 369 | 114 | 323 | 59 |
| 11 | 1.6 | 80 | 85 | 109 | 196 | 169 | 1,570 | 838 | 267 | 105 | 298 | 53 |
| 12 | 12 | 146 | 210 | 97 | 185 | 152 | 1,470 | 328 | 300 | 91 | 200 | 51 |
| 13 | 27 | 374 | 306 | 88 | 156 | 142 | 712 | 204 | 377 | 78 | 144 | 86 |
| 14 | 42 | 716 | 462 | 86 | 133 | 145 | 332 | 154 | 369 | 70 | 120 | 107 |
| 15 | 44 | 357 | 785 | 83 | 136 | 148 | 246 | 126 | 268 | 66 | 104 | 107 |
| 16 | 61 | 169 | 438 | 78 | 239 | 140 | 208 | 152 | 190 | 64 | 93 | 88 |
| 17 | 98 | 215 | 205 | e75 | 276 | 132 | 182 | 180 | 171 | 61 | 86 | 70 |
| 18 | 117 | 406 | 150 | e70 | 259 | 130 | 163 | 544 | 193 | 57 | 79 | 252 |
| 19 | 76 | 687 | 124 | e63 | 217 | 124 | 204 | e2,320 | 315 | 56 | 119 | e8,320 |
| 20 | 48 | 328 | 120 | e70 | 272 | 633 | 231 | 2,010 | 507 | 117 | 121 | e6,520 |
| 21 | 36 | 170 | 139 | e77 | 469 | 5,160 | 197 | 942 | 602 | 124 | 104 | e2,760 |
| 22 | 32 | 129 | 153 | e73 | 819 | 2,210 | 173 | 762 | 331 | 88 | 85 | e600 |
| 23 | 27 | 104 | 132 | e67 | 1,630 | 766 | 156 | 1,140 | 219 | 170 | 74 | e620 |
| 24 | 24 | 86 | 122 | e56 | 1,550 | 382 | 140 | 1,070 | 165 | 194 | 67 | e690 |
| 25 | 22 | 74 | 317 | e64 | 595 | 260 | 129 | 931 | 137 | 180 | 63 | e450 |
| 26 | 24 | 65 | 847 | e60 | 282 | 209 | 151 | e6,020 | 117 | 117 | 60 | e300 |
| 27 | 28 | 59 | 834 | e58 | 233 | 185 | 171 | e5,540 | 104 | 86 | 55 | e220 |
| 28 | 36 | 54 | 278 | e62 | 320 | 168 | 156 | e1,400 | 100 | 71 | 52 | e180 |
| 29 | 126 | 51 | 196 | 65 | --- | 158 | 132 | e900 | 103 | 70 | 51 | e155 |
| 30 | 256 | 49 | 163 | 77 | --- | 211 | 115 | e740 | 107 | 146 | 49 | e130 |
| 31 | 362 | --- | 142 | 95 | --- | 440 | --- | e650 | --- | 316 | 46 | --- |
| TOTAL | 1,507.91 | 5,942 | 6,702 | 3,971 | 9,730 | 15,707 | 14,303 | 29,631 | 9,154 | 3,927 | 5,515 | 22,554 |
| MEAN | 48.6 | 198 | 216 | 128 | 348 | 507 | 477 | 956 | 305 | 127 | 178 | 752 |
| MAX | 362 | 716 | 847 | 570 | 1,630 | 5,160 | 2,240 | 6,020 | 860 | 316 | 857 | 8,320 |
| MIN | 0.29 | 49 | 39 | 56 | 122 | 124 | 115 | 126 | 100 | 56 | 46 | 41 |
| CFSM | 0.31 | 1.25 | 1.37 | 0.81 | 2.20 | 3.21 | 3.02 | 6.05 | 1.93 | 0.80 | 1.13 | 4.76 |
| IN. | 0.36 | 1.40 | 1.58 | 0.93 | 2.29 | 3.70 | 3.37 | 6.98 | 2.16 | 0.92 | 1.30 | 5.31 |

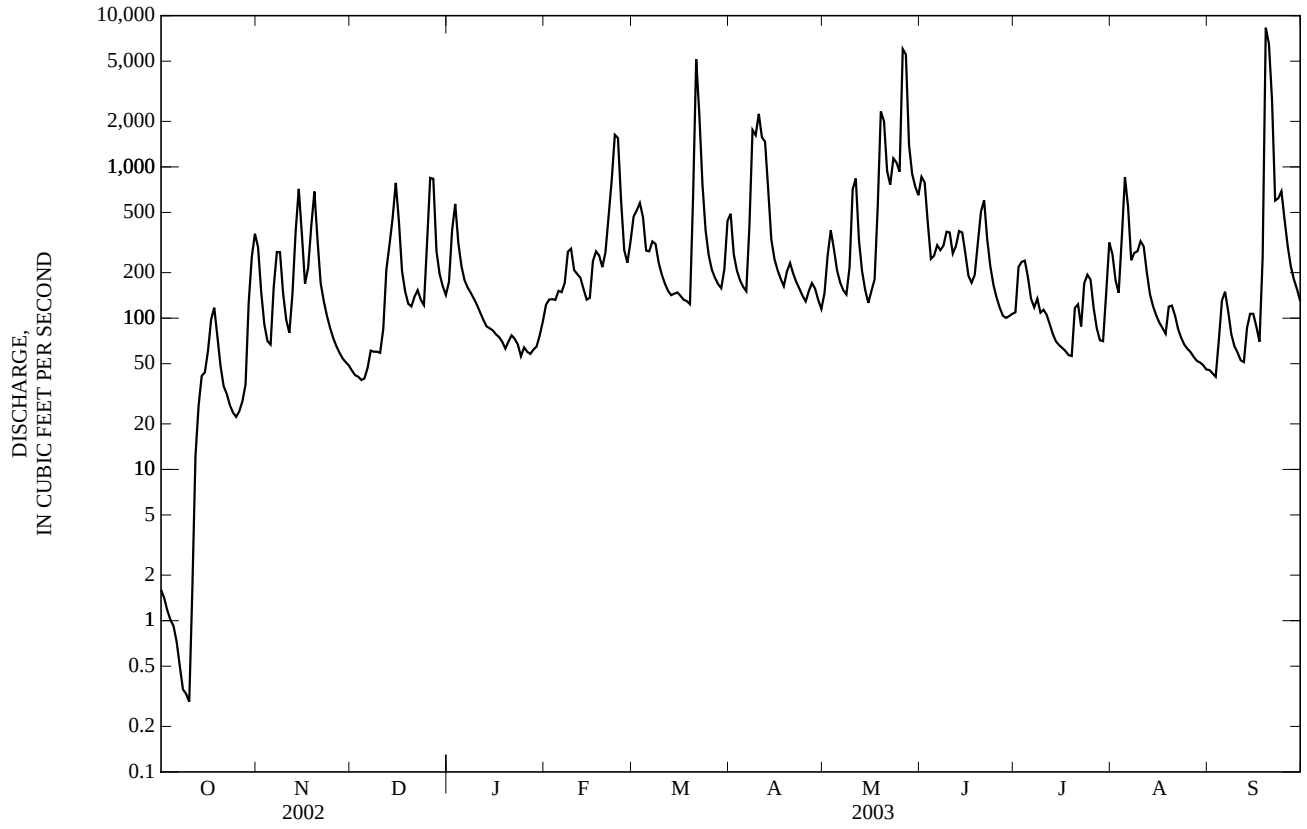
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 97.5 | 134 | 150 | 212 | 248 | 281 | 217 | 142 | 85.3 | 65.6 | 58.2 | 88.1 |
| MAX | 859 | 821 | 453 | 800 | 793 | 718 | 632 | 956 | 449 | 301 | 309 | 1,002 |
| (WY) | (1973) | (1986) | (1997) | (1978) | (1979) | (1993) | (1987) | (2003) | (1972) | (1975) | (1978) | (1979) |
| MIN | 3.55 | 14.6 | 26.4 | 48.5 | 46.5 | 74.8 | 51.2 | 36.4 | 2.71 | 0.52 | 0.52 | 2.19 |
| (WY) | (1971) | (1999) | (1966) | (1966) | (2002) | (1981) | (1985) | (1985) | (2002) | (2002) | (2002) | (1968) |

02041000 DEEP CREEK NEAR MANNBORO, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1947 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 23,677.12 | | 128,643.91 | | | |
| ANNUAL MEAN | 64.9 | | 352 | | 148 | |
| HIGHEST ANNUAL MEAN | | | | | 352 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 30.5 | 2002 |
| HIGHEST DAILY MEAN | 847 | Dec 26 | 8,320 | Sep 19 | 12,000 | Oct 6, 1972 |
| LOWEST DAILY MEAN | 0.00 | aAug 25 | 0.29 | Oct 10 | 0.00 | aAug 25, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.06 | Aug 21 | 0.59 | Oct 4 | 0.06 | Aug 21, 2002 |
| MAXIMUM PEAK FLOW | | | e13,100 | Sep 19 | 15,000 | Oct 6, 1972 |
| MAXIMUM PEAK STAGE | | | b16.87 | Sep 19 | c24.04 | Oct 6, 1972 |
| INSTANTANEOUS LOW FLOW | | | 0.28 | dOct 9 | 0.00 | (f) |
| ANNUAL RUNOFF (CFSM) | 0.41 | | 2.23 | | 0.93 | |
| ANNUAL RUNOFF (INCHES) | 5.57 | | 30.29 | | 12.70 | |
| 10 PERCENT EXCEEDS | 149 | | 699 | | 284 | |
| 50 PERCENT EXCEEDS | 34 | | 153 | | 73 | |
| 90 PERCENT EXCEEDS | 0.42 | | 50 | | 15 | |

a Also Aug. 26, 27, 2002.
b From high-water mark in gage house.
c From floodmarks.
d Also Oct. 10, 2002.
e Estimated.
f Also part or all of each day Aug. 25-28, 2002.



## 02041650 APPOMATTOX RIVER AT MATOACA, VA

LOCATION.--Lat 37°13'31", long 77°28'31", NAD83, 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 $mi^2$.

### WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1969 to current year.

GAGE.--Water-stage recorder. Datum of gage is 68.30 ft NGVD of 1929.

REMARKS.--Records good except those for periods with ice effect, Jan. 20-24, 27, 28, which are fair. Flow regulated by Appomattox Water Authority at Lake Chesdin, capacity, 36,000 acre-ft, 2.8 mi upstream from which an average of 37.0 $ft^3/s$ 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.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 36 | 2,020 | 426 | 1,540 | 913 | 6,130 | 3,900 | 1,090 | 8,790 | 644 | 2,910 | 280 |
| 2 | 36 | 2,000 | 378 | 2,010 | 933 | 4,220 | 3,520 | 1,350 | 8,270 | 1,150 | 2,350 | 250 |
| 3 | 36 | 1,370 | 439 | 3,250 | 910 | 4,450 | 2,410 | 2,120 | 6,410 | 2,230 | 2,220 | 364 |
| 4 | 36 | 886 | 300 | 3,370 | 1,000 | 4,570 | 1,840 | 2,420 | 4,240 | 2,530 | 2,480 | 1,220 |
| 5 | 35 | 444 | 339 | 2,510 | 971 | 3,950 | 1,540 | 1,910 | 2,860 | 2,840 | 3,930 | 1,600 |
| 6 | 35 | 1,120 | 486 | 1,950 | 1,090 | 2,970 | 1,320 | 1,500 | 2,900 | 3,020 | 3,860 | 1,460 |
| 7 | 36 | 1,370 | 637 | 1,680 | 1,260 | 3,120 | 1,960 | 1,270 | 3,470 | 3,290 | 3,000 | 1,270 |
| 8 | 36 | 1,880 | 524 | 1,430 | 1,440 | 3,230 | 5,890 | 1,120 | 4,330 | 3,080 | 2,080 | 930 |
| 9 | 37 | 1,820 | 531 | 1,300 | 1,600 | 2,830 | 8,620 | 1,000 | 4,370 | 1,800 | 1,900 | 392 |
| 10 | 36 | 1,340 | 497 | 1,220 | 1,590 | 2,090 | 9,710 | 1,560 | 4,370 | 1,380 | 2,790 | 454 |
| 11 | 41 | 1,020 | 724 | 917 | 1,490 | 1,670 | 10,700 | 2,700 | 3,650 | 1,130 | 2,710 | 330 |
| 12 | 41 | 946 | 1,140 | 816 | 1,450 | 1,440 | 10,500 | 2,240 | 2,650 | 860 | 1,950 | 547 |
| 13 | 36 | 2,860 | 1,710 | 753 | 1,360 | 1,260 | 9,960 | 1,500 | 2,580 | 641 | 1,550 | 1,010 |
| 14 | 31 | 4,530 | 3,450 | 703 | 1,260 | 1,140 | 9,400 | 1,030 | 2,580 | 718 | 1,210 | 1,060 |
| 15 | 31 | 4,900 | 4,480 | 712 | 1,250 | 1,130 | 8,760 | 936 | 2,420 | 745 | 992 | 817 |
| 16 | 76 | 4,790 | 4,940 | 624 | 1,500 | 1,090 | 7,470 | 873 | 1,910 | 570 | 602 | 713 |
| 17 | 77 | 3,820 | 4,210 | 740 | 2,050 | 988 | 3,240 | 870 | 1,580 | 523 | 609 | 723 |
| 18 | 75 | 4,010 | 2,490 | 536 | 2,200 | 888 | 1,870 | 1,750 | 1,540 | 472 | 782 | 1,710 |
| 19 | 76 | 4,720 | 1,650 | 496 | 2,000 | 861 | 1,710 | 7,240 | 2,000 | 469 | 912 | 15,900 |
| 20 | 76 | 4,730 | 1,410 | e540 | 2,040 | 2,630 | 1,930 | 8,380 | 3,430 | 433 | 769 | 18,500 |
| 21 | 85 | 3,730 | 1,540 | e640 | 2,720 | 9,050 | 1,830 | 8,360 | 3,850 | 537 | 564 | 18,000 |
| 22 | 100 | 1,870 | 1,870 | e570 | 5,140 | 10,700 | 1,610 | 8,150 | 3,430 | 566 | 522 | 14,200 |
| 23 | 102 | 1,490 | 1,870 | e520 | 7,310 | 11,000 | 1,400 | 8,070 | 2,350 | 1,160 | 446 | 11,900 |
| 24 | 117 | 1,280 | 1,540 | e430 | 7,930 | 10,000 | 1,210 | 8,250 | 1,730 | 1,700 | 242 | 12,500 |
| 25 | 125 | 1,080 | 1,530 | 353 | 8,110 | 9,800 | 1,090 | 8,180 | 1,330 | 1,890 | 246 | 16,000 |
| 26 | 138 | 606 | 3,500 | 485 | 7,800 | 10,200 | 1,140 | 21,200 | 1,140 | 1,740 | 554 | 15,500 |
| 27 | 131 | 676 | 4,940 | e470 | 7,470 | 8,770 | 1,150 | 18,600 | 864 | 1,280 | 370 | 12,000 |
| 28 | 149 | 490 | 4,870 | e450 | 7,630 | 3,590 | 1,120 | 15,100 | 776 | 744 | 303 | 10,000 |
| 29 | 174 | 520 | 3,850 | 507 | --- | 1,810 | 1,080 | 11,400 | 706 | 483 | 367 | 8,810 |
| 30 | 183 | 498 | 2,280 | 763 | --- | 2,070 | 734 | 9,450 | 662 | 1,180 | 260 | 6,750 |
| 31 | 311 | --- | 1,590 | 740 | --- | 3,320 | --- | 8,520 | --- | 2,920 | 319 | --- |
| TOTAL | 2,534 | 62,816 | 60,141 | 33,025 | 82,417 | 130,967 | 118,614 | 168,139 | 91,188 | 42,725 | 43,799 | 175,190 |
| MEAN | 81.7 | 2,094 | 1,940 | 1,065 | 2,943 | 4,225 | 3,954 | 5,424 | 3,040 | 1,378 | 1,413 | 5,840 |
| MAX | 311 | 4,900 | 4,940 | 3,370 | 8,110 | 11,000 | 10,700 | 21,200 | 8,790 | 3,290 | 3,930 | 18,500 |
| MIN | 31 | 444 | 300 | 353 | 910 | 861 | 734 | 870 | 662 | 433 | 242 | 250 |
| (†) | 1,141 | 932 | 1,003 | 1,038 | 992 | 1,048 | 1,141 | 1,156 | 1,127 | 1,279 | 1,335 | 1,307 |

CAL YR 2002 TOTAL 210,430 MEAN 577 MAX 4,940 MIN 18 (†) 14,402
WTR YR 2003 TOTAL 1,011,555 MEAN 2,771 MAX 21,200 MIN 31 (†) 13,497

† Total diversion, in cubic feet per second, at Lake Chesdin, provided by Appomattox Water Authority.

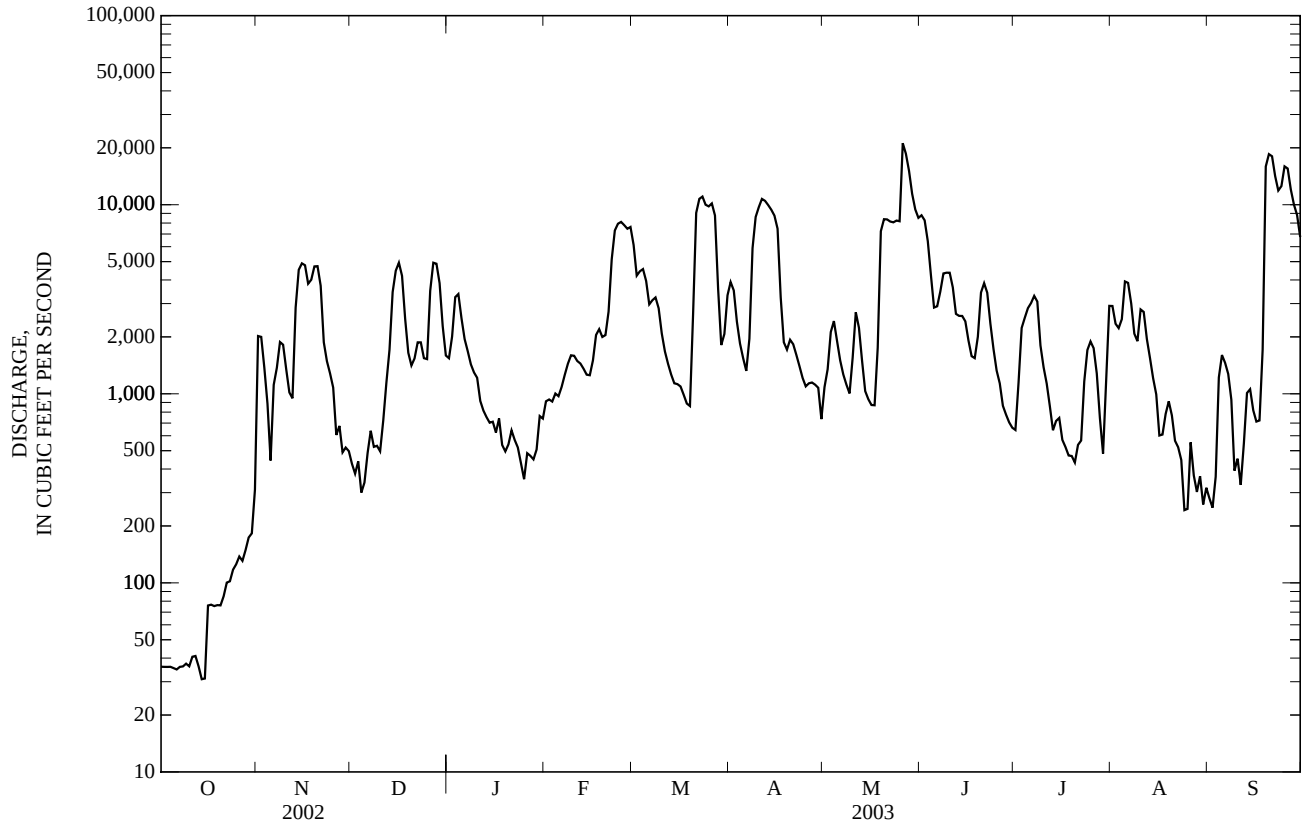
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1970 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 971 | 1,039 | 1,348 | 1,931 | 2,175 | 2,533 | 2,113 | 1,389 | 937 | 553 | 487 | 863 |
| MAX | 6,869 | 5,648 | 3,857 | 5,868 | 6,532 | 6,098 | 5,003 | 5,424 | 5,293 | 2,123 | 1,818 | 5,840 |
| (WY) | (1973) | (1986) | (1997) | (1978) | (1998) | (1993) | (1983) | (2003) | (1972) | (1995) | (1978) | (2003) |
| MIN | 52.2 | 50.4 | 157 | 384 | 347 | 478 | 498 | 411 | 91.0 | 41.0 | 26.0 | 33.1 |
| (WY) | (2002) | (2002) | (2002) | (1981) | (2002) | (1981) | (1985) | (1985) | (2002) | (2002) | (2002) | (2002) |

02041650 APPOMATTOX RIVER AT MATOACA, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1970 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 210,430 | | 1,011,555 | | | |
| ANNUAL MEAN | 577 | | 2,771 | | 1,357 | |
| HIGHEST ANNUAL MEAN | | | | | 2,771 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 255 | 2002 |
| HIGHEST DAILY MEAN | 4,940 | aDec 16 | 21,200 | May 26 | 39,400 | Oct 7, 1972 |
| LOWEST DAILY MEAN | b18 | Aug 26 | b31 | cOct 14 | b18 | Aug 26, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | b19 | Aug 20 | b36 | dOct 1 | b19 | Aug 20, 2002 |
| MAXIMUM PEAK FLOW | | | 25,900 | May 26 | 40,800 | Oct 7, 1972 |
| MAXIMUM PEAK STAGE | | | 14.61 | May 26 | 18.39 | Oct 7, 1972 |
| INSTANTANEOUS LOW FLOW | | | b29 | Oct 14 | b17 | fAug 26, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.43 | | 2.06 | | 1.01 | |
| ANNUAL RUNOFF (INCHES) | 5.82 | | 28.00 | | 13.72 | |
| 10 PERCENT EXCEEDS | 1,520 | | 8,210 | | 3,330 | |
| 50 PERCENT EXCEEDS | 254 | | 1,490 | | 662 | |
| 90 PERCENT EXCEEDS | 29 | | 302 | | 135 | |

a Also Dec. 27, 2002.
b Result of regulation.
c Also Oct. 15, 2002.
d Also Oct. 2-4, 2002.
e Estimated.
f Also Aug. 27, 2002.



02041650 APPOMATTOX RIVER AT MATOACA, VA—Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years l978 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1991 to September 1993.
WATER TEMPERATURE: October 1991 to September 1993.

REMARKS.--Missing gage height values indicate periods that were affected by ice; for these samples only the mean daily discharge is reported.

COOPERATION.--Water samples were collected by the U.S. Geological Survey and analyzed by either the U.S. Geological Survey (Agency Code 80020) or by the Virginia Division of Consolidated Laboratory Services (VDCLS, Agency Code 85116), using analytical methods approved by the U.S. Geological Survey. Analyses performed by VDCLS are reported to U.S. Geological Survey rounding specifications. Results of chemical analyses provided by VDCLS were quality-assured and approved by the U.S. Geological Survey.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Time | Sample type | Agency analyzing sample, code (00028) | Gage height, feet (00065) | Instantaneous discharge, cfs (00061) | Turbidity, NTU (00076) | Barometric pressure, mm Hg (00025) | Dissolved oxygen, mg/L (00300) | Dissolved oxygen, percent of saturation (00301) | pH, water, unfltrd field, std units (00400) | Specif. conductance, wat unf uS/cm 25 degC (00095) | Temperature, air, deg C (00020) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | |
| 08... | 1220 | Environmental | 85116 | 1.29 | 36 | 1.2 | 762 | 12.2 | 139 | 8.5 | 135 | 18.5 |
| 21... | 1100 | Environmental | 85116 | 1.66 | 85 | 1.2 | 758 | 8.9 | 91 | 7.7 | 128 | 15.0 |
| NOV | | | | | | | | | | | | |
| 01... | 0945 | Environmental | 85116 | 4.64 | 2,000 | 20 | 760 | 9.4 | 94 | 6.8 | 118 | 8.0 |
| 05... | 1515 | Environmental | 85116 | 2.68 | 425 | 8.6 | 758 | 10.4 | 98 | 6.1 | 114 | 9.5 |
| 06... | 1140 | Blank | 85116 | -- | -- | 0.30 | -- | -- | -- | -- | -- | -- |
| 06... | 1145 | Environmental | 85116 | 3.73 | 1,180 | 12 | 743 | 11.0 | 104 | 7.2 | 112 | 11.5 |
| 13... | 1415 | Environmental | 85116 | 5.79 | 3,310 | 22 | 759 | 11.5 | 108 | 7.0 | 102 | 15.5 |
| 14... | 1445 | Environmental | 85116 | 6.69 | 4,670 | 14 | 760 | 12.4 | 115 | 7.1 | 95 | 15.5 |
| 20... | 1245 | Environmental | 85116 | 6.72 | 4,720 | 16 | 763 | 11.1 | 101 | 6.5 | 78 | 15.0 |
| 20... | 1300 | Replicate | 85116 | 6.71 | 4,710 | 24 | -- | -- | -- | -- | -- | -- |
| DEC | | | | | | | | | | | | |
| 02... | 1145 | Environmental | 85116 | 2.61 | 393 | 15 | 759 | 11.9 | 100 | 7.1 | 77 | 7.0 |
| 16... | 1300 | Environmental | 85116 | 6.90 | 5,030 | 23 | 753 | 13.9 | 107 | 6.8 | 89 | 12.0 |
| 30... | 1315 | Environmental | 85116 | 4.75 | 2,120 | 30 | 763 | 13.4 | 104 | 6.7 | 67 | 14.0 |
| JAN | | | | | | | | | | | | |
| 09... | 1115 | Environmental | 85116 | 3.81 | 1,300 | 29 | 740 | 10.2 | 86 | 6.5 | 71 | 18.0 |
| 21... | 1100 | Environmental | 85116 | -- | 640 | 15 | 760 | 13.3 | 101 | 6.7 | 73 | -1.0 |
| FEB | | | | | | | | | | | | |
| 04... | 1230 | Environmental | 85116 | 3.41 | 986 | 9.4 | 746 | 13.2 | 105 | 7.7 | 82 | 16.0 |
| 04... | 1245 | Replicate | 85116 | 3.49 | 1,040 | 7.6 | -- | -- | -- | -- | -- | -- |
| 19... | 1315 | Environmental | 85116 | 4.62 | 2,000 | 7.3 | 765 | 13.8 | 104 | 7.5 | 84 | 11.0 |
| 19... | 1320 | Replicate | 80020 | 4.61 | 1,990 | -- | -- | -- | -- | -- | -- | -- |
| 24... | 1030 | Environmental | 85116 | 8.71 | 8,110 | 40 | 759 | 13.9 | 108 | 7.0 | 80 | 11.5 |
| MAR | | | | | | | | | | | | |
| 04... | 1245 | Environmental | 85116 | 6.66 | 4,550 | 29 | 758 | 13.2 | 104 | 6.9 | 67 | 14.0 |
| 12... | 1330 | Environmental | 85116 | 4.10 | 1,430 | 14 | 755 | 11.9 | 107 | 7.4 | 72 | 24.0 |
| 21... | 1515 | Environmental | 85116 | 9.48 | 9,980 | 18 | 751 | 11.5 | 105 | 6.7 | 76 | 18.5 |
| 24... | 1330 | Environmental | 85116 | 9.45 | 9,940 | 21 | 754 | 11.1 | 101 | 6.6 | 50 | 23.0 |
| APR | | | | | | | | | | | | |
| 10... | 1340 | Blank | 85116 | -- | -- | 0.30 | -- | -- | -- | -- | -- | -- |
| 10... | 1345 | Environmental | 85116 | 9.36 | 9,750 | 34 | 749 | 11.2 | 101 | 6.9 | 58 | 9.0 |
| 24... | 1315 | Environmental | 85116 | 3.90 | 1,200 | 16 | 754 | 10.4 | 108 | 7.6 | 64 | 24.0 |
| MAY | | | | | | | | | | | | |
| 27... | 1015 | Environmental | 85116 | 12.54 | 18,300 | 46 | 755 | 9.7 | 103 | 6.4 | 38 | 18.0 |
| 29... | 1245 | Environmental | 85116 | 10.14 | 11,300 | 38 | 745 | 9.3 | 100 | 6.5 | 45 | 22.0 |
| 29... | 1300 | Replicate | 85116 | 10.11 | 11,200 | 37 | -- | -- | -- | -- | -- | -- |
| JUN | | | | | | | | | | | | |
| 19... | 1400 | Environmental | 85116 | 4.85 | 2,060 | 7.8 | 749 | 8.3 | 100 | 7.2 | 75 | 26.0 |
| JUL | | | | | | | | | | | | |
| 15... | 1345 | Environmental | 85116 | 3.31 | 741 | 6.1 | 757 | 8.2 | 105 | 7.5 | 75 | 29.0 |
| AUG | | | | | | | | | | | | |
| 26... | 1300 | Environmental | 85116 | 2.16 | 208 | 4.5 | 759 | 8.9 | 116 | 7.9 | 72 | 31.0 |
| SEP | | | | | | | | | | | | |
| 19... | 1600 | Environmental | 85116 | 12.04 | 16,700 | 24 | 747 | 9.1 | 107 | 7.2 | 75 | 29.5 |
| 25... | 1100 | Environmental | 85116 | 11.88 | 16,100 | 28 | 753 | 8.7 | 101 | 6.6 | 52 | 29.5 |

02041650 APPOMATTOX RIVER AT MATOACA, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Temperature, water, deg C (00010) | Silica, water, fltrd, mg/L (00955) | Residue fixed non-filterable, mg/L (00540) | Residue total at 105 deg. C, suspended, mg/L (00530) | Residue volatile, suspended, mg/L (00535) | Ammonia + org-N, water, fltrd, mg/L as N (00623) | Ammonia + org-N, water, unfltrd mg/L as N (00625) | Ammonia water, fltrd, mg/L as N (00608) | Nitrate water, fltrd, mg/L as N (00618) | Nitrite + nitrate water fltrd, mg/L as N (00631) | Nitrite water, fltrd, mg/L as N (00613) | Orthophosphate, water, fltrd, mg/L as P (00671) | Phosphorus, water, fltrd, mg/L (00666) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | | | |
| 08... | 21.7 | 16.2 | 3 | 3 | 3 | -- | -- | 0.004 | 0.67 | 0.672 | 0.004 | 0.014 | 0.014 |
| 21... | 16.2 | 14.8 | 3 | 3 | 3 | -- | -- | 0.015 | 0.36 | 0.364 | 0.008 | 0.014 | 0.018 |
| NOV | | | | | | | | | | | | | |
| 01... | 15.1 | 16.4 | 23 | 30 | 7 | -- | -- | 0.238 | -- | -- | -- | 0.014 | 0.026 |
| 05... | 12.2 | -- | 3 | 4 | <3 | -- | -- | 0.069 | 0.29 | 0.294 | 0.007 | 0.014 | 0.028 |
| 06... | -- | <0.100 | <3 | <3 | <3 | -- | -- | <0.004 | <0.004 | <0.004 | <0.002 | 0.002 | 0.001 |
| 06... | 11.8 | -- | 7 | 9 | <3 | -- | -- | 0.068 | 0.30 | 0.306 | 0.006 | 0.015 | 0.027 |
| 13... | 12.2 | 17.2 | 20 | 26 | 6 | -- | -- | 0.038 | 0.27 | 0.274 | 0.003 | 0.010 | 0.025 |
| 14... | 11.8 | 17.5 | 11 | 14 | 3 | -- | -- | 0.033 | 0.26 | 0.257 | <0.002 | 0.011 | 0.024 |
| 20... | 10.8 | 15.0 | 7 | 9 | <3 | -- | -- | 0.032 | 0.14 | 0.138 | <0.002 | 0.013 | 0.032 |
| 20... | -- | 14.9 | 7 | 10 | 3 | -- | -- | 0.054 | 0.14 | 0.140 | <0.002 | 0.014 | 0.032 |
| DEC | | | | | | | | | | | | | |
| 02... | 7.6 | 15.0 | 3 | 4 | <3 | -- | -- | 0.040 | 0.17 | 0.169 | <0.002 | 0.011 | 0.040 |
| 16... | 4.0 | 16.8 | 5 | 7 | <3 | -- | -- | 0.019 | 0.26 | 0.257 | <0.002 | 0.011 | 0.027 |
| 30... | 4.9 | 13.3 | 13 | 16 | 3 | -- | -- | 0.013 | 0.20 | 0.196 | <0.002 | 0.011 | 0.030 |
| JAN | | | | | | | | | | | | | |
| 09... | 6.7 | 13.9 | 9 | 11 | <3 | -- | -- | 0.020 | 0.16 | 0.161 | 0.002 | 0.011 | 0.024 |
| 21... | 3.6 | 13.4 | 3 | 4 | <3 | -- | -- | 0.015 | 0.20 | 0.196 | <0.002 | 0.007 | 0.024 |
| FEB | | | | | | | | | | | | | |
| 04... | 4.7 | 14.2 | 5 | 6 | <3 | -- | -- | 0.006 | 0.20 | 0.201 | <0.002 | 0.006 | 0.016 |
| 04... | -- | 14.4 | 3 | 4 | <3 | -- | -- | 0.006 | 0.20 | 0.200 | <0.002 | 0.005 | 0.012 |
| 19... | 3.5 | 14.0 | 5 | 6 | <3 | -- | -- | <0.004 | 0.20 | 0.198 | <0.002 | 0.006 | 0.014 |
| 19... | -- | 13.9 | -- | <10 | <10 | 0.23 | 0.34 | <0.015 | -- | 0.184 | -- | <0.007 | E.02 |
| 24... | 4.4 | 12.0 | 14 | 17 | 3 | -- | -- | 0.034 | 0.26 | 0.265 | 0.002 | 0.012 | 0.024 |
| MAR | | | | | | | | | | | | | |
| 04... | 5.1 | 10.5 | 9 | 12 | 3 | -- | -- | 0.022 | 0.23 | 0.229 | 0.002 | 0.008 | 0.024 |
| 12... | 9.9 | 11.4 | 6 | 7 | <3 | -- | -- | 0.007 | 0.17 | 0.174 | <0.002 | 0.007 | 0.022 |
| 21... | 10.8 | 11.6 | 12 | 15 | 3 | -- | -- | 0.017 | 0.12 | 0.124 | <0.002 | 0.009 | 0.023 |
| 24... | 10.6 | 7.60 | 22 | 26 | 4 | -- | -- | 0.036 | 0.20 | 0.206 | 0.002 | 0.014 | 0.042 |
| APR | | | | | | | | | | | | | |
| 10... | -- | <0.100 | <3 | <3 | <3 | -- | -- | <0.004 | <0.004 | <0.004 | <0.002 | 0.004 | 0.003 |
| 10... | 10.2 | 8.90 | 18 | 22 | 4 | -- | -- | 0.034 | 0.15 | 0.146 | <0.002 | 0.018 | 0.034 |
| 24... | 17.0 | 9.60 | 5 | 8 | 3 | -- | -- | 0.009 | 0.03 | 0.034 | <0.002 | 0.006 | 0.016 |
| MAY | | | | | | | | | | | | | |
| 27... | 17.8 | 6.60 | 33 | 39 | 6 | -- | -- | 0.028 | 0.07 | 0.072 | <0.002 | 0.010 | 0.026 |
| 29... | 18.0 | 7.60 | 18 | 22 | 4 | -- | -- | 0.042 | 0.09 | 0.094 | 0.002 | 0.016 | 0.037 |
| 29... | -- | 7.70 | 14 | 17 | 3 | -- | -- | 0.047 | 0.09 | 0.094 | <0.002 | 0.016 | 0.039 |
| JUN | | | | | | | | | | | | | |
| 19... | 23.9 | 14.8 | 5 | 8 | 3 | -- | -- | 0.066 | 0.13 | 0.132 | 0.004 | 0.021 | 0.036 |
| JUL | | | | | | | | | | | | | |
| 15... | 27.8 | 15.0 | <3 | 3 | <3 | -- | -- | 0.051 | 0.13 | 0.140 | 0.006 | 0.015 | 0.034 |
| AUG | | | | | | | | | | | | | |
| 26... | 29.0 | 18.1 | <3 | <3 | <3 | -- | -- | 0.019 | 0.26 | 0.267 | 0.004 | 0.020 | 0.037 |
| SEP | | | | | | | | | | | | | |
| 19... | 22.2 | 15.7 | 14 | 18 | 4 | -- | -- | 0.039 | 0.12 | 0.119 | <0.002 | 0.010 | 0.033 |
| 25... | 21.7 | 8.90 | 9 | 12 | 3 | -- | -- | 0.036 | 0.05 | 0.052 | <0.002 | 0.013 | 0.045 |

02041650 APPOMATTOX RIVER AT MATOACA, VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Phosphorus, water, unfltrd mg/L (00665) | Total nitrogen, water, fltrd, mg/L (00602) | Phosphorus, suspnd sedimnt total, mg/L (00667) | Total nitrogen, suspnd sedimnt total, mg/L (00601) | Total carbon, suspnd sedimnt total, mg/L (00694) | Inorganic carbon, suspnd sedimnt total, mg/L (00688) | Organic carbon, water, fltrd, mg/L (00681) | Pheophytin a, phytoplankton, ug/L (62360) | Chlorophyll a phytoplankton, fluoro, ug/L (70953) | Suspnd. sediment, sieve diametr percent <.063mm (70331) | Suspended sediment concentration mg/L (80154) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | | | | | | | | | | | |
| 08... | -- | 0.91 | 0.004 | 0.04 | 0.3 | -- | -- | -- | -- | -- | 1 |
| 21... | -- | 0.66 | 0.004 | 0.03 | 0.2 | -- | -- | -- | -- | -- | 1 |
| NOV | | | | | | | | | | | |
| 01... | -- | 0.70 | 0.057 | 0.23 | 1.8 | -- | -- | -- | -- | 75 | 34 |
| 05... | -- | 0.71 | 0.008 | 0.07 | 0.5 | -- | -- | -- | -- | -- | 5 |
| 06... | -- | <0.004 | 0.001 | 0.01 | M | -- | -- | -- | -- | -- | -- |
| 06... | -- | 0.71 | 0.018 | 0.09 | 0.7 | -- | -- | -- | -- | 88 | 8 |
| 13... | -- | 0.67 | 0.051 | 0.23 | 1.9 | -- | -- | -- | -- | 65 | 31 |
| 14... | -- | 0.64 | 0.030 | 0.13 | 1.0 | -- | -- | -- | -- | 62 | 17 |
| 20... | -- | 0.64 | -- | 0.10 | 0.8 | -- | -- | -- | -- | -- | -- |
| 20... | -- | 0.62 | -- | 0.10 | 0.9 | -- | -- | -- | -- | 80 | 14 |
| DEC | | | | | | | | | | | |
| 02... | -- | 0.62 | 0.015 | 0.03 | 0.4 | -- | -- | -- | -- | -- | 7 |
| 16... | -- | 0.55 | 0.021 | 0.07 | 0.8 | -- | -- | -- | -- | 67 | 12 |
| 30... | -- | 0.57 | 0.035 | 0.11 | 1.1 | -- | -- | -- | -- | 96 | 15 |
| JAN | | | | | | | | | | | |
| 09... | -- | 0.51 | 0.030 | 0.11 | 1.0 | -- | -- | -- | -- | -- | 12 |
| 21... | -- | 0.50 | 0.020 | 0.09 | 0.7 | -- | -- | -- | -- | -- | 10 |
| FEB | | | | | | | | | | | |
| 04... | -- | 0.44 | 0.016 | 0.09 | 0.6 | -- | -- | -- | -- | -- | 3 |
| 04... | -- | 0.41 | 0.015 | 0.10 | 0.6 | -- | -- | -- | -- | -- | 4 |
| 19... | -- | 0.44 | 0.020 | 0.09 | 0.6 | -- | -- | -- | -- | 60 | 10 |
| 19... | 0.06 | 0.41 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 24... | -- | 0.55 | 0.046 | 0.15 | 1.2 | -- | -- | -- | -- | 67 | 39 |
| MAR | | | | | | | | | | | |
| 04... | -- | 0.54 | 0.030 | 0.15 | 1.1 | -- | -- | -- | -- | 87 | 13 |
| 12... | -- | 0.41 | 0.023 | 0.10 | 0.7 | -- | -- | -- | -- | -- | 11 |
| 21... | -- | 0.34 | 0.025 | 0.12 | 1.0 | -- | -- | -- | -- | 47 | 32 |
| 24... | -- | 0.65 | 0.048 | 0.30 | 2.3 | -- | -- | -- | -- | 89 | 39 |
| APR | | | | | | | | | | | |
| 10... | -- | 0.01 | 0.001 | 0.01 | 0.5 | -- | -- | -- | -- | 80 | 1 |
| 10... | -- | 0.56 | 0.048 | 0.18 | 2.1 | -- | -- | -- | -- | 85 | 27 |
| 24... | -- | 0.32 | 0.023 | 0.15 | 1.0 | -- | -- | <0.5 | 5.1 | -- | 6 |
| MAY | | | | | | | | | | | |
| 27... | -- | 0.53 | 0.056 | 0.25 | 2.3 | -- | -- | 2.0 | 0.7 | 84 | 55 |
| 29... | -- | 0.60 | 0.046 | 0.18 | 1.6 | -- | -- | 1.8 | 0.7 | 84 | 33 |
| 29... | -- | 0.61 | 0.041 | 0.17 | 1.6 | -- | -- | 0.7 | 1.4 | 84 | 31 |
| JUN | | | | | | | | | | | |
| 19... | -- | 0.58 | 0.019 | 0.09 | 0.9 | -- | -- | 5.9 | 2.3 | -- | 8 |
| JUL | | | | | | | | | | | |
| 15... | -- | 0.58 | 0.007 | 0.05 | 0.3 | <0.02 | 6.9 | 2.7 | <0.5 | -- | 5 |
| AUG | | | | | | | | | | | |
| 26... | -- | 0.68 | 0.005 | 0.02 | 0.3 | <0.02 | 7.7 | <0.5 | <0.5 | -- | 2 |
| SEP | | | | | | | | | | | |
| 19... | -- | 0.48 | 0.039 | 0.21 | 1.5 | M | 6.2 | 6.1 | 6.0 | 71 | 33 |
| 25... | -- | 0.59 | 0.033 | 0.16 | 1.3 | 0.1 | 9.8 | <0.5 | 1.2 | 80 | 22 |

Remark codes used in this table:
< -- Less than
E -- Estimated value
M -- Presence verified, not quantified

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## 02042500 CHICKAHOMINY RIVER NEAR PROVIDENCE FORGE, VA

LOCATION.--Lat 37°26'11", long 77°03'39", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--No estimated daily discharges. Records good. Maximum discharge, 7,710 $ft^3/s$, from rating curve extended above 5,520 $ft^3/s$. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

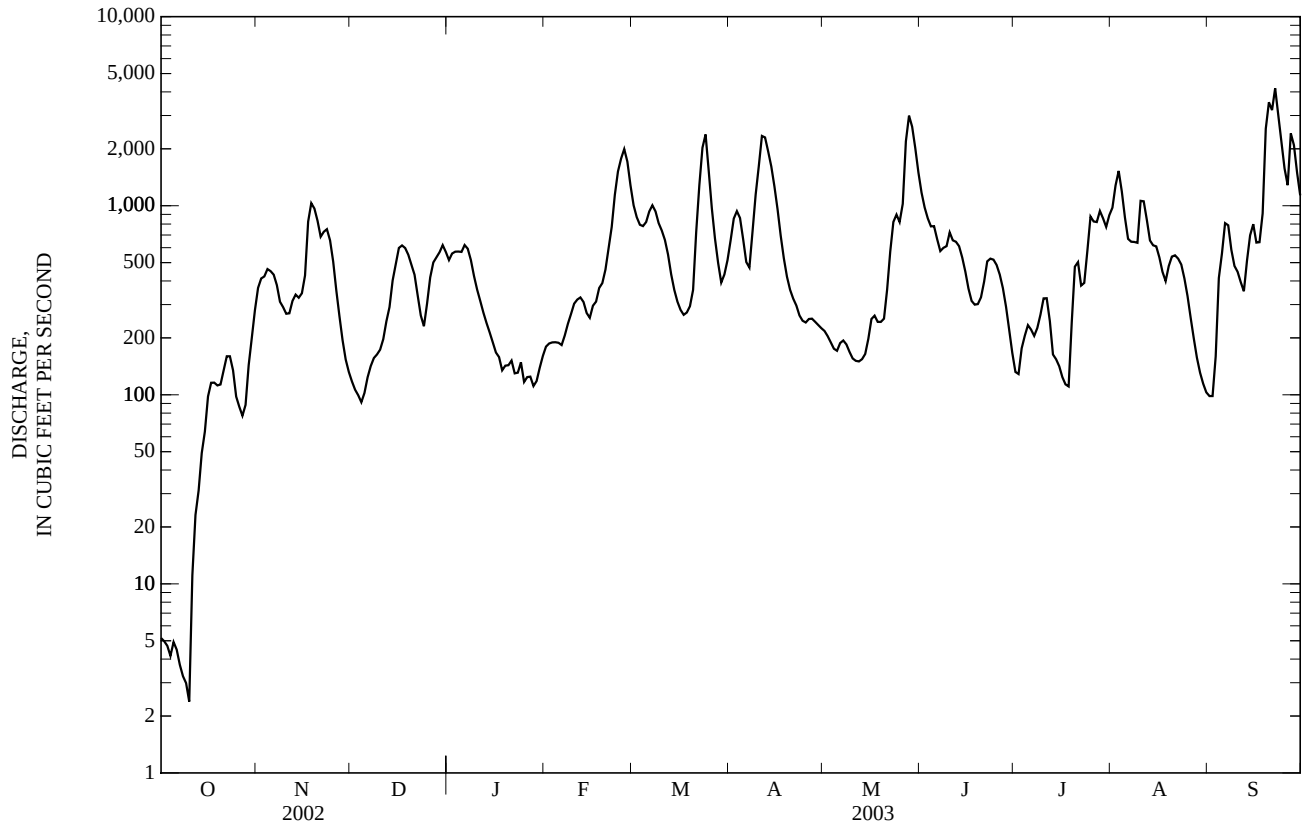
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.2 | 368 | 118 | 516 | 180 | 1,000 | 656 | 217 | 1,170 | 132 | 977 | 99 |
| 2 | 5.0 | 412 | 106 | 559 | 187 | 870 | 855 | 204 | 979 | 129 | 1,280 | 98 |
| 3 | 4.7 | 423 | 99 | 571 | 189 | 793 | 936 | 189 | 857 | 176 | 1,530 | 160 |
| 4 | 4.2 | 462 | 91 | 572 | 190 | 780 | 861 | 175 | 778 | 205 | 1,190 | 415 |
| 5 | 4.9 | 451 | 102 | 570 | 188 | 820 | 664 | 171 | 780 | 234 | 866 | 560 |
| 6 | 4.5 | 432 | 124 | 620 | 183 | 933 | 504 | 188 | 665 | 221 | 668 | 809 |
| 7 | 3.7 | 380 | 142 | 592 | 206 | 1,010 | 471 | 194 | 576 | 205 | 645 | 788 |
| 8 | 3.2 | 311 | 157 | 516 | 237 | 933 | 732 | 185 | 599 | 226 | 643 | 585 |
| 9 | 3.0 | 291 | 163 | 425 | 268 | 809 | 1,150 | 168 | 611 | 265 | 637 | 480 |
| 10 | 2.4 | 268 | 173 | 360 | 303 | 740 | 1,620 | 156 | 723 | 323 | 1,060 | 447 |
| 11 | 11 | 270 | 197 | 313 | 319 | 659 | 2,340 | 151 | 656 | 324 | 1,060 | 394 |
| 12 | 23 | 314 | 245 | 272 | 327 | 551 | 2,300 | 150 | 645 | 245 | 840 | 353 |
| 13 | 31 | 339 | 291 | 240 | 310 | 434 | 1,940 | 154 | 611 | 163 | 655 | 512 |
| 14 | 49 | 326 | 403 | 214 | 271 | 359 | 1,610 | 164 | 532 | 154 | 618 | 698 |
| 15 | 64 | 344 | 491 | 189 | 255 | 311 | 1,260 | 198 | 448 | 142 | 609 | 799 |
| 16 | 98 | 428 | 598 | 167 | 296 | 281 | 958 | 252 | 365 | 124 | 533 | 638 |
| 17 | 116 | 824 | 617 | 158 | 311 | 265 | 694 | 262 | 314 | 114 | 447 | 642 |
| 18 | 116 | 1,030 | 597 | 135 | 367 | 272 | 528 | 243 | 300 | 111 | 399 | 911 |
| 19 | 112 | 966 | 550 | 143 | 390 | 294 | 421 | 243 | 302 | 241 | 480 | 2,550 |
| 20 | 113 | 833 | 487 | 143 | 459 | 359 | 359 | 253 | 328 | 476 | 538 | 3,530 |
| 21 | 135 | 686 | 432 | 152 | 595 | 727 | 323 | 359 | 397 | 503 | 547 | 3,200 |
| 22 | 160 | 728 | 335 | 130 | 773 | 1,280 | 297 | 571 | 508 | 378 | 525 | 4,180 |
| 23 | 160 | 751 | 262 | 131 | 1,140 | 2,030 | 263 | 821 | 525 | 391 | 488 | 3,010 |
| 24 | 135 | 656 | 230 | 148 | 1,520 | 2,380 | 246 | 898 | 518 | 579 | 412 | 2,180 |
| 25 | 98 | 507 | 304 | 117 | 1,780 | 1,530 | 241 | 820 | 486 | 877 | 333 | 1,570 |
| 26 | 86 | 357 | 418 | 124 | 1,990 | 967 | 252 | 1,020 | 432 | 826 | 256 | 1,280 |
| 27 | 78 | 260 | 501 | 125 | 1,710 | 671 | 253 | 2,190 | 367 | 820 | 199 | 2,410 |
| 28 | 88 | 194 | 534 | 111 | 1,280 | 499 | 243 | 3,000 | 292 | 939 | 157 | 2,090 |
| 29 | 143 | 154 | 568 | 118 | --- | 392 | 234 | 2,620 | 221 | 858 | 131 | 1,500 |
| 30 | 201 | 132 | 619 | 139 | --- | 433 | 225 | 2,020 | 167 | 773 | 114 | 1,140 |
| 31 | 281 | --- | 569 | 160 | --- | 515 | --- | 1,500 | --- | 890 | 103 | --- |
| TOTAL | 2,338.8 | 13,897 | 10,523 | 8,730 | 16,224 | 23,897 | 23,436 | 19,736 | 16,152 | 12,044 | 18,940 | 38,028 |
| MEAN | 75.4 | 463 | 339 | 282 | 579 | 771 | 781 | 637 | 538 | 389 | 611 | 1,268 |
| MAX | 281 | 1,030 | 619 | 620 | 1,990 | 2,380 | 2,340 | 3,000 | 1,170 | 939 | 1,530 | 4,180 |
| MIN | 2.4 | 132 | 91 | 111 | 180 | 265 | 225 | 150 | 167 | 111 | 103 | 98 |
| CFSM | 0.30 | 1.84 | 1.35 | 1.12 | 2.30 | 3.06 | 3.10 | 2.53 | 2.14 | 1.54 | 2.42 | 5.03 |
| IN. | 0.35 | 2.05 | 1.55 | 1.29 | 2.39 | 3.53 | 3.46 | 2.91 | 2.38 | 1.78 | 2.80 | 5.61 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 141 | 204 | 279 | 370 | 420 | 474 | 387 | 240 | 169 | 147 | 165 | 143 |
| MAX | 794 | 768 | 1,043 | 1,214 | 1,198 | 1,055 | 1,152 | 676 | 757 | 1,081 | 1,445 | 1,268 |
| (WY) | (1980) | (1986) | (1958) | (1978) | (1998) | (1998) | (1984) | (1978) | (1972) | (1945) | (1955) | (2003) |
| MIN | 2.99 | 4.67 | 28.0 | 58.7 | 86.9 | 108 | 102 | 34.9 | 5.85 | 0.56 | 2.92 | 0.17 |
| (WY) | (2002) | (2002) | (1966) | (1955) | (2002) | (1981) | (1995) | (1985) | (2002) | (2002) | (2002) | (1997) |

02042500 CHICKAHOMINY RIVER NEAR PROVIDENCE FORGE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1942 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 49,463.16 | | 203,945.8 | | | |
| ANNUAL MEAN | 136 | | 559 | | 263 | |
| HIGHEST ANNUAL MEAN | | | | | 559 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 67.6 | 2002 |
| HIGHEST DAILY MEAN | 1,030 | Nov 18 | 4,180 | Sep 22 | 6,680 | Aug 15, 1955 |
| LOWEST DAILY MEAN | 0.05 | Jul 22 | 2.4 | Oct 10 | 0.05 | Jul 22, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.07 | Jul 17 | 3.7 | Oct 4 | 0.07 | Jul 17, 2002 |
| MAXIMUM PEAK FLOW | | | 4,510 | Sep 22 | 7,710 | Aug 15, 1955 |
| MAXIMUM PEAK STAGE | | | 10.62 | Sep 22 | 11.67 | Aug 15, 1955 |
| INSTANTANEOUS LOW FLOW | | | 1.3 | Oct 10 | 0.04 | Jul 22, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.54 | | 2.22 | | 1.04 | |
| ANNUAL RUNOFF (INCHES) | 7.30 | | 30.11 | | 14.17 | |
| 10 PERCENT EXCEEDS | 345 | | 1,140 | | 603 | |
| 50 PERCENT EXCEEDS | 82 | | 390 | | 167 | |
| 90 PERCENT EXCEEDS | 0.22 | | 118 | | 20 | |



## 0204278995 BAPTIST RUN AT ROUTE 637 NEAR YORKTOWN, VA

LOCATION.--Lat 37°12'48," long 76°31'45", NAD83, York County, Hydrologic unit 02080107, on left bank at downstream side of culvert on State Highway 637, 1.9 mi southwest of Yorktown, and 0.7 mi upstream from Beaverdam Creek.

DRAINAGE AREA.--2.02 $mi^2$.

PERIOD OF RECORD.--November 2002 to September 2003.

GAGE.--Water stage recorder. Elevation of gage is 55 ft NGVD of 1929, from topographic map.

REMARKS.--Records good.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | --- | --- | 0.74 | 1.9 | 2.5 | 4.4 | 3.1 | 4.1 | 5.0 | 1.2 | 2.3 | 3.5 |
| 2 | --- | --- | 0.71 | 1.6 | 1.9 | 6.1 | 2.9 | 4.0 | 2.7 | 1.3 | 4.0 | 2.4 |
| 3 | --- | --- | 0.69 | 1.3 | 1.5 | 4.7 | 2.6 | 4.4 | e2.4 | 1.4 | 4.2 | 3.8 |
| 4 | --- | --- | 0.66 | 1.2 | 1.5 | 3.9 | 2.5 | 4.1 | e2.2 | 1.2 | 3.0 | 7.5 |
| 5 | --- | --- | 5.4 | 1.0 | 1.3 | 9.1 | 2.4 | 4.0 | e2.0 | 1.1 | 3.1 | 4.7 |
| 6 | --- | --- | 2.8 | 1.1 | 1.1 | 7.7 | 2.3 | 4.0 | 1.8 | 1.0 | 12 | 2.9 |
| 7 | --- | --- | 1.9 | 1.6 | 4.1 | 5.2 | 9.9 | 3.8 | 6.8 | 0.99 | 14 | 2.5 |
| 8 | --- | --- | 1.6 | 1.3 | 2.3 | 4.2 | 7.5 | 3.6 | 7.3 | 0.97 | 30 | 2.2 |
| 9 | --- | --- | 1.3 | 1.1 | 1.7 | 3.8 | 34 | 3.6 | 3.8 | 0.96 | 25 | 2.1 |
| 10 | --- | --- | 1.2 | 0.99 | 2.2 | 3.6 | 17 | 3.6 | 2.9 | 0.95 | 8.4 | 2.0 |
| 11 | --- | --- | 1.5 | 0.87 | 2.1 | 3.4 | 33 | 3.5 | 2.4 | 0.91 | 7.0 | 1.9 |
| 12 | --- | --- | 1.6 | 0.82 | 1.6 | 3.5 | 15 | 3.4 | 2.2 | 0.87 | 5.8 | 14 |
| 13 | --- | --- | 2.4 | 0.83 | 1.4 | 3.5 | 9.7 | 3.3 | 2.0 | 0.98 | 4.8 | 13 |
| 14 | --- | --- | 3.3 | 0.80 | 1.2 | 3.4 | 7.8 | 3.3 | 1.9 | 1.4 | 4.2 | 5.7 |
| 15 | --- | 1.3 | 1.9 | 0.80 | 2.5 | 2.9 | 6.8 | 3.3 | 1.9 | 1.0 | 3.8 | 4.1 |
| 16 | --- | 2.1 | 1.5 | 0.77 | 3.6 | 2.9 | 6.4 | 3.2 | 2.0 | 0.96 | 3.5 | 3.4 |
| 17 | --- | 7.7 | 1.3 | 0.88 | 17 | 3.2 | 5.9 | 3.1 | 1.9 | 0.91 | 6.7 | 2.8 |
| 18 | --- | 4.5 | 1.1 | 0.80 | 6.0 | 3.0 | 6.0 | 3.5 | 1.8 | 0.91 | 5.7 | 26 |
| 19 | --- | 2.2 | 1.1 | 0.80 | 4.4 | 2.6 | 6.1 | 3.3 | 1.8 | 26 | 3.8 | 57 |
| 20 | --- | 1.6 | 1.2 | 0.90 | 3.7 | 5.0 | 5.5 | 3.1 | 1.8 | 4.2 | 3.2 | 11 |
| 21 | --- | 1.4 | 1.1 | 1.1 | 3.4 | 4.6 | 5.2 | 3.2 | 1.6 | 3.0 | 2.8 | 5.9 |
| 22 | --- | 2.4 | 1.0 | 0.87 | 6.6 | 3.6 | 5.0 | 5.1 | 1.6 | 2.7 | 2.5 | 4.6 |
| 23 | --- | 1.5 | 0.93 | 0.80 | 6.7 | 3.1 | 4.8 | 4.4 | 1.5 | 3.0 | 2.3 | 14 |
| 24 | --- | 1.1 | 1.3 | 0.80 | 4.1 | 2.9 | 4.6 | 3.6 | 1.4 | 2.7 | 2.2 | 8.0 |
| 25 | --- | 0.99 | 4.8 | 0.75 | 3.5 | 2.7 | 4.6 | 3.1 | 1.4 | 2.5 | 2.1 | 5.0 |
| 26 | --- | 0.88 | 2.4 | 0.79 | 3.3 | 2.5 | 4.6 | 3.4 | 1.3 | 2.4 | 2.0 | 4.3 |
| 27 | --- | 0.85 | 1.7 | 0.75 | 4.2 | 2.6 | 4.4 | 2.9 | 1.3 | 2.4 | 1.9 | 4.1 |
| 28 | --- | 0.81 | 1.4 | 0.78 | 7.4 | 2.4 | 4.3 | 2.8 | 1.3 | 2.2 | 1.8 | 4.3 |
| 29 | --- | 0.79 | 1.3 | 1.2 | --- | 2.7 | 4.2 | 2.7 | 1.2 | 4.7 | 1.8 | 3.8 |
| 30 | --- | 0.79 | 1.1 | 2.9 | --- | 4.9 | 4.2 | 2.6 | 1.2 | 3.0 | 2.4 | 3.4 |
| 31 | --- | --- | 1.1 | 4.7 | --- | 3.9 | --- | 5.2 | --- | 2.6 | 7.6 | --- |
| TOTAL | --- | --- | 52.03 | 36.80 | 102.8 | 122.0 | 232.3 | 111.2 | 70.4 | 80.41 | 183.9 | 229.9 |
| MEAN | --- | --- | 1.68 | 1.19 | 3.67 | 3.94 | 7.74 | 3.59 | 2.35 | 2.59 | 5.93 | 7.66 |
| MAX | --- | --- | 5.4 | 4.7 | 17 | 9.1 | 34 | 5.2 | 7.3 | 26 | 30 | 57 |
| MIN | --- | --- | 0.66 | 0.75 | 1.1 | 2.4 | 2.3 | 2.6 | 1.2 | 0.87 | 1.8 | 1.9 |
| CFSM | --- | --- | 0.83 | 0.59 | 1.82 | 1.95 | 3.83 | 1.78 | 1.16 | 1.28 | 2.94 | 3.79 |
| IN. | --- | --- | 0.96 | 0.68 | 1.89 | 2.25 | 4.28 | 2.05 | 1.30 | 1.48 | 3.39 | 4.23 |

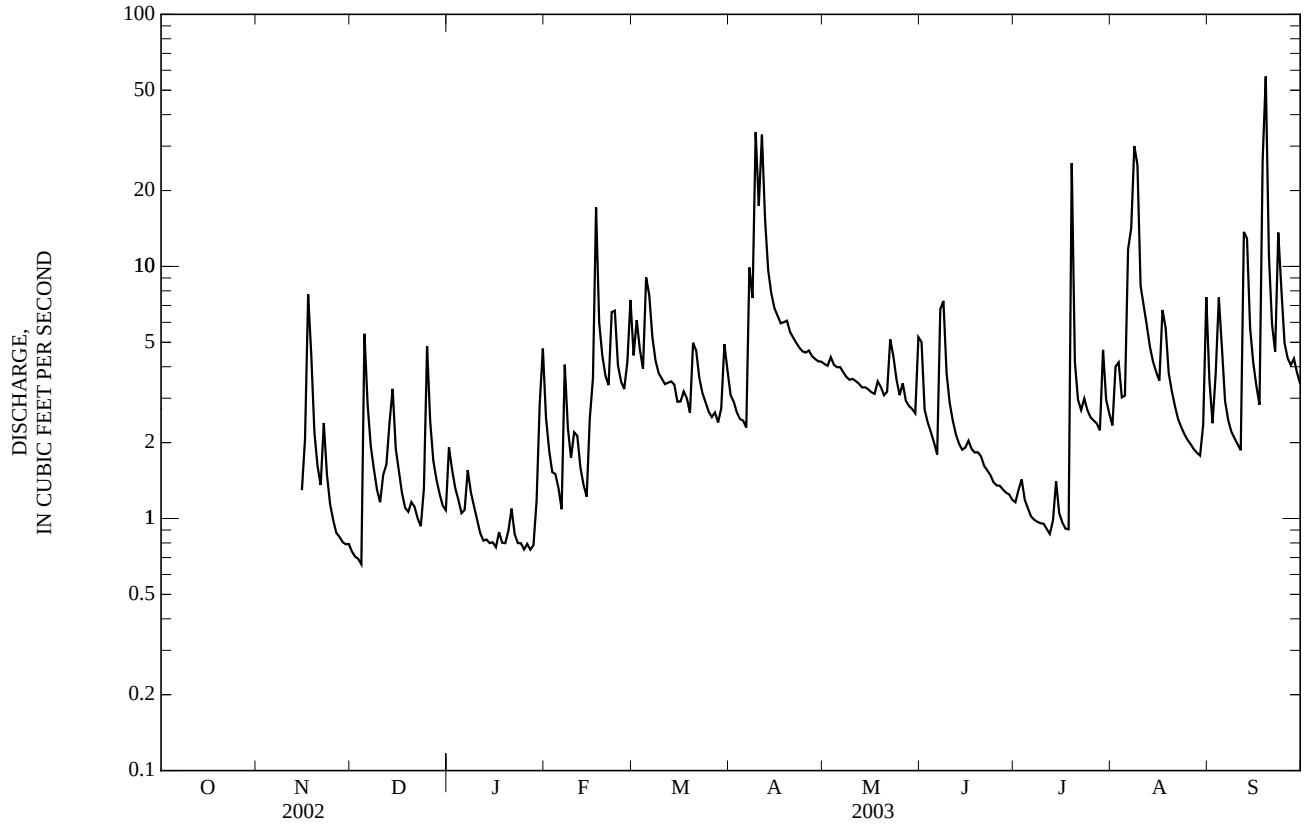
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2002 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | --- | --- | 1.68 | 1.19 | 3.67 | 3.94 | 7.74 | 3.59 | 2.35 | 2.59 | 5.93 | 7.66 |
| MAX | --- | --- | 1.68 | 1.19 | 3.67 | 3.94 | 7.74 | 3.59 | 2.35 | 2.59 | 5.93 | 7.66 |
| (WY) | --- | --- | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) |
| MIN | --- | --- | 1.68 | 1.19 | 3.67 | 3.94 | 7.74 | 3.59 | 2.35 | 2.59 | 5.93 | 7.66 |
| (WY) | --- | --- | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) |

0204278995 BAPTIST RUN AT ROUTE 637 NEAR YORKTOWN, VA—Continued

| SUMMARY STATISTICS | FOR WATER YEAR 2003 | | |
|---|---|---|---|
| HIGHEST DAILY MEAN | 57 | Sep | 19 |
| LOWEST DAILY MEAN | 0.66 | Dec | 4 |
| ANNUAL SEVEN-DAY MINIMUM | 0.74 | Nov | 28 |
| MAXIMUM PEAK FLOW | 90 | Sep | 19 |
| MAXIMUM PEAK STAGE | 4.87 | Sep | 19 |
| INSTANTANEOUS LOW FLOW | 0.45 | aJan | 23 |

a Result of freeze-up, upstream from gage.
e Estimated.



0204278995 BAPTIST RUN AT ROUTE 637 NEAR YORKTOWN,VA—Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.-- June 2002 to current year.

PERIOD OF DAILY RECORD.--November 2002 to September 2003.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Time | Sample type | Gage height, feet (00065) | Instantaneous discharge, cfs (00061) | Barometric pressure, mm Hg (00025) | Dissolved oxygen, mg/L (00300) | Dissolved oxygen, percent of saturation (00301) | pH, water, unfltrd field, std units (00400) | Specif. conductance, wat unf uS/cm 25 degC (00095) | Temperature, air, deg C (00020) | Temperature, water, deg C (00010) | Ammonia + org-N, water, fltrd, mg/L as N (00623) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEC | | | | | | | | | | | | |
| 18... | 1130 | Environmental | 1.90 | 1.1 | 770 | 11.1 | 90 | 7.6 | 358 | 5.9 | 6.9 | 0.11 |
| JAN | | | | | | | | | | | | |
| 27... | 1010 | Environmental | 1.83 | 0.75 | 767 | 14.1 | 98 | 7.9 | 402 | -- | 0.7 | E.06 |
| FEB | | | | | | | | | | | | |
| 22... | 0700 | Environmental | 2.24 | 4.1 | 752 | 9.6 | 82 | 7.3 | 290 | 8.4 | 8.6 | 0.20 |
| 22... | 0800 | Environmental | 2.26 | 4.3 | 751 | 9.1 | 80 | 7.4 | 289 | -- | 8.6 | -- |
| 22... | 0825 | Environmental | 2.39 | 6.0 | 751 | 9.0 | 79 | 7.5 | 289 | -- | 8.8 | -- |
| 22... | 0830 | Environmental | 2.43 | 6.5 | 751 | 9.0 | 78 | 7.5 | 288 | 8.5 | 8.9 | 0.18 |
| 22... | 0850 | Environmental | 2.51 | 7.8 | 751 | 9.1 | 79 | 7.5 | 274 | -- | 8.9 | -- |
| 22... | 0915 | Environmental | 2.56 | 8.5 | 751 | 9.3 | 81 | 7.5 | 226 | -- | 8.7 | 0.22 |
| 22... | 0930 | Environmental | 2.56 | 8.5 | 750 | 9.4 | 82 | 7.4 | 204 | -- | 8.5 | -- |
| 22... | 0945 | Environmental | 2.54 | 8.2 | 750 | 9.4 | 82 | 7.3 | 199 | -- | 8.3 | -- |
| 22... | 1000 | Environmental | 2.52 | 7.9 | 750 | 9.4 | 81 | 7.3 | 199 | -- | 8.3 | -- |
| 22... | 1015 | Environmental | 2.50 | 7.6 | 750 | 9.4 | 81 | 7.3 | 196 | -- | 8.2 | -- |
| 22... | 1030 | Environmental | 2.49 | 7.4 | 750 | 9.4 | 81 | 7.3 | 195 | -- | 8.2 | -- |
| 22... | 1045 | Environmental | 2.48 | 7.3 | 750 | 9.4 | 82 | 7.3 | 195 | -- | 8.3 | 0.21 |
| 22... | 1100 | Environmental | 2.46 | 7.0 | 750 | 9.3 | 81 | 7.3 | 197 | -- | 8.4 | -- |
| 22... | 1115 | Environmental | 2.44 | 6.7 | 750 | 9.3 | 81 | 7.3 | 201 | -- | 8.5 | -- |
| 22... | 1130 | Environmental | 2.43 | 6.5 | 749 | 9.3 | 81 | 7.3 | 204 | -- | 8.6 | -- |
| 22... | 1245 | Environmental | 2.38 | 5.8 | 747 | 9.1 | 81 | 7.3 | 222 | -- | 9.3 | -- |
| 22... | 1300 | Environmental | 2.37 | 5.7 | 747 | 9.1 | 81 | 7.3 | 225 | -- | 9.5 | -- |
| 22... | 1430 | Environmental | 2.35 | 5.4 | 747 | 9.0 | 81 | -- | 229 | -- | 9.8 | -- |
| 22... | 1445 | Environmental | 2.34 | 5.3 | 747 | 8.9 | 80 | 7.4 | 229 | -- | 9.6 | 0.20 |
| 22... | 1515 | Environmental | 2.41 | 6.2 | 747 | 8.9 | 79 | 7.3 | 266 | -- | 9.4 | -- |
| 22... | 1530 | Environmental | 2.41 | 6.2 | 747 | 8.8 | 78 | 7.3 | 268 | -- | 9.3 | -- |
| 22... | 1600 | Environmental | 2.42 | 6.4 | 747 | 8.8 | 78 | 7.3 | 269 | -- | 9.3 | -- |
| 22... | 1615 | Environmental | 2.42 | 6.4 | 747 | 8.8 | 78 | 7.3 | 270 | -- | 9.2 | -- |
| 22... | 1630 | Environmental | 2.42 | 6.4 | 747 | 8.8 | 78 | 7.3 | 270 | -- | 9.2 | 0.21 |
| 24... | 1130 | Environmental | 2.24 | 4.1 | 764 | 11.0 | 96 | 7.1 | 376 | 7.8 | 9.2 | 0.20 |
| 26... | 0930 | Environmental | 2.15 | 3.1 | 765 | 11.4 | 94 | 7.6 | 400 | 0.6 | 7.1 | 0.14 |
| MAR | | | | | | | | | | | | |
| 20... | 1145 | Environmental | 2.10 | 3.2 | 759 | 9.9 | 91 | 7.6 | 308 | -- | 11.2 | 0.15 |
| 20... | 1500 | Environmental | 2.32 | 5.8 | 756 | 9.2 | 86 | 7.4 | 275 | -- | 12.0 | 0.22 |
| 20... | 1615 | Environmental | 2.57 | 9.7 | 755 | 9.4 | 87 | 7.3 | 242 | 15.5 | 11.8 | 0.27 |
| 20... | 1730 | Environmental | 2.62 | 10 | 755 | 9.4 | 87 | 7.2 | 225 | -- | 11.8 | 0.30 |
| 20... | 1735 | Replicate | 2.62 | 10 | -- | -- | -- | -- | -- | -- | -- | 0.31 |
| 21... | 0015 | Environmental | 2.32 | 5.8 | 755 | 8.9 | 85 | 7.3 | 259 | -- | 12.6 | 0.24 |
| 21... | 0630 | Environmental | 2.25 | 4.9 | 755 | 9.0 | -- | 7.3 | -- | -- | 12.6 | 0.25 |
| 21... | 1130 | Environmental | 2.22 | 4.6 | 754 | 10.0 | -- | 7.4 | -- | 17.7 | 14.1 | 0.23 |
| JUN | | | | | | | | | | | | |
| 04... | 1325 | Environmental | -- | -- | 752 | 8.4 | 87 | 7.4 | 346 | -- | 16.4 | 0.15 |
| JUL | | | | | | | | | | | | |
| 02... | 1045 | Environmental | 1.81 | 1.3 | 761 | 8.7 | 90 | 7.7 | 369 | 22.0 | 17.0 | E.08 |
| SEP | | | | | | | | | | | | |
| 04... | 1745 | Environmental | 2.20 | 4.7 | 757 | 7.8 | 89 | 7.4 | 228 | -- | 21.5 | 0.34 |
| 04... | 1800 | Environmental | 2.22 | 4.9 | 757 | 7.7 | 88 | 7.3 | 227 | -- | 21.4 | -- |
| 04... | 1815 | Environmental | 2.24 | 5.2 | 757 | 7.7 | 87 | 7.3 | 230 | -- | 21.4 | -- |
| 04... | 1900 | Environmental | 2.26 | 5.4 | 757 | 7.6 | 85 | 7.2 | 233 | -- | 21.2 | -- |
| 04... | 1915 | Environmental | 2.27 | 5.6 | 756 | 7.5 | 84 | 7.2 | 235 | -- | 21.0 | -- |
| 04... | 2045 | Environmental | 2.70 | 12 | 758 | 7.5 | 87 | 7.2 | 130 | -- | 22.4 | -- |
| 04... | 2100 | Environmental | 2.70 | 12 | 758 | 7.4 | 86 | 7.1 | 123 | -- | 22.7 | 0.59 |
| 04... | 2115 | Environmental | 2.69 | 12 | 758 | 7.4 | 85 | 7.1 | 124 | -- | 22.8 | -- |
| 04... | 2130 | Environmental | 2.67 | 12 | 758 | 7.3 | 85 | 7.1 | 123 | -- | 22.9 | -- |
| 04... | 2145 | Environmental | 2.65 | 12 | 758 | 7.3 | 86 | 7.0 | 125 | -- | 23.0 | 0.53 |
| 04... | 2200 | Environmental | 2.63 | 11 | 758 | 7.3 | 85 | 7.0 | 127 | -- | 23.0 | -- |
| 04... | 2215 | Environmental | 2.60 | 11 | 758 | 7.3 | 85 | 7.0 | 130 | -- | 22.9 | -- |
| 04... | 2230 | Environmental | 2.56 | 9.9 | 758 | 7.3 | 85 | 7.0 | 136 | -- | 22.8 | 0.45 |
| 04... | 2235 | Replicate | 2.56 | 9.9 | -- | -- | -- | -- | -- | -- | -- | 0.51 |
| 04... | 2245 | Environmental | 2.54 | 9.7 | 758 | 7.3 | 85 | 7.0 | 138 | -- | 22.8 | -- |
| 04... | 2300 | Environmental | 2.51 | 9.2 | 758 | 7.3 | 84 | 7.1 | 145 | -- | 22.6 | -- |
| 04... | 2315 | Environmental | 2.49 | 8.8 | 758 | 7.3 | 84 | 7.1 | 148 | -- | 22.5 | 0.44 |
| 04... | 2330 | Environmental | 2.47 | 8.5 | 758 | 7.3 | 84 | 7.1 | 151 | -- | 22.5 | -- |
| 04... | 2345 | Environmental | 2.44 | 8.0 | 758 | 7.3 | 84 | 7.1 | 156 | -- | 22.3 | -- |
| 05... | 0000 | Environmental | 2.43 | 7.9 | 758 | 7.3 | 84 | 7.1 | 160 | -- | 22.2 | -- |
| 05... | 0015 | Environmental | 2.42 | 7.7 | 758 | 7.3 | 84 | 7.1 | 163 | -- | 22.1 | 0.55 |

0204278995 BAPTIST RUN AT ROUTE 637 NEAR YORKTOWN,VA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Ammonia + org-N, water, unfltrd mg/L as N (00625) | Ammonia water, fltrd, mg/L as N (00608) | Nitrite + nitrate water fltrd, mg/L as N (00631) | Nitrite water, fltrd, mg/L as N (00613) | Ortho-phos-phate, water, fltrd, mg/L as P (00671) | Phos-phorus, water, fltrd, mg/L (00666) | Phos-phorus, water, unfltrd mg/L (00665) | Chloro-phyll a phyto-plank-ton, fluoro, ug/L (70953) |
|---|---|---|---|---|---|---|---|---|
| DEC | | | | | | | | |
| 18... | 0.12 | E.008 | 0.040 | <0.002 | 0.012 | 0.015 | 0.166 | 1.8 |
| JAN | | | | | | | | |
| 27... | E.09 | <0.015 | 0.036 | <0.002 | 0.010 | 0.012 | 0.024 | -- |
| FEB | | | | | | | | |
| 22... | 0.24 | E.012 | 0.157 | <0.002 | 0.016 | 0.023 | 0.046 | 4.3 |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | 0.46 | E.010 | 0.132 | <0.002 | 0.018 | 0.023 | 0.078 | 5.7 |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | 0.56 | E.008 | 0.104 | <0.002 | 0.012 | 0.018 | 0.085 | 6.8 |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | 0.45 | <0.015 | 0.208 | E.002 | 0.008 | 0.013 | 0.073 | 6.6 |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | 0.42 | <0.015 | 0.160 | E.002 | 0.011 | 0.017 | 0.065 | 7.4 |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | 0.36 | <0.015 | 0.143 | <0.002 | 0.011 | 0.017 | 0.058 | 4.8 |
| 24... | 0.22 | <0.015 | 0.108 | <0.002 | 0.016 | 0.022 | 0.043 | 5.6 |
| 26... | 0.21 | 0.015 | 0.129 | <0.002 | 0.019 | 0.023 | 0.038 | 2.7 |
| MAR | | | | | | | | |
| 20... | 0.26 | 0.023 | 0.088 | <0.002 | 0.022 | 0.028 | 0.058 | -- |
| 20... | 0.57 | E.013 | 0.073 | <0.002 | 0.016 | 0.023 | 0.114 | -- |
| 20... | 1.1 | E.012 | 0.092 | E.002 | 0.012 | 0.020 | 0.21 | -- |
| 20... | 0.89 | 0.015 | 0.115 | E.002 | 0.009 | 0.015 | 0.151 | -- |
| 20... | 0.99 | 0.015 | 0.115 | E.002 | 0.008 | 0.015 | 0.185 | -- |
| 21... | 0.46 | E.012 | 0.090 | E.002 | 0.013 | 0.021 | 0.073 | -- |
| 21... | 0.39 | E.014 | 0.093 | <0.002 | 0.016 | 0.023 | 0.060 | -- |
| 21... | 0.35 | E.011 | 0.079 | <0.002 | 0.017 | 0.023 | 0.052 | -- |
| JUN | | | | | | | | |
| 04... | 0.30 | 0.032 | 0.140 | E.002 | 0.022 | 0.031 | 0.068 | -- |
| JUL | | | | | | | | |
| 02... | 0.36 | 0.025 | 0.189 | <0.002 | 0.037 | 0.045 | 0.106 | -- |
| SEP | | | | | | | | |
| 04... | 0.82 | 0.016 | 0.073 | 0.003 | 0.011 | 0.029 | 0.165 | -- |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- |
| 04... | 1.7 | <0.015 | 0.086 | 0.005 | <0.007 | 0.029 | 0.27oc | -- |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- |
| 04... | 1.0 | <0.015 | 0.090 | 0.005 | <0.007 | 0.027 | 0.177 | -- |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- |
| 04... | 0.97 | <0.015 | 0.091 | 0.005 | <0.007 | 0.027 | 0.129 | -- |
| 04... | 0.88 | <0.015 | 0.090 | 0.004 | E.005n | 0.026 | 0.131 | -- |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- |
| 04... | 1.0 | <0.015 | 0.082 | 0.003 | 0.010 | 0.025 | 0.146 | -- |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- |
| 04... | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | -- | -- | -- | -- | -- | -- | -- | -- |
| 05... | 0.86 | <0.015 | 0.077 | 0.003 | 0.009 | 0.026 | 0.115 | -- |

Remark codes used in this table:
< -- Less than
E -- Estimated value

Value qualifier codes used in this table:
c -- See laboratory comment
n -- Below the NDV
o -- Result determined by alternate method

## 02044500 NOTTOWAY RIVER NEAR RAWLINGS, VA

LOCATION.--Lat 36°59'01", long 77°47'59", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except those for periods with ice effect, Jan. 19, 20, 25, and periods of no gage-height record, May 27 to June 3 and Sept. 3, 4, which are fair. Maximum discharge, 29,900 $ft^3/s$, from rating curve extended above 16,000 $ft^3/s$ on basis of slope-area measurement of peak flow. Several measurements of water temperature were made during the year. Water-quality records for some 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 $ft^3/s$, from information by local resident.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 24 | 0745 | 2,740 | 7.53 | May 26 | 2000 | *28,100 | *22.65 |
| Mar 21 | 2230 | 8,980 | 13.66 | Aug 10 | 0915 | 3,010 | 7.97 |
| Apr 10 | 1045 | 4,560 | 10.11 | Sep 20 | 0100 | 14,300 | 16.77 |
| May 20 | 0800 | 3,590 | 8.92 | Sep 25 | 0130 | 4,390 | 9.95 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7.9 | 412 | 100 | 298 | 255 | 968 | 904 | 783 | e730 | 950 | 286 | 137 |
| 2 | 6.2 | 216 | 92 | 820 | 252 | 1,060 | 600 | 1,680 | e840 | 1,010 | 341 | 141 |
| 3 | 5.2 | 149 | 90 | 1,020 | 251 | 1,220 | 480 | 688 | e640 | 2,040 | 338 | e130 |
| 4 | 4.6 | 128 | 86 | 532 | 234 | 780 | 407 | 620 | 494 | 1,310 | 351 | e295 |
| 5 | 4.4 | 128 | 103 | 392 | 241 | 587 | 364 | 494 | 508 | 679 | 1,110 | 513 |
| 6 | 4.2 | 287 | 126 | 317 | 259 | 603 | 337 | 398 | 516 | 440 | 589 | 385 |
| 7 | 4.2 | 891 | 129 | 281 | 302 | 715 | 722 | 356 | 562 | 477 | 753 | 234 |
| 8 | 7.2 | 433 | 122 | 255 | 568 | 603 | 2,350 | 322 | 1,310 | 400 | 808 | 187 |
| 9 | 4.4 | 229 | 119 | 237 | 529 | 469 | 3,660 | 310 | 1,180 | 319 | 1,000 | 172 |
| 10 | 3.1 | 166 | 120 | 221 | 375 | 392 | 4,330 | 343 | 863 | 486 | 2,640 | 164 |
| 11 | 7.4 | 140 | 141 | 202 | 347 | 339 | 3,190 | 337 | 567 | 425 | 1,150 | 152 |
| 12 | 144 | 161 | 338 | 186 | 331 | 312 | 2,340 | 300 | 472 | 301 | 579 | 148 |
| 13 | 287 | 739 | 542 | 176 | 276 | 296 | 1,130 | 251 | 813 | 251 | 477 | 196 |
| 14 | 136 | 1,040 | 1,180 | 172 | 240 | 303 | 682 | 219 | 775 | 325 | 355 | 219 |
| 15 | 99 | 413 | 1,410 | 170 | 248 | 283 | 530 | 205 | 494 | 278 | 295 | 210 |
| 16 | 127 | 261 | 603 | 164 | 530 | 265 | 451 | 249 | 410 | 234 | 259 | 187 |
| 17 | 276 | 274 | 351 | 165 | 721 | 265 | 397 | 286 | 397 | 215 | 238 | 163 |
| 18 | 222 | 883 | 261 | 161 | 473 | 260 | 354 | 494 | 471 | 204 | 223 | 782 |
| 19 | 123 | 969 | 217 | e135 | 383 | 248 | 422 | 2,270 | 953 | 222 | 255 | 11,300 |
| 20 | 81 | 416 | 207 | e145 | 535 | 1,200 | 459 | 3,300 | 1,780 | 288 | 258 | 11,200 |
| 21 | 71 | 279 | 252 | 165 | 921 | 5,730 | 388 | 1,230 | 1,150 | 250 | 219 | 3,120 |
| 22 | 76 | 223 | 286 | 161 | 1,280 | 6,250 | 348 | 1,330 | 626 | 208 | 197 | 624 |
| 23 | 78 | 184 | 208 | 154 | 2,210 | 1,440 | 315 | 1,890 | 458 | 373 | 182 | 741 |
| 24 | 71 | 158 | 206 | 132 | 2,510 | 667 | 282 | 1,490 | 368 | 474 | 169 | 2,390 |
| 25 | 60 | 142 | 996 | e130 | 871 | 520 | 270 | 1,090 | 315 | 320 | 156 | 3,160 |
| 26 | 55 | 132 | 1,820 | 138 | 550 | 435 | 339 | 15,700 | 283 | 246 | 149 | 638 |
| 27 | 61 | 123 | 1,110 | 139 | 493 | 391 | 347 | e17,000 | 263 | 210 | 145 | 422 |
| 28 | 84 | 114 | 492 | 123 | 886 | 359 | 298 | e3,940 | 296 | 188 | 138 | 354 |
| 29 | 132 | 107 | 362 | 139 | --- | 344 | 262 | e1,600 | 388 | 183 | 132 | 310 |
| 30 | 559 | 104 | 297 | 181 | --- | 734 | 240 | e1,100 | 326 | 235 | 129 | 275 |
| 31 | 799 | --- | 261 | 243 | --- | 1,290 | --- | e850 | --- | 301 | 130 | --- |
| TOTAL | 3,599.8 | 9,901 | 12,627 | 7,754 | 17,071 | 29,328 | 27,198 | 61,125 | 19,248 | 13,842 | 14,051 | 38,949 |
| MEAN | 116 | 330 | 407 | 250 | 610 | 946 | 907 | 1,972 | 642 | 447 | 453 | 1,298 |
| MAX | 799 | 1,040 | 1,820 | 1,020 | 2,510 | 6,250 | 4,330 | 17,000 | 1,780 | 2,040 | 2,640 | 11,300 |
| MIN | 3.1 | 104 | 86 | 123 | 234 | 248 | 240 | 205 | 263 | 183 | 129 | 130 |
| CFSM | 0.38 | 1.07 | 1.32 | 0.81 | 1.97 | 3.06 | 2.93 | 6.38 | 2.08 | 1.45 | 1.47 | 4.20 |
| IN. | 0.43 | 1.19 | 1.52 | 0.93 | 2.06 | 3.53 | 3.27 | 7.36 | 2.32 | 1.67 | 1.69 | 4.69 |

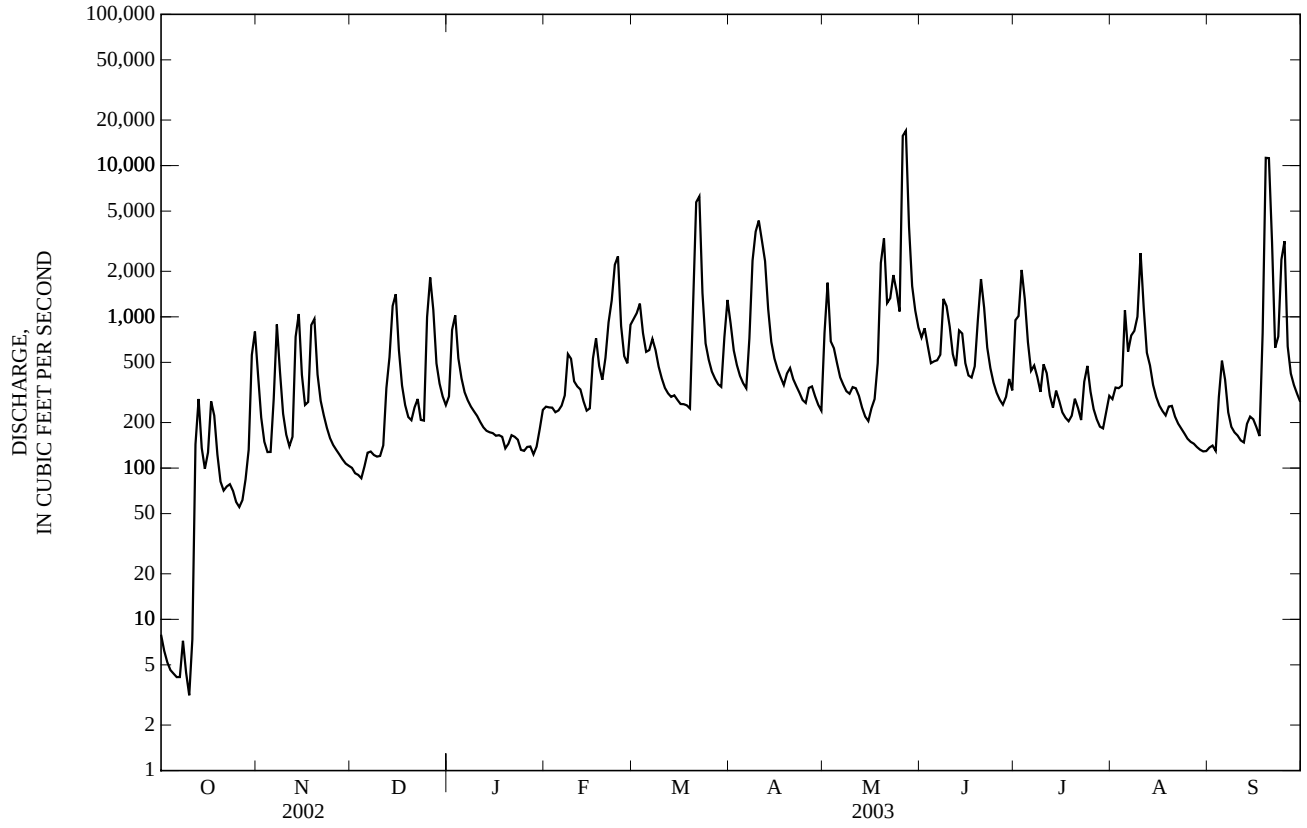
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 219 | 240 | 287 | 406 | 485 | 558 | 470 | 327 | 221 | 153 | 132 | 182 |
| MAX | 2,024 | 1,560 | 893 | 1,289 | 1,248 | 1,350 | 1,201 | 1,972 | 1,359 | 965 | 650 | 1,436 |
| (WY) | (1973) | (1986) | (1958) | (1978) | (1979) | (1998) | (1987) | (2003) | (1972) | (1975) | (1955) | (1979) |
| MIN | 13.0 | 39.4 | 58.1 | 95.0 | 90.2 | 126 | 119 | 98.3 | 16.6 | 15.2 | 2.35 | 3.62 |
| (WY) | (1964) | (2002) | (2002) | (1966) | (2002) | (1981) | (2002) | (1991) | (2002) | (2002) | (2002) | (1954) |

02044500 NOTTOWAY RIVER NEAR RAWLINGS, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1951 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 48,832.70 | | 254,693.8 | | | |
| ANNUAL MEAN | 134 | | 698 | | 306 | |
| HIGHEST ANNUAL MEAN | | | | | 698 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 71.6 | 2002 |
| HIGHEST DAILY MEAN | 1,820 | Dec 26 | 17,000 | May 27 | 27,400 | Oct 6, 1972 |
| LOWEST DAILY MEAN | 0.58 | Aug 14 | 3.1 | Oct 10 | 0.40 | Oct 14, 1954 |
| ANNUAL SEVEN-DAY MINIMUM | 0.68 | Aug 9 | 4.6 | Oct 4 | 0.68 | Aug 9, 2002 |
| MAXIMUM PEAK FLOW | | | 28,100 | May 26 | 29,900 | Oct 6, 1972 |
| MAXIMUM PEAK STAGE | | | 22.65 | May 26 | 23.25 | Oct 6, 1972 |
| INSTANTANEOUS LOW FLOW | | | 2.8 | Oct 10 | 0.40 | aOct 14, 1954 |
| ANNUAL RUNOFF (CFSM) | 0.43 | | 2.26 | | 0.99 | |
| ANNUAL RUNOFF (INCHES) | 5.88 | | 30.66 | | 13.44 | |
| 10 PERCENT EXCEEDS | 281 | | 1,210 | | 580 | |
| 50 PERCENT EXCEEDS | 77 | | 317 | | 170 | |
| 90 PERCENT EXCEEDS | 4.0 | | 127 | | 42 | |

a Also Oct. 15, 1954.
e Estimated.



## 02045500 NOTTOWAY RIVER NEAR STONY CREEK, VA

LOCATION.--Lat 36°54'01", long 77°23'59", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Oct. 11, 1934, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Jan. 18-21, 24-26, which are fair. Diurnal fluctuation at low flow caused by Baskerville Mill, 33 mi upstream. Maximum discharge, 25,200 $ft^3/s$, from rating curve extended above 13,000 $ft^3/s$. 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 24 | 0330 | 3,990 | 14.22 | Jun 9 | 0100 | 3,650 | 13.72 |
| Mar 23 | 2200 | 6,810 | 17.20 | Jun 16 | 1830 | 3,810 | 14.12 |
| Apr 11 | 2130 | 6,900 | 17.28 | Jul 3 | 2300 | 3,620 | 13.65 |
| May 21 | 1630 | 3,750 | 13.76 | Aug 11 | 1300 | 4,300 | 15.34 |
| May 24 | 1330 | 4,510 | 14.91 | Sep 21 | 0900 | *13,400 | *20.35 |
| May 28 | 2300 | *13,400 | *20.35 | Sep 26 | 1130 | 3,790 | 14.15 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 14 | 1,060 | 171 | 757 | 1,010 | 2,620 | 2,810 | 442 | 1,440 | 811 | 448 | 165 |
| 2 | 15 | 568 | 162 | 1,660 | 753 | 2,360 | 1,510 | 1,400 | 1,500 | 1,830 | 440 | 176 |
| 3 | 14 | 325 | 148 | 1,770 | 620 | 2,820 | 1,020 | 1,740 | 1,240 | 3,310 | 571 | 175 |
| 4 | 13 | 227 | 143 | 1,390 | 559 | 2,100 | 815 | 922 | 938 | 3,440 | 518 | 253 |
| 5 | 13 | 191 | 189 | 908 | 500 | 1,390 | 692 | 851 | 889 | 2,010 | 647 | 646 |
| 6 | 11 | 424 | 272 | 725 | 475 | 1,410 | 611 | 680 | 874 | 1,060 | 1,310 | 820 |
| 7 | 10 | 1,010 | 365 | 628 | 727 | 1,520 | 1,230 | 588 | 856 | 818 | 819 | 556 |
| 8 | 9.4 | 1,190 | 357 | 572 | 1,110 | 1,320 | 3,790 | 537 | 2,870 | 909 | 1,700 | 359 |
| 9 | 9.0 | 609 | 317 | 522 | 1,080 | 1,030 | 4,620 | 497 | 3,460 | 718 | 1,660 | 279 |
| 10 | 9.1 | 368 | 305 | 480 | 880 | 834 | 6,520 | 691 | 2,440 | 731 | 3,290 | 242 |
| 11 | 20 | 267 | 325 | 432 | 840 | 701 | 6,830 | 687 | 1,480 | 919 | 4,230 | 220 |
| 12 | 69 | 240 | 684 | 389 | 742 | 625 | 6,620 | 565 | 1,090 | 684 | 2,620 | 215 |
| 13 | 160 | 569 | 960 | 361 | 642 | 579 | 4,920 | 448 | 1,040 | 505 | 1,200 | 295 |
| 14 | 400 | 1,550 | 2,140 | 343 | 542 | 563 | 2,040 | 349 | 1,360 | 422 | 854 | 410 |
| 15 | 185 | 1,260 | 2,340 | 334 | 530 | 547 | 1,180 | 288 | 1,080 | 510 | 650 | 385 |
| 16 | 127 | 651 | 1,830 | 323 | 1,070 | 501 | 956 | 280 | 3,070 | 425 | 531 | 342 |
| 17 | 175 | 649 | 944 | 323 | 1,360 | 479 | 823 | 377 | 2,130 | 397 | 469 | 279 |
| 18 | 398 | 1,250 | 637 | e310 | 1,160 | 481 | 722 | 531 | 1,380 | 407 | 450 | 912 |
| 19 | 303 | 1,700 | 496 | e285 | 936 | 457 | 754 | 2,860 | 1,250 | 807 | 534 | 7,910 |
| 20 | 161 | 1,230 | 439 | e265 | 1,150 | 1,120 | 933 | 3,580 | 2,490 | 670 | 659 | 12,700 |
| 21 | 108 | 690 | 786 | e320 | 1,590 | 4,430 | 829 | 3,700 | 2,570 | 519 | 475 | 13,200 |
| 22 | 88 | 573 | 627 | 335 | 2,280 | 5,630 | 702 | 2,600 | 1,530 | 416 | 375 | 10,800 |
| 23 | 96 | 447 | 535 | 311 | 3,690 | 6,440 | 620 | 3,550 | 1,000 | 450 | 326 | 4,700 |
| 24 | 91 | 355 | 473 | e245 | 3,940 | 5,210 | 537 | 4,350 | 781 | 865 | 287 | 2,710 |
| 25 | 86 | 292 | 2,060 | e280 | 3,450 | 1,400 | 479 | 3,360 | 639 | 793 | 253 | 3,100 |
| 26 | 75 | 255 | 3,110 | e260 | 1,490 | 876 | 635 | 2,750 | 547 | 532 | 224 | 3,610 |
| 27 | 64 | 232 | 2,810 | 278 | 1,060 | 768 | 1,430 | 4,530 | 480 | 398 | 205 | 1,500 |
| 28 | 63 | 210 | 1,420 | 257 | 2,470 | 681 | 854 | 11,300 | 518 | 324 | 192 | 838 |
| 29 | 91 | 191 | 860 | 269 | --- | 615 | 594 | 11,700 | 661 | 276 | 178 | 704 |
| 30 | 353 | 179 | 689 | 373 | --- | 1,560 | 479 | 5,860 | 619 | 269 | 165 | 591 |
| 31 | 1,120 | --- | 591 | 1,080 | --- | 3,270 | --- | 2,050 | --- | 356 | 161 | --- |
| TOTAL | 4,350.5 | 18,762 | 27,185 | 16,785 | 36,656 | 54,337 | 56,555 | 74,063 | 42,222 | 26,581 | 26,441 | 69,092 |
| MEAN | 140 | 625 | 877 | 541 | 1,309 | 1,753 | 1,885 | 2,389 | 1,407 | 857 | 853 | 2,303 |
| MAX | 1,120 | 1,700 | 3,110 | 1,770 | 3,940 | 6,440 | 6,830 | 11,700 | 3,460 | 3,440 | 4,230 | 13,200 |
| MIN | 9.0 | 179 | 143 | 245 | 475 | 457 | 479 | 280 | 480 | 269 | 161 | 165 |
| CFSM | 0.24 | 1.08 | 1.51 | 0.94 | 2.26 | 3.03 | 3.26 | 4.13 | 2.43 | 1.48 | 1.47 | 3.98 |
| IN. | 0.28 | 1.21 | 1.75 | 1.08 | 2.36 | 3.49 | 3.63 | 4.76 | 2.71 | 1.71 | 1.70 | 4.44 |

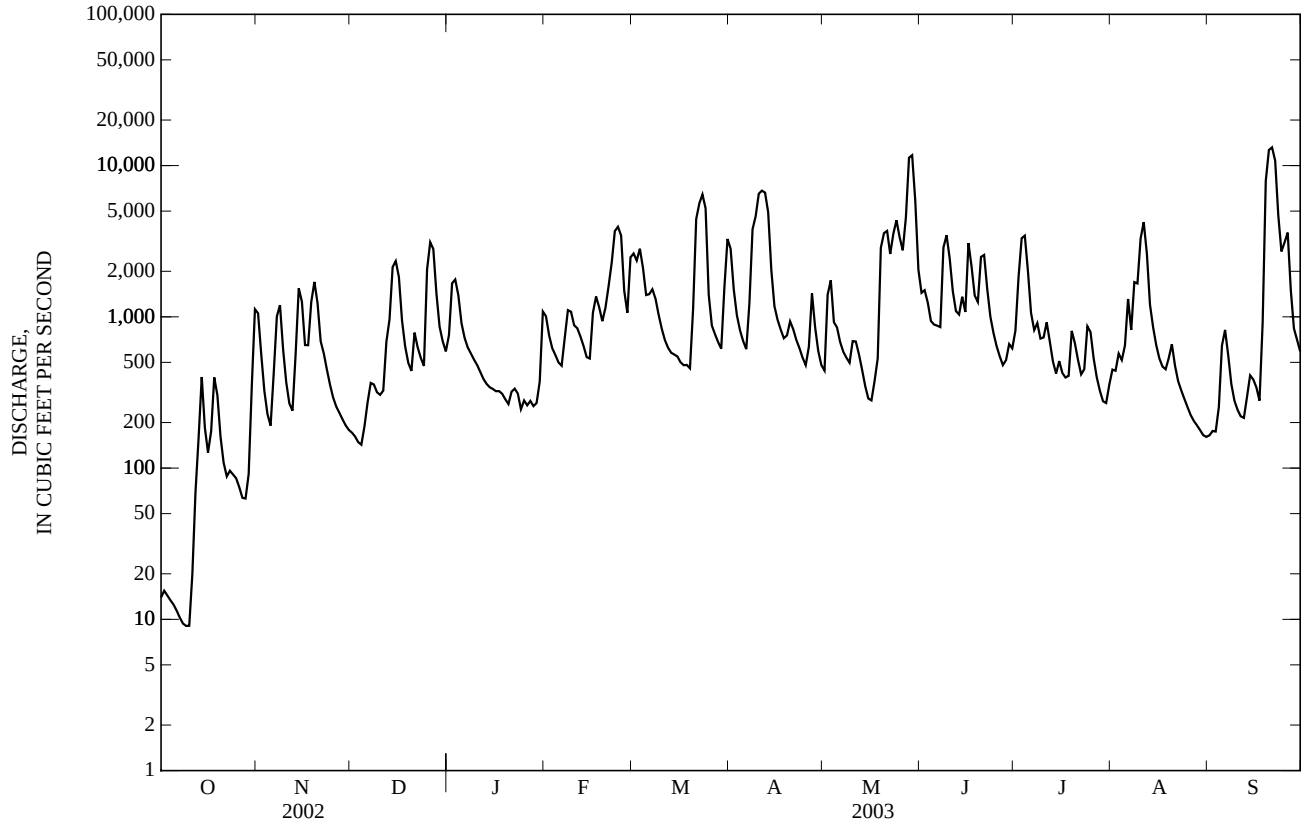
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 304 | 399 | 513 | 807 | 929 | 1,038 | 874 | 554 | 353 | 348 | 301 | 331 |
| MAX | 2,666 | 2,800 | 1,783 | 2,578 | 2,355 | 2,827 | 2,261 | 2,389 | 1,612 | 2,423 | 3,057 | 2,802 |
| (WY) | (1973) | (1986) | (1958) | (1936) | (1979) | (1998) | (1987) | (2003) | (1938) | (1938) | (1940) | (1999) |
| MIN | 14.0 | 43.1 | 65.7 | 109 | 174 | 196 | 192 | 129 | 30.1 | 26.1 | 13.5 | 9.40 |
| (WY) | (1931) | (1942) | (1966) | (1966) | (2002) | (1981) | (1966) | (1942) | (2002) | (2002) | (2002) | (1932) |

02045500 NOTTOWAY RIVER NEAR STONY CREEK, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1931 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 94,373.7 | | 453,029.5 | | | |
| ANNUAL MEAN | 259 | | 1,241 | | 561 | |
| HIGHEST ANNUAL MEAN | | | | | 1,241 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 134 | 2002 |
| HIGHEST DAILY MEAN | 3,110 | Dec 26 | 13,200 | Sep 21 | 24,000 | Aug 17, 1940 |
| LOWEST DAILY MEAN | 1.5 | Aug 25 | 9.0 | Oct 9 | 1.5 | Aug 25, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 3.2 | Aug 21 | 11 | Oct 4 | 3.2 | Aug 21, 2002 |
| MAXIMUM PEAK FLOW | | | 13,400 | aMay 28 | 25,200 | Aug 17, 1940 |
| MAXIMUM PEAK STAGE | | | 20.35 | aMay 28 | 23.66 | Aug 17, 1940 |
| INSTANTANEOUS LOW FLOW | | | 8.5 | Oct 10 | 1.3 | Aug 25, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.45 | | 2.14 | | 0.97 | |
| ANNUAL RUNOFF (INCHES) | 6.06 | | 29.11 | | 13.15 | |
| 10 PERCENT EXCEEDS | 633 | | 3,080 | | 1,180 | |
| 50 PERCENT EXCEEDS | 128 | | 649 | | 300 | |
| 90 PERCENT EXCEEDS | 9.6 | | 183 | | 59 | |

a Also Sept. 21, 2003.
e Estimated.



## 02046000 STONY CREEK NEAR DINWIDDIE, VA

LOCATION.--Lat 37°04'02", long 77°36'09", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to June 12, 1957, nonrecording gage and crest-stage gage at same site and datum.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Oct. 2-9 and Sept. 19, and periods with ice effect, Dec. 4 and Jan. 17-27, which are fair. Maximum discharge, 11,400 $ft^3/s$, from rating curve extended above 5,800 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Mar 21 | 0800 | 2,360 | 11.20 | May 26 | 2015 | 8,880 | 18.79 |
| Mar 30 | 1930 | 1,260 | 8.78 | Jun 8 | 0500 | 1,240 | 8.72 |
| Apr 9 | 2345 | 1,990 | 10.50 | Jun 19 | 2145 | 1,540 | 9.52 |
| May 19 | 0815 | 1,920 | 10.35 | Sep 19 | --- | *9,640 | *19.41 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.21 | 38 | 34 | 387 | 138 | 456 | 553 | 148 | 529 | 105 | 93 | 34 |
| 2 | e0.17 | 20 | 32 | 387 | 108 | 445 | 317 | 326 | 417 | 217 | 90 | 32 |
| 3 | e0.15 | 15 | 30 | 208 | 86 | 391 | 221 | 286 | 269 | 619 | 78 | 34 |
| 4 | e0.14 | 16 | e22 | 153 | 76 | 247 | 173 | 223 | 217 | 456 | 67 | 235 |
| 5 | e0.13 | 21 | 24 | 113 | 72 | 239 | 147 | 161 | 203 | 219 | 64 | 252 |
| 6 | e0.14 | 175 | 31 | 116 | 62 | 281 | 130 | 132 | 175 | 140 | 78 | 151 |
| 7 | e0.28 | 142 | 37 | 97 | 148 | 324 | 498 | 117 | 289 | 141 | 84 | 97 |
| 8 | e0.18 | 64 | 39 | 84 | 205 | 230 | 997 | 110 | 999 | 111 | 181 | 69 |
| 9 | e0.10 | 41 | 42 | 75 | 136 | 175 | 1,390 | 152 | 578 | 105 | 512 | 57 |
| 10 | 0.44 | 30 | 40 | 65 | 113 | 139 | 1,660 | 693 | 371 | 185 | 397 | 50 |
| 11 | 1.3 | 25 | 70 | 57 | 120 | 115 | 1,130 | 545 | 250 | 186 | 687 | 44 |
| 12 | 3.1 | 32 | 156 | 51 | 97 | 104 | 728 | 325 | 377 | 119 | 304 | 58 |
| 13 | 3.8 | 185 | 135 | 48 | 80 | 96 | 410 | 185 | 563 | 84 | 140 | 336 |
| 14 | 1.8 | 134 | 464 | 46 | 69 | 102 | 270 | 130 | 408 | 78 | 102 | 243 |
| 15 | 1.0 | 74 | 261 | 44 | 78 | 94 | 206 | 109 | 364 | 66 | 83 | 145 |
| 16 | 5.0 | 51 | 151 | 42 | 227 | 89 | 173 | 164 | 456 | 58 | 72 | 99 |
| 17 | 15 | 101 | 103 | e41 | 179 | 88 | 146 | 196 | 334 | 53 | 67 | 73 |
| 18 | 7.9 | 332 | 78 | e38 | 136 | 84 | 130 | 534 | 356 | 48 | 62 | 913 |
| 19 | 5.8 | 173 | 64 | e35 | 125 | 79 | 187 | 1,740 | 796 | 105 | 75 | e8,400 |
| 20 | 3.7 | 109 | 67 | e40 | 223 | 646 | 207 | 1,030 | 962 | 312 | 63 | 3,350 |
| 21 | 3.6 | 81 | 67 | e45 | 350 | 2,120 | 166 | 453 | 501 | 225 | 56 | 906 |
| 22 | 5.7 | 64 | 56 | e41 | 668 | 1,120 | 142 | 607 | 271 | 103 | 51 | 368 |
| 23 | 5.3 | 51 | 49 | e37 | 1,000 | 423 | 124 | 715 | 181 | 138 | 47 | 393 |
| 24 | 3.6 | 41 | 60 | e31 | 788 | 255 | 110 | 905 | 139 | 245 | 43 | 417 |
| 25 | 2.7 | 36 | 500 | e36 | 359 | 188 | 103 | 634 | 116 | 164 | 40 | 320 |
| 26 | 2.6 | 31 | 455 | e34 | 197 | 155 | 182 | 5,050 | 99 | 106 | 38 | 216 |
| 27 | 2.8 | 28 | 235 | e32 | 178 | 137 | 170 | 4,490 | 84 | 77 | 36 | 153 |
| 28 | 3.6 | 38 | 137 | 33 | 559 | 120 | 131 | 1,090 | 175 | 62 | 34 | 125 |
| 29 | 29 | 39 | 100 | 37 | --- | 118 | 110 | 560 | 147 | 55 | 32 | 105 |
| 30 | 152 | 37 | 81 | 64 | --- | 928 | 96 | 390 | 111 | 105 | 31 | 90 |
| 31 | 95 | --- | 70 | 118 | --- | 949 | --- | 308 | --- | 116 | 34 | --- |
| TOTAL | 356.24 | 2,224 | 3,690 | 2,635 | 6,577 | 10,937 | 11,007 | 22,508 | 10,737 | 4,803 | 3,741 | 17,765 |
| MEAN | 11.5 | 74.1 | 119 | 85.0 | 235 | 353 | 367 | 726 | 358 | 155 | 121 | 592 |
| MAX | 152 | 332 | 500 | 387 | 1,000 | 2,120 | 1,660 | 5,050 | 999 | 619 | 687 | 8,400 |
| MIN | 0.10 | 15 | 22 | 31 | 62 | 79 | 96 | 109 | 84 | 48 | 31 | 32 |
| CFSM | 0.10 | 0.66 | 1.06 | 0.76 | 2.10 | 3.15 | 3.28 | 6.48 | 3.20 | 1.38 | 1.08 | 5.29 |
| IN. | 0.12 | 0.74 | 1.23 | 0.88 | 2.18 | 3.63 | 3.66 | 7.48 | 3.57 | 1.60 | 1.24 | 5.90 |

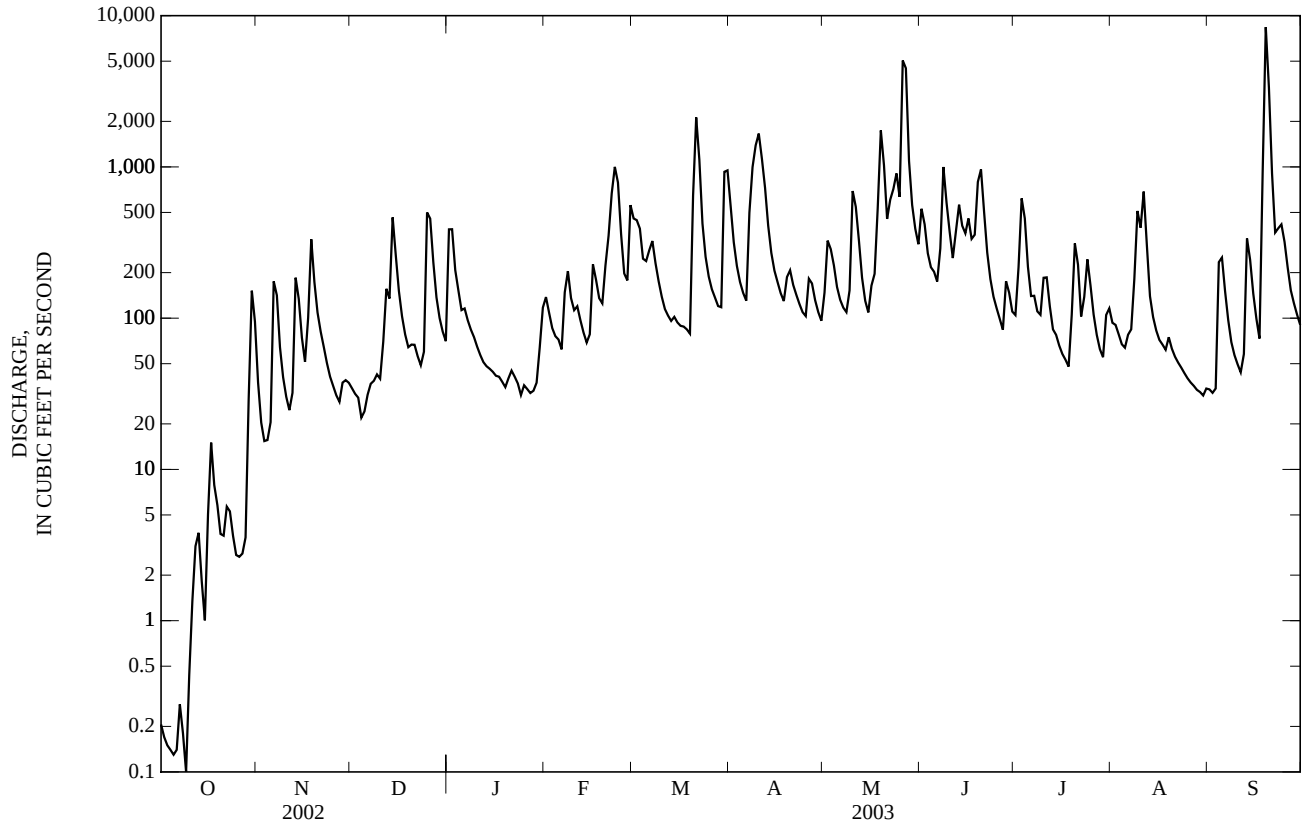
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 65.6 | 83.5 | 103 | 161 | 192 | 216 | 168 | 104 | 64.8 | 47.8 | 45.0 | 66.0 |
| MAX | 554 | 510 | 426 | 549 | 541 | 551 | 379 | 726 | 358 | 560 | 288 | 774 |
| (WY) | (1973) | (1986) | (1958) | (1978) | (1979) | (1998) | (2000) | (2003) | (2003) | (1975) | (1955) | (1979) |
| MIN | 0.12 | 2.99 | 5.68 | 15.5 | 21.3 | 27.7 | 27.0 | 20.9 | 5.36 | 2.02 | 0.97 | 0.18 |
| (WY) | (1955) | (1966) | (1966) | (1966) | (2002) | (1981) | (1966) | (1991) | (2002) | (2002) | (1963) | (1954) |

02046000 STONY CREEK NEAR DINWIDDIE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1947 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 11,545.15 | | 96,980.24 | | | |
| ANNUAL MEAN | 31.6 | | 266 | | 109 | |
| HIGHEST ANNUAL MEAN | | | | | 266 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 15.5 | 2002 |
| HIGHEST DAILY MEAN | 500 | Dec 25 | e8,400 | Sep 19 | e8,400 | Sep 19, 2003 |
| LOWEST DAILY MEAN | 0.00 | aAug 13 | e0.10 | Oct 9 | 0.00 | aAug 13, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.03 | Aug 11 | e0.16 | Oct 3 | 0.03 | Aug 11, 2002 |
| MAXIMUM PEAK FLOW | | | 9,640 | Sep 19 | 11,400 | Oct 6, 1972 |
| MAXIMUM PEAK STAGE | | | b19.41 | Sep 19 | b20.84 | Oct 6, 1972 |
| INSTANTANEOUS LOW FLOW | | | (c) | (d) | 0.00 | (f) |
| ANNUAL RUNOFF (CFSM) | 0.28 | | 2.37 | | 0.98 | |
| ANNUAL RUNOFF (INCHES) | 3.83 | | 32.21 | | 13.26 | |
| 10 PERCENT EXCEEDS | 79 | | 555 | | 241 | |
| 50 PERCENT EXCEEDS | 13 | | 115 | | 48 | |
| 90 PERCENT EXCEEDS | 0.34 | | 29 | | 4.9 | |

a Also Aug. 14, 15, 2002.
b From high-water mark in gage house.
c Not determined.
d Probably occured Oct. 9, 2002.
e Estimated.
f No flow part or all of each day Oct. 13, 1954 and Aug. 12-17, 2002.



## 02047000 NOTTOWAY RIVER NEAR SEBRELL, VA

LOCATION.--Lat 36°46'14", long 77°09'58", NAD83, 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 $mi^2$.

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 NGVD of 1929. 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 periods of partial gage-height record, Feb. 4, 5, and June 11-13, and discharges greater than 3,000 $ft^3/s$, which are fair. Maximum discharge, 36,000 $ft^3/s$, from rating curve extended above 25,000 $ft^3/s$. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

REVISIONS.--The maximum discharges for the water years 2000 and 2001 have been revised to 9,910 $ft^3/s$, Sept. 8, 2000, gage height, 19.71 ft, and 6,110 $ft^3/s$, Apr. 5, 2001, gage height, 16.73 ft, superseding figures published in reports for 2000 and 2001.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 47 | 1,390 | 766 | 3,300 | 2,200 | 6,200 | 3,370 | 2,060 | 10,800 | 1,250 | 529 | 465 |
| 2 | 45 | 1,630 | 713 | 2,430 | 2,810 | 5,720 | 4,080 | 1,650 | 9,090 | 1,390 | 650 | 484 |
| 3 | 43 | 1,370 | 654 | 2,500 | 2,990 | 5,760 | 5,170 | 1,700 | 7,050 | 2,150 | 746 | 460 |
| 4 | 43 | 996 | 602 | 2,850 | e2,700 | 6,100 | 5,650 | 2,150 | 5,240 | 2,650 | 861 | 559 |
| 5 | 43 | 765 | 672 | 3,130 | e2,400 | 6,270 | 5,150 | 2,380 | 3,980 | 3,160 | 888 | 809 |
| 6 | 41 | 764 | 985 | 3,240 | 1,970 | 6,310 | 4,170 | 2,280 | 3,160 | 4,250 | 867 | 1,360 |
| 7 | 39 | 1,150 | 1,280 | 2,920 | 1,780 | 6,150 | 3,320 | 2,040 | 2,540 | 4,920 | 1,410 | 1,800 |
| 8 | 35 | 1,720 | 1,470 | 2,260 | 2,020 | 5,700 | 3,320 | 1,760 | 2,190 | 4,420 | 2,080 | 1,910 |
| 9 | 34 | 2,020 | 1,520 | 1,830 | 2,440 | 5,250 | 4,370 | 1,560 | 2,290 | 3,390 | 2,330 | 1,440 |
| 10 | 34 | 1,840 | 1,480 | 1,580 | 2,730 | 4,870 | 6,560 | 1,500 | 2,720 | 2,360 | 2,620 | 894 |
| 11 | 52 | 1,360 | 1,410 | 1,410 | 2,760 | 4,410 | 8,730 | 1,730 | e4,200 | 1,620 | 2,750 | 644 |
| 12 | 294 | 1,060 | 1,450 | 1,250 | 2,660 | 3,830 | 10,500 | 2,110 | e5,400 | 1,490 | 2,950 | 617 |
| 13 | 591 | 1,140 | 1,770 | 1,110 | 2,500 | 3,190 | 11,400 | 2,230 | e5,000 | 1,360 | 3,460 | 1,300 |
| 14 | 680 | 1,580 | 2,400 | 1,010 | 2,160 | 2,590 | 11,100 | 2,040 | 4,020 | 1,170 | 4,170 | 1,780 |
| 15 | 666 | 2,150 | 3,030 | 948 | 1,850 | 2,180 | 9,990 | 1,540 | 3,200 | 1,010 | 4,110 | 2,080 |
| 16 | 625 | 2,490 | 3,580 | 899 | 1,880 | 1,980 | 8,520 | 1,150 | 2,900 | 938 | 3,200 | 2,170 |
| 17 | 497 | 2,540 | 3,980 | 872 | 2,270 | 1,840 | 6,810 | 964 | 2,830 | 891 | 2,000 | 1,930 |
| 18 | 438 | 2,660 | 4,220 | 858 | 2,710 | 1,710 | 5,110 | 1,080 | 3,000 | 768 | 1,310 | 1,830 |
| 19 | 498 | 3,050 | 3,960 | 835 | 3,100 | 1,630 | 3,830 | 1,830 | 3,590 | 717 | 1,200 | 4,830 |
| 20 | 561 | 3,380 | 2,970 | 802 | 3,360 | 1,650 | 2,990 | 2,530 | 4,030 | 780 | 1,310 | 8,190 |
| 21 | 455 | 3,580 | 2,110 | 841 | 3,420 | 2,150 | 2,560 | 3,240 | 3,890 | 981 | 1,740 | 10,700 |
| 22 | 372 | 3,450 | 1,940 | 863 | 3,490 | 3,020 | 2,430 | 4,430 | 3,740 | 939 | 1,910 | 16,500 |
| 23 | 326 | 2,850 | 1,910 | 864 | 3,890 | 4,300 | 2,280 | 6,180 | 4,050 | 875 | 1,640 | 20,400 |
| 24 | 292 | 2,220 | 1,750 | 783 | 4,510 | 6,130 | 2,040 | 7,290 | 4,310 | 780 | 1,280 | 18,400 |
| 25 | 275 | 1,750 | 2,010 | 723 | 5,180 | 7,460 | 1,780 | 7,510 | 3,770 | 981 | 969 | 14,900 |
| 26 | 256 | 1,420 | 2,860 | 753 | 5,940 | 7,860 | 1,640 | 7,550 | 2,830 | 1,180 | 751 | 11,800 |
| 27 | 237 | 1,180 | 3,660 | 723 | 6,540 | 7,270 | 1,990 | 7,520 | 1,940 | 998 | 603 | 9,160 |
| 28 | 215 | 1,020 | 4,250 | 666 | 6,680 | 5,830 | 2,370 | 7,170 | 1,280 | 766 | 501 | 7,360 |
| 29 | 211 | 909 | 4,810 | 668 | --- | 4,280 | 2,750 | 6,920 | 1,100 | 615 | 433 | 6,070 |
| 30 | 326 | 826 | 5,020 | 809 | --- | 3,360 | 2,610 | 8,630 | 1,230 | 531 | 389 | 4,910 |
| 31 | 707 | --- | 4,440 | 1,360 | --- | 3,070 | --- | 10,900 | --- | 481 | 400 | --- |
| TOTAL | 8,978 | 54,260 | 73,672 | 45,087 | 88,940 | 138,070 | 146,590 | 113,624 | 115,370 | 49,811 | 50,057 | 155,752 |
| MEAN | 290 | 1,809 | 2,377 | 1,454 | 3,176 | 4,454 | 4,886 | 3,665 | 3,846 | 1,607 | 1,615 | 5,192 |
| MAX | 707 | 3,580 | 5,020 | 3,300 | 6,680 | 7,860 | 11,400 | 10,900 | 10,800 | 4,920 | 4,170 | 20,400 |
| MIN | 34 | 764 | 602 | 666 | 1,780 | 1,630 | 1,640 | 964 | 1,100 | 481 | 389 | 460 |
| CFSM | 0.20 | 1.27 | 1.67 | 1.02 | 2.24 | 3.13 | 3.44 | 2.58 | 2.71 | 1.13 | 1.14 | 3.65 |
| IN. | 0.24 | 1.42 | 1.93 | 1.18 | 2.33 | 3.61 | 3.84 | 2.97 | 3.02 | 1.30 | 1.31 | 4.08 |

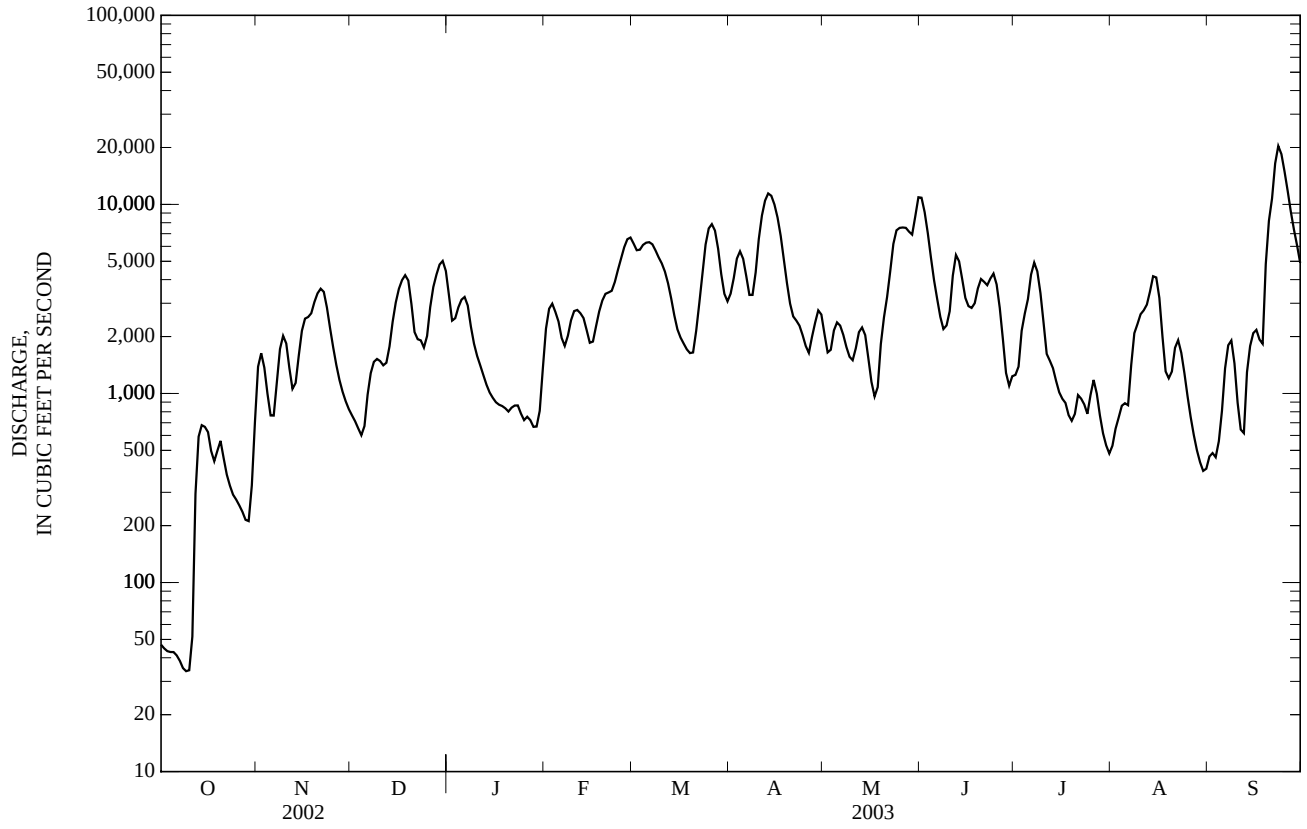
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1941 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 656 | 858 | 1,314 | 2,010 | 2,471 | 2,772 | 2,147 | 1,331 | 813 | 720 | 627 | 771 |
| MAX | 4,491 | 4,854 | 4,310 | 6,115 | 6,255 | 6,531 | 5,127 | 5,180 | 3,846 | 5,782 | 2,831 | 9,191 |
| (WY) | (1973) | (1986) | (1958) | (1978) | (1998) | (1998) | (1987) | (1978) | (2003) | (1975) | (1955) | (1999) |
| MIN | 27.4 | 59.5 | 98.8 | 196 | 466 | 389 | 427 | 300 | 54.8 | 37.8 | 35.7 | 27.8 |
| (WY) | (1955) | (1942) | (1966) | (1966) | (2002) | (1981) | (1966) | (1942) | (2002) | (2002) | (2002) | (1954) |

02047000 NOTTOWAY RIVER NEAR SEBRELL, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1941 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 244,770 | | 1,040,211 | | | |
| ANNUAL MEAN | 671 | | 2,850 | | 1,368 | |
| HIGHEST ANNUAL MEAN | | | | | 2,850 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 316 | 2002 |
| HIGHEST DAILY MEAN | 5,020 | Dec 30 | 20,400 | Sep 23 | 34,500 | Sep 19, 1999 |
| LOWEST DAILY MEAN | e13 | Aug 26 | 34 | aOct 9 | e13 | Aug 26, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 17 | Aug 9 | 38 | Oct 4 | 15 | Oct 8, 1954 |
| MAXIMUM PEAK FLOW | | | 20,800 | Sep 23 | 36,000 | (b) |
| MAXIMUM PEAK STAGE | | | 24.71 | Sep 23 | c26.98 | (b) |
| INSTANTANEOUS LOW FLOW | | | 33 | aOct 9 | d12 | Oct 23, 1941 |
| ANNUAL RUNOFF (CFSM) | 0.47 | | 2.01 | | 0.96 | |
| ANNUAL RUNOFF (INCHES) | 6.41 | | 27.23 | | 13.08 | |
| 10 PERCENT EXCEEDS | 1,830 | | 6,190 | | 3,380 | |
| 50 PERCENT EXCEEDS | 326 | | 2,040 | | 736 | |
| 90 PERCENT EXCEEDS | 30 | | 560 | | 99 | |

a Also Oct. 10, 2002.
b Occurred Sept. 19 or 20, 1999.
c From high-water mark in gage house.
d Observed, may have gone lower Aug. 26, 2002.
e Estimated.



## 02047500 BLACKWATER RIVER NEAR DENDRON, VA

LOCATION.--Lat 37°01'31", long 76°52'29", NAD83, 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 $mi^2$.

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 NGVD of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Aug. 13, 1980, at site 25 ft upstream at same datum.

REMARKS.--No estimated daily discharges. Records good. Maximum discharge, 12,300 $ft^3/s$, from rating curve extended above 5,000 $ft^3/s$. 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 $ft^3/s$, from rating curve extended above 4,900 $ft^3/s$.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.9 | 186 | 241 | 665 | 525 | 1,460 | 1,320 | 354 | 1,060 | 165 | 156 | 192 |
| 2 | 1.0 | 218 | 198 | 622 | 657 | 1,420 | 1,200 | 308 | 890 | 177 | 162 | 184 |
| 3 | 0.55 | 172 | 151 | 565 | 639 | 1,400 | 1,110 | 299 | 785 | 177 | 159 | 183 |
| 4 | 0.16 | 145 | 129 | 498 | 604 | 1,450 | 1,150 | 282 | 640 | 153 | 212 | 207 |
| 5 | 0.00 | 124 | 194 | 437 | 570 | 1,480 | 1,050 | 262 | 519 | 160 | 280 | 536 |
| 6 | 0.00 | 199 | 282 | 407 | 550 | 1,510 | 885 | 252 | 434 | 200 | 461 | 1,020 |
| 7 | 0.00 | 297 | 308 | 462 | 592 | 1,550 | 823 | 235 | 390 | 223 | 1,060 | 991 |
| 8 | 0.00 | 345 | 339 | 527 | 617 | 1,450 | 1,000 | 221 | 530 | 240 | 2,290 | 864 |
| 9 | 0.00 | 407 | 330 | 530 | 613 | 1,290 | 1,660 | 195 | 609 | 283 | 2,300 | 849 |
| 10 | 0.00 | 366 | 298 | 491 | 603 | 1,120 | 2,570 | 182 | 621 | 299 | 1,860 | 864 |
| 11 | 2.4 | 348 | 296 | 436 | 600 | 996 | 3,120 | 180 | 590 | 249 | 1,420 | 753 |
| 12 | 26 | 341 | 300 | 380 | 584 | 898 | 3,280 | 168 | 493 | 171 | 1,030 | 697 |
| 13 | 28 | 387 | 333 | 342 | 576 | 802 | 3,000 | 143 | 544 | 113 | 1,010 | 1,340 |
| 14 | 21 | 412 | 483 | 312 | 543 | 722 | 2,460 | 124 | 580 | 95 | 1,160 | 1,950 |
| 15 | 31 | 477 | 596 | 287 | 531 | 653 | 1,960 | 100 | 557 | 90 | 1,060 | 1,860 |
| 16 | 46 | 572 | 689 | 259 | 570 | 597 | 1,560 | 88 | 568 | 91 | 859 | 1,670 |
| 17 | 53 | 624 | 690 | 244 | 697 | 544 | 1,230 | 82 | 541 | 94 | 702 | 1,590 |
| 18 | 48 | 671 | 683 | 228 | 771 | 503 | 969 | 98 | 580 | 80 | 565 | 1,700 |
| 19 | 45 | 732 | 682 | 224 | 787 | 467 | 803 | 131 | 596 | 96 | 391 | 3,470 |
| 20 | 39 | 786 | 657 | 217 | 790 | 484 | 681 | 141 | 647 | 96 | 290 | 5,330 |
| 21 | 40 | 729 | 594 | 219 | 862 | 636 | 583 | 153 | 716 | 101 | 249 | 5,250 |
| 22 | 41 | 684 | 514 | 199 | 989 | 895 | 507 | 232 | 815 | 95 | 210 | 5,350 |
| 23 | 36 | 663 | 441 | 199 | 1,240 | 1,100 | 436 | 379 | 790 | 115 | 147 | 5,130 |
| 24 | 32 | 635 | 394 | 187 | 1,510 | 1,260 | 390 | 565 | 740 | 147 | 110 | 4,340 |
| 25 | 30 | 579 | 428 | 176 | 1,650 | 1,470 | 369 | 767 | 724 | 186 | 88 | 3,380 |
| 26 | 33 | 514 | 501 | 176 | 1,730 | 1,350 | 372 | 1,030 | 662 | 193 | 75 | 2,550 |
| 27 | 29 | 444 | 674 | 171 | 1,680 | 1,100 | 439 | 1,160 | 536 | 170 | 64 | 1,890 |
| 28 | 31 | 375 | 742 | 165 | 1,570 | 873 | 517 | 1,130 | 382 | 133 | 57 | 1,400 |
| 29 | 50 | 322 | 703 | 190 | --- | 716 | 497 | 1,010 | 290 | 117 | 78 | 1,070 |
| 30 | 93 | 280 | 688 | 259 | --- | 753 | 416 | 1,020 | 199 | 115 | 78 | 855 |
| 31 | 134 | --- | 684 | 387 | --- | 1,030 | --- | 1,120 | --- | 133 | 144 | --- |
| TOTAL | 892.01 | 13,034 | 14,242 | 10,461 | 23,650 | 31,979 | 36,357 | 12,411 | 18,028 | 4,757 | 18,727 | 57,465 |
| MEAN | 28.8 | 434 | 459 | 337 | 845 | 1,032 | 1,212 | 400 | 601 | 153 | 604 | 1,916 |
| MAX | 134 | 786 | 742 | 665 | 1,730 | 1,550 | 3,280 | 1,160 | 1,060 | 299 | 2,300 | 5,350 |
| MIN | 0.00 | 124 | 129 | 165 | 525 | 467 | 369 | 82 | 199 | 80 | 57 | 183 |
| CFSM | 0.10 | 1.48 | 1.56 | 1.15 | 2.87 | 3.51 | 4.12 | 1.36 | 2.04 | 0.52 | 2.05 | 6.52 |
| IN. | 0.11 | 1.65 | 1.80 | 1.32 | 2.99 | 4.05 | 4.60 | 1.57 | 2.28 | 0.60 | 2.37 | 7.27 |

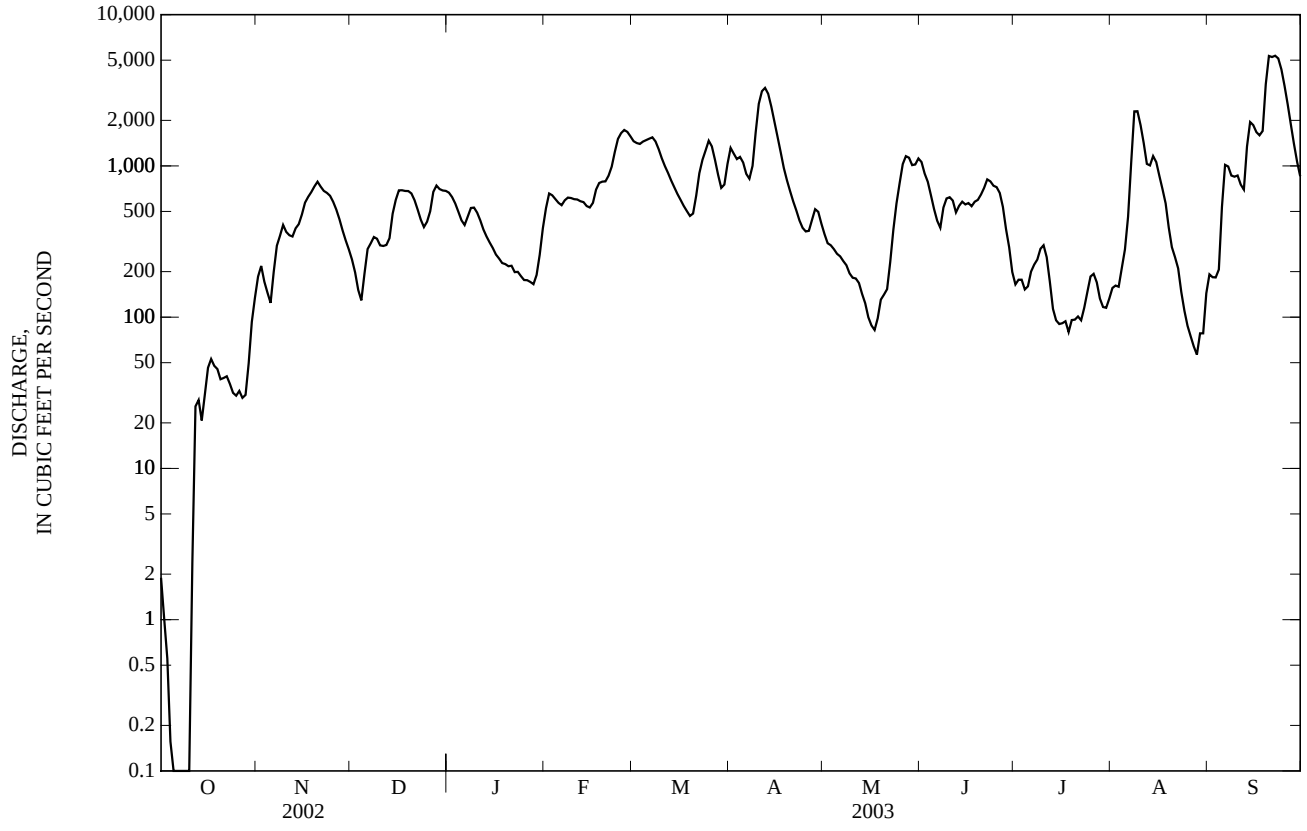
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1986, 1989 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 152 | 201 | 310 | 482 | 572 | 647 | 465 | 257 | 147 | 139 | 171 | 214 |
| MAX | 1,128 | 1,108 | 1,240 | 1,473 | 1,732 | 1,501 | 1,271 | 879 | 988 | 1,364 | 912 | 2,355 |
| (WY) | (1973) | (1980) | (1958) | (1978) | (1998) | (1975) | (1989) | (1958) | (1963) | (1945) | (1969) | (1999) |
| MIN | 0.000 | 0.000 | 2.65 | 21.1 | 70.8 | 79.5 | 87.2 | 25.8 | 0.018 | 0.32 | 0.000 | 0.000 |
| (WY) | (a) | (b) | (1981) | (1981) | (1942) | (1981) | (1981) | (1991) | (1999) | (1957) | (c) | (d) |

02047500 BLACKWATER RIVER NEAR DENDRON, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1942 - 1986 1989 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 48,142.89 | | 242,003.01 | | | |
| ANNUAL MEAN | 132 | | 663 | | 313 | |
| HIGHEST ANNUAL MEAN | | | | | 663 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 55.1 | 2002 |
| HIGHEST DAILY MEAN | 786 | Nov 20 | 5,350 | Sep 22 | e11,400 | Sep 18, 1999 |
| LOWEST DAILY MEAN | 0.00 | fJun 6 | 0.00 | gOct 5 | 0.00 | (h) |
| ANNUAL SEVEN-DAY MINIMUM | 0.00 | jJun 9 | 0.02 | Oct 4 | 0.00 | (h) |
| MAXIMUM PEAK FLOW | | | 5,460 | Sep 20 | 12,300 | Sep 17, 1999 |
| MAXIMUM PEAK STAGE | | | 10.57 | Sep 20 | k17.11 | Sep 17, 1999 |
| INSTANTANEOUS LOW FLOW | | | 0.00 | lOct 4 | 0.00 | (h) |
| ANNUAL RUNOFF (CFSM) | 0.45 | | 2.26 | | 1.06 | |
| ANNUAL RUNOFF (INCHES) | 6.09 | | 30.62 | | 14.45 | |
| 10 PERCENT EXCEEDS | 416 | | 1,450 | | 786 | |
| 50 PERCENT EXCEEDS | 64 | | 493 | | 160 | |
| 90 PERCENT EXCEEDS | 0.00 | | 86 | | 1.3 | |

a Monthly mean flow is 0.0 $ft^3/s$ in 1955, 1969, 1981, 1984, 1994, 1998, 1999, 2001.
b Monthly mean flow is 0.0 $ft^3/s$ in 1955, 1981, 1999, 2001.
c Monthly mean flow is 0.0 $ft^3/s$ in 1976, 1980, 1993.
d Monthly mean flow is 0.0 $ft^3/s$ in 1944, 1954, 1980, 1983, 1993, 1995, 1997.
f Also June 8 to July 26, Aug. 7 to Sept. 2, Sept. 8-22, and Oct. 5-10, 2002.
g Also Oct. 6-10, 2002.
h No flow at times most years.
j Also many days June to September 2002.
k From floodmarks.
l Also Oct. 5-11, 2002.



## 02049500 BLACKWATER RIVER NEAR FRANKLIN, VA

LOCATION.--Lat 36°45'46", long 76°53'54", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--No estimated daily discharges. Records good except those for periods of tidal effect below 20 $ft^3/s$, 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 $ft^3/s$, from rating curve extended above 12,800 $ft^3/s$. 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 $ft^3/s$, from rating curve extended above 9,400 $ft^3/s$.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7.0 | 172 | 778 | 1,240 | 1,030 | 2,970 | 1,500 | 994 | 1,400 | 653 | 239 | 87 |
| 2 | 7.1 | 218 | 705 | 1,260 | 1,280 | 3,130 | 1,600 | 839 | 1,360 | 525 | 299 | 136 |
| 3 | 6.4 | 247 | 634 | 1,280 | 1,440 | 3,140 | 1,720 | 775 | 1,390 | 453 | 414 | 231 |
| 4 | 6.0 | 274 | 566 | 1,260 | 1,480 | 3,010 | 1,740 | 715 | 1,330 | 437 | 417 | 365 |
| 5 | 6.4 | 309 | 598 | 1,210 | 1,450 | 2,800 | 1,650 | 685 | 1,190 | 433 | 410 | 526 |
| 6 | 5.9 | 347 | 808 | 1,140 | 1,390 | 2,750 | 1,540 | 696 | 1,020 | 375 | 426 | 659 |
| 7 | 5.6 | 442 | 928 | 1,070 | 1,370 | 2,990 | 1,560 | 644 | 859 | 302 | 433 | 667 |
| 8 | 5.4 | 486 | 1,000 | 1,000 | 1,480 | 3,090 | 2,150 | 614 | 800 | 238 | 753 | 727 |
| 9 | 4.9 | 543 | 1,040 | 950 | 1,570 | 3,000 | 2,890 | 606 | 970 | 203 | 2,220 | 946 |
| 10 | 4.9 | 584 | 1,020 | 927 | 1,620 | 2,760 | 4,020 | 601 | 1,330 | 193 | 3,360 | 1,030 |
| 11 | 8.9 | 599 | 967 | 927 | 1,640 | 2,460 | 4,800 | 562 | 1,420 | 194 | 3,610 | 956 |
| 12 | 21 | 594 | 913 | 921 | 1,600 | 2,170 | 5,380 | 491 | 1,410 | 206 | 3,380 | 970 |
| 13 | 42 | 658 | 882 | 891 | 1,510 | 1,910 | 5,610 | 408 | 1,310 | 223 | 2,920 | 1,460 |
| 14 | 74 | 779 | 985 | 841 | 1,420 | 1,710 | 5,440 | 327 | 1,110 | 293 | 2,440 | 2,120 |
| 15 | 73 | 891 | 1,120 | 781 | 1,350 | 1,540 | 4,960 | 264 | 993 | 407 | 2,090 | 2,760 |
| 16 | 68 | 1,000 | 1,230 | 719 | 1,410 | 1,390 | 4,340 | 220 | 1,820 | 366 | 1,970 | 3,060 |
| 17 | 63 | 1,190 | 1,290 | 671 | 1,830 | 1,280 | 3,670 | 185 | 2,720 | 270 | 1,840 | 2,930 |
| 18 | 59 | 1,460 | 1,300 | 625 | 2,410 | 1,200 | 3,000 | 195 | 2,620 | 189 | 1,750 | 2,890 |
| 19 | 53 | 1,680 | 1,260 | 563 | 2,630 | 1,120 | 2,370 | 377 | 2,270 | 152 | 1,790 | 5,220 |
| 20 | 48 | 1,790 | 1,220 | 560 | 2,560 | 1,070 | 1,930 | 505 | 2,110 | 155 | 1,730 | 7,090 |
| 21 | 46 | 1,750 | 1,200 | 567 | 2,320 | 1,110 | 1,600 | 576 | 2,250 | 168 | 1,450 | 7,790 |
| 22 | 57 | 1,630 | 1,180 | 539 | 2,100 | 1,200 | 1,370 | 603 | 2,220 | 163 | 1,070 | 7,740 |
| 23 | 45 | 1,510 | 1,130 | 524 | 2,060 | 1,320 | 1,180 | 951 | 1,920 | 143 | 732 | 7,390 |
| 24 | 39 | 1,390 | 1,080 | 501 | 2,200 | 1,430 | 996 | 1,620 | 1,600 | 120 | 532 | 7,060 |
| 25 | 35 | 1,290 | 1,170 | 486 | 2,380 | 1,510 | 842 | 1,930 | 1,350 | 103 | 405 | 6,740 |
| 26 | 32 | 1,190 | 1,310 | 463 | 2,460 | 1,580 | 733 | 1,870 | 1,150 | 94 | 309 | 6,250 |
| 27 | 30 | 1,100 | 1,400 | 436 | 2,490 | 1,670 | 689 | 1,760 | 978 | 92 | 232 | 5,600 |
| 28 | 27 | 1,020 | 1,390 | 386 | 2,680 | 1,720 | 901 | 1,650 | 877 | 98 | 173 | 4,900 |
| 29 | 31 | 938 | 1,340 | 406 | --- | 1,660 | 1,260 | 1,600 | 975 | 109 | 128 | 4,190 |
| 30 | 39 | 858 | 1,290 | 471 | --- | 1,570 | 1,180 | 1,570 | 821 | 122 | 96 | 3,540 |
| 31 | 114 | --- | 1,260 | 720 | --- | 1,510 | --- | 1,480 | --- | 158 | 76 | --- |
| TOTAL | 1,064.5 | 26,939 | 32,994 | 24,335 | 51,160 | 61,770 | 72,621 | 26,313 | 43,573 | 7,637 | 37,694 | 96,030 |
| MEAN | 34.3 | 898 | 1,064 | 785 | 1,827 | 1,993 | 2,421 | 849 | 1,452 | 246 | 1,216 | 3,201 |
| MAX | 114 | 1,790 | 1,400 | 1,280 | 2,680 | 3,140 | 5,610 | 1,930 | 2,720 | 653 | 3,610 | 7,790 |
| MIN | 4.9 | 172 | 566 | 386 | 1,030 | 1,070 | 689 | 185 | 800 | 92 | 76 | 87 |
| (†) | 19.5 | 17.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MEAN‡ | 53.8 | 915 | 1,064 | 785 | 1,827 | 1,993 | 2,421 | 849 | 1,452 | 246 | 1,216 | 3,201 |
| CFSM‡ | .09 | 1.48 | 1.72 | 1.27 | 2.96 | 3.23 | 3.92 | 1.38 | 2.35 | 0.40 | 1.97 | 5.19 |
| IN.‡ | .10 | 1.65 | 1.99 | 1.47 | 3.08 | 3.72 | 4.38 | 1.59 | 2.63 | 0.46 | 2.27 | 5.79 |

CAL YR 2002 MEAN‡ 348 CFSM‡ 0.56 IN.‡ 7.66
WTR YR 2003 MEAN‡ 1,324 CFSM‡ 2.15 IN.‡ 29.14

† Average daily diversion, in cubic feet per second, by city of Norfolk.
‡ Adjusted for diversion.

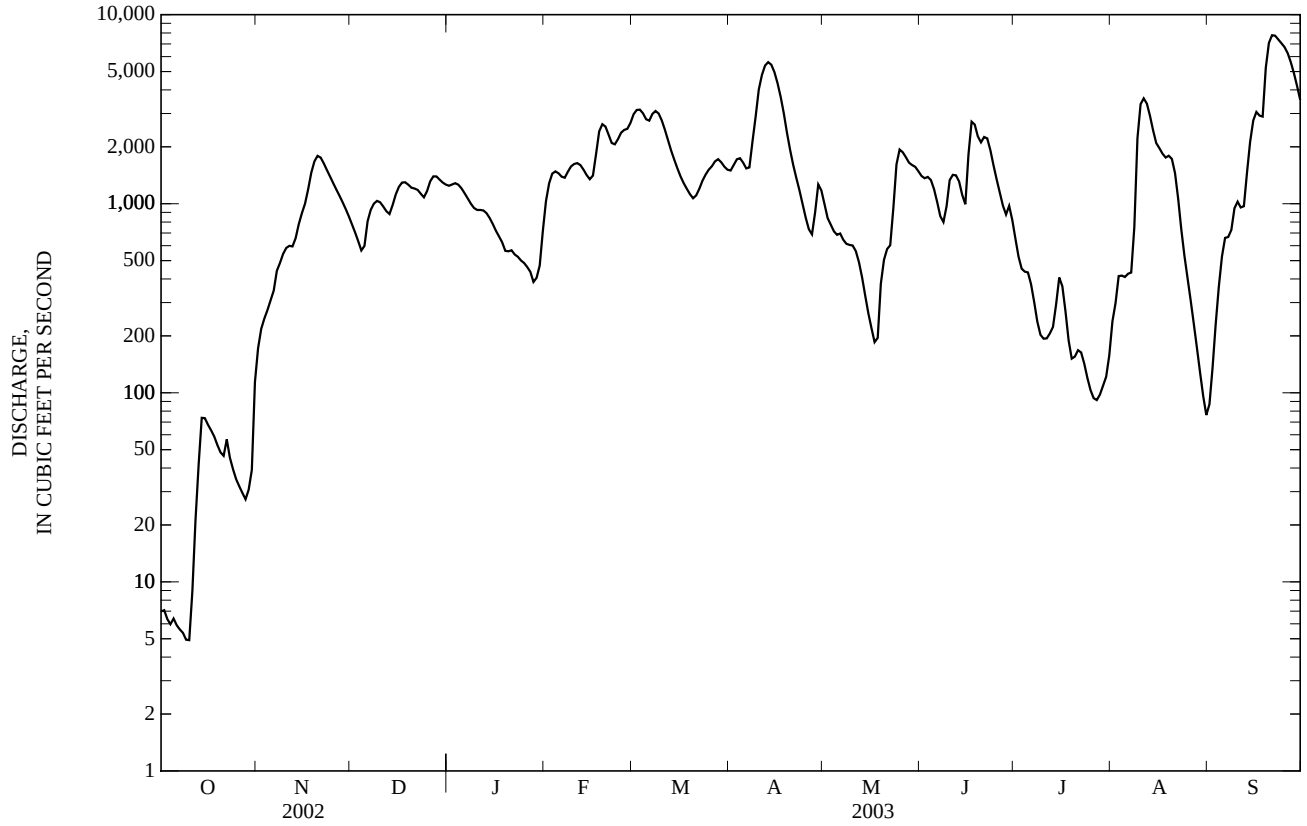
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 298 | 368 | 618 | 980 | 1,182 | 1,267 | 942 | 545 | 360 | 285 | 363 | 436 |
| MAX | 1,795 | 1,713 | 2,082 | 2,271 | 3,520 | 2,915 | 2,783 | 1,890 | 1,925 | 2,003 | 1,481 | 5,923 |
| (WY) | (1973) | (1980) | (1958) | (1978) | (1998) | (1989) | (1989) | (1958) | (1963) | (1945) | (1969) | (1999) |
| MIN | 0.94 | 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) |

02049500 BLACKWATER RIVER NEAR FRANKLIN, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1944 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 122,974.38 | | 482,130.5 | | | |
| ANNUAL MEAN | 337 | | 1,321 | | 634 | |
| HIGHEST ANNUAL MEAN | | | | | 1,321 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 133 | 1981 |
| HIGHEST DAILY MEAN | 1,790 | Nov 20 | 7,790 | Sep 21 | e22,000 | Sep 18, 1999 |
| LOWEST DAILY MEAN | 0.00 | Jul 13 | 4.9 | Oct 9 | 0.00 | Jul 13, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.35 | Jul 7 | 5.6 | Oct 4 | 0.26 | Oct 10, 1987 |
| MAXIMUM PEAK FLOW | | | 7,840 | Sep 21 | 23,000 | (a) |
| MAXIMUM PEAK STAGE | | | 16.79 | Sep 21 | b26.27 | (a) |
| INSTANTANEOUS LOW FLOW | | | (c) | | (c) | |
| ANNUAL RUNOFF (CFSM) | 0.55 | | 2.14 | | 1.03 | |
| ANNUAL RUNOFF (INCHES) | 7.41 | | 29.07 | | 13.97 | |
| 10 PERCENT EXCEEDS | 1,020 | | 2,840 | | 1,620 | |
| 50 PERCENT EXCEEDS | 131 | | 1,020 | | 376 | |
| 90 PERCENT EXCEEDS | 2.2 | | 101 | | 8.2 | |

a Probably occurred Sept. 18, 1999.
b From floodmarks.
c Not determined, tidally affected most years during periods of extreme low flows; minimum measured flow, 2.4 $ft^3/s$ (reverse flow), Sept. 17, 1952.



## 02051000 NORTH MEHERRIN RIVER NEAR LUNENBURG, VA

LOCATION.--Lat 36°59'51", long 78°20'59", NAD83, 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 $mi^2$.

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 NGVD of 1929 (levels by U.S. Army Corps of Engineers). Prior to July 5, 1951, nonrecording gage at same site and datum. July 5, 1951, to July 11, 1980, water-stage recorder at site 20 ft downstream at same datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 7-9 and Jan. 17-28, which are fair. Maximum discharge, 14,400 $ft^3/s$, from rating curve extended above 2,320 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,200 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Mar 20 | 1615 | 5,240 | 21.29 | Sep 19 | 0300 | *7,180 | *23.86 |
| Apr 7 | 1400 | 2,560 | 13.87 | Sep 23 | 1045 | 6,310 | 22.84 |
| May 26 | 0615 | 4,810 | 20.51 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.22 | 27 | 12 | 289 | 35 | 167 | 62 | 586 | 151 | 33 | 63 | 9.8 |
| 2 | 0.15 | 17 | 11 | 203 | 56 | 336 | 49 | 83 | 57 | 461 | 54 | 10 |
| 3 | 0.14 | 13 | 11 | 80 | 40 | 121 | 42 | 147 | 46 | 288 | 31 | 8.5 |
| 4 | 0.16 | 16 | 10 | 62 | 56 | 67 | 38 | 75 | 54 | 144 | 194 | 73 |
| 5 | 0.14 | 24 | 16 | 46 | 60 | 63 | 37 | 52 | 115 | 58 | 48 | 65 |
| 6 | 0.12 | 407 | 17 | 39 | 36 | 150 | 32 | 49 | 54 | 39 | 30 | 22 |
| 7 | 0.11 | 59 | e12 | 34 | 127 | 87 | 983 | 40 | 205 | 31 | 71 | 15 |
| 8 | 0.10 | 30 | e13 | 31 | 119 | 58 | 246 | 40 | 177 | 26 | 106 | 13 |
| 9 | 0.09 | 20 | e15 | 29 | 61 | 49 | 1,070 | 32 | 166 | 33 | 115 | 12 |
| 10 | 0.08 | 16 | 17 | 26 | 53 | 40 | 434 | 28 | 67 | 40 | 151 | 11 |
| 11 | 300 | 19 | 98 | 23 | 63 | 36 | 560 | 27 | 48 | 25 | 50 | 9.9 |
| 12 | 58 | 444 | 144 | 20 | 46 | 34 | 139 | 23 | 58 | 20 | 46 | 9.2 |
| 13 | 25 | 212 | 371 | 20 | 36 | 32 | 83 | 19 | 71 | 19 | 31 | 16 |
| 14 | 212 | 65 | 350 | 20 | 32 | 31 | 61 | 17 | 48 | 20 | 26 | 18 |
| 15 | 22 | 39 | 113 | 19 | 125 | 28 | 52 | 17 | 39 | 19 | 21 | 15 |
| 16 | 72 | 39 | 62 | 18 | 208 | 29 | 45 | 29 | 36 | 17 | 19 | 13 |
| 17 | 44 | 409 | 43 | e18 | 75 | 35 | 39 | 25 | 41 | 16 | 17 | 10 |
| 18 | 15 | 227 | 34 | e15 | 55 | 31 | 37 | 688 | 56 | 15 | 16 | 623 |
| 19 | 7.7 | 65 | 30 | e14 | 95 | 28 | 56 | 458 | 238 | 15 | 15 | 2,530 |
| 20 | 5.4 | 43 | 158 | e17 | 213 | 2,780 | 45 | 94 | 96 | 14 | 15 | 77 |
| 21 | 8.0 | 34 | 100 | e15 | 207 | 418 | 39 | 110 | 57 | 13 | 14 | 42 |
| 22 | 10 | 28 | 51 | e14 | 678 | 124 | 37 | 280 | 41 | 14 | 13 | 29 |
| 23 | 6.9 | 23 | 38 | e13 | 331 | 73 | 31 | 243 | 33 | 43 | 12 | 2,460 |
| 24 | 5.1 | 20 | 204 | e12 | 102 | 57 | 28 | 137 | 26 | 44 | 11 | 137 |
| 25 | 4.2 | 18 | 731 | e13 | 65 | 48 | 28 | 163 | 24 | 21 | 9.5 | 59 |
| 26 | 16 | 17 | 152 | e15 | 51 | 42 | 35 | 2,080 | 21 | 16 | 9.1 | 41 |
| 27 | 15 | 15 | 68 | e14 | 55 | 39 | 34 | 293 | 19 | 13 | 8.8 | 32 |
| 28 | 41 | 14 | 50 | e13 | 132 | 34 | 26 | 252 | 88 | 12 | 8.3 | 31 |
| 29 | 177 | 14 | 41 | 17 | --- | 35 | 23 | 101 | 34 | 11 | 8.0 | 26 |
| 30 | 217 | 13 | 35 | 24 | --- | 196 | 22 | 83 | 25 | 20 | 7.3 | 21 |
| 31 | 62 | --- | 31 | 27 | --- | 134 | --- | 88 | --- | 19 | 7.8 | --- |
| TOTAL | 1,324.61 | 2,387 | 3,038 | 1,200 | 3,212 | 5,402 | 4,413 | 6,359 | 2,191 | 1,559 | 1,227.8 | 6,438.4 |
| MEAN | 42.7 | 79.6 | 98.0 | 38.7 | 115 | 174 | 147 | 205 | 73.0 | 50.3 | 39.6 | 215 |
| MAX | 300 | 444 | 731 | 289 | 678 | 2,780 | 1,070 | 2,080 | 238 | 461 | 194 | 2,530 |
| MIN | 0.08 | 13 | 10 | 12 | 32 | 28 | 22 | 17 | 19 | 11 | 7.3 | 8.5 |
| CFSM | 0.77 | 1.43 | 1.76 | 0.70 | 2.06 | 3.13 | 2.65 | 3.69 | 1.31 | 0.90 | 0.71 | 3.86 |
| IN. | 0.89 | 1.60 | 2.03 | 0.80 | 2.15 | 3.61 | 2.95 | 4.25 | 1.47 | 1.04 | 0.82 | 4.31 |

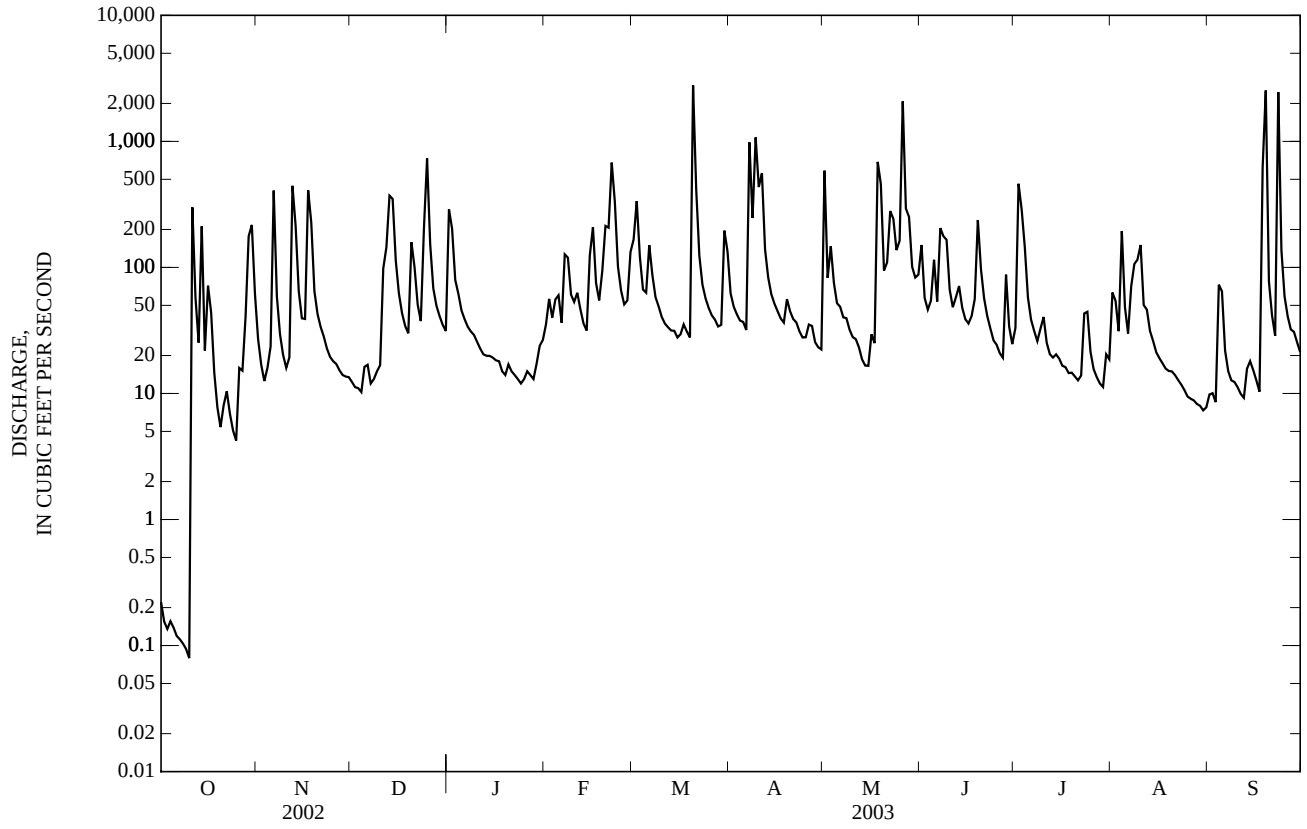
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 1980, 1982 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 32.0 | 44.2 | 52.2 | 69.5 | 87.9 | 97.2 | 77.8 | 48.0 | 28.2 | 20.2 | 18.6 | 30.3 |
| MAX | 442 | 299 | 186 | 194 | 249 | 293 | 223 | 205 | 154 | 98.6 | 138 | 292 |
| (WY) | (1972) | (1986) | (1949) | (1978) | (1979) | (1975) | (1978) | (2003) | (1968) | (1975) | (1955) | (1979) |
| MIN | 0.60 | 1.68 | 3.19 | 10.3 | 10.1 | 32.8 | 15.3 | 11.2 | 2.16 | 2.72 | 0.077 | 0.16 |
| (WY) | (2002) | (2002) | (2002) | (2002) | (2002) | (1985) | (1995) | (1964) | (2002) | (1957) | (2002) | (1954) |

02051000 NORTH MEHERRIN RIVER NEAR LUNENBURG, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1947 - 1980 1982 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 10,239.50 | | 38,751.81 | | | |
| ANNUAL MEAN | 28.1 | | 106 | | 50.3 | |
| HIGHEST ANNUAL MEAN | | | | | 106 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 10.0 | 2002 |
| HIGHEST DAILY MEAN | 731 | Dec 25 | 2,780 | Mar 20 | 6,710 | Oct 23, 1971 |
| LOWEST DAILY MEAN | 0.00 | aAug 14 | 0.08 | Oct 10 | 0.00 | (b) |
| ANNUAL SEVEN-DAY MINIMUM | 0.01 | Aug 12 | 0.11 | Oct 4 | 0.00 | (b) |
| MAXIMUM PEAK FLOW | | | 7,180 | Sep 19 | 14,400 | Oct 23, 1971 |
| MAXIMUM PEAK STAGE | | | 23.86 | Sep 19 | 28.30 | Oct 23, 1971 |
| INSTANTANEOUS LOW FLOW | | | 0.07 | Oct 10 | 0.00 | (b) |
| ANNUAL RUNOFF (CFSM) | 0.50 | | 1.91 | | 0.90 | |
| ANNUAL RUNOFF (INCHES) | 6.85 | | 25.93 | | 12.29 | |
| 10 PERCENT EXCEEDS | 56 | | 212 | | 92 | |
| 50 PERCENT EXCEEDS | 8.0 | | 36 | | 20 | |
| 90 PERCENT EXCEEDS | 0.12 | | 12 | | 3.6 | |

a Also Aug. 15, 23-25, 2002.
b Many days in September and October 1954, and August 2002.
e Estimated.



## 02051500 MEHERRIN RIVER NEAR LAWRENCEVILLE, VA

LOCATION.--Lat 36°43'01", long 77°49'54", NAD83, Brunswick County, Hydrologic Unit 03010204, on right bank 5 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 $mi^2$.

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 NGVD of 1929. Prior to Nov. 17, 1931, nonrecording gage at site 50 ft upstream at same datum. Nov. 17, 1931 to May 1, 2001, water-stage recorder at above site, at same datum. May 1, 2001 to current year, water-stage recorder at present site, at same datum.

REMARKS.--Records good except those for periods of doubtful gage-height record, Mar. 21-23, Apr. 9-12, and May 27-29, which are fair. Maximum discharge, 38,000 $ft^3/s$, from rating curve extended above 13,000 $ft^3/s$ on basis of velocity-area studies and records for Nottoway River near Stony Creek. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Dec 26 | 1115 | 5,150 | 16.80 | May 28 | --- | *16,500 | *30.25 |
| Feb 24 | 0245 | 5,390 | 17.27 | Jun 8 | 2045 | 4,970 | 16.43 |
| Mar 22 | --- | unknown | unknown | Aug 11 | 0745 | 5,300 | 17.10 |
| Apr 11 | --- | 7,520 | 20.95 | Sep 20 | 2100 | 14,700 | 28.73 |
| May 20 | 0300 | 5,120 | 16.73 | Sep 25 | 0515 | 5,610 | 17.69 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 18 | 673 | 123 | 582 | 753 | 2,360 | 1,530 | 1,010 | 1,980 | 456 | 227 | 192 |
| 2 | 17 | 344 | 113 | 2,650 | 607 | 2,470 | 919 | 2,640 | 1,390 | 1,060 | 322 | 198 |
| 3 | 16 | 219 | 107 | 1,410 | 506 | 3,010 | 727 | 884 | 789 | 3,720 | 354 | 180 |
| 4 | 16 | 170 | 100 | 871 | 427 | 1,330 | 618 | 801 | 703 | 2,440 | 380 | 359 |
| 5 | 15 | 154 | 128 | 700 | 392 | 922 | 556 | 663 | 903 | 1,090 | 816 | 1,070 |
| 6 | 14 | 814 | 190 | 553 | 475 | 1,020 | 515 | 562 | 921 | 666 | 454 | 766 |
| 7 | 14 | 1,990 | 216 | 475 | 624 | 1,500 | 1,560 | 533 | 812 | 561 | 1,310 | 369 |
| 8 | 13 | 672 | 187 | 411 | 1,530 | 996 | 5,330 | 504 | 4,160 | 497 | 2,570 | 260 |
| 9 | 12 | 372 | 199 | 374 | 1,060 | 735 | e6,550 | 444 | 3,650 | 401 | 977 | 222 |
| 10 | 12 | 264 | 197 | 343 | 672 | 623 | e7,300 | 401 | 1,890 | 445 | 3,590 | 202 |
| 11 | 29 | 210 | 250 | 307 | 637 | 538 | e7,490 | 371 | 1,060 | 501 | 4,290 | 186 |
| 12 | 2,350 | 211 | 1,140 | 275 | 618 | 484 | e6,950 | 356 | 771 | 365 | 946 | 173 |
| 13 | 1,010 | 2,280 | 1,420 | 255 | 484 | 455 | 2,380 | 319 | 1,420 | 291 | 840 | 225 |
| 14 | 258 | 1,560 | 3,550 | 245 | 402 | 434 | 1,110 | 276 | 1,180 | 299 | 618 | 227 |
| 15 | 449 | 650 | 2,590 | 246 | 400 | 393 | 878 | 253 | 797 | 299 | 485 | 229 |
| 16 | 381 | 424 | 952 | 229 | 1,520 | 369 | 760 | 298 | 1,600 | 278 | 404 | 218 |
| 17 | 769 | 446 | 609 | 228 | 1,550 | 371 | 696 | 374 | 773 | 342 | 357 | 188 |
| 18 | 504 | 2,280 | 467 | 214 | 844 | 389 | 637 | 479 | 761 | 267 | 360 | 766 |
| 19 | 214 | 1,440 | 392 | 177 | 745 | 373 | 732 | 3,560 | 1,070 | 229 | 334 | 7,810 |
| 20 | 119 | 641 | 434 | 267 | 1,500 | 1,690 | 786 | 3,830 | 1,990 | 212 | 283 | 13,300 |
| 21 | 101 | 443 | 610 | 271 | 1,790 | e7,000 | 675 | 1,020 | 1,160 | 205 | 254 | 11,900 |
| 22 | 132 | 352 | 654 | 212 | 2,020 | e8,600 | 610 | 1,710 | 872 | 198 | 237 | 3,770 |
| 23 | 201 | 287 | 418 | 210 | 4,470 | e6,100 | 558 | 4,160 | 637 | 323 | 224 | 1,260 |
| 24 | 141 | 234 | 442 | 169 | 3,970 | 1,100 | 510 | 3,170 | 519 | 492 | 206 | 4,460 |
| 25 | 100 | 200 | 3,360 | 198 | 1,170 | 798 | 481 | 1,560 | 449 | 382 | 184 | 4,160 |
| 26 | 85 | 181 | 4,870 | 246 | 789 | 691 | 656 | 3,270 | 405 | 299 | 173 | 875 |
| 27 | 80 | 164 | 1,540 | 221 | 767 | 625 | 1,150 | e11,300 | 374 | 229 | 169 | 650 |
| 28 | 101 | 148 | 762 | 201 | 2,310 | 558 | 564 | e14,300 | 412 | 199 | 167 | 543 |
| 29 | 165 | 136 | 590 | 211 | --- | 528 | 467 | e6,620 | 585 | 183 | 155 | 480 |
| 30 | 1,140 | 129 | 485 | 312 | --- | 1,280 | 419 | 1,340 | 440 | 181 | 149 | 422 |
| 31 | 1,640 | --- | 418 | 885 | --- | 2,960 | --- | 938 | --- | 226 | 156 | --- |
| TOTAL | 10,116 | 18,088 | 27,513 | 13,948 | 33,032 | 50,702 | 54,114 | 67,946 | 34,473 | 17,336 | 21,991 | 55,660 |
| MEAN | 326 | 603 | 888 | 450 | 1,180 | 1,636 | 1,804 | 2,192 | 1,149 | 559 | 709 | 1,855 |
| MAX | 2,350 | 2,280 | 4,870 | 2,650 | 4,470 | 8,600 | 7,490 | 14,300 | 4,160 | 3,720 | 4,290 | 13,300 |
| MIN | 12 | 129 | 100 | 169 | 392 | 369 | 419 | 253 | 374 | 181 | 149 | 173 |
| CFSM | 0.59 | 1.09 | 1.61 | 0.82 | 2.14 | 2.96 | 3.27 | 3.97 | 2.08 | 1.01 | 1.29 | 3.36 |
| IN. | 0.68 | 1.22 | 1.85 | 0.94 | 2.23 | 3.42 | 3.65 | 4.58 | 2.32 | 1.17 | 1.48 | 3.75 |

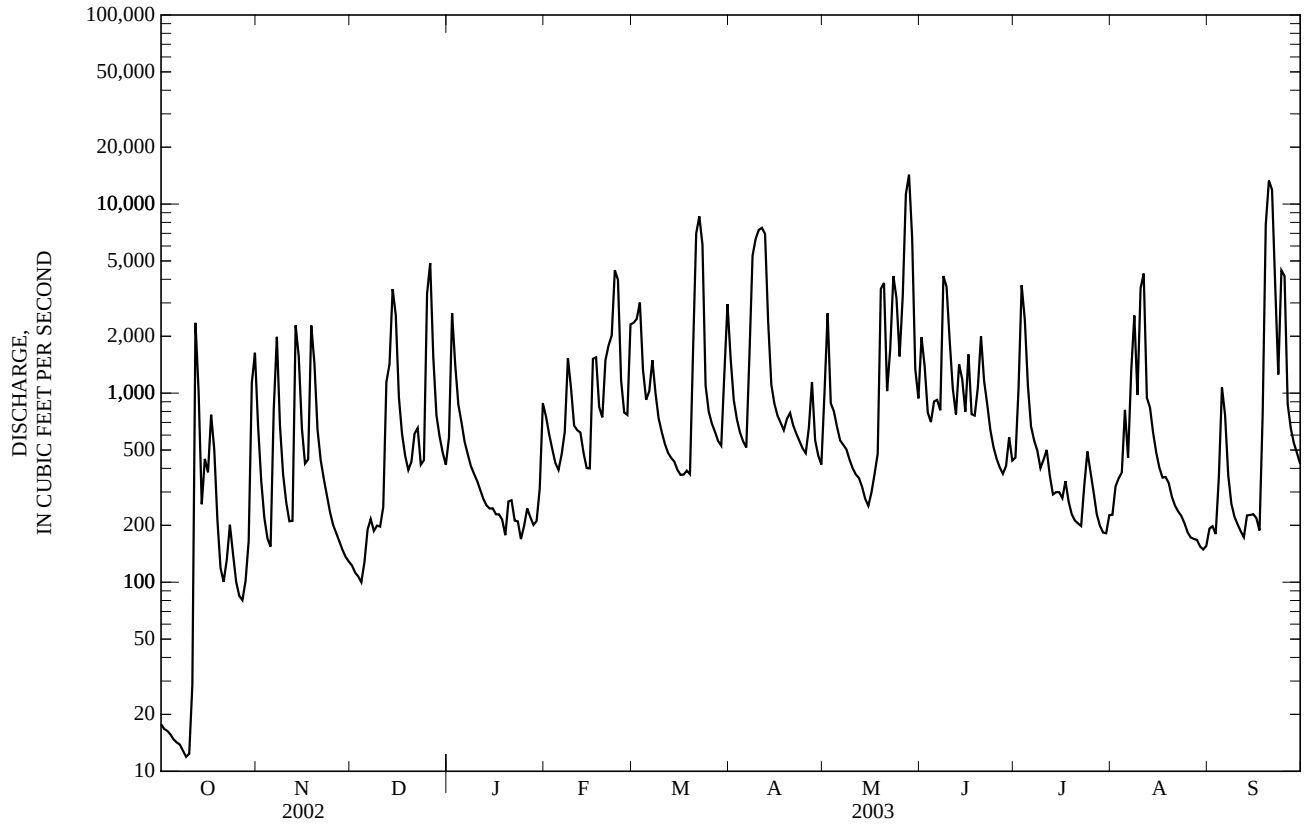
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 299 | 369 | 463 | 718 | 825 | 924 | 761 | 475 | 331 | 309 | 291 | 291 |
| MAX | 2,266 | 2,853 | 1,340 | 2,391 | 1,904 | 2,707 | 2,067 | 2,192 | 1,555 | 2,358 | 4,199 | 2,627 |
| (WY) | (1972) | (1986) | (1997) | (1936) | (1998) | (1998) | (1987) | (2003) | (1938) | (1945) | (1940) | (1999) |
| MIN | 17.1 | 44.1 | 64.6 | 88.8 | 139 | 190 | 162 | 128 | 43.1 | 22.8 | 10.7 | 9.70 |
| (WY) | (1931) | (1934) | (1966) | (1934) | (2002) | (1981) | (1966) | (1942) | (2002) | (2002) | (2002) | (1954) |

02051500 MEHERRIN RIVER NEAR LAWRENCEVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1929 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 91,974.1 | | 404,919 | | | |
| ANNUAL MEAN | 252 | | 1,109 | | 503 | |
| HIGHEST ANNUAL MEAN | | | | | 1,109 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 111 | 2002 |
| HIGHEST DAILY MEAN | 4,870 | Dec 26 | 14,300 | May 28 | 35,300 | Aug 17, 1940 |
| LOWEST DAILY MEAN | 2.2 | aAug 23 | 12 | bOct 9 | 2.2 | aAug 23, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 2.6 | Aug 19 | 14 | Oct 4 | 2.6 | Aug 19, 2002 |
| MAXIMUM PEAK FLOW | | | 16,500 | May 28 | 38,000 | Aug 17, 1940 |
| MAXIMUM PEAK STAGE | | | c30.25 | May 28 | 42.00 | Aug 17, 1940 |
| INSTANTANEOUS LOW FLOW | | | 11 | Oct 9 | 2.0 | Aug 25, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.46 | | 2.01 | | 0.91 | |
| ANNUAL RUNOFF (INCHES) | 6.20 | | 27.29 | | 12.38 | |
| 10 PERCENT EXCEEDS | 507 | | 2,610 | | 974 | |
| 50 PERCENT EXCEEDS | 112 | | 501 | | 248 | |
| 90 PERCENT EXCEEDS | 13 | | 170 | | 64 | |

a Also Aug. 24, 25, 2002.
b Also Oct. 10, 2002.
c From floodmarks.
e Estimated.



## 02052000 MEHERRIN RIVER AT EMPORIA, VA

LOCATION.--Lat 36°41'25", long 77°32'26", NAD83, 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 $mi^2$.

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 NGVD of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--Records good except those for periods with ice effect, Jan. 17, 18, 23, and period of doubtful gage-height record, May 12-18, which are fair. Prior to November 1965 and since April 1986, low and medium flow regulated by powerplant 0.8 mi upstream from station. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

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 $ft^3/s$, from rating curve extended above 18,000 $ft^3/s$ on basis of record for station near Lawrenceville.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 22 | 1,490 | 206 | 684 | 1,580 | 4,400 | 4,050 | 442 | 2,620 | 411 | 228 | 195 |
| 2 | 22 | 574 | 191 | 2,270 | 1,060 | 3,970 | 1,940 | 3,050 | 3,170 | 1,080 | 281 | 214 |
| 3 | 16 | 317 | 138 | 3,470 | 729 | 4,850 | 1,190 | 2,260 | 1,610 | 3,600 | 355 | 217 |
| 4 | 3.8 | 222 | 214 | 1,600 | 601 | 3,820 | 919 | 1,010 | 1,060 | 5,320 | 356 | 379 |
| 5 | 3.9 | 253 | 262 | 1,110 | 490 | 2,020 | 768 | 890 | 1,400 | 3,050 | 691 | 796 |
| 6 | 6.7 | 455 | 389 | 780 | 525 | 1,850 | 699 | 643 | 1,540 | 1,410 | 696 | 1,520 |
| 7 | 9.9 | 2,490 | 443 | 595 | 828 | 2,380 | 1,400 | 571 | 1,210 | 728 | 637 | 555 |
| 8 | 12 | 1,710 | 392 | 492 | 1,590 | 2,160 | 6,140 | 582 | 3,580 | 693 | 3,990 | 357 |
| 9 | 12 | 549 | 363 | 455 | 2,030 | 1,400 | 9,430 | 524 | 6,700 | 529 | 2,710 | 287 |
| 10 | 13 | 386 | 352 | 403 | 1,200 | 1,100 | 10,300 | 458 | 4,920 | 463 | 3,610 | 268 |
| 11 | 68 | 303 | 416 | 353 | 840 | 853 | 11,300 | 403 | 2,850 | 547 | 6,680 | 243 |
| 12 | 1,080 | 279 | 950 | 312 | 818 | 661 | 11,000 | e380 | 1,580 | 480 | 4,590 | 162 |
| 13 | 3,050 | 1,330 | 2,020 | 280 | 632 | 731 | 8,020 | e350 | 1,250 | 360 | 1,760 | 259 |
| 14 | 657 | 3,480 | 3,630 | 275 | 667 | 668 | 3,080 | e510 | 2,320 | 334 | 1,130 | 297 |
| 15 | 325 | 1,510 | 5,130 | 265 | 532 | 584 | 1,560 | e320 | 1,320 | 341 | 749 | 361 |
| 16 | 502 | 659 | 2,720 | 251 | 1,210 | 548 | 1,140 | e360 | 2,180 | 330 | 570 | 272 |
| 17 | 742 | 703 | 1,120 | e240 | 2,900 | 531 | 952 | e440 | 1,860 | 462 | 473 | 231 |
| 18 | 815 | 1,810 | 598 | e215 | 1,830 | 548 | 781 | e460 | 1,260 | 309 | 429 | 1,250 |
| 19 | 348 | 3,280 | 420 | 154 | 1,230 | 533 | 902 | 3,210 | 1,220 | 279 | 435 | 12,100 |
| 20 | 185 | 1,450 | 399 | 227 | 1,680 | 1,350 | 1,050 | 6,100 | 2,530 | 247 | 413 | 13,000 |
| 21 | 166 | 718 | 643 | 321 | 2,790 | 6,510 | 985 | 3,930 | 2,650 | 226 | 395 | 15,600 |
| 22 | 157 | 546 | 833 | 243 | 3,090 | 9,640 | 773 | 2,370 | 1,510 | 214 | 314 | 12,100 |
| 23 | 192 | 429 | 531 | e215 | 4,990 | 12,500 | 708 | 5,520 | 1,000 | 275 | 307 | 4,630 |
| 24 | 212 | 352 | 474 | 100 | 6,710 | 6,350 | 569 | 6,430 | 685 | 515 | 192 | 4,730 |
| 25 | 182 | 298 | 2,810 | 165 | 4,410 | 1,840 | 513 | 4,510 | 524 | 518 | 239 | 6,560 |
| 26 | 107 | 275 | 6,110 | 212 | 1,880 | 1,060 | 620 | 3,420 | 459 | 379 | 226 | 3,880 |
| 27 | 89 | 255 | 5,450 | 310 | 1,320 | 838 | 2,310 | 6,720 | 392 | 279 | 216 | 1,480 |
| 28 | 101 | 233 | 2,050 | 126 | 3,230 | 752 | 1,880 | 13,900 | 467 | 219 | 208 | 797 |
| 29 | 173 | 218 | 1,060 | 210 | --- | 682 | 736 | 15,100 | 572 | 191 | 201 | 683 |
| 30 | 555 | 213 | 657 | 464 | --- | 1,280 | 519 | 7,230 | 607 | 180 | 193 | 526 |
| 31 | 2,220 | --- | 527 | 1,460 | --- | 4,070 | --- | 2,380 | --- | 197 | 191 | --- |
| TOTAL | 12,047.3 | 26,787 | 41,498 | 18,257 | 51,392 | 80,479 | 86,234 | 94,473 | 55,046 | 24,166 | 33,465 | 83,949 |
| MEAN | 389 | 893 | 1,339 | 589 | 1,835 | 2,596 | 2,874 | 3,048 | 1,835 | 780 | 1,080 | 2,798 |
| MAX | 3,050 | 3,480 | 6,110 | 3,470 | 6,710 | 12,500 | 11,300 | 15,100 | 6,700 | 5,320 | 6,680 | 15,600 |
| MIN | 3.8 | 213 | 138 | 100 | 490 | 531 | 513 | 320 | 392 | 180 | 191 | 162 |
| CFSM | 0.52 | 1.20 | 1.79 | 0.79 | 2.46 | 3.48 | 3.85 | 4.08 | 2.46 | 1.04 | 1.45 | 3.75 |
| IN. | 0.60 | 1.33 | 2.07 | 0.91 | 2.56 | 4.01 | 4.29 | 4.70 | 2.74 | 1.20 | 1.67 | 4.18 |

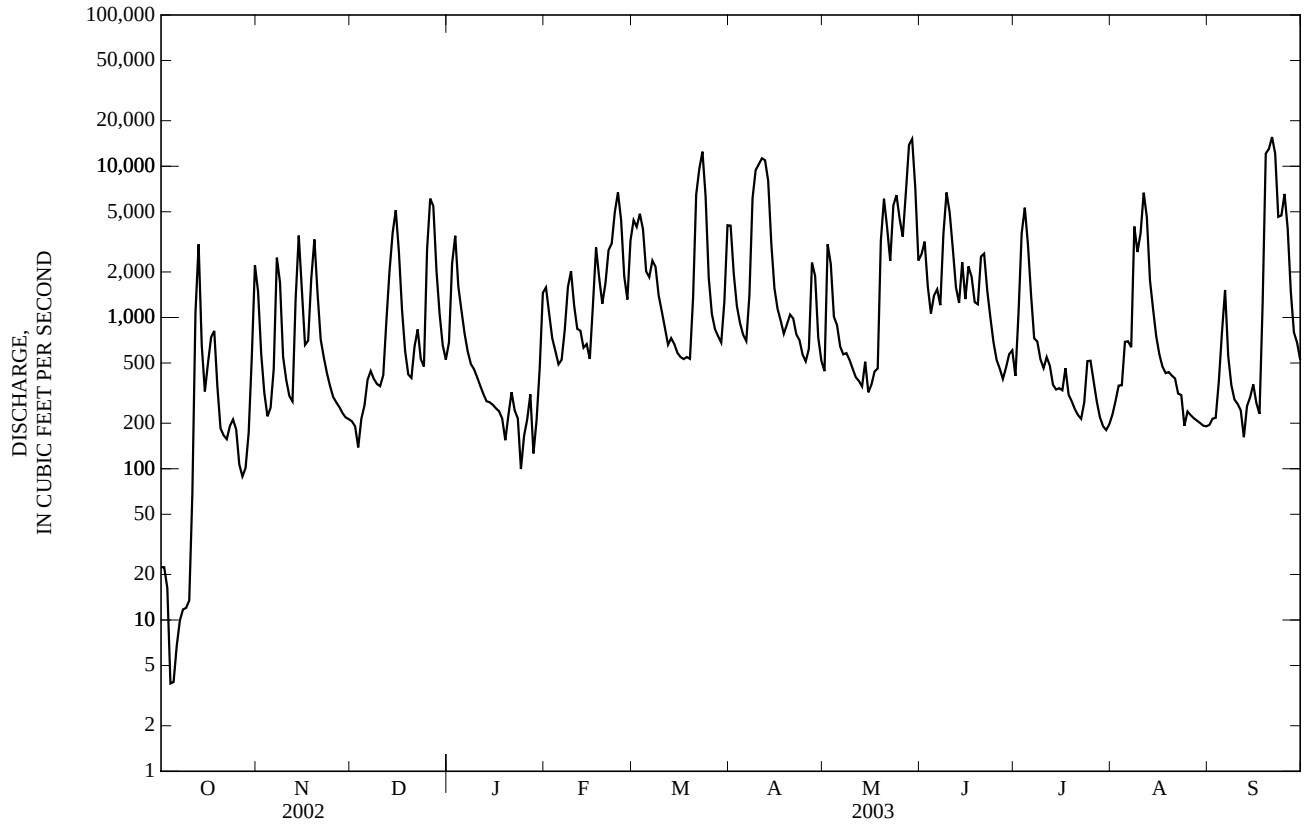
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 411 | 519 | 663 | 1,033 | 1,220 | 1,371 | 1,091 | 691 | 454 | 343 | 304 | 403 |
| MAX | 3,057 | 3,711 | 1,772 | 3,063 | 2,749 | 3,631 | 3,077 | 3,048 | 1,835 | 2,647 | 1,536 | 4,372 |
| (WY) | (1973) | (1986) | (1973) | (1978) | (1998) | (1998) | (1987) | (2003) | (2003) | (1975) | (1955) | (1999) |
| MIN | 37.7 | 57.0 | 86.2 | 159 | 225 | 261 | 221 | 256 | 28.0 | 30.7 | 19.4 | 18.7 |
| (WY) | (1969) | (2002) | (2002) | (1966) | (2002) | (1981) | (1995) | (1995) | (2002) | (2002) | (2002) | (1954) |

02052000 MEHERRIN RIVER AT EMPORIA, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1952 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 134,900.3 | | 607,793.3 | | | |
| ANNUAL MEAN | 370 | | 1,665 | | 706 | |
| HIGHEST ANNUAL MEAN | | | | | 1,665 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 165 | 2002 |
| HIGHEST DAILY MEAN | 6,110 | Dec 26 | 15,600 | Sep 21 | 20,700 | Oct 8, 1972 |
| LOWEST DAILY MEAN | a3.6 | Jun 21 | a3.8 | Oct 4 | a3.6 | Jun 21, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | a6.4 | Aug 11 | a8.8 | Oct 4 | a6.4 | Aug 11, 2002 |
| MAXIMUM PEAK FLOW | | | 17,200 | May 29 | 21,100 | Oct 8, 1972 |
| MAXIMUM PEAK STAGE | | | 25.56 | May 29 | 27.38 | Oct 8, 1972 |
| INSTANTANEOUS LOW FLOW | | | a3.6 | bOct 4 | a3.2 | cJun 20, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.49 | | 2.23 | | 0.94 | |
| ANNUAL RUNOFF (INCHES) | 6.72 | | 30.27 | | 12.84 | |
| 10 PERCENT EXCEEDS | 806 | | 4,450 | | 1,460 | |
| 50 PERCENT EXCEEDS | 164 | | 659 | | 350 | |
| 90 PERCENT EXCEEDS | 8.5 | | 207 | | 68 | |

a Result of regulation.
b Also Oct. 5, 2002.
c Also June 21, 2002.
e Estimated.



## 02053800 SOUTH FORK ROANOKE RIVER NEAR SHAWSVILLE, VA

LOCATION.--Lat 37°08'24", long 80°15'59", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Aug. 26, 1974, water-stage recorder, and Aug. 26, 1974, to July 24, 1975, nonrecording gage at site 95 ft upstream at same datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 4-10, Jan. 23-25, 27, 28, and Feb. 7-9, and period of no gage-height record, Jan. 17-20, which are fair. Virginia Department of Emergency Services gage-height radio transmitter at station. Maximum discharge, 14,200 $ft^3/s$, from rating curve extended above 3,700 $ft^3/s$ 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 Sept. 30, 1959, reached a stage of 9.89 ft, from information by local resident.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 800 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1330 | *7,090 | *8.66 | Jul 3 | 0030 | 1,480 | 3.64 |
| Mar 20 | 1700 | 1,000 | 2.94 | Jul 6 | 1830 | 2,530 | 4.90 |
| Apr 10 | 2200 | 3,460 | 5.86 | Sep 19 | 0100 | 3,220 | 5.62 |
| Jun 19 | 0930 | 1,480 | 3.64 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 17 | 54 | 42 | 99 | 47 | 263 | 203 | 139 | 181 | 280 | 142 | 77 |
| 2 | 15 | 44 | 39 | 113 | 47 | 315 | 393 | 118 | 149 | 776 | 122 | 80 |
| 3 | 15 | 38 | 38 | 118 | 48 | 301 | 331 | 111 | 140 | 1,060 | 115 | 72 |
| 4 | 14 | 34 | e37 | 121 | 59 | 251 | 258 | 158 | 150 | 559 | 113 | 111 |
| 5 | 14 | 35 | e41 | 113 | 60 | 232 | 226 | 144 | 135 | 383 | 227 | 105 |
| 6 | 14 | 67 | e40 | 104 | 54 | 232 | 185 | 148 | 117 | 740 | 181 | 78 |
| 7 | 14 | 56 | e32 | 89 | e50 | 207 | 278 | 137 | 236 | 871 | 150 | 72 |
| 8 | 14 | 46 | e36 | 86 | e47 | 188 | 351 | 129 | 384 | 424 | 134 | 69 |
| 9 | 14 | 41 | e35 | 83 | e43 | 173 | 686 | 115 | 329 | 301 | 209 | 65 |
| 10 | 14 | 35 | e34 | 76 | 57 | 152 | 1,500 | 105 | 241 | 264 | 251 | 63 |
| 11 | 19 | 167 | 55 | 66 | 52 | 137 | 1,790 | 99 | 188 | 217 | 205 | 61 |
| 12 | 23 | 324 | 85 | 56 | 51 | 126 | 769 | 91 | 208 | 186 | 158 | 59 |
| 13 | 18 | 258 | 149 | 63 | 47 | 118 | 490 | 84 | 166 | 168 | 138 | 60 |
| 14 | 16 | 130 | 230 | 61 | 53 | 113 | 360 | 80 | 164 | 171 | 125 | 62 |
| 15 | 16 | 91 | 158 | 54 | 202 | 104 | 288 | 91 | 217 | 149 | 111 | 59 |
| 16 | 60 | 144 | 125 | 50 | 507 | 111 | 245 | 125 | 532 | 139 | 183 | 59 |
| 17 | 53 | 421 | 116 | e49 | 255 | 115 | 212 | 97 | 574 | 129 | 195 | 58 |
| 18 | 29 | 251 | 100 | e44 | 167 | 105 | 208 | 242 | 454 | 122 | 140 | 259 |
| 19 | 24 | 146 | 90 | e47 | 132 | 101 | 219 | 470 | 1,050 | 115 | 117 | 1,260 |
| 20 | 23 | 107 | 171 | e51 | 153 | 599 | 190 | 292 | 686 | 111 | 104 | 281 |
| 21 | 24 | 91 | 184 | 53 | 294 | 647 | 182 | 242 | 425 | 106 | 99 | 158 |
| 22 | 24 | 83 | 135 | 48 | 3,030 | 389 | 171 | 237 | 304 | 112 | 92 | 122 |
| 23 | 21 | 70 | 107 | e43 | 1,930 | 280 | 152 | 236 | 233 | 142 | 86 | 189 |
| 24 | 18 | 62 | 174 | e39 | 822 | 222 | 139 | 228 | 187 | 122 | 81 | 133 |
| 25 | 18 | 57 | 307 | e44 | 492 | 182 | 135 | 195 | 157 | 102 | 77 | 114 |
| 26 | 27 | 53 | 203 | 47 | 350 | 165 | 136 | 188 | 138 | 94 | 71 | 99 |
| 27 | 28 | 50 | 145 | e46 | 282 | 153 | 130 | 193 | 125 | 90 | 71 | 109 |
| 28 | 48 | 47 | 119 | e49 | 249 | 132 | 116 | 228 | 127 | 86 | 76 | 205 |
| 29 | 88 | 45 | 103 | 47 | --- | 141 | 110 | 226 | 116 | 170 | 91 | 133 |
| 30 | 113 | 43 | 89 | 52 | --- | 171 | 113 | 207 | 176 | 170 | 80 | 112 |
| 31 | 82 | --- | 80 | 47 | --- | 164 | --- | 185 | --- | 135 | 81 | --- |
| TOTAL | 917 | 3,090 | 3,299 | 2,058 | 9,580 | 6,589 | 10,566 | 5,340 | 8,289 | 8,494 | 4,025 | 4,384 |
| MEAN | 29.6 | 103 | 106 | 66.4 | 342 | 213 | 352 | 172 | 276 | 274 | 130 | 146 |
| MAX | 113 | 421 | 307 | 121 | 3,030 | 647 | 1,790 | 470 | 1,050 | 1,060 | 251 | 1,260 |
| MIN | 14 | 34 | 32 | 39 | 43 | 101 | 110 | 80 | 116 | 86 | 71 | 58 |
| CFSM | 0.27 | 0.94 | 0.97 | 0.60 | 3.11 | 1.93 | 3.20 | 1.57 | 2.51 | 2.49 | 1.18 | 1.33 |
| IN. | 0.31 | 1.04 | 1.12 | 0.70 | 3.24 | 2.23 | 3.57 | 1.81 | 2.80 | 2.87 | 1.36 | 1.48 |

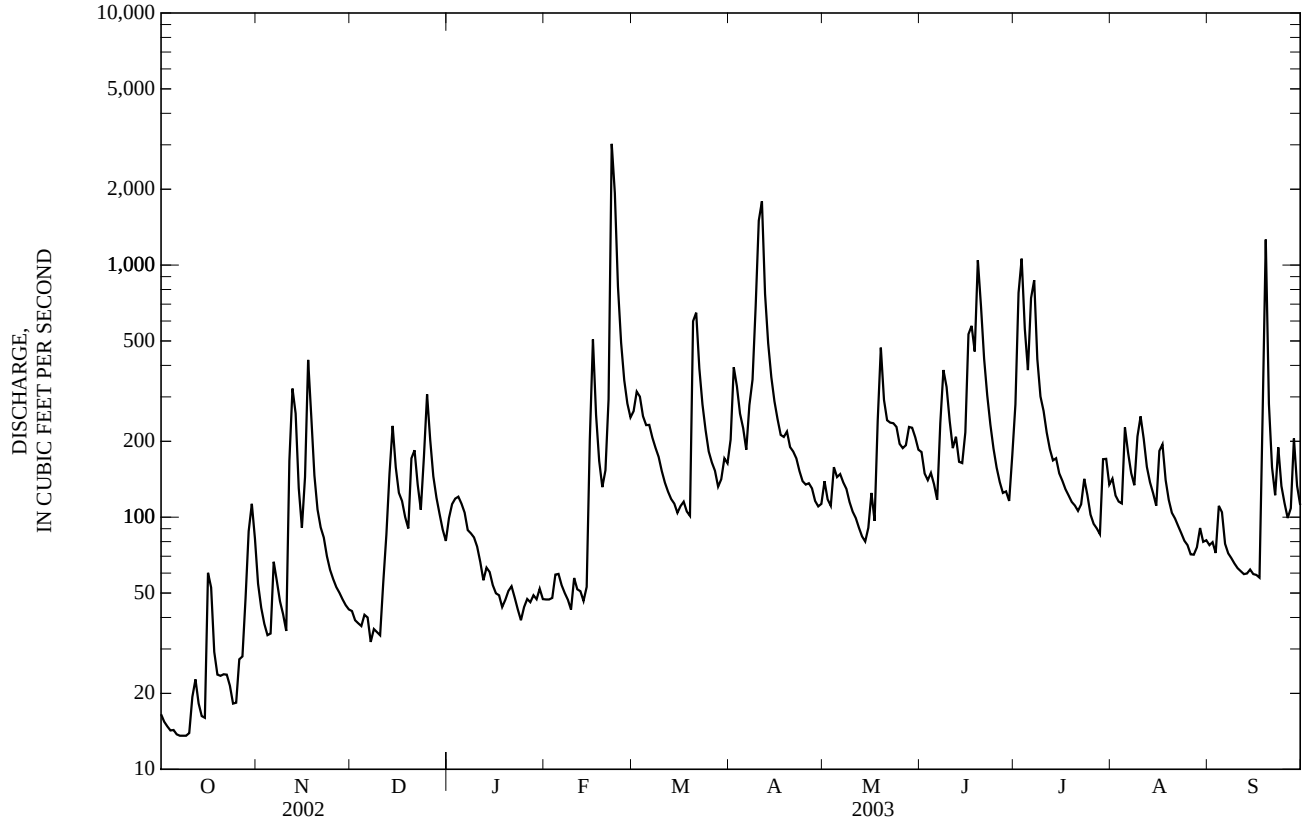
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 69.1 | 87.4 | 95.7 | 131 | 165 | 205 | 183 | 135 | 102 | 61.4 | 53.3 | 63.7 |
| MAX | 294 | 407 | 232 | 299 | 523 | 571 | 750 | 334 | 483 | 274 | 174 | 347 |
| (WY) | (1972) | (1986) | (1973) | (1996) | (1998) | (1993) | (1987) | (1978) | (1972) | (2003) | (1994) | (1989) |
| MIN | 18.4 | 21.5 | 22.1 | 18.9 | 29.4 | 55.6 | 51.0 | 50.7 | 24.0 | 18.6 | 12.4 | 17.2 |
| (WY) | (2002) | (2002) | (1966) | (1966) | (2002) | (1981) | (1966) | (1963) | (1999) | (2002) | (2002) | (2002) |

02053800 SOUTH FORK ROANOKE RIVER NEAR SHAWSVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1961 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 19,528.8 | | 66,631 | | | |
| ANNUAL MEAN | 53.5 | | 183 | | 112 | |
| HIGHEST ANNUAL MEAN | | | | | 205 | 1972 |
| LOWEST ANNUAL MEAN | | | | | 38.8 | 2002 |
| HIGHEST DAILY MEAN | 1,260 | May 3 | 3,030 | Feb 22 | 6,840 | Jun 21, 1972 |
| LOWEST DAILY MEAN | 7.0 | Aug 14 | 14 | aOct 4 | 7.0 | Aug 14, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 7.5 | Aug 8 | 14 | Oct 4 | 7.5 | Aug 8, 2002 |
| MAXIMUM PEAK FLOW | | | 7,090 | Feb 22 | 14,200 | Jun 21, 1972 |
| MAXIMUM PEAK STAGE | | | 8.66 | Feb 22 | b11.12 | Jun 21, 1972 |
| INSTANTANEOUS LOW FLOW | | | 14 | cOct 3 | 6.3 | Aug 12, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.49 | | 1.66 | | 1.02 | |
| ANNUAL RUNOFF (INCHES) | 6.60 | | 22.53 | | 13.86 | |
| 10 PERCENT EXCEEDS | 107 | | 326 | | 217 | |
| 50 PERCENT EXCEEDS | 29 | | 118 | | 68 | |
| 90 PERCENT EXCEEDS | 14 | | 39 | | 27 | |

a Also Oct. 5-10, 2002.
b From high-water mark in gage house.
c also Oct. 4-10, 2002.
e Estimated.



## 02054500 ROANOKE RIVER AT LAFAYETTE, VA

LOCATION.--Lat 37°14'11", long 80°12'33", NAD83, Montgomery County, Hydrologic Unit 03010101, on right bank 120 ft upstream from bridge on State Highway 626 (corrected) at Lafayette, 0.4 mi downstream from confluence of North and South Forks, and 1.1 mi upstream from Cove Hollow.

DRAINAGE AREA.--257 $mi^2$.

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 NGVD of 1929. Prior to July 30, 1949, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Jan. 17-20, 23-28, which are 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 $ft^3/s$, from rating curve extended above 12,000 $ft^3/s$ 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 12.2 ft, from information by local residents, discharge, 19,000 $ft^3/s$, from rating curve extended above 12,000 $ft^3/s$.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1700 | *15,800 | *12.69 | Jul 3 | 0100 | 4,470 | 7.00 |
| Apr 11 | 0000 | 6,570 | 8.46 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 36 | 141 | 98 | 266 | 101 | 758 | 428 | 437 | 707 | 552 | 246 | 136 |
| 2 | 32 | 102 | 92 | 306 | 101 | 879 | 693 | 331 | 533 | 1,800 | 200 | 140 |
| 3 | 31 | 86 | 89 | 360 | 103 | 795 | 604 | 358 | 478 | 3,060 | 188 | 126 |
| 4 | 30 | 77 | 87 | 400 | 119 | 654 | 485 | 1,070 | 626 | 1,350 | 180 | 172 |
| 5 | 28 | 77 | 93 | 353 | 131 | 599 | 428 | 688 | 543 | 882 | 302 | 211 |
| 6 | 26 | 155 | 98 | 318 | 116 | 559 | 355 | 633 | 442 | 1,100 | 295 | 142 |
| 7 | 26 | 141 | 80 | 272 | 121 | 484 | 540 | 532 | 774 | 1,520 | 250 | 127 |
| 8 | 25 | 108 | 84 | 255 | 114 | 436 | 749 | 466 | 1,270 | 802 | 365 | 120 |
| 9 | 25 | 94 | 88 | 238 | 95 | 391 | 2,060 | 389 | 1,570 | 638 | 424 | 113 |
| 10 | 26 | 84 | 87 | 215 | 125 | 347 | 2,880 | 338 | 898 | 579 | 416 | 109 |
| 11 | 34 | 354 | 150 | 189 | 117 | 309 | 4,010 | 306 | 674 | 619 | 408 | 104 |
| 12 | 44 | 810 | 345 | 163 | 120 | 283 | 1,780 | 274 | 654 | 455 | 363 | 100 |
| 13 | 38 | 727 | 631 | 157 | 110 | 261 | 1,130 | 243 | 601 | 431 | 296 | 102 |
| 14 | 32 | 394 | 802 | 161 | 124 | 244 | 867 | 224 | 705 | 414 | 259 | 107 |
| 15 | 31 | 262 | 553 | 147 | 516 | 223 | 725 | 257 | 1,190 | 339 | 220 | 102 |
| 16 | 69 | 461 | 415 | 131 | 1,490 | 222 | 631 | 501 | 2,090 | 297 | 772 | 101 |
| 17 | 126 | 1,150 | 358 | e120 | 720 | 225 | 559 | 355 | 2,100 | 266 | 620 | 95 |
| 18 | 71 | 701 | 300 | e102 | 505 | 208 | 543 | 1,660 | 1,470 | 241 | 407 | 118 |
| 19 | 54 | 441 | 256 | e115 | 408 | 197 | 580 | 1,800 | 2,280 | 227 | 308 | 1,570 |
| 20 | 48 | 315 | 566 | e125 | 533 | 1,280 | 516 | 965 | 1,620 | 209 | 256 | 441 |
| 21 | 49 | 268 | 590 | 128 | 887 | 1,440 | 496 | 818 | 1,030 | 196 | 228 | 261 |
| 22 | 50 | 304 | 413 | 117 | 7,190 | 825 | 468 | 798 | 775 | 197 | 208 | 204 |
| 23 | 45 | 258 | 316 | e90 | 4,330 | 607 | 415 | 731 | 616 | 257 | 187 | 332 |
| 24 | 41 | 212 | 618 | e72 | 1,930 | 479 | 374 | 661 | 506 | 228 | 174 | 244 |
| 25 | 41 | 178 | 988 | e88 | 1,180 | 393 | 360 | 561 | 422 | 184 | 158 | 198 |
| 26 | 72 | 154 | 632 | e97 | 880 | 354 | 361 | 533 | 364 | 165 | 148 | 175 |
| 27 | 74 | 137 | 467 | e87 | 729 | 328 | 331 | 668 | 325 | 155 | 140 | 163 |
| 28 | 91 | 120 | 376 | e79 | 696 | 279 | 295 | 828 | 317 | 144 | 136 | 341 |
| 29 | 225 | 110 | 319 | 105 | --- | 274 | 276 | 710 | 290 | 290 | 163 | 238 |
| 30 | 371 | 105 | 272 | 113 | --- | 343 | 270 | 632 | 279 | 315 | 145 | 194 |
| 31 | 243 | --- | 242 | 103 | --- | 371 | --- | 674 | --- | 226 | 145 | --- |
| TOTAL | 2,134 | 8,526 | 10,505 | 5,472 | 23,591 | 15,047 | 24,209 | 19,441 | 26,149 | 18,138 | 8,607 | 6,586 |
| MEAN | 68.8 | 284 | 339 | 177 | 843 | 485 | 807 | 627 | 872 | 585 | 278 | 220 |
| MAX | 371 | 1,150 | 988 | 400 | 7,190 | 1,440 | 4,010 | 1,800 | 2,280 | 3,060 | 772 | 1,570 |
| MIN | 25 | 77 | 80 | 72 | 95 | 197 | 270 | 224 | 279 | 144 | 136 | 95 |
| CFSM | 0.27 | 1.11 | 1.32 | 0.69 | 3.28 | 1.89 | 3.14 | 2.44 | 3.39 | 2.28 | 1.08 | 0.85 |
| IN. | 0.31 | 1.23 | 1.52 | 0.79 | 3.41 | 2.18 | 3.50 | 2.81 | 3.78 | 2.63 | 1.25 | 0.95 |

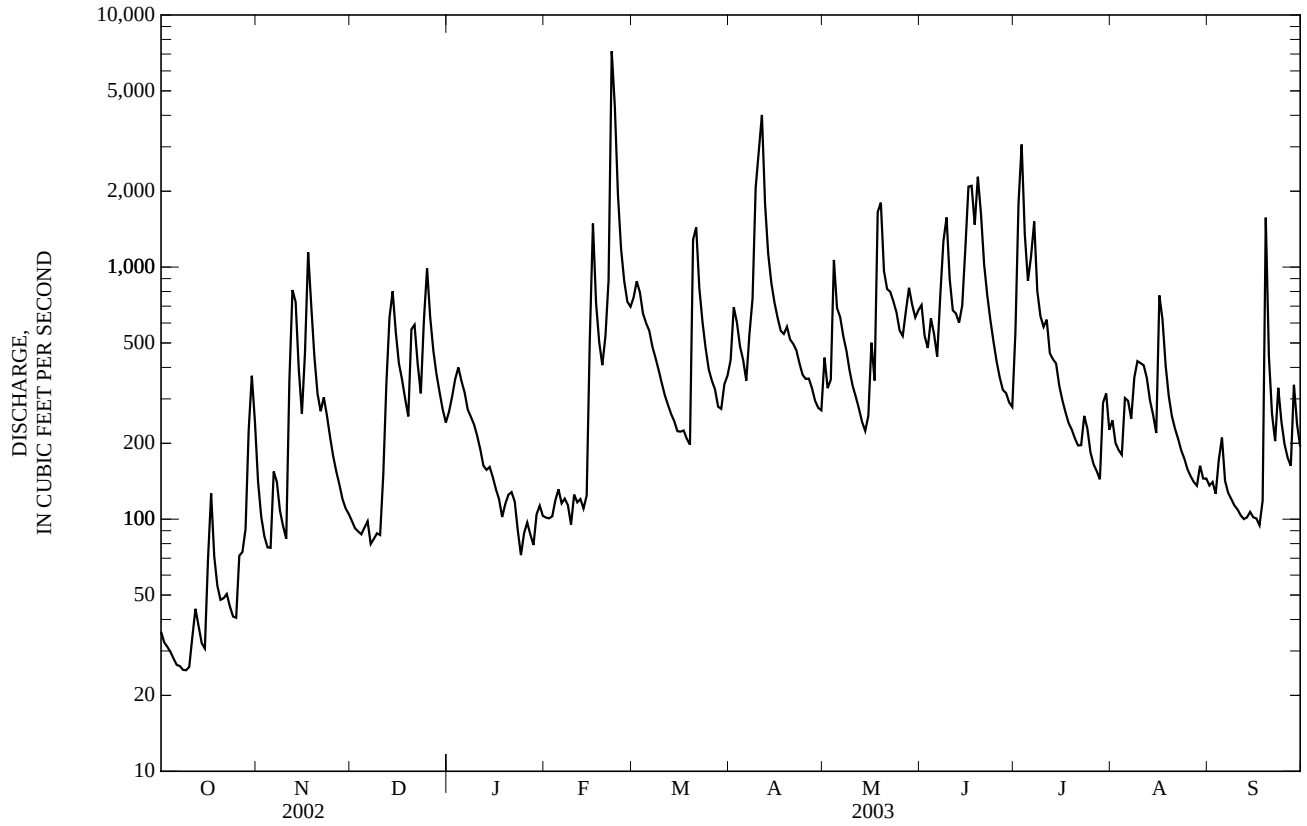
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 131 | 166 | 221 | 299 | 392 | 458 | 412 | 289 | 192 | 120 | 112 | 122 |
| MAX | 603 | 770 | 913 | 682 | 1,214 | 1,309 | 1,497 | 716 | 872 | 590 | 551 | 570 |
| (WY) | (1977) | (1978) | (1949) | (1947) | (1998) | (1993) | (1987) | (1978) | (2003) | (1949) | (1948) | (1989) |
| MIN | 32.8 | 32.3 | 44.7 | 52.0 | 47.9 | 103 | 102 | 99.1 | 48.0 | 43.0 | 23.4 | 29.4 |
| (WY) | (2002) | (2002) | (2002) | (1981) | (2002) | (1981) | (1966) | (1963) | (1999) | (2002) | (2002) | (1954) |

02054500 ROANOKE RIVER AT LAFAYETTE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1944 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 44,730 | | 168,405 | | | |
| ANNUAL MEAN | 123 | | 461 | | 242 | |
| HIGHEST ANNUAL MEAN | | | | | 461 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 73.8 | 2002 |
| HIGHEST DAILY MEAN | 2,320 | May 3 | 7,190 | Feb 22 | 11,700 | Jun 21, 1972 |
| LOWEST DAILY MEAN | 14 | aSep 12 | 25 | bOct 8 | c10 | dJan 14, 1959 |
| ANNUAL SEVEN-DAY MINIMUM | 15 | Sep 8 | 27 | Oct 4 | c11 | Jan 14, 1959 |
| MAXIMUM PEAK FLOW | | | 15,800 | Feb 22 | 24,500 | Jun 21, 1972 |
| MAXIMUM PEAK STAGE | | | 12.69 | Feb 22 | f15.60 | Jun 21, 1972 |
| INSTANTANEOUS LOW FLOW | | | 24 | Oct 9 | c8.0 | gJan 19, 1959 |
| ANNUAL RUNOFF (CFSM) | 0.48 | | 1.80 | | 0.94 | |
| ANNUAL RUNOFF (INCHES) | 6.47 | | 24.38 | | 12.79 | |
| 10 PERCENT EXCEEDS | 300 | | 881 | | 495 | |
| 50 PERCENT EXCEEDS | 58 | | 295 | | 130 | |
| 90 PERCENT EXCEEDS | 25 | | 87 | | 49 | |

a Also Sept. 13, 2002.
b Also Oct. 9, 2002.
c Result of freezeup.
d Also Jan. 15, 18, 19, 1959.
e Estimated.
f From high-water mark in gage house.
g Also Jan. 3, 2001.



## 02054530 ROANOKE RIVER AT GLENVAR, VA

LOCATION.--Lat 37°16'04", long 80°08'22", NAD83, 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 $mi^2$.

PERIOD OF RECORD.--December 1991 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,100 ft NGVD of 1929, from topographic map.

REMARKS.--Records good except those for periods with ice effect, Jan. 17-20, 23-26, which are fair. About 11.1 $ft^3/s$ is withdrawn upstream for municipal use by Roanoke County. Roanoke County gage-height transmitter at station. Maximum discharge, 19,800 $ft^3/s$, from rating curve extended above 10,900 $ft^3/s$. 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 $ft^3/s$, from rating curve extended above 10,900 $ft^3/s$.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1930 | *19,600 | *17.61 | Jun 19 | 1230 | 3,540 | 7.55 |
| Apr 11 | 0130 | 10,100 | 12.16 | Jul 3 | 0230 | 5,720 | 9.38 |
| Jun 17 | 0000 | 3,690 | 7.69 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 41 | 108 | 81 | 214 | 106 | 704 | 440 | 400 | 758 | 548 | 262 | 145 |
| 2 | 38 | 92 | 74 | 294 | 106 | 839 | 681 | 334 | 539 | 1,830 | 223 | 142 |
| 3 | 35 | 81 | 81 | 334 | 106 | 774 | 619 | 339 | 473 | 4,000 | 206 | 126 |
| 4 | 35 | 84 | 81 | 395 | 115 | 630 | 506 | 1,210 | 602 | 1,620 | 199 | 146 |
| 5 | 33 | 78 | 84 | 330 | 136 | 568 | 464 | 730 | 534 | 993 | 300 | 216 |
| 6 | 31 | 113 | 97 | 329 | 111 | 525 | 407 | 646 | 440 | 1,010 | 345 | 142 |
| 7 | 31 | 98 | 79 | 284 | 107 | 468 | 527 | 532 | 710 | 1,800 | 298 | 128 |
| 8 | 30 | 72 | 94 | 250 | 104 | 439 | 750 | 464 | 1,390 | 866 | 342 | 121 |
| 9 | 30 | 83 | 90 | 225 | 87 | 408 | 2,270 | 397 | 1,780 | 664 | 467 | 115 |
| 10 | 31 | 79 | 78 | 201 | 117 | 363 | 3,410 | 352 | 997 | 583 | 451 | 111 |
| 11 | 37 | 254 | 109 | 175 | 104 | 323 | 6,050 | 318 | 686 | 632 | 421 | 106 |
| 12 | 47 | 775 | 274 | 147 | 106 | 299 | 2,180 | 289 | 669 | 465 | 402 | 103 |
| 13 | 44 | 776 | 545 | 144 | 101 | 281 | 1,300 | 258 | 588 | 427 | 331 | 112 |
| 14 | 38 | 361 | 849 | 174 | 106 | 270 | 912 | 238 | 582 | 426 | 278 | 120 |
| 15 | 36 | 225 | 535 | 160 | 366 | 261 | 716 | 249 | 1,350 | 356 | 230 | 116 |
| 16 | 55 | 338 | 389 | 142 | 1,870 | 260 | 608 | 488 | 2,180 | 315 | 747 | 115 |
| 17 | 85 | 1,290 | 333 | e130 | 840 | 259 | 532 | 367 | 2,520 | 286 | 675 | 110 |
| 18 | 77 | 721 | 276 | e110 | 539 | 234 | 508 | 1,710 | 1,740 | 258 | 427 | 113 |
| 19 | 63 | 410 | 231 | e122 | 417 | 226 | 548 | 2,200 | 2,670 | 243 | 314 | 1,580 |
| 20 | 55 | 283 | 494 | e132 | 521 | 1,330 | 492 | 1,100 | 1,960 | 230 | 244 | 470 |
| 21 | 55 | 226 | 598 | 134 | 981 | 1,720 | 470 | 843 | 1,200 | 213 | 214 | 291 |
| 22 | 55 | 252 | 399 | 125 | 9,620 | 920 | 450 | 819 | 850 | 205 | 194 | 222 |
| 23 | 52 | 218 | 302 | e105 | 6,600 | 651 | 405 | 744 | 649 | 266 | 173 | 318 |
| 24 | 47 | 173 | 560 | e85 | 2,200 | 514 | 361 | 675 | 531 | 247 | 158 | 257 |
| 25 | 46 | 141 | 1,250 | e98 | 1,230 | 426 | 338 | 561 | 453 | 201 | 143 | 211 |
| 26 | 68 | 118 | 683 | e110 | 849 | 383 | 340 | 525 | 400 | 182 | 135 | 185 |
| 27 | 80 | 102 | 473 | 102 | 672 | 365 | 318 | 634 | 364 | 169 | 128 | 170 |
| 28 | 73 | 85 | 351 | 95 | 616 | 316 | 284 | 921 | 350 | 160 | 123 | 328 |
| 29 | 131 | 88 | 286 | 112 | --- | 305 | 265 | 748 | 337 | 265 | 141 | 257 |
| 30 | 258 | 90 | 249 | 116 | --- | 369 | 259 | 648 | 295 | 335 | 129 | 206 |
| 31 | 194 | --- | 216 | 109 | --- | 399 | --- | 664 | --- | 245 | 143 | --- |
| TOTAL | 1,931 | 7,814 | 10,241 | 5,483 | 28,833 | 15,829 | 27,410 | 20,403 | 28,597 | 20,040 | 8,843 | 6,782 |
| MEAN | 62.3 | 260 | 330 | 177 | 1,030 | 511 | 914 | 658 | 953 | 646 | 285 | 226 |
| MAX | 258 | 1,290 | 1,250 | 395 | 9,620 | 1,720 | 6,050 | 2,200 | 2,670 | 4,000 | 747 | 1,580 |
| MIN | 30 | 72 | 74 | 85 | 87 | 226 | 259 | 238 | 295 | 160 | 123 | 103 |
| CFSM | 0.22 | 0.92 | 1.16 | 0.62 | 3.63 | 1.80 | 3.22 | 2.32 | 3.36 | 2.28 | 1.00 | 0.80 |
| IN. | 0.25 | 1.02 | 1.34 | 0.72 | 3.78 | 2.07 | 3.59 | 2.67 | 3.75 | 2.62 | 1.16 | 0.89 |

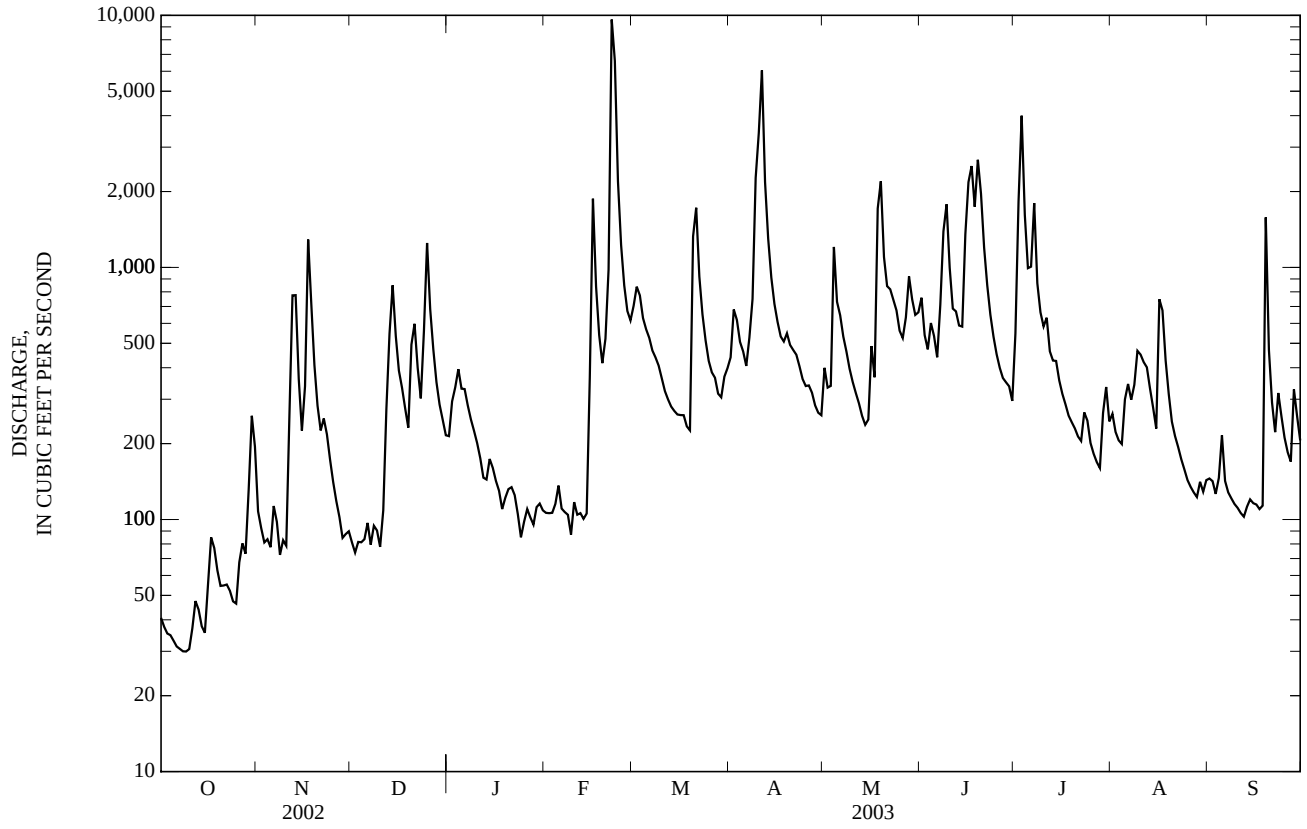
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1992 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 77.0 | 129 | 212 | 367 | 507 | 546 | 433 | 328 | 299 | 160 | 126 | 142 |
| MAX | 170 | 355 | 715 | 784 | 1,400 | 1,667 | 914 | 658 | 953 | 646 | 295 | 586 |
| (WY) | (1997) | (1997) | (1997) | (1996) | (1998) | (1993) | (2003) | (2003) | (2003) | (2003) | (1996) | (1996) |
| MIN | 40.1 | 48.0 | 58.3 | 62.8 | 61.8 | 124 | 99.5 | 125 | 54.9 | 46.1 | 26.1 | 33.7 |
| (WY) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (1999) | (2002) | (2002) | (2002) | (2002) |

02054530 ROANOKE RIVER AT GLENVAR, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1992 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 43,841 | | 182,206 | | | |
| ANNUAL MEAN | 120 | | 499 | | 270 | |
| HIGHEST ANNUAL MEAN | | | | | 499 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 77.7 | 2002 |
| HIGHEST DAILY MEAN | 3,190 | May 3 | 9,620 | Feb 22 | 9,620 | Feb 22, 2003 |
| LOWEST DAILY MEAN | 15 | Sep 13 | 30 | aOct 8 | 15 | Sep 13, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 18 | Sep 8 | 32 | bOct 4 | 18 | Sep 8, 2002 |
| MAXIMUM PEAK FLOW | | | 19,600 | Feb 22 | 19,800 | Apr 21, 1992 |
| MAXIMUM PEAK STAGE | | | 17.61 | Feb 22 | 17.73 | Apr 21, 1992 |
| INSTANTANEOUS LOW FLOW | | | 29 | cOct 8 | 15 | dSep 12, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.42 | | 1.76 | | 0.95 | |
| ANNUAL RUNOFF (INCHES) | 5.74 | | 23.87 | | 12.90 | |
| 10 PERCENT EXCEEDS | 253 | | 945 | | 545 | |
| 50 PERCENT EXCEEDS | 64 | | 291 | | 115 | |
| 90 PERCENT EXCEEDS | 31 | | 81 | | 53 | |

a Also Oct. 9, 2002.
b Also Oct. 5, 2002.
c Also Oct. 9, 10, 2002.
d Also Sept. 13, 14, 2002.
e Estimated.



## 02055000 ROANOKE RIVER AT ROANOKE, VA

LOCATION.--Lat 37°15'30", long 79°56'19", NAD83, 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 $mi^2$.

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 NGVD of 1929 (levels by U.S. Army Corps of Engineers). Prior to June 7, 1937, nonrecording gage on downstream side of highway bridge 50 ft upstream at same datum.

REMARKS.--Records good except for period of doubtful gage-height record, Nov. 22-25, which is 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 $ft^3/s$, from rating curve extended above 26,000 $ft^3/s$. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 23 | 0030 | *17,400 | *15.57 | Jun 16 | 1745 | 4,140 | 6.50 |
| Mar 20 | 2315 | 2,880 | 5.21 | Jun 19 | 1500 | 3,590 | 5.96 |
| Apr 9 | 1315 | 3,140 | 5.49 | Jul 3 | 0430 | 5,010 | 7.30 |
| Apr 11 | 0400 | 8,190 | 9.78 | Jul 7 | 0200 | 2,710 | 5.01 |
| May 18 | 1845 | 4,160 | 6.52 | Sep 19 | 0915 | 2,570 | 4.85 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 57 | 251 | 138 | 462 | 155 | 961 | 617 | 504 | 1,000 | 630 | 373 | 236 |
| 2 | 47 | 186 | 126 | 513 | 149 | 1,070 | 859 | 462 | 722 | 1,810 | 365 | 222 |
| 3 | 42 | 163 | 120 | 587 | 144 | 1,040 | 847 | 597 | 630 | 3,960 | 360 | 198 |
| 4 | 39 | 153 | 125 | 667 | 167 | 869 | 693 | 1,790 | 770 | 1,950 | 320 | 274 |
| 5 | 38 | 190 | 138 | 576 | 175 | 785 | 623 | 1,190 | 708 | 1,310 | 522 | 295 |
| 6 | 36 | 228 | 143 | 536 | 161 | 710 | 551 | 999 | 598 | 987 | 554 | 227 |
| 7 | 35 | 225 | 129 | 461 | 159 | 627 | 711 | 800 | 770 | 1,840 | 453 | 193 |
| 8 | 33 | 174 | 134 | 396 | 152 | 603 | 1,050 | 661 | 1,580 | 1,030 | 397 | 181 |
| 9 | 33 | 158 | 150 | 348 | 135 | 600 | 2,650 | 591 | 2,070 | 826 | 846 | 169 |
| 10 | 34 | 151 | 131 | 316 | 154 | 598 | 3,180 | 536 | 1,320 | 727 | 762 | 159 |
| 11 | 73 | 374 | 222 | 277 | 155 | 592 | 5,850 | 478 | 927 | 814 | 573 | 152 |
| 12 | 55 | 1,020 | 397 | 243 | 149 | 573 | 2,480 | 432 | 875 | 621 | 536 | 144 |
| 13 | 60 | 1,180 | 754 | 214 | 151 | 541 | 1,580 | 380 | 860 | 658 | 458 | 156 |
| 14 | 51 | 626 | 1,260 | 242 | 148 | 505 | 1,140 | 352 | 791 | 602 | 389 | 196 |
| 15 | 49 | 463 | 827 | 232 | 345 | 477 | 907 | 670 | 1,380 | 542 | 334 | 171 |
| 16 | 240 | 595 | 606 | 215 | 1,890 | 478 | 773 | 641 | 2,780 | 481 | 709 | 161 |
| 17 | 133 | 1,590 | 540 | 218 | 1,160 | 477 | 662 | 600 | 3,010 | 439 | 900 | 154 |
| 18 | 120 | 1,100 | 450 | 192 | 772 | 441 | 651 | 2,820 | 2,210 | 400 | 580 | 244 |
| 19 | 103 | 658 | 374 | 184 | 606 | 420 | 691 | 2,880 | 3,040 | 378 | 446 | 1,380 |
| 20 | 91 | 563 | 674 | 196 | 672 | 1,420 | 614 | 1,550 | 2,280 | 362 | 358 | 721 |
| 21 | 115 | 450 | 909 | 192 | 1,220 | 2,180 | 600 | 1,260 | 1,490 | 340 | 318 | 445 |
| 22 | 91 | e420 | 618 | 185 | 7,770 | 1,270 | 600 | 1,510 | 1,100 | 360 | 293 | 361 |
| 23 | 86 | e360 | 504 | 173 | 7,770 | 902 | 588 | 1,190 | 850 | 386 | 282 | 533 |
| 24 | 78 | e290 | 742 | 125 | 2,620 | 714 | 550 | 1,030 | 689 | 363 | 257 | 431 |
| 25 | 90 | e240 | 1,690 | 152 | 1,620 | 596 | 511 | 848 | 605 | 316 | 231 | 344 |
| 26 | 188 | 212 | 1,030 | 162 | 1,190 | 533 | 564 | 830 | 578 | 292 | 217 | 299 |
| 27 | 137 | 184 | 698 | 149 | 970 | 473 | 485 | 923 | 526 | 276 | 207 | 303 |
| 28 | 219 | 159 | 570 | 133 | 880 | 419 | 426 | 1,310 | 492 | 260 | 199 | 421 |
| 29 | 301 | 143 | 470 | 150 | --- | 414 | 394 | 1,040 | 483 | 360 | 212 | 378 |
| 30 | 486 | 151 | 387 | 168 | --- | 582 | 405 | 895 | 436 | 500 | 207 | 296 |
| 31 | 402 | --- | 335 | 170 | --- | 596 | --- | 855 | --- | 393 | 207 | --- |
| TOTAL | 3,562 | 12,657 | 15,391 | 8,834 | 31,639 | 22,466 | 32,252 | 30,624 | 35,570 | 24,213 | 12,865 | 9,444 |
| MEAN | 115 | 422 | 496 | 285 | 1,130 | 725 | 1,075 | 988 | 1,186 | 781 | 415 | 315 |
| MAX | 486 | 1,590 | 1,690 | 667 | 7,770 | 2,180 | 5,850 | 2,880 | 3,040 | 3,960 | 900 | 1,380 |
| MIN | 33 | 143 | 120 | 125 | 135 | 414 | 394 | 352 | 436 | 260 | 199 | 144 |
| CFSM | 0.29 | 1.07 | 1.26 | 0.72 | 2.86 | 1.83 | 2.72 | 2.50 | 3.00 | 1.98 | 1.05 | 0.80 |
| IN. | 0.34 | 1.19 | 1.45 | 0.83 | 2.98 | 2.12 | 3.04 | 2.88 | 3.35 | 2.28 | 1.21 | 0.89 |

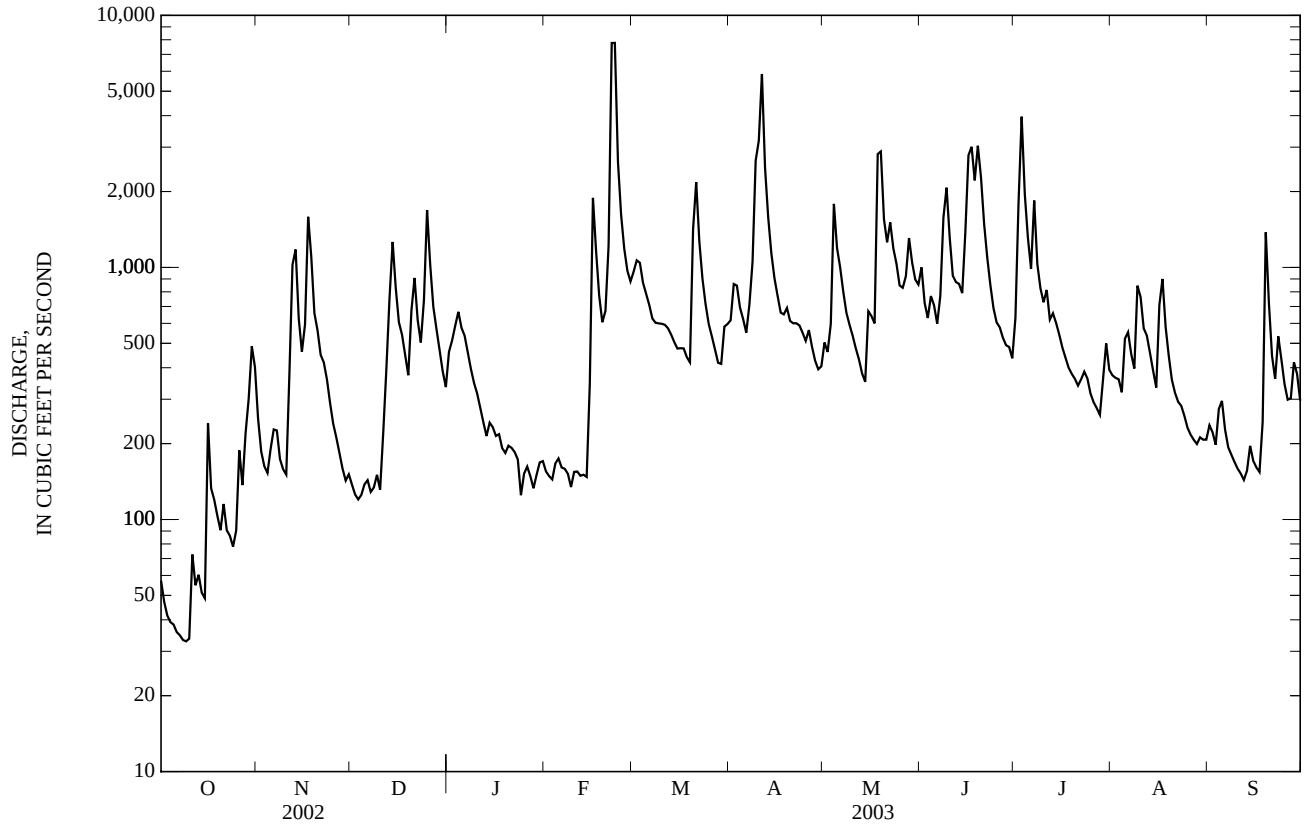
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1899 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 226 | 243 | 343 | 466 | 564 | 681 | 583 | 424 | 309 | 221 | 223 | 201 |
| MAX | 1,080 | 1,626 | 1,425 | 1,353 | 1,912 | 2,521 | 2,558 | 1,466 | 1,206 | 1,190 | 2,140 | 1,569 |
| (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 | 73.8 | 45.6 | 39.4 | 42.6 |
| (WY) | (1992) | (1932) | (1918) | (1981) | (1934) | (1981) | (1942) | (1941) | (2002) | (1930) | (2002) | (1930) |

02055000 ROANOKE RIVER AT ROANOKE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1899 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 65,047 | | 239,517 | | | |
| ANNUAL MEAN | 178 | | 656 | | 371 | |
| HIGHEST ANNUAL MEAN | | | | | 836 | 1901 |
| LOWEST ANNUAL MEAN | | | | | 110 | 2002 |
| HIGHEST DAILY MEAN | 2,160 | May 3 | 7,770 | Feb 22 | 18,200 | Aug 15, 1940 |
| LOWEST DAILY MEAN | 16 | Sep 13 | 33 | aOct 8 | 16 | Sep 13, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 19 | Sep 7 | 35 | Oct 4 | 19 | Sep 7, 2002 |
| MAXIMUM PEAK FLOW | | | 17,400 | Feb 23 | 32,300 | Nov 4, 1985 |
| MAXIMUM PEAK STAGE | | | 15.57 | Feb 23 | b23.35 | Nov 4, 1985 |
| INSTANTANEOUS LOW FLOW | | | 31 | Oct 10 | c0.00 | dDec 23, 1909 |
| ANNUAL RUNOFF (CFSM) | 0.45 | | 1.66 | | 0.94 | |
| ANNUAL RUNOFF (INCHES) | 6.13 | | 22.56 | | 12.75 | |
| 10 PERCENT EXCEEDS | 450 | | 1,290 | | 745 | |
| 50 PERCENT EXCEEDS | 91 | | 462 | | 206 | |
| 90 PERCENT EXCEEDS | 36 | | 141 | | 73 | |

a Also Oct. 9, 2002.
b From floodmark.
c Practically no flow; retarded by freezing.
d Also Dec. 19, 1963.
e Estimated.



## 02055100 TINKER CREEK NEAR DALEVILLE, VA

LOCATION.--Lat 37°25'03", long 79°56'07", NAD83, 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 $mi^2$.

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 NGVD of 1929 (Norfolk Southern Railway bench mark).

REMARKS.--Records good except for period with ice effect, Jan. 24-25, which is 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 $ft^3/s$, from rating curve extended above 130 $ft^3/s$ 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. 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 250 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1200 | 1,310 | 7.03 | Jun 18 | 2345 | 443 | 4.57 |
| Apr 10 | 2245 | 424 | 4.49 | Jul 10 | 2015 | 397 | 4.37 |
| May 18 | 0230 | 365 | 4.22 | Aug 5 | 0400 | 612 | 5.22 |
| May 18 | 1615 | *1,840 | *7.89 | Aug 5 | 1645 | 397 | 4.37 |
| Jun 16 | 1115 | 695 | 5.50 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.83 | 9.7 | 6.8 | 25 | 8.2 | 41 | 33 | 33 | 46 | 27 | 22 | 13 |
| 2 | 0.80 | 8.0 | 6.7 | 23 | 8.0 | 42 | 33 | 26 | 41 | 77 | 19 | 13 |
| 3 | 0.84 | 6.6 | 6.7 | 30 | 7.7 | 38 | 29 | 28 | 41 | 79 | 22 | 13 |
| 4 | 0.95 | 6.1 | 6.5 | 27 | 8.6 | 35 | 27 | 38 | 63 | 51 | 26 | 17 |
| 5 | 1.4 | 8.0 | 8.4 | 24 | 7.6 | 33 | 26 | 36 | 55 | 44 | 192 | 15 |
| 6 | 1.4 | 16 | 7.4 | 21 | 7.4 | 31 | 24 | 39 | 42 | 37 | 56 | 14 |
| 7 | 1.5 | 12 | 6.6 | 19 | 8.2 | 28 | 30 | 32 | 62 | 34 | 38 | 13 |
| 8 | 1.6 | 10 | 6.5 | 18 | 7.5 | 27 | 38 | 29 | 57 | 32 | 33 | 13 |
| 9 | 1.6 | 8.8 | 6.7 | 17 | 7.2 | 25 | 89 | 26 | 53 | 31 | 40 | 12 |
| 10 | 1.8 | 8.1 | 6.4 | 16 | 7.5 | 23 | 105 | 24 | 44 | 72 | 44 | 12 |
| 11 | 3.1 | 15 | 11 | 15 | 7.5 | 22 | 117 | 23 | 40 | 55 | 56 | 11 |
| 12 | 2.7 | 27 | 16 | 14 | 7.4 | 22 | 60 | 21 | 42 | 36 | 35 | 11 |
| 13 | 2.4 | 21 | 27 | 13 | 6.8 | 21 | 48 | 20 | 46 | 36 | 31 | 12 |
| 14 | 2.5 | 15 | 31 | 13 | 7.0 | 20 | 42 | 19 | 55 | 34 | 28 | 13 |
| 15 | 2.5 | 12 | 23 | 13 | 15 | 19 | 39 | 22 | 60 | 30 | 26 | 12 |
| 16 | 8.4 | 23 | 20 | 12 | 23 | 19 | 36 | 24 | 231 | 28 | 26 | 11 |
| 17 | 4.8 | 33 | 17 | 12 | 18 | 19 | 33 | 26 | 110 | 25 | 24 | 19 |
| 18 | 3.2 | 23 | 15 | 12 | 15 | 18 | 33 | 396 | 113 | 23 | 22 | 35 |
| 19 | 2.5 | 18 | 14 | 11 | 13 | 18 | 32 | 125 | 169 | 23 | 20 | 30 |
| 20 | 2.1 | 15 | 30 | 11 | 16 | 57 | 29 | 72 | 80 | 22 | 19 | 15 |
| 21 | 2.7 | 14 | 23 | 11 | 31 | 46 | 28 | 76 | 58 | 20 | 18 | 12 |
| 22 | 2.6 | 13 | 19 | 11 | 347 | 37 | 26 | 80 | 49 | 20 | 18 | 13 |
| 23 | 2.1 | 11 | 16 | 10 | 133 | 33 | 24 | 67 | 42 | 20 | 17 | 25 |
| 24 | 1.9 | 10 | 34 | e8.4 | 61 | 28 | 22 | 57 | 38 | 18 | 16 | 18 |
| 25 | 3.8 | 9.0 | 41 | e8.8 | 48 | 26 | 22 | 49 | 36 | 17 | 15 | 16 |
| 26 | 12 | 8.4 | 29 | 9.0 | 43 | 24 | 22 | 49 | 33 | 16 | 15 | 14 |
| 27 | 6.5 | 7.8 | 23 | 8.6 | 39 | 23 | 21 | 70 | 30 | 16 | 14 | 14 |
| 28 | 10 | 7.3 | 21 | 7.9 | 39 | 22 | 20 | 63 | 28 | 15 | 14 | 15 |
| 29 | 16 | 7.1 | 18 | 8.5 | --- | 23 | 19 | 63 | 26 | 25 | 13 | 13 |
| 30 | 18 | 7.0 | 17 | 8.7 | --- | 29 | 32 | 56 | 25 | 27 | 13 | 12 |
| 31 | 13 | --- | 16 | 8.7 | --- | 32 | --- | 53 | --- | 23 | 13 | --- |
| TOTAL | 135.52 | 389.9 | 529.7 | 446.6 | 947.6 | 881 | 1,139 | 1,742 | 1,815 | 1,013 | 945 | 456 |
| MEAN | 4.37 | 13.0 | 17.1 | 14.4 | 33.8 | 28.4 | 38.0 | 56.2 | 60.5 | 32.7 | 30.5 | 15.2 |
| MAX | 18 | 33 | 41 | 30 | 347 | 57 | 117 | 396 | 231 | 79 | 192 | 35 |
| MIN | 0.80 | 6.1 | 6.4 | 7.9 | 6.8 | 18 | 19 | 19 | 25 | 15 | 13 | 11 |
| CFSM | 0.37 | 1.11 | 1.46 | 1.23 | 2.89 | 2.43 | 3.25 | 4.80 | 5.17 | 2.79 | 2.61 | 1.30 |
| IN. | 0.43 | 1.24 | 1.68 | 1.42 | 3.01 | 2.80 | 3.62 | 5.54 | 5.77 | 3.22 | 3.00 | 1.45 |

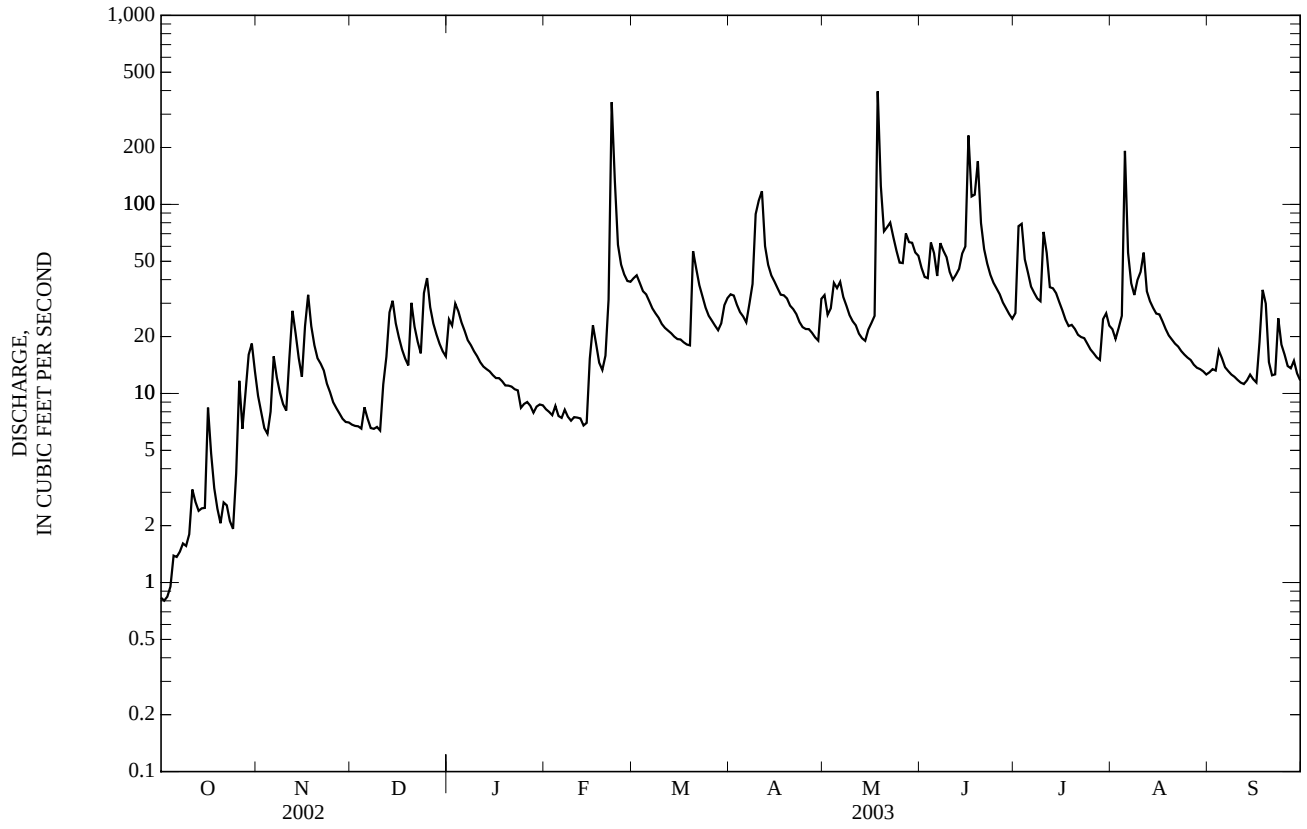
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1956 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 7.94 | 10.6 | 10.4 | 13.9 | 18.6 | 22.1 | 19.7 | 13.2 | 9.57 | 6.98 | 6.61 | 7.14 |
| MAX | 34.2 | 118 | 32.6 | 35.9 | 82.6 | 69.3 | 87.9 | 56.2 | 60.5 | 32.7 | 30.5 | 50.4 |
| (WY) | (1980) | (1986) | (1973) | (1996) | (1998) | (1993) | (1987) | (2003) | (2003) | (2003) | (2003) | (1979) |
| MIN | 2.09 | 1.37 | 1.65 | 1.78 | 1.88 | 3.16 | 2.55 | 3.07 | 1.29 | 0.90 | 0.59 | 1.07 |
| (WY) | (1987) | (2002) | (2002) | (1966) | (2002) | (1981) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) |

02055100 TINKER CREEK NEAR DALEVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1956 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 1,612.30 | | 10,440.32 | | | |
| ANNUAL MEAN | 4.42 | | 28.6 | | 12.2 | |
| HIGHEST ANNUAL MEAN | | | | | 28.6 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 1.96 | 2002 |
| HIGHEST DAILY MEAN | 41 | Dec 25 | 396 | May 18 | 2,560 | Nov 4, 1985 |
| LOWEST DAILY MEAN | 0.41 | aAug 7 | 0.80 | Oct 2 | 0.41 | aAug 7, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.42 | Aug 7 | 1.1 | Oct 1 | 0.42 | Aug 7, 2002 |
| MAXIMUM PEAK FLOW | | | 1,840 | May 18 | 10,400 | Nov 4, 1985 |
| MAXIMUM PEAK STAGE | | | 7.89 | May 18 | b13.36 | Nov 4, 1985 |
| INSTANTANEOUS LOW FLOW | | | 0.80 | cOct 1 | d0.20 | Jan 24, 1961 |
| ANNUAL RUNOFF (CFSM) | 0.38 | | 2.44 | | 1.04 | |
| ANNUAL RUNOFF (INCHES) | 5.13 | | 33.19 | | 14.19 | |
| 10 PERCENT EXCEEDS | 13 | | 55 | | 24 | |
| 50 PERCENT EXCEEDS | 2.0 | | 21 | | 6.8 | |
| 90 PERCENT EXCEEDS | 0.65 | | 6.9 | | 2.4 | |

a Also Aug. 10, 13, 14, 2002.
b From floodmarks.
c Also Oct. 2, 3, 2002.
d Result of freezeup.
e Estimated.



## 02056000 ROANOKE RIVER AT NIAGARA, VA

LOCATION.--Lat 37°15'18", long 79°52'17", NAD83, 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 $mi^2$.

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 NGVD of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--No estimated daily discharges. Records good. Flow regulated by dam and powerplant 200 ft upstream from station. Maximum discharge, 52,300 $ft^3/s$, from rating curve extended above 12,000 $ft^3/s$ on basis of slope-area measurements at gage heights 18.98 ft and 25.30 ft. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1545 | *21,800 | *16.71 | Jun 9 | 0130 | 3,520 | 7.72 |
| Mar 20 | 2245 | 4,250 | 8.37 | Jun 13 | 1700 | 4,430 | 8.52 |
| Apr 9 | 1300 | 4,980 | 8.96 | Jun 16 | 1330 | 9,010 | 11.53 |
| Apr 11 | 0430 | 13,800 | 13.78 | Jun 19 | 1630 | 5,760 | 9.54 |
| May 15 | 1530 | 4,670 | 8.71 | Jul 3 | 0530 | 7,270 | 10.54 |
| May 18 | 1915 | 10,300 | 12.20 | Aug 9 | 0400 | 3,860 | 8.03 |
| May 22 | 0130 | 3,800 | 7.98 | Aug 10 | 0145 | 6,560 | 10.09 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 113 | 303 | 209 | 695 | 224 | 1,290 | 929 | 666 | 1,460 | 846 | 487 | 351 |
| 2 | 106 | 232 | 200 | 679 | 224 | 1,410 | 1,150 | 610 | 1,080 | 2,620 | 498 | 340 |
| 3 | 106 | 208 | 192 | 815 | 221 | 1,380 | 1,140 | 750 | 969 | 5,780 | 755 | 313 |
| 4 | 97 | 210 | 204 | 872 | 272 | 1,180 | 955 | 2,350 | 1,140 | 2,760 | 491 | 488 |
| 5 | 94 | 264 | 228 | 731 | 252 | 1,100 | 869 | 1,630 | 1,080 | 1,970 | 1,370 | 426 |
| 6 | 93 | 342 | 216 | 658 | 250 | 976 | 761 | 1,420 | 886 | 1,580 | 1,420 | 351 |
| 7 | 89 | 279 | 210 | 584 | 262 | 858 | 1,040 | 1,140 | 1,160 | 2,380 | 972 | 307 |
| 8 | 91 | 223 | 217 | 517 | 231 | 784 | 1,430 | 967 | 2,080 | 1,370 | 743 | 291 |
| 9 | 87 | 205 | 242 | 467 | 219 | 730 | 4,250 | 824 | 2,950 | 1,110 | 1,930 | 276 |
| 10 | 90 | 206 | 212 | 427 | 245 | 678 | 4,820 | 694 | 1,820 | 999 | 2,490 | 279 |
| 11 | 164 | 524 | 372 | 385 | 240 | 603 | 9,630 | 617 | 1,310 | 1,310 | 1,470 | 265 |
| 12 | 111 | 1,320 | 518 | 348 | 227 | 556 | 3,700 | 553 | 1,290 | 929 | 989 | 257 |
| 13 | 111 | 1,420 | 971 | 316 | 237 | 522 | 2,230 | 488 | 1,780 | 937 | 781 | 278 |
| 14 | 110 | 718 | 1,560 | 341 | 244 | 491 | 1,600 | 450 | 1,470 | 827 | 656 | 314 |
| 15 | 118 | 517 | 1,030 | 332 | 476 | 477 | 1,260 | 1,490 | 2,120 | 690 | 564 | 282 |
| 16 | 448 | 763 | 755 | 309 | 2,420 | 479 | 1,070 | 1,050 | 5,520 | 643 | 901 | 265 |
| 17 | 208 | 1,910 | 635 | 311 | 1,360 | 466 | 933 | 832 | 5,130 | 569 | 1,150 | 267 |
| 18 | 173 | 1,330 | 552 | 283 | 919 | 430 | 940 | 6,030 | 3,500 | 513 | 775 | 551 |
| 19 | 144 | 796 | 477 | 268 | 742 | 406 | 1,000 | 5,400 | 5,220 | 491 | 627 | 1,910 |
| 20 | 132 | 592 | 823 | 283 | 874 | 2,150 | 858 | 2,560 | 3,560 | 482 | 516 | 841 |
| 21 | 185 | 485 | 1,070 | 280 | 1,540 | 2,980 | 810 | 2,040 | 2,220 | 439 | 462 | 535 |
| 22 | 133 | 460 | 737 | 268 | 12,300 | 1,700 | 791 | 2,680 | 1,600 | 503 | 443 | 492 |
| 23 | 134 | 420 | 578 | 257 | 11,400 | 1,210 | 709 | 1,980 | 1,230 | 525 | 417 | 825 |
| 24 | 130 | 365 | 1,000 | 208 | 3,610 | 971 | 641 | 1,640 | 1,010 | 476 | 401 | 563 |
| 25 | 170 | 324 | 2,070 | 235 | 2,170 | 808 | 605 | 1,320 | 863 | 413 | 358 | 464 |
| 26 | 346 | 287 | 1,270 | 249 | 1,610 | 711 | 690 | 1,370 | 760 | 395 | 338 | 409 |
| 27 | 189 | 259 | 878 | 234 | 1,330 | 675 | 615 | 1,570 | 699 | 365 | 325 | 447 |
| 28 | 372 | 231 | 692 | 219 | 1,220 | 596 | 528 | 2,020 | 653 | 343 | 326 | 580 |
| 29 | 479 | 212 | 577 | 248 | --- | 616 | 497 | 1,660 | 633 | 481 | 312 | 497 |
| 30 | 641 | 223 | 504 | 253 | --- | 937 | 539 | 1,440 | 573 | 707 | 324 | 402 |
| 31 | 486 | --- | 448 | 237 | --- | 929 | --- | 1,350 | --- | 545 | 306 | --- |
| TOTAL | 5,950 | 15,628 | 19,647 | 12,309 | 45,319 | 29,099 | 46,990 | 49,591 | 55,766 | 33,998 | 23,597 | 13,866 |
| MEAN | 192 | 521 | 634 | 397 | 1,619 | 939 | 1,566 | 1,600 | 1,859 | 1,097 | 761 | 462 |
| MAX | 641 | 1,910 | 2,070 | 872 | 12,300 | 2,980 | 9,630 | 6,030 | 5,520 | 5,780 | 2,490 | 1,910 |
| MIN | 87 | 205 | 192 | 208 | 219 | 406 | 497 | 450 | 573 | 343 | 306 | 257 |
| CFSM | 0.37 | 1.02 | 1.24 | 0.78 | 3.16 | 1.83 | 3.06 | 3.12 | 3.63 | 2.14 | 1.49 | 0.90 |
| IN. | 0.43 | 1.14 | 1.43 | 0.89 | 3.29 | 2.11 | 3.41 | 3.60 | 4.05 | 2.47 | 1.71 | 1.01 |

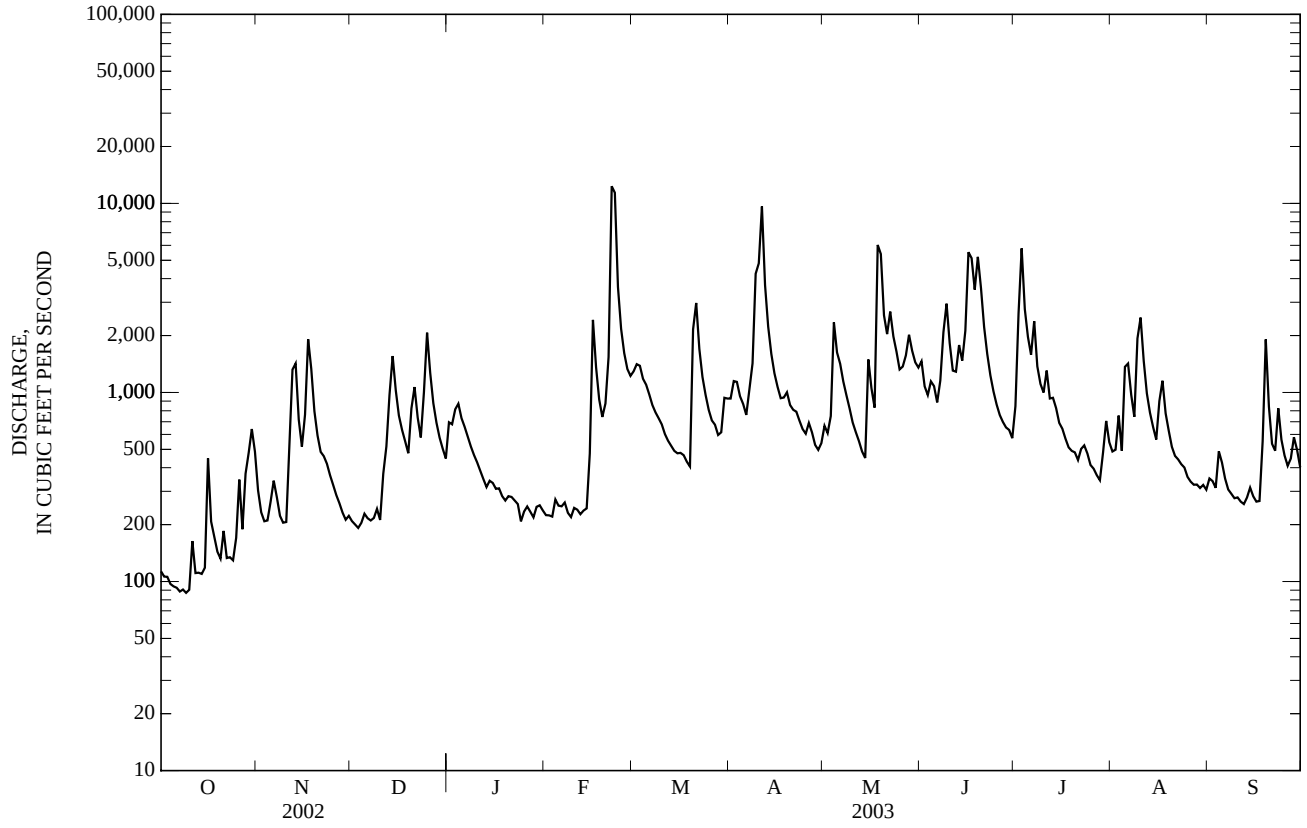
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1927 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 342 | 362 | 465 | 620 | 773 | 897 | 825 | 574 | 431 | 299 | 340 | 317 |
| MAX | 1,722 | 2,100 | 2,065 | 1,941 | 2,805 | 2,846 | 3,661 | 1,600 | 1,859 | 1,396 | 2,456 | 2,051 |
| (WY) | (1938) | (1986) | (1949) | (1937) | (1998) | (1993) | (1987) | (2003) | (2003) | (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) |

02056000 ROANOKE RIVER AT NIAGARA, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1927 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 94,061 | | 351,760 | | | |
| ANNUAL MEAN | 258 | | 964 | | 519 | |
| HIGHEST ANNUAL MEAN | | | | | 984 | 1949 |
| LOWEST ANNUAL MEAN | | | | | 176 | 2002 |
| HIGHEST DAILY MEAN | 3,110 | May 3 | 12,300 | Feb 22 | 19,700 | Nov 4, 1985 |
| LOWEST DAILY MEAN | 79 | Aug 14 | 87 | Oct 9 | 8.0 | Oct 9, 1954 |
| ANNUAL SEVEN-DAY MINIMUM | 82 | Aug 8 | 92 | Oct 4 | 67 | Jan 28, 1966 |
| MAXIMUM PEAK FLOW | | | 21,800 | Feb 22 | 52,300 | Nov 4, 1985 |
| MAXIMUM PEAK STAGE | | | 16.71 | Feb 22 | a25.30 | Nov 4, 1985 |
| INSTANTANEOUS LOW FLOW | | | 50 | Sep 11 | 1.0 | bOct 16, 1956 |
| ANNUAL RUNOFF (CFSM) | 0.50 | | 1.88 | | 1.01 | |
| ANNUAL RUNOFF (INCHES) | 6.83 | | 25.56 | | 13.77 | |
| 10 PERCENT EXCEEDS | 509 | | 1,950 | | 985 | |
| 50 PERCENT EXCEEDS | 162 | | 592 | | 305 | |
| 90 PERCENT EXCEEDS | 97 | | 212 | | 135 | |

a From floodmark.
b Also Oct. 20, 1956, and Nov. 25, 26, 1990.



## 02056650 BACK CREEK NEAR DUNDEE, VA

LOCATION.--Lat 37°13'40", long 79°52'05", NAD83, 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 $mi^2$.

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

GAGE.--Water-stage recorder. Datum of gage is 822.67 ft NGVD of 1929. Prior to Apr. 4, 1975, nonrecording gage, and Apr. 4, 1975, to Nov. 4, 1985, water-stage recorder, at site 80 ft downstream at same datum.

REMARKS.--Records good except those for periods of no gage-height record, Nov. 12-14 and July 22-24, and period with ice effect, Jan. 19-22, which are fair. Maximum discharge, 20,000 $ft^3/s$, from rating curve extended above 5,900 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1530 | *3,770 | *11.03 | Jul 1 | 2145 | 648 | 5.47 |
| Mar 20 | 1415 | 620 | 5.40 | Jul 3 | 0000 | 1,500 | 7.37 |
| Apr 10 | 2230 | 1,630 | 7.62 | Jul 6 | 2000 | 1,500 | 7.37 |
| Jun 16 | 0330 | 852 | 5.95 | Aug 3 | 0300 | 660 | 5.50 |
| Jun 16 | 1230 | 2,420 | 9.03 | Aug 9 | 0515 | 852 | 5.95 |
| Jun 19 | 0915 | 894 | 6.04 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7.3 | 36 | 18 | 98 | 25 | 136 | 155 | 76 | 234 | 122 | 82 | 44 |
| 2 | 6.2 | 26 | 17 | 100 | 24 | 150 | 145 | 66 | 158 | 499 | 69 | 47 |
| 3 | 5.6 | 22 | 17 | 117 | 23 | 134 | 124 | 80 | 141 | 696 | 225 | 39 |
| 4 | 5.2 | 20 | 16 | 104 | 28 | 115 | 107 | 278 | 136 | 286 | 85 | 64 |
| 5 | 4.9 | 20 | 20 | 85 | 30 | 112 | 100 | 151 | 114 | 201 | 178 | 60 |
| 6 | 4.2 | 42 | 24 | 73 | 26 | 109 | 84 | 127 | 98 | 401 | 207 | 43 |
| 7 | 3.9 | 29 | 16 | 61 | 28 | 95 | 164 | 107 | 159 | 366 | 122 | 40 |
| 8 | 3.6 | 24 | 19 | 56 | 26 | 87 | 173 | 95 | 184 | 196 | 106 | 39 |
| 9 | 3.6 | 22 | 23 | 50 | 23 | 80 | 411 | 83 | 264 | 163 | 415 | 37 |
| 10 | 3.6 | 20 | 21 | 45 | 28 | 72 | 787 | 75 | 170 | 150 | 187 | 35 |
| 11 | 5.3 | 118 | 53 | 40 | 27 | 66 | 932 | 70 | 136 | 120 | 134 | 34 |
| 12 | 9.8 | e190 | 83 | 35 | 28 | 63 | 407 | 62 | 165 | 103 | 100 | 32 |
| 13 | 7.1 | e170 | 159 | 35 | 25 | 60 | 264 | 56 | 195 | 107 | 83 | 34 |
| 14 | 5.3 | e96 | 193 | 34 | 27 | 57 | 197 | 53 | 222 | 95 | 76 | 38 |
| 15 | 4.8 | 59 | 108 | 31 | 69 | 53 | 161 | 68 | 230 | 86 | 68 | 35 |
| 16 | 63 | 81 | 79 | 29 | 250 | 57 | 139 | 84 | 993 | 79 | 110 | 34 |
| 17 | 38 | 206 | 65 | 32 | 119 | 58 | 122 | 64 | 531 | 73 | 92 | 33 |
| 18 | 18 | 119 | 54 | 24 | 82 | 54 | 126 | 209 | 380 | 69 | 74 | 76 |
| 19 | 13 | 78 | 47 | e23 | 73 | 51 | 152 | 273 | 539 | 66 | 65 | 239 |
| 20 | 10 | 60 | 69 | e24 | 103 | 351 | 126 | 175 | 340 | 63 | 60 | 79 |
| 21 | 11 | 50 | 67 | e23 | 187 | 280 | 117 | 158 | 234 | 61 | 57 | 58 |
| 22 | 12 | 44 | 58 | e22 | 1,480 | 175 | 107 | 306 | 183 | e60 | 54 | 59 |
| 23 | 9.6 | 36 | 50 | 20 | 793 | 130 | 95 | 246 | 149 | e74 | 51 | 168 |
| 24 | 8.0 | 32 | 127 | 19 | 362 | 106 | 86 | 207 | 126 | e70 | 51 | 80 |
| 25 | 8.3 | 29 | 187 | 25 | 225 | 91 | 84 | 162 | 111 | 59 | 46 | 62 |
| 26 | 23 | 27 | 109 | 24 | 164 | 82 | 94 | 346 | 100 | 56 | 44 | 54 |
| 27 | 18 | 25 | 82 | 20 | 136 | 76 | 90 | 252 | 92 | 53 | 42 | 52 |
| 28 | 33 | 23 | 67 | 20 | 130 | 68 | 75 | 279 | 89 | 51 | 40 | 78 |
| 29 | 76 | 21 | 57 | 25 | --- | 79 | 71 | 209 | 84 | 70 | 42 | 51 |
| 30 | 105 | 20 | 49 | 26 | --- | 138 | 71 | 178 | 76 | 84 | 46 | 46 |
| 31 | 58 | --- | 44 | 24 | --- | 155 | --- | 234 | --- | 73 | 45 | --- |
| TOTAL | 584.3 | 1,745 | 1,998 | 1,344 | 4,541 | 3,340 | 5,766 | 4,829 | 6,633 | 4,652 | 3,056 | 1,790 |
| MEAN | 18.8 | 58.2 | 64.5 | 43.4 | 162 | 108 | 192 | 156 | 221 | 150 | 98.6 | 59.7 |
| MAX | 105 | 206 | 193 | 117 | 1,480 | 351 | 932 | 346 | 993 | 696 | 415 | 239 |
| MIN | 3.6 | 20 | 16 | 19 | 23 | 51 | 71 | 53 | 76 | 51 | 40 | 32 |
| CFSM | 0.33 | 1.02 | 1.13 | 0.76 | 2.86 | 1.90 | 3.38 | 2.74 | 3.89 | 2.64 | 1.74 | 1.05 |
| IN. | 0.38 | 1.14 | 1.31 | 0.88 | 2.97 | 2.19 | 3.78 | 3.16 | 4.34 | 3.05 | 2.00 | 1.17 |

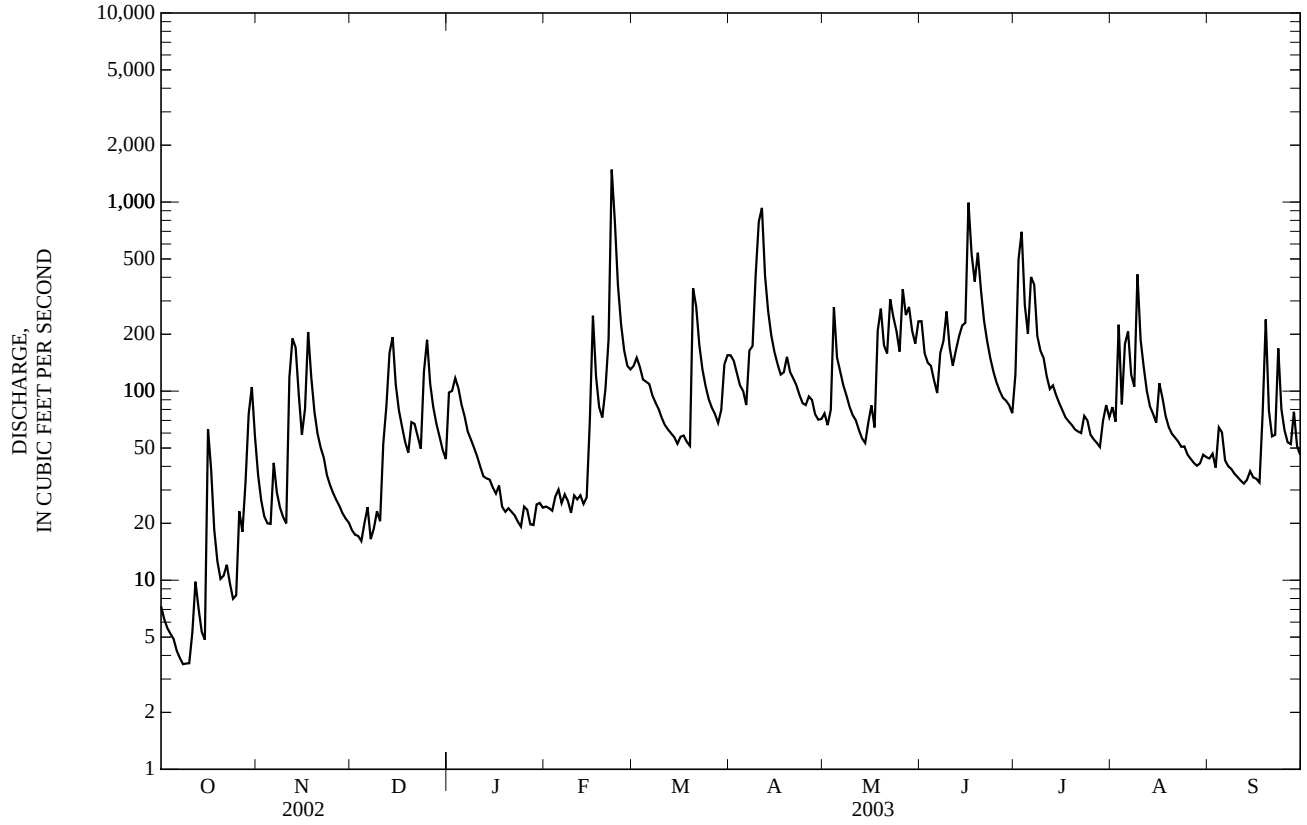
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1974 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 31.8 | 45.7 | 45.9 | 64.9 | 80.9 | 105 | 109 | 66.9 | 54.9 | 31.0 | 27.4 | 40.3 |
| MAX | 154 | 292 | 117 | 146 | 317 | 265 | 396 | 190 | 221 | 150 | 121 | 314 |
| (WY) | (1977) | (1986) | (1987) | (1996) | (1998) | (1993) | (1987) | (1978) | (2003) | (2003) | (1985) | (1979) |
| MIN | 5.61 | 6.58 | 11.4 | 11.6 | 12.6 | 20.5 | 22.4 | 20.8 | 6.16 | 6.96 | 3.47 | 5.03 |
| (WY) | (1992) | (1982) | (1999) | (1981) | (2002) | (1981) | (1981) | (1981) | (2002) | (1981) | (1981) | (1998) |

02056650 BACK CREEK NEAR DUNDEE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1974 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 8,774.47 | | 40,278.3 | | | |
| ANNUAL MEAN | 24.0 | | 110 | | 58.5 | |
| HIGHEST ANNUAL MEAN | | | | | 110 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 14.2 | 2002 |
| HIGHEST DAILY MEAN | 260 | May 3 | 1,480 | Feb 22 | 4,000 | Nov 4, 1985 |
| LOWEST DAILY MEAN | 0.32 | Aug 14 | 3.6 | aOct 8 | 0.32 | Aug 14, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.59 | Aug 8 | 4.1 | Oct 4 | 0.59 | Aug 8, 2002 |
| MAXIMUM PEAK FLOW | | | 3,770 | Feb 22 | 20,000 | Nov 4, 1985 |
| MAXIMUM PEAK STAGE | | | 11.03 | Feb 22 | b25.10 | Nov 4, 1985 |
| INSTANTANEOUS LOW FLOW | | | 3.5 | aOct 8 | 0.24 | cAug 14, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.42 | | 1.94 | | 1.03 | |
| ANNUAL RUNOFF (INCHES) | 5.75 | | 26.38 | | 14.00 | |
| 10 PERCENT EXCEEDS | 57 | | 225 | | 114 | |
| 50 PERCENT EXCEEDS | 13 | | 72 | | 31 | |
| 90 PERCENT EXCEEDS | 2.6 | | 20 | | 8.9 | |

a Also Oct. 9, 10, 2002.
b From floodmark, present site.
c Also Aug. 15, 2002.
e Estimated.



## 02056900 BLACKWATER RIVER NEAR ROCKY MOUNT, VA

LOCATION.--Lat 37°02'43", long 79°50'39", NAD83, 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 $mi^2$.

PERIOD OF RECORD.--October 1976 to current year.

GAGE.--Water-stage recorder. Datum of gage is 876.45 ft NGVD of 1929.

REMARKS.--Records good except those for periods with ice effect, Dec. 7-9 and Jan. 16-19, 23, 29, which are fair. American Electric Power gage-height transmitter at station with recorder at Roanoke. Maximum discharge, 20,800 $ft^3/s$, from rating curve extended above 7,000 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1645 | *5,000 | *11.85 | Jun 19 | 1100 | 1,830 | 6.55 |
| Mar 20 | 1430 | 1,560 | 6.01 | Aug 9 | 0230 | 1,700 | 6.29 |
| Apr 10 | 2200 | 2,600 | 7.95 | Aug 9 | 1115 | 3,300 | 9.15 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 34 | 86 | 58 | 159 | 70 | 316 | 230 | 155 | 210 | 147 | 159 | 128 |
| 2 | 30 | 67 | 55 | 214 | 72 | 284 | 220 | 142 | 180 | 439 | 147 | 178 |
| 3 | 26 | 57 | 54 | 225 | 70 | 244 | 202 | 138 | 173 | 800 | 276 | 137 |
| 4 | 25 | 53 | 54 | 208 | 75 | 213 | 184 | 268 | 195 | 375 | 155 | 197 |
| 5 | 22 | 53 | 58 | 168 | 85 | 202 | 173 | 200 | 167 | 271 | 152 | 171 |
| 6 | 22 | 91 | 76 | 153 | 73 | 214 | 165 | 192 | 149 | 244 | 385 | 131 |
| 7 | 20 | 78 | e62 | 135 | 79 | 191 | 247 | 174 | 424 | 227 | 189 | 120 |
| 8 | 19 | 63 | e64 | 125 | 75 | 173 | 261 | 163 | 503 | 191 | 178 | 114 |
| 9 | 19 | 56 | e60 | 116 | 67 | 163 | 568 | 152 | 316 | 179 | 1,570 | 107 |
| 10 | 19 | 53 | 59 | 108 | 72 | 152 | 1,170 | 158 | 238 | 189 | 468 | 103 |
| 11 | 26 | 434 | 115 | 99 | 74 | 143 | 1,370 | 229 | 207 | 186 | 326 | 98 |
| 12 | 35 | 577 | 171 | 93 | 76 | 138 | 657 | 150 | 385 | 150 | 233 | 94 |
| 13 | 29 | 381 | 247 | 89 | 73 | 132 | 460 | 130 | 255 | 148 | 192 | 95 |
| 14 | 24 | 176 | 397 | 87 | 71 | 127 | 362 | 122 | 256 | 143 | 348 | 105 |
| 15 | 22 | 130 | 202 | 84 | 107 | 119 | 301 | 125 | 224 | 139 | 191 | 99 |
| 16 | 70 | 148 | 150 | e75 | 452 | 128 | 260 | 155 | 335 | 131 | 440 | 96 |
| 17 | 132 | 397 | 128 | e69 | 233 | 147 | 232 | 134 | 582 | 123 | 317 | 88 |
| 18 | 57 | 223 | 113 | e62 | 164 | 127 | 234 | 270 | 526 | 117 | 211 | 106 |
| 19 | 43 | 157 | 102 | e80 | 147 | 121 | 315 | 552 | 1,160 | 118 | 175 | 540 |
| 20 | 37 | 131 | 161 | 95 | 204 | 839 | 247 | 297 | 644 | 112 | 159 | 190 |
| 21 | 36 | 115 | 149 | 77 | 383 | 518 | 224 | 242 | 437 | 108 | 155 | 144 |
| 22 | 41 | 106 | 121 | 71 | 2,310 | 316 | 211 | 416 | 344 | 111 | 150 | 133 |
| 23 | 36 | 91 | 107 | e62 | 1,290 | 239 | 191 | 383 | 280 | 261 | 135 | 643 |
| 24 | 33 | 83 | 175 | e49 | 649 | 202 | 176 | 346 | 239 | 169 | 146 | 241 |
| 25 | 31 | 77 | 370 | e57 | 416 | 180 | 170 | 282 | 210 | 122 | 126 | 175 |
| 26 | 35 | 73 | 207 | e64 | 319 | 168 | 188 | 437 | 190 | 109 | 117 | 151 |
| 27 | 40 | 69 | 158 | e59 | 272 | 163 | 210 | 378 | 178 | 103 | 111 | 142 |
| 28 | 40 | 65 | 139 | e53 | 289 | 148 | 168 | 360 | 171 | 97 | 106 | 219 |
| 29 | 92 | 63 | 125 | e70 | --- | 162 | 156 | 286 | 164 | 99 | 111 | 145 |
| 30 | 185 | 61 | 112 | 77 | --- | 238 | 151 | 257 | 150 | 136 | 134 | 129 |
| 31 | 139 | --- | 104 | 73 | --- | 278 | --- | 221 | --- | 135 | 140 | --- |
| TOTAL | 1,419 | 4,214 | 4,153 | 3,156 | 8,267 | 6,785 | 9,703 | 7,514 | 9,492 | 5,879 | 7,702 | 5,019 |
| MEAN | 45.8 | 140 | 134 | 102 | 295 | 219 | 323 | 242 | 316 | 190 | 248 | 167 |
| MAX | 185 | 577 | 397 | 225 | 2,310 | 839 | 1,370 | 552 | 1,160 | 800 | 1,570 | 643 |
| MIN | 19 | 53 | 54 | 49 | 67 | 119 | 151 | 122 | 149 | 97 | 106 | 88 |
| CFSM | 0.40 | 1.22 | 1.16 | 0.89 | 2.57 | 1.90 | 2.81 | 2.11 | 2.75 | 1.65 | 2.16 | 1.45 |
| IN. | 0.46 | 1.36 | 1.34 | 1.02 | 2.67 | 2.19 | 3.14 | 2.43 | 3.07 | 1.90 | 2.49 | 1.62 |

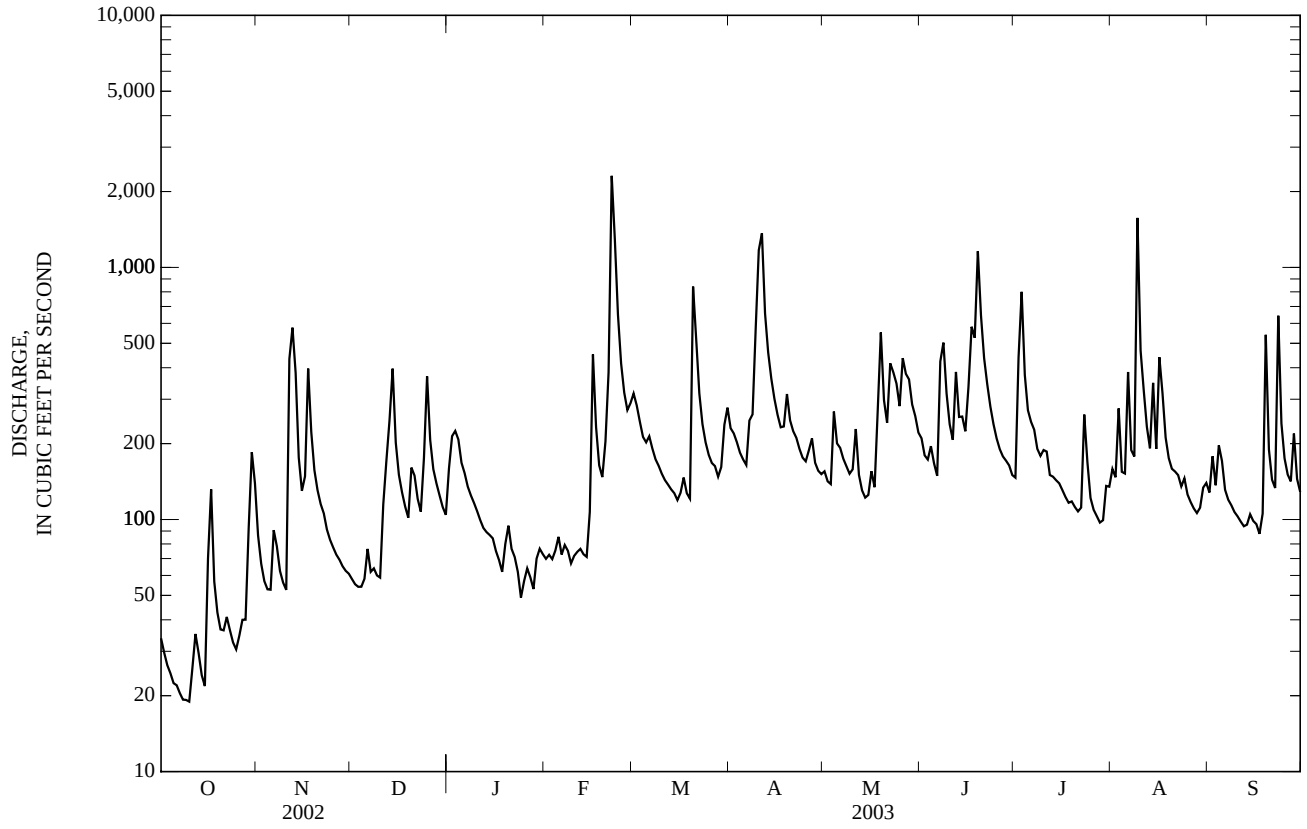
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1977 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 91.9 | 109 | 107 | 148 | 164 | 216 | 230 | 138 | 124 | 81.9 | 71.6 | 93.2 |
| MAX | 544 | 584 | 272 | 349 | 495 | 585 | 821 | 346 | 416 | 261 | 248 | 375 |
| (WY) | (1977) | (1986) | (1997) | (1996) | (1998) | (1993) | (1987) | (1978) | (1992) | (1989) | (2003) | (1979) |
| MIN | 17.3 | 21.9 | 34.2 | 42.0 | 39.6 | 60.1 | 56.2 | 53.6 | 17.1 | 24.6 | 12.4 | 23.0 |
| (WY) | (2002) | (2002) | (2002) | (2002) | (2002) | (1981) | (2002) | (1981) | (2002) | (1977) | (1981) | (1983) |

02056900 BLACKWATER RIVER NEAR ROCKY MOUNT, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1977 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 21,071.0 | | 73,303 | | | |
| ANNUAL MEAN | 57.7 | | 201 | | 131 | |
| HIGHEST ANNUAL MEAN | | | | | 234 | 1987 |
| LOWEST ANNUAL MEAN | | | | | 37.1 | 2002 |
| HIGHEST DAILY MEAN | 577 | Nov 12 | 2,310 | Feb 22 | 5,410 | Nov 5, 1985 |
| LOWEST DAILY MEAN | 3.8 | Aug 14 | 19 | aOct 8 | 3.8 | Aug 14, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 4.6 | Aug 9 | 21 | bOct 4 | 4.6 | Aug 9, 2002 |
| MAXIMUM PEAK FLOW | | | 5,000 | Feb 22 | 20,800 | Nov 5, 1985 |
| MAXIMUM PEAK STAGE | | | 11.85 | Feb 22 | 21.92 | Nov 5, 1985 |
| INSTANTANEOUS LOW FLOW | | | 17 | cOct 8 | 3.2 | dAug 13, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.50 | | 1.75 | | 1.14 | |
| ANNUAL RUNOFF (INCHES) | 6.82 | | 23.71 | | 15.45 | |
| 10 PERCENT EXCEEDS | 125 | | 383 | | 230 | |
| 50 PERCENT EXCEEDS | 38 | | 150 | | 83 | |
| 90 PERCENT EXCEEDS | 11 | | 57 | | 31 | |

a Also Oct. 9, 10, 2002.
b Also Oct. 5, 2002.
c Also Oct. 9-11, 2002.
d Also Aug. 14, 2002.
e Estimated.



## 02057400 SMITH MOUNTAIN LAKE NEAR PENHOOK, VA

LOCATION.--Lat 37°02'29", long 79°31'19", NAD83, 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 $mi^2$.

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

GAGE.--Water-stage recorder. Datum of gage is NGVD 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.

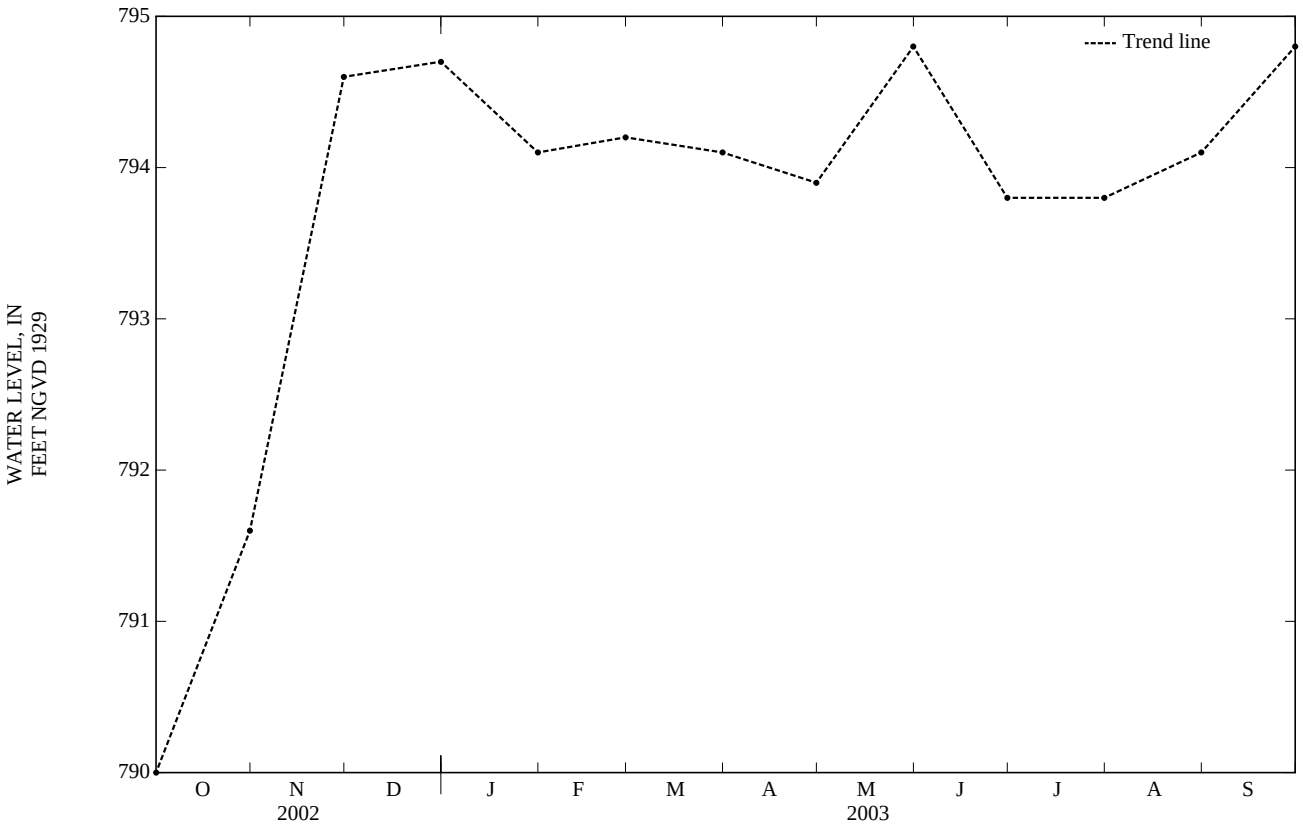
EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 1,250,200 acre-ft, Apr. 27, 1978, elevation, 799.8 ft; minimum (after first filling to minimum power pool), 995,400 acre-ft, Jan. 23, 1970, elevation, 787.6 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 1,169,000 acre-ft, Feb. 23, elevation, 796.2 ft; minimum, 1,046,100 acre-ft, Nov. 4, elevation, 790.3 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Elevation (feet) | Contents (acre-feet) | Change in contents (acre-feet) |
|---|---|---|---|
| Sept. 30 | 790.0 | 1,040,000 | |
| Oct. 31 | 791.6 | 1,072,600 | +32,600 |
| Nov. 30 | 794.6 | 1,133,800 | +61,200 |
| Dec. 31 | 794.7 | 1,135,900 | +2,100 |
| CAL YR 2002 | | | +91,800 |
| Jan. 31 | 794.1 | 1,123,600 | -12,300 |
| Feb. 28 | 794.2 | 1,125,700 | +2,100 |
| Mar. 31 | 794.1 | 1,123,600 | -2,100 |
| Apr. 30 | 793.9 | 1,119,600 | -4,000 |
| May 31 | 794.8 | 1,137,900 | +18,300 |
| June 30 | 793.8 | 1,117,500 | -20,400 |
| July 31 | 793.8 | 1,117,500 | 0 |
| Aug. 31 | 794.1 | 1,123,600 | +6,100 |
| Sept. 30 | 794.8 | 1,137,900 | +14,300 |
| WTR YR 2003 | | | +97,900 |

02057400 SMITH MOUNTAIN LAKE NEAR PENHOOK, VA—Continued



## 02058400 PIGG RIVER NEAR SANDY LEVEL, VA

LOCATION.--Lat 36°56'46", long 79°31'29", NAD83, 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 $mi^2$.

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 NGVD of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Nov. 18, 1963, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect, Jan. 18-27, which is poor. American Electric Power gage-height transmitter at station, recorder at Roanoke. Maximum discharge, 65,600 $ft^3/s$, from rating curve extended above 25,500 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 23 | 0130 | 10,000 | 16.23 | Jun 7 | 2330 | 4,120 | 8.20 |
| Mar 20 | 2245 | *12,600 | *18.61 | Jul 3 | 0830 | 4,010 | 8.01 |
| Apr 10 | 2345 | 7,170 | 12.81 | Sep 23 | 0730 | 6,500 | 11.86 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 78 | 279 | 166 | 466 | 228 | 899 | 621 | 546 | 567 | 447 | 553 | 400 |
| 2 | 71 | 199 | 160 | 576 | 225 | 812 | 542 | 488 | 474 | 625 | 475 | 372 |
| 3 | 67 | 165 | 158 | 534 | 218 | 679 | 478 | 432 | 448 | 2,680 | 764 | 332 |
| 4 | 64 | 156 | 157 | 595 | 241 | 545 | 438 | 659 | 572 | 929 | 579 | 478 |
| 5 | 62 | 158 | 183 | 440 | 290 | 495 | 420 | 624 | 826 | 607 | 680 | 567 |
| 6 | 60 | 352 | 230 | 368 | 252 | 508 | 405 | 539 | 517 | 574 | 919 | 402 |
| 7 | 58 | 322 | 180 | 324 | 266 | 505 | 960 | 496 | 1,740 | 879 | 638 | 350 |
| 8 | 57 | 228 | 202 | 300 | 255 | 438 | 1,080 | 461 | 2,390 | 548 | 681 | 338 |
| 9 | 57 | 184 | 190 | 285 | 227 | 418 | 2,820 | 434 | 1,020 | 496 | 1,660 | 328 |
| 10 | 57 | 164 | 183 | 268 | 229 | 388 | 3,570 | 426 | 689 | 508 | 1,420 | 316 |
| 11 | 115 | 1,080 | 319 | 250 | 251 | 365 | 4,000 | 501 | 558 | 548 | 1,490 | 307 |
| 12 | 180 | 2,180 | 562 | 238 | 269 | 356 | 1,210 | 461 | 932 | 456 | 772 | 299 |
| 13 | 131 | 1,520 | 797 | 227 | 268 | 349 | 796 | 398 | 1,360 | 587 | 562 | 313 |
| 14 | 99 | 544 | 1,620 | 225 | 255 | 345 | 646 | 373 | 791 | 603 | 500 | 371 |
| 15 | 81 | 363 | 687 | 225 | 321 | 331 | 580 | 371 | 605 | 511 | 451 | 362 |
| 16 | 170 | 446 | 455 | 215 | 1,330 | 345 | 548 | 429 | 923 | 477 | 639 | 369 |
| 17 | 390 | 1,610 | 361 | 216 | 738 | 420 | 523 | 434 | 1,420 | 485 | 627 | 327 |
| 18 | 223 | 800 | 310 | e190 | 481 | 379 | 520 | 502 | 1,470 | 420 | 502 | 370 |
| 19 | 141 | 457 | 280 | e180 | 440 | 351 | 666 | 1,030 | 1,970 | 400 | 424 | 1,590 |
| 20 | 116 | 352 | 389 | e190 | 654 | 6,810 | 629 | 639 | 1,420 | 397 | 388 | 611 |
| 21 | 112 | 304 | 497 | e180 | 1,150 | 4,500 | 557 | 513 | 800 | 388 | 377 | 425 |
| 22 | 113 | 276 | 351 | e175 | 4,300 | 984 | 530 | 558 | 627 | 408 | 386 | 380 |
| 23 | 112 | 244 | 297 | e170 | 5,330 | 668 | 492 | 715 | 551 | 503 | 356 | 4,650 |
| 24 | 101 | 221 | 428 | e160 | 1,140 | 556 | 462 | 700 | 502 | 661 | 501 | 1,030 |
| 25 | 95 | 209 | 1,610 | e160 | 723 | 495 | 449 | 1,830 | 466 | 458 | 387 | 574 |
| 26 | 125 | 200 | 842 | e165 | 591 | 454 | 476 | 1,250 | 442 | 399 | 346 | 464 |
| 27 | 141 | 192 | 498 | e170 | 558 | 435 | 514 | 1,420 | 425 | 384 | 333 | 415 |
| 28 | 150 | 183 | 383 | 180 | 666 | 406 | 465 | 1,400 | 411 | 371 | 320 | 394 |
| 29 | 275 | 175 | 335 | 213 | --- | 398 | 432 | 791 | 412 | 390 | 327 | 383 |
| 30 | 547 | 172 | 301 | 218 | --- | 642 | 435 | 838 | 417 | 427 | 336 | 342 |
| 31 | 479 | --- | 280 | 226 | --- | 944 | --- | 596 | --- | 439 | 445 | --- |
| TOTAL | 4,527 | 13,735 | 13,411 | 8,329 | 21,896 | 26,220 | 26,264 | 20,854 | 25,745 | 18,005 | 18,838 | 17,859 |
| MEAN | 146 | 458 | 433 | 269 | 782 | 846 | 875 | 673 | 858 | 581 | 608 | 595 |
| MAX | 547 | 2,180 | 1,620 | 595 | 5,330 | 6,810 | 4,000 | 1,830 | 2,390 | 2,680 | 1,660 | 4,650 |
| MIN | 57 | 156 | 157 | 160 | 218 | 331 | 405 | 371 | 411 | 371 | 320 | 299 |
| CFSM | 0.42 | 1.31 | 1.24 | 0.77 | 2.23 | 2.42 | 2.50 | 1.92 | 2.45 | 1.66 | 1.74 | 1.70 |
| IN. | 0.48 | 1.46 | 1.43 | 0.89 | 2.33 | 2.79 | 2.79 | 2.22 | 2.74 | 1.91 | 2.00 | 1.90 |

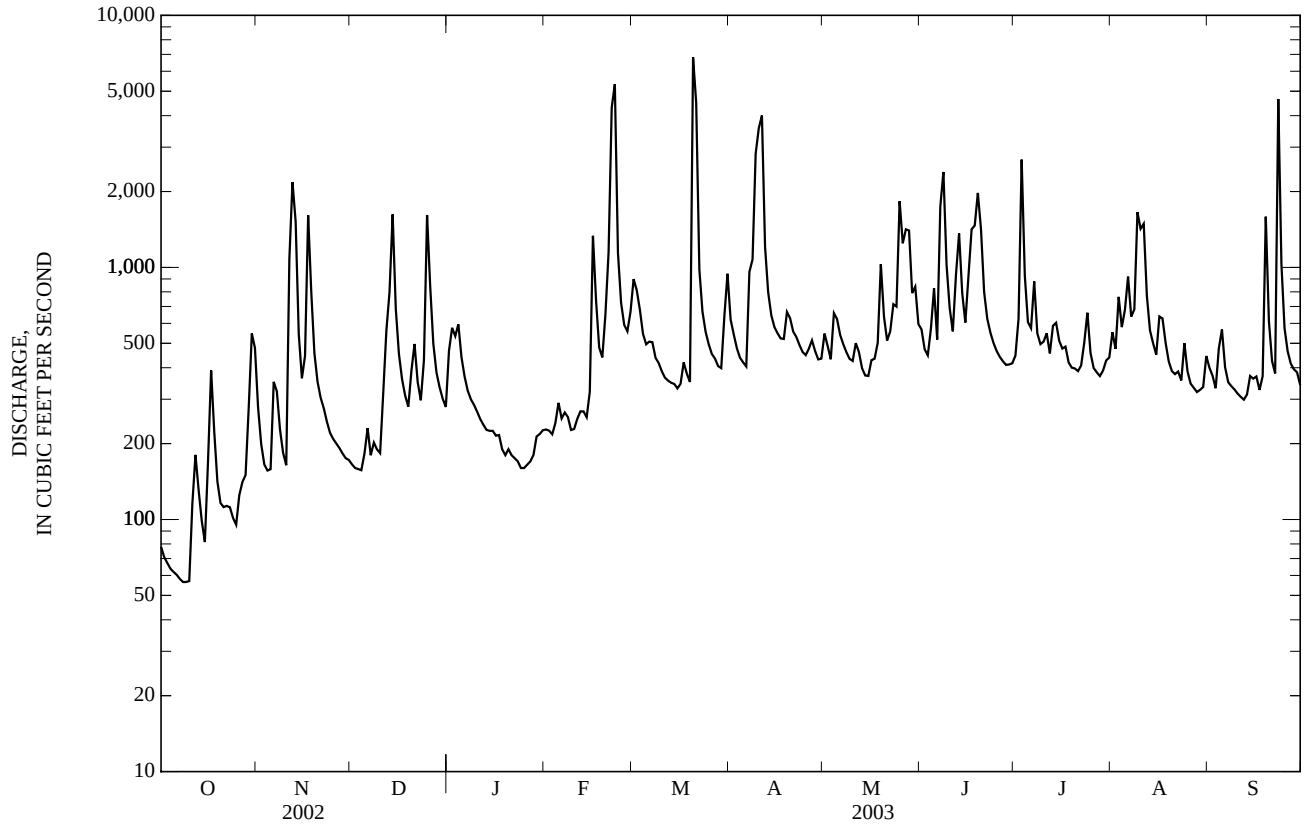
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 283 | 304 | 346 | 460 | 493 | 585 | 534 | 404 | 336 | 257 | 240 | 304 |
| MAX | 1,220 | 995 | 836 | 1,054 | 1,086 | 1,578 | 2,265 | 989 | 1,200 | 814 | 867 | 1,864 |
| (WY) | (1991) | (1986) | (1974) | (1978) | (1998) | (1993) | (1987) | (1978) | (1972) | (1972) | (1985) | (1987) |
| MIN | 74.3 | 96.5 | 136 | 157 | 148 | 203 | 172 | 165 | 83.7 | 73.2 | 36.2 | 70.0 |
| (WY) | (2002) | (2002) | (2002) | (2002) | (2002) | (1981) | (2002) | (1981) | (2002) | (2002) | (2002) | (1968) |

02058400 PIGG RIVER NEAR SANDY LEVEL, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1963 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 70,991 | | 215,683 | | | |
| ANNUAL MEAN | 194 | | 591 | | 379 | |
| HIGHEST ANNUAL MEAN | | | | | 709 | 1987 |
| LOWEST ANNUAL MEAN | | | | | 133 | 2002 |
| HIGHEST DAILY MEAN | 2,180 | Nov 12 | 6,810 | Mar 20 | 34,900 | Sep 8, 1987 |
| LOWEST DAILY MEAN | 17 | Aug 16 | 57 | aOct 8 | 17 | Aug 16, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 19 | Aug 11 | 59 | Oct 4 | 19 | Aug 11, 2002 |
| MAXIMUM PEAK FLOW | | | 12,600 | Mar 20 | 65,600 | Sep 8, 1987 |
| MAXIMUM PEAK STAGE | | | 18.61 | Mar 20 | b31.12 | Sep 8, 1987 |
| INSTANTANEOUS LOW FLOW | | | 57 | cOct 7 | d17 | Aug 16, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.56 | | 1.69 | | 1.08 | |
| ANNUAL RUNOFF (INCHES) | 7.55 | | 22.92 | | 14.73 | |
| 10 PERCENT EXCEEDS | 362 | | 1,030 | | 597 | |
| 50 PERCENT EXCEEDS | 135 | | 432 | | 251 | |
| 90 PERCENT EXCEEDS | 42 | | 170 | | 119 | |

a Also Oct. 9, 10, 2002.
b From floodmarks.
c Also Oct. 8-10, 2002.
d Also Aug. 17, 2002.
e Estimated.



## 02059400 LEESVILLE LAKE NEAR LEESVILLE, VA

LOCATION.--Lat 37°05'36", long 79°24'08", NAD83, 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 $mi^2$.

PERIOD OF RECORD.--September 1962 to current year.

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929. Prior to June 6, 1963, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by concrete dam. Spillway, with crest at elevation 578.0 ft, is equipped with 4 radial gates 35 ft high by 50 ft wide. Storage began on Sept. 29, 1962, during construction, and water in reservoir first reached minimum power pool, elevation, 600.0 ft, on Mar. 5, 1963. Total capacity at maximum pool elevation, 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.

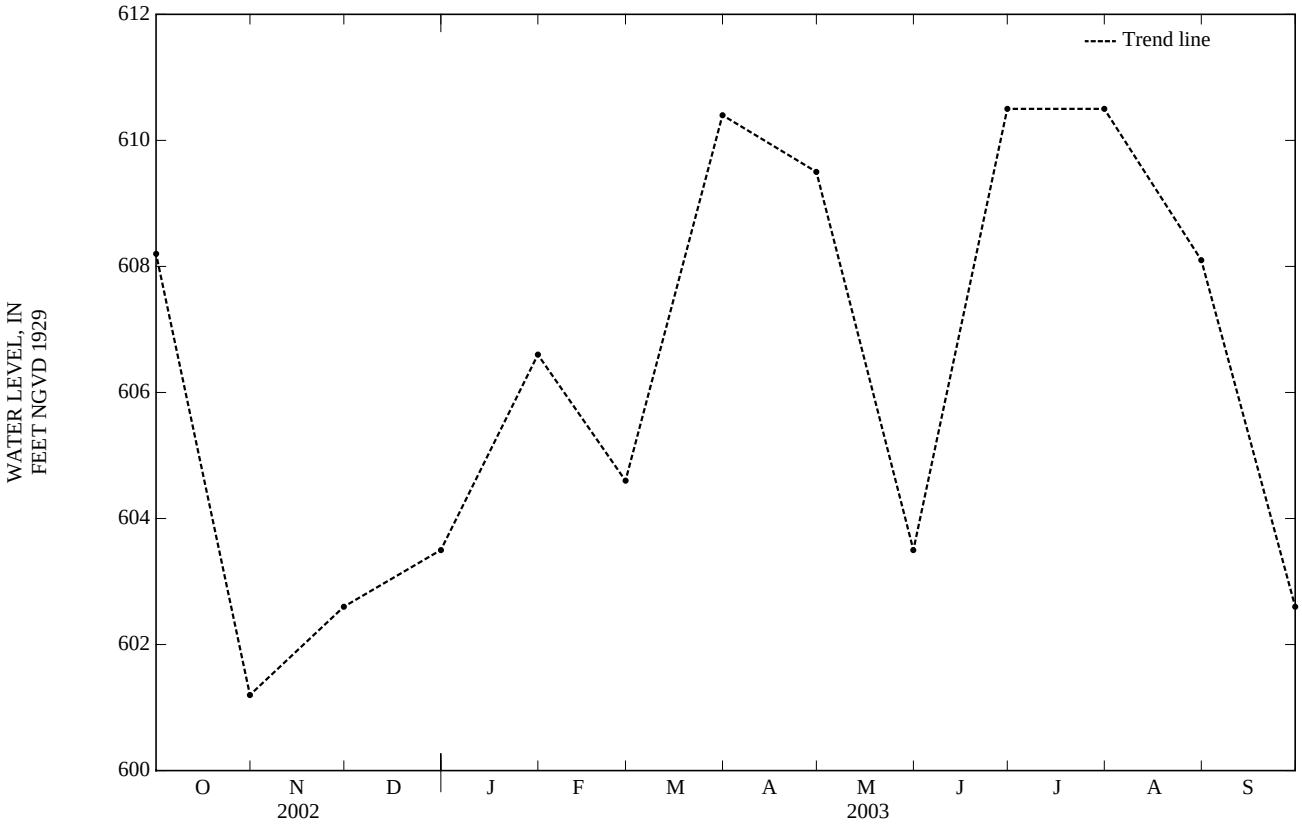
EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 98,180 acre-ft, Feb. 1, 1965, elevation, 614.0 ft; minimum (after first filling to minimum power pool), 39,880 acre-ft, Mar. 19, 1963, elevation, 592.0 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 94,320 acre-ft, May 9, elevation, 612.8 ft; minimum, 54,900 acre-ft, Feb. 20, elevation, 599.0 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Elevation (feet) | Contents (acre-feet) | Change in contents (acre-feet) |
|---|---|---|---|
| Sept. 30 | 608.2 | 80,010 | |
| Oct. 31 | 601.2 | 60,420 | -19,590 |
| Nov. 30 | 602.6 | 64,170 | +3,750 |
| Dec. 31 | 603.5 | 66,580 | +2,410 |
| CAL YR 2002 | | | +4,020 |
| Jan. 31 | 606.6 | 75,300 | +8,720 |
| Feb. 28 | 604.6 | 69,530 | -5,770 |
| Mar. 31 | 610.4 | 86,590 | +17,060 |
| Apr. 30 | 609.5 | 83,830 | -2,760 |
| May 31 | 603.5 | 66,580 | -17,250 |
| June 30 | 610.5 | 86,910 | +20,330 |
| July 31 | 610.5 | 86,910 | 0 |
| Aug. 31 | 608.1 | 79,710 | -7,200 |
| Sept. 30 | 602.6 | 64,170 | -15,540 |
| WTR YR 2003 | | | -15,840 |

02059400 LEESVILLE LAKE NEAR LEESVILLE, VA—Continued



## 02059500 GOOSE CREEK NEAR HUDDLESTON, VA

LOCATION.--Lat 37°10'24", long 79°31'13", NAD83, 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 $mi^2$.

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 NGVD of 1929. Mar. 15, 1925, to Aug. 4, 1928, nonrecording gage at site 1,300 ft downstream at different datum.

REMARKS.--Records good except those for period with ice effect, Jan. 16-29, and periods of doubtful or no gage-height record, Feb. 4-11, Mar. 22-24, July 6-8, 21-24, Aug. 5-8, 16-21, and Aug. 30 to Sept. 5, 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 $ft^3/s$, from rating curve extended above 11,000 $ft^3/s$ on basis of slope-area measurements at gage heights 19.25 ft, 24.1 ft, 24.89 ft, and 37.49 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,300 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1515 | 15,800 | 16.02 | Jun 16 | 1630 | 5,310 | 8.28 |
| Mar 20 | 1515 | 7,900 | 10.41 | Jun 17 | 1200 | 2,380 | 5.35 |
| Apr 11 | 0230 | 3,040 | 6.08 | Aug 9 | 0715 | 11,500 | 13.12 |
| May 18 | 2000 | 7,330 | 9.97 | Aug 10 | 0145 | 7,430 | 10.04 |
| Jun 9 | 0330 | 3,610 | 6.68 | Aug 10 | 2345 | 6,760 | 9.51 |
| Jun 13 | 2230 | 4,950 | 7.95 | Sep 23 | 0715 | 2,930 | 5.96 |
| Jun 14 | 2215 | *24,400 | *21.11 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 17 | 64 | 48 | 249 | 78 | 443 | 353 | 234 | 444 | 201 | 200 | e185 |
| 2 | 16 | 48 | 46 | 287 | 79 | 429 | 338 | 174 | 289 | 970 | 192 | e165 |
| 3 | 16 | 40 | 46 | 249 | 70 | 389 | 292 | 155 | 250 | 1,010 | 227 | e200 |
| 4 | 15 | 38 | 43 | 239 | e87 | 310 | 230 | 232 | 287 | 511 | 176 | e250 |
| 5 | 14 | 39 | 52 | 189 | e105 | 294 | 210 | 204 | 289 | 457 | e220 | e300 |
| 6 | 14 | 88 | 75 | 166 | e83 | 299 | 189 | 224 | 223 | e415 | e175 | 171 |
| 7 | 14 | 75 | 59 | 142 | e94 | 251 | 326 | 205 | 820 | e445 | e150 | 153 |
| 8 | 13 | 56 | 62 | 129 | e89 | 221 | 409 | 186 | 693 | e455 | e230 | 142 |
| 9 | 13 | 46 | 64 | 122 | e75 | 211 | 1,490 | 172 | 1,150 | 350 | 2,970 | 141 |
| 10 | 13 | 43 | 63 | 114 | e82 | 197 | 1,120 | 230 | 467 | 346 | 2,420 | 137 |
| 11 | 21 | 454 | 155 | 104 | e85 | 179 | 1,840 | 193 | 336 | 357 | 1,500 | 131 |
| 12 | 28 | 684 | 225 | 95 | 92 | 173 | 698 | 160 | 442 | 249 | 533 | 125 |
| 13 | 24 | 450 | 335 | 90 | 90 | 165 | 480 | 139 | 985 | 222 | 355 | 128 |
| 14 | 20 | 178 | 572 | 96 | 87 | 161 | 357 | 128 | 4,850 | 209 | 280 | 140 |
| 15 | 17 | 117 | 289 | 90 | 140 | 147 | 291 | 126 | 2,390 | 197 | 233 | 137 |
| 16 | 36 | 127 | 197 | e82 | 377 | 148 | 253 | 202 | 2,160 | 188 | e215 | 140 |
| 17 | 64 | 418 | 155 | e73 | 209 | 148 | 224 | 170 | 1,870 | 177 | e270 | 122 |
| 18 | 36 | 282 | 132 | e60 | 169 | 143 | 212 | 2,330 | 918 | 165 | e300 | 171 |
| 19 | 25 | 164 | 118 | e70 | 149 | 141 | 236 | 2,120 | 1,070 | 168 | e235 | 1,250 |
| 20 | 22 | 124 | 223 | e84 | 237 | 3,110 | 209 | 641 | 655 | 168 | e200 | 429 |
| 21 | 24 | 105 | 205 | e78 | 523 | 1,080 | 192 | 470 | 486 | e158 | e180 | 237 |
| 22 | 25 | 93 | 156 | e72 | 6,220 | e525 | 185 | 516 | 381 | e175 | 170 | 193 |
| 23 | 25 | 78 | 132 | e59 | 2,210 | e350 | 169 | 481 | 305 | e445 | 168 | 1,310 |
| 24 | 21 | 70 | 280 | e50 | 820 | e275 | 160 | 414 | 255 | e188 | 187 | 508 |
| 25 | 20 | 65 | 605 | e60 | 519 | 226 | 157 | 317 | 221 | 142 | 156 | 301 |
| 26 | 47 | 61 | 323 | e69 | 385 | 201 | 209 | 632 | 206 | 127 | 149 | 230 |
| 27 | 58 | 58 | 206 | e60 | 326 | 196 | 238 | 614 | 193 | 120 | 144 | 197 |
| 28 | 42 | 55 | 164 | e55 | 341 | 170 | 173 | 654 | 188 | 123 | 143 | 249 |
| 29 | 83 | 53 | 141 | e67 | --- | 172 | 157 | 475 | 180 | 160 | 141 | 188 |
| 30 | 145 | 52 | 124 | 75 | --- | 357 | 184 | 463 | 184 | 193 | e160 | 163 |
| 31 | 114 | --- | 113 | 77 | --- | 518 | --- | 419 | --- | 189 | e230 | --- |
| TOTAL | 1,042 | 4,225 | 5,408 | 3,452 | 13,821 | 11,629 | 11,581 | 13,680 | 23,187 | 9,280 | 12,909 | 8,193 |
| MEAN | 33.6 | 141 | 174 | 111 | 494 | 375 | 386 | 441 | 773 | 299 | 416 | 273 |
| MAX | 145 | 684 | 605 | 287 | 6,220 | 3,110 | 1,840 | 2,330 | 4,850 | 1,010 | 2,970 | 1,310 |
| MIN | 13 | 38 | 43 | 50 | 70 | 141 | 157 | 126 | 180 | 120 | 141 | 122 |
| CFSM | 0.18 | 0.75 | 0.93 | 0.59 | 2.63 | 2.00 | 2.05 | 2.35 | 4.11 | 1.59 | 2.21 | 1.45 |
| IN. | 0.21 | 0.84 | 1.07 | 0.68 | 2.73 | 2.30 | 2.29 | 2.71 | 4.59 | 1.84 | 2.55 | 1.62 |

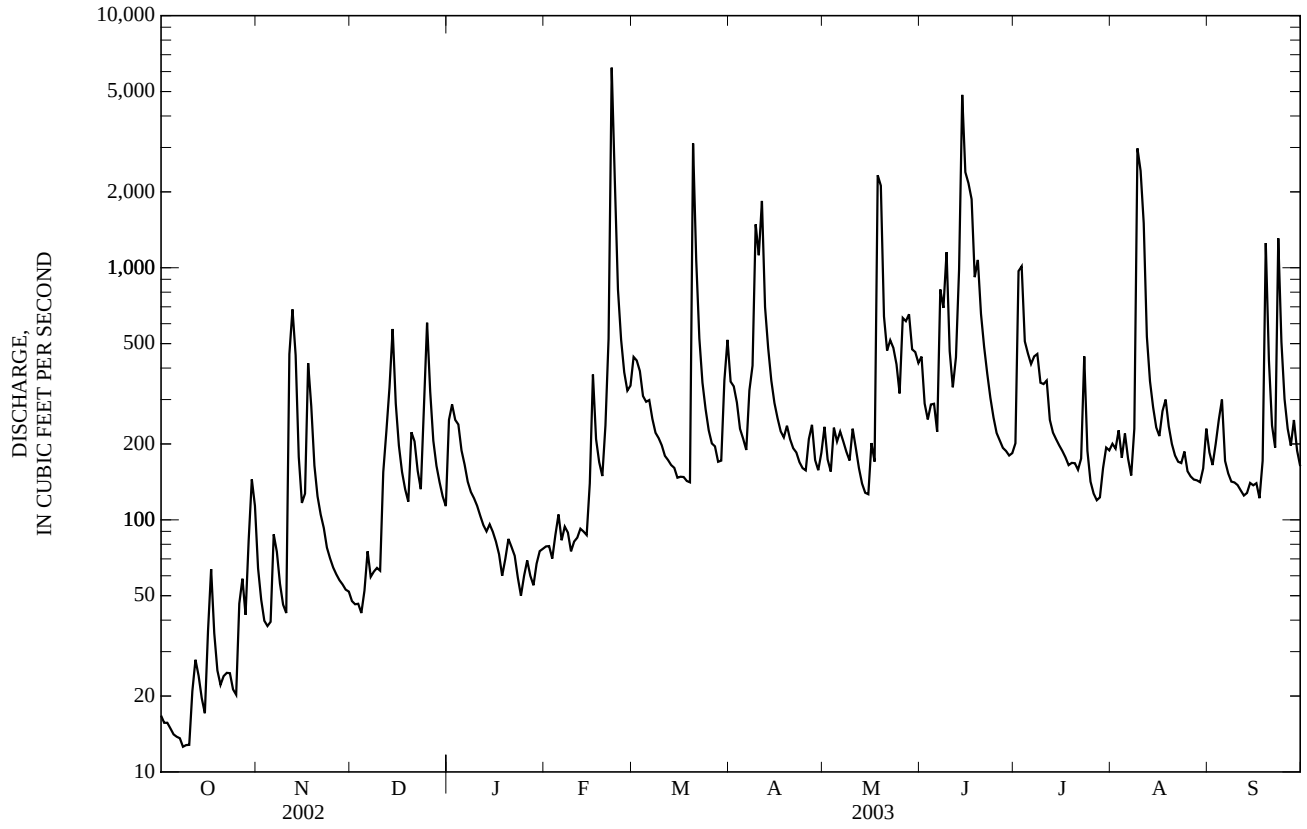
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 128 | 133 | 169 | 223 | 247 | 284 | 260 | 198 | 157 | 115 | 132 | 129 |
| MAX | 719 | 642 | 616 | 772 | 821 | 909 | 1,320 | 780 | 802 | 466 | 822 | 1,229 |
| (WY) | (1938) | (1986) | (1949) | (1936) | (1998) | (1975) | (1987) | (1989) | (1995) | (1949) | (1940) | (1987) |
| MIN | 23.3 | 30.8 | 45.2 | 46.6 | 46.6 | 79.4 | 55.7 | 56.8 | 23.4 | 26.3 | 11.0 | 15.4 |
| (WY) | (2002) | (2002) | (1966) | (1966) | (2002) | (2002) | (2002) | (1981) | (2002) | (1966) | (2002) | (2002) |

02059500 GOOSE CREEK NEAR HUDDLESTON, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1931 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 21,972.6 | | 118,407 | | | |
| ANNUAL MEAN | 60.2 | | 324 | | 181 | |
| HIGHEST ANNUAL MEAN | | | | | 393 | 1987 |
| LOWEST ANNUAL MEAN | | | | | 39.4 | 2002 |
| HIGHEST DAILY MEAN | 684 | Nov 12 | 6,220 | Feb 22 | e26,000 | Sep 8, 1987 |
| LOWEST DAILY MEAN | 6.0 | Sep 13 | 13 | aOct 8 | 6.0 | bAug 28, 1932 |
| ANNUAL SEVEN-DAY MINIMUM | 7.2 | Sep 8 | 14 | Oct 4 | 7.2 | Sep 8, 2002 |
| MAXIMUM PEAK FLOW | | | 24,400 | Jun 14 | 53,200 | Sep 8, 1987 |
| MAXIMUM PEAK STAGE | | | 21.11 | Jun 14 | c37.49 | Sep 8, 1987 |
| INSTANTANEOUS LOW FLOW | | | 12 | dOct 9 | 3.0 | fAug 31, 1932 |
| ANNUAL RUNOFF (CFSM) | 0.32 | | 1.73 | | 0.96 | |
| ANNUAL RUNOFF (INCHES) | 4.35 | | 23.43 | | 13.08 | |
| 10 PERCENT EXCEEDS | 121 | | 549 | | 320 | |
| 50 PERCENT EXCEEDS | 42 | | 184 | | 110 | |
| 90 PERCENT EXCEEDS | 13 | | 49 | | 46 | |

a Also Oct. 9, 10, 2002.
b Also Sept. 13, 2002.
c From floodmarks.
d Also Oct. 10, 2002.
e Estimated.
f Also Jan. 30, 1934, result of freezeup.



## 02060500 ROANOKE (STAUNTON) RIVER AT ALTAVISTA, VA

LOCATION.--Lat 37°06'17", long 79°17'43", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Feb. 21, 1951, on left bank 50 ft downstream at same datum.

REMARKS.--Records good except for period of no gage-height record, July 1, 2, which is fair. 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 $ft^3/s$, from rating curve extended above 52,000 $ft^3/s$ 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. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 408 | 523 | 864 | 2,160 | 910 | 3,740 | 3,100 | 1,780 | 4,340 | e2,700 | 2,180 | 1,810 |
| 2 | 407 | 473 | 818 | 3,050 | 905 | 3,520 | 3,570 | 1,790 | 3,830 | e6,000 | 2,160 | 1,690 |
| 3 | 410 | 451 | 702 | 2,810 | 902 | 3,310 | 3,890 | 1,850 | 2,960 | 10,200 | 2,920 | 1,640 |
| 4 | 404 | 453 | 709 | 4,590 | 918 | 3,130 | 3,570 | 2,690 | 2,920 | 7,650 | 4,600 | 1,790 |
| 5 | 455 | 453 | 698 | 1,930 | 940 | 3,040 | 2,680 | 4,790 | 3,000 | 4,450 | 4,140 | 2,000 |
| 6 | 457 | 523 | 738 | 1,450 | 950 | 2,870 | 2,640 | 4,260 | 3,120 | 3,290 | 3,120 | 2,020 |
| 7 | 482 | 548 | 719 | 1,510 | 1,030 | 2,570 | 3,210 | 3,130 | 6,030 | 4,330 | 3,230 | 1,960 |
| 8 | 452 | 492 | 716 | 1,360 | 1,090 | 2,210 | 6,990 | 2,610 | 9,830 | 4,260 | 3,800 | 1,660 |
| 9 | 446 | 465 | 727 | 1,210 | 1,060 | 2,140 | 12,300 | 2,190 | 9,810 | 3,480 | 8,290 | 1,500 |
| 10 | 448 | 450 | 728 | 1,190 | 1,110 | 1,940 | 13,500 | 2,060 | 5,580 | 3,160 | 11,300 | 1,230 |
| 11 | 493 | 1,170 | 830 | 1,310 | 1,210 | 1,890 | 15,300 | 2,340 | 3,310 | 2,890 | 12,100 | 1,150 |
| 12 | 437 | 1,650 | 1,300 | 1,700 | 1,440 | 1,630 | 13,100 | 2,240 | 3,490 | 2,770 | 7,980 | 1,140 |
| 13 | 425 | 1,440 | 2,460 | 1,380 | 1,510 | 1,520 | 5,940 | 2,170 | 4,660 | 2,720 | 2,810 | 1,150 |
| 14 | 423 | 812 | 6,560 | 1,040 | 1,460 | 1,320 | 3,380 | 1,940 | 6,440 | 2,930 | 2,450 | 1,170 |
| 15 | 418 | 668 | 5,000 | 1,010 | 1,430 | 1,220 | 3,310 | 1,690 | 11,300 | 2,990 | 2,120 | 1,210 |
| 16 | 471 | 671 | 2,220 | 928 | 6,260 | 1,200 | 3,190 | 1,850 | 10,000 | 2,330 | 1,540 | 1,440 |
| 17 | 485 | 1,360 | 1,820 | 916 | 5,660 | 1,240 | 2,950 | 1,990 | 11,300 | 2,090 | 1,850 | 1,880 |
| 18 | 464 | 1,500 | 1,570 | 870 | 3,120 | 1,360 | 2,700 | 6,460 | 10,200 | 1,910 | 2,810 | 3,660 |
| 19 | 425 | 1,110 | 1,400 | 878 | 2,370 | 1,470 | 2,950 | 12,700 | 10,500 | 1,840 | 3,110 | 6,220 |
| 20 | 421 | 1,040 | 1,580 | 896 | 3,920 | 8,420 | 3,000 | 9,830 | 9,860 | 1,650 | 2,950 | 4,690 |
| 21 | 429 | 1,380 | 2,900 | 899 | 7,070 | 14,100 | 2,950 | 6,310 | 6,310 | 1,390 | 2,600 | 2,310 |
| 22 | 426 | 1,630 | 2,100 | 885 | 13,600 | 13,700 | 2,960 | 5,280 | 4,290 | 1,480 | 2,210 | 1,480 |
| 23 | 426 | 1,460 | 1,510 | 888 | 18,000 | 4,650 | 2,630 | 4,780 | 3,170 | 2,390 | 2,020 | 5,550 |
| 24 | 418 | 1,020 | 1,790 | 826 | 16,900 | 2,800 | 2,250 | 4,040 | 2,450 | 2,470 | 1,790 | 5,140 |
| 25 | 418 | 893 | 7,410 | 840 | 14,700 | 2,770 | 2,260 | 4,100 | 2,130 | 2,310 | 1,670 | 4,720 |
| 26 | 481 | 886 | 5,370 | 877 | 6,230 | 2,660 | 2,130 | 4,690 | 2,070 | 1,800 | 1,450 | 4,610 |
| 27 | 528 | 886 | 2,000 | 879 | 4,130 | 2,420 | 2,220 | 5,520 | 1,580 | 1,640 | 1,290 | 3,060 |
| 28 | 502 | 876 | 1,690 | 881 | 3,630 | 2,060 | 1,890 | 5,780 | 1,560 | 1,420 | 1,210 | 1,530 |
| 29 | 511 | 869 | 1,570 | 892 | --- | 1,880 | 1,970 | 5,290 | 2,000 | 1,450 | 1,170 | 1,540 |
| 30 | 626 | 869 | 1,510 | 905 | --- | 2,080 | 1,780 | 5,310 | 1,980 | 1,780 | 1,280 | 1,090 |
| 31 | 640 | --- | 1,530 | 904 | --- | 2,750 | --- | 4,940 | --- | 2,020 | 1,740 | --- |
| TOTAL | 14,236 | 27,021 | 61,539 | 41,864 | 122,455 | 101,610 | 134,310 | 126,400 | 160,020 | 93,790 | 103,890 | 72,040 |
| MEAN | 459 | 901 | 1,985 | 1,350 | 4,373 | 3,278 | 4,477 | 4,077 | 5,334 | 3,025 | 3,351 | 2,401 |
| MAX | 640 | 1,650 | 7,410 | 4,590 | 18,000 | 14,100 | 15,300 | 12,700 | 11,300 | 10,200 | 12,100 | 6,220 |
| MIN | 404 | 450 | 698 | 826 | 902 | 1,200 | 1,780 | 1,690 | 1,560 | 1,390 | 1,170 | 1,090 |
| (†) | +6,564 | +32,741 | +2,274 | -1,805 | -1,850 | +7,542 | -3,408 | +529 | -30 | 0 | -555 | -626 |
| MEAN‡ | 671 | 1,992 | 2,058 | 1,292 | 4,307 | 3,521 | 4,363 | 4,094 | 5,333 | 3,025 | 3,333 | 2,380 |
| CFSM‡ | .38 | 1.11 | 1.15 | .72 | 2.41 | 1.97 | 2.44 | 2.29 | 2.98 | 1.69 | 1.86 | 1.33 |
| IN.‡ | .43 | 1.24 | 1.33 | .83 | 2.51 | 2.27 | 2.72 | 2.64 | 3.33 | 1.95 | 2.15 | 1.48 |

CAL YR 2002 MEAN‡ 858 CFSM‡ .48 IN.‡ 6.51
WTR YR 2003 MEAN‡ 3,015 CFSM‡ 1.69 IN.‡ 22.88

† 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 change in contents.

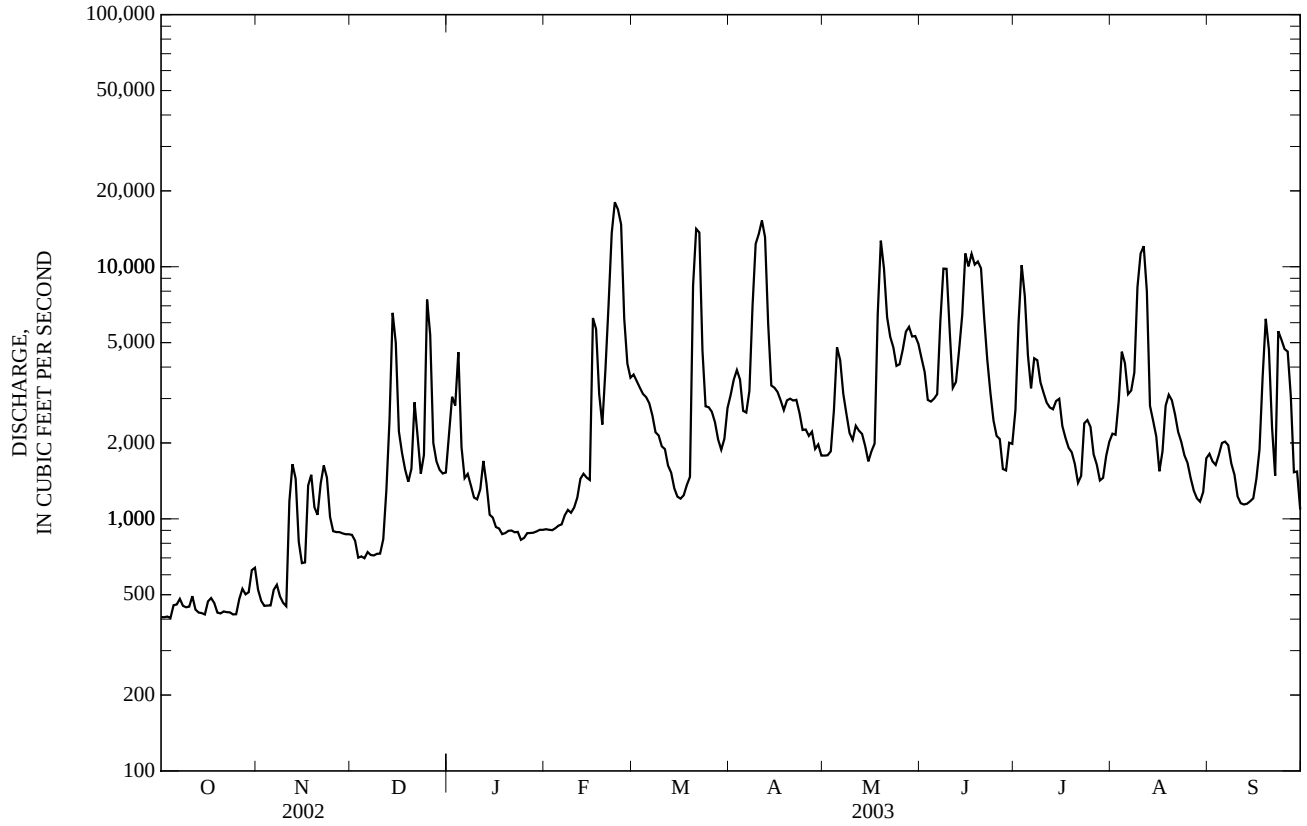
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 1,111 | 1,253 | 1,357 | 2,008 | 2,242 | 2,729 | 2,493 | 1,950 | 1,563 | 1,110 | 1,061 | 1,218 |
| MAX | 4,811 | 6,190 | 3,622 | 4,643 | 7,119 | 7,795 | 10,930 | 4,716 | 5,684 | 3,363 | 3,351 | 5,246 |
| (WY) | (1991) | (1986) | (1997) | (1978) | (1998) | (1993) | (1987) | (1978) | (1972) | (1972) | (2003) | (1987) |
| MIN | 189 | 396 | 351 | 455 | 421 | 338 | 604 | 484 | 220 | 504 | 311 | 438 |
| (WY) | (1964) | (1982) | (1964) | (2002) | (2002) | (1981) | (1964) | (1964) | (1964) | (1981) | (1963) | (2002) |

02060500 ROANOKE (STAUNTON) RIVER AT ALTAVISTA, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1963 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 264,992 | | 1,059,175 | | | |
| ANNUAL MEAN | 726 | | 2,902 | | 1,671 | |
| HIGHEST ANNUAL MEAN | | | | | 2,903 | 1987 |
| LOWEST ANNUAL MEAN | | | | | 583 | 2002 |
| HIGHEST DAILY MEAN | 7,410 | Dec 25 | 18,000 | Feb 23 | 46,700 | Sep 8, 1987 |
| LOWEST DAILY MEAN | 393 | Sep 30 | 404 | Oct 4 | 39 | Jul 10, 1966 |
| ANNUAL SEVEN-DAY MINIMUM | 409 | Sep 28 | 423 | Oct 19 | 116 | Sep 2, 1965 |
| MAXIMUM PEAK FLOW | | | 20,300 | Feb 22 | a62,100 | Sep 8, 1987 |
| MAXIMUM PEAK STAGE | | | 20.03 | Feb 22 | a34.45 | Sep 8, 1987 |
| INSTANTANEOUS LOW FLOW | | | 377 | Oct 4 | b13 | Jan 30, 1966 |
| ANNUAL RUNOFF (CFSM) | 0.41 | | 1.62 | | 0.93 | |
| ANNUAL RUNOFF (INCHES) | 5.51 | | 22.02 | | 12.69 | |
| 10 PERCENT EXCEEDS | 1,320 | | 6,240 | | 3,320 | |
| 50 PERCENT EXCEEDS | 493 | | 1,940 | | 995 | |
| 90 PERCENT EXCEEDS | 418 | | 523 | | 289 | |

a Prior to regulation, 1931-62, maximum peak flow, 105,000 $ft^3/s$, Aug. 15, 1940, gage height, 40.08 ft, from floodmarks.
b Prior to regulation, 1931-62, instantaneous low flow, 94 $ft^3/s$, Jan. 31, 1934.
e Estimated.



## 02061500 BIG OTTER RIVER NEAR EVINGTON, VA

LOCATION.--Lat 37°12'31", long 79°18'13", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except those for periods with ice effect, Jan. 16-19, 22-28, and periods of doubtful gage-height record, June 25, 26, 29, 30, which are fair. Maximum discharge, 65,600 $ft^3/s$, from rating curve extended above 24,000 $ft^3/s$ 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 $ft^3/s$, from rating curve extended above 7,000 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 2030 | *16,300 | *19.44 | Jun 7 | 1930 | 4,950 | 10.80 |
| Mar 20 | 1900 | 6,050 | 13.20 | Aug 11 | 0615 | 5,840 | 12.69 |
| Apr 11 | 0430 | 4,840 | 10.81 | Sep 19 | 0830 | 4,400 | 9.60 |
| May 18 | 2245 | 7,890 | 15.47 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 16 | 135 | 112 | 687 | 154 | 699 | 549 | 394 | 905 | 418 | 371 | 318 |
| 2 | 12 | 96 | 107 | 771 | 155 | 792 | 500 | 325 | 664 | 1,640 | 325 | 279 |
| 3 | 11 | 79 | 107 | 604 | 145 | 693 | 462 | 288 | 615 | 2,030 | 300 | 350 |
| 4 | 11 | 73 | 103 | 555 | 173 | 563 | 422 | 421 | 729 | 881 | 341 | 445 |
| 5 | 10 | 72 | 103 | 441 | 211 | 555 | 398 | 383 | 1,040 | 643 | 403 | 562 |
| 6 | 9.1 | 209 | 153 | 393 | 164 | 599 | 376 | 412 | 709 | 781 | 325 | 334 |
| 7 | 8.4 | 180 | 113 | 335 | 180 | 528 | 545 | 376 | 2,510 | 720 | 281 | 280 |
| 8 | 10 | 115 | 118 | 304 | 175 | 468 | 659 | 346 | 2,120 | 684 | 321 | 258 |
| 9 | 11 | 93 | 132 | 280 | 147 | 433 | 2,360 | 350 | 2,440 | 605 | 1,670 | 238 |
| 10 | 10 | 83 | 129 | 250 | 169 | 392 | 1,510 | 606 | 1,160 | 722 | 1,730 | 222 |
| 11 | 17 | 1,110 | 266 | 227 | 172 | 367 | 3,040 | 527 | 872 | 584 | 3,220 | 209 |
| 12 | 28 | 1,500 | 503 | 208 | 179 | 351 | 1,180 | 422 | 1,100 | 443 | 1,010 | 199 |
| 13 | 35 | 965 | 524 | 196 | 174 | 336 | 845 | 360 | 1,010 | 398 | 698 | 207 |
| 14 | 27 | 439 | 971 | 203 | 167 | 317 | 693 | 313 | 1,640 | 377 | 595 | 261 |
| 15 | 21 | 297 | 558 | 190 | 256 | 292 | 609 | 295 | 1,760 | 363 | 480 | 246 |
| 16 | 28 | 306 | 391 | e165 | 683 | 284 | 551 | 597 | 1,640 | 343 | 422 | 221 |
| 17 | 86 | 825 | 308 | e150 | 427 | 280 | 538 | 427 | 2,390 | 317 | 541 | 205 |
| 18 | 57 | 602 | 259 | e130 | 351 | 267 | 480 | 3,600 | 1,600 | 300 | 562 | 297 |
| 19 | 35 | 387 | 230 | e155 | 299 | 255 | 505 | 3,580 | 1,940 | 410 | 402 | 2,850 |
| 20 | 27 | 303 | 470 | 187 | 486 | 3,090 | 458 | 1,340 | 1,370 | 304 | 357 | 958 |
| 21 | 25 | 251 | 463 | 166 | 922 | 1,920 | 422 | 1,070 | 1,040 | 281 | 330 | 624 |
| 22 | 25 | 230 | 321 | e145 | 6,910 | 882 | 407 | 1,080 | 837 | 293 | 306 | 509 |
| 23 | 28 | 192 | 271 | e120 | 3,960 | 659 | 366 | 1,060 | 719 | 426 | 288 | 1,900 |
| 24 | 25 | 171 | 412 | e100 | 1,290 | 555 | 346 | 942 | 633 | 317 | 368 | 957 |
| 25 | 22 | 157 | 1,100 | e120 | 857 | 488 | 340 | 790 | e569 | 268 | 275 | 691 |
| 26 | 90 | 147 | 714 | e135 | 690 | 444 | 410 | 1,820 | e514 | 247 | 252 | 575 |
| 27 | 116 | 137 | 457 | e118 | 607 | 434 | 431 | 1,390 | 477 | 240 | 234 | 502 |
| 28 | 66 | 128 | 365 | e110 | 605 | 391 | 343 | 1,400 | 451 | 237 | 222 | 534 |
| 29 | 157 | 123 | 311 | 155 | --- | 397 | 315 | 942 | e433 | 279 | 344 | 432 |
| 30 | 358 | 120 | 270 | 149 | --- | 622 | 302 | 902 | e407 | 331 | 270 | 384 |
| 31 | 282 | --- | 243 | 152 | --- | 766 | --- | 814 | --- | 336 | 517 | --- |
| TOTAL | 1,663.5 | 9,525 | 10,584 | 7,901 | 20,708 | 19,119 | 20,362 | 27,572 | 34,294 | 16,218 | 17,760 | 16,047 |
| MEAN | 53.7 | 318 | 341 | 255 | 740 | 617 | 679 | 889 | 1,143 | 523 | 573 | 535 |
| MAX | 358 | 1,500 | 1,100 | 771 | 6,910 | 3,090 | 3,040 | 3,600 | 2,510 | 2,030 | 3,220 | 2,850 |
| MIN | 8.4 | 72 | 103 | 100 | 145 | 255 | 302 | 288 | 407 | 237 | 222 | 199 |
| CFSM | 0.17 | 0.99 | 1.07 | 0.80 | 2.31 | 1.93 | 2.12 | 2.78 | 3.57 | 1.63 | 1.79 | 1.67 |
| IN. | 0.19 | 1.11 | 1.23 | 0.92 | 2.41 | 2.22 | 2.37 | 3.21 | 3.99 | 1.89 | 2.06 | 1.87 |

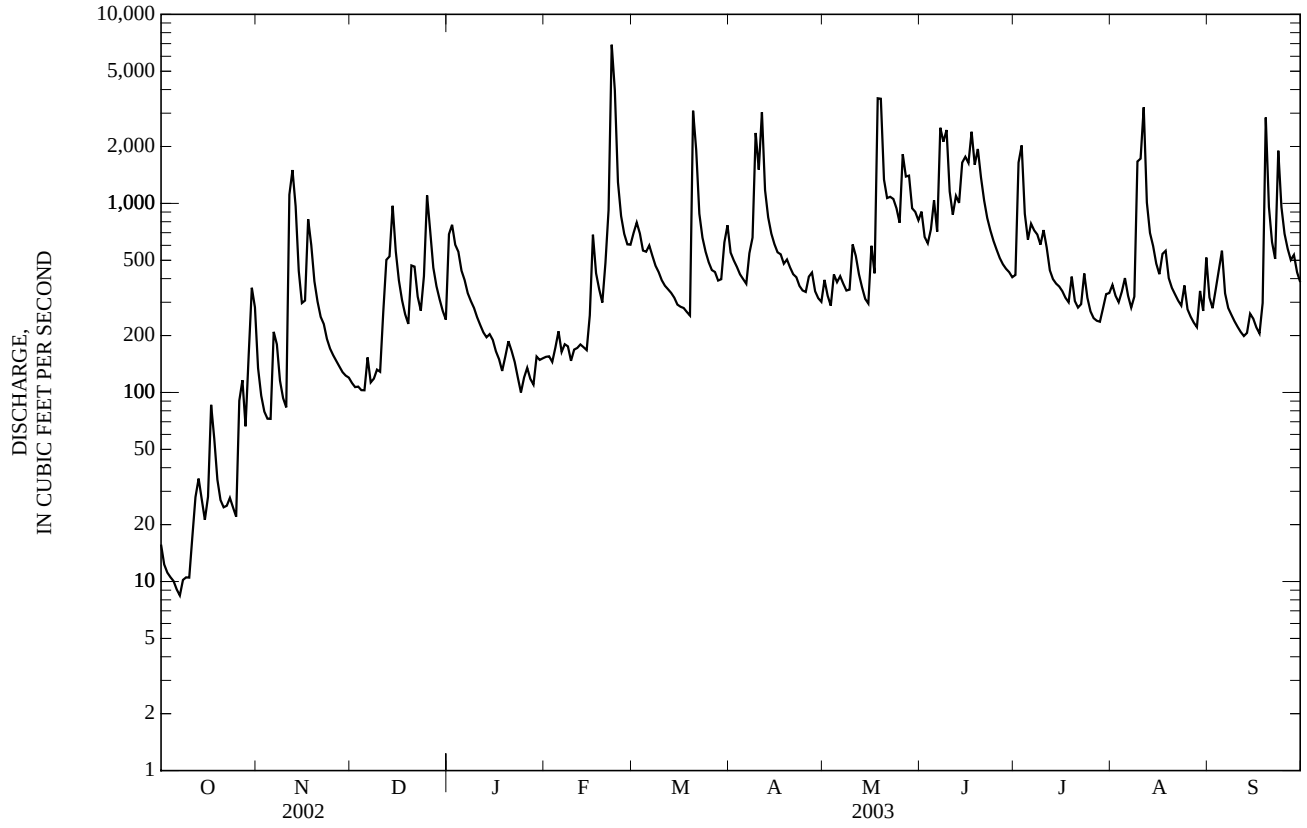
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 222 | 250 | 328 | 404 | 483 | 532 | 479 | 375 | 314 | 212 | 235 | 209 |
| MAX | 1,163 | 1,200 | 1,192 | 1,045 | 1,165 | 1,332 | 2,062 | 1,335 | 2,124 | 925 | 1,412 | 1,150 |
| (WY) | (1991) | (1986) | (1949) | (1998) | (1998) | (1993) | (1987) | (1989) | (1995) | (1949) | (1940) | (1996) |
| MIN | 31.9 | 41.2 | 68.6 | 95.7 | 97.0 | 148 | 102 | 106 | 38.0 | 27.9 | 4.96 | 10.8 |
| (WY) | (2002) | (2002) | (1966) | (1966) | (2002) | (2002) | (2002) | (1981) | (2002) | (1966) | (2002) | (2002) |

02061500 BIG OTTER RIVER NEAR EVINGTON, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1937 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 41,397.06 | | 201,753.5 | | | |
| ANNUAL MEAN | 113 | | 553 | | 336 | |
| HIGHEST ANNUAL MEAN | | | | | 635 | 1949 |
| LOWEST ANNUAL MEAN | | | | | 67.2 | 2002 |
| HIGHEST DAILY MEAN | 1,500 | Nov 12 | 6,910 | Feb 22 | 35,700 | Jun 23, 1995 |
| LOWEST DAILY MEAN | 0.64 | Sep 14 | 8.4 | Oct 7 | 0.64 | Sep 14, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 1.3 | Sep 9 | 9.9 | Oct 4 | 1.3 | Sep 9, 2002 |
| MAXIMUM PEAK FLOW | | | 16,300 | Feb 22 | 65,600 | Jun 23, 1995 |
| MAXIMUM PEAK STAGE | | | 19.44 | Feb 22 | 29.93 | Jun 23, 1995 |
| INSTANTANEOUS LOW FLOW | | | 7.8 | Oct 7 | 0.63 | aSep 13, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.35 | | 1.73 | | 1.05 | |
| ANNUAL RUNOFF (INCHES) | 4.81 | | 23.45 | | 14.26 | |
| 10 PERCENT EXCEEDS | 254 | | 1,100 | | 621 | |
| 50 PERCENT EXCEEDS | 83 | | 365 | | 213 | |
| 90 PERCENT EXCEEDS | 4.9 | | 105 | | 76 | |

a Also Sept. 14, 2002.
e Estimated.



## 02062500 ROANOKE (STAUNTON) RIVER AT BROOKNEAL, VA

LOCATION.--Lat 37°02'29", long 78°57'01", NAD83, 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 $mi^2$.

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 NGVD of 1929. Apr. 30, 1923, to Aug. 29, 1929, nonrecording gage, Aug. 30, 1929, to Aug. 15, 1940, water-stage recorder, and Aug. 16 to Oct. 1, 1940, nonrecording gage at site 1,800 ft downstream at same datum. Oct. 2, 1940, to Sept. 30, 1941, nonrecording gage at site 1,600 ft downstream at same datum.

REMARKS.--Records good except those for periods of no gage-height record, Jan. 18-21, Feb. 27, 28, and June 8, 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 $ft^3/s$, at present site, from gage-height relation curve, from rating curve extended above 55,000 $ft^3/s$ 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.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 366 | 1,100 | 1,050 | 2,320 | 1,210 | 5,050 | 4,270 | 2,700 | 6,840 | 3,360 | 2,910 | 2,390 |
| 2 | 364 | 795 | 1,030 | 4,380 | 1,220 | 5,120 | 4,580 | 2,610 | 5,630 | 9,620 | 2,960 | 2,130 |
| 3 | 353 | 657 | 928 | 3,910 | 1,190 | 4,700 | 4,970 | 2,510 | 4,530 | 15,100 | 3,350 | 2,130 |
| 4 | 342 | 620 | 844 | 5,070 | 1,270 | 4,210 | 4,900 | 2,650 | 4,400 | 12,500 | 6,480 | 2,630 |
| 5 | 330 | 633 | 923 | 3,900 | 1,390 | 3,980 | 3,800 | 5,410 | 4,740 | 7,680 | 6,240 | 2,910 |
| 6 | 398 | 1,040 | 890 | 2,180 | 1,310 | 4,090 | 3,540 | 5,660 | 4,560 | 5,340 | 4,200 | 2,710 |
| 7 | 412 | 1,100 | 955 | 2,030 | 1,360 | 3,810 | 4,450 | 4,360 | 6,120 | 5,290 | 4,070 | 2,550 |
| 8 | 450 | 925 | 883 | 2,040 | 1,450 | 3,160 | 7,630 | 3,560 | e13,000 | 6,050 | 4,410 | 2,230 |
| 9 | 406 | 751 | 915 | 1,740 | 1,420 | 2,920 | 18,500 | 3,150 | e14,400 | 5,140 | 6,820 | 2,040 |
| 10 | 405 | 673 | 924 | 1,620 | 1,400 | 2,660 | 19,500 | 3,590 | 9,710 | 4,680 | 13,300 | 1,690 |
| 11 | 598 | 1,180 | 1,220 | 1,690 | 1,550 | 2,490 | 25,200 | 3,850 | 5,510 | 4,210 | 15,400 | 1,530 |
| 12 | 644 | 4,510 | 2,010 | 1,800 | 1,740 | 2,240 | 18,300 | 3,290 | 5,450 | 3,940 | 11,600 | 1,460 |
| 13 | 486 | 4,970 | 2,950 | 2,170 | 1,930 | 1,990 | 11,000 | 3,000 | 7,180 | 3,690 | 5,520 | 1,480 |
| 14 | 481 | 2,020 | 7,260 | 1,430 | 1,910 | 1,870 | 5,040 | 2,830 | 8,360 | 4,450 | 3,640 | 1,560 |
| 15 | 437 | 1,330 | 7,630 | 1,380 | 1,950 | 1,630 | 4,660 | 2,350 | 12,900 | 3,920 | 3,290 | 1,610 |
| 16 | 576 | 1,190 | 3,770 | 1,270 | 5,170 | 1,570 | 4,490 | 2,580 | 12,100 | 3,590 | 2,430 | 1,620 |
| 17 | 741 | 2,840 | 2,630 | 1,220 | 7,840 | 1,550 | 4,260 | 2,880 | 14,600 | 2,900 | 2,370 | 2,000 |
| 18 | 687 | 3,340 | 2,240 | e1,160 | 4,460 | 1,620 | 3,870 | 6,030 | 13,900 | 2,670 | 3,270 | 3,230 |
| 19 | 574 | 2,090 | 1,940 | e1,100 | 3,160 | 1,660 | 3,950 | 19,600 | 13,500 | 2,600 | 3,910 | 12,300 |
| 20 | 469 | 1,660 | 2,040 | e1,150 | 4,130 | 12,000 | 4,140 | 13,900 | 13,100 | 2,410 | 3,630 | 8,270 |
| 21 | 475 | 1,620 | 3,510 | e1,210 | 7,850 | 23,700 | 4,010 | 10,100 | 9,950 | 2,110 | 3,540 | 4,390 |
| 22 | 467 | 2,020 | 3,320 | 1,160 | 17,200 | 18,300 | 3,970 | 7,220 | 6,520 | 2,020 | 2,840 | 2,580 |
| 23 | 452 | 2,010 | 2,220 | 1,180 | 33,300 | 9,560 | 3,810 | 7,600 | 4,860 | 2,530 | 2,700 | 8,320 |
| 24 | 439 | 1,600 | 2,180 | 1,060 | 23,600 | 4,230 | 3,170 | 6,370 | 3,820 | 3,520 | 2,390 | 8,180 |
| 25 | 427 | 1,210 | 8,000 | 1,090 | 20,700 | 3,860 | 3,080 | 7,980 | 3,200 | 3,130 | 2,190 | 6,300 |
| 26 | 511 | 1,150 | 8,730 | 1,150 | 9,600 | 3,740 | 3,070 | 8,550 | 3,000 | 2,560 | 2,020 | 5,870 |
| 27 | 646 | 1,120 | 3,680 | 1,130 | e5,800 | 3,540 | 3,250 | 9,360 | 2,800 | 2,330 | 1,700 | 5,240 |
| 28 | 833 | 1,100 | 2,460 | 1,080 | e5,000 | 3,130 | 2,930 | 10,600 | 1,960 | 2,030 | 1,600 | 2,720 |
| 29 | 876 | 1,070 | 2,220 | 1,130 | --- | 2,750 | 2,590 | 7,760 | 2,690 | 2,000 | 1,510 | 2,580 |
| 30 | 1,290 | 1,060 | 2,070 | 1,200 | --- | 3,110 | 2,580 | 7,490 | 2,720 | 2,620 | 1,600 | 1,960 |
| 31 | 1,510 | --- | 1,990 | 1,190 | --- | 4,410 | --- | 7,300 | --- | 2,710 | 1,950 | --- |
| TOTAL | 17,445 | 47,384 | 83,412 | 56,140 | 170,110 | 148,650 | 193,510 | 186,840 | 222,050 | 136,700 | 133,840 | 106,610 |
| MEAN | 563 | 1,579 | 2,691 | 1,811 | 6,075 | 4,795 | 6,450 | 6,027 | 7,402 | 4,410 | 4,317 | 3,554 |
| MAX | 1,510 | 4,970 | 8,730 | 5,070 | 33,300 | 23,700 | 25,200 | 19,600 | 14,600 | 15,100 | 15,400 | 12,300 |
| MIN | 330 | 620 | 844 | 1,060 | 1,190 | 1,550 | 2,580 | 2,350 | 1,960 | 2,000 | 1,510 | 1,460 |
| (†) | +6,564 | +32,741 | +2,274 | -1,805 | -1,850 | +7,542 | -3,408 | +529 | -30 | 0 | -555 | -626 |
| MEAN‡ | 724 | 2,671 | 2,764 | 1,753 | 6,009 | 5,038 | 6,337 | 6,094 | 7,401 | 4,410 | 4,300 | 3,533 |
| CFSM‡ | .32 | 1.11 | 1.14 | .73 | 2.49 | 2.09 | 2.62 | 2.50 | 3.06 | 1.83 | 1.78 | 1.46 |
| IN.‡ | .37 | 1.23 | 1.32 | .84 | 2.59 | 2.41 | 2.93 | 2.89 | 3.42 | 2.11 | 2.05 | 1.63 |

CAL YR 2002 MEAN‡ 1,120 CFSM‡ .46 IN.‡ 6.30
WTR YR 2003 MEAN‡ 4,230 CFSM‡ 1.75 IN.‡ 23.78

† 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 change in contents.

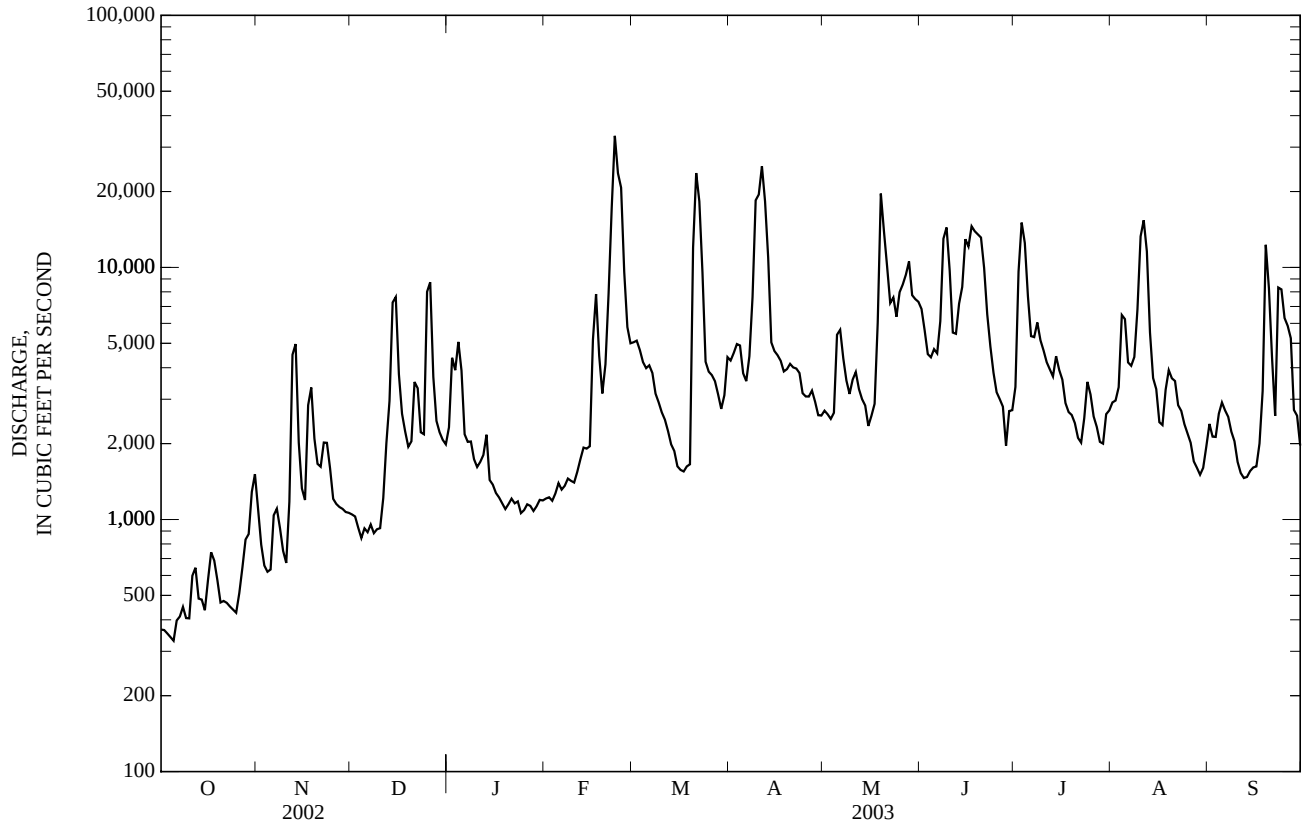
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 1,539 | 1,746 | 1,997 | 2,879 | 3,231 | 3,912 | 3,545 | 2,715 | 2,187 | 1,523 | 1,429 | 1,708 |
| MAX | 6,446 | 8,961 | 5,625 | 7,695 | 9,536 | 11,760 | 14,410 | 7,039 | 7,522 | 4,775 | 4,675 | 8,822 |
| (WY) | (1991) | (1986) | (1997) | (1978) | (1998) | (1993) | (1987) | (1978) | (1995) | (1972) | (1985) | (1996) |
| MIN | 325 | 549 | 637 | 695 | 642 | 561 | 921 | 836 | 405 | 536 | 411 | 401 |
| (WY) | (1964) | (2002) | (1964) | (2002) | (2002) | (1981) | (1981) | (1964) | (1964) | (2002) | (1964) | (2002) |

02062500 ROANOKE (STAUNTON) RIVER AT BROOKNEAL, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1963 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 360,614 | | 1,502,691 | | | |
| ANNUAL MEAN | 988 | | 4,117 | | 2,362 | |
| HIGHEST ANNUAL MEAN | | | | | 4,440 | 1973 |
| LOWEST ANNUAL MEAN | | | | | 741 | 2002 |
| HIGHEST DAILY MEAN | 8,730 | Dec 26 | 33,300 | Feb 23 | 65,600 | Sep 9, 1987 |
| LOWEST DAILY MEAN | 330 | Oct 5 | 330 | Oct 5 | 140 | Jul 25, 1966 |
| ANNUAL SEVEN-DAY MINIMUM | 350 | Sep 9 | 366 | Oct 1 | 203 | Sep 4, 1965 |
| MAXIMUM PEAK FLOW | | | 37,100 | Feb 23 | a85,800 | Sep 9, 1987 |
| MAXIMUM PEAK STAGE | | | 28.62 | Feb 23 | a39.80 | Sep 9, 1987 |
| INSTANTANEOUS LOW FLOW | | | 304 | Oct 5 | b,c136 | dJul 25, 1966 |
| ANNUAL RUNOFF (CFSM) | 0.41 | | 1.70 | | 0.98 | |
| ANNUAL RUNOFF (INCHES) | 5.55 | | 23.15 | | 13.29 | |
| 10 PERCENT EXCEEDS | 2,000 | | 8,980 | | 4,620 | |
| 50 PERCENT EXCEEDS | 662 | | 2,710 | | 1,390 | |
| 90 PERCENT EXCEEDS | 405 | | 880 | | 550 | |

a Prior to regulation, 1924-62, maximum peak flow, 130,00 $ft^3/s$, Aug. 15, 1940, gage height, 46.50 ft.
b Prior to regulation, 1924-62, instantaneous low flow, probably less than 191 $ft^3/s$, probably occurred Sept. 1, 2, 1932.
c Lowest recorded discharge; may have been lower during period of no gage-height record, July 25, 26, 1966.
d Also July 26, 1966.
e Estimated.



## 02064000 FALLING RIVER NEAR NARUNA, VA

LOCATION.-- Lat 37°07'37", long 78°57'35", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Jan. 15, 1935, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 5, 7, and Jan. 17-19, 22-28, and periods of doubtful gage-height record, June 23-25, 29, 30, Aug. 6, 7, 11, 19-27, and Sept. 25, 26, which are fair. Small diurnal fluctuation caused by gristmill at Spring Mills. Maximum discharge, 62,800 $ft^3/s$, from rating curve extended above 7,100 $ft^3/s$ on basis of slope-area measurements at gage heights 23.9 ft, 26.5 ft, 29.2 ft, and 36.1 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 August 1940 reached a stage of 26.5 ft, from floodmarks, discharge, 22,000 $ft^3/s$, by slope-area measurement.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,300 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 23 | 0100 | 6,560 | 16.47 | Jun 7 | 2130 | 3,430 | 11.62 |
| Mar 20 | 2100 | 6,400 | 16.28 | Jul 3 | 0400 | *7,760 | *17.82 |
| Apr 9 | 1000 | 3,570 | 11.90 | Aug 3 | 2145 | 3,050 | 10.79 |
| Apr 11 | 0230 | 3,300 | 11.34 | Sep 19 | 0400 | 5,770 | 15.48 |
| May 25 | 1045 | 2,450 | 9.46 | Sep 23 | 1300 | 3,740 | 12.22 |
| May 27 | 1900 | 3,300 | 11.34 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 12 | 72 | 34 | 216 | 94 | 381 | 241 | 186 | 357 | 125 | 191 | 66 |
| 2 | 11 | 48 | 32 | 296 | 99 | 524 | 192 | 141 | 217 | 428 | 136 | 62 |
| 3 | 11 | 40 | 32 | 258 | 88 | 376 | 162 | 125 | 192 | 5,100 | 791 | 165 |
| 4 | 11 | 40 | 31 | 263 | 141 | 249 | 143 | 156 | 270 | 1,190 | 1,030 | 421 |
| 5 | 10 | 43 | e40 | 186 | 162 | 231 | 134 | 135 | 662 | 511 | 428 | 177 |
| 6 | 9.6 | 226 | 52 | 157 | 110 | 371 | 123 | 133 | 273 | 353 | e246 | 89 |
| 7 | 8.9 | 117 | e42 | 134 | 122 | 304 | 534 | 127 | 1,360 | 277 | e182 | 74 |
| 8 | 8.7 | 66 | 40 | 121 | 116 | 220 | 521 | 127 | 1,170 | 197 | 207 | 68 |
| 9 | 8.4 | 52 | 41 | 113 | 99 | 187 | 2,730 | 116 | 480 | 164 | 372 | 67 |
| 10 | 8.8 | 45 | 40 | 102 | 113 | 151 | 1,100 | 159 | 301 | 197 | 199 | 64 |
| 11 | 47 | 555 | 203 | 93 | 126 | 132 | 1,700 | 138 | 240 | 161 | e146 | 60 |
| 12 | 65 | 997 | 304 | 86 | 136 | 123 | 530 | 120 | 398 | 130 | 136 | 58 |
| 13 | 27 | 580 | 441 | 82 | 119 | 120 | 341 | 100 | 569 | 141 | 136 | 80 |
| 14 | 18 | 199 | 721 | 83 | 107 | 128 | 262 | 93 | 320 | 279 | 194 | 97 |
| 15 | 14 | 110 | 365 | 79 | 204 | 110 | 223 | 100 | 251 | 135 | 131 | 79 |
| 16 | 62 | 187 | 227 | 75 | 421 | 111 | 197 | 141 | 266 | 120 | 122 | 125 |
| 17 | 100 | 836 | 158 | e72 | 255 | 121 | 175 | 124 | 365 | 114 | 161 | 72 |
| 18 | 36 | 484 | 123 | e66 | 206 | 109 | 158 | 1,040 | 386 | 108 | 112 | 338 |
| 19 | 24 | 210 | 106 | e70 | 224 | 96 | 166 | 1,050 | 421 | 117 | e96 | 3,630 |
| 20 | 20 | 130 | 282 | 75 | 473 | 3,350 | 158 | 347 | 339 | 118 | e87 | 550 |
| 21 | 23 | 97 | 285 | 73 | 715 | 1,920 | 150 | 241 | 259 | 114 | e83 | 311 |
| 22 | 25 | 79 | 166 | e72 | 2,960 | 508 | 144 | 349 | 211 | 111 | e81 | 223 |
| 23 | 22 | 62 | 124 | e62 | 2,660 | 306 | 130 | 436 | e177 | 159 | e78 | 1,710 |
| 24 | 19 | 53 | 263 | e64 | 557 | 230 | 124 | 351 | e146 | 212 | e74 | 514 |
| 25 | 19 | 49 | 1,030 | e72 | 341 | 188 | 128 | 1,020 | e129 | 112 | e70 | e280 |
| 26 | 34 | 46 | 487 | e68 | 250 | 163 | 169 | 884 | 123 | 95 | e66 | e222 |
| 27 | 41 | 43 | 263 | e64 | 227 | 152 | 168 | 1,390 | 121 | 88 | e63 | 243 |
| 28 | 46 | 39 | 195 | e66 | 321 | 134 | 131 | 1,180 | 124 | 89 | 62 | 690 |
| 29 | 125 | 37 | 159 | 72 | --- | 135 | 123 | 444 | e118 | 119 | 61 | 261 |
| 30 | 338 | 37 | 134 | 80 | --- | 314 | 122 | 365 | e108 | 324 | 60 | 194 |
| 31 | 178 | --- | 119 | 81 | --- | 404 | --- | 317 | --- | 169 | 58 | --- |
| TOTAL | 1,382.4 | 5,579 | 6,539 | 3,401 | 11,446 | 11,848 | 11,179 | 11,635 | 10,353 | 11,557 | 5,859 | 10,990 |
| MEAN | 44.6 | 186 | 211 | 110 | 409 | 382 | 373 | 375 | 345 | 373 | 189 | 366 |
| MAX | 338 | 997 | 1,030 | 296 | 2,960 | 3,350 | 2,730 | 1,390 | 1,360 | 5,100 | 1,030 | 3,630 |
| MIN | 8.4 | 37 | 31 | 62 | 88 | 96 | 122 | 93 | 108 | 88 | 58 | 58 |
| CFSM | 0.26 | 1.07 | 1.22 | 0.63 | 2.36 | 2.21 | 2.15 | 2.17 | 1.99 | 2.15 | 1.09 | 2.12 |
| IN. | 0.30 | 1.20 | 1.41 | 0.73 | 2.46 | 2.55 | 2.40 | 2.50 | 2.23 | 2.49 | 1.26 | 2.36 |

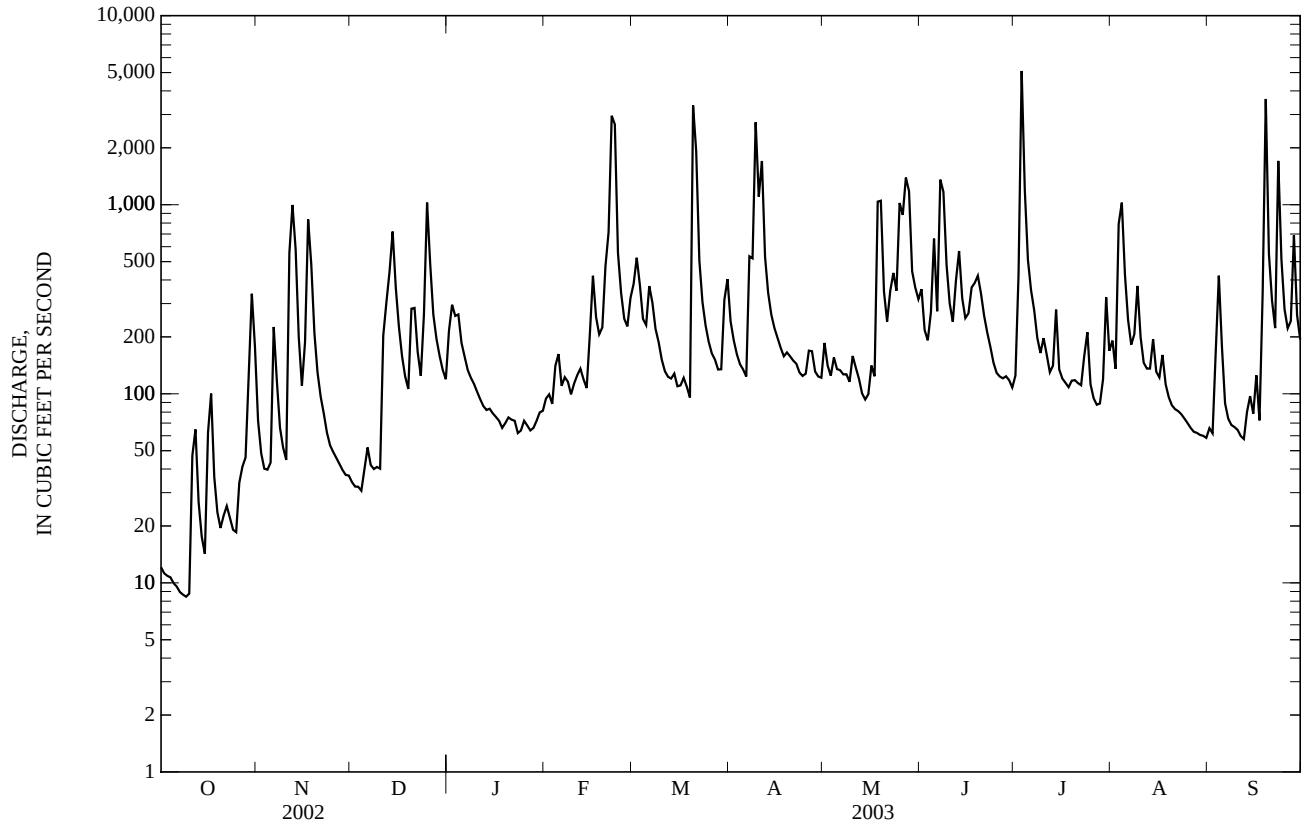
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 1934, 1942 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 100 | 123 | 157 | 197 | 232 | 260 | 215 | 164 | 123 | 92.3 | 81.5 | 124 |
| MAX | 399 | 639 | 487 | 636 | 683 | 844 | 552 | 606 | 898 | 373 | 400 | 1,475 |
| (WY) | (1973) | (1986) | (1997) | (1978) | (1979) | (1975) | (1987) | (1971) | (1972) | (2003) | (1985) | (1996) |
| MIN | 18.9 | 28.5 | 44.0 | 47.9 | 53.9 | 62.9 | 60.2 | 50.7 | 18.4 | 12.9 | 8.95 | 10.6 |
| (WY) | (2002) | (2002) | (1966) | (1966) | (2002) | (1981) | (1966) | (1981) | (2002) | (2002) | (2002) | (2002) |

02064000 FALLING RIVER NEAR NARUNA, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1930 - 1934 1942 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 26,208.6 | | 101,768.4 | | | |
| ANNUAL MEAN | 71.8 | | 279 | | 155 | |
| HIGHEST ANNUAL MEAN | | | | | 322 | 1996 |
| LOWEST ANNUAL MEAN | | | | | 42.6 | 2002 |
| HIGHEST DAILY MEAN | 1,030 | Dec 25 | 5,100 | Jul 3 | e20,000 | Sep 6, 1996 |
| LOWEST DAILY MEAN | e1.0 | Aug 15 | 8.4 | Oct 9 | e1.0 | Aug 15, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 1.4 | Aug 12 | 9.3 | Oct 4 | 1.4 | Aug 12, 2002 |
| MAXIMUM PEAK FLOW | | | 7,760 | Jul 3 | 62,800 | Sep 6, 1996 |
| MAXIMUM PEAK STAGE | | | 17.82 | Jul 3 | a36.14 | Sep 6, 1996 |
| INSTANTANEOUS LOW FLOW | | | 8.2 | Oct 9 | (b) | (c) |
| ANNUAL RUNOFF (CFSM) | 0.42 | | 1.61 | | 0.90 | |
| ANNUAL RUNOFF (INCHES) | 5.64 | | 21.88 | | 12.20 | |
| 10 PERCENT EXCEEDS | 138 | | 522 | | 266 | |
| 50 PERCENT EXCEEDS | 43 | | 136 | | 92 | |
| 90 PERCENT EXCEEDS | 7.8 | | 42 | | 36 | |

a From high-water mark on gage house.
b Not determined.
c Probably occurred Aug. 15, 2002.
e Estimated.



## 02065500 CUB CREEK AT PHENIX, VA

LOCATION.--Lat 37°04'46", long 78°45'49", NAD83, Charlotte County, Hydrologic Unit 03010102, on right bank 50 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 $mi^2$.

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 NGVD of 1929. Prior to Jul. 14, 1950, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods with ice effect, Jan. 16-19, 22-31, which are fair. Maximum discharge, 15,200 $ft^3/s$, from rating curve extended above 5,400 $ft^3/s$ 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 OUTSIDE PERIOD OF RECORD.--Flood of August 1940 reached a stage of 17.5 ft, from floodmarks, discharge not determined.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 23 | 1130 | 2,820 | 11.23 | May 28 | 1915 | 1,060 | 7.37 |
| Mar 21 | 0745 | 3,830 | 12.60 | Jul 4 | 1345 | 2,410 | 10.58 |
| Apr 10 | 0445 | 1,320 | 8.33 | Sep 19 | 1630 | *6,170 | *15.12 |
| May 19 | 1730 | 1,260 | 8.10 | Sep 23 | 2400 | 2,690 | 11.03 |
| May 26 | 0915 | 1,670 | 9.22 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7.6 | 79 | 59 | 93 | 71 | 180 | 149 | 154 | 296 | 102 | 186 | 97 |
| 2 | 7.1 | 52 | 57 | 148 | 76 | 214 | 119 | 105 | 189 | 211 | 160 | 95 |
| 3 | 7.0 | 42 | 57 | 120 | 71 | 218 | 106 | 88 | 152 | 888 | 141 | 96 |
| 4 | 6.9 | 41 | 55 | 124 | 82 | 135 | 98 | 99 | 171 | 2,060 | 247 | 198 |
| 5 | 6.8 | 46 | 60 | 100 | 106 | 122 | 94 | 89 | 249 | 681 | 334 | 273 |
| 6 | 6.6 | 153 | 74 | 91 | 79 | 153 | 90 | 87 | 600 | 211 | 151 | 136 |
| 7 | 6.4 | 136 | 63 | 83 | 81 | 189 | 200 | 84 | 235 | 167 | 134 | 116 |
| 8 | 6.2 | 70 | 64 | 79 | 81 | 126 | 481 | 84 | 433 | 147 | 132 | 109 |
| 9 | 6.3 | 52 | 66 | 77 | 72 | 110 | 541 | 78 | 420 | 138 | 200 | 107 |
| 10 | 6.6 | 46 | 62 | 73 | 77 | 99 | 1,050 | 75 | 185 | 148 | 424 | 104 |
| 11 | 29 | 97 | 82 | 69 | 82 | 91 | 746 | 76 | 154 | 133 | 152 | 100 |
| 12 | 81 | 370 | 139 | 66 | 87 | 87 | 582 | 72 | 271 | 124 | 129 | 98 |
| 13 | 35 | 701 | 151 | 62 | 84 | 85 | 197 | 65 | 349 | 134 | 129 | 119 |
| 14 | 28 | 351 | 297 | 66 | 79 | 96 | 142 | 62 | 261 | 160 | 135 | 136 |
| 15 | 25 | 116 | 288 | 64 | 96 | 86 | 124 | 63 | 170 | 126 | 120 | 118 |
| 16 | 32 | 104 | 140 | e61 | 191 | 85 | 116 | 88 | 159 | 118 | 114 | 108 |
| 17 | 83 | 225 | 110 | e58 | 134 | 100 | 107 | 78 | 192 | 115 | 226 | 100 |
| 18 | 41 | 358 | 95 | e55 | 113 | 90 | 101 | 205 | 258 | 111 | 316 | 144 |
| 19 | 27 | 219 | 87 | e56 | 114 | 84 | 107 | 860 | 271 | 109 | 146 | 3,300 |
| 20 | 23 | 116 | 98 | 69 | 164 | 618 | 103 | 610 | 317 | 107 | 127 | 1,630 |
| 21 | 24 | 96 | 127 | 64 | 262 | 2,790 | 98 | 177 | 188 | 106 | 118 | 231 |
| 22 | 30 | 87 | 97 | e54 | 421 | 646 | 96 | 198 | 151 | 111 | 113 | 127 |
| 23 | 27 | 79 | 86 | e50 | 1,920 | 197 | 89 | 221 | 135 | 165 | 108 | 1,280 |
| 24 | 23 | 72 | 103 | e46 | 652 | 137 | 84 | 244 | 124 | 195 | 104 | 1,410 |
| 25 | 20 | 69 | 284 | e55 | 178 | 117 | 84 | 272 | 117 | 130 | 100 | 261 |
| 26 | 30 | 67 | 461 | e52 | 129 | 107 | 97 | 1,230 | 112 | 114 | 99 | 136 |
| 27 | 41 | 65 | 197 | e48 | 120 | 100 | 103 | 761 | 109 | 108 | 97 | 118 |
| 28 | 40 | 61 | 111 | e46 | 142 | 94 | 86 | 677 | 107 | 105 | 96 | 126 |
| 29 | 96 | 61 | 96 | e54 | --- | 95 | 81 | 578 | 106 | 120 | 94 | 115 |
| 30 | 164 | 61 | 86 | e60 | --- | 139 | 85 | 254 | 103 | 223 | 93 | 97 |
| 31 | 195 | --- | 80 | e65 | --- | 246 | --- | 202 | --- | 343 | 92 | --- |
| TOTAL | 1,161.5 | 4,092 | 3,832 | 2,208 | 5,764 | 7,636 | 6,156 | 7,936 | 6,584 | 7,710 | 4,817 | 11,085 |
| MEAN | 37.5 | 136 | 124 | 71.2 | 206 | 246 | 205 | 256 | 219 | 249 | 155 | 370 |
| MAX | 195 | 701 | 461 | 148 | 1,920 | 2,790 | 1,050 | 1,230 | 600 | 2,060 | 424 | 3,300 |
| MIN | 6.2 | 41 | 55 | 46 | 71 | 84 | 81 | 62 | 103 | 102 | 92 | 95 |
| CFSM | 0.38 | 1.39 | 1.26 | 0.73 | 2.10 | 2.51 | 2.09 | 2.61 | 2.24 | 2.54 | 1.59 | 3.77 |
| IN. | 0.44 | 1.55 | 1.45 | 0.84 | 2.19 | 2.90 | 2.34 | 3.01 | 2.50 | 2.93 | 1.83 | 4.21 |

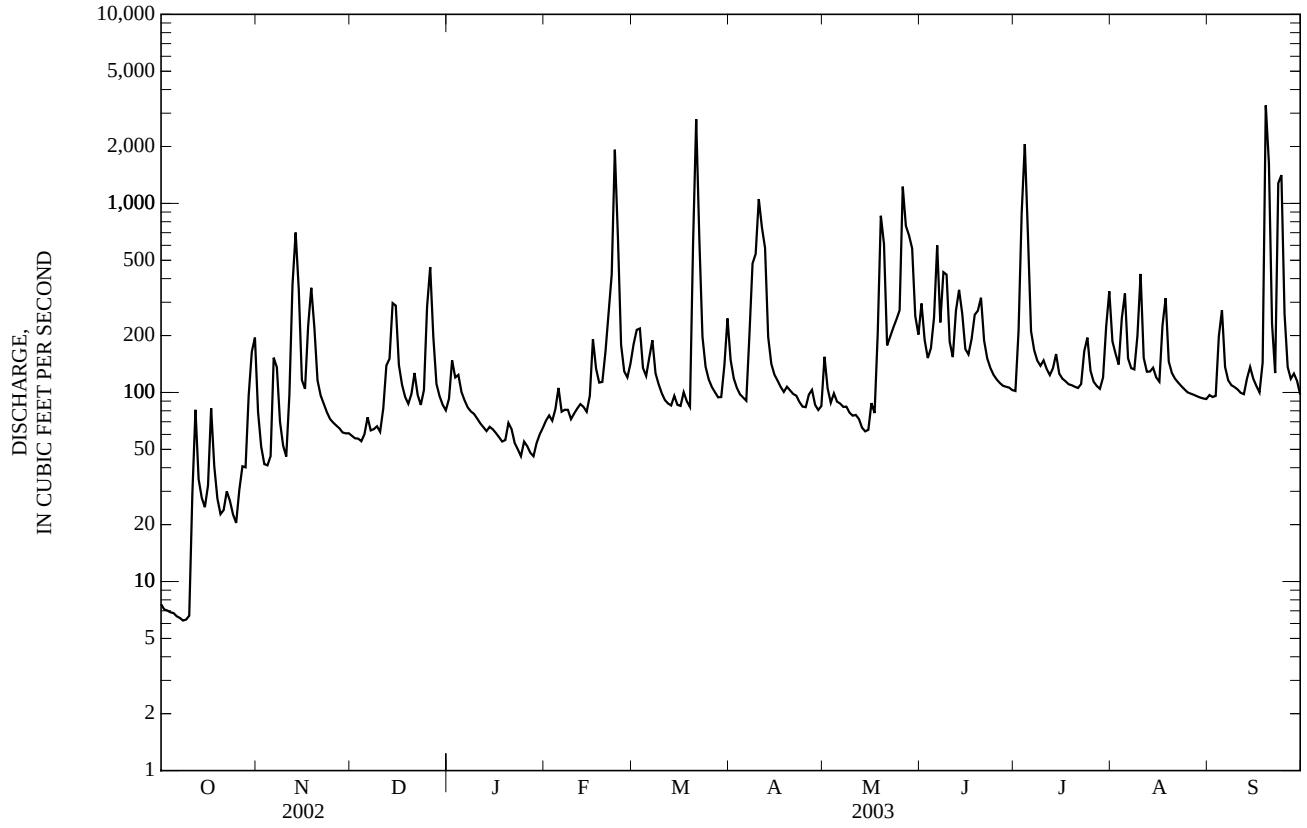
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 66.1 | 89.8 | 101 | 129 | 145 | 162 | 142 | 104 | 78.2 | 58.8 | 53.6 | 72.7 |
| MAX | 293 | 429 | 279 | 478 | 447 | 443 | 354 | 261 | 518 | 249 | 257 | 572 |
| (WY) | (1972) | (1986) | (1997) | (1978) | (1979) | (1975) | (1983) | (1971) | (1972) | (2003) | (1985) | (1996) |
| MIN | 14.0 | 22.6 | 27.9 | 35.1 | 43.2 | 51.7 | 50.4 | 37.8 | 14.6 | 8.21 | 5.29 | 8.03 |
| (WY) | (1971) | (2002) | (1966) | (1966) | (2002) | (1981) | (1966) | (1981) | (2002) | (2002) | (2002) | (1968) |

02065500 CUB CREEK AT PHENIX, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1947 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 18,765.39 | | 68,981.5 | | | |
| ANNUAL MEAN | 51.4 | | 189 | | 99.9 | |
| HIGHEST ANNUAL MEAN | | | | | 189 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 32.9 | 2002 |
| HIGHEST DAILY MEAN | 701 | Nov 13 | 3,300 | Sep 19 | 6,920 | Sep 6, 1996 |
| LOWEST DAILY MEAN | 0.00 | Aug 23 | 6.2 | Oct 8 | 0.00 | Aug 23, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 0.02 | Aug 19 | 6.5 | Oct 4 | 0.02 | Aug 19, 2002 |
| MAXIMUM PEAK FLOW | | | 6,170 | Sep 19 | 15,200 | Sep 6, 1996 |
| MAXIMUM PEAK STAGE | | | 15.12 | Sep 19 | 21.89 | Sep 6, 1996 |
| INSTANTANEOUS LOW FLOW | | | 5.8 | Oct 8 | 0.00 | aAug 22, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.52 | | 1.93 | | 1.02 | |
| ANNUAL RUNOFF (INCHES) | 7.12 | | 26.18 | | 13.85 | |
| 10 PERCENT EXCEEDS | 98 | | 324 | | 172 | |
| 50 PERCENT EXCEEDS | 36 | | 107 | | 64 | |
| 90 PERCENT EXCEEDS | 4.8 | | 52 | | 25 | |

a Also no flow part or all each day Aug. 23, 24, 2002.
e Estimated.



## 02066000 ROANOKE (STAUNTON) RIVER AT RANDOLPH, VA

LOCATION.--Lat 36°54'55", long 78°44'27", NAD83, 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 $mi^2$.

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 NGVD of 1929. Aug. 27, 1900, to Oct. 13, 1902, nonrecording gage at site 3.2 mi downstream at datum about 5.9 ft lower. Oct. 14, 1902, to Aug. 11, 1906, and Oct. 1, 1927, to Mar. 31, 1930, nonrecording gage at site of original gage at datum 3.93 ft lower than present datum.

REMARKS.--Records good except for period of no gage-height record, Feb. 16-18, which is fair. Flow regulated since 1962 by Leesville Lake (station 02059400) 68.7 mi upstream and since 1963 by Smith Mountain Lake (station 02057400) 86.7 mi upstream. 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 $ft^3/s$, 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 $ft^3/s$, from information by U.S. Army Corps of Engineers.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 446 | 1,650 | 1,230 | 2,430 | 1,500 | 6,580 | 5,230 | 3,480 | 8,880 | 3,090 | 3,540 | 2,490 |
| 2 | 416 | 1,100 | 1,200 | 4,560 | 1,560 | 7,100 | 4,920 | 3,310 | 6,810 | 8,220 | 3,470 | 2,520 |
| 3 | 411 | 852 | 1,170 | 5,030 | 1,540 | 6,700 | 5,160 | 2,910 | 5,580 | 16,200 | 3,260 | 2,300 |
| 4 | 402 | 762 | 1,060 | 5,060 | 1,520 | 5,500 | 5,260 | 2,890 | 4,920 | 21,300 | 7,400 | 3,100 |
| 5 | 393 | 754 | 1,080 | 5,770 | 1,840 | 4,900 | 4,690 | 4,250 | 5,660 | 13,500 | 7,390 | 4,480 |
| 6 | 389 | 1,550 | 1,120 | 3,180 | 1,780 | 4,990 | 3,890 | 5,960 | 5,850 | 7,130 | 5,650 | 3,560 |
| 7 | 418 | 1,730 | 1,120 | 2,480 | 1,710 | 5,240 | 5,510 | 5,150 | 5,920 | 5,460 | 4,470 | 3,010 |
| 8 | 425 | 1,320 | 1,120 | 2,390 | 1,800 | 4,340 | 8,940 | 4,120 | 16,500 | 6,310 | 4,460 | 2,780 |
| 9 | 446 | 1,020 | 1,090 | 2,220 | 1,800 | 3,750 | 16,900 | 3,590 | 17,300 | 5,740 | 5,370 | 2,400 |
| 10 | 426 | 866 | 1,110 | 1,980 | 1,750 | 3,510 | 25,400 | 3,940 | 14,800 | 5,100 | 13,300 | 2,210 |
| 11 | 1,520 | 879 | 1,250 | 1,870 | 1,860 | 3,150 | 28,300 | 4,610 | 7,670 | 4,710 | 15,300 | 1,850 |
| 12 | 1,330 | 5,340 | 2,360 | 1,940 | 1,990 | 2,980 | 29,600 | 3,920 | 6,520 | 4,230 | 15,800 | 1,710 |
| 13 | 773 | 8,570 | 3,350 | 2,230 | 2,230 | 2,660 | 22,300 | 3,400 | 8,070 | 3,980 | 8,640 | 1,710 |
| 14 | 622 | 4,690 | 7,850 | 2,050 | 2,270 | 2,540 | 9,870 | 3,130 | 8,590 | 4,780 | 4,370 | 1,850 |
| 15 | 545 | 2,480 | 10,100 | 1,610 | 2,330 | 2,290 | 6,490 | 2,790 | 11,900 | 4,400 | 3,900 | 1,920 |
| 16 | 573 | 1,750 | 6,270 | 1,550 | e5,600 | 2,100 | 6,030 | 2,610 | 14,400 | 4,100 | 3,310 | 1,900 |
| 17 | 897 | 3,540 | 3,660 | 1,450 | e9,200 | 2,110 | 5,580 | 3,110 | 14,400 | 3,390 | 2,650 | 2,000 |
| 18 | 868 | 5,810 | 2,920 | 1,390 | e6,000 | 2,100 | 5,060 | 4,140 | 16,600 | 3,020 | 3,350 | 2,560 |
| 19 | 711 | 3,940 | 2,470 | 1,310 | 4,530 | 2,180 | 4,730 | 19,200 | 15,200 | 2,750 | 4,190 | 14,300 |
| 20 | 594 | 2,510 | 2,340 | 1,340 | 4,460 | 9,550 | 4,830 | 23,500 | 16,500 | 2,730 | 4,120 | 18,300 |
| 21 | 545 | 2,030 | 3,420 | 1,420 | 7,870 | 27,800 | 4,650 | 15,400 | 13,600 | 2,420 | 3,920 | 9,210 |
| 22 | 548 | 2,130 | 4,360 | 1,390 | 13,100 | 30,000 | 4,470 | 9,050 | 8,540 | 2,180 | 3,490 | 4,330 |
| 23 | 538 | 2,360 | 3,130 | 1,360 | 26,300 | 21,700 | 4,330 | 9,040 | 6,350 | 2,330 | 3,070 | 13,600 |
| 24 | 516 | 2,120 | 2,600 | 1,280 | 34,800 | 8,110 | 3,810 | 8,020 | 5,150 | 4,140 | 2,810 | 17,700 |
| 25 | 499 | 1,640 | 7,250 | 1,270 | 29,500 | 4,940 | 3,410 | 8,090 | 4,340 | 3,640 | 2,570 | 10,200 |
| 26 | 537 | 1,400 | 12,900 | 1,350 | 21,900 | 4,560 | 3,450 | 13,800 | 3,850 | 3,180 | 2,360 | 6,990 |
| 27 | 621 | 1,350 | 7,140 | 1,340 | 9,290 | 4,230 | 3,520 | 12,100 | 3,590 | 2,540 | 2,120 | 6,320 |
| 28 | 769 | 1,300 | 3,600 | 1,280 | 6,210 | 3,840 | 3,490 | 15,000 | 2,980 | 2,330 | 1,900 | 4,770 |
| 29 | 1,190 | 1,270 | 2,890 | 1,310 | --- | 3,420 | 2,970 | 10,800 | 2,740 | 2,080 | 1,780 | 3,370 |
| 30 | 1,630 | 1,240 | 2,560 | 1,420 | --- | 3,710 | 2,920 | 8,830 | 3,180 | 2,760 | 1,770 | 2,930 |
| 31 | 2,170 | --- | 2,380 | 1,480 | --- | 5,250 | --- | 8,040 | --- | 3,650 | 1,850 | --- |
| TOTAL | 22,168 | 67,953 | 106,100 | 66,740 | 206,240 | 201,830 | 245,710 | 228,180 | 266,390 | 161,390 | 151,580 | 156,370 |
| MEAN | 715 | 2,265 | 3,423 | 2,153 | 7,366 | 6,511 | 8,190 | 7,361 | 8,880 | 5,206 | 4,890 | 5,212 |
| MAX | 2,170 | 8,570 | 12,900 | 5,770 | 34,800 | 30,000 | 29,600 | 23,500 | 17,300 | 21,300 | 15,800 | 18,300 |
| MIN | 389 | 754 | 1,060 | 1,270 | 1,500 | 2,100 | 2,920 | 2,610 | 2,740 | 2,080 | 1,770 | 1,710 |
| (†) | +6,564 | +32,741 | +2,274 | -1,805 | -1,850 | +7,542 | -3,408 | +529 | -30 | 0 | -555 | -626 |
| MEAN‡ | 927 | 3,356 | 3,496 | 2,905 | 7,300 | 6,754 | 8,077 | 7,378 | 8,879 | 5,206 | 4,872 | 5,191 |
| CFSM‡ | .31 | 1.13 | 1.17 | .70 | 2.45 | 2.27 | 2.71 | 2.48 | 2.98 | 1.75 | 1.64 | 1.74 |
| IN.‡ | .36 | 1.26 | 1.35 | .81 | 2.55 | 2.62 | 3.03 | 2.86 | 3.33 | 2.02 | 1.89 | 1.95 |

CAL YR 2002 MEAN‡ 1,339 CFSM‡ .45 IN.‡ 6.11
WTR YR 2003 MEAN‡ 5,266 CFSM‡ 1.77 IN.‡ 24.02

† 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 change in contents.

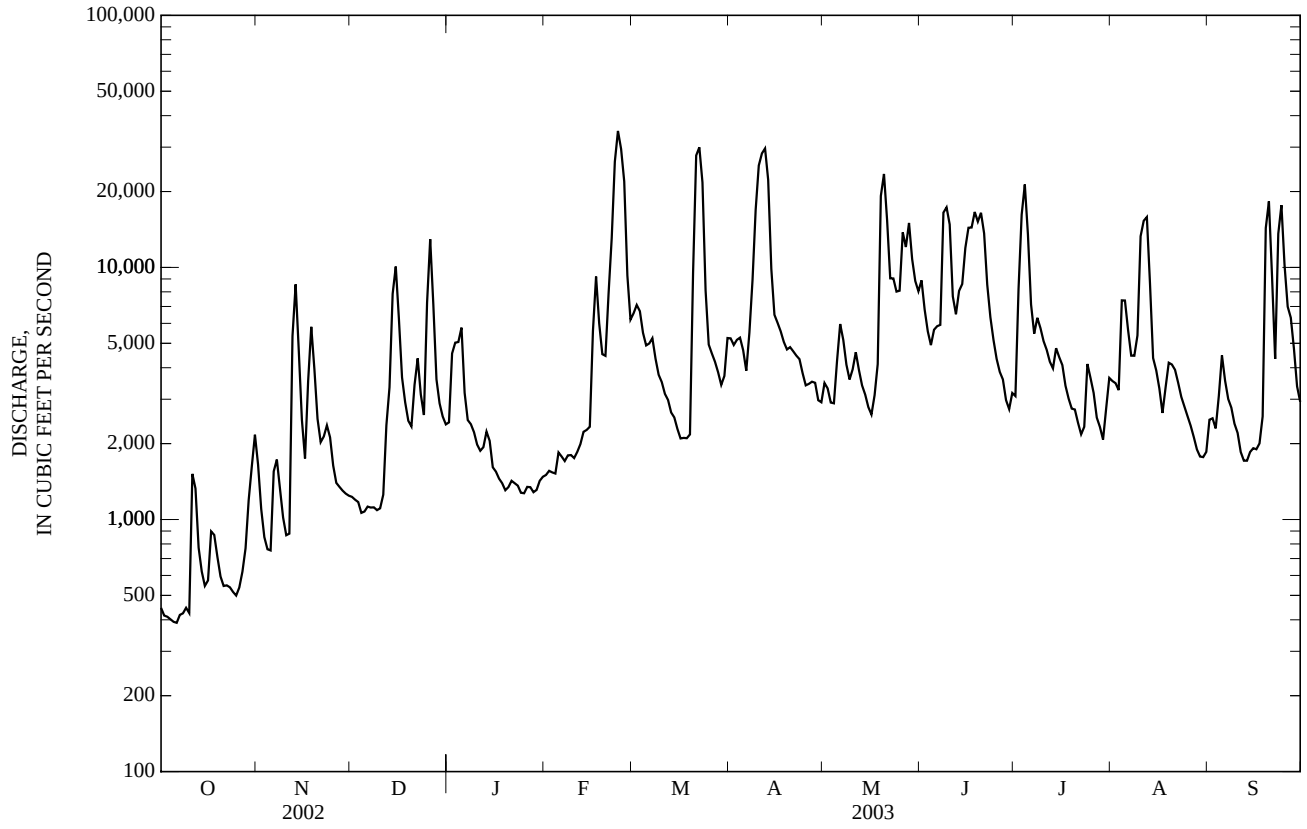
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 1,951 | 2,204 | 2,488 | 3,577 | 4,011 | 4,866 | 4,324 | 3,379 | 2,662 | 1,869 | 1,690 | 2,138 |
| MAX | 7,906 | 11,230 | 6,887 | 9,532 | 12,230 | 13,970 | 17,570 | 10,060 | 10,260 | 5,635 | 5,988 | 11,350 |
| (WY) | (1991) | (1986) | (1997) | (1978) | (1998) | (1975) | (1987) | (1978) | (1972) | (1972) | (1985) | (1996) |
| MIN | 428 | 658 | 809 | 857 | 781 | 769 | 1,082 | 1,038 | 491 | 613 | 493 | 458 |
| (WY) | (1964) | (2002) | (2002) | (2002) | (2002) | (1981) | (2002) | (1964) | (1964) | (2002) | (1964) | (2002) |

02066000 ROANOKE (STAUNTON) RIVER AT RANDOLPH, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1963 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 440,314 | | 1,880,651 | | | |
| ANNUAL MEAN | 1,206 | | 5,152 | | 2,923 | |
| HIGHEST ANNUAL MEAN | | | | | 5,152 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 852 | 2002 |
| HIGHEST DAILY MEAN | 12,900 | Dec 26 | 34,800 | Feb 24 | 78,700 | Sep 8, 1996 |
| LOWEST DAILY MEAN | 389 | Oct 6 | 389 | Oct 6 | 179 | aSep 8, 1965 |
| ANNUAL SEVEN-DAY MINIMUM | 406 | Sep 10 | 408 | Oct 2 | 238 | Sep 5, 1965 |
| MAXIMUM PEAK FLOW | | | 36,400 | Feb 24 | b89,300 | Sep 7, 1996 |
| MAXIMUM PEAK STAGE | | | 27.18 | Feb 24 | b34.94 | Sep 7, 1996 |
| INSTANTANEOUS LOW FLOW | | | 380 | Oct 6 | c176 | dSep 8, 1965 |
| ANNUAL RUNOFF (CFSM) | 0.41 | | 1.73 | | 0.98 | |
| ANNUAL RUNOFF (INCHES) | 5.50 | | 23.50 | | 13.34 | |
| 10 PERCENT EXCEEDS | 2,350 | | 13,200 | | 5,620 | |
| 50 PERCENT EXCEEDS | 808 | | 3,390 | | 1,740 | |
| 90 PERCENT EXCEEDS | 435 | | 1,110 | | 808 | |

a Also July 7, 1970.
b Prior to regulation, 1901-06, 1928-30, 1951-62, maximum peak flow, 97,000 $ft^3/s$, Dec. 31, 1901, gage height, 35.00 ft.
c Prior to regulation, 1901-06, 1928-30, 1951-62, instantaneous low flow, 256 $ft^3/s$, Sept. 16, 1954.
d Also Sept. 9, 1965.
e Estimated.



## 02067800; 02067820 TALBOTT AND TOWNES RESERVOIRS NEAR KIBLER, VA

LOCATION.--Talbott Dam: Lat 36°40'39", long 80°23'51", NAD83, Patrick County, Hydrologic Unit 03010103, on Dan River 4.5 mi northeast of Kibler. Townes Dam: Lat 36°41'10", long 80°25'49", NAD83, Patrick County, Hydrologic Unit 03010103, on Dan River about 4 mi north of Kibler.

DRAINAGE AREA.--Talbott Dam, 20.2 $mi^2$; Townes Dam, 32.9 $mi^2$.

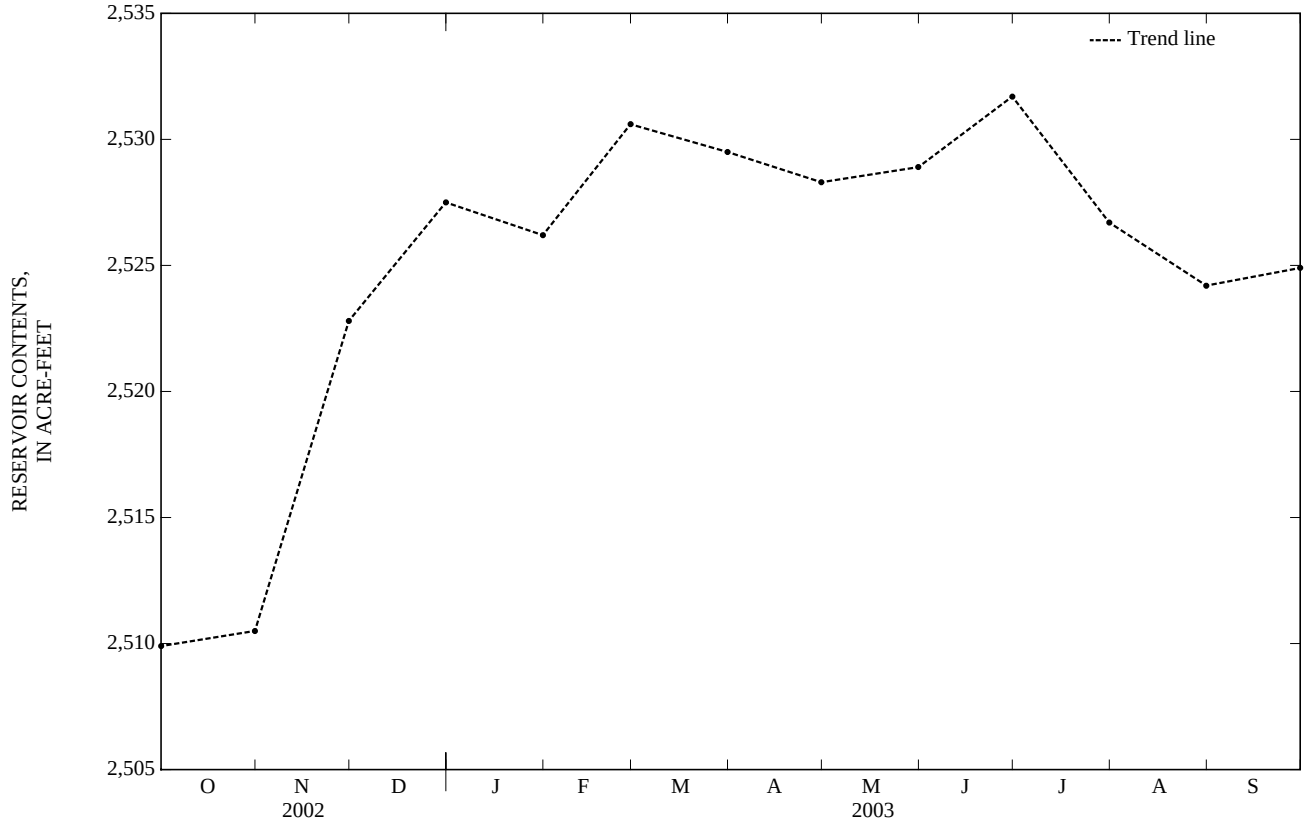
PERIOD OF RECORD.--February 1939 to December 1945, January 1948 to September 1960 (published in WSP 1723), and October 1960 to current year.

REMARKS.--The two reservoirs are operated as a unit for storage of water for Pinnacles hydroelectric plant. Total capacity of Talbott Reservoir, 8,040 acre-ft, and Townes Reservoir, 1,380 acre-ft. Storage began in Talbott Reservoir on Feb. 13, 1939, and in Townes Reservoir several months earlier.

COOPERATION.--Records were provided by the city of Danville.

TALBOTT RESERVOIR, MONTHEND CONTENTS AT 2400, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

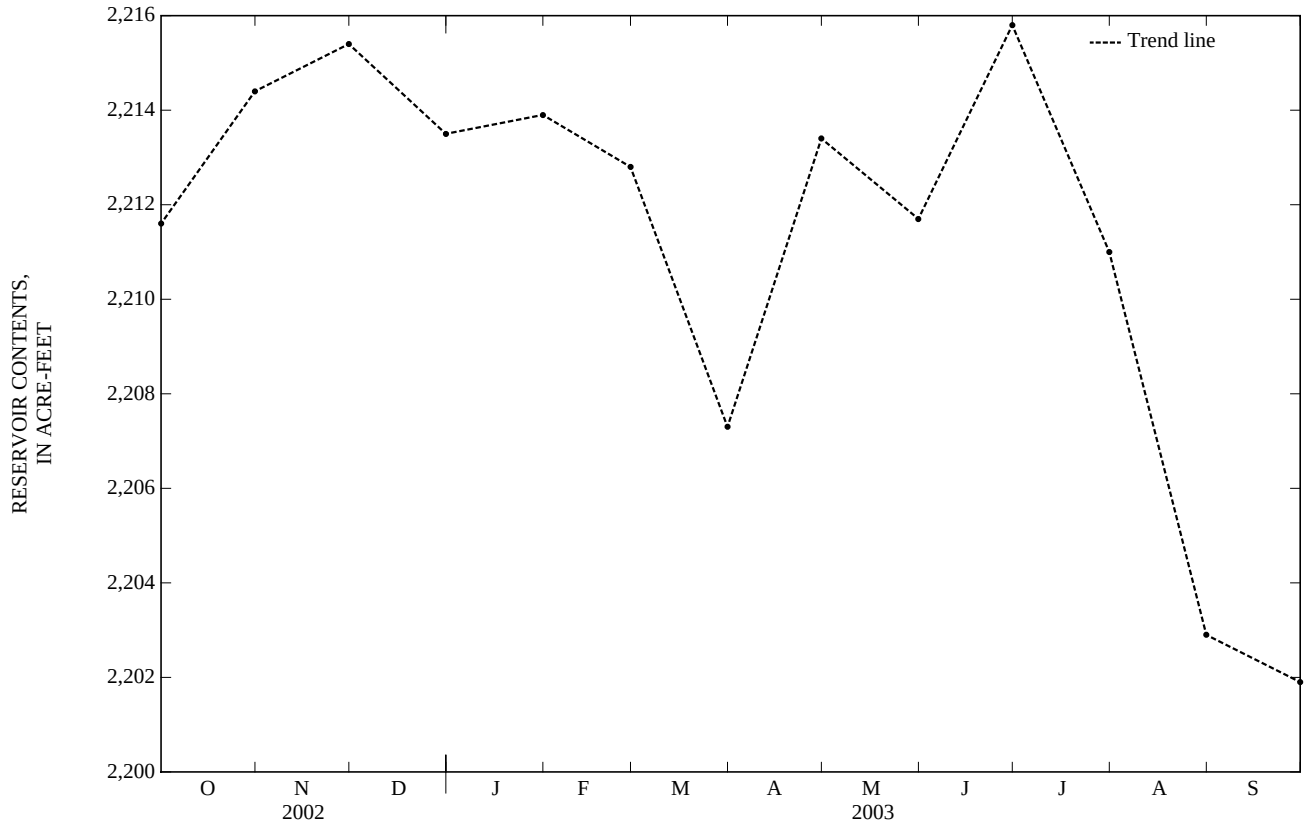
| Date | Elevation (feet) | Contents (acre-feet) | Change in contents (acre-feet) |
|---|---|---|---|
| September 30 | 2,509.9 | 4,545 | |
| October 31 | 2,510.5 | 4,617 | +72 |
| November 30 | 2,522.8 | 6,196 | +1,579 |
| December 31 | 2,527.5 | 6,892 | +696 |
| CAL YR 2002 | | | +2,537 |
| January 31 | 2,526.2 | 6,699 | -193 |
| February 28 | 2,530.6 | 7,355 | +657 |
| March 31 | 2,529.5 | 7,190 | -165 |
| April 30 | 2,528.3 | 7,013 | -177 |
| May 31 | 2,528.9 | 7,101 | +87 |
| June 30 | 2,531.7 | 7,518 | +418 |
| July 31 | 2,526.7 | 6,772 | -746 |
| August 31 | 2,524.2 | 6,403 | -370 |
| September 30 | 2,524.9 | 6,506 | +103 |
| WTR YR 2003 | | | +1,961 |



02067800; 02067820 TALBOTT AND TOWNES RESERVOIRS NEAR KIBLER, VA

TOWNES RESERVOIR, MONTHEND CONTENTS AT 2400, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Elevation (feet) | Contents (acre-feet) | Change in contents (acre-feet) |
|---|---|---|---|
| September 30 | 2,211.6 | 1,058 | |
| October 31 | 2,214.4 | 1,143 | +85 |
| November 30 | 2,215.4 | 1,175 | +32 |
| December 31 | 2,213.5 | 1,116 | -60 |
| CAL YR 2002 | | | +74 |
| January 31 | 2,213.9 | 1,172 | +11 |
| February 28 | 2,212.8 | 1,093 | -34 |
| March 31 | 2,207.3 | 941 | -152 |
| April 30 | 2,213.4 | 1,111 | +170 |
| May 31 | 2,211.7 | 1,061 | -51 |
| June 30 | 2,215.8 | 1,187 | +126 |
| July 31 | 2,211.0 | 1,040 | -147 |
| August 31 | 2,202.9 | 820 | -220 |
| September 30 | 2,201.9 | 792 | -28 |
| WTR YR 2003 | | | -266 |



## 02068500 DAN RIVER NEAR FRANCISCO, NC

LOCATION.--Lat 36°30'53", long 80°18'10", 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 $mi^2$.

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 NGVD of 1929. Prior to Nov. 15, 1929, nonrecording gage at same site and datum. Satellite telemetry at station.

REMARKS.--Records good except those for estimated daily discharges and those for discharges above 1,000 $ft^3/s$, 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 $ft^3/s$.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 62 | 100 | 91 | 179 | 110 | 205 | 291 | 307 | 320 | 457 | 446 | 292 |
| 2 | 60 | 92 | 92 | 198 | 120 | 210 | 238 | 276 | 276 | 717 | 365 | 241 |
| 3 | 62 | 88 | 110 | 237 | 117 | 199 | 187 | 267 | 183 | 665 | 519 | 268 |
| 4 | 61 | 87 | 112 | 230 | 145 | 169 | 189 | 422 | 338 | 570 | 482 | 529 |
| 5 | 60 | 94 | 125 | 213 | 141 | 170 | 246 | 372 | 485 | 527 | 458 | 289 |
| 6 | 59 | 148 | 101 | 202 | 127 | 223 | 298 | 381 | 358 | 496 | 471 | 253 |
| 7 | 60 | 118 | 114 | 200 | 127 | 227 | 357 | 362 | 1,130 | 461 | e2,000 | 247 |
| 8 | 60 | 106 | 119 | 192 | 126 | 187 | 383 | 343 | 1,210 | 417 | e1,000 | 232 |
| 9 | 59 | 101 | 120 | 186 | 120 | 187 | e640 | 327 | 1,480 | 450 | 663 | 225 |
| 10 | 60 | 92 | 115 | 184 | 131 | 188 | e1,400 | 258 | 694 | 501 | 791 | 222 |
| 11 | 87 | 349 | 200 | 177 | 130 | 173 | e1,000 | 260 | 501 | 384 | 905 | 218 |
| 12 | 82 | 503 | 184 | e174 | 133 | 161 | 724 | 277 | 814 | 377 | 567 | 216 |
| 13 | 66 | 330 | 269 | e170 | 171 | 135 | 598 | 179 | 1,030 | 395 | 540 | 228 |
| 14 | 64 | 180 | 351 | e168 | 172 | 129 | 540 | 172 | 1,520 | 366 | 619 | 230 |
| 15 | 65 | 154 | 185 | e164 | 206 | 130 | 511 | 175 | 898 | 398 | 454 | 217 |
| 16 | 166 | 219 | 156 | e160 | 291 | 313 | 491 | 197 | 1,060 | 336 | 410 | 236 |
| 17 | 116 | 428 | 143 | e158 | 263 | 300 | 479 | 209 | 951 | 323 | 377 | 234 |
| 18 | 97 | 304 | 134 | e156 | 181 | 246 | 559 | 271 | 826 | 314 | 351 | 232 |
| 19 | 74 | 219 | 129 | e152 | 193 | 277 | 665 | 286 | 1,280 | 431 | 331 | 208 |
| 20 | 70 | 161 | 247 | e148 | 203 | 1,610 | 556 | 167 | 973 | 443 | 335 | 160 |
| 21 | 73 | 149 | 271 | e146 | 204 | 684 | 509 | 290 | 731 | 357 | 364 | 157 |
| 22 | 73 | 143 | 203 | e144 | 1,540 | 452 | 505 | 281 | 669 | 372 | 412 | 160 |
| 23 | 78 | 118 | 156 | e142 | 788 | 384 | 483 | 256 | 626 | 496 | 361 | 478 |
| 24 | 78 | 111 | 221 | e138 | 365 | 342 | 473 | 242 | 557 | 455 | 311 | 200 |
| 25 | 79 | 108 | 312 | e136 | 239 | 317 | 475 | 376 | 467 | 336 | 274 | 226 |
| 26 | 92 | 105 | 185 | e134 | 211 | 298 | 595 | 365 | 414 | 335 | 257 | 219 |
| 27 | 84 | 99 | 169 | e132 | 228 | 283 | 467 | 231 | 440 | 356 | 247 | 224 |
| 28 | 95 | 96 | 171 | e126 | 223 | 273 | 295 | 193 | 487 | 330 | 239 | 267 |
| 29 | 125 | 96 | 193 | 125 | --- | 234 | 251 | 188 | 440 | 314 | 243 | 215 |
| 30 | 142 | 95 | 172 | 124 | --- | 305 | 248 | 188 | 423 | 342 | 250 | 202 |
| 31 | 120 | --- | 153 | 114 | --- | 313 | --- | 193 | --- | 447 | 270 | --- |
| TOTAL | 2,529 | 4,993 | 5,303 | 5,109 | 7,005 | 9,324 | 14,653 | 8,311 | 21,581 | 13,168 | 15,312 | 7,325 |
| MEAN | 81.6 | 166 | 171 | 165 | 250 | 301 | 488 | 268 | 719 | 425 | 494 | 244 |
| MAX | 166 | 503 | 351 | 237 | 1,540 | 1,610 | 1,400 | 422 | 1,520 | 717 | 2,000 | 529 |
| MIN | 59 | 87 | 91 | 114 | 110 | 129 | 187 | 167 | 183 | 314 | 239 | 157 |
| † | +3 | +27 | +10 | -3 | +11 | -5 | 0 | +1 | +9 | -15 | -10 | +1 |

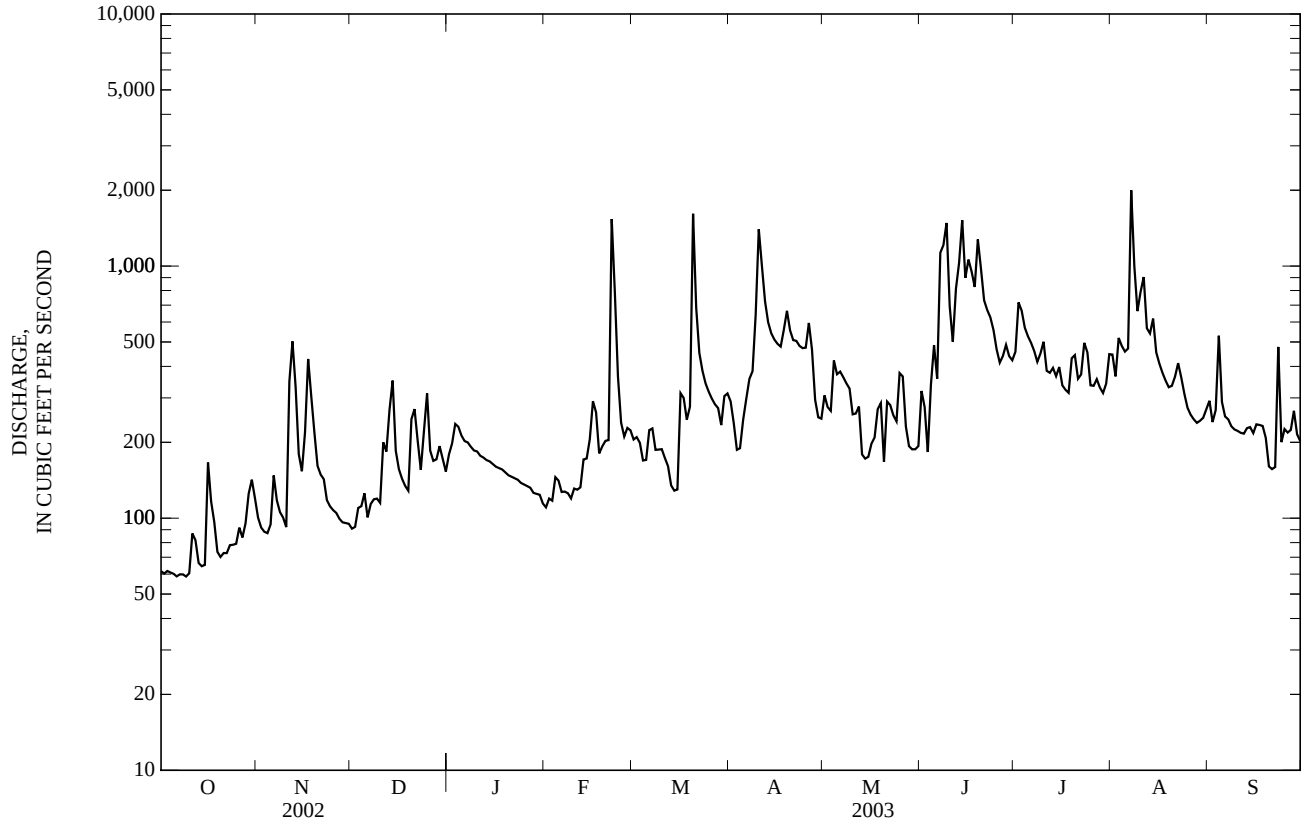
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 2003,*@ BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 147 | 154 | 175 | 197 | 220 | 259 | 268 | 218 | 202 | 168 | 169 | 148 |
| MAX | 543 | 327 | 479 | 424 | 463 | 571 | 677 | 405 | 719 | 425 | 514 | 630 |
| (WY) | (1938) | (1980) | (1997) | (1978) | (1960) | (1993) | (1980) | (1949) | (2003) | (2003) | (1940) | (1979) |
| MIN | 49.7 | 61.3 | 77.5 | 76.2 | 94.9 | 94.2 | 119 | 95.3 | 77.9 | 54.8 | 52.5 | 50.4 |
| (WY) | (1964) | (1954) | (1998) | (1956) | (1956) | (1981) | (2002) | (2000) | (2002) | (1986) | (1981) | (1968) |

02068500 DAN RIVER NEAR FRANCISCO, NC—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1938 - 2003*@ | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 39,453 | | 114,613 | ‡316 | | (UNADJUSTED) |
| ANNUAL MEAN | 108 | | 314 | | 194 | |
| HIGHEST ANNUAL MEAN | | | | | 314 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 93.6 | 2002 |
| HIGHEST DAILY MEAN | 503 | Nov 12 | 2,000 | Aug 7 | 6,830 | Sep 22, 1979 |
| LOWEST DAILY MEAN | 45 | Sep 12 | 59 | Oct 6 | 21 | Sep 4, 1999 |
| ANNUAL SEVEN-DAY MINIMUM | 47 | Sep 7 | 60 | Oct 4 | 28 | Aug 24, 1981 |
| MAXIMUM PEAK FLOW | | | 6,830 | Aug 7 | 21,200 | Aug 17, 1985 |
| MAXIMUM PEAK STAGE | | | 9.22 | Aug 7 | 19.50 | Aug 17, 1985 |
| INSTANTANEOUS LOW FLOW | | | 57 | Oct 4 | 7.1 | Sep 8, 1932 |
| 10 PERCENT EXCEEDS | 164 | | 568 | | 320 | |
| 50 PERCENT EXCEEDS | 99 | | 234 | | 154 | |
| 90 PERCENT EXCEEDS | 58 | | 98 | | 80 | |

e Estimated.
† Change in contents, equivalent in cubic feet per second, in Talbott and Townes Reservoirs provided by city of Danville, Virginia.
* Regulated period only (1938-2003). See REMARKS.
@ See PERIOD OF RECORD.
‡ Adjusted for change in contents.



## 02069700 SOUTH MAYO RIVER NEAR NETTLERIDGE, VA

LOCATION.--Lat 36°34'15", long 80°07'46", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Oct. 9, 1964, nonrecording gage and crest-stage gage at same site and datum.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Dec. 10-12, Jan. 20-29, Feb. 11, Mar. 23-26, Apr. 26-30, May 5, 6, June 7, 8, and June 20 to July 1, and period with ice effect, Jan. 17-19, which are fair. Maximum discharge, 20,600 $ft^3/s$, from rating curve extended above 2,900 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,300 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1815 | *2,280 | *9.15 | Jun 14 | 0515 | 1,390 | 7.31 |
| Mar 20 | 1300 | 2,230 | 9.06 | Aug 7 | 0900 | 1,580 | 7.72 |
| Apr 10 | 2100 | 2,060 | 8.72 | Sep 23 | 0500 | 1,480 | 7.51 |
| Jun 9 | 0415 | 1,380 | 7.27 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 30 | 57 | 42 | 121 | 68 | 192 | 167 | 188 | 132 | e185 | 202 | 202 |
| 2 | 30 | 48 | 41 | 124 | 66 | 189 | 152 | 161 | 115 | 483 | 160 | 153 |
| 3 | 29 | 43 | 40 | 155 | 65 | 164 | 140 | 157 | 131 | 521 | 271 | 142 |
| 4 | 26 | 41 | 41 | 145 | 90 | 145 | 133 | 240 | 256 | 311 | 241 | 305 |
| 5 | 24 | 44 | 57 | 121 | 84 | 136 | 133 | e180 | 584 | 292 | 263 | 207 |
| 6 | 23 | 95 | 53 | 107 | 73 | 164 | 119 | e190 | 266 | 359 | 209 | 155 |
| 7 | 22 | 60 | 48 | 98 | 78 | 136 | 234 | 176 | e540 | 313 | 781 | 143 |
| 8 | 22 | 50 | 46 | 94 | 73 | 124 | 189 | 163 | e650 | 227 | 546 | 135 |
| 9 | 22 | 46 | 48 | 90 | 69 | 117 | 488 | 156 | 1,000 | 212 | 370 | 128 |
| 10 | 22 | 44 | e50 | 85 | 73 | 111 | 1,300 | 145 | 540 | 231 | 434 | 123 |
| 11 | 46 | 183 | e170 | 78 | e74 | 106 | 935 | 140 | 369 | 199 | 681 | 117 |
| 12 | 45 | 248 | e145 | 76 | 73 | 103 | 451 | 132 | 529 | 181 | 341 | 115 |
| 13 | 31 | 175 | 215 | 74 | 70 | 100 | 317 | 125 | 485 | 202 | 304 | 115 |
| 14 | 28 | 101 | 237 | 74 | 71 | 98 | 260 | 121 | 992 | 451 | 244 | 116 |
| 15 | 27 | 80 | 134 | 71 | 99 | 95 | 228 | 123 | 580 | 252 | 247 | 114 |
| 16 | 175 | 135 | 106 | 70 | 227 | 205 | 210 | 136 | 688 | e225 | 298 | 111 |
| 17 | 89 | 307 | 94 | e68 | 141 | 175 | 194 | 125 | 738 | e200 | 230 | 106 |
| 18 | 54 | 144 | 86 | e63 | 114 | 147 | 248 | 135 | 624 | e175 | 205 | 128 |
| 19 | 42 | 101 | 81 | e76 | 130 | 134 | 337 | 138 | 706 | 294 | 188 | 192 |
| 20 | 38 | 81 | 174 | e72 | 153 | 1,400 | 254 | 125 | e470 | 308 | 179 | 116 |
| 21 | 38 | 75 | 126 | e67 | 157 | 613 | 227 | 121 | e350 | e190 | 182 | 109 |
| 22 | 39 | 66 | 102 | e62 | 957 | 357 | 209 | 143 | e285 | e160 | 313 | 110 |
| 23 | 35 | 59 | 92 | e58 | 744 | e255 | 187 | 156 | e255 | e176 | 196 | 598 |
| 24 | 32 | 56 | 150 | e53 | 334 | e220 | 174 | 134 | e230 | 243 | 173 | 185 |
| 25 | 32 | 54 | 220 | e60 | 230 | e185 | 173 | 239 | e210 | 171 | 160 | 145 |
| 26 | 42 | 52 | 142 | e57 | 186 | e157 | e197 | 308 | e200 | 154 | 147 | 132 |
| 27 | 37 | 51 | 113 | e61 | 190 | 145 | e220 | 200 | e195 | 146 | 137 | 126 |
| 28 | 44 | 49 | 101 | e59 | 216 | 136 | e190 | 171 | e185 | 142 | 133 | 144 |
| 29 | 77 | 47 | 94 | e64 | --- | 146 | e180 | 156 | e180 | 138 | 135 | 121 |
| 30 | 100 | 46 | 87 | 73 | --- | 255 | e175 | 143 | e175 | 161 | 198 | 116 |
| 31 | 75 | --- | 81 | 69 | --- | 208 | --- | 142 | --- | 230 | 188 | --- |
| TOTAL | 1,376 | 2,638 | 3,216 | 2,545 | 4,905 | 6,718 | 8,421 | 4,969 | 12,660 | 7,532 | 8,356 | 4,709 |
| MEAN | 44.4 | 87.9 | 104 | 82.1 | 175 | 217 | 281 | 160 | 422 | 243 | 270 | 157 |
| MAX | 175 | 307 | 237 | 155 | 957 | 1,400 | 1,300 | 308 | 1,000 | 521 | 781 | 598 |
| MIN | 22 | 41 | 40 | 53 | 65 | 95 | 119 | 121 | 115 | 138 | 133 | 106 |
| CFSM | 0.52 | 1.04 | 1.23 | 0.97 | 2.07 | 2.56 | 3.32 | 1.89 | 4.99 | 2.87 | 3.19 | 1.86 |
| IN. | 0.61 | 1.16 | 1.41 | 1.12 | 2.16 | 2.95 | 3.70 | 2.18 | 5.57 | 3.31 | 3.67 | 2.07 |

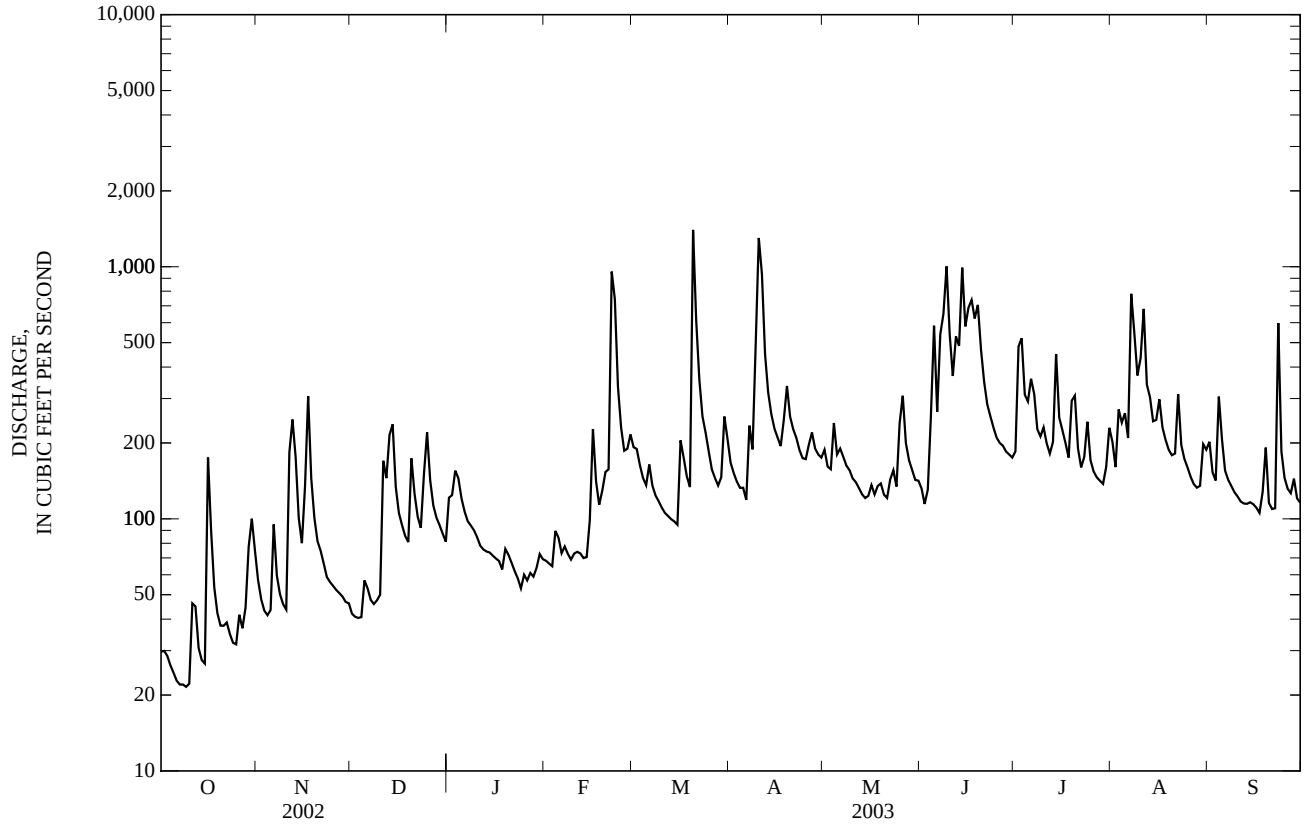
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 94.8 | 101 | 113 | 136 | 148 | 181 | 177 | 144 | 129 | 106 | 97.4 | 90.6 |
| 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 | 30.4 | 30.2 | 43.0 | 48.6 | 50.7 | 65.0 | 64.4 | 56.5 | 28.2 | 25.9 | 17.2 | 30.4 |
| (WY) | (2002) | (2002) | (2001) | (1981) | (2001) | (1981) | (2002) | (1981) | (2002) | (2002) | (2002) | (2002) |

02069700 SOUTH MAYO RIVER NEAR NETTLERIDGE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1963 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 20,270.6 | | 68,045 | | | |
| ANNUAL MEAN | 55.5 | | 186 | | 126 | |
| HIGHEST ANNUAL MEAN | | | | | 206 | 1990 |
| LOWEST ANNUAL MEAN | | | | | 44.9 | 2002 |
| HIGHEST DAILY MEAN | 395 | Mar 18 | 1,400 | Mar 20 | 6,820 | Jun 21, 1972 |
| LOWEST DAILY MEAN | 8.7 | Aug 15 | 22 | aOct 7 | 8.7 | Aug 15, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 10 | Aug 9 | 23 | Oct 4 | 10 | Aug 9, 2002 |
| MAXIMUM PEAK FLOW | | | 2,280 | Feb 22 | 20,600 | Sep 22, 1979 |
| MAXIMUM PEAK STAGE | | | 9.15 | Feb 22 | 22.00 | Sep 22, 1979 |
| INSTANTANEOUS LOW FLOW | | | 21 | bOct 7 | 8.3 | Aug 15, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.66 | | 2.20 | | 1.49 | |
| ANNUAL RUNOFF (INCHES) | 8.91 | | 29.92 | | 20.29 | |
| 10 PERCENT EXCEEDS | 100 | | 339 | | 212 | |
| 50 PERCENT EXCEEDS | 46 | | 143 | | 95 | |
| 90 PERCENT EXCEEDS | 19 | | 47 | | 46 | |

a Also Oct. 8-10, 2002.
b Also Oct. 9, 10, 2002.
e Estimated.



## 02070000 NORTH MAYO RIVER NEAR SPENCER, VA

LOCATION.--Lat 36°34'05", long 79°59'14", NAD83, 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 $mi^2$.

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 NGVD of 1929 (levels by U.S. Army Corps of Engineers). Prior to Jan. 23, 1936, nonrecording gage at site 800 ft upstream at datum 1.50 ft higher. July 25 to Sept. 27, 1936, nonrecording gage at present site and datum.

REMARKS.--Records good except those for periods with ice effect, Dec. 6-8 and Jan. 17-20, 23-28, and periods of no gage-height record, Feb. 11 and Sept. 12-15, which are fair. Maximum discharge, 17,200 $ft^3/s$, from rating curve extended above 7,200 $ft^3/s$ on basis of slope-area measurement at gage height 13.41 ft 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.

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

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,400 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 2145 | 3,030 | 6.93 | Jul 7 | 0215 | 1,920 | 5.53 |
| Mar 20 | 1430 | *5,250 | *9.04 | Jul 14 | 1130 | 4,350 | 8.28 |
| Apr 10 | 2330 | 2,200 | 5.91 | Jul 17 | 0215 | 1,830 | 5.41 |
| Jun 5 | 0800 | 1,680 | 5.19 | Aug 11 | 0045 | 2,330 | 6.09 |
| Jun 9 | 0845 | 1,920 | 5.54 | Sep 23 | 0945 | 2,940 | 6.82 |
| Jun 16 | 1545 | 1,800 | 5.37 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 30 | 78 | 55 | 122 | 74 | 243 | 183 | 176 | 147 | 161 | 247 | 165 |
| 2 | 28 | 64 | 55 | 156 | 73 | 220 | 161 | 145 | 129 | 437 | 188 | 149 |
| 3 | 26 | 57 | 55 | 177 | 70 | 179 | 147 | 136 | 133 | 693 | 241 | 145 |
| 4 | 25 | 55 | 55 | 168 | 81 | 150 | 139 | 175 | 193 | 279 | 287 | 263 |
| 5 | 24 | 56 | 64 | 129 | 92 | 138 | 135 | 154 | 814 | 222 | 269 | 233 |
| 6 | 23 | 114 | e68 | 113 | 77 | 151 | 129 | 159 | 289 | 447 | 224 | 165 |
| 7 | 22 | 81 | e62 | 100 | 82 | 137 | 366 | 144 | 534 | 738 | 340 | 155 |
| 8 | 22 | 66 | e57 | 96 | 78 | 123 | 296 | 135 | 720 | 257 | 297 | 149 |
| 9 | 22 | 60 | 59 | 92 | 72 | 117 | 676 | 132 | 1,220 | 216 | 323 | 143 |
| 10 | 22 | 57 | 58 | 87 | 78 | 111 | 1,250 | 124 | 381 | 220 | 495 | 139 |
| 11 | 49 | 93 | 168 | 82 | e82 | 106 | 1,060 | 122 | 263 | 191 | 1,100 | 136 |
| 12 | 59 | 337 | 185 | 79 | 83 | 103 | 384 | 118 | 557 | 176 | 400 | e133 |
| 13 | 36 | 287 | 359 | 77 | 79 | 104 | 272 | 110 | 400 | 299 | 264 | e132 |
| 14 | 30 | 131 | 467 | 76 | 77 | 107 | 227 | 108 | 456 | 2,590 | 231 | e137 |
| 15 | 28 | 98 | 196 | 75 | 96 | 99 | 205 | 111 | 336 | 483 | 212 | e134 |
| 16 | 130 | 174 | 139 | 73 | 320 | 246 | 190 | 124 | 978 | 426 | 257 | 131 |
| 17 | 131 | 465 | 114 | e70 | 176 | 226 | 177 | 115 | 740 | 766 | 287 | 124 |
| 18 | 65 | 190 | 99 | e67 | 133 | 160 | 188 | 130 | 508 | 294 | 209 | 142 |
| 19 | 51 | 125 | 92 | e86 | 134 | 137 | 284 | 145 | 530 | 250 | 185 | 256 |
| 20 | 46 | 102 | 185 | e77 | 201 | 3,530 | 219 | 125 | 384 | 235 | 179 | 147 |
| 21 | 46 | 90 | 158 | 72 | 257 | 882 | 193 | 116 | 290 | 209 | 173 | 134 |
| 22 | 48 | 82 | 115 | 68 | 1,350 | 387 | 181 | 158 | 249 | 205 | 173 | 132 |
| 23 | 44 | 74 | 99 | e65 | 1,050 | 233 | 165 | 195 | 224 | 210 | 170 | 1,320 |
| 24 | 41 | 69 | 165 | e57 | 303 | 195 | 155 | 167 | 206 | 464 | 167 | 267 |
| 25 | 39 | 67 | 401 | e63 | 204 | 173 | 153 | 314 | 194 | 217 | 159 | 181 |
| 26 | 49 | 65 | 201 | e70 | 169 | 160 | 178 | 545 | 183 | 191 | 154 | 161 |
| 27 | 49 | 62 | 139 | e64 | 169 | 148 | 190 | 291 | 176 | 179 | 150 | 151 |
| 28 | 47 | 60 | 117 | e60 | 228 | 140 | 154 | 262 | 170 | 172 | 149 | 149 |
| 29 | 103 | 58 | 104 | 77 | --- | 142 | 146 | 192 | 167 | 168 | 147 | 136 |
| 30 | 154 | 57 | 96 | 75 | --- | 268 | 140 | 170 | 162 | 186 | 155 | 132 |
| 31 | 118 | --- | 90 | 76 | --- | 263 | --- | 157 | --- | 196 | 173 | --- |
| TOTAL | 1,607 | 3,374 | 4,277 | 2,749 | 5,888 | 9,378 | 8,343 | 5,255 | 11,733 | 11,777 | 8,005 | 5,941 |
| MEAN | 51.8 | 112 | 138 | 88.7 | 210 | 303 | 278 | 170 | 391 | 380 | 258 | 198 |
| MAX | 154 | 465 | 467 | 177 | 1,350 | 3,530 | 1,250 | 545 | 1,220 | 2,590 | 1,100 | 1,320 |
| MIN | 22 | 55 | 55 | 57 | 70 | 99 | 129 | 108 | 129 | 161 | 147 | 124 |
| CFSM | 0.48 | 1.04 | 1.28 | 0.82 | 1.95 | 2.80 | 2.58 | 1.57 | 3.62 | 3.52 | 2.39 | 1.83 |
| IN. | 0.55 | 1.16 | 1.47 | 0.95 | 2.03 | 3.23 | 2.87 | 1.81 | 4.04 | 4.06 | 2.76 | 2.05 |

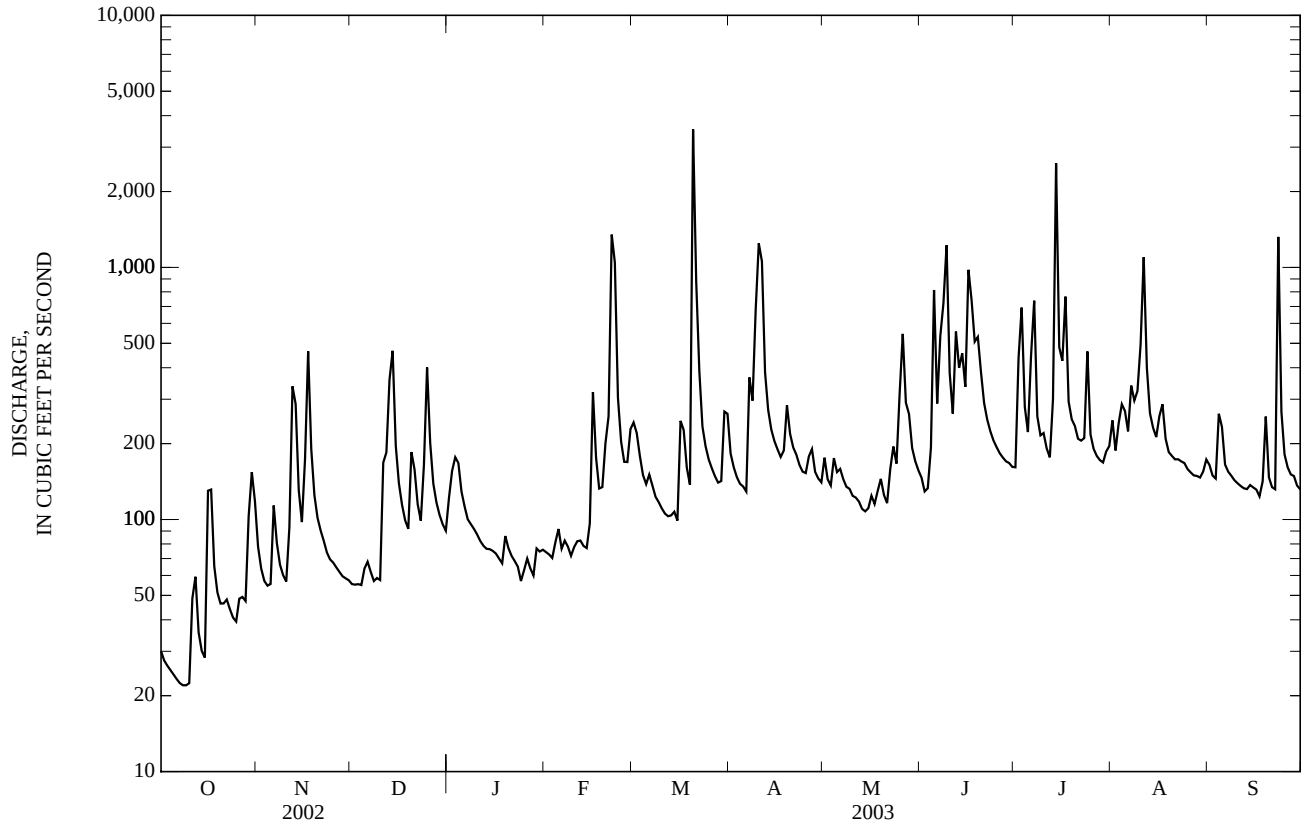
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1935, 1937 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 110 | 104 | 121 | 143 | 155 | 181 | 164 | 134 | 124 | 106 | 98.3 | 103 |
| MAX | 498 | 392 | 256 | 368 | 364 | 479 | 523 | 329 | 470 | 380 | 446 | 462 |
| (WY) | (1938) | (1986) | (1997) | (1937) | (1960) | (1993) | (1987) | (1972) | (1972) | (2003) | (1985) | (1987) |
| MIN | 25.4 | 30.5 | 43.5 | 40.6 | 49.6 | 85.5 | 56.9 | 55.5 | 21.1 | 21.5 | 12.4 | 25.7 |
| (WY) | (2002) | (2002) | (1956) | (1956) | (1931) | (1981) | (2002) | (2002) | (2002) | (2002) | (2002) | (1954) |

02070000 NORTH MAYO RIVER NEAR SPENCER, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1929 - 1935 1937 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 21,920.7 | | 78,327 | | | |
| ANNUAL MEAN | 60.1 | | 215 | | 129 | |
| HIGHEST ANNUAL MEAN | | | | | 218 | 1987 |
| LOWEST ANNUAL MEAN | | | | | 43.5 | 2002 |
| HIGHEST DAILY MEAN | 730 | Mar 18 | 3,530 | Mar 20 | 7,460 | Aug 18, 1985 |
| LOWEST DAILY MEAN | 5.9 | aAug 15 | 22 | bOct 7 | 5.9 | aAug 15, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 6.4 | Aug 10 | 23 | Oct 4 | 6.4 | Aug 10, 2002 |
| MAXIMUM PEAK FLOW | | | 5,250 | Mar 20 | 17,200 | Oct 9, 1947 |
| MAXIMUM PEAK STAGE | | | 9.04 | Mar 20 | 15.80 | Oct 9, 1947 |
| INSTANTANEOUS LOW FLOW | | | 22 | bOct 7 | 5.6 | aAug 15, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.56 | | 1.99 | | 1.19 | |
| ANNUAL RUNOFF (INCHES) | 7.55 | | 26.98 | | 16.17 | |
| 10 PERCENT EXCEEDS | 115 | | 385 | | 200 | |
| 50 PERCENT EXCEEDS | 48 | | 150 | | 94 | |
| 90 PERCENT EXCEEDS | 13 | | 58 | | 49 | |

a Also Aug. 16, 2002.
b Also Oct. 8-10, 2002.
e Estimated.



## 02071530 SMITH RIVER AT SMITH RIVER CHURCH NEAR WOOLWINE, VA

LOCATION.--Lat 36°46'42", long 80°14'57", NAD83, Patrick County, Hydrologic Unit 03010103, on left bank 10 ft downstream from bridge on State Highway 708, 1l9 miles southeast of Woolwine, and 29 miles upstream from Philpott Dam.

DRAINAGE AREA.--26.7 $mi^2$.

PERIOD OF RECORD.--October 1994 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,210 ft NGVD of 1929, from topographic map.

REMARKS.--Records good except for period of doubtful gage-height record, Jan. 18-20, which is fair. Several observations of water temperature were made during the year.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,100 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1215 | *1,480 | *8.27 | Jun 8 | 2300 | 1,150 | 7.41 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 16 | 30 | 26 | 65 | 33 | 100 | 84 | 91 | 67 | 109 | 68 | 61 |
| 2 | 14 | 27 | 26 | 58 | 32 | 103 | 79 | 85 | 64 | 286 | 64 | 54 |
| 3 | 14 | 26 | 26 | 74 | 32 | 94 | 76 | 84 | 74 | 205 | 63 | 52 |
| 4 | 13 | 25 | 26 | 61 | 44 | 87 | 73 | 100 | 98 | 138 | 60 | 59 |
| 5 | 13 | 29 | 30 | 53 | 34 | 83 | 74 | 92 | 98 | 117 | 110 | 54 |
| 6 | 13 | 35 | 28 | 48 | 31 | 88 | 69 | 91 | 79 | 109 | 67 | 50 |
| 7 | 13 | 28 | 27 | 44 | 33 | 80 | 113 | 84 | 251 | 100 | 91 | 49 |
| 8 | 13 | 26 | 27 | 42 | 29 | 75 | 104 | 80 | 252 | 93 | 163 | 48 |
| 9 | 13 | 25 | 27 | 40 | 29 | 72 | 162 | 76 | 302 | 96 | 132 | 46 |
| 10 | 13 | 25 | 26 | 40 | 30 | 69 | 476 | 80 | 159 | 90 | 179 | 48 |
| 11 | 19 | 195 | 52 | 38 | 30 | 68 | 288 | 76 | 145 | 83 | 157 | 44 |
| 12 | 15 | 142 | 44 | 37 | 29 | 66 | 185 | 70 | 216 | 86 | 111 | 44 |
| 13 | 13 | 83 | 73 | 36 | 28 | 65 | 148 | 67 | 179 | 84 | 95 | 44 |
| 14 | 13 | 55 | 62 | 36 | 30 | 63 | 130 | 66 | 155 | 83 | 92 | 47 |
| 15 | 14 | 44 | 44 | 35 | 57 | 62 | 119 | 71 | 132 | 76 | 84 | 45 |
| 16 | 78 | 74 | 39 | 34 | 76 | 126 | 110 | 73 | 155 | 73 | 80 | 42 |
| 17 | 31 | 98 | 37 | 34 | 52 | 100 | 105 | 72 | 212 | 70 | 73 | 40 |
| 18 | 22 | 63 | 34 | e34 | 44 | 87 | 195 | 87 | 178 | 68 | 69 | 53 |
| 19 | 19 | 51 | 33 | e33 | 48 | 83 | 204 | 84 | 294 | 67 | 66 | 56 |
| 20 | 17 | 44 | 75 | e35 | 59 | 300 | 150 | 76 | 181 | 65 | 64 | 44 |
| 21 | 18 | 41 | 50 | 34 | 75 | 164 | 133 | 73 | 148 | 62 | 71 | 42 |
| 22 | 17 | 37 | 43 | 33 | 512 | 123 | 122 | 80 | 130 | 64 | 70 | 64 |
| 23 | 16 | 34 | 40 | 34 | 272 | 107 | 112 | 91 | 118 | 64 | 63 | 113 |
| 24 | 15 | 33 | 62 | 35 | 155 | 97 | 106 | 85 | 109 | 61 | 60 | 56 |
| 25 | 17 | 31 | 63 | 34 | 121 | 90 | 103 | 80 | 102 | 58 | 58 | 49 |
| 26 | 22 | 30 | 50 | 30 | 106 | 87 | 115 | 94 | 96 | 56 | 55 | 46 |
| 27 | 18 | 29 | 44 | 28 | 101 | 82 | 105 | 91 | 92 | 54 | 53 | 48 |
| 28 | 26 | 28 | 41 | 26 | 105 | 78 | 98 | 82 | 90 | 53 | 53 | 51 |
| 29 | 43 | 27 | 39 | 28 | --- | 80 | 93 | 77 | 88 | 60 | 60 | 44 |
| 30 | 64 | 27 | 38 | 35 | --- | 106 | 93 | 71 | 91 | 68 | 56 | 43 |
| 31 | 39 | --- | 36 | 33 | --- | 91 | --- | 74 | --- | 78 | 63 | --- |
| TOTAL | 671 | 1,442 | 1,268 | 1,227 | 2,227 | 2,976 | 4,024 | 2,503 | 4,355 | 2,776 | 2,550 | 1,536 |
| MEAN | 21.6 | 48.1 | 40.9 | 39.6 | 79.5 | 96.0 | 134 | 80.7 | 145 | 89.5 | 82.3 | 51.2 |
| MAX | 78 | 195 | 75 | 74 | 512 | 300 | 476 | 100 | 302 | 286 | 179 | 113 |
| MIN | 13 | 25 | 26 | 26 | 28 | 62 | 69 | 66 | 64 | 53 | 53 | 40 |
| CFSM | 0.81 | 1.80 | 1.53 | 1.48 | 2.98 | 3.60 | 5.02 | 3.02 | 5.44 | 3.35 | 3.08 | 1.92 |
| IN. | 0.93 | 2.01 | 1.77 | 1.71 | 3.10 | 4.15 | 5.61 | 3.49 | 6.07 | 3.87 | 3.55 | 2.14 |

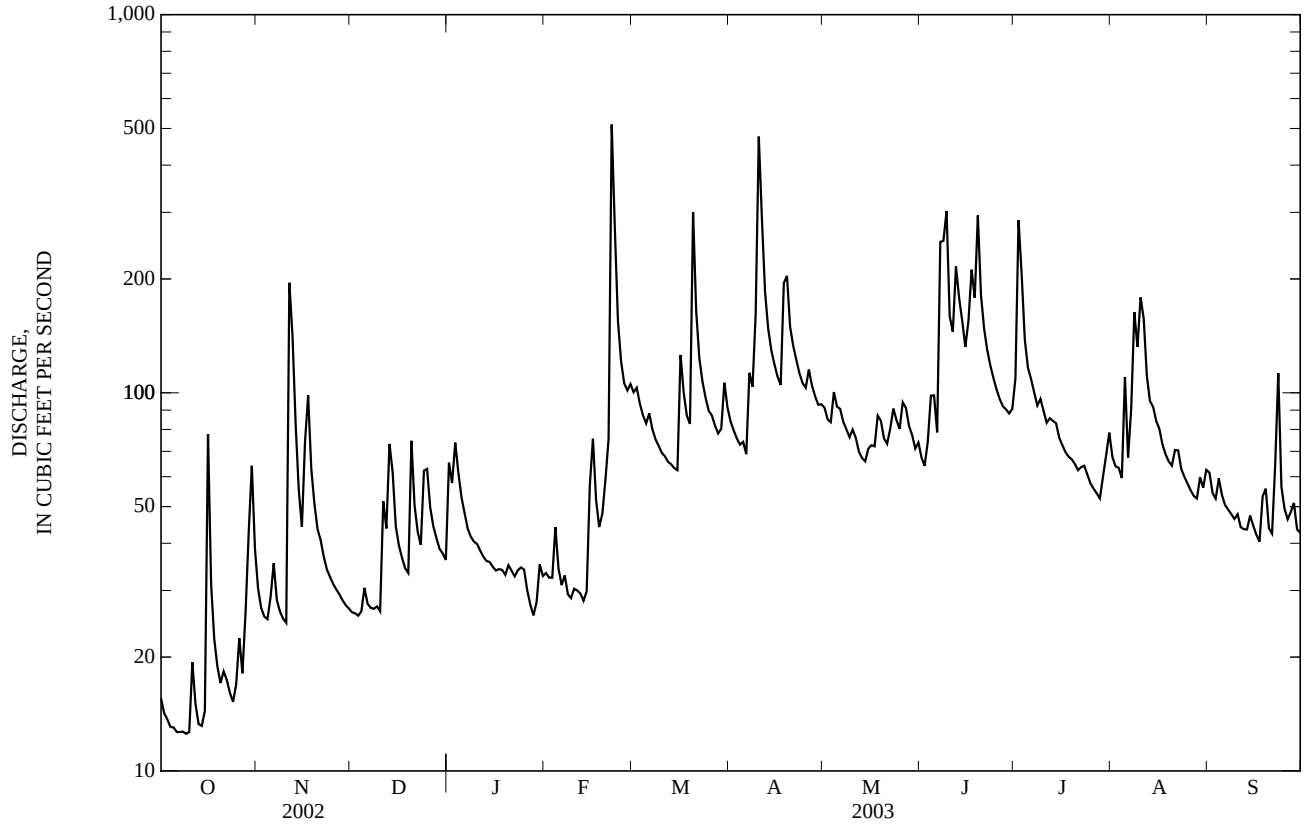
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1995 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 22.7 | 28.5 | 35.6 | 50.3 | 55.2 | 61.3 | 57.9 | 47.1 | 43.5 | 27.8 | 27.8 | 27.4 |
| MAX | 49.8 | 54.3 | 95.2 | 86.9 | 120 | 96.0 | 134 | 80.7 | 145 | 89.5 | 82.3 | 70.0 |
| (WY) | (1997) | (1997) | (1997) | (1995) | (1998) | (2003) | (2003) | (2003) | (2003) | (2003) | (2003) | (1996) |
| MIN | 12.3 | 13.2 | 17.6 | 22.2 | 21.7 | 35.0 | 30.7 | 23.8 | 12.9 | 10.9 | 6.85 | 13.2 |
| (WY) | (2001) | (2002) | (1998) | (2001) | (2002) | (1999) | (1999) | (2002) | (2002) | (2002) | (2002) | (1995) |

02071530 SMITH RIVER AT SMITH RIVER CHURCH NEAR WOOLWINE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1995 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 9,451.0 | | 27,555 | | | |
| ANNUAL MEAN | 25.9 | | 75.5 | | 40.3 | |
| HIGHEST ANNUAL MEAN | | | | | 75.5 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 20.7 | 2002 |
| HIGHEST DAILY MEAN | 195 | Nov 11 | 512 | Feb 22 | 669 | Dec 1, 1996 |
| LOWEST DAILY MEAN | 3.8 | Aug 10 | 13 | aOct 4 | 3.8 | Aug 10, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 4.7 | Aug 19 | 13 | Oct 4 | 4.7 | Aug 19, 2002 |
| MAXIMUM PEAK FLOW | | | 1,480 | Feb 22 | 1,480 | Feb 22, 2003 |
| MAXIMUM PEAK STAGE | | | 8.27 | Feb 22 | 8.45 | Aug 12, 1996 |
| INSTANTANEOUS LOW FLOW | | | 12 | bOct 6 | 2.7 | Aug 11, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.97 | | 2.83 | | 1.51 | |
| ANNUAL RUNOFF (INCHES) | 13.17 | | 38.39 | | 20.52 | |
| 10 PERCENT EXCEEDS | 47 | | 132 | | 76 | |
| 50 PERCENT EXCEEDS | 21 | | 64 | | 28 | |
| 90 PERCENT EXCEEDS | 7.7 | | 26 | | 13 | |

a Also Oct. 5-10, 13, 14, 2002.
b Also Oct. 7-10, 2002.
e Estimated.



## 02071900 PHILPOTT LAKE NEAR PHILPOTT, VA

LOCATION.--Lat 36°46'52", long 80°01'39", NAD83, 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 $mi^2$.

PERIOD OF RECORD.--August 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929.

REMARKS.--Reservoir is formed by concrete dam. Spillway, with crest at elevation 985 ft, is ungated and 120 ft long. Storage began August 1950 during construction; initial filling started in December 1951; water in reservoir first reached rule-curve elevation in July 1953. Total capacity at maximum flood-control pool elevation, 998 ft, is 247,400 acre-ft of which 47,000 acre-ft is 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.

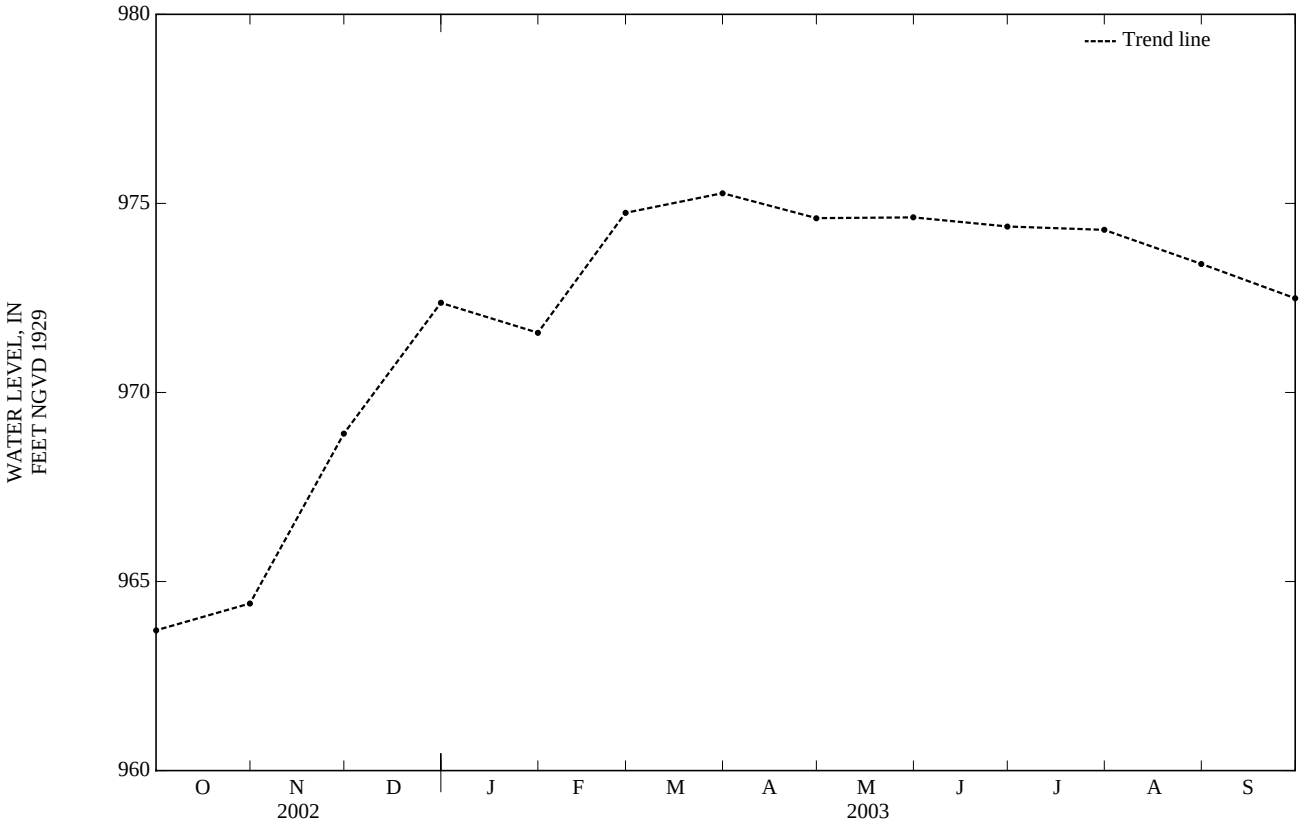
EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 191,700 acre-ft, June 22, 1972, elevation, 983.06 ft; minimum (after first filling to rule curve), 64,540 acre-ft, Sept. 26, 1956, elevation, 927.59 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 177,490 acre-ft, Apr. 11, elevation 977.80 ft; minimum, 137,240 acre-ft, Oct. 10, elevation, 963.35 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Elevation (feet) | Contents (acre-feet) | Change in contents (acre-feet) |
|---|---|---|---|
| Sept. 30 | 963.71 | 138,150 | |
| Oct. 31 | 964.42 | 139,960 | +1,810 |
| Nov. 30 | 968.91 | 151,850 | +11,890 |
| Dec. 31 | 972.37 | 161,500 | +9,650 |
| CAL YR 2002 | | | +30,170 |
| Jan. 31 | 971.58 | 159,260 | -2,240 |
| Feb. 28 | 974.75 | 168,380 | +9,120 |
| Mar. 31 | 975.27 | 169,910 | +1,530 |
| Apr. 30 | 974.61 | 167,970 | -1,940 |
| May 31 | 974.63 | 168,030 | +60 |
| June 30 | 974.39 | 167,330 | -700 |
| July 31 | 974.30 | 167,070 | -260 |
| Aug. 31 | 973.40 | 164,460 | -2,610 |
| Sept. 30 | 972.49 | 161,840 | -2,620 |
| WTR YR 2003 | | | +23,690 |

02071900 PHILPOTT LAKE NEAR PHILPOTT, VA—Continued



## 02072000 SMITH RIVER NEAR PHILPOTT, VA

LOCATION.--Lat 36°46'50", long 80°01'29", NAD83, Franklin County, Hydrologic Unit 03010103, on left bank 900 ft down-stream from Philpott Dam, l.3 mi southwest of Philpott (corrected), 11.6 mi upstream from Reed Creek, and at mile 44.1.

DRAINAGE AREA.--216 $mi^2$.

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 NGVD of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Oct. 8, 1952, at site 1.9 mi downstream at different datum.

REMARKS.--No estimated daily discharges, records good. Since August 1950, flow regulated by Philpott Lake (station 02071900) 0.2 mi upstream. 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 $ft^3/s$, at site then in use, from rating curve extended above 9,700 $ft^3/s$ on basis of slope-area measurements at gage heights 18.2 ft and 20.3 ft. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 93 | 80 | 53 | 507 | 55 | 74 | 328 | 808 | 66 | 521 | 505 | 393 |
| 2 | 90 | 53 | 105 | 493 | 55 | 64 | 332 | 808 | 816 | 751 | 64 | 393 |
| 3 | 78 | 53 | 52 | 492 | 225 | 638 | 656 | 67 | 820 | 842 | 63 | 392 |
| 4 | 79 | 78 | 48 | 50 | 227 | 630 | 645 | 67 | 822 | 1,390 | 610 | 393 |
| 5 | 52 | 80 | 44 | 50 | 229 | 630 | 65 | 371 | 820 | 1,400 | 610 | 391 |
| 6 | 53 | 79 | 178 | 217 | 230 | 632 | 65 | 1,020 | 821 | 1,410 | 607 | 67 |
| 7 | 97 | 82 | 52 | 210 | 238 | 632 | 655 | 1,020 | 68 | 1,080 | 608 | 67 |
| 8 | 95 | 80 | 52 | 321 | 65 | 65 | 654 | 1,020 | 67 | 521 | 607 | 496 |
| 9 | 81 | 53 | 76 | 328 | 64 | 65 | 651 | 1,020 | 647 | 510 | 65 | 498 |
| 10 | 80 | 53 | 83 | 328 | 237 | 590 | 1,060 | 66 | 1,350 | 512 | 60 | 497 |
| 11 | 80 | 81 | 78 | 47 | 237 | 631 | 1,310 | 67 | 1,160 | 511 | 872 | 498 |
| 12 | 53 | 78 | 78 | 47 | 237 | 644 | 1,320 | 493 | 1,380 | 71 | 1,350 | 500 |
| 13 | 53 | 79 | 68 | 287 | 236 | 634 | 1,340 | 496 | 1,380 | 69 | 1,350 | 68 |
| 14 | 80 | 77 | 53 | 292 | 261 | 688 | 1,340 | 493 | 74 | 512 | 1,350 | 67 |
| 15 | 81 | 80 | 52 | 292 | 68 | 66 | 1,340 | 498 | 68 | 508 | 1,350 | 393 |
| 16 | 83 | 53 | 78 | 292 | 67 | 65 | 1,340 | 490 | 657 | 507 | 73 | 394 |
| 17 | 80 | 53 | 78 | 292 | 95 | 415 | 1,350 | 67 | 1,380 | 507 | 65 | 394 |
| 18 | 80 | 77 | 77 | 47 | 122 | 415 | 1,350 | 67 | 1,380 | 507 | 715 | 395 |
| 19 | 53 | 91 | 78 | 47 | 132 | 415 | 72 | 234 | 1,380 | 67 | 713 | 419 |
| 20 | 53 | 75 | 78 | 292 | 122 | 61 | 65 | 233 | 1,370 | 68 | 714 | 67 |
| 21 | 80 | 77 | 52 | 292 | 120 | 691 | 486 | 813 | 1,380 | 507 | 712 | 68 |
| 22 | 77 | 79 | 52 | 292 | 69 | 1,320 | 530 | 809 | 1,380 | 529 | 712 | 287 |
| 23 | 79 | 53 | 78 | 288 | 489 | 1,320 | 1,320 | 810 | 1,390 | 536 | 65 | 287 |
| 24 | 74 | 50 | 77 | 295 | 1,340 | 1,330 | 1,320 | 66 | 792 | 509 | 65 | 293 |
| 25 | 80 | 79 | 79 | 47 | 1,350 | 707 | 1,320 | 67 | 1,370 | 509 | 605 | 292 |
| 26 | 53 | 78 | 84 | 47 | 1,350 | 409 | 73 | 335 | 1,400 | 67 | 605 | 292 |
| 27 | 53 | 78 | 86 | 217 | 1,360 | 409 | 67 | 335 | 1,410 | 67 | 605 | 69 |
| 28 | 80 | 78 | 52 | 218 | 1,360 | 388 | 646 | 595 | 76 | 507 | 607 | 69 |
| 29 | 85 | 76 | 52 | 218 | --- | 66 | 647 | 911 | 69 | 505 | 610 | 790 |
| 30 | 81 | 51 | 547 | 232 | --- | 67 | 965 | 920 | 413 | 506 | 66 | 792 |
| 31 | 81 | --- | 492 | 224 | --- | 327 | --- | 66 | --- | 507 | 67 | --- |
| TOTAL | 2,317 | 2,134 | 3,112 | 7,301 | 10,640 | 15,088 | 23,312 | 15,132 | 26,206 | 17,013 | 17,070 | 10,021 |
| MEAN | 74.7 | 71.1 | 100 | 236 | 380 | 487 | 777 | 488 | 874 | 549 | 551 | 334 |
| MAX | 97 | 91 | 547 | 507 | 1,360 | 1,330 | 1,350 | 1,020 | 1,410 | 1,410 | 1,350 | 792 |
| MIN | 52 | 50 | 44 | 47 | 55 | 61 | 65 | 66 | 66 | 67 | 60 | 67 |
| (†) | +913 | +5,994 | +4,865 | -1,129 | +4,598 | +771 | -978 | +30 | -353 | -131 | -1,316 | -1,321 |
| MEAN‡ | 104 | 271 | 257 | 199 | 544 | 512 | 744 | 489 | 862 | 545 | 508 | 290 |
| CFSM‡ | .48 | 1.25 | 1.19 | .92 | 2.52 | 2.37 | 3.44 | 2.26 | 3.99 | 2.52 | 2.35 | 1.34 |
| IN.‡ | .56 | 1.40 | 1.37 | 1.06 | 2.62 | 2.73 | 3.84 | 2.61 | 4.45 | 2.91 | 2.71 | 1.50 |

CAL YR 2002 MEAN‡ 132 CFSM‡ .61 IN.‡ 8.30
WTR YR 2003 MEAN‡ 442 CFSM‡ 2.05 IN.‡ 27.78

† 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.

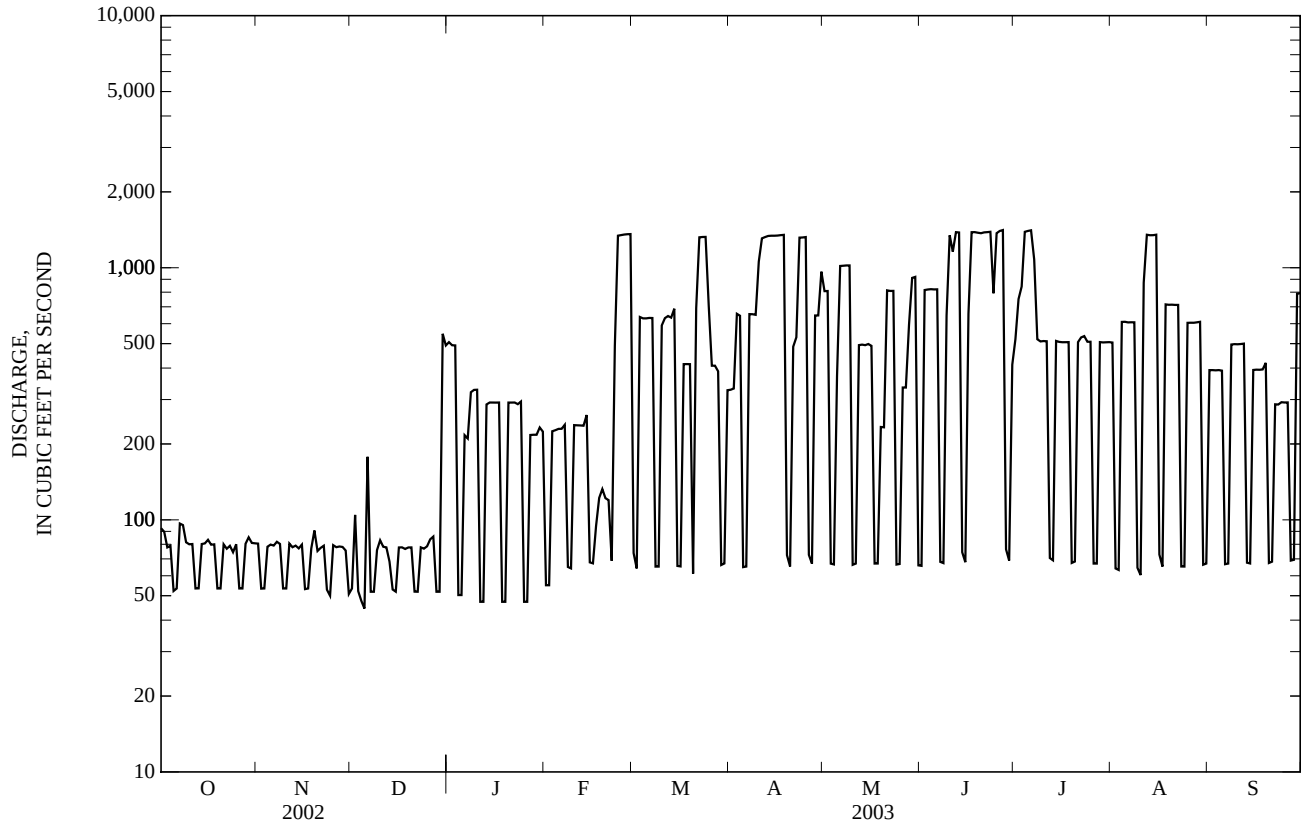
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 228 | 219 | 240 | 266 | 264 | 327 | 376 | 302 | 283 | 241 | 257 | 253 |
| MAX | 755 | 835 | 586 | 526 | 718 | 946 | 1,194 | 796 | 874 | 646 | 551 | 724 |
| (WY) | (1990) | (1986) | (1997) | (1991) | (1973) | (1993) | (1983) | (1978) | (2003) | (1972) | (2003) | (1979) |
| MIN | 74.7 | 70.5 | 88.0 | 71.1 | 58.2 | 60.5 | 69.2 | 61.3 | 67.2 | 77.6 | 74.8 | 71.2 |
| (WY) | (2003) | (1953) | (1996) | (1953) | (1953) | (1953) | (1969) | (1964) | (1964) | (2002) | (2002) | (2002) |

02072000 SMITH RIVER NEAR PHILPOTT, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1951 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 32,990 | | 149,346 | | | |
| ANNUAL MEAN | 90.4 | | 409 | | 271 | |
| HIGHEST ANNUAL MEAN | | | | | 441 | 1973 |
| LOWEST ANNUAL MEAN | | | | | 113 | 2002 |
| HIGHEST DAILY MEAN | 547 | Dec 30 | 1,410 | aJun 27 | 5,710 | Apr 24, 1992 |
| LOWEST DAILY MEAN | 44 | Dec 5 | 44 | Dec 5 | b20 | Mar 24, 1984 |
| ANNUAL SEVEN-DAY MINIMUM | 61 | Nov 29 | 61 | Nov 29 | 42 | Mar 2, 1953 |
| MAXIMUM PEAK FLOW | | | 1,550 | Dec 6 | c9,500 | Dec 7, 1950 |
| MAXIMUM PEAK STAGE | | | 5.27 | Dec 6 | c15.00 | Dec 7, 1950 |
| INSTANTANEOUS LOW FLOW | | | 19 | dNov 8 | f,g2.3 | Dec 16, 1985 |
| ANNUAL RUNOFF (CFSM) | 0.42 | | 1.89 | | 1.26 | |
| ANNUAL RUNOFF (INCHES) | 5.68 | | 25.72 | | 17.06 | |
| 10 PERCENT EXCEEDS | 117 | | 1,320 | | 647 | |
| 50 PERCENT EXCEEDS | 81 | | 238 | | 203 | |
| 90 PERCENT EXCEEDS | 53 | | 53 | | 46 | |

a Also July 6, 2003.
b Result of turbines being shut down for repair at Philpott Dam.
c Prior to regulation, 1947-50, maximum peak flow, 17,000 $ft^3/s$, June 29, 1949, gage height, 20.30 ft.
d Also Nov. 29 and Dec. 2, 2002.
f Prior to regulation, 1947-50, instantaneous low flow, 21 $ft^3/s$, Aug. 15, 1950.
g Result of repair at dam but may have been less during periods of estimated record.



## 02072500 SMITH RIVER AT BASSETT, VA

LOCATION.--Lat 36°46'12", long 80°00'03", NAD83, 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 $mi^2$.

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 NGVD of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--No estimated daily discharges. 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 $ft^3/s$. 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. 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 $ft^3/s$, from rating curve extended above 23,000 $ft^3/s$ on basis of backwater studies and records for station at Martinsville.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 110 | 113 | 81 | 578 | 100 | 308 | 409 | 962 | 137 | 571 | 586 | 467 |
| 2 | 107 | 85 | 130 | 545 | 90 | 185 | 402 | 902 | 862 | 901 | 141 | 459 |
| 3 | 96 | 80 | 80 | 562 | 239 | 719 | 669 | 212 | 896 | 973 | 137 | 485 |
| 4 | 95 | 102 | 79 | 159 | 266 | 709 | 719 | 296 | 915 | 1,480 | 653 | 510 |
| 5 | 69 | 110 | 81 | 115 | 267 | 706 | 187 | 464 | 898 | 1,470 | 809 | 476 |
| 6 | 69 | 129 | 192 | 252 | 275 | 713 | 115 | 1,110 | 890 | 1,510 | 741 | 126 |
| 7 | 105 | 119 | 90 | 247 | 270 | 704 | 798 | 1,130 | 290 | 1,290 | 689 | 118 |
| 8 | 107 | 110 | 82 | 336 | 92 | 152 | 789 | 1,120 | 240 | 571 | 766 | 561 |
| 9 | 96 | 84 | 106 | 355 | 90 | 124 | 985 | 1,120 | 670 | 567 | 301 | 563 |
| 10 | 95 | 82 | 110 | 352 | 265 | 629 | 1,570 | 206 | 1,440 | 557 | 190 | 561 |
| 11 | 110 | 412 | 173 | 108 | 265 | 691 | 1,680 | 138 | 1,240 | 566 | 994 | 559 |
| 12 | 80 | 383 | 159 | 84 | 267 | 703 | 1,530 | 556 | 1,670 | 132 | 1,500 | 561 |
| 13 | 72 | 204 | 219 | 300 | 266 | 699 | 1,510 | 562 | 1,620 | 126 | 1,470 | 117 |
| 14 | 93 | 136 | 210 | 313 | 295 | 753 | 1,490 | 558 | 314 | 746 | 1,490 | 114 |
| 15 | 99 | 126 | 131 | 312 | 129 | 143 | 1,490 | 574 | 231 | 581 | 1,480 | 448 |
| 16 | 142 | 145 | 134 | 313 | 258 | 154 | 1,490 | 570 | 898 | 567 | 272 | 450 |
| 17 | 118 | 250 | 125 | 313 | 172 | 489 | 1,490 | 142 | 1,760 | 560 | 133 | 447 |
| 18 | 103 | 157 | 120 | 89 | 173 | 485 | 1,520 | 147 | 1,590 | 558 | 768 | 480 |
| 19 | 78 | 147 | 117 | 81 | 183 | 479 | 322 | 325 | 1,840 | 141 | 792 | 546 |
| 20 | 74 | 121 | 179 | 300 | 204 | 1,170 | 167 | 302 | 1,540 | 132 | 793 | 124 |
| 21 | 98 | 119 | 123 | 312 | 249 | 839 | 564 | 876 | 1,500 | 548 | 793 | 113 |
| 22 | 98 | 116 | 106 | 311 | 1,060 | 1,490 | 531 | 904 | 1,480 | 592 | 808 | 344 |
| 23 | 100 | 88 | 124 | 282 | 686 | 1,460 | 1,440 | 924 | 1,470 | 609 | 160 | 440 |
| 24 | 92 | 83 | 174 | 334 | 1,510 | 1,450 | 1,440 | 176 | 854 | 568 | 158 | 366 |
| 25 | 101 | 111 | 241 | 88 | 1,490 | 909 | 1,450 | 149 | 1,430 | 558 | 671 | 355 |
| 26 | 83 | 109 | 168 | 79 | 1,480 | 465 | 283 | 447 | 1,450 | 125 | 677 | 352 |
| 27 | 77 | 108 | 147 | 227 | 1,490 | 469 | 158 | 462 | 1,460 | 115 | 677 | 116 |
| 28 | 109 | 107 | 105 | 238 | 1,520 | 446 | 716 | 651 | 254 | 557 | 676 | 115 |
| 29 | 140 | 105 | 100 | 240 | --- | 129 | 734 | 1,010 | 127 | 547 | 705 | 826 |
| 30 | 174 | 80 | 501 | 257 | --- | 186 | 1,020 | 1,010 | 436 | 582 | 141 | 866 |
| 31 | 127 | --- | 531 | 250 | --- | 446 | --- | 209 | --- | 586 | 123 | --- |
| TOTAL | 3,117 | 4,121 | 4,918 | 8,332 | 13,651 | 19,004 | 27,668 | 18,214 | 30,402 | 19,386 | 20,294 | 12,065 |
| MEAN | 101 | 137 | 159 | 269 | 488 | 613 | 922 | 588 | 1,013 | 625 | 655 | 402 |
| MAX | 174 | 412 | 531 | 578 | 1,520 | 1,490 | 1,680 | 1,130 | 1,840 | 1,510 | 1,500 | 866 |
| MIN | 69 | 80 | 79 | 79 | 90 | 124 | 115 | 138 | 127 | 115 | 123 | 113 |
| (†) | +913 | +5,994 | +4,865 | -1,129 | +4,598 | +771 | -978 | +30 | -353 | -131 | -1,316 | -1,321 |
| MEAN‡ | 130 | 337 | 316 | 232 | 652 | 638 | 890 | 589 | 1,002 | 621 | 612 | 358 |
| CFSM‡ | .50 | 1.30 | 1.22 | .90 | 2.52 | 2.46 | 3.44 | 2.27 | 3.87 | 2.40 | 2.36 | 1.38 |
| IN.‡ | .58 | 1.45 | 1.41 | 1.03 | 2.62 | 2.84 | 3.83 | 2.62 | 4.32 | 2.77 | 2.73 | 1.54 |

CAL YR 2002 MEAN‡ 160 CFSM‡ .62 IN.‡ 8.38
WTR YR 2003 MEAN‡ 529 CFSM‡ 2.04 IN.‡ 27.74

† 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.

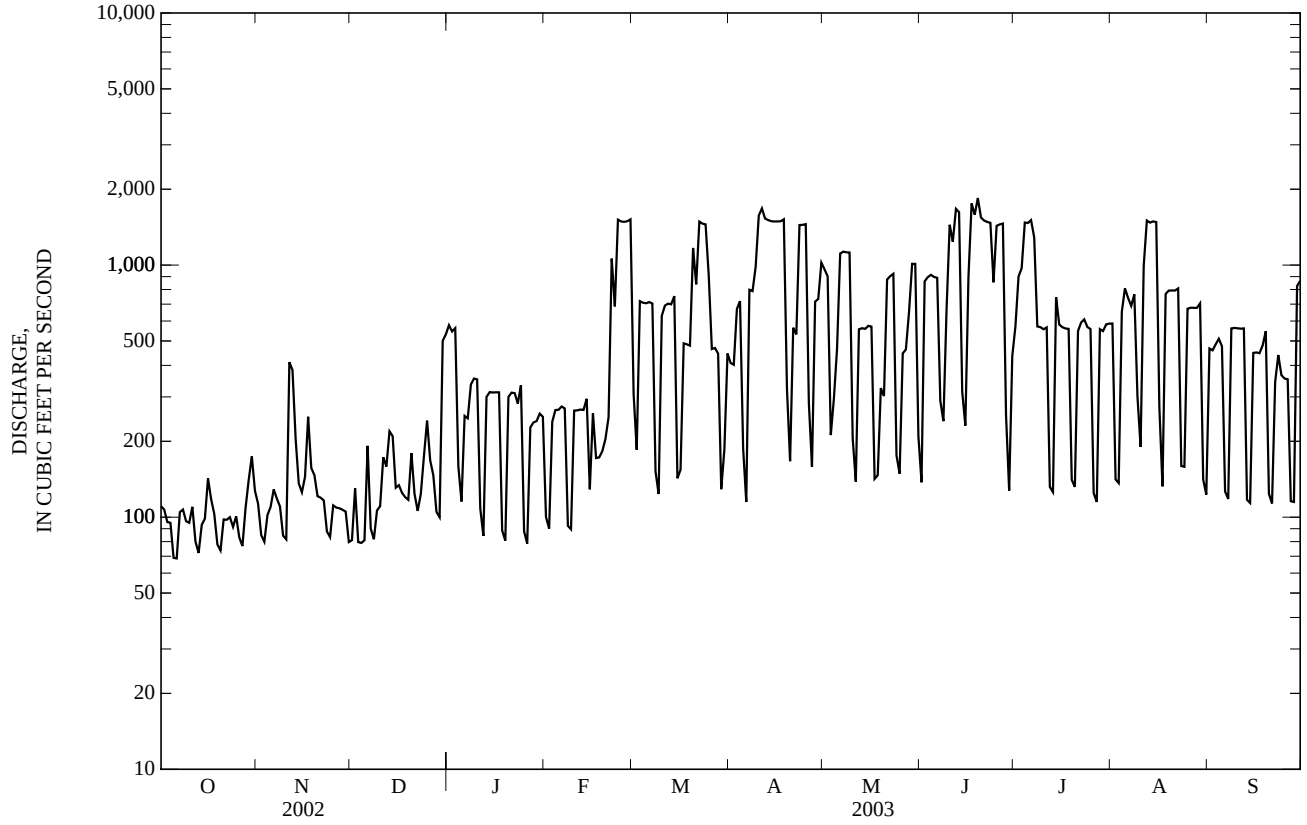
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 268 | 262 | 289 | 324 | 332 | 404 | 453 | 363 | 336 | 282 | 297 | 300 |
| MAX | 944 | 996 | 724 | 655 | 846 | 1,197 | 1,474 | 902 | 1,013 | 759 | 655 | 912 |
| (WY) | (1990) | (1986) | (1997) | (1991) | (1998) | (1993) | (1987) | (1978) | (2003) | (1972) | (2003) | (1979) |
| MIN | 101 | 98.4 | 110 | 107 | 110 | 114 | 98.6 | 86.7 | 84.4 | 89.7 | 83.1 | 89.7 |
| (WY) | (2003) | (1953) | (1996) | (1989) | (1989) | (1982) | (1969) | (1964) | (1964) | (2002) | (2002) | (2002) |

02072500 SMITH RIVER AT BASSETT, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1951 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 43,120 | | 181,172 | | | |
| ANNUAL MEAN | 118 | | 496 | | 326 | |
| HIGHEST ANNUAL MEAN | | | | | 523 | 1987 |
| LOWEST ANNUAL MEAN | | | | | 131 | 2002 |
| HIGHEST DAILY MEAN | 531 | Dec 31 | 1,840 | Jun 19 | 6,080 | Apr 24, 1992 |
| LOWEST DAILY MEAN | 62 | aAug 10 | 69 | bOct 5 | 44 | Aug 23, 1964 |
| ANNUAL SEVEN-DAY MINIMUM | 80 | Aug 9 | 91 | Oct 4 | 67 | Oct 6, 1980 |
| MAXIMUM PEAK FLOW | | | 3,120 | Feb 22 | c17,700 | Sep 7, 1987 |
| MAXIMUM PEAK STAGE | | | 5.80 | Feb 22 | c15.20 | Sep 7, 1987 |
| INSTANTANEOUS LOW FLOW | | | 57 | Oct 24 | d19 | Jul 19, 1956 |
| ANNUAL RUNOFF (CFSM) | 0.46 | | 1.92 | | 1.26 | |
| ANNUAL RUNOFF (INCHES) | 6.19 | | 26.02 | | 17.09 | |
| 10 PERCENT EXCEEDS | 190 | | 1,440 | | 718 | |
| 50 PERCENT EXCEEDS | 99 | | 312 | | 240 | |
| 90 PERCENT EXCEEDS | 76 | | 98 | | 76 | |

a Also Aug. 24, 25, 2002.
b Also Oct. 6, 2002.
c Prior to regulation, 1940-50, maximum peak flow, 26,600 $ft^3/s$, Aug. 14, 1940, gage height, 18.28 ft.
d Prior to regulation, 1940-50, instantaneous low flow, 58 $ft^3/s$, Jan. 3, 1940.



## 02073000 SMITH RIVER AT MARTINSVILLE, VA

LOCATION.--Lat 36°39'40", long 79°52'50", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--No estimated daily discharges. Records good. Flow regulated since August 1950 by Philpott Lake (station 02071900) 19.6 mi upstream from station. Some additional regulation by powerplant 1,000 ft upstream from station. Statistics of monthly mean data and summary statistics for water years 1930-1950 (unregulated flow) are available in previous data books, water years 1991-1998. Maximum discharge, 39,000 $ft^3/s$, from rating curve extended above 17,000 $ft^3/s$ 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.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 124 | 184 | 102 | 762 | 143 | 834 | 597 | 1,150 | 309 | 719 | 837 | 512 |
| 2 | 144 | 91 | 199 | 782 | 169 | 445 | 595 | 1,010 | 754 | 1,340 | 546 | 670 |
| 3 | 135 | 101 | 151 | 792 | 328 | 713 | 504 | 531 | 1,070 | 1,550 | 398 | 713 |
| 4 | 106 | 168 | 236 | 467 | 265 | 832 | 845 | 587 | 1,380 | 1,760 | 680 | 1,390 |
| 5 | 71 | 126 | 149 | 263 | 386 | 807 | 571 | 411 | 2,310 | 1,730 | 1,130 | 863 |
| 6 | 86 | 295 | 164 | 423 | 429 | 853 | 242 | 1,200 | 1,090 | 1,740 | 1,150 | 526 |
| 7 | 117 | 157 | 164 | 353 | 387 | 821 | 1,160 | 1,240 | 1,520 | 1,730 | 1,060 | 302 |
| 8 | 160 | 173 | 149 | 362 | 221 | 406 | 1,180 | 1,220 | 916 | 584 | 1,070 | 605 |
| 9 | 138 | 83 | 254 | 445 | 90 | 227 | 1,820 | 1,210 | 1,370 | 757 | 901 | 789 |
| 10 | 105 | 94 | 176 | 435 | 371 | 586 | 2,700 | 605 | 1,650 | 721 | 734 | 764 |
| 11 | 297 | 560 | 349 | 238 | 353 | 737 | 2,460 | 290 | 1,520 | 763 | 1,620 | 749 |
| 12 | 65 | 1,020 | 413 | 167 | 375 | 756 | 1,810 | 463 | 2,010 | 519 | 2,020 | 768 |
| 13 | 79 | 502 | 712 | 370 | 365 | 733 | 1,710 | 644 | 2,160 | 322 | 1,900 | 490 |
| 14 | 246 | 336 | 837 | 384 | 374 | 834 | 1,650 | 639 | 840 | 1,790 | 1,900 | 282 |
| 15 | 119 | 251 | 247 | 381 | 265 | 393 | 1,630 | 661 | 536 | 777 | 1,890 | 447 |
| 16 | 404 | 395 | 331 | 396 | 730 | 449 | 1,610 | 690 | 1,380 | 744 | 825 | 638 |
| 17 | 278 | 901 | 254 | 395 | 378 | 590 | 1,600 | 452 | 2,410 | 727 | 363 | 623 |
| 18 | 152 | 301 | 163 | 166 | 326 | 679 | 1,680 | 293 | 2,010 | 699 | 809 | 873 |
| 19 | 74 | 288 | 253 | 147 | 350 | 600 | 840 | 416 | 2,320 | 473 | 1,080 | 976 |
| 20 | 78 | 249 | 406 | 351 | 450 | 5,920 | 359 | 432 | 1,860 | 269 | 1,080 | 533 |
| 21 | 104 | 212 | 236 | 393 | 596 | 1,510 | 514 | 828 | 1,730 | 474 | 1,070 | 273 |
| 22 | 284 | 198 | 228 | 381 | 2,970 | 1,770 | 725 | 1,130 | 1,670 | 735 | 1,070 | 436 |
| 23 | 126 | 91 | 278 | 385 | 1,230 | 1,680 | 1,480 | 1,140 | 1,640 | 988 | 712 | 3,250 |
| 24 | 117 | 152 | 395 | 342 | 1,700 | 1,630 | 1,540 | 609 | 993 | 871 | 461 | 762 |
| 25 | 127 | 249 | 750 | 200 | 1,620 | 952 | 1,540 | 848 | 1,590 | 729 | 691 | 574 |
| 26 | 75 | 174 | 445 | 147 | 1,580 | 462 | 706 | 931 | 1,600 | 486 | 935 | 528 |
| 27 | 91 | 205 | 294 | 305 | 1,720 | 598 | 317 | 1,030 | 1,610 | 244 | 922 | 363 |
| 28 | 281 | 94 | 184 | 309 | 1,730 | 607 | 583 | 988 | 638 | 495 | 910 | 336 |
| 29 | 316 | 224 | 208 | 306 | --- | 329 | 834 | 1,260 | 262 | 705 | 940 | 716 |
| 30 | 350 | 89 | 537 | 321 | --- | 574 | 1,110 | 1,200 | 435 | 811 | 714 | 1,070 |
| 31 | 266 | --- | 604 | 354 | --- | 712 | --- | 696 | --- | 871 | 379 | --- |
| TOTAL | 5,115 | 7,963 | 9,868 | 11,522 | 19,901 | 29,039 | 34,912 | 24,804 | 41,583 | 27,123 | 30,797 | 21,821 |
| MEAN | 165 | 265 | 318 | 372 | 711 | 937 | 1,164 | 800 | 1,386 | 875 | 993 | 727 |
| MAX | 404 | 1,020 | 837 | 792 | 2,970 | 5,920 | 2,700 | 1,260 | 2,410 | 1,790 | 2,020 | 3,250 |
| MIN | 65 | 83 | 102 | 147 | 90 | 227 | 242 | 290 | 262 | 244 | 363 | 273 |
| (†) | +913 | +5,994 | +4,865 | -1,129 | +4,598 | +771 | -978 | +30 | -353 | -131 | -1,316 | -1,321 |
| MEAN‡ | 194 | 465 | 475 | 335 | 875 | 962 | 1,131 | 801 | 1,374 | 871 | 951 | 683 |
| CFSM‡ | .51 | 1.22 | 1.25 | .88 | 2.30 | 2.53 | 2.98 | 2.11 | 3.62 | 2.29 | 2.50 | 1.80 |
| IN.‡ | .59 | 1.37 | 1.44 | 1.02 | 2.40 | 2.92 | 3.32 | 2.43 | 4.04 | 2.64 | 2.89 | 2.01 |

CAL YR 2002 MEAN‡ 236 CFSM‡ .62 IN.‡ 8.42
WTR YR 2003 MEAN‡ 757 CFSM‡ 1.99 IN.‡ 27.05

† 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.

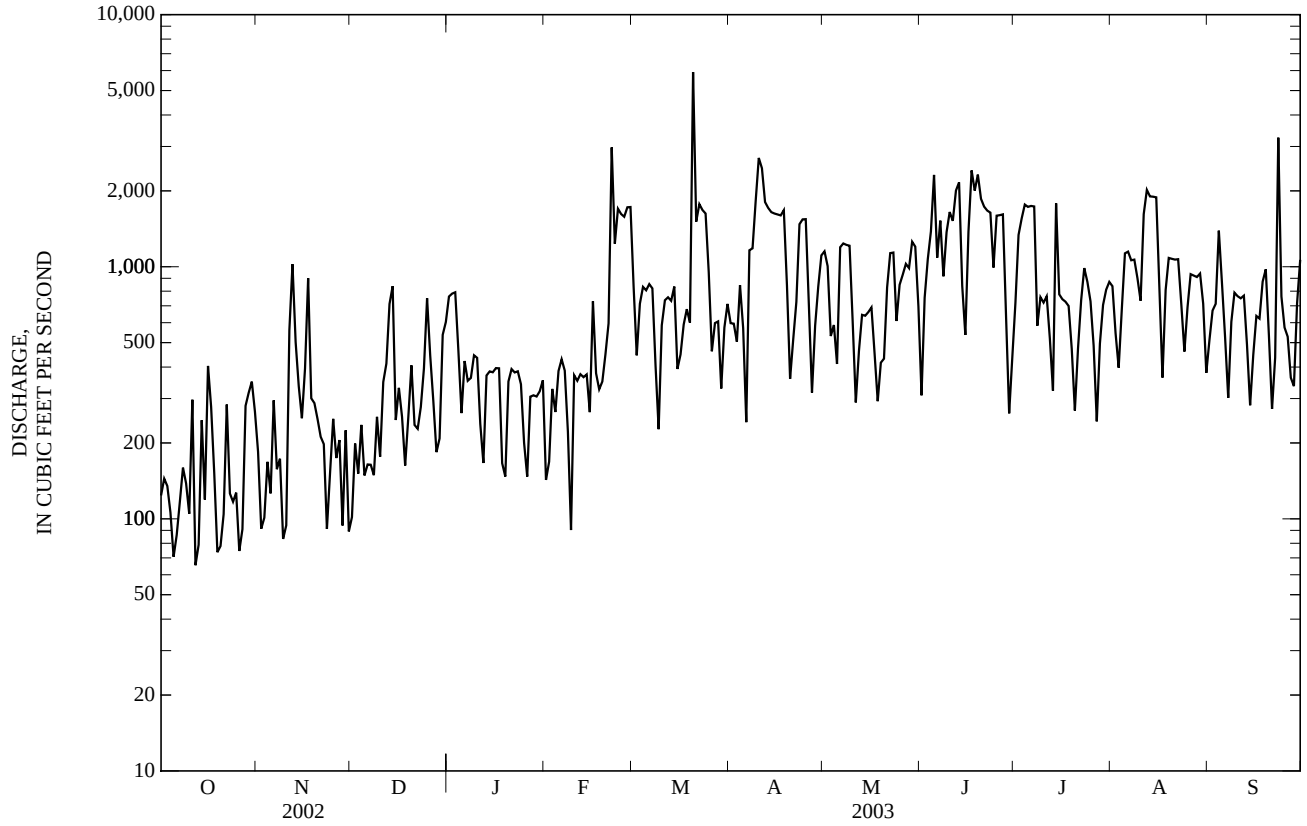
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 382 | 378 | 422 | 487 | 511 | 614 | 637 | 521 | 486 | 414 | 410 | 429 |
| MAX | 1,389 | 1,266 | 988 | 1,000 | 1,212 | 1,735 | 2,206 | 1,138 | 1,467 | 1,174 | 1,032 | 1,624 |
| (WY) | (1990) | (1986) | (1997) | (1991) | (1998) | (1993) | (1987) | (1978) | (1992) | (1989) | (1985) | (1987) |
| MIN | 163 | 162 | 203 | 206 | 179 | 233 | 175 | 164 | 120 | 125 | 95.6 | 132 |
| (WY) | (1952) | (1953) | (2001) | (1957) | (2002) | (1981) | (2002) | (1964) | (2002) | (2002) | (2002) | (2002) |

02073000 SMITH RIVER AT MARTINSVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1951 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 70,768 | | 264,448 | | | |
| ANNUAL MEAN | 194 | | 725 | | 474 | |
| HIGHEST ANNUAL MEAN | | | | | 817 | 1987 |
| LOWEST ANNUAL MEAN | | | | | 187 | 2002 |
| HIGHEST DAILY MEAN | 1,400 | Mar 18 | 5,920 | Mar 20 | 11,300 | Sep 8, 1987 |
| LOWEST DAILY MEAN | 59 | Sep 13 | 65 | Oct 12 | 24 | Oct 2, 1982 |
| ANNUAL SEVEN-DAY MINIMUM | 82 | Aug 9 | 112 | Oct 1 | 82 | Aug 9, 2002 |
| MAXIMUM PEAK FLOW | | | 11,200 | Mar 20 | a34,600 | Sep 8, 1987 |
| MAXIMUM PEAK STAGE | | | 10.27 | Mar 20 | a20.08 | Sep 8, 1987 |
| INSTANTANEOUS LOW FLOW | | | 43 | bNov 4 | c3.8 | Mar 19, 1955 |
| ANNUAL RUNOFF (CFSM) | 0.51 | | 1.91 | | 1.25 | |
| ANNUAL RUNOFF (INCHES) | 6.93 | | 25.89 | | 16.95 | |
| 10 PERCENT EXCEEDS | 315 | | 1,630 | | 903 | |
| 50 PERCENT EXCEEDS | 157 | | 571 | | 351 | |
| 90 PERCENT EXCEEDS | 79 | | 152 | | 161 | |

a Prior to regulation, 1930-50, maximum peak flow, 39,000 $ft^3/s$, Oct. 19, 1937, gage height, 21.50 ft.
b Also Nov. 5, 2002.
c Prior to regulation, 1930-50, instantaneous low flow, 5.0 $ft^3/s$, May 20, 1934.



## 02074000 SMITH RIVER AT EDEN, NC

LOCATION.--Lat 36°31'31", long 79°45'56", 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 $mi^2$.

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 NGVD of 1929. 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 $ft^3$). Additional regulation by hydroelectric plant at Martinsville, Virginia, 18 mi upstream. Maximum discharge prior to regulation: 45,600 $ft^3/s$, Aug. 15, 1940, from rating curve extended above 12,000 $ft^3/s$ on the basis of computation of peak flow over dam 1.5 mi downstream; gage height: 19.28 ft. Minimum discharge for current water year also occurred Oct. 11.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 245 | 292 | 150 | 890 | 321 | 1,630 | 819 | 1,400 | 507 | 803 | 1,060 | e900 |
| 2 | 151 | 177 | 247 | 1,020 | 236 | 788 | 770 | 1,130 | 579 | 1,280 | 924 | e700 |
| 3 | 166 | 166 | 188 | 987 | 352 | 795 | 581 | 980 | 1,190 | 1,990 | 568 | e600 |
| 4 | 154 | 230 | 280 | 843 | 419 | 1,010 | 948 | 738 | 1,410 | 1,870 | 947 | e1,400 |
| 5 | 124 | 229 | 242 | 463 | 375 | 949 | 870 | 695 | 3,840 | 1,780 | 1,140 | 1,300 |
| 6 | 84 | 455 | 232 | 508 | 386 | 996 | 419 | 1,010 | 1,590 | 1,760 | 1,370 | 889 |
| 7 | 100 | 346 | 222 | 481 | 626 | 940 | 1,590 | 1,340 | 2,670 | 1,780 | 1,450 | 576 |
| 8 | 127 | 274 | 210 | 456 | 400 | 731 | 1,640 | 1,310 | 2,170 | 968 | 1,100 | 551 |
| 9 | 167 | 176 | 309 | 530 | 222 | 394 | 2,770 | 1,310 | 3,110 | 866 | 1,240 | 946 |
| 10 | 150 | 163 | 240 | 509 | 402 | 528 | 4,150 | 1,150 | 2,110 | 922 | 771 | 949 |
| 11 | 305 | 490 | 511 | 422 | 424 | 819 | 4,130 | 446 | 1,970 | 892 | 2,140 | 911 |
| 12 | 372 | 1,300 | 701 | 249 | 441 | 838 | 2,290 | 499 | 2,550 | 850 | 2,160 | 865 |
| 13 | 134 | 1,200 | 945 | 357 | 502 | 836 | 2,010 | 825 | 3,070 | 549 | 1,870 | 975 |
| 14 | 140 | 508 | 1,590 | 462 | 412 | 896 | 1,840 | 825 | 1,700 | 2,580 | 1,780 | 519 |
| 15 | 262 | 385 | 628 | 449 | 379 | 709 | 1,760 | 834 | 921 | 1,190 | 1,730 | 537 |
| 16 | 421 | 429 | 593 | 449 | 1,210 | 906 | 1,700 | 901 | 2,080 | 996 | 1,300 | 826 |
| 17 | 447 | 1,540 | 424 | 459 | 703 | 881 | 1,660 | 851 | 3,270 | 1,050 | 529 | 805 |
| 18 | 322 | 784 | 316 | 362 | 573 | 855 | 1,700 | 532 | 2,640 | 935 | 719 | 872 |
| 19 | 212 | 478 | 342 | 185 | 554 | 779 | 1,430 | 686 | 2,800 | 897 | 1,110 | 1,540 |
| 20 | 133 | 395 | 522 | 348 | 683 | 11,400 | 507 | 697 | 2,260 | 530 | 1,060 | 992 |
| 21 | 166 | 338 | 448 | 444 | 922 | 3,750 | 557 | 649 | 1,950 | 508 | 1,060 | 501 |
| 22 | 213 | 302 | 381 | 442 | 4,460 | 2,360 | 863 | 1,490 | 1,840 | 901 | 1,060 | 530 |
| 23 | 288 | 196 | 426 | 432 | 3,480 | 2,050 | 1,310 | 1,480 | 1,770 | 944 | 1,030 | 4,160 |
| 24 | 180 | 196 | 544 | 402 | 1,860 | 1,900 | 1,550 | 1,170 | 1,250 | 1,300 | 631 | 1,550 |
| 25 | 167 | 318 | 1,370 | 379 | 1,910 | 1,770 | 1,550 | 1,060 | 1,610 | 922 | 503 | 1,130 |
| 26 | 201 | 256 | 850 | 226 | 1,760 | 819 | 1,210 | 1,520 | 1,650 | 880 | 950 | 1,050 |
| 27 | 145 | 240 | 527 | 267 | 1,860 | 810 | 453 | 1,300 | 1,670 | 435 | 992 | 995 |
| 28 | 169 | 202 | 325 | 408 | 2,000 | 782 | 514 | 1,490 | 1,170 | 456 | 916 | 667 |
| 29 | 377 | 256 | 353 | 381 | --- | 606 | 922 | 1,310 | 488 | 888 | e800 | 785 |
| 30 | 531 | 178 | 460 | 399 | --- | 762 | 1,050 | 1,400 | 518 | 915 | e600 | 1,300 |
| 31 | 513 | --- | 682 | 431 | --- | 1,060 | --- | 1,260 | --- | 899 | e800 | --- |
| TOTAL | 7,166 | 12,499 | 15,258 | 14,640 | 27,872 | 44,349 | 43,563 | 32,288 | 56,353 | 33,536 | 34,310 | 30,321 |
| MEAN | 231 | 417 | 492 | 472 | 995 | 1,431 | 1,452 | 1,042 | 1,878 | 1,082 | 1,107 | 1,011 |
| MAX | 531 | 1,540 | 1,590 | 1,020 | 4,460 | 11,400 | 4,150 | 1,520 | 3,840 | 2,580 | 2,160 | 4,160 |
| MIN | 84 | 163 | 150 | 185 | 222 | 394 | 419 | 446 | 488 | 435 | 503 | 501 |
| † | +29 | +200 | +157 | -36 | +164 | +25 | -33 | +1 | -12 | -4 | -42 | -44 |

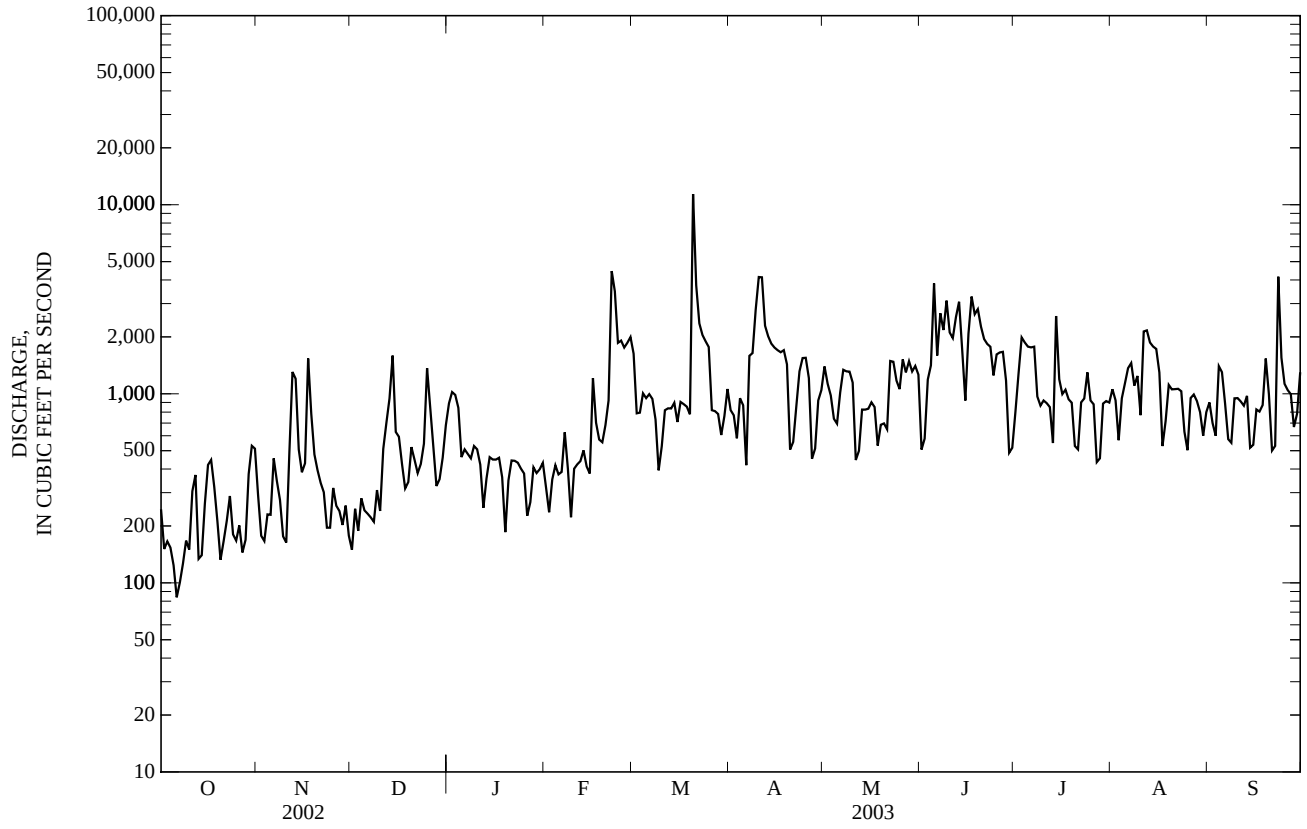
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 2003,* BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 496 | 491 | 576 | 678 | 728 | 892 | 883 | 707 | 649 | 510 | 495 | 528 |
| MAX | 1,572 | 1,530 | 1,376 | 1,453 | 1,633 | 2,519 | 3,016 | 1,567 | 2,026 | 1,374 | 1,454 | 2,030 |
| (WY) | (1990) | (1986) | (1997) | (1979) | (1998) | (1993) | (1987) | (1978) | (1972) | (1989) | (1985) | (1996) |
| MIN | 201 | 211 | 267 | 291 | 249 | 331 | 248 | 266 | 146 | 151 | 126 | 165 |
| (WY) | (1952) | (1982) | (2001) | (1989) | (2002) | (1967) | (2002) | (1964) | (2002) | (2002) | (2002) | (2002) |

02074000 SMITH RIVER AT EDEN, NC—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1951 - 2003* | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 102,288 | | 352,155 | ‡998 | | (UNADJUSTED) |
| ANNUAL MEAN | 280 | | 965 | | 635 | |
| HIGHEST ANNUAL MEAN | | | | | 1,010 | 1987 |
| LOWEST ANNUAL MEAN | | | | | 254 | 2002 |
| HIGHEST DAILY MEAN | 2,560 | May 9 | 11,400 | Mar 20 | 16,700 | Jun 21, 1972 |
| LOWEST DAILY MEAN | 73 | Jul 21 | 84 | Oct 6 | 46 | Aug 14, 1967 |
| ANNUAL SEVEN-DAY MINIMUM | 100 | Aug 10 | 129 | Oct 2 | 100 | Aug 10, 2002 |
| MAXIMUM PEAK FLOW | | | 16,800 | Mar 20 | 24,800 | Jun 21, 1972 |
| MAXIMUM PEAK STAGE | | | 13.06 | Mar 20 | 16.24 | Jun 21, 1972 |
| INSTANTANEOUS LOW FLOW | | | 76* | Oct 10 | 38 | Aug 7, 1967 |
| 10 PERCENT EXCEEDS | 451 | | 1,860 | | 1,170 | |
| 50 PERCENT EXCEEDS | 228 | | 800 | | 445 | |
| 90 PERCENT EXCEEDS | 113 | | 230 | | 219 | |

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 (1951-2003). See REMARKS.



## 02074500 SANDY RIVER NEAR DANVILLE, VA

LOCATION.--Lat 36°37'10", long 79°30'15", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to June 26, 1942, at site 1,200 ft downstream at datum 5.57 ft lower.

REMARKS.--Records good except those for periods with ice effect, Dec. 6-8 and Jan. 17-20, 23-25, which are fair. Diurnal fluctuation at low flow caused by small mill upstream from station. Maximum discharge, 23,000 $ft^3/s$, from rating curve extended above 11,000 $ft^3/s$. 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1700 | 4,480 | 6.73 | Jun 16 | 1530 | 3,570 | 6.16 |
| Mar 20 | 1100 | *6,380 | *7.83 | Aug 11 | 0030 | 2,210 | 5.15 |
| Apr 11 | 0000 | 2,140 | 5.08 | Sep 23 | 0430 | 1,670 | 4.61 |
| Jun 5 | 0830 | 2,320 | 5.24 | Sep 23 | 1130 | 1,520 | 4.45 |
| Jun 12 | 2230 | 1,760 | 4.71 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 21 | 58 | 35 | 227 | 70 | 347 | 178 | 138 | 155 | 106 | 78 | 90 |
| 2 | 20 | 48 | 34 | 256 | 65 | 392 | 148 | 109 | 112 | 253 | 75 | 80 |
| 3 | 20 | 43 | 35 | 247 | 63 | 245 | 131 | 96 | 124 | 327 | 153 | 79 |
| 4 | 19 | 43 | 35 | 219 | 74 | 172 | 121 | 137 | 180 | 163 | 501 | 212 |
| 5 | 19 | 47 | 45 | 148 | 82 | 150 | 118 | 116 | 985 | 119 | 189 | 137 |
| 6 | 19 | 134 | e44 | 121 | 70 | 170 | 112 | 113 | 231 | 103 | 121 | 95 |
| 7 | 18 | 81 | e40 | 103 | 83 | 145 | 702 | 104 | 665 | 99 | 362 | 86 |
| 8 | 18 | 58 | e42 | 96 | 78 | 124 | 427 | 95 | 487 | 92 | 200 | 82 |
| 9 | 18 | 51 | 39 | 90 | 70 | 115 | 1,060 | 91 | 461 | 86 | 139 | 80 |
| 10 | 19 | 48 | 38 | 85 | 78 | 105 | 1,540 | 89 | 227 | 91 | 247 | 77 |
| 11 | 81 | 152 | 125 | 79 | 85 | 98 | 940 | 94 | 177 | 82 | 945 | 74 |
| 12 | 76 | 434 | 155 | 76 | 83 | 95 | 340 | 85 | 775 | 80 | 221 | 72 |
| 13 | 38 | 310 | 513 | 73 | 77 | 95 | 231 | 78 | 810 | 87 | 152 | 81 |
| 14 | 31 | 128 | 612 | 71 | 74 | 105 | 190 | 74 | 339 | 131 | 148 | 94 |
| 15 | 27 | 89 | 240 | 70 | 105 | 90 | 169 | 76 | 289 | 95 | 115 | 85 |
| 16 | 85 | 157 | 157 | 67 | 432 | 232 | 155 | 87 | 1,100 | 83 | 110 | 85 |
| 17 | 88 | 669 | 119 | e66 | 209 | 261 | 140 | 80 | 620 | 83 | 117 | 74 |
| 18 | 45 | 235 | 100 | e62 | 149 | 166 | 136 | 104 | 371 | 76 | 194 | 132 |
| 19 | 36 | 114 | 89 | e72 | 170 | 132 | 153 | 140 | 375 | 74 | 110 | 393 |
| 20 | 32 | 81 | 173 | e69 | 257 | 4,060 | 135 | 100 | 250 | 73 | 99 | 141 |
| 21 | 51 | 67 | 166 | 64 | 344 | 824 | 127 | 96 | 178 | 73 | 93 | 104 |
| 22 | 48 | 59 | 111 | 61 | 2,060 | 327 | 122 | 153 | 149 | 74 | 88 | 94 |
| 23 | 40 | 51 | 91 | e60 | 1,020 | 222 | 111 | 208 | 128 | 101 | 167 | 837 |
| 24 | 35 | 47 | 271 | e55 | 300 | 181 | 106 | 156 | 114 | 144 | 229 | 236 |
| 25 | 33 | 45 | 796 | e61 | 197 | 155 | 107 | 209 | 104 | 83 | 111 | 142 |
| 26 | 43 | 43 | 288 | 64 | 160 | 140 | 110 | 469 | 98 | 72 | 92 | 116 |
| 27 | 42 | 41 | 165 | 60 | 174 | 128 | 106 | 364 | 93 | 68 | 86 | 128 |
| 28 | 42 | 39 | 126 | e59 | 292 | 121 | 99 | 412 | 94 | 68 | 83 | 159 |
| 29 | 72 | 38 | 108 | 66 | --- | 124 | 96 | 201 | 93 | 72 | 80 | 101 |
| 30 | 112 | 38 | 97 | 68 | --- | 287 | 93 | 159 | 110 | 85 | 78 | 90 |
| 31 | 91 | --- | 89 | 73 | --- | 292 | --- | 146 | --- | 76 | 87 | --- |
| TOTAL | 1,339 | 3,448 | 4,978 | 2,988 | 6,921 | 10,100 | 8,203 | 4,579 | 9,894 | 3,219 | 5,470 | 4,256 |
| MEAN | 43.2 | 115 | 161 | 96.4 | 247 | 326 | 273 | 148 | 330 | 104 | 176 | 142 |
| MAX | 112 | 669 | 796 | 256 | 2,060 | 4,060 | 1,540 | 469 | 1,100 | 327 | 945 | 837 |
| MIN | 18 | 38 | 34 | 55 | 63 | 90 | 93 | 74 | 93 | 68 | 75 | 72 |
| CFSM | 0.39 | 1.03 | 1.43 | 0.86 | 2.21 | 2.91 | 2.44 | 1.32 | 2.94 | 0.93 | 1.58 | 1.27 |
| IN. | 0.44 | 1.15 | 1.65 | 0.99 | 2.30 | 3.35 | 2.72 | 1.52 | 3.29 | 1.07 | 1.82 | 1.41 |

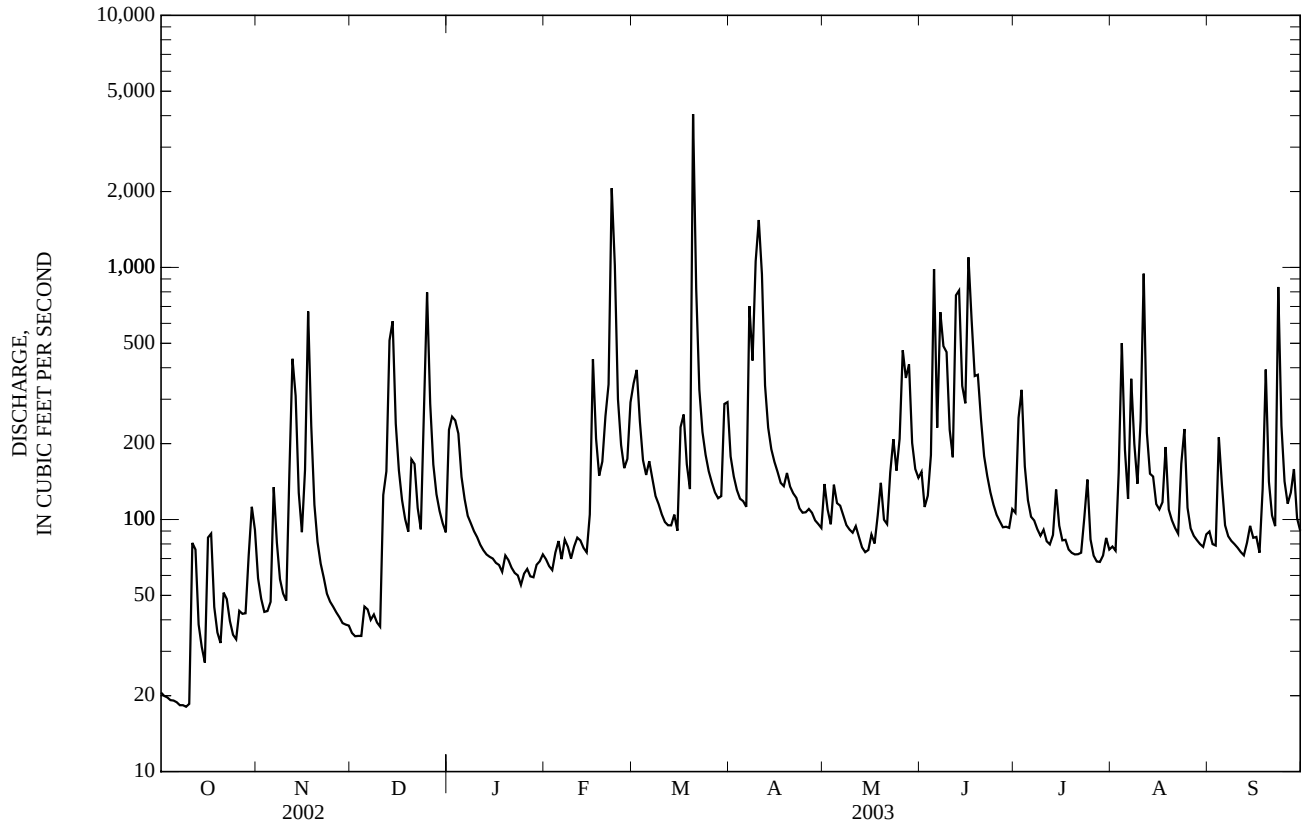
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 81.4 | 82.9 | 106 | 138 | 147 | 174 | 147 | 110 | 90.0 | 74.2 | 81.8 | 86.8 |
| 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 | 19.2 | 26.5 | 35.2 | 31.5 | 40.2 | 63.9 | 42.5 | 52.8 | 23.0 | 19.0 | 11.6 | 14.2 |
| (WY) | (2002) | (2002) | (1934) | (1934) | (1934) | (1967) | (2002) | (1986) | (2002) | (2002) | (2002) | (1930) |

02074500 SANDY RIVER NEAR DANVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1930 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 23,557.1 | | 65,395 | | | |
| ANNUAL MEAN | 64.5 | | 179 | | 110 | |
| HIGHEST ANNUAL MEAN | | | | | 191 | 1996 |
| LOWEST ANNUAL MEAN | | | | | 44.8 | 2002 |
| HIGHEST DAILY MEAN | 2,430 | May 9 | 4,060 | Mar 20 | 8,340 | Sep 6, 1996 |
| LOWEST DAILY MEAN | 6.4 | aAug 23 | 18 | bOct 7 | 6.4 | aAug 23, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 7.8 | Aug 9 | 19 | Oct 4 | 7.8 | Aug 9, 2002 |
| MAXIMUM PEAK FLOW | | | 6,380 | Mar 20 | 23,000 | Aug 14, 1940 |
| MAXIMUM PEAK STAGE | | | 7.83 | Mar 20 | c14.80 | Aug 14, 1940 |
| INSTANTANEOUS LOW FLOW | | | 18 | dOct 6 | 3.0 | Sep 29, 1930 |
| ANNUAL RUNOFF (CFSM) | 0.58 | | 1.60 | | 0.98 | |
| ANNUAL RUNOFF (INCHES) | 7.82 | | 21.72 | | 13.31 | |
| 10 PERCENT EXCEEDS | 109 | | 342 | | 166 | |
| 50 PERCENT EXCEEDS | 39 | | 104 | | 71 | |
| 90 PERCENT EXCEEDS | 14 | | 44 | | 34 | |

a Also Aug. 24, 2002.
b Also Oct. 8, 9, 2002.
c From floodmarks, present datum.
d Also Oct. 7-10, 2002.
e Estimated.



## 02075045 DAN RIVER AT SEWAGE TREATMENT PLANT, NEAR DANVILLE, VA

LOCATION.--Lat 36°33'46", long 79°22'11", NAD83, Pittsylvania County, Hydrologic Unit 03010104, on right bank at foot- bridge at Danville sewage treatment plant, 0.1 mi downstream from Pumpkin Creek, and 0.6 mi southeast of Danville.

DRAINAGE AREA.--2,105 $mi^2$, approximately .

PERIOD OF RECORD.--October 1995 to current year.

REVISED RECORDS.--WDR VA-01-1: 1996-2000(m).

GAGE.--Water-stage recorder. Datum of gage is 365.19 ft NGVD of 1929.

REMARKS.--No estimated daily discharges. Records good except for discharges greater than 5,000 $ft^3/s$, 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.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 381 | 1,580 | 858 | 2,380 | 1,430 | 6,570 | 4,140 | 3,580 | 3,050 | 2,320 | 2,600 | 2,090 |
| 2 | 433 | 1,020 | 516 | 3,210 | 1,100 | 5,040 | 3,470 | 3,870 | 2,670 | 3,190 | 2,870 | 2,490 |
| 3 | 226 | 867 | 829 | 2,990 | 949 | 4,240 | 3,190 | 3,430 | 3,020 | 5,760 | 2,430 | 2,320 |
| 4 | 425 | 540 | 888 | 3,310 | 1,230 | 3,400 | 2,960 | 3,000 | 5,590 | 4,550 | 7,340 | 6,710 |
| 5 | 425 | 908 | 822 | 2,500 | 1,420 | 2,950 | 2,940 | 3,440 | 11,200 | 3,610 | 5,040 | 13,100 |
| 6 | 204 | 1,440 | 1,020 | 2,000 | 1,520 | 3,080 | 2,600 | 3,480 | 6,080 | 3,480 | 4,150 | 4,370 |
| 7 | 220 | 1,770 | 1,100 | 1,770 | 1,550 | 3,410 | 5,540 | 3,790 | 6,920 | 4,550 | 5,120 | 3,100 |
| 8 | 325 | 1,340 | 989 | 1,680 | 1,520 | 2,980 | 9,240 | 3,590 | 12,900 | 3,850 | 8,900 | 2,710 |
| 9 | 294 | 1,130 | 800 | 1,610 | 1,520 | 2,370 | 10,600 | 3,390 | 16,500 | 2,620 | 6,530 | 2,720 |
| 10 | 242 | 840 | 1,020 | 1,630 | 1,110 | 2,190 | 18,900 | 3,260 | 8,540 | 2,660 | 4,440 | 2,720 |
| 11 | 1,190 | 876 | 1,860 | 1,420 | 1,520 | 2,390 | 27,500 | 2,500 | 5,210 | 2,680 | 14,400 | 2,590 |
| 12 | 1,460 | 3,170 | 3,830 | 1,330 | 1,520 | 2,310 | 22,300 | 2,220 | 6,380 | 2,540 | 10,300 | 2,410 |
| 13 | 801 | 6,270 | 4,450 | 1,160 | 1,430 | 2,240 | 6,850 | 2,390 | 8,640 | 2,290 | 5,690 | 2,450 |
| 14 | 561 | 3,000 | 10,100 | 1,170 | 1,420 | 2,290 | 5,240 | 2,360 | 5,800 | 4,520 | 5,780 | 2,340 |
| 15 | 544 | 2,030 | 4,910 | 1,320 | 1,440 | 2,500 | 4,860 | 2,360 | 5,510 | 5,810 | 4,170 | 2,090 |
| 16 | 1,020 | 1,540 | 2,800 | 1,310 | 2,380 | 3,310 | 4,490 | 2,450 | 11,700 | 3,060 | 3,700 | 2,110 |
| 17 | 2,160 | 7,270 | 2,130 | 1,150 | 2,910 | 7,570 | 4,190 | 2,500 | 13,400 | 3,200 | 2,890 | 2,230 |
| 18 | 1,670 | 5,760 | 1,710 | 1,260 | 2,370 | 4,310 | 3,970 | 2,470 | 8,640 | 3,060 | 3,900 | 2,370 |
| 19 | 832 | 2,750 | 1,400 | 1,060 | 2,200 | 3,200 | 4,420 | 3,000 | 7,080 | 2,430 | 3,410 | 4,270 |
| 20 | 525 | 1,960 | 1,650 | 682 | 2,720 | 24,300 | 4,370 | 2,740 | 7,190 | 2,350 | 2,920 | 3,400 |
| 21 | 1,040 | 1,500 | 2,490 | 1,270 | 3,180 | 37,100 | 3,490 | 2,510 | 5,240 | 2,410 | 2,740 | 2,500 |
| 22 | 1,070 | 1,400 | 2,140 | 1,290 | 9,350 | 31,500 | 3,470 | 3,340 | 4,300 | 2,460 | 2,690 | 2,100 |
| 23 | 995 | 1,020 | 1,720 | 1,180 | 25,200 | 6,590 | 3,380 | 5,090 | 3,870 | 2,770 | 2,960 | 12,200 |
| 24 | 877 | 1,280 | 2,180 | 1,030 | 12,200 | 5,000 | 3,850 | 4,250 | 3,590 | 3,260 | 2,770 | 11,200 |
| 25 | 518 | 985 | 5,960 | 1,040 | 5,080 | 4,480 | 3,780 | 3,320 | 3,070 | 2,920 | 2,430 | 3,430 |
| 26 | 555 | 1,090 | 5,430 | 1,040 | 3,970 | 3,860 | 3,790 | 12,000 | 3,290 | 2,380 | 2,330 | 2,760 |
| 27 | 753 | 924 | 2,890 | 1,030 | 3,900 | 3,350 | 3,330 | 8,310 | 3,190 | 1,970 | 2,280 | 2,560 |
| 28 | 711 | 889 | 2,120 | 893 | 5,580 | 3,240 | 3,190 | 5,460 | 3,160 | 1,820 | 2,260 | 2,350 |
| 29 | 1,180 | 514 | 1,710 | 1,300 | --- | 3,140 | 3,130 | 4,150 | 2,360 | 2,110 | 2,230 | 2,300 |
| 30 | 1,950 | 954 | 1,420 | 1,410 | --- | 3,700 | 2,950 | 3,920 | 2,210 | 2,330 | 2,260 | 2,320 |
| 31 | 2,110 | --- | 1,730 | 1,440 | --- | 5,960 | --- | 3,670 | --- | 2,490 | 2,190 | --- |
| TOTAL | 25,697 | 56,617 | 73,472 | 47,865 | 101,719 | 198,570 | 186,130 | 115,840 | 190,300 | 95,450 | 133,720 | 112,310 |
| MEAN | 829 | 1,887 | 2,370 | 1,544 | 3,633 | 6,405 | 6,204 | 3,737 | 6,343 | 3,079 | 4,314 | 3,744 |
| MAX | 2,160 | 7,270 | 10,100 | 3,310 | 25,200 | 37,100 | 27,500 | 12,000 | 16,500 | 5,810 | 14,400 | 13,100 |
| MIN | 204 | 514 | 516 | 682 | 949 | 2,190 | 2,600 | 2,220 | 2,210 | 1,820 | 2,190 | 2,090 |
| (†) | +913 | +5,994 | +4,865 | -1,129 | +4,598 | +771 | -978 | +30 | -353 | -131 | -1,316 | -1,321 |
| MEAN‡ | 858 | 2,087 | 2,527 | 1,508 | 3,797 | 6,430 | 6,172 | 3,738 | 6,332 | 3,075 | 4,271 | 3,700 |
| CFSM‡ | .41 | .99 | 1.20 | .72 | 1.80 | 3.05 | 2.93 | 1.78 | 3.01 | 1.46 | 2.03 | 1.76 |
| IN.‡ | .47 | 1.11 | 1.38 | .83 | 1.88 | 3.52 | 3.27 | 2.05 | 3.36 | 1.68 | 2.34 | 1.96 |

CAL YR 2002 MEAN‡ 1,053 CFSM‡ .50 IN.‡ 6.79
WTR YR 2003 MEAN‡ 3,698 CFSM‡ 1 .76 IN.‡ 23.85

† 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.

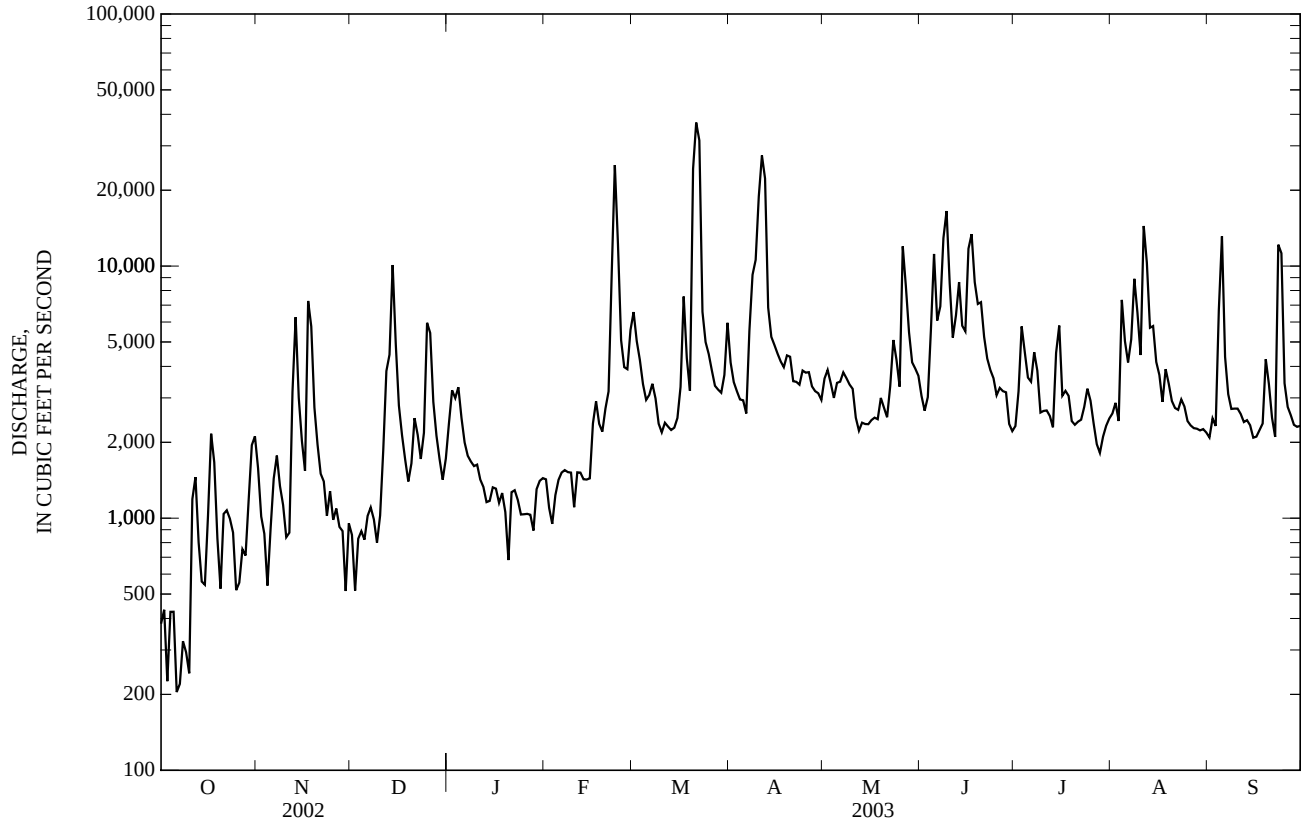
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 1,193 | 1,302 | 1,743 | 2,521 | 2,705 | 3,127 | 3,096 | 2,436 | 2,195 | 1,284 | 1,571 | 2,324 |
| MAX | 2,418 | 2,120 | 4,516 | 4,924 | 5,565 | 6,405 | 6,204 | 3,983 | 6,343 | 3,079 | 4,314 | 8,158 |
| (WY) | (1997) | (1996) | (1997) | (1998) | (1998) | (2003) | (2003) | (1998) | (2003) | (2003) | (2003) | (1996) |
| MIN | 426 | 523 | 796 | 1,116 | 864 | 1,412 | 884 | 1,173 | 466 | 418 | 236 | 454 |
| (WY) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) | (2002) |

02075045 DAN RIVER AT SEWAGE TREATMENT PLANT, NEAR DANVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1996 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 369,078 | | 1,337,690 | | | |
| ANNUAL MEAN | 1,011 | | 3,665 | | 2,119 | |
| HIGHEST ANNUAL MEAN | | | | | 3,665 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 731 | 2002 |
| HIGHEST DAILY MEAN | 10,100 | Dec 14 | 37,100 | Mar 21 | 41,500 | Sep 7, 1996 |
| LOWEST DAILY MEAN | a104 | Aug 15 | 204 | Oct 6 | a104 | Aug 15, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 126 | Aug 11 | 303 | Oct 3 | 126 | Aug 11, 2002 |
| MAXIMUM PEAK FLOW | | | 38,500 | Mar 21 | 47,100 | Sep 6, 1996 |
| MAXIMUM PEAK STAGE | | | 25.38 | Mar 21 | 28.65 | Sep 6, 1996 |
| INSTANTANEOUS LOW FLOW | | | a192 | Oct 1 | a83 | Aug 15, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.48 | | 1.74 | | 1.01 | |
| ANNUAL RUNOFF (INCHES) | 6.52 | | 23.64 | | 13.68 | |
| 10 PERCENT EXCEEDS | 1,780 | | 6,640 | | 3,790 | |
| 50 PERCENT EXCEEDS | 766 | | 2,620 | | 1,370 | |
| 90 PERCENT EXCEEDS | 221 | | 939 | | 585 | |

a Result of regulation.



## 02075500 DAN RIVER AT PACES, VA

LOCATION.--Lat 36°38'32", long 79°05'22", NAD83, 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 $mi^2$, approximately.

PERIOD OF RECORD.--November 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is 322.48 ft NGVD of 1929.

REMARKS.--Records fair except those for periods of doubtful gage-height record, Apr. 9, May 13-17, 26-30, and June 4, which are poor. 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 $ft^3/s$, from rating curve extended above 32,000 $ft^3/s$. 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 Aug. 16, 1940, reached a stage of 32.3 ft, from floodmark.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 506 | 2,620 | 1,220 | 2,890 | 2,060 | 9,360 | 6,150 | 3,400 | 4,130 | 2,600 | 3,920 | 2,370 |
| 2 | 396 | 1,770 | 858 | 4,740 | 1,850 | 8,740 | 4,310 | 4,160 | 2,960 | 3,820 | 4,060 | 2,530 |
| 3 | 379 | 1,290 | 741 | 4,760 | 1,180 | 7,600 | 3,710 | 3,680 | 2,810 | 7,890 | 3,420 | 2,770 |
| 4 | 254 | 977 | 1,130 | 4,900 | 1,480 | 5,960 | 3,180 | 3,440 | e8,000 | 7,050 | 6,360 | 5,440 |
| 5 | 461 | 855 | 974 | 4,230 | 1,690 | 4,620 | 3,160 | 3,430 | 13,600 | 5,100 | 7,280 | 15,800 |
| 6 | 362 | 2,010 | 1,250 | 3,240 | 1,900 | 4,390 | 3,060 | 3,430 | 10,300 | 4,490 | 5,800 | 8,920 |
| 7 | 217 | 2,770 | 1,270 | 2,450 | 2,030 | 5,200 | 5,870 | 3,890 | 6,990 | 4,840 | 6,970 | 4,360 |
| 8 | 233 | 2,250 | 1,510 | 2,360 | 2,630 | 4,760 | 12,700 | 3,770 | 14,000 | 5,540 | 9,730 | 3,340 |
| 9 | 326 | 1,590 | 967 | 2,040 | 2,440 | 3,710 | e12,000 | 3,490 | 17,000 | 3,720 | 9,440 | 2,870 |
| 10 | 304 | 1,550 | 1,200 | 2,190 | 1,880 | 3,050 | 18,100 | 3,290 | 16,400 | 3,420 | 7,760 | 3,230 |
| 11 | 1,700 | 911 | 1,930 | 1,880 | 1,720 | 2,950 | 25,500 | 3,010 | 7,780 | 3,440 | 10,600 | 2,930 |
| 12 | 2,890 | 3,340 | 5,590 | 1,750 | 2,210 | 3,090 | 29,200 | 2,270 | 6,750 | 3,330 | 13,900 | 2,730 |
| 13 | 2,690 | 8,380 | 6,840 | 1,440 | 1,840 | 2,830 | 19,500 | e2,400 | 10,100 | 3,340 | 7,820 | 2,460 |
| 14 | 824 | 6,590 | 12,400 | 1,530 | 1,790 | 2,860 | 7,280 | e2,500 | 8,400 | 3,760 | 6,490 | 2,820 |
| 15 | 682 | 3,460 | 10,200 | 1,460 | 1,800 | 2,970 | 6,030 | e2,400 | 7,230 | 7,870 | 5,870 | 2,260 |
| 16 | 1,120 | 2,480 | 5,270 | 1,670 | 2,620 | 3,580 | 5,400 | e2,600 | 10,500 | 4,490 | 4,840 | 2,200 |
| 17 | 2,600 | 7,680 | 3,740 | 1,400 | 4,170 | 9,400 | 4,940 | e2,600 | 17,700 | 4,000 | 3,980 | 2,250 |
| 18 | 3,000 | 10,800 | 2,660 | 1,370 | 3,410 | 7,570 | 4,540 | 2,640 | 13,800 | 4,380 | 3,850 | 2,390 |
| 19 | 1,620 | 5,950 | 2,350 | 1,530 | 3,560 | 5,250 | 4,610 | 4,000 | 9,290 | 3,260 | 4,890 | 5,560 |
| 20 | 777 | 3,540 | 2,180 | 967 | 3,960 | 16,000 | 5,430 | 3,420 | 8,660 | 2,990 | 3,720 | 5,300 |
| 21 | 962 | 2,550 | 3,640 | 1,120 | 4,540 | 35,300 | 3,900 | 2,890 | 7,050 | 3,100 | 3,280 | 3,450 |
| 22 | 1,600 | 1,820 | 3,550 | 1,610 | 6,530 | 42,200 | 3,520 | 4,040 | 5,740 | 2,800 | 3,170 | 2,320 |
| 23 | 1,060 | 1,790 | 2,560 | 1,360 | 18,900 | 27,300 | 3,540 | 8,130 | 5,120 | 3,830 | 3,210 | 13,600 |
| 24 | 1,390 | 1,470 | 2,760 | 1,270 | 23,200 | 7,520 | 3,860 | 7,330 | 4,770 | 4,000 | 3,790 | 19,700 |
| 25 | 896 | 1,510 | 7,770 | 1,200 | 9,440 | 5,630 | 3,890 | 5,390 | 4,060 | 4,110 | 3,120 | 9,710 |
| 26 | 717 | 1,290 | 9,320 | 1,190 | 5,800 | 4,910 | 3,930 | e14,000 | 4,210 | 3,160 | 2,560 | 4,430 |
| 27 | 762 | 1,290 | 5,400 | 1,200 | 5,360 | 3,770 | 3,740 | e17,500 | 4,040 | 2,780 | 2,670 | 3,690 |
| 28 | 880 | 1,340 | 3,640 | 1,130 | 7,300 | 3,540 | 3,360 | e9,000 | 4,070 | 2,180 | 2,530 | 3,480 |
| 29 | 1,190 | 808 | 2,610 | 1,220 | --- | 3,260 | 3,030 | e5,100 | 3,520 | 2,250 | 2,480 | 2,960 |
| 30 | 3,330 | 823 | 2,310 | 1,690 | --- | 3,770 | 3,080 | e4,600 | 2,780 | 2,850 | 2,470 | 2,930 |
| 31 | 3,710 | --- | 1,900 | 2,080 | --- | 7,260 | --- | 4,440 | --- | 3,050 | 2,600 | --- |
| TOTAL | 37,838 | 85,504 | 109,740 | 63,867 | 127,290 | 258,350 | 220,520 | 146,240 | 241,760 | 123,440 | 162,580 | 148,800 |
| MEAN | 1,221 | 2,850 | 3,540 | 2,060 | 4,546 | 8,334 | 7,351 | 4,717 | 8,059 | 3,982 | 5,245 | 4,960 |
| MAX | 3,710 | 10,800 | 12,400 | 4,900 | 23,200 | 42,200 | 29,200 | 17,500 | 17,700 | 7,890 | 13,900 | 19,700 |
| MIN | 217 | 808 | 741 | 967 | 1,180 | 2,830 | 3,030 | 2,270 | 2,780 | 2,180 | 2,470 | 2,200 |
| (†) | +913 | +5,994 | +4,865 | -1,129 | +4,598 | +771 | -978 | +30 | -353 | -131 | -1,316 | -1,321 |
| MEAN‡ | 1,250 | 3,050 | 3,697 | 2,024 | 4,710 | 8,359 | 7,318 | 4,718 | 8,047 | 3,978 | 5,202 | 4,916 |
| CFSM‡ | .49 | 1.20 | 1.45 | .79 | 1.85 | 3.28 | 2.87 | 1.85 | 3.16 | 1.56 | 2.04 | 1.93 |
| IN.‡ | .56 | 1.35 | 1.67 | .92 | 1.92 | 3.78 | 3.20 | 2.13 | 3.52 | 1.80 | 2.35 | 2.15 |

CAL YR 2002 MEAN 1,380‡ CFSM‡ .54 IN.‡ 7.35
WTR YR 2003 MEAN 4,761‡ CFSM‡ 1.87 IN.‡ 25.35

† 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.

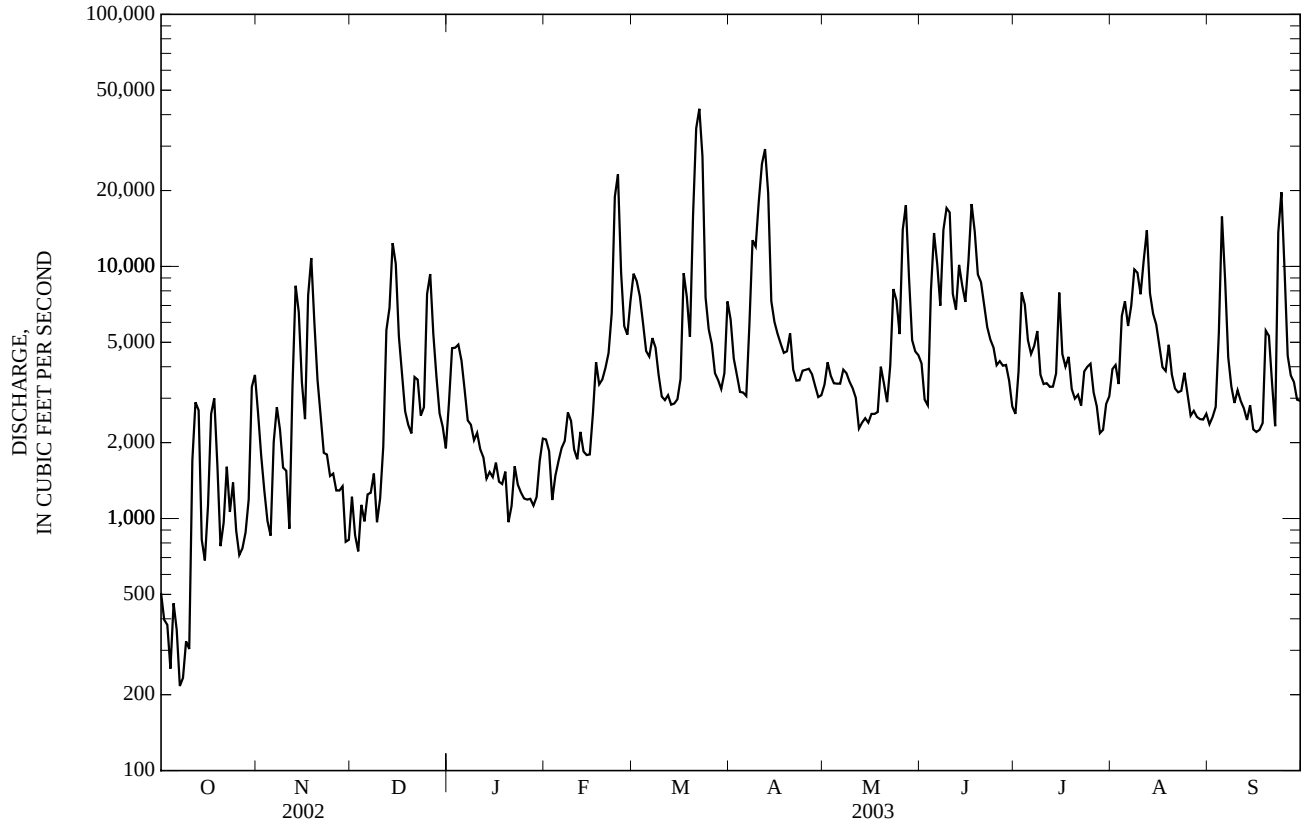
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 1,959 | 2,015 | 2,603 | 3,356 | 3,826 | 4,476 | 4,009 | 2,845 | 2,428 | 1,847 | 1,772 | 1,924 |
| MAX | 7,253 | 6,184 | 5,734 | 8,407 | 9,141 | 11,190 | 11,500 | 6,505 | 8,987 | 5,091 | 5,245 | 10,200 |
| (WY) | (1960) | (1958) | (1997) | (1978) | (1960) | (1975) | (1987) | (1978) | (1972) | (1975) | (2003) | (1996) |
| MIN | 522 | 602 | 925 | 1,015 | 1,104 | 1,580 | 1,060 | 1,184 | 465 | 418 | 243 | 452 |
| (WY) | (2002) | (2002) | (2002) | (1981) | (2002) | (1981) | (2002) | (1986) | (2002) | (2002) | (2002) | (1954) |

02075500 DAN RIVER AT PACES, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1951 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 488,547 | | 1,725,929 | | | |
| ANNUAL MEAN | 1,338 | | 4,729 | | 2,749 | |
| HIGHEST ANNUAL MEAN | | | | | 4,729 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 872 | 2002 |
| HIGHEST DAILY MEAN | 12,400 | Dec 14 | 42,200 | Mar 22 | 63,400 | Jun 23, 1972 |
| LOWEST DAILY MEAN | a133 | Aug 15 | 217 | Oct 7 | a133 | Aug 15, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 143 | Aug 12 | 308 | Oct 4 | 143 | Aug 12, 2002 |
| MAXIMUM PEAK FLOW | | | 42,900 | Mar 22 | 64,800 | Jun 23, 1972 |
| MAXIMUM PEAK STAGE | | | 28.26 | Mar 22 | 33.15 | Jun 23, 1972 |
| INSTANTANEOUS LOW FLOW | | | 210 | Oct 7 | a129 | Aug 15, 2002 |
| ANNUAL RUNOFF (CFSM) | 0.52 | | 1.85 | | 1.08 | |
| ANNUAL RUNOFF (INCHES) | 7.13 | | 25.18 | | 14.65 | |
| 10 PERCENT EXCEEDS | 2,720 | | 9,380 | | 4,970 | |
| 50 PERCENT EXCEEDS | 878 | | 3,410 | | 1,850 | |
| 90 PERCENT EXCEEDS | 242 | | 1,200 | | 875 | |

a Result of regulation.
e Estimated.



## 02076000 DAN RIVER AT SOUTH BOSTON, VA

LOCATION.--Lat 36°41'37", long 78°54'09", NAD83, Halifax County, Hydrologic Unit 03010104, on left bank 100 ft upstream from Norfolk and Western Railroad bridge at South Boston.

DRAINAGE AREA.--2,730 $mi^2$.

PERIOD OF RECORD.--August 1900 to May 1907, April 1923 to September 1952, October 1952 to July 1962 (gage heights only), August 1980 to September 2000 (annual maximum only), October 2000 to current year (gage heights only).

REVISED RECORDS.--WDR VA-02-01: 2001(M,m).

GAGE.--Water-stage recorder. Datum of gage is 299.23 ft NGVD of 1929.

REMARKS.-- No gage-height record Jan. 6-8. Mean daily gage heights are shown in table below. Diurnal fluctuation caused by mills and hydroelectric generating facility 36.4 mi upstream at Danville. Since August 1950, flow regulated by Philpott Lake (station 02071900) 114.8 mi upstream.

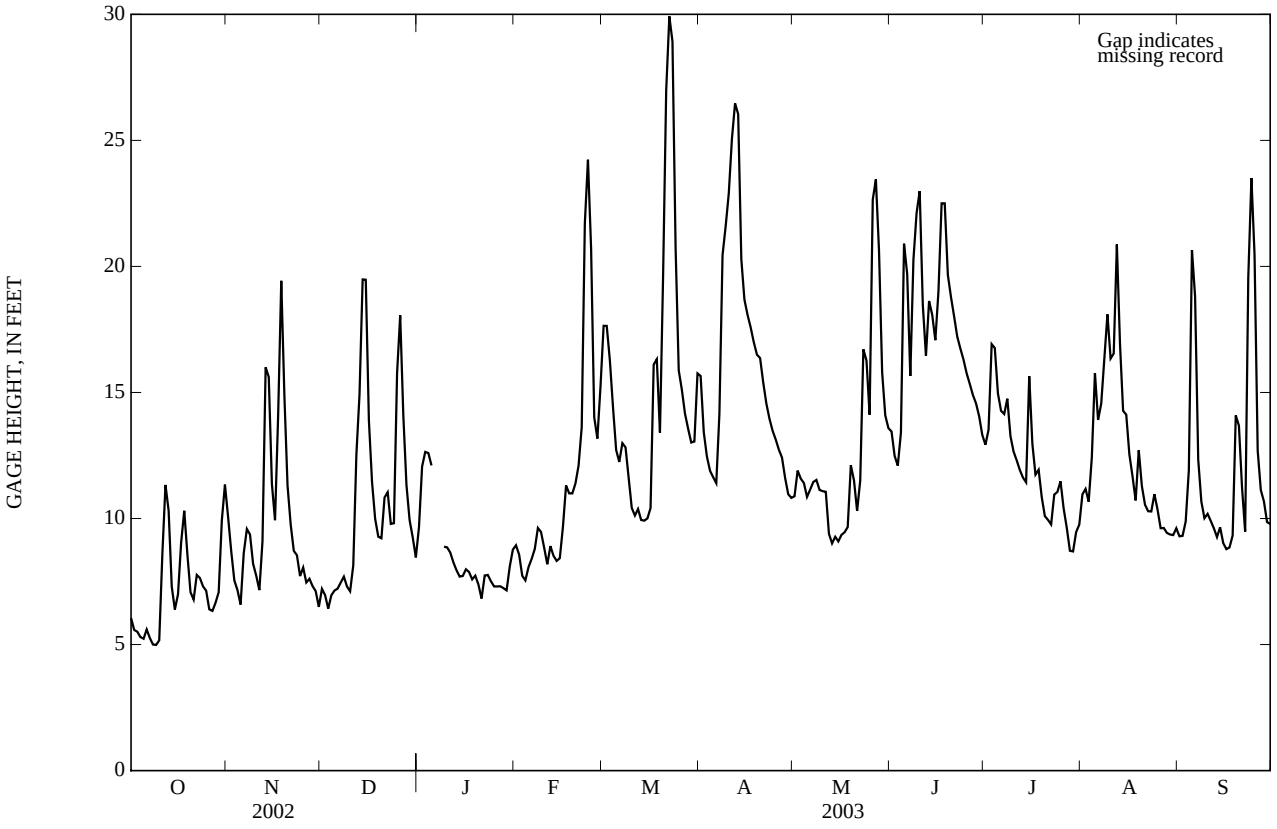
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 81,000 $ft^3/s$, Aug. 16, 1940, gage height, 31.8 ft.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 30.34 ft, Mar. 22; minimum gage height, 4.92 ft, Oct. 9.

GAGE HEIGHT, FEET
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.05 | 10.07 | 7.21 | 9.65 | 8.94 | 17.64 | 15.65 | 10.88 | 13.45 | 12.93 | 10.96 | 9.29 |
| 2 | 5.58 | 8.71 | 6.96 | 12.06 | 8.57 | 17.64 | 13.42 | 11.90 | 12.48 | 13.52 | 11.17 | 9.31 |
| 3 | 5.51 | 7.54 | 6.42 | 12.64 | 7.73 | 16.27 | 12.46 | 11.58 | 12.10 | 16.92 | 10.67 | 9.88 |
| 4 | 5.30 | 7.16 | 6.95 | 12.60 | 7.55 | 14.42 | 11.90 | 11.41 | 13.40 | 16.76 | 12.43 | 11.92 |
| 5 | 5.23 | 6.59 | 7.14 | 12.10 | 8.07 | 12.72 | 11.64 | 10.86 | 20.90 | 14.96 | 15.77 | 20.65 |
| 6 | 5.60 | 8.62 | 7.22 | --- | 8.40 | 12.25 | 11.40 | 11.15 | 19.70 | 14.27 | 13.91 | 18.81 |
| 7 | 5.26 | 9.58 | 7.46 | --- | 8.79 | 12.99 | 14.14 | 11.45 | 15.65 | 14.15 | 14.55 | 12.34 |
| 8 | 5.00 | 9.37 | 7.70 | --- | 9.62 | 12.82 | 20.45 | 11.53 | 20.26 | 14.75 | 16.33 | 10.67 |
| 9 | 4.98 | 8.20 | 7.30 | 8.88 | 9.47 | 11.61 | 21.59 | 11.13 | 22.11 | 13.27 | 18.10 | 10.01 |
| 10 | 5.17 | 7.73 | 7.11 | 8.85 | 8.85 | 10.42 | 22.90 | 11.09 | 22.99 | 12.65 | 16.35 | 10.19 |
| 11 | 8.59 | 7.16 | 8.14 | 8.65 | 8.18 | 10.12 | 25.07 | 11.06 | 18.47 | 12.31 | 16.54 | 9.91 |
| 12 | 11.33 | 9.10 | 12.53 | 8.26 | 8.90 | 10.38 | 26.47 | 9.39 | 16.46 | 11.92 | 20.87 | 9.61 |
| 13 | 10.31 | 16.00 | 14.91 | 7.95 | 8.52 | 9.94 | 26.04 | 9.01 | 18.63 | 11.62 | 16.94 | 9.26 |
| 14 | 7.30 | 15.62 | 19.48 | 7.70 | 8.32 | 9.91 | 20.29 | 9.27 | 18.08 | 11.44 | 14.27 | 9.65 |
| 15 | 6.39 | 11.37 | 19.47 | 7.72 | 8.43 | 10.00 | 18.68 | 9.09 | 17.07 | 15.65 | 14.12 | 9.02 |
| 16 | 6.99 | 9.93 | 13.89 | 7.99 | 9.67 | 10.42 | 18.08 | 9.35 | 19.02 | 12.97 | 12.54 | 8.78 |
| 17 | 9.05 | 14.09 | 11.45 | 7.88 | 11.31 | 16.11 | 17.57 | 9.46 | 22.50 | 11.74 | 11.68 | 8.85 |
| 18 | 10.31 | 19.43 | 9.99 | 7.59 | 11.00 | 16.32 | 16.98 | 9.66 | 22.50 | 11.94 | 10.72 | 9.33 |
| 19 | 8.57 | 14.85 | 9.28 | 7.73 | 11.00 | 13.41 | 16.50 | 12.12 | 19.66 | 10.85 | 12.71 | 14.09 |
| 20 | 7.07 | 11.31 | 9.22 | 7.38 | 11.39 | 19.58 | 16.37 | 11.51 | 18.78 | 10.09 | 11.28 | 13.68 |
| 21 | 6.79 | 9.77 | 10.83 | 6.83 | 12.10 | 26.98 | 15.40 | 10.30 | 18.02 | 9.94 | 10.55 | 11.22 |
| 22 | 7.76 | 8.72 | 11.04 | 7.74 | 13.63 | 29.92 | 14.56 | 11.50 | 17.22 | 9.76 | 10.29 | 9.48 |
| 23 | 7.64 | 8.55 | 9.79 | 7.76 | 21.71 | 28.93 | 13.96 | 16.71 | 16.74 | 10.95 | 10.28 | 19.56 |
| 24 | 7.31 | 7.72 | 9.81 | 7.51 | 24.23 | 20.77 | 13.48 | 16.26 | 16.30 | 11.05 | 10.97 | 23.51 |
| 25 | 7.13 | 8.05 | 15.77 | 7.31 | 20.70 | 15.88 | 13.13 | 14.12 | 15.76 | 11.48 | 10.36 | 20.47 |
| 26 | 6.40 | 7.46 | 18.06 | 7.30 | 14.01 | 15.11 | 12.73 | 22.65 | 15.34 | 10.40 | 9.61 | 12.69 |
| 27 | 6.33 | 7.61 | 14.09 | 7.31 | 13.17 | 14.16 | 12.42 | 23.45 | 14.90 | 9.63 | 9.62 | 11.13 |
| 28 | 6.66 | 7.32 | 11.33 | 7.24 | 15.23 | 13.56 | 11.61 | 20.61 | 14.56 | 8.72 | 9.43 | 10.68 |
| 29 | 7.08 | 7.12 | 9.94 | 7.15 | --- | 13.01 | 10.96 | 15.80 | 14.06 | 8.69 | 9.37 | 9.86 |
| 30 | 9.92 | 6.49 | 9.26 | 8.08 | --- | 13.05 | 10.82 | 14.09 | 13.32 | 9.47 | 9.34 | 9.78 |
| 31 | 11.34 | --- | 8.46 | 8.77 | --- | 15.76 | --- | 13.58 | --- | 9.76 | 9.61 | --- |
| MEAN | 7.22 | 9.71 | 10.59 | --- | 11.34 | 15.23 | 16.22 | 12.64 | 17.35 | 12.08 | 12.62 | 12.12 |
| MAX | 11.34 | 19.43 | 19.48 | --- | 24.23 | 29.92 | 26.47 | 23.45 | 22.99 | 16.92 | 20.87 | 23.51 |
| MIN | 4.98 | 6.49 | 6.42 | --- | 7.55 | 9.91 | 10.82 | 9.01 | 12.10 | 8.69 | 9.34 | 8.78 |

02076000 DAN RIVER AT SOUTH BOSTON, VA—Continued



## 02077000 BANISTER RIVER AT HALIFAX, VA

LOCATION.--Lat 36°46'35", long 78°54'57", NAD83, 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 $mi^2$.

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 NGVD of 1929 (levels by U.S. Army Corps of Engineers). Sept. 28, 1904, to Dec. 31, 1905, nonrecording gage at site 400 ft upstream at different datum. Dec. 9, 1928, to Sept. 20, 1950, water-stage recorder at site 400 ft upstream at present datum.

REMARKS.--Records good except for period of no gage-height record, Nov. 3-6, which is poor. Flow regulated by a reservoir and hydroelectric generating facility 0.5 mi upstream from station. Maximum discharge, 50,000 $ft^3/s$, from rating curve extended above 13,000 $ft^3/s$ 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.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 43 | 407 | 212 | 546 | 405 | 1,760 | 1,190 | 632 | 1,130 | 480 | 529 | 422 |
| 2 | 43 | 257 | 202 | 1,050 | 419 | 2,050 | 817 | 458 | 933 | 794 | 466 | 356 |
| 3 | 43 | e200 | 194 | 931 | 371 | 2,080 | 635 | 283 | 680 | 1,920 | 479 | 349 |
| 4 | 43 | e180 | 192 | 1,130 | 420 | 1,320 | 621 | 596 | 778 | 2,370 | 1,170 | 1,060 |
| 5 | 43 | e170 | 194 | 929 | 460 | 976 | 526 | 508 | 976 | 1,090 | 2,190 | 2,100 |
| 6 | 42 | e1,000 | 249 | 681 | 470 | 875 | 466 | 496 | 1,890 | 649 | 1,100 | 1,080 |
| 7 | 42 | 837 | 252 | 512 | 465 | 945 | 1,400 | 441 | 1,660 | 606 | 804 | 523 |
| 8 | 41 | 467 | 252 | 567 | 474 | 768 | 3,790 | 426 | 2,370 | 550 | 856 | 441 |
| 9 | 40 | 315 | 262 | 452 | 442 | 646 | 4,710 | 401 | 2,340 | 531 | 1,260 | 390 |
| 10 | 40 | 229 | 238 | 400 | 438 | 538 | 5,980 | 1,330 | 1,540 | 556 | 1,020 | 345 |
| 11 | 625 | 258 | 420 | 365 | 484 | 530 | 8,100 | 2,780 | 1,020 | 517 | 768 | 354 |
| 12 | 576 | 1,610 | 1,080 | 314 | 481 | 469 | 7,770 | 1,080 | 876 | 435 | 1,950 | 330 |
| 13 | 277 | 3,240 | 1,430 | 286 | 481 | 472 | 2,760 | 515 | 1,490 | 436 | 1,380 | 339 |
| 14 | 198 | 1,800 | 2,870 | 351 | 447 | 469 | 1,320 | 394 | 2,270 | 497 | 799 | 436 |
| 15 | 95 | 801 | 2,710 | 275 | 471 | 481 | 1,020 | 407 | 1,940 | 537 | 558 | 467 |
| 16 | 195 | 567 | 1,490 | 323 | 1,390 | 446 | 822 | 441 | 1,380 | 455 | 478 | 445 |
| 17 | 404 | 1,550 | 855 | 303 | 1,830 | 489 | 715 | 488 | 1,240 | 438 | 848 | 390 |
| 18 | 336 | 2,660 | 605 | 274 | 1,070 | 567 | 648 | 590 | 2,030 | 475 | 650 | 867 |
| 19 | 135 | 1,460 | 524 | 227 | 884 | 499 | 633 | 1,330 | 1,670 | 348 | 505 | 3,320 |
| 20 | 161 | 754 | 583 | 295 | 1,190 | 4,460 | 629 | 1,330 | 1,980 | 373 | 486 | 2,940 |
| 21 | 178 | 525 | 930 | 320 | 1,720 | 11,700 | 584 | 782 | 1,280 | 363 | 439 | 1,300 |
| 22 | 91 | 450 | 755 | 284 | 2,360 | 8,830 | 561 | 933 | 869 | 426 | 414 | 693 |
| 23 | 153 | 369 | 520 | 279 | 6,430 | 2,750 | 516 | 1,430 | 664 | 533 | 376 | 7,500 |
| 24 | 122 | 309 | 654 | 201 | 6,990 | 1,200 | 477 | 1,730 | 588 | 919 | 384 | 5,440 |
| 25 | 83 | 295 | 2,580 | 211 | 2,530 | 886 | 460 | 1,260 | 530 | 756 | 457 | 2,240 |
| 26 | 154 | 278 | 3,550 | 293 | 1,170 | 734 | 489 | 4,900 | 483 | 481 | 385 | 1,040 |
| 27 | 188 | 261 | 1,710 | 291 | 935 | 632 | 546 | 4,410 | 462 | 400 | 344 | 740 |
| 28 | 96 | 242 | 893 | 236 | 1,060 | 585 | 544 | 3,270 | 462 | 365 | 306 | 806 |
| 29 | 346 | 235 | 634 | 301 | --- | 557 | 453 | 2,950 | 431 | 334 | 299 | 938 |
| 30 | 769 | 231 | 546 | 349 | --- | 708 | 431 | 1,720 | 426 | 468 | 294 | 592 |
| 31 | 645 | --- | 482 | 389 | --- | 1,240 | --- | 1,210 | --- | 576 | 405 | --- |
| TOTAL | 6,247 | 21,957 | 28,068 | 13,365 | 36,287 | 50,662 | 49,613 | 39,521 | 36,388 | 19,678 | 22,399 | 38,243 |
| MEAN | 202 | 732 | 905 | 431 | 1,296 | 1,634 | 1,654 | 1,275 | 1,213 | 635 | 723 | 1,275 |
| MAX | 769 | 3,240 | 3,550 | 1,130 | 6,990 | 11,700 | 8,100 | 4,900 | 2,370 | 2,370 | 2,190 | 7,500 |
| MIN | 40 | 170 | 192 | 201 | 371 | 446 | 431 | 283 | 426 | 334 | 294 | 330 |
| CFSM | 0.37 | 1.34 | 1.66 | 0.79 | 2.37 | 2.99 | 3.02 | 2.33 | 2.22 | 1.16 | 1.32 | 2.33 |
| IN. | 0.42 | 1.49 | 1.91 | 0.91 | 2.47 | 3.45 | 3.37 | 2.69 | 2.47 | 1.34 | 1.52 | 2.60 |

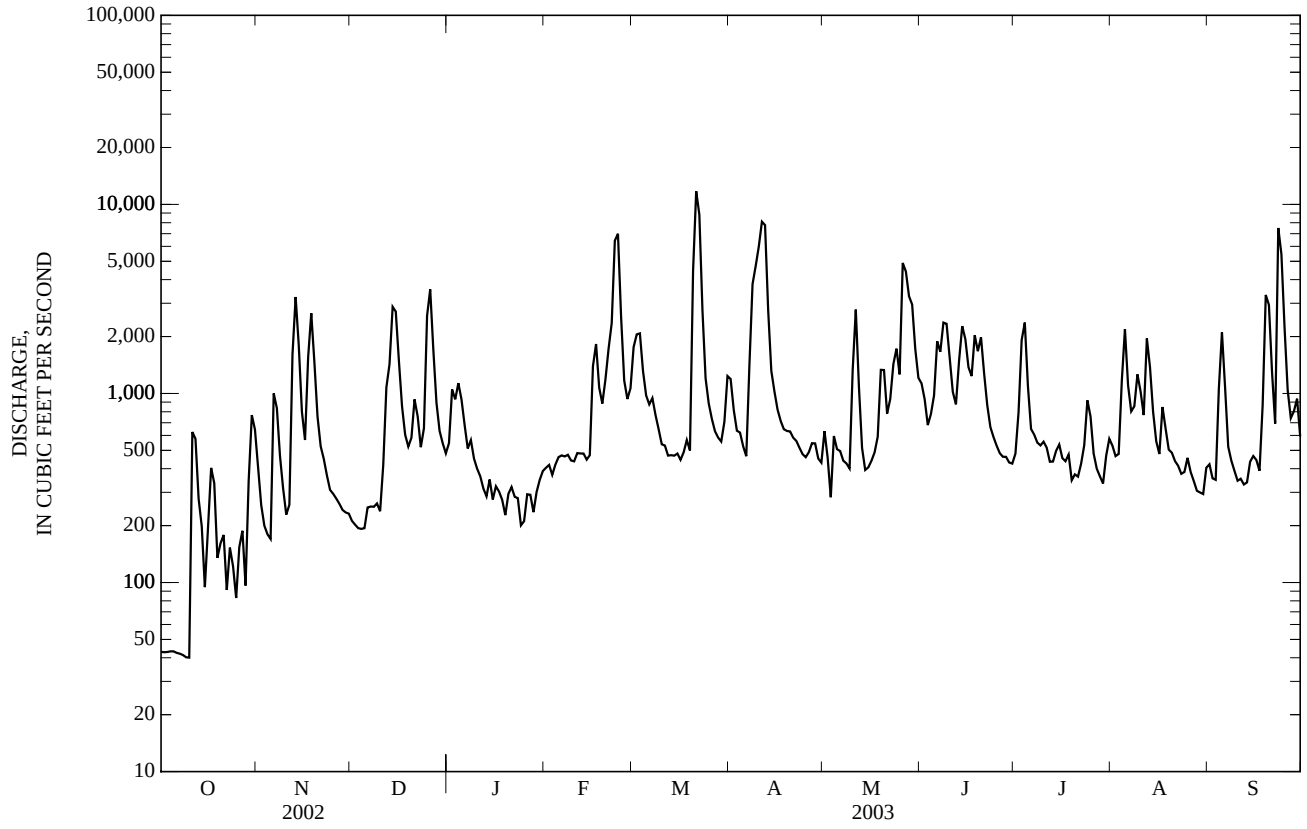
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1905 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 346 | 389 | 494 | 670 | 755 | 840 | 725 | 492 | 391 | 298 | 321 | 381 |
| MAX | 1,691 | 1,431 | 1,211 | 2,125 | 1,857 | 2,738 | 2,121 | 1,374 | 1,588 | 1,065 | 2,898 | 3,717 |
| (WY) | (1938) | (1973) | (1949) | (1937) | (1979) | (1975) | (1983) | (1978) | (1972) | (1938) | (1940) | (1944) |
| MIN | 34.9 | 77.4 | 125 | 170 | 160 | 270 | 170 | 178 | 62.4 | 29.6 | 25.2 | 29.4 |
| (WY) | (1931) | (2002) | (2002) | (1981) | (2002) | (1981) | (2002) | (1981) | (2002) | (2002) | (1999) | (1954) |

02077000 BANISTER RIVER AT HALIFAX, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1905 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 98,176 | | 362,428 | | | |
| ANNUAL MEAN | 269 | | 993 | | 508 | |
| HIGHEST ANNUAL MEAN | | | | | 993 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 136 | 2002 |
| HIGHEST DAILY MEAN | 3,550 | Dec 26 | 11,700 | Mar 21 | 44,700 | Sep 20, 1944 |
| LOWEST DAILY MEAN | 18 | aAug 23 | 40 | bOct 9 | 6.0 | Aug 30, 1932 |
| ANNUAL SEVEN-DAY MINIMUM | 18 | Aug 21 | 42 | Oct 4 | 18 | Oct 8, 1930 |
| MAXIMUM PEAK FLOW | | | 12,700 | Mar 21 | 50,000 | Sep 20, 1944 |
| MAXIMUM PEAK STAGE | | | 26.19 | Mar 21 | c40.80 | Sep 20, 1944 |
| INSTANTANEOUS LOW FLOW | | | 40 | bOct 9 | 6.0 | dAug 19, 1932 |
| ANNUAL RUNOFF (CFSM) | 0.49 | | 1.82 | | 0.93 | |
| ANNUAL RUNOFF (INCHES) | 6.68 | | 24.65 | | 12.61 | |
| 10 PERCENT EXCEEDS | 604 | | 2,090 | | 952 | |
| 50 PERCENT EXCEEDS | 159 | | 533 | | 300 | |
| 90 PERCENT EXCEEDS | 29 | | 233 | | 108 | |

a Also Aug. 24-27, 2002.
b Also Oct. 10, 2002.
c From floodmarks.
d Also many other days in August and September 1932.
e Estimated.



## 02077500 HYCO RIVER NEAR DENNISTON, VA

LOCATION.--Lat 36°35'17", long 78°53'55", NAD83, 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 $mi^2$.

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 NGVD of 1929. July 10, 1929, to Mar. 14, 1934, nonrecording gage at same site and datum.

REMARKS.--Records good except for period of no gage-height record, Mar. 27 to Apr. 3, which is poor. 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 $ft^3/s$, from rating curve extended above 8,200 $ft^3/s$. 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.--Floods in August 1928 and September 1945 reached stages of 26.4 ft and 25.6 ft, respectively, from floodmarks.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7.4 | 768 | 89 | 1,030 | 201 | 2,120 | e1,400 | 130 | 260 | 238 | 550 | 110 |
| 2 | 7.5 | 666 | 87 | 198 | 596 | 2,830 | e800 | 122 | 181 | 746 | 864 | 85 |
| 3 | 6.7 | 125 | 88 | 179 | 368 | 3,040 | e680 | 126 | 161 | 2,260 | 120 | 81 |
| 4 | 7.2 | 108 | 87 | 175 | 125 | 3,190 | 629 | 128 | 437 | 1,970 | 1,290 | 606 |
| 5 | 6.8 | 456 | 103 | 145 | 125 | 2,740 | 595 | 119 | 971 | 1,840 | 1,550 | 1,440 |
| 6 | 6.1 | 833 | 122 | 133 | 111 | 1,580 | 543 | 129 | 794 | 340 | 1,770 | 1,050 |
| 7 | 6.4 | 605 | 123 | 124 | 332 | 1,420 | 1,280 | 122 | 1,120 | 161 | 1,520 | 146 |
| 8 | 7.7 | 217 | 118 | 119 | 521 | 1,180 | 3,250 | 115 | 2,370 | 134 | 887 | 104 |
| 9 | 8.4 | 120 | 130 | 114 | 1,030 | 334 | 4,690 | 109 | 2,980 | 123 | 974 | 96 |
| 10 | 8.6 | 198 | 131 | 109 | 1,010 | 189 | 5,840 | 113 | 3,920 | 136 | 2,680 | 91 |
| 11 | 1,130 | 444 | 672 | 504 | 820 | 164 | 6,110 | 167 | 3,090 | 113 | 2,000 | 87 |
| 12 | 1,680 | 775 | 1,490 | 722 | 556 | 152 | 5,090 | 122 | 1,730 | 113 | 886 | 84 |
| 13 | 148 | 1,430 | 1,580 | 110 | 199 | 141 | 3,250 | 107 | 900 | 124 | 265 | 84 |
| 14 | 72 | 1,480 | 2,270 | 97 | 121 | 156 | 1,360 | 102 | 928 | 121 | 151 | 85 |
| 15 | 57 | 1,020 | 2,500 | 93 | 125 | 187 | 706 | 101 | 1,050 | 109 | 118 | 83 |
| 16 | 320 | 530 | 2,740 | 90 | 254 | 820 | 588 | 138 | 1,820 | 104 | 107 | 81 |
| 17 | 614 | 1,410 | 1,470 | 90 | 197 | 909 | 522 | 112 | 2,780 | 115 | 102 | 79 |
| 18 | 476 | 2,130 | 204 | 88 | 267 | 1,160 | 483 | 153 | 3,130 | 110 | 97 | 329 |
| 19 | 450 | 2,570 | 177 | 85 | 1,090 | 1,220 | 344 | 1,360 | 2,630 | 511 | 154 | 2,130 |
| 20 | 432 | 1,950 | 611 | 84 | 788 | 2,900 | 170 | 1,550 | 932 | 436 | 111 | 1,420 |
| 21 | 303 | 868 | 629 | 85 | 561 | 6,620 | 157 | 807 | 203 | 97 | 97 | 649 |
| 22 | 108 | 496 | 564 | 84 | 895 | 6,340 | 148 | 1,440 | 199 | 110 | 92 | 167 |
| 23 | 97 | 138 | 457 | 84 | 1,850 | 3,790 | 138 | 2,760 | 545 | 519 | 88 | 853 |
| 24 | 81 | 123 | 353 | 82 | 1,900 | 2,270 | 130 | 3,840 | 517 | 245 | 85 | 1,830 |
| 25 | 77 | 115 | 1,500 | 82 | 1,230 | 870 | 126 | 3,140 | 166 | 135 | 84 | 2,000 |
| 26 | 77 | 109 | 1,800 | 82 | 582 | 1,240 | 129 | 3,970 | 118 | 109 | 82 | 891 |
| 27 | 75 | 105 | 1,730 | 82 | 703 | e1,210 | 643 | 5,310 | 111 | 99 | 80 | 340 |
| 28 | 90 | 102 | 1,230 | 80 | 1,470 | e790 | 539 | 4,350 | 114 | 93 | 79 | 138 |
| 29 | 344 | 97 | 199 | 85 | --- | e700 | 165 | 2,120 | 109 | 91 | 78 | 110 |
| 30 | 939 | 94 | 157 | 134 | --- | e1,000 | 138 | 717 | 105 | 92 | 79 | 103 |
| 31 | 889 | --- | 558 | 336 | --- | e2,600 | --- | 521 | --- | 92 | 106 | --- |
| TOTAL | 8,531.8 | 20,082 | 23,969 | 5,505 | 18,027 | 53,862 | 40,643 | 34,100 | 34,371 | 11,486 | 17,146 | 15,352 |
| MEAN | 275 | 669 | 773 | 178 | 644 | 1,737 | 1,355 | 1,100 | 1,146 | 371 | 553 | 512 |
| MAX | 1,680 | 2,570 | 2,740 | 1,030 | 1,900 | 6,620 | 6,110 | 5,310 | 3,920 | 2,260 | 2,680 | 2,130 |
| MIN | 6.1 | 94 | 87 | 80 | 111 | 141 | 126 | 101 | 105 | 91 | 78 | 79 |
| CFSM | 0.95 | 2.32 | 2.68 | 0.61 | 2.23 | 6.01 | 4.69 | 3.81 | 3.96 | 1.28 | 1.91 | 1.77 |
| IN. | 1.10 | 2.58 | 3.09 | 0.71 | 2.32 | 6.93 | 5.23 | 4.39 | 4.42 | 1.48 | 2.21 | 1.98 |

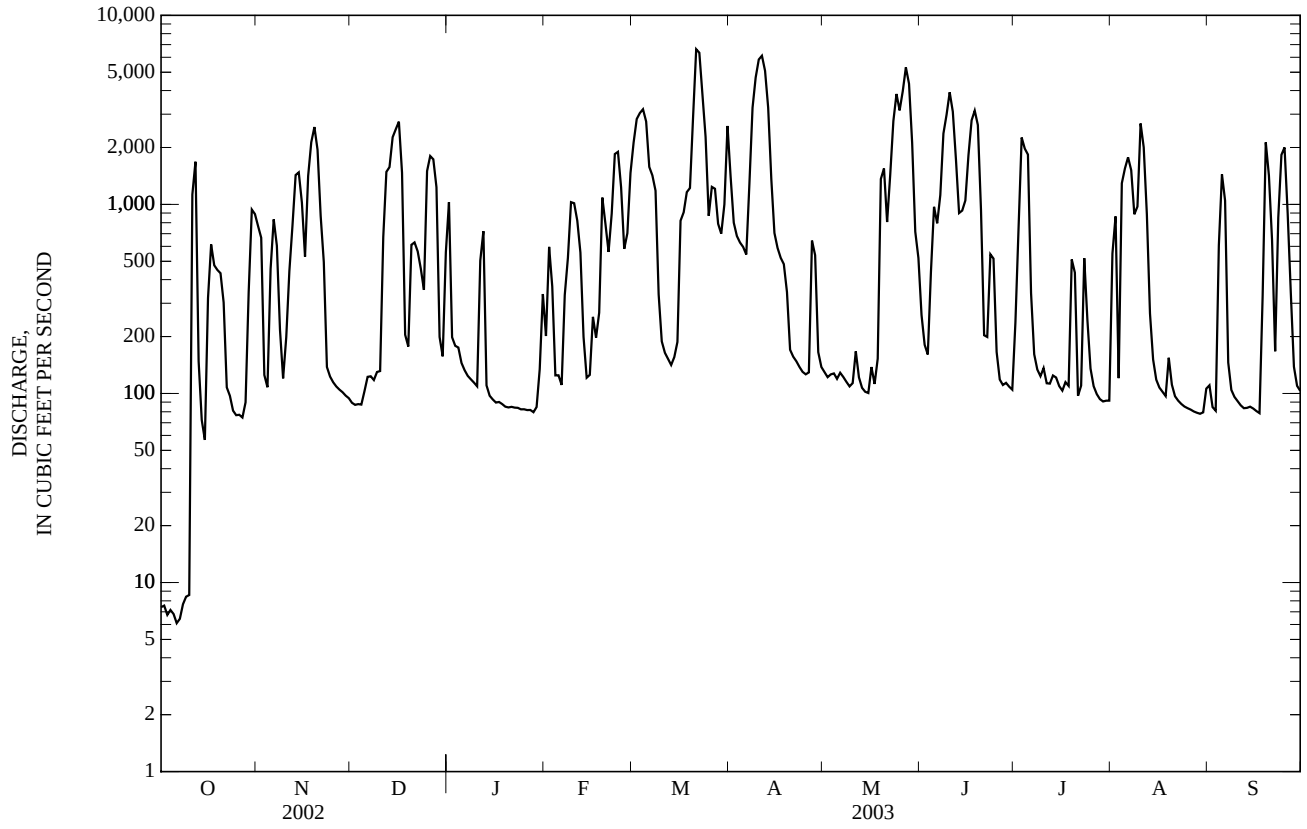
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 116 | 131 | 204 | 447 | 490 | 604 | 392 | 229 | 148 | 130 | 108 | 166 |
| MAX | 805 | 786 | 815 | 1,692 | 1,364 | 1,737 | 1,355 | 1,332 | 1,146 | 1,492 | 553 | 1,341 |
| (WY) | (1972) | (1973) | (1973) | (1978) | (1998) | (2003) | (2003) | (1978) | (2003) | (1975) | (2003) | (1996) |
| MIN | 9.04 | 9.36 | 14.0 | 28.5 | 29.2 | 44.6 | 23.6 | 21.7 | 11.3 | 10.9 | 7.49 | 11.1 |
| (WY) | (1999) | (1999) | (2002) | (1966) | (2002) | (1981) | (2002) | (2002) | (2002) | (2002) | (1999) | (1998) |

02077500 HYCO RIVER NEAR DENNISTON, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1965 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 59,124.5 | | 283,074.8 | | | |
| ANNUAL MEAN | 162 | | 776 | | 263 | |
| HIGHEST ANNUAL MEAN | | | | | 776 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 21.5 | 2002 |
| HIGHEST DAILY MEAN | 2,740 | Dec 16 | 6,620 | Mar 21 | 10,300 | Jul 15, 1975 |
| LOWEST DAILY MEAN | 4.2 | aAug 23 | 6.1 | Oct 6 | 2.5 | Aug 24, 1999 |
| ANNUAL SEVEN-DAY MINIMUM | 4.7 | Aug 21 | 6.9 | Oct 1 | 3.4 | Aug 19, 1999 |
| MAXIMUM PEAK FLOW | | | 7,230 | Mar 21 | b10,800 | Jul 15, 1975 |
| MAXIMUM PEAK STAGE | | | 20.42 | Mar 21 | b24.27 | Jul 15, 1975 |
| INSTANTANEOUS LOW FLOW | | | 5.9 | cOct 6 | d2.1 | Aug 24, 1999 |
| ANNUAL RUNOFF (CFSM) | 0.56 | | 2.68 | | 0.91 | |
| ANNUAL RUNOFF (INCHES) | 7.61 | | 36.44 | | 12.35 | |
| 10 PERCENT EXCEEDS | 465 | | 2,130 | | 630 | |
| 50 PERCENT EXCEEDS | 20 | | 217 | | 71 | |
| 90 PERCENT EXCEEDS | 8.1 | | 85 | | 19 | |

a Also Aug. 25, 2002.
b Prior to regulation, 1929-34, 1951-64, maximum peak flow, 7,630 $ft^3/s$, Oct. 3, 1929, gage height, 21.88 ft.
c Also Oct. 7, 2002.
d Prior to regulation, 1929-34, 1951-64, instantaneous low flow, 0.004 $ft^3/s$, Sept. 14, 1932.
e Estimated.



## 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 $mi^2$, approximately.

PERIOD OF RECORD.--July 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929.

REMARKS.--Reservoir is formed by concrete dam with earth embankments. Spillway, with crest at elevation 288.0 ft, is equipped with 22 radial gates 32 ft high by 42 ft wide. Storage began in September 1950 during construction; initial filling started June 30, 1952; water in reservoir first reached rule-curve elevation in March 1953. Total capacity at top of gates, elevation, 320 ft, is 2,770,000 acre-ft of which 1,281,400 acre-ft is controlled flood storage between elevations 300 ft, top of power pool, and 320 ft; 316,900 acre- ft is available for power between elevations 293.0 ft, bottom of power pool, and 300 ft; 1,171,700 acre-ft is inactive and dead storage below elevation 293.0 ft. Figures given herein represent total contents. Reservoir is used for flood control, hydroelectric power, low-water regulation for navigation and pollution abatement, release of water for downstream fish spawning, water supply, and recreation.

COOPERATION.--Records were provided by the U.S. Army Corps of Engineers.

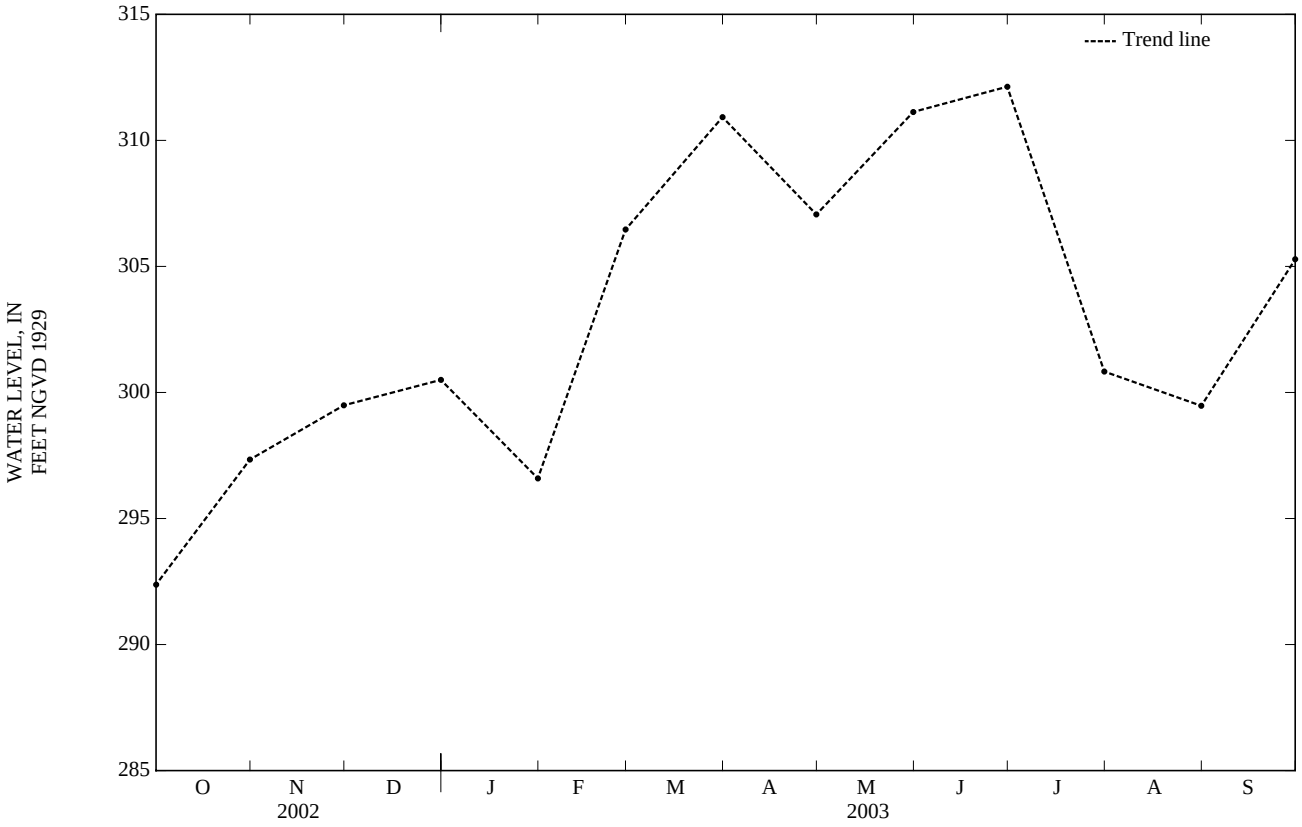
EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 2,736,460 acre-ft, Apr. 29, 1987, elevation, 319.61 ft; minimum (after first filling to rule curve), 724,700 acre-ft, Feb. 3, 1956, elevation, 280.23 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 2,534,690 acre-ft, Apr. 14, elevation, 317.16 ft; minimum, 1,102,040 acre-ft, Oct. 10, elevation, 291.24 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Elevation (feet) | Contents (acre-feet) | Change in contents (acre-feet) |
|---|---|---|---|
| Sept. 30 | 292.38 | 1,146,840 | |
| Oct. 31 | 297.34 | 1,360,940 | +214,100 |
| Nov. 30 | 299.49 | 1,463,560 | +102,620 |
| Dec. 31 | 300.50 | 1,513,850 | +50,290 |
| CAL YR 2002 | | | +415,700 |
| Jan. 31 | 296.59 | 1,326,570 | -187,280 |
| Feb. 28 | 306.46 | 1,834,960 | +508,390 |
| Mar. 31 | 310.92 | 2,101,740 | +266,780 |
| Apr. 30 | 307.06 | 1,869,410 | -232,330 |
| May 31 | 311.13 | 2,114,960 | +245,550 |
| June 30 | 312.13 | 2,178,690 | +63,730 |
| July 31 | 300.83 | 1,530,520 | -648,170 |
| Aug. 31 | 299.47 | 1,462,580 | -67,940 |
| Sept. 30 | 305.28 | 1,768,140 | +305,560 |
| WTR YR 2003 | | | +621,300 |

02079490 JOHN H. KERR RESERVOIR NEAR BOYDTON, VA—Continued



## 02079500 ROANOKE RIVER AT BUGGS ISLAND, VA

LOCATION.--Lat 36°36'06", long 78°17'56" NAD83, Mecklenburg County, Hydrologic 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, 6.7 mi southeast of Boydton, and at mile 178.4.

DRAINAGE AREA.--7,789 $mi^2$.

PERIOD OF RECORD.--November 1921 to August 1923 (gage heights only), April 1947 to September 1962, October 1963 to September 2000 (annual maximum only), October 2000 to current year (gage heights only).

GAGE.--Water-stage recorder. Datum of gage is 196.72 ft NGVD of 1929. November 1921 to August 1923, at site 0.3 mi upstream at different datum. April 1947 to Sept. 30, 1952, at site 2,800 ft downstream at different datum.

REMARKS.--Mean daily gage heights are shown in table below. Since July 1950, flow regulated by John H. Kerr reservoir (station 02079490) 1,200 ft upstream.

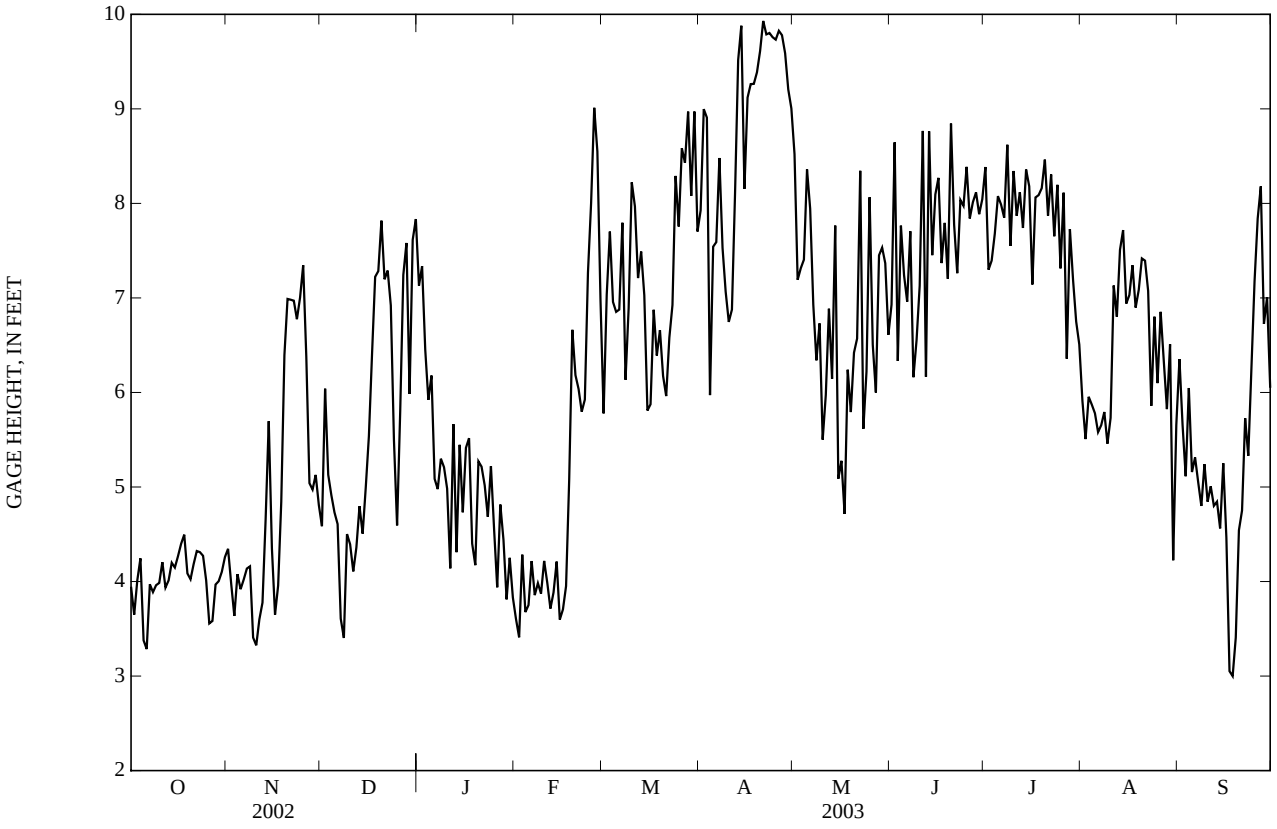
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 76,000 $ft^3/s$, Dec. 7, 1948, gage height, 14.97 ft.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 10.02 ft, Dec. 4; minimum gage height, 2.11 ft, Sept. 18.

GAGE HEIGHT, FEET
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.95 | 4.35 | 4.58 | 7.13 | 3.60 | 5.78 | 7.93 | 8.52 | 6.93 | 8.38 | 5.91 | 6.35 |
| 2 | 3.65 | 3.97 | 6.04 | 7.34 | 3.41 | 7.04 | 9.00 | 7.19 | 8.65 | 7.30 | 5.51 | 5.66 |
| 3 | 4.01 | 3.64 | 5.13 | 6.45 | 4.28 | 7.70 | 8.91 | 7.31 | 6.33 | 7.40 | 5.95 | 5.11 |
| 4 | 4.25 | 4.08 | 4.91 | 5.92 | 3.68 | 6.96 | 5.97 | 7.40 | 7.76 | 7.68 | 5.87 | 6.05 |
| 5 | 3.38 | 3.92 | 4.73 | 6.18 | 3.75 | 6.85 | 7.54 | 8.36 | 7.24 | 8.08 | 5.78 | 5.16 |
| 6 | 3.29 | 4.02 | 4.61 | 5.09 | 4.22 | 6.88 | 7.59 | 7.94 | 6.96 | 7.99 | 5.58 | 5.31 |
| 7 | 3.97 | 4.14 | 3.61 | 4.98 | 3.86 | 7.80 | 8.48 | 6.93 | 7.71 | 7.85 | 5.65 | 5.05 |
| 8 | 3.89 | 4.16 | 3.40 | 5.30 | 3.98 | 6.13 | 7.53 | 6.34 | 6.16 | 8.62 | 5.79 | 4.80 |
| 9 | 3.96 | 3.41 | 4.50 | 5.21 | 3.87 | 6.89 | 7.07 | 6.73 | 6.55 | 7.55 | 5.46 | 5.24 |
| 10 | 3.99 | 3.33 | 4.39 | 4.98 | 4.22 | 8.22 | 6.75 | 5.50 | 7.13 | 8.34 | 5.73 | 4.84 |
| 11 | 4.21 | 3.60 | 4.11 | 4.14 | 3.99 | 7.97 | 6.88 | 5.97 | 8.77 | 7.87 | 7.13 | 5.01 |
| 12 | 3.94 | 3.78 | 4.36 | 5.67 | 3.71 | 7.21 | 8.11 | 6.89 | 6.17 | 8.12 | 6.80 | 4.80 |
| 13 | 4.01 | 4.66 | 4.80 | 4.31 | 3.88 | 7.49 | 9.52 | 6.14 | 8.76 | 7.74 | 7.51 | 4.84 |
| 14 | 4.20 | 5.70 | 4.51 | 5.45 | 4.21 | 7.03 | 9.88 | 7.77 | 7.45 | 8.36 | 7.72 | 4.56 |
| 15 | 4.15 | 4.35 | 5.00 | 4.73 | 3.60 | 5.81 | 8.15 | 5.09 | 8.09 | 8.18 | 6.94 | 5.25 |
| 16 | 4.27 | 3.65 | 5.54 | 5.41 | 3.71 | 5.88 | 9.12 | 5.28 | 8.27 | 7.14 | 7.03 | 4.46 |
| 17 | 4.40 | 3.96 | 6.41 | 5.52 | 3.95 | 6.87 | 9.26 | 4.71 | 7.37 | 8.06 | 7.35 | 3.05 |
| 18 | 4.50 | 4.84 | 7.22 | 4.40 | 5.07 | 6.39 | 9.26 | 6.24 | 7.79 | 8.09 | 6.90 | 3.00 |
| 19 | 4.09 | 6.39 | 7.28 | 4.17 | 6.66 | 6.66 | 9.39 | 5.79 | 7.20 | 8.16 | 7.09 | 3.41 |
| 20 | 4.02 | 6.99 | 7.82 | 5.27 | 6.18 | 6.17 | 9.61 | 6.42 | 8.84 | 8.46 | 7.42 | 4.54 |
| 21 | 4.18 | 6.98 | 7.20 | 5.21 | 6.04 | 5.96 | 9.93 | 6.57 | 7.78 | 7.87 | 7.39 | 4.75 |
| 22 | 4.32 | 6.97 | 7.29 | 5.02 | 5.80 | 6.58 | 9.79 | 8.34 | 7.26 | 8.31 | 7.07 | 5.73 |
| 23 | 4.31 | 6.77 | 6.92 | 4.68 | 5.92 | 6.92 | 9.80 | 5.62 | 8.04 | 7.65 | 5.86 | 5.33 |
| 24 | 4.27 | 7.00 | 5.50 | 5.22 | 7.27 | 8.29 | 9.76 | 6.22 | 7.97 | 8.20 | 6.80 | 6.26 |
| 25 | 4.01 | 7.35 | 4.59 | 4.55 | 8.00 | 7.76 | 9.73 | 8.07 | 8.39 | 7.31 | 6.10 | 7.17 |
| 26 | 3.56 | 6.38 | 5.80 | 3.94 | 9.01 | 8.58 | 9.83 | 6.51 | 7.84 | 8.11 | 6.85 | 7.84 |
| 27 | 3.58 | 5.04 | 7.24 | 4.81 | 8.55 | 8.43 | 9.78 | 6.00 | 8.01 | 6.36 | 6.33 | 8.18 |
| 28 | 3.97 | 4.97 | 7.58 | 4.44 | 6.98 | 8.97 | 9.59 | 7.45 | 8.12 | 7.73 | 5.82 | 6.73 |
| 29 | 4.00 | 5.13 | 5.98 | 3.81 | --- | 8.08 | 9.21 | 7.53 | 7.89 | 7.19 | 6.51 | 7.01 |
| 30 | 4.10 | 4.81 | 7.62 | 4.25 | --- | 8.97 | 9.00 | 7.37 | 8.04 | 6.75 | 4.22 | 6.05 |
| 31 | 4.26 | --- | 7.83 | 3.83 | --- | 7.70 | --- | 6.61 | --- | 6.51 | 5.66 | --- |
| MEAN | 4.02 | 4.94 | 5.69 | 5.08 | 5.05 | 7.22 | 8.75 | 6.74 | 7.65 | 7.79 | 6.38 | 5.38 |
| MAX | 4.50 | 7.35 | 7.83 | 7.34 | 9.01 | 8.97 | 9.93 | 8.52 | 8.84 | 8.62 | 7.72 | 8.18 |
| MIN | 3.29 | 3.33 | 3.40 | 3.81 | 3.41 | 5.78 | 5.97 | 4.71 | 6.16 | 6.36 | 4.22 | 3.00 |

02079500 ROANOKE RIVER AT BUGGS ISLAND, VA—Continued



## 02079640 ALLEN CREEK NEAR BOYDTON, VA

LOCATION.--Lat 36°40'47", long 78°19'36", NAD83, Mecklenburg County, Hydrologic Unit 03010106, on right bank at upstream side of upstream bridge on U.S. Highway 58, 0.8 mi upstream from Coleman Creek, 2.3 mi downstream from Layton Creek, 3.7 mi east of Boydton, and 11.8 mi southwest of South Hill.

DRAINAGE AREA.--53.4 $mi^2$, approximately.

PERIOD OF RECORD.--October 1961 to September 1996, October 2000 to current year.

REVISED RECORDS.--WSP 2104: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 216.50 ft NGVD of 1929 (levels by Virginia Department of Transportation). October 1961 to September 1996, recording gage at site 200 ft downstream, on left bank, and at same datum.

REMARKS.--Records good except those for periods of doubtful or no gage-height record, Oct. 26 to Dec. 4, Apr. 1, 2, and Aug. 10-20, and periods with ice effect, Dec. 7-9 and Jan. 17, 18, 21-25, 28, which are fair. Maximum discharge, 7,380 $ft^3/s$, from rating curve extended above 3,100 $ft^3/s$. Several measurements of water temperature were made during the year.

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

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 850 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Oct 11 | 1930 | 1,300 | 13.77 | Apr 7 | 1900 | 1,970 | 16.17 |
| Dec 13 | 2300 | 1,280 | 13.70 | Apr 9 | 1500 | 3,000 | 18.38 |
| Dec 25 | 0100 | 1,330 | 13.91 | Apr 11 | 0400 | 2,010 | 16.27 |
| Jan 1 | 2030 | 1,260 | 13.58 | May 22 | 1900 | 1,300 | 13.78 |
| Feb 22 | 2300 | 1,510 | 14.65 | May 26 | 1030 | *7,380 | *23.35 |
| Mar 2 | 1000 | 864 | 11.29 | Jun 8 | 0330 | 1,990 | 16.22 |
| Mar 20 | 2130 | 3,880 | 19.77 | Sep 19 | 0600 | 5,330 | 21.50 |
| Mar 30 | 1830 | 945 | 11.79 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.68 | e19 | e9.2 | 463 | 70 | 279 | e85 | 61 | 93 | 18 | 12 | 26 |
| 2 | 0.44 | e12 | e8.5 | 298 | 45 | 539 | e60 | 28 | 43 | 311 | 13 | 12 |
| 3 | 0.21 | e9.5 | e8.0 | 111 | 34 | 166 | 49 | 19 | 33 | 143 | 13 | 9.7 |
| 4 | 0.07 | e13 | e7.3 | 85 | 30 | 83 | 41 | 20 | 55 | 48 | 31 | 172 |
| 5 | 0.02 | e17 | 12 | 53 | 27 | 72 | 36 | 18 | 151 | 29 | 59 | 188 |
| 6 | 0.01 | e175 | 17 | 42 | 23 | 155 | 32 | 19 | 43 | 22 | 349 | 36 |
| 7 | 0.01 | e85 | e14 | 35 | 184 | 115 | 967 | 18 | 335 | 39 | 41 | 22 |
| 8 | 0.00 | e21 | e15 | 31 | 148 | 66 | 374 | 17 | 889 | 23 | 83 | 17 |
| 9 | 0.00 | e16 | e20 | 29 | 60 | 52 | 1,820 | 15 | 336 | 21 | 21 | 15 |
| 10 | 0.00 | e12 | 23 | 25 | 49 | 42 | 640 | 22 | 99 | 21 | e145 | 14 |
| 11 | 444 | e16 | 205 | 22 | 56 | 36 | 966 | 67 | 64 | 16 | e52 | 12 |
| 12 | 162 | e315 | 217 | 20 | 40 | 33 | 167 | 25 | 52 | 14 | e43 | 12 |
| 13 | 21 | e150 | 424 | 18 | 31 | 31 | 91 | 17 | 68 | 13 | e23 | 13 |
| 14 | 11 | e60 | 480 | 18 | 27 | 30 | 64 | 14 | 41 | 13 | e19 | 16 |
| 15 | 8.1 | e28 | 115 | 17 | 60 | 26 | 51 | 13 | 33 | 13 | e17 | 16 |
| 16 | 67 | e32 | 64 | 16 | 259 | 26 | 43 | 20 | 32 | 13 | e15 | 15 |
| 17 | 47 | e420 | 42 | e16 | 92 | 27 | 37 | 17 | 35 | 19 | e16 | 14 |
| 18 | 15 | e190 | 32 | e13 | 59 | 26 | 32 | 106 | 41 | 13 | e25 | 340 |
| 19 | 8.4 | e70 | 28 | 17 | 133 | 24 | 46 | 422 | 72 | 11 | e17 | 2,810 |
| 20 | 5.8 | e33 | 32 | 15 | 223 | 1,770 | 39 | 92 | 62 | 10 | e14 | 141 |
| 21 | 14 | e25 | 42 | e14 | 144 | 1,030 | 33 | 49 | 34 | 9.7 | 12 | 57 |
| 22 | 24 | e22 | 29 | e12 | 555 | 134 | 30 | 687 | 26 | 9.9 | 11 | 43 |
| 23 | 12 | e19 | 24 | e11 | 563 | 78 | 27 | 675 | 22 | 27 | 10 | 272 |
| 24 | 8.0 | e16 | 227 | e10 | 118 | 57 | 23 | 249 | 19 | 20 | 9.4 | 114 |
| 25 | 5.9 | e14 | 794 | e12 | 67 | 46 | 23 | 149 | 17 | 13 | 8.7 | 50 |
| 26 | e13 | e13 | 172 | 13 | 50 | 39 | 28 | 3,500 | 16 | 10 | 8.4 | 35 |
| 27 | e11 | e12 | 73 | 12 | 111 | 34 | 27 | 248 | 14 | 9.3 | 8.2 | 28 |
| 28 | e30 | e11 | 49 | e11 | 425 | 30 | 22 | 177 | 15 | 8.6 | 7.9 | 24 |
| 29 | e100 | e11 | 39 | 13 | --- | 32 | 19 | 83 | 14 | 8.5 | 7.6 | 22 |
| 30 | e130 | e10 | 32 | 50 | --- | 477 | 17 | 59 | 13 | 17 | 7.5 | 19 |
| 31 | e45 | --- | 28 | 182 | --- | 268 | --- | 60 | --- | 14 | 15 | --- |
| TOTAL | 1,183.64 | 1,846.5 | 3,282.0 | 1,684 | 3,683 | 5,823 | 5,889 | 6,966 | 2,767 | 957.0 | 1,113.7 | 4,564.7 |
| MEAN | 38.2 | 61.5 | 106 | 54.3 | 132 | 188 | 196 | 225 | 92.2 | 30.9 | 35.9 | 152 |
| MAX | 444 | 420 | 794 | 463 | 563 | 1,770 | 1,820 | 3,500 | 889 | 311 | 349 | 2,810 |
| MIN | 0.00 | 9.5 | 7.3 | 10 | 23 | 24 | 17 | 13 | 13 | 8.5 | 7.5 | 9.7 |
| CFSM | 0.72 | 1.15 | 1.98 | 1.02 | 2.46 | 3.52 | 3.68 | 4.21 | 1.73 | 0.58 | 0.67 | 2.85 |
| IN. | 0.82 | 1.29 | 2.29 | 1.17 | 2.57 | 4.06 | 4.10 | 4.85 | 1.93 | 0.67 | 0.78 | 3.18 |

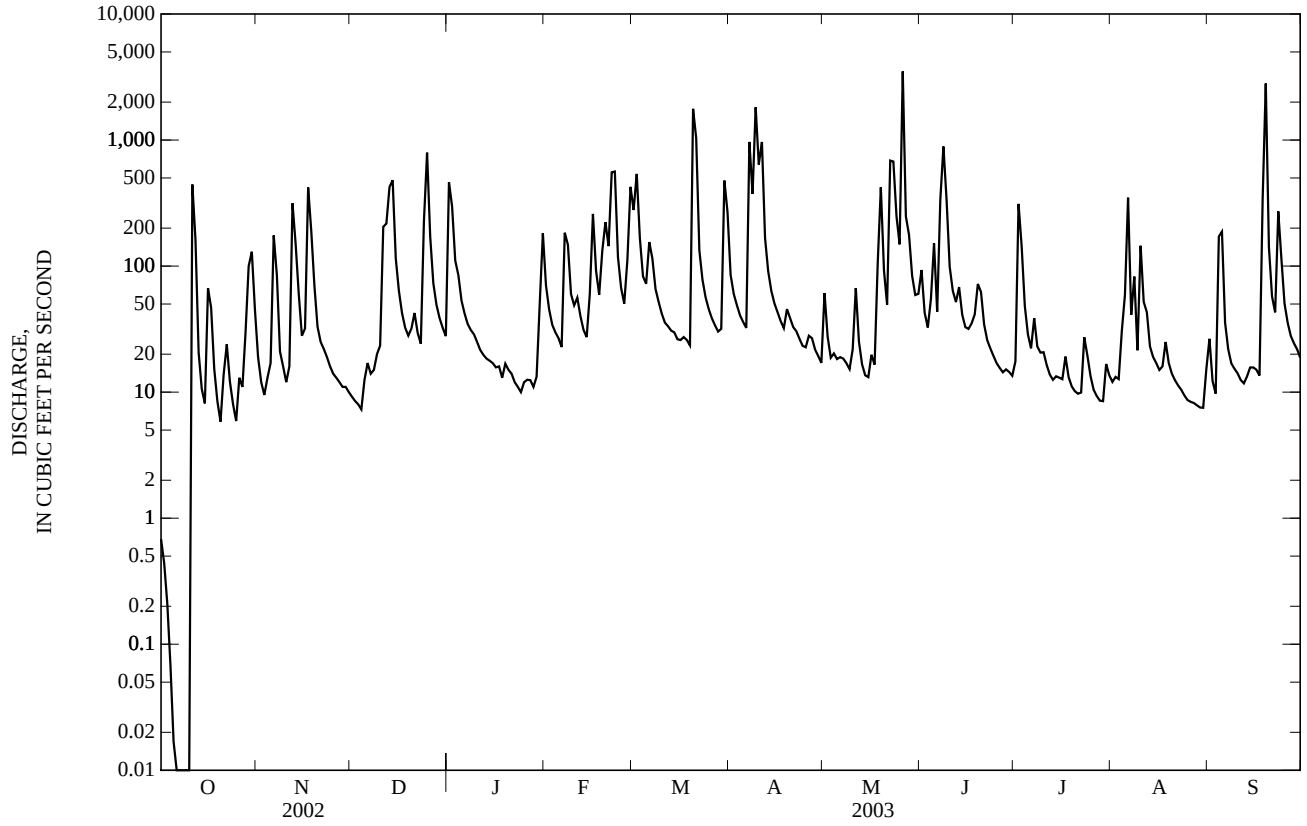
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 1996, 2001 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 24.1 | 31.6 | 41.9 | 74.8 | 82.5 | 101 | 70.0 | 40.3 | 28.3 | 17.7 | 13.3 | 22.0 |
| MAX | 201 | 151 | 107 | 239 | 214 | 289 | 404 | 225 | 125 | 174 | 61.9 | 188 |
| (WY) | (1972) | (1986) | (1984) | (1978) | (1979) | (1975) | (1987) | (2003) | (1982) | (1975) | (1989) | (1979) |
| MIN | 0.20 | 1.61 | 2.36 | 7.42 | 11.8 | 15.3 | 10.9 | 10.3 | 0.95 | 0.080 | 0.090 | 0.022 |
| (WY) | (1971) | (1966) | (1966) | (1981) | (2002) | (1981) | (1966) | (1986) | (2002) | (2002) | (2002) | (1970) |

02079640 ALLEN CREEK NEAR BOYDTON, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1952 - 1996 2001 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 9,470.91 | | 39,759.54 | | | |
| ANNUAL MEAN | 25.9 | | 109 | | 45.4 | |
| HIGHEST ANNUAL MEAN | | | | | 109 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 9.07 | 2002 |
| HIGHEST DAILY MEAN | 794 | Dec 25 | 3,500 | May 26 | 3,700 | Apr 25, 1987 |
| LOWEST DAILY MEAN | 0.00 | aJul 16 | 0.00 | bOct 8 | 0.00 | (c) |
| ANNUAL SEVEN-DAY MINIMUM | 0.00 | dJul 16 | 0.02 | Oct 4 | 0.00 | (f) |
| MAXIMUM PEAK FLOW | | | 7,380 | May 26 | 7,380 | May 26, 2003 |
| MAXIMUM PEAK STAGE | | | 23.35 | May 26 | 23.35 | May 26, 2003 |
| INSTANTANEOUS LOW FLOW | | | 0.00 | (g) | 0.00 | (h) |
| ANNUAL RUNOFF (CFSM) | 0.49 | | 2.04 | | 0.85 | |
| ANNUAL RUNOFF (INCHES) | 6.60 | | 27.70 | | 11.56 | |
| 10 PERCENT EXCEEDS | 45 | | 248 | | 82 | |
| 50 PERCENT EXCEEDS | 6.3 | | 28 | | 14 | |
| 90 PERCENT EXCEEDS | 0.01 | | 10 | | 1.9 | |

a Also July 17-23, Aug. 7-18, 20-25, and Oct. 8-10, 2002.
b Also Oct. 9, 10, 2002.
c Many days August to October 1968, September, October 1970, and July, August, October 2002.
d Also July 17 and August 7-19, 2002.
e Estimated.
f Many days August to October 1968, September, October 1970, and July, August 2002.
g No flow part or all of each day Oct. 7-10, 2002.
h No flow part or all of many days August to October 1968, September, October 1970, and July to October 2002.



## 03161000 SOUTH FORK NEW RIVER NEAR JEFFERSON, NC

LOCATION.--Lat 36°23'35", long 81°24'25", 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 $mi^2$.

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 NGVD of 1929. Prior to Oct. 14, 1934, nonrecording gage on bridge 400 ft downstream at same datum. Oct. 14, 1934, to Mar. 25, 1935, nonrecording gage at present site and datum. 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 $ft^3/s$ 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 Oct. 9, 10, 2002. Maximum peak stage for current water year from high-water mark in well.

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 $ft^3/s$.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 291 | 307 | 288 | 484 | 332 | 602 | 542 | 979 | 511 | 660 | 477 | 494 |
| 2 | 253 | 268 | 275 | 637 | e310 | 560 | 594 | 688 | 431 | 1,720 | 529 | 480 |
| 3 | 230 | 246 | 278 | 586 | 295 | 527 | 545 | 652 | 441 | 1,800 | 696 | 416 |
| 4 | 216 | 237 | 284 | 590 | 333 | 487 | 504 | 584 | 561 | 975 | 782 | 488 |
| 5 | 202 | 256 | 375 | 506 | 406 | 470 | 504 | 599 | 505 | 764 | 575 | 521 |
| 6 | 192 | 416 | 468 | 476 | 332 | 557 | 513 | 683 | 437 | 732 | 547 | 431 |
| 7 | 185 | 413 | 358 | 446 | 329 | 608 | 494 | 642 | 927 | 758 | 607 | 401 |
| 8 | 178 | 332 | e306 | e425 | e306 | 502 | 530 | 594 | 1,410 | 692 | 806 | 389 |
| 9 | 174 | 292 | e294 | e402 | e298 | 475 | 649 | 558 | 1,170 | 604 | 999 | 386 |
| 10 | 174 | 280 | 291 | 393 | e294 | 450 | 1,550 | 548 | 816 | 573 | 1,100 | 367 |
| 11 | 202 | 430 | 608 | 371 | 294 | 429 | 2,150 | 515 | 672 | 572 | 912 | 352 |
| 12 | 253 | 702 | 734 | 346 | 289 | 414 | 1,400 | 496 | 627 | 547 | 747 | 341 |
| 13 | 203 | 675 | 665 | e330 | e279 | 406 | 1,090 | 469 | 649 | 529 | 687 | 334 |
| 14 | 179 | 493 | 954 | e320 | 294 | 413 | 930 | 454 | 689 | 499 | 590 | 332 |
| 15 | 204 | 417 | 671 | e310 | 393 | 388 | 811 | 455 | 982 | 517 | 615 | 329 |
| 16 | 871 | 591 | 545 | e300 | 831 | 891 | 732 | 608 | 1,010 | 482 | 752 | 335 |
| 17 | 720 | 975 | 485 | e290 | 573 | 1,010 | 665 | 508 | 1,650 | 461 | 685 | 319 |
| 18 | 407 | 704 | 440 | e284 | 458 | 720 | 1,830 | 497 | 1,070 | 442 | 563 | 310 |
| 19 | 322 | 545 | 413 | e282 | 458 | 685 | 1,700 | 494 | 1,180 | 423 | 511 | 309 |
| 20 | 285 | 472 | 529 | e280 | 447 | 1,040 | 1,130 | 470 | 905 | 412 | 484 | 301 |
| 21 | 263 | 468 | 580 | e278 | 446 | 1,150 | 965 | 459 | 751 | 422 | 464 | 294 |
| 22 | 255 | 502 | 468 | e276 | e1,640 | 845 | 891 | 485 | 660 | 415 | 489 | 318 |
| 23 | 242 | 428 | 437 | e270 | e2,120 | 709 | 782 | 508 | 601 | 577 | 464 | 818 |
| 24 | 223 | 385 | 496 | e268 | 1,100 | 634 | 713 | 525 | 557 | 445 | 481 | 495 |
| 25 | 224 | 361 | 704 | e264 | 800 | 581 | 677 | 501 | 523 | 400 | 428 | 373 |
| 26 | 234 | 341 | 532 | e262 | 670 | 542 | 662 | 570 | 509 | 383 | 407 | 342 |
| 27 | 230 | 328 | 463 | e270 | 641 | 521 | 616 | 504 | 504 | 375 | 391 | 350 |
| 28 | 229 | 312 | e425 | e300 | 683 | 495 | 583 | 455 | 521 | 363 | 397 | 632 |
| 29 | 276 | 297 | e402 | e340 | --- | 498 | 566 | 447 | 482 | 387 | 422 | 462 |
| 30 | 334 | 292 | 392 | 428 | --- | 606 | 582 | 472 | 527 | 496 | 458 | 382 |
| 31 | 404 | --- | 380 | 388 | --- | 614 | --- | 473 | --- | 459 | 485 | --- |
| TOTAL | 8,655 | 12,765 | 14,540 | 11,402 | 15,651 | 18,829 | 25,900 | 16,892 | 22,278 | 18,884 | 18,550 | 12,101 |
| MEAN | 279 | 426 | 469 | 368 | 559 | 607 | 863 | 545 | 743 | 609 | 598 | 403 |
| MAX | 871 | 975 | 954 | 637 | 2,120 | 1,150 | 2,150 | 979 | 1,650 | 1,800 | 1,100 | 818 |
| MIN | 174 | 237 | 275 | 262 | 279 | 388 | 494 | 447 | 431 | 363 | 391 | 294 |
| CFSM | 1.36 | 2.08 | 2.29 | 1.79 | 2.73 | 2.96 | 4.21 | 2.66 | 3.62 | 2.97 | 2.92 | 1.97 |
| IN. | 1.57 | 2.32 | 2.64 | 2.07 | 2.84 | 3.42 | 4.70 | 3.07 | 4.04 | 3.43 | 3.37 | 2.20 |

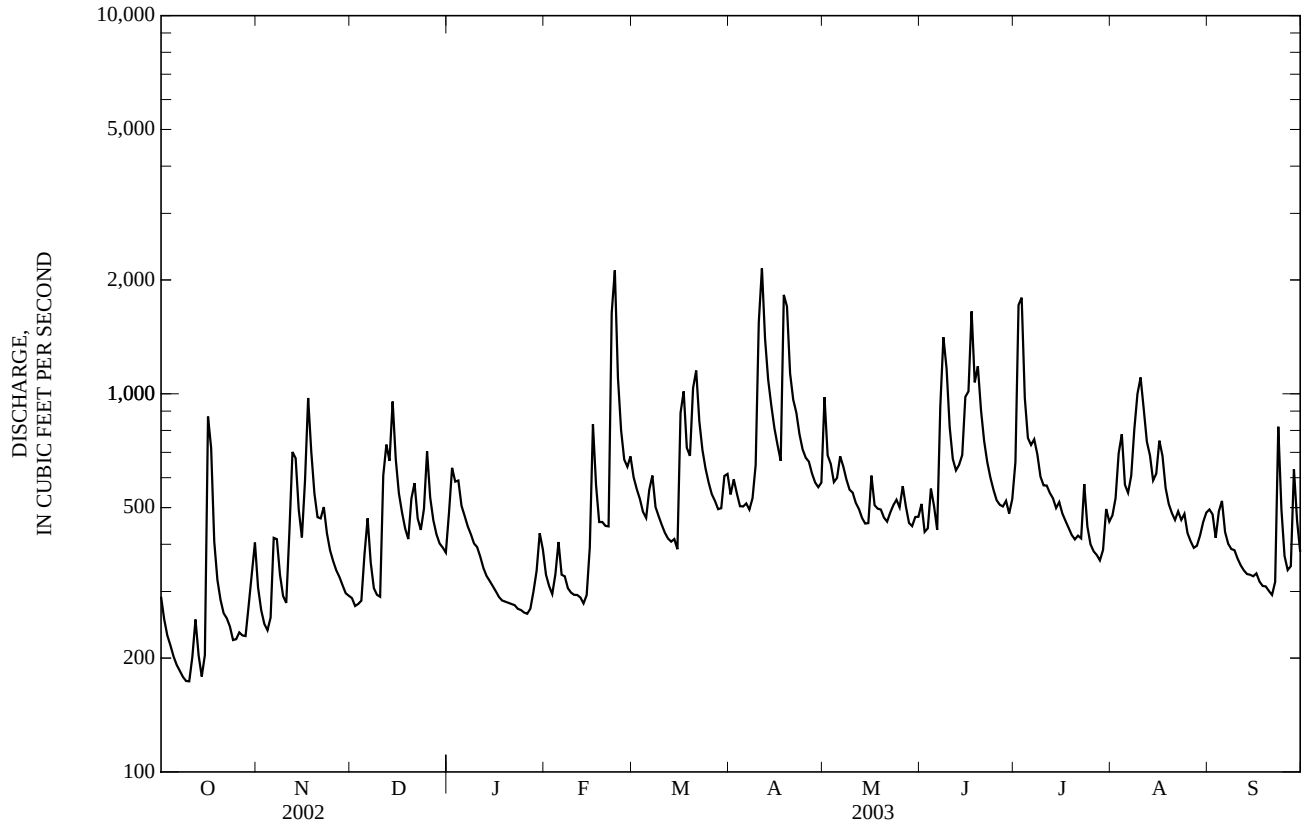
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1925 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 352 | 398 | 402 | 468 | 513 | 584 | 562 | 455 | 389 | 332 | 352 | 321 |
| MAX | 901 | 1,889 | 797 | 1,346 | 1,173 | 1,316 | 1,350 | 1,052 | 1,036 | 904 | 2,613 | 1,212 |
| (WY) | (1991) | (1978) | (1958) | (1995) | (1998) | (1979) | (1983) | (1973) | (1992) | (1941) | (1940) | (1979) |
| MIN | 111 | 124 | 146 | 140 | 188 | 222 | 236 | 220 | 158 | 111 | 93.7 | 99.5 |
| (WY) | (2001) | (1932) | (1934) | (1940) | (2001) | (1988) | (1986) | (2001) | (1988) | (1930) | (1925) | (1954) |

03161000 SOUTH FORK NEW RIVER NEAR JEFFERSON, NC—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1925 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 98,015 | | 196,447 | | | |
| ANNUAL MEAN | 269 | | 538 | | 427 | |
| HIGHEST ANNUAL MEAN | | | | | 669 | 1949 |
| LOWEST ANNUAL MEAN | | | | | 215 | 2002 |
| HIGHEST DAILY MEAN | 2,020 | Sep 27 | 2,150 | Apr 11 | 27,700 | Aug 14, 1940 |
| LOWEST DAILY MEAN | 75 | Aug 24 | 174 | Oct 9 | 65 | Sep 9, 1925 |
| ANNUAL SEVEN-DAY MINIMUM | 83 | Aug 9 | 187 | Oct 5 | 72 | Aug 21, 1925 |
| MAXIMUM PEAK FLOW | | | 3,440 | Feb 22 | 52,800* | Aug 14, 1940 |
| MAXIMUM PEAK STAGE | | | 5.99* | Feb 22 | 22.50 | Aug 14, 1940 |
| INSTANTANEOUS LOW FLOW | | | 173 | Oct 8 | 52* | Dec 24, 1943 |
| ANNUAL RUNOFF (CFSM) | 1.31 | | 2.63 | | 2.08 | |
| ANNUAL RUNOFF (INCHES) | 17.79 | | 35.65 | | 28.28 | |
| 10 PERCENT EXCEEDS | 465 | | 855 | | 705 | |
| 50 PERCENT EXCEEDS | 223 | | 482 | | 342 | |
| 90 PERCENT EXCEEDS | 119 | | 279 | | 167 | |

e Estimated.
* See REMARKS.



## 03164000 NEW RIVER NEAR GALAX, VA

LOCATION.--Lat 36°38'50", long 80°58'44", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except for period with ice effect, Jan. 17 to Feb. 3, which is poor. 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 $ft^3/s$, from rating curve extended above 32,000 $ft^3/s$ on basis of computation of peak flow over dam at Fries 6 mi downstream and 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 9,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 2330 | *24,400 | *7.31 | Jun 8 | 0600 | 9,380 | 3.88 |
| Apr 11 | 0130 | 22,100 | 6.84 | Jul 3 | 0330 | 14,300 | 5.12 |
| Apr 19 | 0630 | 9,470 | 3.90 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 968 | 1,750 | 1,030 | 1,920 | e1,550 | 3,840 | 2,450 | 3,120 | 2,180 | 2,320 | 2,180 | 2,390 |
| 2 | 826 | 1,320 | 969 | 2,920 | e1,600 | 3,520 | 2,830 | 3,460 | 2,090 | 6,190 | 2,680 | 2,090 |
| 3 | 736 | 1,080 | 943 | 3,110 | e1,800 | 3,160 | 2,760 | 2,890 | 1,890 | 12,200 | 2,770 | 1,710 |
| 4 | 672 | 964 | 965 | 3,350 | 1,920 | 2,740 | 2,500 | 2,750 | 2,290 | 6,550 | 2,910 | 1,960 |
| 5 | 635 | 949 | 1,180 | 2,900 | 1,930 | 2,500 | 2,460 | 2,560 | 2,350 | 4,430 | 2,580 | 2,290 |
| 6 | 596 | 1,460 | 1,990 | 2,540 | 1,810 | 2,770 | 2,790 | 2,910 | 1,960 | 3,590 | 2,510 | 1,890 |
| 7 | 569 | 2,120 | 1,690 | 2,220 | 1,670 | 3,850 | 2,750 | 2,850 | 3,330 | 3,850 | 3,610 | 1,590 |
| 8 | 548 | 1,830 | 1,400 | 1,970 | 1,490 | 3,230 | 3,060 | 2,680 | 7,970 | 4,020 | 3,070 | 1,450 |
| 9 | 532 | 1,450 | 1,260 | 1,830 | 1,230 | 2,690 | 3,640 | 2,500 | 5,450 | 3,180 | 4,370 | 1,380 |
| 10 | 527 | 1,220 | 1,160 | 1,730 | 1,360 | 2,360 | 9,390 | 2,320 | 4,110 | 3,020 | 3,890 | 1,340 |
| 11 | 574 | 1,530 | 1,540 | 1,590 | 1,290 | 2,090 | 17,800 | 2,210 | 3,170 | 2,830 | 4,170 | 1,260 |
| 12 | 716 | 3,150 | 3,260 | 1,340 | 1,210 | 1,920 | 10,400 | 2,080 | 4,620 | 2,720 | 3,730 | 1,200 |
| 13 | 718 | 4,030 | 3,410 | 1,260 | 1,100 | 1,780 | 7,180 | 1,890 | 3,910 | 2,650 | 2,940 | 1,160 |
| 14 | 639 | 2,940 | 5,290 | 1,390 | 1,090 | 1,800 | 5,620 | 1,780 | 3,440 | 2,420 | 2,850 | 1,130 |
| 15 | 598 | 2,120 | 4,270 | 1,390 | 1,530 | 1,730 | 4,650 | 1,780 | 3,540 | 2,220 | 2,350 | 1,140 |
| 16 | 1,680 | 2,320 | 3,010 | 1,160 | 5,730 | 2,560 | 4,060 | 2,280 | 4,240 | 2,100 | 2,460 | 1,180 |
| 17 | 3,610 | 4,830 | 2,430 | e1,100 | 5,170 | 4,010 | 3,570 | 2,150 | 6,720 | 1,980 | 2,900 | 1,150 |
| 18 | 2,010 | 4,400 | 2,090 | e1,080 | 3,410 | 3,230 | 5,000 | 2,070 | 5,600 | 1,860 | 2,400 | 1,070 |
| 19 | 1,320 | 3,010 | 1,860 | e1,000 | 2,780 | 2,890 | 8,610 | 2,060 | 6,590 | 1,780 | 2,030 | 1,100 |
| 20 | 1,040 | 2,370 | 2,180 | e940 | 2,680 | 4,300 | 5,890 | 1,910 | 5,740 | 1,670 | 1,830 | 1,090 |
| 21 | 920 | 2,060 | 2,980 | e920 | 2,670 | 6,640 | 4,850 | 1,830 | 4,350 | 1,720 | 1,740 | 1,010 |
| 22 | 885 | 2,210 | 2,600 | e880 | 10,800 | 5,060 | 4,530 | 1,940 | 3,510 | 1,690 | 1,710 | 1,030 |
| 23 | 825 | 2,030 | 2,150 | e820 | 18,400 | 4,010 | 4,020 | 2,010 | 2,950 | 2,080 | 1,690 | 2,540 |
| 24 | 771 | 1,770 | 2,150 | e760 | 9,260 | 3,350 | 3,530 | 2,180 | 2,570 | 1,890 | 1,640 | 2,500 |
| 25 | 741 | 1,580 | 3,520 | e760 | 5,820 | 2,920 | 3,250 | 2,220 | 2,280 | 1,630 | 1,550 | 1,590 |
| 26 | 750 | 1,450 | 3,090 | e800 | 4,450 | 2,630 | 3,130 | 2,340 | 2,080 | 1,470 | 1,440 | 1,280 |
| 27 | 781 | 1,330 | 2,380 | e880 | 3,880 | 2,450 | 2,950 | 2,170 | 1,960 | 1,420 | 1,360 | 1,290 |
| 28 | 779 | 1,260 | 2,060 | e1,100 | 4,010 | 2,230 | 2,650 | 1,910 | 2,010 | 1,380 | 1,350 | 2,030 |
| 29 | 1,020 | 1,160 | 1,860 | e1,400 | --- | 2,120 | 2,470 | 1,830 | 1,960 | 1,500 | 1,460 | 1,990 |
| 30 | 1,510 | 1,090 | 1,690 | e1,700 | --- | 2,410 | 2,370 | 2,130 | 1,850 | 2,450 | 1,610 | 1,490 |
| 31 | 2,150 | --- | 1,590 | e1,600 | --- | 2,600 | --- | 2,070 | --- | 1,910 | 1,700 | --- |
| TOTAL | 30,646 | 60,783 | 67,997 | 48,360 | 101,640 | 93,390 | 141,160 | 70,880 | 106,710 | 90,720 | 75,480 | 46,320 |
| MEAN | 989 | 2,026 | 2,193 | 1,560 | 3,630 | 3,013 | 4,705 | 2,286 | 3,557 | 2,926 | 2,435 | 1,544 |
| MAX | 3,610 | 4,830 | 5,290 | 3,350 | 18,400 | 6,640 | 17,800 | 3,460 | 7,970 | 12,200 | 4,370 | 2,540 |
| MIN | 527 | 949 | 943 | 760 | 1,090 | 1,730 | 2,370 | 1,780 | 1,850 | 1,380 | 1,350 | 1,010 |
| CFSM | 0.87 | 1.79 | 1.94 | 1.38 | 3.21 | 2.66 | 4.16 | 2.02 | 3.15 | 2.59 | 2.15 | 1.37 |
| IN. | 1.01 | 2.00 | 2.24 | 1.59 | 3.34 | 3.07 | 4.64 | 2.33 | 3.51 | 2.98 | 2.48 | 1.52 |

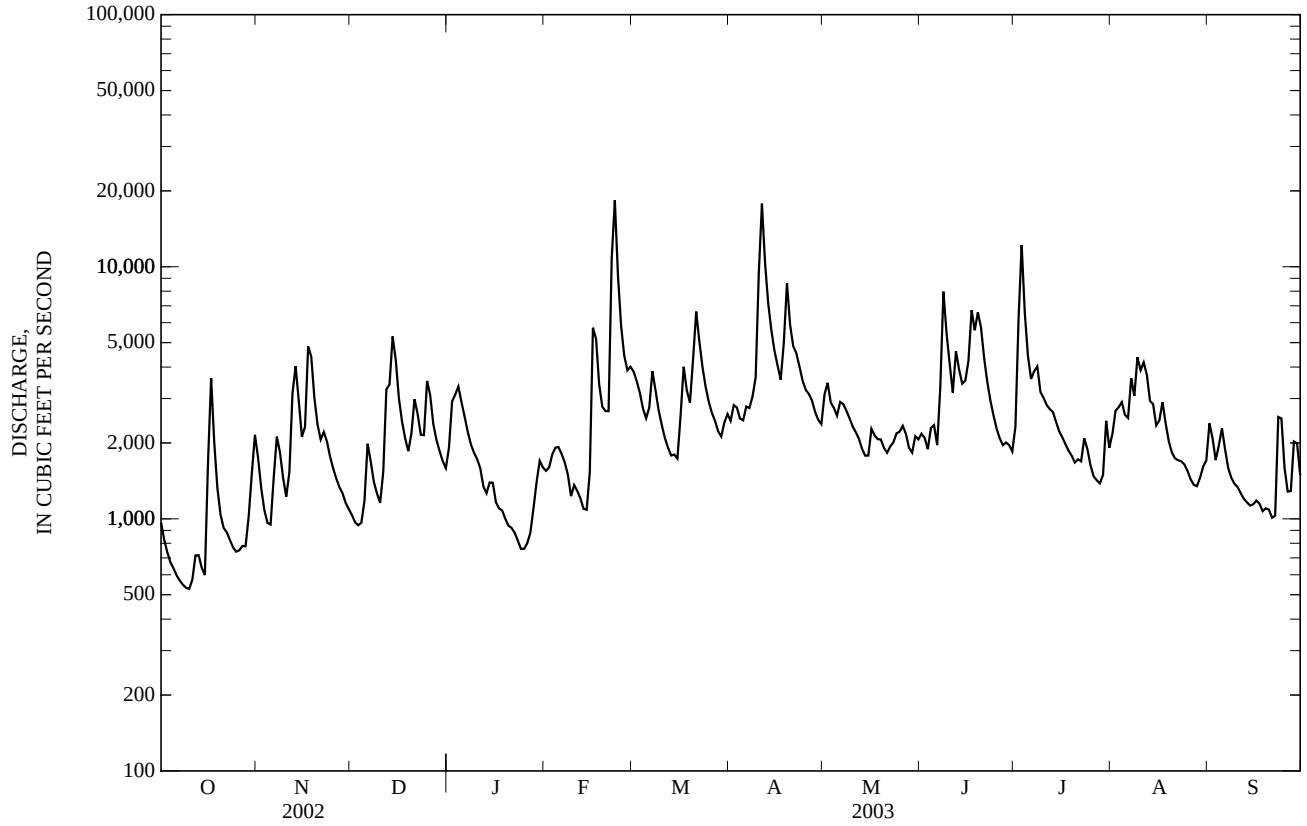
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 1,357 | 1,597 | 1,786 | 2,186 | 2,571 | 2,876 | 2,636 | 2,122 | 1,696 | 1,382 | 1,366 | 1,219 |
| MAX | 3,625 | 7,189 | 4,005 | 5,744 | 5,566 | 5,827 | 6,345 | 4,469 | 5,280 | 4,017 | 8,148 | 4,827 |
| (WY) | (1977) | (1978) | (1962) | (1995) | (1998) | (1993) | (1987) | (1973) | (1992) | (1949) | (1940) | (1989) |
| MIN | 414 | 504 | 592 | 568 | 630 | 958 | 1,017 | 811 | 614 | 426 | 424 | 381 |
| (WY) | (2001) | (1954) | (1956) | (1956) | (1934) | (1988) | (1942) | (1941) | (1988) | (1930) | (2002) | (1954) |

03164000 NEW RIVER NEAR GALAX, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1930 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 449,739 | | 934,086 | | | |
| ANNUAL MEAN | 1,232 | | 2,559 | | 1,896 | |
| HIGHEST ANNUAL MEAN | | | | | 2,807 | 1958 |
| LOWEST ANNUAL MEAN | | | | | 954 | 2002 |
| HIGHEST DAILY MEAN | 8,560 | Mar 18 | 18,400 | Feb 23 | 86,200 | Aug 14, 1940 |
| LOWEST DAILY MEAN | 299 | Aug 15 | 527 | Oct 10 | 265 | Sep 19, 1954 |
| ANNUAL SEVEN-DAY MINIMUM | 317 | Aug 10 | 569 | Oct 5 | 304 | Sep 13, 1954 |
| MAXIMUM PEAK FLOW | | | 24,400 | Feb 22 | 141,000 | Aug 14, 1940 |
| MAXIMUM PEAK STAGE | | | 7.31 | Feb 22 | a25.70 | Aug 14, 1940 |
| INSTANTANEOUS LOW FLOW | | | 519 | Oct 10 | b193 | Jan 9, 1956 |
| ANNUAL RUNOFF (CFSM) | 1.09 | | 2.26 | | 1.68 | |
| ANNUAL RUNOFF (INCHES) | 14.79 | | 30.72 | | 22.78 | |
| 10 PERCENT EXCEEDS | 2,180 | | 4,320 | | 3,420 | |
| 50 PERCENT EXCEEDS | 943 | | 2,090 | | 1,440 | |
| 90 PERCENT EXCEEDS | 476 | | 988 | | 651 | |

a From floodmark.
b Result of freezeup.
e Estimated.



## 03165000 CHESTNUT CREEK AT GALAX, VA

LOCATION.--Lat 36°38'45", long 80°55'09", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to June 25, 1948, nonrecording gage, and June 25, 1948, to May 28, 1953, water-stage recorder, at site 200 ft upstream at datum 0.86 ft higher.

REMARKS.--Records good except those for periods with ice effect, Jan. 12, 13, 16-19, 24-28, which are fair. Maximum discharge, 6,980 $ft^3/s$, from rating curve extended above 2,200 $ft^3/s$ 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 $ft^3/s$, by contracted-opening measurement.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 850 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 1315 | 1,650 | 4.94 | Jun 12 | 0330 | 1,490 | 4.59 |
| Apr 10 | 1845 | 1,370 | 4.33 | Jun 19 | 0630 | 856 | 3.24 |
| Apr 18 | 2000 | 902 | 3.33 | Aug 7 | 0800 | *1,740 | *5.13 |
| Jun 7 | 1545 | 1,000 | 3.53 | Aug 15 | 2330 | 866 | 3.26 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 37 | 49 | 37 | 125 | 48 | 86 | 106 | 88 | 73 | 108 | 139 | 141 |
| 2 | 34 | 43 | 37 | 97 | 48 | 81 | 100 | 83 | 66 | 434 | 117 | 89 |
| 3 | 31 | 39 | 37 | 98 | 47 | 72 | 86 | 80 | 71 | 234 | 138 | 113 |
| 4 | 29 | 37 | 35 | 79 | 61 | 66 | 80 | 89 | 91 | 125 | 103 | 135 |
| 5 | 28 | 42 | 54 | 69 | 52 | 64 | 86 | 93 | 80 | 105 | 101 | 104 |
| 6 | 27 | 65 | 51 | 64 | 48 | 81 | 78 | 94 | 67 | 103 | 97 | 87 |
| 7 | 25 | 46 | 44 | 59 | 49 | 68 | 93 | 85 | 487 | 102 | 724 | 84 |
| 8 | 25 | 42 | 44 | 57 | 46 | 63 | 88 | 81 | 215 | 93 | 172 | 79 |
| 9 | 25 | 39 | 43 | 55 | 48 | 61 | 143 | 77 | 121 | 90 | 135 | 78 |
| 10 | 25 | 38 | 42 | 53 | 45 | 59 | 732 | 74 | 95 | 91 | 235 | 75 |
| 11 | 35 | 111 | 94 | 50 | 45 | 56 | 345 | 72 | 98 | 87 | 175 | 73 |
| 12 | 34 | 154 | 79 | e49 | 45 | 56 | 159 | 69 | 515 | 83 | 121 | 72 |
| 13 | 28 | 94 | 121 | e47 | 43 | 54 | 121 | 66 | 144 | 91 | 103 | 72 |
| 14 | 27 | 66 | 114 | 48 | 46 | 55 | 105 | 64 | 114 | 82 | 97 | 70 |
| 15 | 29 | 57 | 73 | 48 | 78 | 53 | 98 | 73 | 101 | 85 | 155 | 76 |
| 16 | 163 | 117 | 62 | e47 | 111 | 219 | 93 | 80 | 306 | 88 | 252 | 71 |
| 17 | 71 | 154 | 57 | e47 | 70 | 111 | 89 | 70 | 172 | 82 | 113 | 68 |
| 18 | 49 | 83 | 53 | e44 | 61 | 90 | 485 | 82 | 145 | 83 | 97 | 68 |
| 19 | 41 | 68 | 51 | e44 | 68 | 83 | 331 | 81 | 408 | 90 | 92 | 77 |
| 20 | 37 | 60 | 95 | 45 | 82 | 335 | 167 | 72 | 170 | 77 | 87 | 68 |
| 21 | 38 | 60 | 66 | 45 | 103 | 164 | 139 | 71 | 127 | 78 | 85 | 66 |
| 22 | 38 | 55 | 58 | 47 | 711 | 110 | 123 | 85 | 109 | 168 | 87 | 84 |
| 23 | 35 | 50 | 54 | 42 | 281 | 94 | 109 | 90 | 98 | 152 | 82 | 159 |
| 24 | 33 | 48 | 90 | e41 | 128 | 87 | 100 | 84 | 92 | 102 | 79 | 80 |
| 25 | 32 | 46 | 89 | e39 | 97 | 81 | 99 | 77 | 89 | 85 | 78 | 73 |
| 26 | 39 | 45 | 66 | e40 | 85 | 78 | 101 | 122 | 86 | 79 | 76 | 69 |
| 27 | 35 | 43 | 59 | e42 | 93 | 77 | 94 | 86 | 83 | 77 | 75 | 177 |
| 28 | 44 | 42 | 56 | e44 | 97 | 72 | 90 | 76 | 84 | 74 | 75 | 168 |
| 29 | 56 | 40 | 53 | 47 | --- | 91 | 88 | 92 | 86 | 104 | 99 | 86 |
| 30 | 83 | 39 | 52 | 53 | --- | 103 | 86 | 89 | 81 | 117 | 104 | 79 |
| 31 | 60 | --- | 51 | 49 | --- | 96 | --- | 80 | --- | 89 | 159 | --- |
| TOTAL | 1,293 | 1,872 | 1,917 | 1,714 | 2,736 | 2,866 | 4,614 | 2,525 | 4,474 | 3,458 | 4,252 | 2,741 |
| MEAN | 41.7 | 62.4 | 61.8 | 55.3 | 97.7 | 92.5 | 154 | 81.5 | 149 | 112 | 137 | 91.4 |
| MAX | 163 | 154 | 121 | 125 | 711 | 335 | 732 | 122 | 515 | 434 | 724 | 177 |
| MIN | 25 | 37 | 35 | 39 | 43 | 53 | 78 | 64 | 66 | 74 | 75 | 66 |
| CFSM | 1.06 | 1.58 | 1.57 | 1.40 | 2.48 | 2.35 | 3.90 | 2.07 | 3.79 | 2.83 | 3.48 | 2.32 |
| IN. | 1.22 | 1.77 | 1.81 | 1.62 | 2.58 | 2.71 | 4.36 | 2.38 | 4.22 | 3.26 | 4.01 | 2.59 |

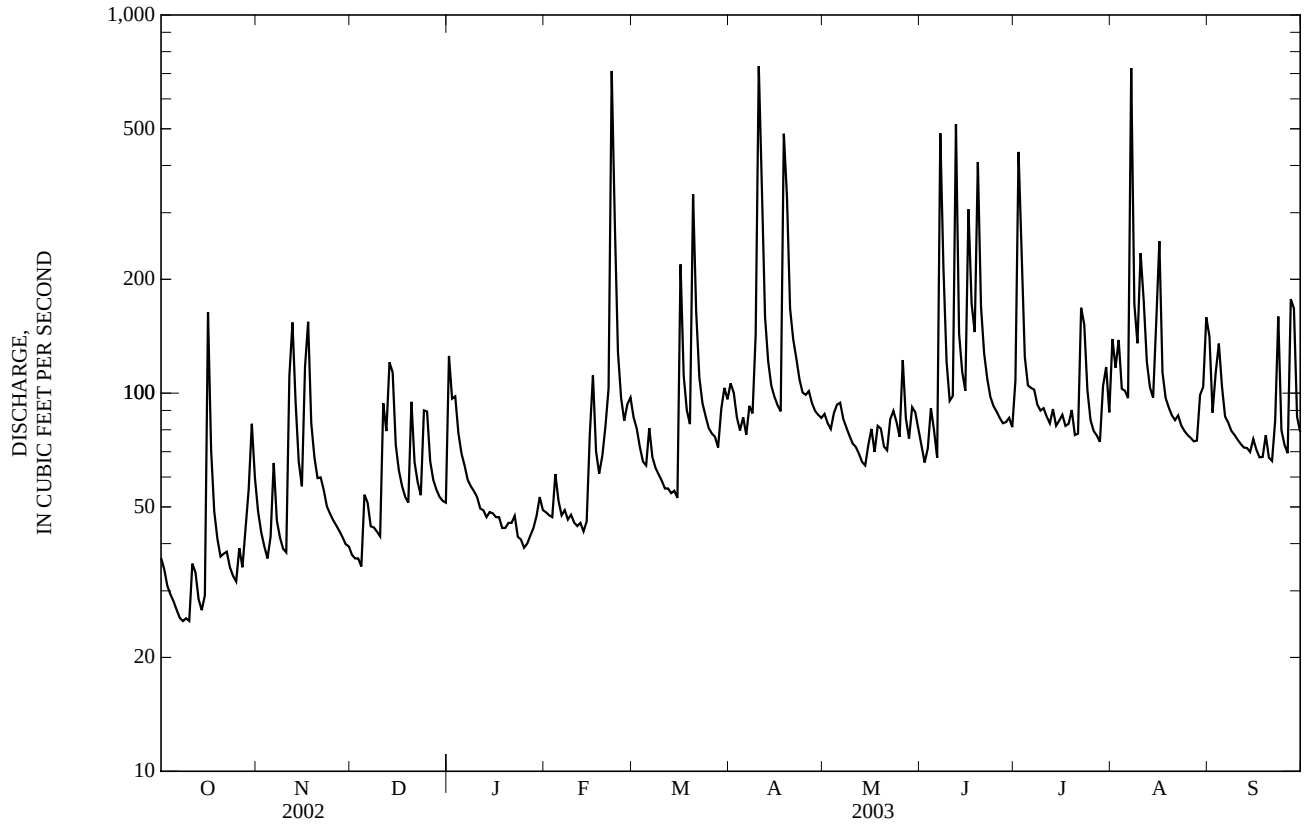
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 57.1 | 61.5 | 63.5 | 69.8 | 80.7 | 92.7 | 89.8 | 74.5 | 66.7 | 52.1 | 49.7 | 53.3 |
| MAX | 197 | 157 | 112 | 161 | 166 | 301 | 233 | 160 | 172 | 150 | 156 | 254 |
| (WY) | (1948) | (1980) | (1958) | (1995) | (1998) | (1993) | (1983) | (1973) | (1992) | (1989) | (1949) | (1989) |
| MIN | 19.8 | 24.2 | 25.8 | 23.9 | 33.2 | 38.1 | 35.5 | 30.4 | 19.6 | 20.7 | 15.6 | 18.6 |
| (WY) | (1964) | (2002) | (1964) | (1956) | (2001) | (1988) | (2001) | (2002) | (2002) | (1986) | (1981) | (1954) |

03165000 CHESTNUT CREEK AT GALAX, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1945 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 14,216 | | 34,462 | | | |
| ANNUAL MEAN | 38.9 | | 94.4 | | 67.5 | |
| HIGHEST ANNUAL MEAN | | | | | 107 | 1993 |
| LOWEST ANNUAL MEAN | | | | | 32.5 | 2002 |
| HIGHEST DAILY MEAN | 350 | Sep 27 | 732 | Apr 10 | 2,050 | Apr 21, 1992 |
| LOWEST DAILY MEAN | 12 | aSep 11 | 25 | bOct 7 | 12 | cAug 26, 1981 |
| ANNUAL SEVEN-DAY MINIMUM | 13 | Sep 7 | 26 | Oct 4 | 13 | Aug 23, 1981 |
| MAXIMUM PEAK FLOW | | | 1,740 | Aug 7 | 6,980 | Oct 17, 1947 |
| MAXIMUM PEAK STAGE | | | 5.13 | Aug 7 | d14.40 | Oct 17, 1947 |
| INSTANTANEOUS LOW FLOW | | | 25 | fOct 7 | 12 | gAug 25, 1981 |
| ANNUAL RUNOFF (CFSM) | 0.99 | | 2.40 | | 1.71 | |
| ANNUAL RUNOFF (INCHES) | 13.42 | | 32.54 | | 23.28 | |
| 10 PERCENT EXCEEDS | 63 | | 144 | | 108 | |
| 50 PERCENT EXCEEDS | 32 | | 79 | | 51 | |
| 90 PERCENT EXCEEDS | 17 | | 41 | | 27 | |

a Also Sept. 12, 13, 2002.
b Also Oct. 8-10, 2002.
c Also Sept. 11-13, 2002.
d From floodmark, site and datum then in use.
e Estimated.
f Also Oct. 8-11, 2002.
g Also Aug. 26-30, 1981, Nov. 22, 2000, and Sept. 11-14, 2002.



## 03165500 NEW RIVER AT IVANHOE, VA

LOCATION.--Lat 36°50'05", long 80°57'09", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except for period with ice effect, Jan. 20-29, 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 $ft^3/s$, from rating curve extended above 32,000 $ft^3/s$ on basis of flood records for other stations on New River. 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 $ft^3/s$, 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 13,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 23 | 0445 | *24,100 | *12.56 | Jul 3 | 0545 | 14,500 | 9.36 |
| Apr 11 | 0800 | 21,700 | 11.84 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1,440 | 2,220 | 1,540 | 2,370 | 2,260 | 4,040 | 3,050 | 3,190 | 2,400 | 2,740 | 2,580 | 2,620 |
| 2 | 1,280 | 1,790 | 1,390 | 3,200 | 2,070 | 3,810 | 3,370 | 3,540 | 2,520 | 5,420 | 3,010 | 2,520 |
| 3 | 996 | 1,530 | 1,410 | 3,380 | 2,100 | 3,870 | 3,350 | 3,150 | 2,300 | 12,700 | 3,120 | 2,240 |
| 4 | 911 | 1,400 | 1,420 | 3,510 | 2,100 | 3,540 | 3,060 | 3,100 | 2,480 | 7,340 | 3,110 | 2,090 |
| 5 | 837 | 1,440 | 1,490 | 3,170 | 2,340 | 3,130 | 2,980 | 2,950 | 2,730 | 4,800 | 2,960 | 2,560 |
| 6 | 759 | 1,700 | 2,270 | 2,840 | 2,270 | 2,370 | 3,270 | 3,130 | 2,430 | 3,910 | 2,940 | 2,240 |
| 7 | 688 | 2,320 | 2,160 | 2,580 | 2,180 | 3,640 | 3,230 | 3,170 | 3,370 | 3,740 | 4,760 | 1,930 |
| 8 | 669 | 2,230 | 1,880 | 2,390 | 1,920 | 3,600 | 3,550 | 2,990 | 7,760 | 4,040 | 3,880 | 1,710 |
| 9 | 657 | 1,910 | 2,110 | 2,270 | 1,770 | 3,120 | 3,980 | 2,900 | 6,090 | 3,530 | 4,460 | 1,680 |
| 10 | 593 | 1,700 | 1,890 | 2,140 | 1,850 | 2,900 | 7,540 | 2,750 | 4,350 | 3,200 | 4,170 | 1,650 |
| 11 | 732 | 2,070 | 1,870 | 2,080 | 1,830 | 2,670 | 18,700 | 2,620 | 3,480 | 3,060 | 4,440 | 1,570 |
| 12 | 912 | 3,280 | 3,110 | 1,750 | 1,710 | 2,480 | 10,800 | 2,600 | 5,120 | 2,980 | 3,910 | 1,490 |
| 13 | 1,010 | 4,060 | 2,990 | 1,600 | 1,620 | 2,390 | 7,290 | 2,300 | 4,240 | 2,960 | 3,300 | 1,460 |
| 14 | 900 | 3,280 | 4,890 | 1,750 | 1,600 | 2,360 | 5,690 | 2,200 | 3,860 | 2,810 | 3,200 | 1,440 |
| 15 | 908 | 2,560 | 4,340 | 1,760 | 2,010 | 2,340 | 4,840 | 2,270 | 3,770 | 2,610 | 2,820 | 1,460 |
| 16 | 1,520 | 2,660 | 3,360 | 1,510 | 4,830 | 2,860 | 4,170 | 2,590 | 4,580 | 2,490 | 2,960 | 1,470 |
| 17 | 3,580 | 4,400 | 2,780 | 1,470 | 5,370 | 3,980 | 3,660 | 2,630 | 6,360 | 2,410 | 3,120 | 1,490 |
| 18 | 2,540 | 4,470 | 2,430 | 1,420 | 3,730 | 3,610 | 4,690 | 2,550 | 6,150 | 2,320 | 2,790 | 1,420 |
| 19 | 1,870 | 3,330 | 2,260 | 1,280 | 3,100 | 3,260 | 8,930 | 2,560 | 7,500 | 2,280 | 2,400 | 1,500 |
| 20 | 1,490 | 2,740 | 2,460 | e1,200 | 3,070 | 4,300 | 6,160 | 2,400 | 6,280 | 2,150 | 2,180 | 1,400 |
| 21 | 1,350 | 2,450 | 3,070 | e1,200 | 3,090 | 6,410 | 5,000 | 2,280 | 4,630 | 2,160 | 2,040 | 1,360 |
| 22 | 1,250 | 2,460 | 2,940 | e1,150 | 9,170 | 5,190 | 4,580 | 2,410 | 3,770 | 2,200 | 2,260 | 1,380 |
| 23 | 1,210 | 2,420 | 2,530 | e1,100 | 20,700 | 4,170 | 4,090 | 2,510 | 3,340 | 2,620 | 2,040 | 2,420 |
| 24 | 1,090 | 2,160 | 2,550 | e1,000 | 10,400 | 3,700 | 3,650 | 2,530 | 2,930 | 2,390 | 2,130 | 2,920 |
| 25 | 964 | 2,000 | 3,510 | e1,000 | 6,310 | 3,320 | 3,500 | 2,660 | 2,720 | 2,200 | 1,950 | 2,090 |
| 26 | 1,030 | 1,880 | 3,390 | e1,050 | 4,710 | 3,100 | 3,390 | 2,720 | 2,520 | 1,930 | 1,510 | 1,610 |
| 27 | 1,050 | 1,800 | 2,760 | e1,100 | 4,110 | 2,960 | 3,290 | 2,670 | 2,400 | 1,920 | 1,700 | 1,550 |
| 28 | 1,120 | 1,680 | 2,460 | e1,200 | 4,100 | 2,800 | 3,030 | 2,420 | 2,400 | 1,850 | 1,600 | 2,520 |
| 29 | 1,360 | 1,610 | 2,280 | e1,500 | --- | 2,740 | 2,810 | 2,250 | 2,470 | 1,980 | 1,720 | 2,300 |
| 30 | 2,060 | 1,530 | 2,200 | 1,840 | --- | 2,960 | 2,550 | 2,490 | 2,440 | 2,910 | 1,950 | 1,890 |
| 31 | 2,340 | --- | 2,040 | 2,410 | --- | 3,160 | --- | 2,540 | --- | 2,510 | 2,080 | --- |
| TOTAL | 39,116 | 71,080 | 77,780 | 58,220 | 112,320 | 104,780 | 148,200 | 83,070 | 117,390 | 102,160 | 87,090 | 55,980 |
| MEAN | 1,262 | 2,369 | 2,509 | 1,878 | 4,011 | 3,380 | 4,940 | 2,680 | 3,913 | 3,295 | 2,809 | 1,866 |
| MAX | 3,580 | 4,470 | 4,890 | 3,510 | 20,700 | 6,410 | 18,700 | 3,540 | 7,760 | 12,700 | 4,760 | 2,920 |
| MIN | 593 | 1,400 | 1,390 | 1,000 | 1,600 | 2,340 | 2,550 | 2,200 | 2,300 | 1,850 | 1,510 | 1,360 |
| CFSM | 0.94 | 1.77 | 1.87 | 1.40 | 2.99 | 2.52 | 3.69 | 2.00 | 2.92 | 2.46 | 2.10 | 1.39 |
| IN. | 1.09 | 1.97 | 2.16 | 1.62 | 3.12 | 2.91 | 4.11 | 2.31 | 3.26 | 2.84 | 2.42 | 1.55 |

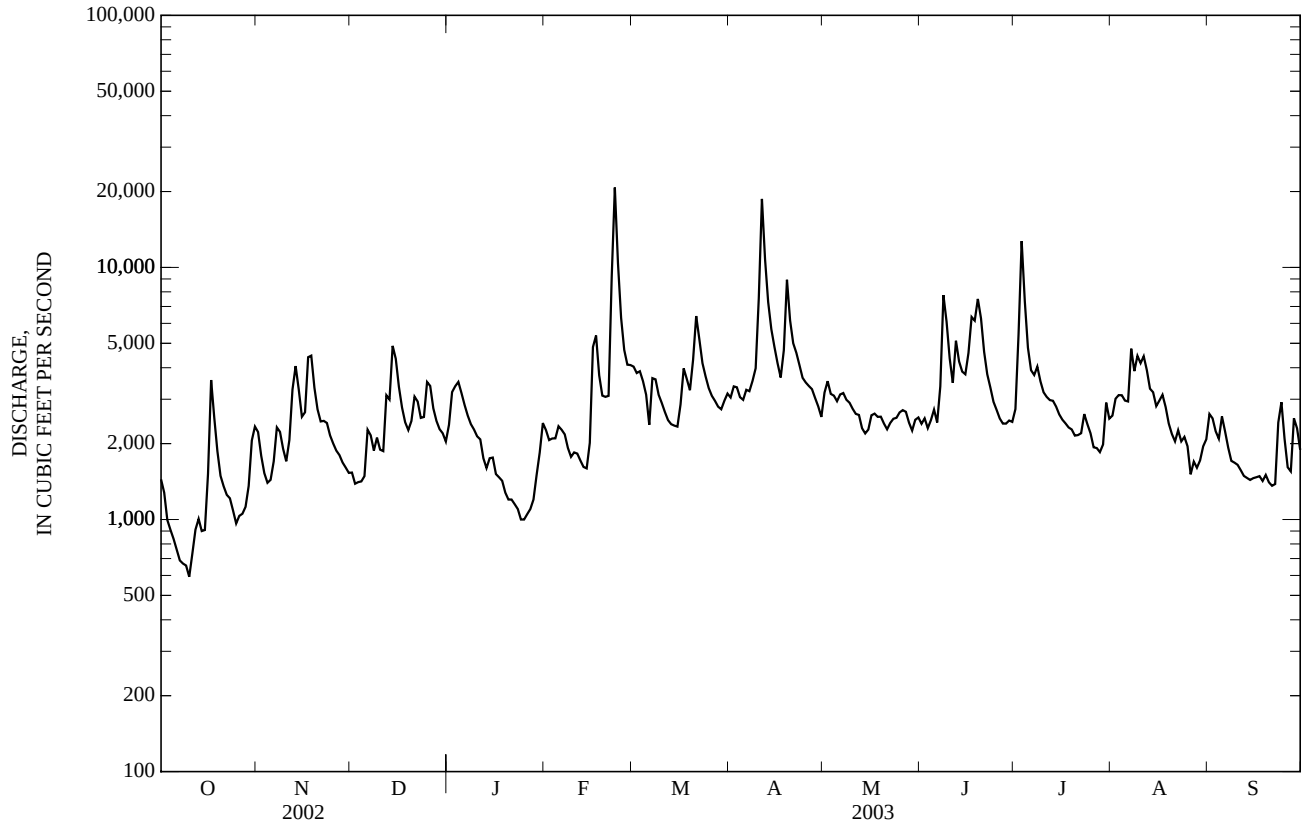
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 1978, 1997 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 1,571 | 1,759 | 1,993 | 2,420 | 2,885 | 3,162 | 2,909 | 2,351 | 1,882 | 1,560 | 1,589 | 1,343 |
| MAX | 4,200 | 7,149 | 4,248 | 5,052 | 6,106 | 6,266 | 5,993 | 5,000 | 4,511 | 4,440 | 8,953 | 4,499 |
| (WY) | (1930) | (1978) | (1962) | (1937) | (1998) | (1975) | (1960) | (1998) | (1976) | (1949) | (1940) | (1945) |
| MIN | 491 | 578 | 703 | 678 | 693 | 1,450 | 1,289 | 991 | 781 | 485 | 451 | 433 |
| (WY) | (1931) | (1932) | (1940) | (1940) | (1934) | (1931) | (1942) | (1941) | (2002) | (1930) | (2002) | (1954) |

03165500 NEW RIVER AT IVANHOE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1930 - 1978 1997 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 526,626 | | 1,057,186 | | | |
| ANNUAL MEAN | 1,443 | | 2,896 | | 2,109 | |
| HIGHEST ANNUAL MEAN | | | | | 3,188 | 1978 |
| LOWEST ANNUAL MEAN | | | | | 1,131 | 2002 |
| HIGHEST DAILY MEAN | 9,140 | Mar 19 | 20,700 | Feb 23 | 87,600 | Aug 14, 1940 |
| LOWEST DAILY MEAN | 239 | Aug 23 | 593 | Oct 10 | 184 | Jul 28, 1930 |
| ANNUAL SEVEN-DAY MINIMUM | 297 | Aug 10 | 705 | Oct 5 | 297 | Aug 10, 2002 |
| MAXIMUM PEAK FLOW | | | 24,100 | Feb 23 | 155,000 | Aug 14, 1940 |
| MAXIMUM PEAK STAGE | | | 12.56 | Feb 23 | a38.10 | Aug 14, 1940 |
| INSTANTANEOUS LOW FLOW | | | 564 | bOct 10 | 44 | Oct 11, 1965 |
| ANNUAL RUNOFF (CFSM) | 1.08 | | 2.16 | | 1.57 | |
| ANNUAL RUNOFF (INCHES) | 14.62 | | 29.35 | | 21.38 | |
| 10 PERCENT EXCEEDS | 2,540 | | 4,460 | | 3,750 | |
| 50 PERCENT EXCEEDS | 1,230 | | 2,510 | | 1,660 | |
| 90 PERCENT EXCEEDS | 472 | | 1,400 | | 723 | |

a From floodmark.
b Also Oct. 15, 2002.
e Estimated.



## 03167000 REED CREEK AT GRAHAMS FORGE, VA

LOCATION.--Lat 36°56'22", long 80°53'12", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Oct. 1, 1916, nonrecording gage at same site at datum 0.68 ft lower. Feb. 3, 1927, to Oct. 28, 1934, and June 11, 1974, to July 22, 1975, nonrecording gage, at present site and datum.

REMARKS.--Records good except for period with ice effect, Jan. 24-29, which is fair. Occasional diurnal fluctuation at low flow caused by mills upstream from station. Maximum discharge, 17,500 $ft^3/s$, from rating curve extended above 7,600 $ft^3/s$ on basis of velocity-area study and slope-area measurement at gage heights 11.4 ft and 10.01 ft, respectively. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,300 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 16 | 1145 | 5,010 | 5.65 | Jul 3 | 0500 | 4,280 | 5.32 |
| Feb 23 | 0145 | *9,390 | *7.73 | Jul 7 | 0345 | 2,680 | 4.46 |
| Apr 11 | 0830 | 4,670 | 5.50 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 77 | 248 | 177 | 381 | 240 | 804 | 364 | 313 | 183 | 612 | 317 | 439 |
| 2 | 70 | 180 | 165 | 624 | 236 | 901 | 476 | 300 | 172 | 2,010 | 307 | 281 |
| 3 | 66 | 147 | 156 | 729 | 233 | 805 | 483 | 275 | 164 | 3,430 | 400 | 222 |
| 4 | 62 | 131 | 151 | 847 | 277 | 662 | 434 | 267 | 188 | 1,220 | 482 | 291 |
| 5 | 60 | 126 | 173 | 651 | 566 | 602 | 410 | 259 | 176 | 807 | 484 | 520 |
| 6 | 58 | 208 | 205 | 539 | 396 | 582 | 392 | 258 | 157 | 868 | 387 | 313 |
| 7 | 57 | 302 | 184 | 450 | 336 | 550 | 404 | 245 | 226 | 1,660 | 390 | 252 |
| 8 | 55 | 228 | 176 | 397 | 279 | 507 | 475 | 240 | 437 | 721 | 702 | 226 |
| 9 | 55 | 182 | 174 | 376 | 225 | 480 | 1,050 | 241 | 477 | 565 | 615 | 204 |
| 10 | 56 | 157 | 170 | 353 | 241 | 445 | 1,630 | 241 | 334 | 632 | 514 | 190 |
| 11 | 70 | 257 | 280 | 328 | 219 | 413 | 3,540 | 227 | 306 | 555 | 700 | 181 |
| 12 | 80 | 574 | 694 | 297 | 208 | 387 | 1,460 | 215 | 600 | 473 | 747 | 173 |
| 13 | 73 | 852 | 951 | 277 | 192 | 367 | 926 | 197 | 766 | 416 | 546 | 169 |
| 14 | 67 | 490 | 1,450 | 267 | 197 | 364 | 705 | 188 | 480 | 375 | 477 | 164 |
| 15 | 63 | 344 | 891 | 248 | 518 | 337 | 601 | 196 | 659 | 349 | 399 | 172 |
| 16 | 163 | 364 | 633 | 223 | 3,240 | 347 | 540 | 246 | 678 | 326 | 497 | 199 |
| 17 | 331 | 828 | 509 | 228 | 1,250 | 343 | 496 | 209 | 1,670 | 306 | 695 | 171 |
| 18 | 173 | 739 | 438 | 198 | 768 | 334 | 642 | 227 | 1,160 | 286 | 437 | 161 |
| 19 | 122 | 475 | 386 | 199 | 592 | 335 | 1,020 | 221 | 1,050 | 271 | 352 | 189 |
| 20 | 102 | 372 | 501 | 203 | 603 | 507 | 753 | 205 | 921 | 258 | 311 | 177 |
| 21 | 97 | 338 | 769 | 200 | 820 | 931 | 655 | 241 | 673 | 244 | 283 | 163 |
| 22 | 94 | 408 | 545 | 184 | 4,060 | 681 | 634 | 300 | 529 | 238 | 276 | 162 |
| 23 | 86 | 421 | 433 | 169 | 5,660 | 558 | 548 | 291 | 435 | 249 | 247 | 270 |
| 24 | 81 | 364 | 504 | e110 | 1,910 | 492 | 481 | 274 | 373 | 235 | 235 | 242 |
| 25 | 80 | 309 | 1,070 | e105 | 1,180 | 436 | 440 | 248 | 329 | 219 | 221 | 199 |
| 26 | 92 | 267 | 757 | e110 | 926 | 402 | 415 | 225 | 304 | 206 | 209 | 181 |
| 27 | 91 | 243 | 555 | e120 | 781 | 379 | 378 | 210 | 285 | 199 | 201 | 243 |
| 28 | 103 | 221 | 465 | e120 | 734 | 347 | 342 | 194 | 281 | 193 | 197 | 446 |
| 29 | 173 | 202 | 409 | e140 | --- | 331 | 317 | 188 | 261 | 564 | 190 | 305 |
| 30 | 351 | 191 | 368 | 220 | --- | 363 | 310 | 192 | 263 | 522 | 185 | 240 |
| 31 | 385 | --- | 336 | 247 | --- | 360 | --- | 185 | --- | 344 | 196 | --- |
| TOTAL | 3,493 | 10,168 | 14,675 | 9,540 | 26,887 | 15,352 | 21,321 | 7,318 | 14,537 | 19,353 | 12,199 | 7,145 |
| MEAN | 113 | 339 | 473 | 308 | 960 | 495 | 711 | 236 | 485 | 624 | 394 | 238 |
| MAX | 385 | 852 | 1,450 | 847 | 5,660 | 931 | 3,540 | 313 | 1,670 | 3,430 | 747 | 520 |
| MIN | 55 | 126 | 151 | 105 | 192 | 331 | 310 | 185 | 157 | 193 | 185 | 161 |
| CFSM | 0.46 | 1.37 | 1.92 | 1.25 | 3.89 | 2.00 | 2.88 | 0.96 | 1.96 | 2.53 | 1.59 | 0.96 |
| IN. | 0.53 | 1.53 | 2.21 | 1.44 | 4.05 | 2.31 | 3.21 | 1.10 | 2.19 | 2.91 | 1.84 | 1.08 |

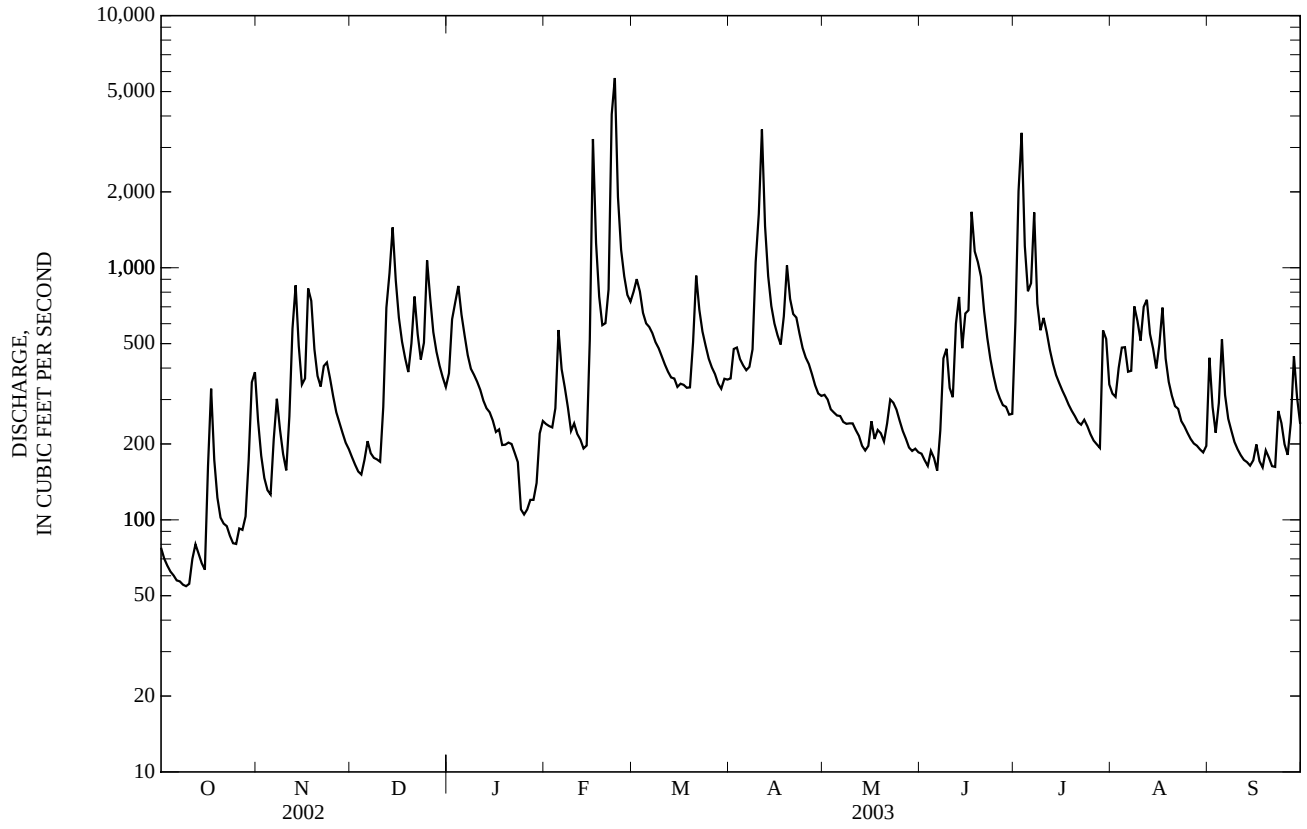
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1909 - 1916, 1927 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 138 | 161 | 239 | 348 | 457 | 506 | 418 | 322 | 211 | 163 | 142 | 117 |
| MAX | 626 | 606 | 790 | 911 | 1,411 | 1,406 | 1,374 | 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) |

03167000 REED CREEK AT GRAHAMS FORGE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1909 - 1916 1927 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 79,281 | | 161,988 | | | |
| ANNUAL MEAN | 217 | | 444 | | 268 | |
| HIGHEST ANNUAL MEAN | | | | | 444 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 118 | 1941 |
| HIGHEST DAILY MEAN | 7,620 | Mar 18 | 5,660 | Feb 23 | 10,600 | Apr 5, 1977 |
| LOWEST DAILY MEAN | 41 | Sep 11 | 55 | aOct 8 | 22 | Jan 30, 1934 |
| ANNUAL SEVEN-DAY MINIMUM | 47 | Sep 8 | 58 | Oct 4 | 33 | Feb 24, 1942 |
| MAXIMUM PEAK FLOW | | | 9,390 | Feb 23 | 17,500 | Jul 16, 1916 |
| MAXIMUM PEAK STAGE | | | 7.73 | Feb 23 | b11.40 | Jul 16, 1916 |
| INSTANTANEOUS LOW FLOW | | | 45 | Oct 5 | c5.0 | Dec 22, 1909 |
| ANNUAL RUNOFF (CFSM) | 0.88 | | 1.80 | | 1.08 | |
| ANNUAL RUNOFF (INCHES) | 11.94 | | 24.40 | | 14.72 | |
| 10 PERCENT EXCEEDS | 446 | | 774 | | 541 | |
| 50 PERCENT EXCEEDS | 111 | | 313 | | 158 | |
| 90 PERCENT EXCEEDS | 58 | | 157 | | 73 | |

a Also Oct. 9, 2002.
b Present datum, from floodmarks.
c Observed, result of freezeup.
e Estimated.



## 03168000 NEW RIVER AT ALLISONIA, VA

LOCATION.--Lat 36°56'15", long 80°44'44", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except those for period with ice effect, Jan. 20-29, and period of no gage-height record, Mar. 19-21, 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 $ft^3/s$, from rating curve extended above 52,000 $ft^3/s$ on basis of flood records for other stations on New River. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 17,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 23 | 0400 | *46,500 | *9.85 | Jun 19 | 1330 | 17,500 | 5.55 |
| Apr 11 | 0730 | 37,800 | 8.67 | Jul 3 | 0445 | 25,600 | 6.81 |
| Jun 9 | 0230 | 20,000 | 5.97 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1,690 | 2,850 | 1,800 | 3,160 | 2,910 | 6,780 | 4,280 | 4,460 | 3,290 | 4,310 | 4,420 | 4,170 |
| 2 | 1,380 | 2,160 | 1,620 | 5,160 | 2,690 | 6,570 | 4,930 | 5,000 | 3,340 | 9,050 | 4,390 | 3,950 |
| 3 | 1,190 | 1,820 | 1,660 | 5,300 | 2,670 | 6,210 | 4,970 | 4,440 | 3,100 | 22,600 | 5,590 | 3,580 |
| 4 | 1,140 | 1,630 | 1,620 | 5,870 | 2,720 | 5,730 | 4,430 | 4,490 | 3,380 | 12,300 | 5,520 | 3,430 |
| 5 | 1,030 | 1,490 | 1,760 | 5,040 | 3,370 | 5,090 | 4,180 | 4,230 | 3,880 | 8,100 | 5,040 | 4,550 |
| 6 | 986 | 1,890 | 2,560 | 4,400 | 3,210 | 4,110 | 4,410 | 4,390 | 3,360 | 6,370 | 4,870 | 3,660 |
| 7 | 948 | 2,750 | 2,490 | 3,870 | 2,960 | 5,350 | 4,560 | 4,470 | 5,250 | 7,050 | 10,000 | 3,100 |
| 8 | 908 | 2,730 | 2,170 | 3,460 | 2,540 | 5,410 | 5,300 | 4,160 | 13,500 | 6,370 | 7,540 | 2,750 |
| 9 | 870 | 2,240 | 2,260 | 3,260 | 2,160 | 4,750 | 6,990 | 4,060 | 13,800 | 5,510 | 8,470 | 2,600 |
| 10 | 877 | 1,940 | 2,580 | 3,030 | 2,380 | 4,330 | 13,400 | 3,810 | 7,480 | 5,350 | 7,620 | 2,510 |
| 11 | 946 | 3,200 | 2,230 | 2,860 | 2,330 | 3,900 | 32,900 | 3,810 | 5,830 | 4,900 | 8,040 | 2,400 |
| 12 | 1,080 | 5,480 | 4,350 | 2,390 | 2,170 | 3,640 | 17,400 | 3,500 | 10,300 | 4,510 | 6,920 | 2,300 |
| 13 | 1,180 | 7,230 | 5,090 | 2,030 | 1,990 | 3,390 | 11,600 | 3,270 | 8,380 | 4,530 | 5,650 | 2,230 |
| 14 | 1,100 | 5,060 | 8,880 | 2,330 | 1,980 | 3,290 | 9,060 | 2,980 | 7,290 | 4,400 | 5,090 | 2,200 |
| 15 | 1,030 | 3,580 | 7,420 | 2,310 | 2,700 | 3,270 | 7,520 | 3,040 | 6,700 | 4,010 | 4,440 | 2,180 |
| 16 | 1,620 | 3,560 | 5,240 | 1,880 | 11,300 | 3,720 | 6,420 | 3,670 | 7,700 | 3,750 | 4,770 | 2,360 |
| 17 | 4,570 | 7,460 | 4,140 | 2,000 | 10,100 | 5,400 | 5,490 | 3,820 | 11,700 | 3,650 | 5,260 | 2,230 |
| 18 | 3,370 | 7,620 | 3,590 | 1,800 | 6,330 | 5,160 | 6,640 | 3,720 | 11,200 | 3,550 | 4,720 | 2,160 |
| 19 | 2,190 | 5,100 | 3,130 | 1,660 | 4,770 | e4,600 | 14,800 | 3,700 | 15,200 | 3,540 | 3,930 | 3,140 |
| 20 | 1,720 | 3,950 | 3,550 | e1,600 | 4,740 | e6,000 | 10,600 | 3,420 | 12,300 | 3,240 | 3,530 | 2,370 |
| 21 | 1,500 | 3,400 | 5,000 | e1,600 | 5,260 | e10,000 | 8,170 | 3,280 | 8,570 | 3,090 | 3,370 | 2,190 |
| 22 | 1,400 | 3,350 | 4,520 | e1,500 | 22,300 | 8,600 | 7,350 | 3,540 | 6,530 | 3,220 | 3,670 | 2,080 |
| 23 | 1,350 | 3,350 | 3,770 | e1,400 | 38,100 | 6,420 | 6,470 | 3,690 | 5,500 | 4,190 | 3,250 | 4,430 |
| 24 | 1,230 | 2,990 | 3,590 | e1,350 | 17,500 | 5,370 | 5,610 | 3,660 | 4,720 | 3,590 | 3,220 | 4,530 |
| 25 | 1,190 | 2,670 | 6,060 | e1,350 | 10,800 | 4,670 | 5,270 | 3,760 | 4,430 | 3,140 | 3,100 | 3,350 |
| 26 | 1,190 | 2,420 | 5,610 | e1,400 | 7,990 | 4,400 | 5,070 | 3,920 | 4,070 | 2,730 | 2,540 | 2,570 |
| 27 | 1,210 | 2,260 | 4,340 | e1,500 | 6,700 | 4,210 | 4,970 | 3,850 | 3,760 | 2,620 | 2,600 | 2,430 |
| 28 | 1,290 | 2,070 | 3,680 | e1,600 | 6,610 | 3,850 | 4,520 | 3,500 | 3,660 | 2,500 | 2,550 | 4,440 |
| 29 | 1,540 | 1,970 | 3,340 | e1,900 | --- | 3,680 | 4,100 | 3,160 | 3,710 | 3,170 | 2,560 | 3,710 |
| 30 | 2,490 | 1,880 | 3,100 | 2,210 | --- | 3,970 | 3,650 | 3,380 | 3,510 | 5,220 | 2,960 | 3,050 |
| 31 | 3,250 | --- | 2,770 | 2,950 | --- | 4,380 | --- | 3,500 | --- | 3,960 | 3,330 | --- |
| TOTAL | 47,465 | 100,100 | 113,920 | 82,170 | 191,280 | 156,250 | 235,060 | 117,680 | 205,440 | 164,520 | 148,960 | 90,650 |
| MEAN | 1,531 | 3,337 | 3,675 | 2,651 | 6,831 | 5,040 | 7,835 | 3,796 | 6,848 | 5,307 | 4,805 | 3,022 |
| MAX | 4,570 | 7,620 | 8,880 | 5,870 | 38,100 | 10,000 | 32,900 | 5,000 | 15,200 | 22,600 | 10,000 | 4,550 |
| MIN | 870 | 1,490 | 1,620 | 1,350 | 1,980 | 3,270 | 3,650 | 2,980 | 3,100 | 2,500 | 2,540 | 2,080 |
| CFSM | 0.70 | 1.52 | 1.67 | 1.20 | 3.10 | 2.29 | 3.56 | 1.72 | 3.11 | 2.41 | 2.18 | 1.37 |
| IN. | 0.80 | 1.69 | 1.92 | 1.39 | 3.23 | 2.64 | 3.97 | 1.99 | 3.47 | 2.78 | 2.52 | 1.53 |

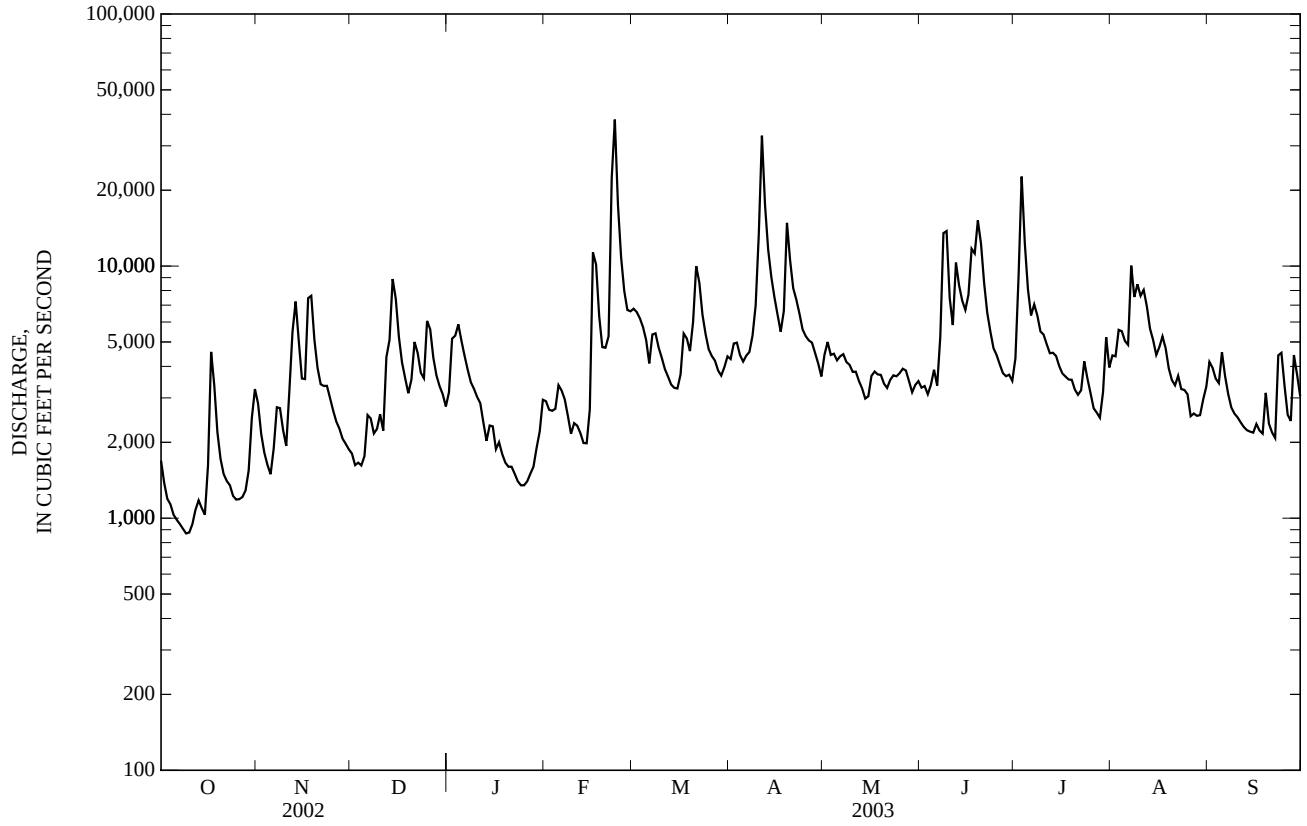
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 2,224 | 2,549 | 2,933 | 3,702 | 4,416 | 4,974 | 4,547 | 3,686 | 2,864 | 2,284 | 2,200 | 1,979 |
| MAX | 6,561 | 9,597 | 6,125 | 8,600 | 9,195 | 10,870 | 11,880 | 7,736 | 8,552 | 6,230 | 11,570 | 8,448 |
| (WY) | (1990) | (1978) | (1962) | (1995) | (1998) | (1993) | (1987) | (1973) | (1992) | (1949) | (1940) | (1989) |
| MIN | 726 | 797 | 1,007 | 1,018 | 1,041 | 1,554 | 1,685 | 1,406 | 989 | 744 | 662 | 743 |
| (WY) | (1931) | (2002) | (1966) | (1956) | (1934) | (1988) | (1942) | (1941) | (2002) | (1930) | (2002) | (1930) |

03168000 NEW RIVER AT ALLISONIA, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1930 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 718,593 | | 1,653,495 | | | |
| ANNUAL MEAN | 1,969 | | 4,530 | | 3,190 | |
| HIGHEST ANNUAL MEAN | | | | | 4,761 | 1978 |
| LOWEST ANNUAL MEAN | | | | | 1,496 | 2002 |
| HIGHEST DAILY MEAN | 21,800 | Mar 18 | 38,100 | Feb 23 | 95,000 | Aug 14, 1940 |
| LOWEST DAILY MEAN | 446 | Sep 13 | 870 | Oct 9 | 446 | Sep 13, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 501 | Sep 8 | 938 | Oct 5 | 501 | Sep 8, 2002 |
| MAXIMUM PEAK FLOW | | | 46,500 | Feb 23 | 185,000 | Aug 14, 1940 |
| MAXIMUM PEAK STAGE | | | 9.85 | Feb 23 | 23.42 | Aug 14, 1940 |
| INSTANTANEOUS LOW FLOW | | | 835 | Oct 9 | 412 | Sep 7, 1930 |
| ANNUAL RUNOFF (CFSM) | 0.89 | | 2.06 | | 1.45 | |
| ANNUAL RUNOFF (INCHES) | 12.14 | | 27.93 | | 19.68 | |
| 10 PERCENT EXCEEDS | 3,630 | | 7,620 | | 5,770 | |
| 50 PERCENT EXCEEDS | 1,400 | | 3,670 | | 2,380 | |
| 90 PERCENT EXCEEDS | 696 | | 1,630 | | 1,080 | |

e Estimated.



## 03169000 CLAYTOR RESERVOIR NEAR RADFORD, VA

LOCATION.--Lat 37°04'28", long 80°35'06", NAD83, 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 $mi^2$.

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 NGVD of 1929 (levels by Appalachian Power Company). Prior to Sept. 11, 1943, nonrecording gage at same site and datum.

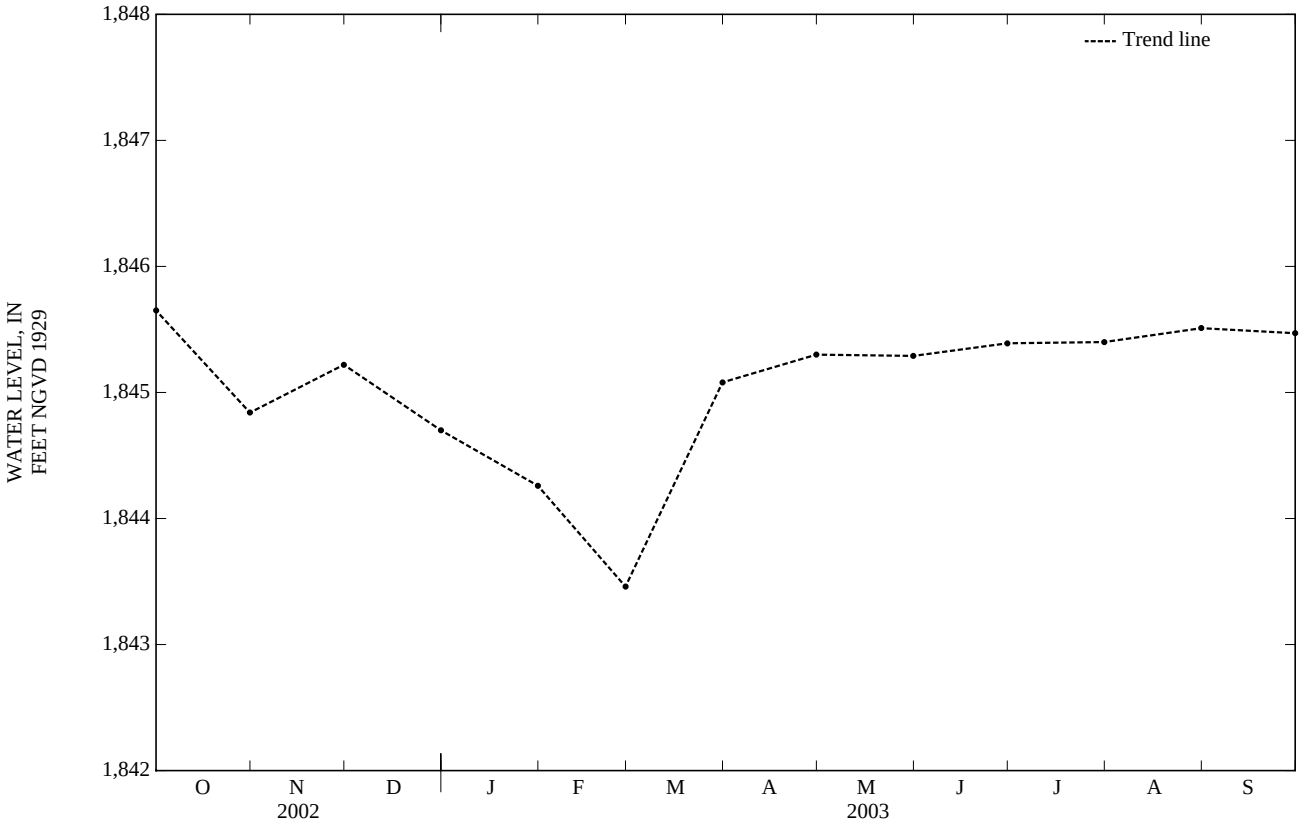
REMARKS.--Reservoir is formed by gravity overflow concrete dam. Spillway with crest at elevation 1,818.5 ft is equipped with 9 lift gates 30 ft high by 50 ft wide. Dam completed and storage began May 22, 1939; water in reservoir reached minimum pool elevation in January 1940. Total level-pool capacity at elevation 1,847.0 ft, 1.5 ft below top of gates, is 230,100 acre-ft of which about 100,000 acre-ft is controlled storage above minimum pool elevation of 1,820.0 ft. Reservoir is used for hydroelectric power and recreation. U.S. Army Corps of Engineers satellite elevation telemeter at station.

COOPERATION.--Records were provided by the American Electric Power.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Elevation (feet) | Contents (acre-feet) | Change in contents (acre-feet) |
|---|---|---|---|
| Sept. 30 | 1,845.65 | 224,000 | |
| Oct. 31 | 1,844.84 | 220,500 | -3,500 |
| Nov. 30 | 1,845.22 | 222,200 | +1,700 |
| Dec. 31 | 1,844.70 | 219,900 | -2,300 |
| CAL YR 2002 | | | -3,400 |
| Jan. 31 | 1,844.26 | 218,100 | -1,800 |
| Feb. 28 | 1,843.46 | 214,600 | -3,500 |
| Mar. 31 | 1,845.08 | 221,600 | +7,000 |
| Apr. 30 | 1,845.30 | 222,500 | +900 |
| May 31 | 1,845.29 | 222,500 | 0 |
| June 30 | 1,845.39 | 222,900 | +400 |
| July 31 | 1,845.40 | 222,900 | 0 |
| Aug. 31 | 1,845.51 | 223,400 | +500 |
| Sept. 30 | 1,845.47 | 223,200 | -200 |
| WTR YR 2003 | | | -800 |

03169000 CLAYTOR RESERVOIR NEAR RADFORD, VA—Continued



## 03170000 LITTLE RIVER AT GRAYSONTOWN, VA

LOCATION.--Lat 37°02'15", long 80°33'24", NAD83, 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 $mi^2$.

PERIOD OF RECORD.--October 1928 to current year. Published as "at Graysonton" 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 NGVD of 1929. Prior to Nov. 20, 1931, nonrecording gage at bridge 1.0 mi downstream at datum 17.99 ft lower. Nov. 20, 1931, to Nov. 12, 1941, water-stage recorder 1.2 mi downstream at datum 20.58 ft lower.

REMARKS.--Records good except for period with ice effect, Jan. 17-27, which is poor. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Maximum discharge, 22,800 $ft^3/s$, from rating curve extended above 16,000 $ft^3/s$ on basis of slope-area measurements at gage heights 12.76 ft and 13.40 ft. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 22 | 2130 | *9,500 | *7.80 | Jun 19 | 1500 | 3,450 | 4.27 |
| Apr 11 | 0330 | 3,470 | 4.28 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 104 | 234 | 172 | 294 | 232 | 761 | 599 | 506 | 467 | 455 | 791 | 388 |
| 2 | 95 | 164 | 158 | 431 | 238 | 704 | 973 | 445 | 401 | 1,230 | 567 | 384 |
| 3 | 90 | 132 | 167 | 386 | 254 | 623 | 736 | 414 | 375 | 1,880 | 650 | 408 |
| 4 | 85 | 120 | 163 | 408 | 300 | 532 | 577 | 789 | 433 | 957 | 606 | 544 |
| 5 | 82 | 132 | 142 | 367 | 344 | 505 | 539 | 614 | 433 | 663 | 562 | 624 |
| 6 | 79 | 158 | 209 | 340 | 276 | 542 | 526 | 554 | 380 | 622 | 873 | 386 |
| 7 | 75 | 231 | 166 | 315 | 226 | 560 | 579 | 495 | 697 | 598 | 741 | 345 |
| 8 | 72 | 155 | 168 | 285 | 231 | 486 | 892 | 462 | 1,630 | 570 | 985 | 334 |
| 9 | 70 | 149 | 221 | 312 | 198 | 457 | 1,250 | 439 | 1,120 | 497 | 1,570 | 321 |
| 10 | 72 | 134 | 188 | 286 | 269 | 430 | 1,790 | 422 | 703 | 484 | 1,410 | 312 |
| 11 | 83 | 383 | 224 | 267 | 242 | 401 | 2,600 | 535 | 669 | 487 | 1,310 | 301 |
| 12 | 92 | 890 | 386 | 181 | 246 | 388 | 1,390 | 454 | 1,330 | 420 | 917 | 293 |
| 13 | 101 | 930 | 504 | 179 | 205 | 381 | 966 | 393 | 895 | 468 | 707 | 300 |
| 14 | 86 | 434 | 762 | 250 | 239 | 384 | 760 | 360 | 939 | 625 | 701 | 313 |
| 15 | 80 | 312 | 518 | 238 | 413 | 366 | 653 | 358 | 803 | 497 | 584 | 324 |
| 16 | 129 | 359 | 398 | 182 | 1,260 | 377 | 593 | 461 | 943 | 424 | 635 | 346 |
| 17 | 410 | 957 | 352 | e180 | 610 | 499 | 557 | 450 | 1,020 | 398 | 637 | 299 |
| 18 | 215 | 629 | 321 | e170 | 450 | 431 | 579 | 502 | 1,050 | 379 | 501 | 301 |
| 19 | 136 | 409 | 295 | e160 | 374 | 396 | 922 | 719 | 2,800 | 364 | 448 | 961 |
| 20 | 116 | 331 | 358 | e160 | 413 | 1,100 | 711 | 585 | 1,700 | 385 | 418 | 515 |
| 21 | 107 | 293 | 486 | e165 | 637 | 1,560 | 621 | 513 | 1,100 | 360 | 404 | 383 |
| 22 | 118 | 281 | 366 | e150 | 5,260 | 895 | 581 | 571 | 811 | 428 | 421 | 362 |
| 23 | 123 | 255 | 329 | e140 | 4,110 | 642 | 536 | 574 | 648 | 794 | 392 | 786 |
| 24 | 103 | 237 | 376 | e130 | 1,580 | 543 | 501 | 565 | 556 | 535 | 368 | 595 |
| 25 | 96 | 207 | 681 | e130 | 1,020 | 495 | 490 | 499 | 499 | 399 | 360 | 414 |
| 26 | 98 | 200 | 508 | e140 | 760 | 467 | 497 | 534 | 478 | 360 | 349 | 332 |
| 27 | 108 | 199 | 377 | e150 | 643 | 483 | 501 | 531 | 456 | 342 | 336 | 333 |
| 28 | 121 | 193 | 335 | 152 | 626 | 438 | 454 | 557 | 457 | 333 | 341 | 739 |
| 29 | 186 | 175 | 321 | 159 | --- | 427 | 430 | 487 | 457 | 630 | 339 | 484 |
| 30 | 318 | 173 | 297 | 215 | --- | 531 | 422 | 498 | 419 | 797 | 333 | 398 |
| 31 | 363 | --- | 284 | 238 | --- | 580 | --- | 457 | --- | 614 | 367 | --- |
| TOTAL | 4,013 | 9,456 | 10,232 | 7,160 | 21,656 | 17,384 | 23,225 | 15,743 | 24,669 | 17,995 | 19,623 | 12,825 |
| MEAN | 129 | 315 | 330 | 231 | 773 | 561 | 774 | 508 | 822 | 580 | 633 | 428 |
| MAX | 410 | 957 | 762 | 431 | 5,260 | 1,560 | 2,600 | 789 | 2,800 | 1,880 | 1,570 | 961 |
| MIN | 70 | 120 | 142 | 130 | 198 | 366 | 422 | 358 | 375 | 333 | 333 | 293 |
| CFSM | 0.43 | 1.05 | 1.10 | 0.77 | 2.58 | 1.87 | 2.58 | 1.69 | 2.74 | 1.93 | 2.11 | 1.43 |
| IN. | 0.50 | 1.17 | 1.27 | 0.89 | 2.69 | 2.16 | 2.88 | 1.95 | 3.06 | 2.23 | 2.43 | 1.59 |

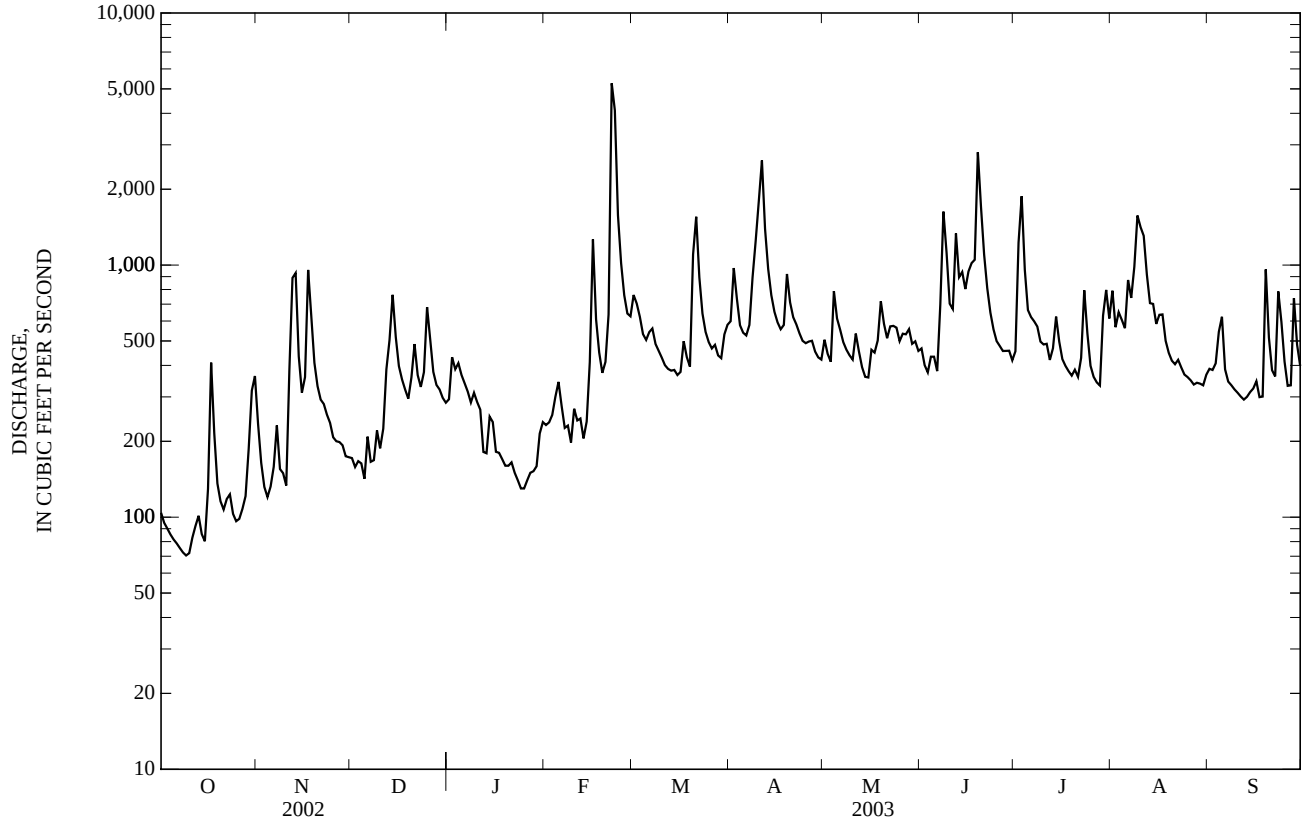
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 287 | 294 | 327 | 396 | 472 | 537 | 502 | 406 | 335 | 265 | 253 | 250 |
| MAX | 1,458 | 916 | 860 | 1,050 | 1,055 | 1,213 | 1,444 | 810 | 942 | 945 | 1,584 | 988 |
| (WY) | (1930) | (1986) | (1949) | (1937) | (1998) | (1993) | (1987) | (1958) | (1972) | (1949) | (1940) | (1989) |
| MIN | 86.7 | 94.7 | 115 | 108 | 113 | 220 | 146 | 168 | 101 | 97.6 | 53.7 | 76.9 |
| (WY) | (1954) | (2002) | (1966) | (1966) | (1934) | (1940) | (1942) | (1941) | (2002) | (2002) | (2002) | (1932) |

03170000 LITTLE RIVER AT GRAYSONTOWN, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1929 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 67,700 | | 183,981 | | | |
| ANNUAL MEAN | 185 | | 504 | | 360 | |
| HIGHEST ANNUAL MEAN | | | | | 631 | 1949 |
| LOWEST ANNUAL MEAN | | | | | 148 | 2002 |
| HIGHEST DAILY MEAN | 1,830 | Mar 18 | 5,260 | Feb 22 | 13,200 | Oct 2, 1929 |
| LOWEST DAILY MEAN | 31 | aAug 14 | 70 | Oct 9 | 31 | aAug 14, 2002 |
| ANNUAL SEVEN-DAY MINIMUM | 32 | Aug 10 | 76 | Oct 5 | 32 | Aug 10, 2002 |
| MAXIMUM PEAK FLOW | | | 9,500 | Feb 22 | 22,800 | Jun 21, 1972 |
| MAXIMUM PEAK STAGE | | | 7.80 | Feb 22 | 13.40 | Jun 21, 1972 |
| INSTANTANEOUS LOW FLOW | | | 70 | bOct 8 | c21 | Feb 22, 1942 |
| ANNUAL RUNOFF (CFSM) | 0.62 | | 1.68 | | 1.20 | |
| ANNUAL RUNOFF (INCHES) | 8.39 | | 22.81 | | 16.29 | |
| 10 PERCENT EXCEEDS | 354 | | 895 | | 616 | |
| 50 PERCENT EXCEEDS | 136 | | 414 | | 264 | |
| 90 PERCENT EXCEEDS | 69 | | 150 | | 124 | |

a Also Aug. 15, 2002.
b Also Oct. 9, 10, 2002.
c Result of freezeup.
e Estimated.



## 03170500 LITTLE RIVER RESERVOIR NEAR RADFORD, VA

LOCATION.--Lat 37°04'39", long 80°34'21", NAD83, 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 $mi^2$.

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

GAGE.--Water-stage recorder. Datum of gage is 1,770 ft NGVD of 1929, from topographic map.

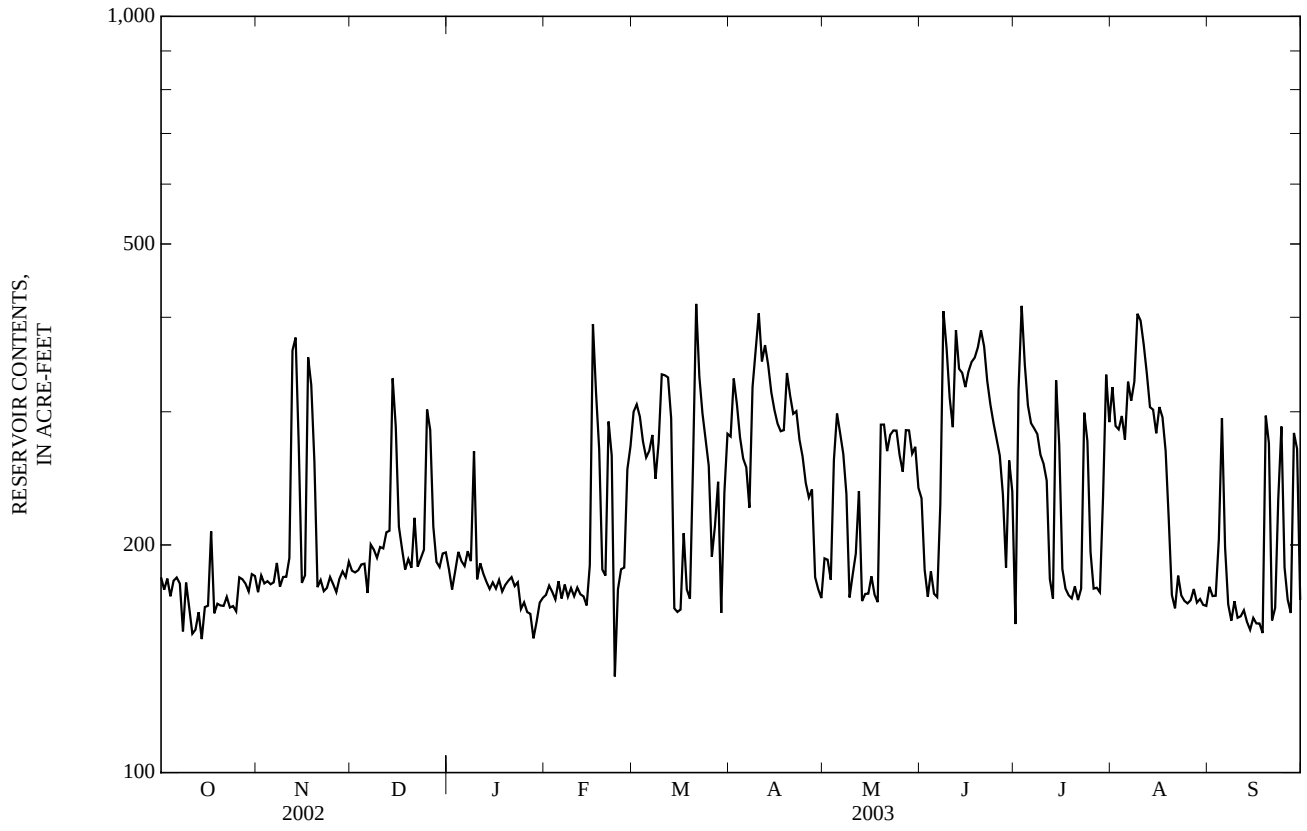
REMARKS.--No estimated daily values. Records good. Reservoir is operated for generating power for the city of Radford.

EXTREMES FOR CURRENT YEAR.--Maximum recorded contents, 501 acre-ft, Mar. 20; minimum recorded contents, 0.93 acre-ft, Feb. 23.

RESERVOIR STORAGE, ACRE FEET
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 181 | 173 | 185 | 186 | 172 | 300 | 278 | 192 | 231 | 157 | 323 | 176 |
| 2 | 175 | 182 | 184 | 175 | 177 | 307 | 332 | 191 | 185 | 321 | 287 | 171 |
| 3 | 181 | 178 | 185 | 185 | 173 | 295 | 307 | 180 | 171 | 414 | 284 | 171 |
| 4 | 171 | 179 | 188 | 196 | 169 | 274 | 278 | 259 | 185 | 346 | 296 | 203 |
| 5 | 179 | 177 | 189 | 190 | 179 | 261 | 260 | 298 | 172 | 306 | 276 | 294 |
| 6 | 181 | 178 | 173 | 188 | 170 | 266 | 253 | 281 | 171 | 290 | 329 | 199 |
| 7 | 178 | 189 | 200 | 196 | 177 | 280 | 224 | 264 | 226 | 285 | 310 | 167 |
| 8 | 154 | 176 | 197 | 190 | 171 | 245 | 324 | 233 | 407 | 280 | 329 | 159 |
| 9 | 178 | 181 | 192 | 266 | 175 | 273 | 362 | 170 | 364 | 263 | 404 | 169 |
| 10 | 165 | 182 | 199 | 180 | 171 | 336 | 405 | 183 | 313 | 256 | 396 | 160 |
| 11 | 153 | 192 | 198 | 189 | 176 | 335 | 350 | 195 | 286 | 243 | 368 | 161 |
| 12 | 155 | 362 | 208 | 183 | 172 | 333 | 367 | 236 | 385 | 180 | 337 | 164 |
| 13 | 163 | 376 | 209 | 179 | 171 | 294 | 346 | 169 | 342 | 170 | 304 | 158 |
| 14 | 150 | 271 | 332 | 175 | 166 | 165 | 318 | 172 | 338 | 330 | 302 | 154 |
| 15 | 166 | 178 | 287 | 178 | 188 | 163 | 302 | 172 | 323 | 271 | 281 | 160 |
| 16 | 166 | 182 | 211 | 175 | 392 | 164 | 289 | 182 | 339 | 186 | 304 | 157 |
| 17 | 209 | 354 | 198 | 180 | 317 | 207 | 283 | 172 | 349 | 175 | 295 | 157 |
| 18 | 162 | 325 | 186 | 174 | 268 | 175 | 284 | 168 | 354 | 172 | 266 | 153 |
| 19 | 167 | 258 | 192 | 177 | 186 | 170 | 338 | 288 | 365 | 170 | 216 | 296 |
| 20 | 166 | 176 | 187 | 179 | 182 | 258 | 315 | 289 | 384 | 176 | 172 | 272 |
| 21 | 166 | 180 | 217 | 181 | 291 | 417 | 298 | 266 | 366 | 169 | 165 | 159 |
| 22 | 171 | 174 | 187 | 176 | 263 | 334 | 301 | 280 | 329 | 175 | 182 | 165 |
| 23 | 165 | 175 | 192 | 178 | 134 | 299 | 276 | 283 | 307 | 299 | 172 | 230 |
| 24 | 166 | 181 | 197 | 165 | 175 | 276 | 262 | 283 | 290 | 274 | 169 | 287 |
| 25 | 163 | 177 | 302 | 168 | 186 | 255 | 242 | 263 | 276 | 196 | 167 | 187 |
| 26 | 181 | 173 | 284 | 163 | 187 | 193 | 231 | 250 | 263 | 175 | 169 | 169 |
| 27 | 180 | 180 | 211 | 162 | 252 | 212 | 237 | 284 | 233 | 176 | 175 | 163 |
| 28 | 178 | 185 | 190 | 151 | 270 | 242 | 181 | 283 | 187 | 173 | 168 | 281 |
| 29 | 174 | 181 | 187 | 158 | --- | 163 | 175 | 264 | 259 | 231 | 170 | 268 |
| 30 | 183 | 190 | 195 | 168 | --- | 235 | 170 | 270 | 235 | 336 | 167 | 169 |
| 31 | 182 | --- | 195 | 170 | --- | 281 | --- | 238 | --- | 291 | 166 | --- |
| TOTAL | 5,309 | 6,265 | 6,457 | 5,581 | 5,710 | 8,008 | 8,588 | 7,258 | 8,635 | 7,486 | 7,949 | 5,779 |
| MEAN | 171 | 209 | 208 | 180 | 204 | 258 | 286 | 234 | 288 | 241 | 256 | 193 |
| MAX | 209 | 376 | 332 | 266 | 392 | 417 | 405 | 298 | 407 | 414 | 404 | 296 |
| MIN | 150 | 173 | 173 | 151 | 134 | 163 | 170 | 168 | 171 | 157 | 165 | 153 |

03170500 LITTLE RIVER RESERVOIR NEAR RADFORD, VA—Continued



## 03171000 NEW RIVER AT RADFORD, VA

LOCATION.--Lat 37°08'30", long 80°34'09", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Aug. 30, 1939, nonrecording gage at highway bridge 2,000 ft upstream at datum 0.85 ft lower.

REMARKS.--No estimated daily discharges. Records good. Flow regulated since 1939 by Claytor Reservoir (station 03169000). Some additional regulation at low flow by dam and powerplant on Little River. 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 $ft^3/s$, from rating curve extended above 76,000 $ft^3/s$ on basis of records for other stations on New River and flow over Claytor Dam, computed by Appalachian Power Company. 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 $ft^3/s$, at site and datum used by Geological Survey 1907-15, from reports of the National Weather Service.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2,090 | 4,570 | 1,250 | 4,880 | 1,220 | 5,470 | 5,550 | 5,250 | 3,950 | 6,920 | 5,130 | 4,350 |
| 2 | 1,500 | 1,320 | 1,580 | 4,860 | 1,380 | 5,770 | 6,020 | 5,530 | 3,910 | 9,140 | 5,050 | 4,900 |
| 3 | 1,370 | 1,080 | 1,840 | 6,790 | 3,470 | 6,600 | 6,300 | 4,760 | 3,950 | 23,800 | 6,140 | 4,160 |
| 4 | 1,060 | 2,080 | 2,570 | 6,270 | 4,130 | 6,910 | 6,900 | 4,920 | 4,040 | 15,900 | 6,590 | 5,320 |
| 5 | 987 | 1,710 | 2,910 | 3,860 | 4,150 | 6,780 | 4,340 | 4,940 | 4,500 | 9,770 | 5,770 | 5,590 |
| 6 | 947 | 2,340 | 3,480 | 4,380 | 4,620 | 6,860 | 3,940 | 4,960 | 4,400 | 6,640 | 5,560 | 3,180 |
| 7 | 961 | 3,260 | 2,070 | 4,190 | 4,090 | 5,680 | 5,360 | 5,110 | 5,650 | 7,760 | 7,310 | 3,600 |
| 8 | 997 | 2,720 | 898 | 4,200 | 1,130 | 4,100 | 7,260 | 4,840 | 13,000 | 8,250 | 8,800 | 3,420 |
| 9 | 965 | 1,960 | 2,840 | 4,180 | 870 | 3,950 | 9,660 | 4,690 | 15,000 | 6,380 | 9,610 | 3,440 |
| 10 | 977 | 1,620 | 3,040 | 3,950 | 2,830 | 5,590 | 13,700 | 4,500 | 11,100 | 5,470 | 9,540 | 2,580 |
| 11 | 987 | 3,920 | 3,970 | 1,490 | 3,300 | 4,530 | 30,300 | 4,470 | 6,330 | 6,090 | 9,130 | 2,610 |
| 12 | 1,230 | 7,720 | 4,510 | 1,370 | 3,100 | 4,710 | 20,000 | 4,430 | 11,600 | 4,900 | 8,390 | 3,220 |
| 13 | 1,260 | 9,860 | 5,990 | 3,590 | 2,690 | 4,780 | 14,100 | 3,970 | 10,600 | 4,780 | 6,680 | 2,440 |
| 14 | 1,290 | 5,340 | 8,590 | 3,020 | 2,900 | 4,510 | 11,500 | 3,800 | 8,560 | 5,180 | 5,970 | 2,630 |
| 15 | 2,670 | 5,600 | 7,890 | 3,340 | 1,360 | 1,610 | 7,930 | 2,800 | 8,190 | 4,870 | 5,030 | 2,820 |
| 16 | 2,840 | 4,280 | 5,530 | 2,400 | 11,000 | 2,510 | 6,700 | 4,490 | 8,670 | 4,110 | 4,950 | 3,450 |
| 17 | 4,130 | 8,650 | 5,180 | 2,110 | 12,100 | 5,750 | 6,350 | 4,520 | 11,800 | 4,040 | 5,900 | 3,480 |
| 18 | 3,840 | 7,710 | 4,180 | 1,010 | 8,370 | 8,030 | 7,900 | 4,660 | 12,300 | 3,990 | 6,010 | 3,020 |
| 19 | 2,360 | 4,790 | 3,160 | 891 | 6,900 | 6,050 | 12,600 | 4,140 | 17,800 | 3,970 | 4,440 | 3,950 |
| 20 | 1,120 | 3,600 | 4,200 | 1,780 | 7,500 | 8,830 | 13,100 | 4,550 | 16,700 | 3,400 | 4,160 | 3,040 |
| 21 | 1,510 | 4,940 | 4,790 | 1,440 | 8,440 | 11,000 | 10,600 | 4,370 | 11,300 | 3,620 | 3,890 | 2,110 |
| 22 | 1,140 | 4,830 | 4,540 | 2,220 | 22,300 | 8,260 | 7,440 | 4,670 | 7,250 | 3,980 | 3,910 | 2,620 |
| 23 | 1,050 | 2,740 | 4,370 | 4,070 | 45,300 | 6,020 | 7,020 | 4,420 | 6,300 | 5,420 | 4,040 | 5,230 |
| 24 | 1,260 | 1,450 | 4,820 | 3,580 | 20,300 | 5,220 | 6,600 | 4,400 | 5,530 | 4,180 | 3,370 | 5,560 |
| 25 | 1,840 | 3,650 | 7,730 | 1,050 | 13,600 | 6,260 | 6,380 | 4,310 | 5,090 | 3,710 | 3,520 | 4,230 |
| 26 | 1,350 | 3,970 | 7,150 | 933 | 11,700 | 5,170 | 5,360 | 5,020 | 4,610 | 3,230 | 3,100 | 3,100 |
| 27 | 1,040 | 3,320 | 5,930 | 3,260 | 10,500 | 5,250 | 5,040 | 4,600 | 4,240 | 2,850 | 3,010 | 3,210 |
| 28 | 2,630 | 1,390 | 2,120 | 1,810 | 8,340 | 5,720 | 5,690 | 4,630 | 4,210 | 2,770 | 3,510 | 5,150 |
| 29 | 2,480 | 1,270 | 2,800 | 1,520 | --- | 3,040 | 4,700 | 4,340 | 4,280 | 4,440 | 2,970 | 4,690 |
| 30 | 3,160 | 1,210 | 3,830 | 2,530 | --- | 3,080 | 4,060 | 3,800 | 4,480 | 6,610 | 3,460 | 3,650 |
| 31 | 3,860 | --- | 4,680 | 3,080 | --- | 5,530 | --- | 4,090 | --- | 4,950 | 3,990 | --- |
| TOTAL | 54,901 | 112,900 | 128,438 | 94,054 | 227,590 | 173,570 | 262,400 | 139,980 | 239,340 | 191,120 | 168,930 | 110,750 |
| MEAN | 1,771 | 3,763 | 4,143 | 3,034 | 8,128 | 5,599 | 8,747 | 4,515 | 7,978 | 6,165 | 5,449 | 3,692 |
| MAX | 4,130 | 9,860 | 8,590 | 6,790 | 45,300 | 11,000 | 30,300 | 5,530 | 17,800 | 23,800 | 9,610 | 5,590 |
| MIN | 947 | 1,080 | 898 | 891 | 870 | 1,610 | 3,940 | 2,800 | 3,910 | 2,770 | 2,970 | 2,110 |
| (†) | -1,765 | +857 | -1,160 | -907 | -1,765 | +3,529 | +454 | 0 | +202 | 0 | +252 | -101 |
| MEAN‡ | 1,714 | 3,792 | 4,106 | 3,005 | 8,065 | 5,713 | 8,762 | 4,515 | 7,985 | 6,165 | 5,457 | 3,688 |
| CFSM‡ | .62 | 1.38 | 1.49 | 1.09 | 2.93 | 2.08 | 3.19 | 1.64 | 2.91 | 2.24 | 1.99 | 1.34 |
| IN.‡ | .72 | 1.54 | 1.72 | 1.26 | 3.06 | 2.40 | 3.56 | 1.89 | 3.24 | 2.59 | 2.29 | 1.50 |

CAL YR 2002 MEAN‡ 2,236 CFSM‡ .81 IN.‡ 11.05
WTR YR 2003 MEAN‡ 5,215 CFSM‡ 1.90 IN.‡ 25.77

† 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.

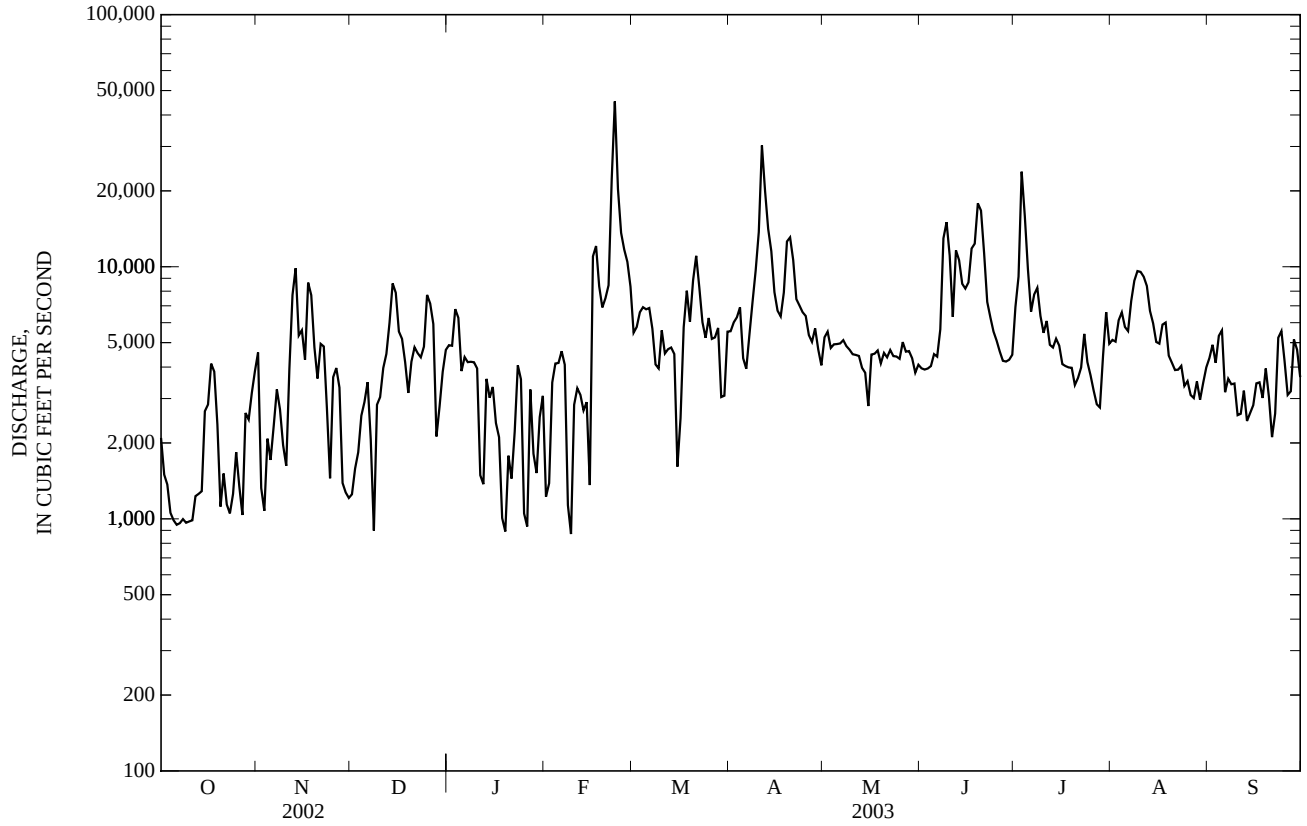
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1940 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 2,604 | 2,991 | 3,519 | 4,271 | 5,319 | 5,960 | 5,472 | 4,465 | 3,598 | 2,793 | 2,684 | 2,440 |
| MAX | 7,619 | 10,300 | 7,426 | 9,459 | 10,590 | 13,130 | 14,490 | 8,875 | 9,627 | 7,545 | 14,170 | 9,855 |
| (WY) | (1990) | (1978) | (1962) | (1995) | (1998) | (1993) | (1987) | (1973) | (1992) | (1949) | (1940) | (1989) |
| MIN | 1,028 | 925 | 1,144 | 1,064 | 1,618 | 2,016 | 2,203 | 1,721 | 1,198 | 1,208 | 867 | 1,126 |
| (WY) | (2002) | (2002) | (1940) | (1940) | (2002) | (1988) | (1942) | (1941) | (2002) | (1988) | (2002) | (1968) |

03171000 NEW RIVER AT RADFORD, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1940 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 817,732 | | 1,903,973 | | | |
| ANNUAL MEAN | 2,240 | | 5,216 | | 3,834 | |
| HIGHEST ANNUAL MEAN | | | | | 5,471 | 1978 |
| LOWEST ANNUAL MEAN | | | | | 1,708 | 2002 |
| HIGHEST DAILY MEAN | 22,300 | Mar 19 | 45,300 | Feb 23 | 105,000 | Aug 14, 1940 |
| LOWEST DAILY MEAN | 765 | Sep 8 | 870 | Feb 9 | 627 | Nov 19, 1967 |
| ANNUAL SEVEN-DAY MINIMUM | 793 | Sep 8 | 974 | Oct 5 | 793 | Sep 8, 2002 |
| MAXIMUM PEAK FLOW | | | 53,900 | Feb 23 | a218,000 | Aug 14, 1940 |
| MAXIMUM PEAK STAGE | | | 15.08 | Feb 23 | a35.96 | Aug 14, 1940 |
| INSTANTANEOUS LOW FLOW | | | 713 | Feb 2 | b165 | Aug 25, 1944 |
| ANNUAL RUNOFF (CFSM) | 0.82 | | 1.90 | | 1.40 | |
| ANNUAL RUNOFF (INCHES) | 11.07 | | 25.77 | | 18.96 | |
| 10 PERCENT EXCEEDS | 4,350 | | 8,950 | | 7,240 | |
| 50 PERCENT EXCEEDS | 1,500 | | 4,400 | | 2,900 | |
| 90 PERCENT EXCEEDS | 852 | | 1,450 | | 1,150 | |

a Prior to regulation, 1908-15, maximum peak flow, 46,000 $ft^3/s$, May 21, 1909; maximum gage height, 15.00 ft, May 21, 1909 and Mar. 27, 1913, at site and datum then in use.
b Prior to regulation, 1908-15, instantaneous low flow not determined.



## 03173000 WALKER CREEK AT BANE, VA

LOCATION.--Lat 37°16'05", long 80°42'34", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Aug. 1, 1938, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect, Jan. 24-29, which is fair. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Maximum discharge, 25,000 $ft^3/s$, from rating curve extended above 7,200 $ft^3/s$ on basis of slope-area measurements at gage heights 16.50 ft and 19.28 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 OUTSIDE PERIOD OF RECORD.--Flood in September 1878 reached a stage of about 23.5 ft, discharge, 40,400 $ft^3/s$, from rating curve extended as explained above.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 16 | 0730 | 6,860 | 11.11 | Apr 11 | 0730 | 4,090 | 9.19 |
| Feb 22 | 2200 | *14,400 | *15.43 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 76 | 361 | 199 | 516 | 177 | 892 | 342 | 402 | 303 | 211 | 231 | 947 |
| 2 | 63 | 253 | 179 | 1,050 | 182 | 985 | 630 | 401 | 276 | 799 | 203 | 607 |
| 3 | 55 | 192 | 163 | 1,030 | 190 | 985 | 698 | 362 | 253 | 2,830 | 185 | 364 |
| 4 | 50 | 160 | 155 | 1,110 | 224 | 845 | 616 | 376 | 270 | 1,420 | 289 | 319 |
| 5 | 47 | 146 | 155 | 912 | 479 | 753 | 542 | 353 | 259 | 875 | 311 | 703 |
| 6 | 44 | 279 | 178 | 754 | 446 | 692 | 474 | 340 | 225 | 760 | 341 | 482 |
| 7 | 41 | 402 | 144 | 627 | 389 | 624 | 432 | 322 | 261 | 1,290 | 273 | 357 |
| 8 | 39 | 307 | 150 | 533 | 326 | 551 | 501 | 315 | 628 | 630 | 471 | 290 |
| 9 | 38 | 244 | 162 | 499 | 247 | 505 | 1,280 | 311 | 703 | 479 | 935 | 245 |
| 10 | 39 | 202 | 149 | 472 | 288 | 464 | 1,670 | 313 | 517 | 436 | 2,010 | 211 |
| 11 | 45 | 332 | 258 | 435 | 251 | 417 | 3,190 | 295 | 422 | 370 | 1,300 | 186 |
| 12 | 49 | 962 | 877 | 378 | 236 | 385 | 1,780 | 275 | 816 | 317 | 891 | 168 |
| 13 | 52 | 1,370 | 1,110 | 348 | 210 | 355 | 1,170 | 245 | 925 | 292 | 901 | 156 |
| 14 | 50 | 781 | 1,740 | 349 | 215 | 341 | 903 | 222 | 698 | 323 | 1,220 | 147 |
| 15 | 46 | 539 | 1,110 | 312 | 703 | 309 | 741 | 221 | 786 | 249 | 784 | 145 |
| 16 | 155 | 447 | 818 | 262 | 4,770 | 301 | 638 | 298 | 1,000 | 223 | 604 | 160 |
| 17 | 428 | 913 | 698 | 281 | 1,870 | 304 | 556 | 307 | 1,270 | 203 | 608 | 151 |
| 18 | 220 | 924 | 610 | 229 | 1,100 | 290 | 621 | 672 | 1,320 | 187 | 483 | 137 |
| 19 | 142 | 649 | 509 | 230 | 810 | 297 | 1,740 | 1,310 | 1,600 | 174 | 392 | 258 |
| 20 | 109 | 496 | 1,450 | 233 | 751 | 510 | 1,240 | 921 | 1,250 | 167 | 327 | 330 |
| 21 | 94 | 432 | 1,680 | 228 | 1,050 | 1,120 | 985 | 717 | 960 | 155 | 287 | 230 |
| 22 | 85 | 568 | 1,020 | 201 | 6,470 | 891 | 867 | 657 | 734 | 147 | 260 | 198 |
| 23 | 77 | 602 | 757 | 183 | 6,780 | 715 | 726 | 584 | 562 | 146 | 230 | 484 |
| 24 | 69 | 492 | 756 | e130 | 2,690 | 601 | 622 | 522 | 448 | 144 | 206 | 480 |
| 25 | 64 | 404 | 1,720 | e125 | 1,600 | 508 | 554 | 454 | 369 | 136 | 188 | 349 |
| 26 | 73 | 336 | 1,140 | e130 | 1,200 | 449 | 508 | 400 | 310 | 127 | 173 | 281 |
| 27 | 88 | 297 | 824 | e135 | 993 | 406 | 453 | 355 | 270 | 121 | 160 | 246 |
| 28 | 105 | 267 | 680 | e135 | 890 | 358 | 391 | 310 | 250 | 116 | 151 | 708 |
| 29 | 280 | 233 | 576 | e150 | --- | 329 | 346 | 302 | 232 | 273 | 151 | 533 |
| 30 | 606 | 215 | 493 | 177 | --- | 345 | 337 | 322 | 209 | 588 | 148 | 374 |
| 31 | 560 | --- | 439 | 186 | --- | 346 | --- | 299 | --- | 304 | 140 | --- |
| TOTAL | 3,889 | 13,805 | 20,899 | 12,340 | 35,537 | 16,873 | 25,553 | 13,183 | 18,126 | 14,492 | 14,853 | 10,246 |
| MEAN | 125 | 460 | 674 | 398 | 1,269 | 544 | 852 | 425 | 604 | 467 | 479 | 342 |
| MAX | 606 | 1,370 | 1,740 | 1,110 | 6,780 | 1,120 | 3,190 | 1,310 | 1,600 | 2,830 | 2,010 | 947 |
| MIN | 38 | 146 | 144 | 125 | 177 | 290 | 337 | 221 | 209 | 116 | 140 | 137 |
| CFSM | 0.41 | 1.51 | 2.21 | 1.31 | 4.16 | 1.78 | 2.79 | 1.39 | 1.98 | 1.53 | 1.57 | 1.12 |
| IN. | 0.47 | 1.68 | 2.55 | 1.51 | 4.33 | 2.06 | 3.12 | 1.61 | 2.21 | 1.77 | 1.81 | 1.25 |

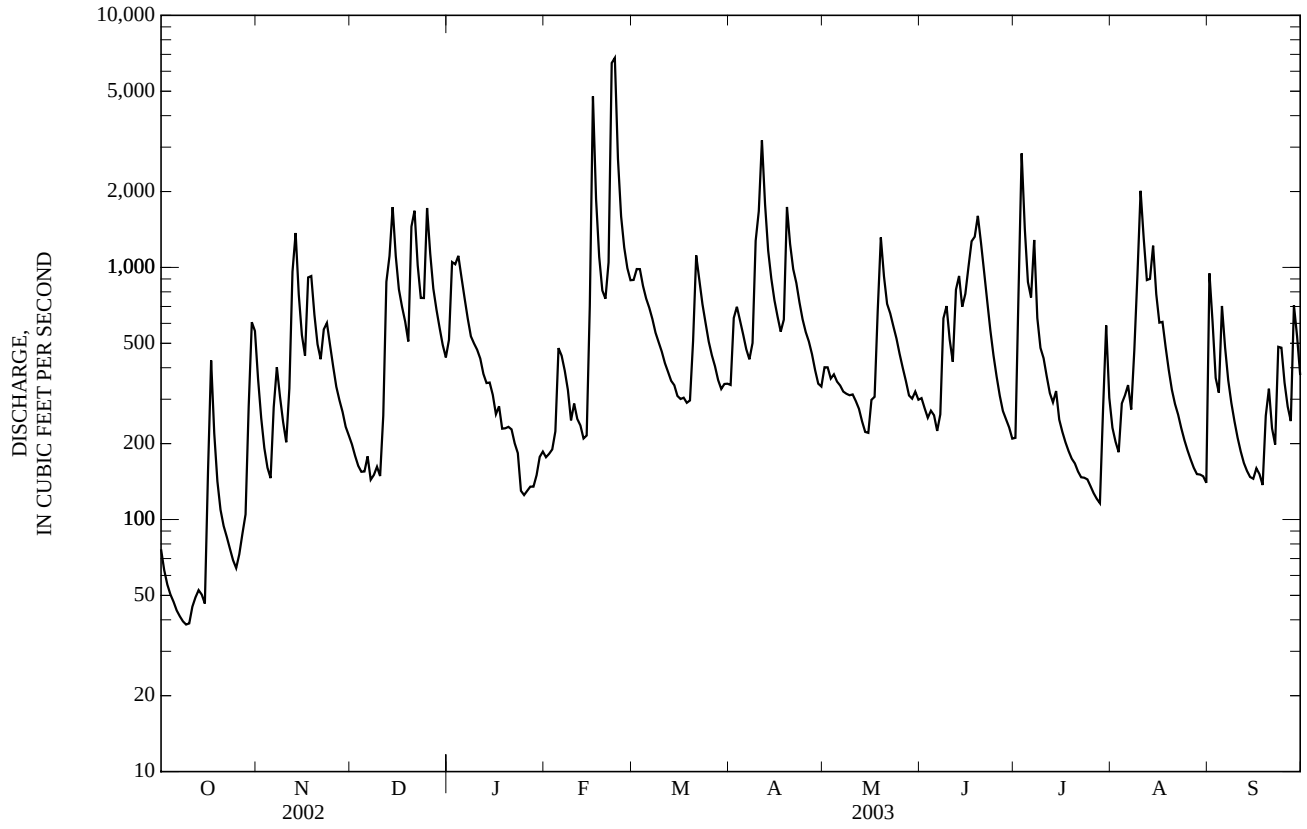
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 124 | 182 | 308 | 431 | 592 | 683 | 542 | 427 | 241 | 146 | 133 | 101 |
| MAX | 721 | 737 | 941 | 1,191 | 1,577 | 1,800 | 1,806 | 1,096 | 1,125 | 735 | 759 | 639 |
| (WY) | (1990) | (1980) | (1973) | (1996) | (1957) | (1955) | (1987) | (2001) | (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) |

03173000 WALKER CREEK AT BANE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1938 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 92,724 | | 199,796 | | | |
| ANNUAL MEAN | 254 | | 547 | | 323 | |
| HIGHEST ANNUAL MEAN | | | | | 553 | 1949 |
| LOWEST ANNUAL MEAN | | | | | 135 | 1988 |
| HIGHEST DAILY MEAN | 3,600 | Mar 18 | 6,780 | Feb 23 | 14,100 | Jun 5, 1992 |
| LOWEST DAILY MEAN | 27 | aSep 12 | 38 | Oct 9 | 24 | bSep 27, 1964 |
| ANNUAL SEVEN-DAY MINIMUM | 29 | Sep 8 | 42 | Oct 5 | 28 | Sep 22, 1964 |
| MAXIMUM PEAK FLOW | | | 14,400 | Feb 22 | 25,000 | Jun 5, 1992 |
| MAXIMUM PEAK STAGE | | | 15.43 | Feb 22 | 19.28 | Jun 5, 1992 |
| INSTANTANEOUS LOW FLOW | | | 38 | cOct 9 | d15 | Dec 21, 1958 |
| ANNUAL RUNOFF (CFSM) | 0.83 | | 1.79 | | 1.06 | |
| ANNUAL RUNOFF (INCHES) | 11.31 | | 24.37 | | 14.41 | |
| 10 PERCENT EXCEEDS | 608 | | 1,070 | | 729 | |
| 50 PERCENT EXCEEDS | 114 | | 355 | | 157 | |
| 90 PERCENT EXCEEDS | 39 | | 143 | | 48 | |

a Also Sept. 13, 2002.
b Also Sept. 28, 1964.
c Also Oct. 10, 2002.
d Result of freezeup.
e Estimated.



## 03175500 WOLF CREEK NEAR NARROWS, VA

LOCATION.--Lat 37°18'20", long 80°50'59", NAD83, 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 $mi^2$.

PERIOD OF RECORD.--July 1908 to September 1916, March 1938 to September 1995, October 1996 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 NGVD of 1929. July 22, 1908, to Sept. 30, 1916, and Mar. 31 to Nov. 7, 1938, nonrecording gage at same site and datum.

REMARKS.--Records good except for period with ice effect Jan. 24-29, which is fair. U.S. Army Corps of Engineers satellite gage-height telemeter at station. Maximum discharge, 12,900 $ft^3/s$, from rating curve extended above 5,700 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,200 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 16 | 0600 | 7,720 | 10.49 | Apr 11 | 0400 | 4,180 | 8.43 |
| Feb 22 | 1830 | *10,900 | *11.81 | Sep 1 | 0030 | 2,230 | 6.70 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 64 | 417 | 293 | 467 | 285 | 861 | 271 | 290 | 337 | 145 | 144 | 879 |
| 2 | 54 | 310 | 257 | 669 | 274 | 941 | 509 | 278 | 339 | 527 | 138 | 325 |
| 3 | 48 | 244 | 233 | 864 | 281 | 919 | 566 | 253 | 309 | 1,560 | 125 | 218 |
| 4 | 43 | 213 | 208 | 1,060 | 500 | 785 | 505 | 239 | 305 | 950 | 141 | 267 |
| 5 | 40 | 205 | 247 | 853 | 838 | 692 | 457 | 221 | 274 | 634 | 154 | 465 |
| 6 | 36 | 472 | 311 | 702 | 629 | 637 | 404 | 219 | 229 | 462 | 178 | 319 |
| 7 | 33 | 678 | 264 | 584 | 542 | 575 | 392 | 202 | 227 | 441 | 179 | 248 |
| 8 | 31 | 527 | 255 | 512 | 445 | 504 | 448 | 219 | 509 | 370 | 402 | 202 |
| 9 | 29 | 402 | 244 | 489 | 362 | 465 | 1,600 | 217 | 525 | 314 | 783 | 168 |
| 10 | 30 | 326 | 226 | 469 | 357 | 420 | 1,900 | 236 | 428 | 308 | 732 | 143 |
| 11 | 39 | 673 | 575 | 432 | 318 | 380 | 3,440 | 217 | 371 | 281 | 706 | 124 |
| 12 | 49 | 1,260 | 988 | 370 | 288 | 350 | 1,720 | 206 | 422 | 253 | 518 | 112 |
| 13 | 49 | 1,410 | 1,160 | 345 | 250 | 328 | 1,090 | 177 | 367 | 230 | 451 | 102 |
| 14 | 43 | 884 | 1,430 | 331 | 255 | 335 | 851 | 161 | 350 | 201 | 503 | 95 |
| 15 | 41 | 638 | 1,000 | 297 | 1,260 | 300 | 676 | 155 | 355 | 177 | 368 | 96 |
| 16 | 316 | 504 | 775 | 253 | 5,540 | 290 | 569 | 229 | 486 | 159 | 336 | 120 |
| 17 | 428 | 668 | 656 | 268 | 1,950 | 285 | 492 | 226 | 1,040 | 146 | 405 | 102 |
| 18 | 234 | 760 | 575 | 216 | 1,120 | 281 | 616 | 565 | 925 | 132 | 359 | 94 |
| 19 | 151 | 591 | 513 | 213 | 809 | 281 | 1,020 | 863 | 837 | 123 | 294 | 415 |
| 20 | 115 | 499 | 1,050 | 204 | 727 | 307 | 819 | 638 | 780 | 114 | 248 | 371 |
| 21 | 99 | 469 | 1,300 | 213 | 915 | 465 | 693 | 525 | 657 | 103 | 209 | 271 |
| 22 | 92 | 601 | 896 | 170 | 5,700 | 461 | 630 | 459 | 546 | 98 | 182 | 217 |
| 23 | 85 | 621 | 677 | 165 | 5,970 | 417 | 538 | 398 | 442 | 113 | 163 | 473 |
| 24 | 75 | 529 | 720 | e110 | 2,440 | 379 | 470 | 359 | 361 | 108 | 144 | 431 |
| 25 | 69 | 449 | 1,240 | e105 | 1,410 | 342 | 431 | 317 | 303 | 93 | 128 | 326 |
| 26 | 73 | 384 | 939 | e110 | 1,070 | 317 | 404 | 292 | 262 | 85 | 115 | 264 |
| 27 | 78 | 402 | 729 | e115 | 903 | 306 | 363 | 262 | 221 | 79 | 105 | 246 |
| 28 | 81 | 383 | 616 | e115 | 820 | 275 | 318 | 230 | 195 | 74 | 99 | 311 |
| 29 | 220 | 348 | 533 | e130 | --- | 257 | 289 | 233 | 173 | 126 | 96 | 248 |
| 30 | 584 | 326 | 467 | 303 | --- | 272 | 274 | 265 | 145 | 256 | 88 | 202 |
| 31 | 585 | --- | 421 | 306 | --- | 273 | --- | 281 | --- | 176 | 176 | --- |
| TOTAL | 3,914 | 16,193 | 19,798 | 11,440 | 36,258 | 13,700 | 22,755 | 9,432 | 12,720 | 8,838 | 8,669 | 7,854 |
| MEAN | 126 | 540 | 639 | 369 | 1,295 | 442 | 758 | 304 | 424 | 285 | 280 | 262 |
| MAX | 585 | 1,410 | 1,430 | 1,060 | 5,970 | 941 | 3,440 | 863 | 1,040 | 1,560 | 783 | 879 |
| MIN | 29 | 205 | 208 | 105 | 250 | 257 | 271 | 155 | 145 | 74 | 88 | 94 |
| CFSM | 0.57 | 2.42 | 2.86 | 1.65 | 5.81 | 1.98 | 3.40 | 1.36 | 1.90 | 1.28 | 1.25 | 1.17 |
| IN. | 0.65 | 2.70 | 3.30 | 1.91 | 6.05 | 2.29 | 3.80 | 1.57 | 2.12 | 1.47 | 1.45 | 1.31 |

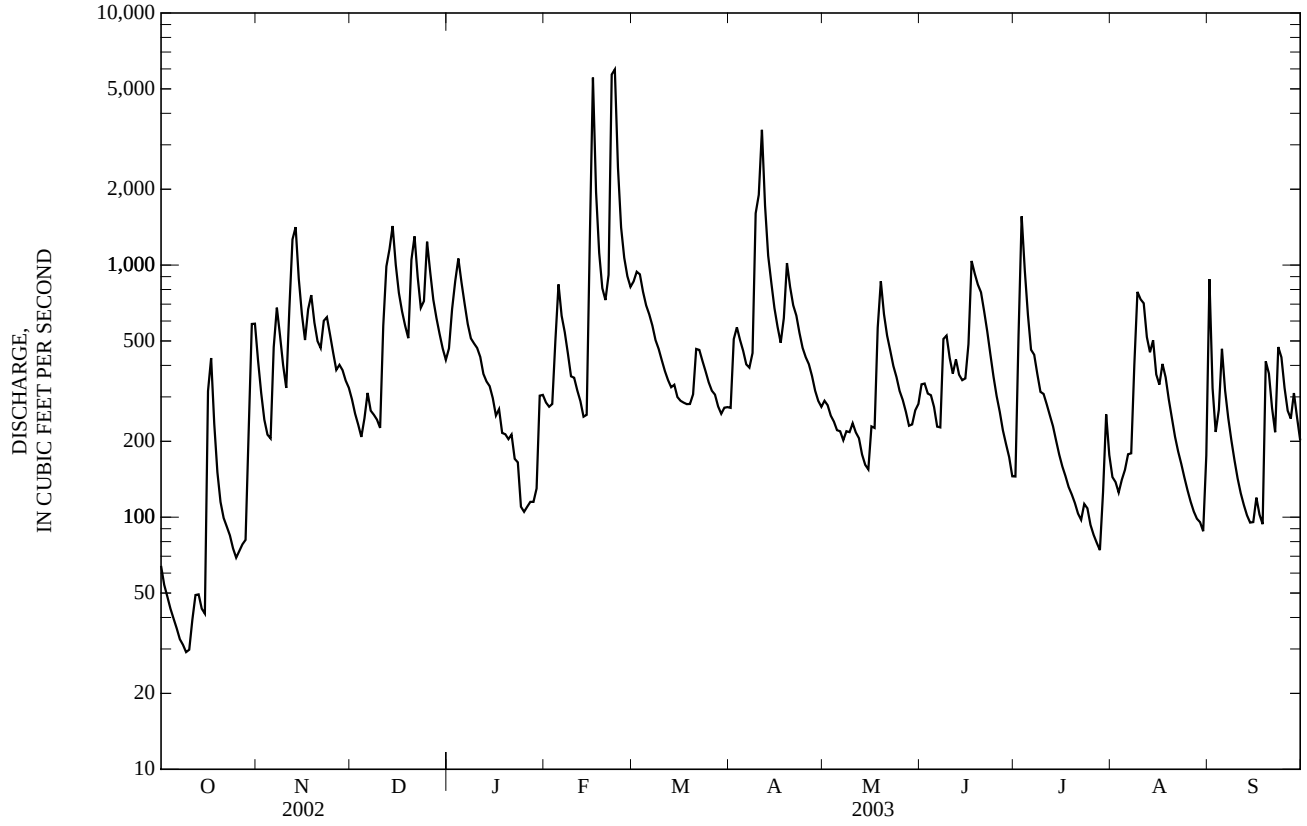
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1908 - 1916, 1938 - 1995, 1997 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 108 | 162 | 300 | 425 | 554 | 640 | 486 | 374 | 207 | 142 | 115 | 80.4 |
| MAX | 621 | 754 | 850 | 1,128 | 1,469 | 1,789 | 1,728 | 1,059 | 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) |

03175500 WOLF CREEK NEAR NARROWS, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1908 - 1916, 1938 - 1995, 1997 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 102,552 | | 171,571 | | | |
| ANNUAL MEAN | 281 | | 470 | | 298 | |
| HIGHEST ANNUAL MEAN | | | | | 475 | 1972 |
| LOWEST ANNUAL MEAN | | | | | 126 | 1988 |
| HIGHEST DAILY MEAN | 4,050 | May 3 | 5,970 | Feb 23 | 8,380 | Apr 5, 1977 |
| LOWEST DAILY MEAN | 26 | Sep 14 | 29 | Oct 9 | 10 | Sep 4, 1999 |
| ANNUAL SEVEN-DAY MINIMUM | 27 | Sep 8 | 34 | Oct 5 | 16 | Aug 29, 1999 |
| MAXIMUM PEAK FLOW | | | 10,900 | Feb 22 | 12,900 | Jan 29, 1957 |
| MAXIMUM PEAK STAGE | | | 11.81 | Feb 22 | a12.55 | Jan 29, 1957 |
| INSTANTANEOUS LOW FLOW | | | 28 | bOct 9 | c8.8 | Dec 25, 1953 |
| ANNUAL RUNOFF (CFSM) | 1.26 | | 2.11 | | 1.33 | |
| ANNUAL RUNOFF (INCHES) | 17.11 | | 28.62 | | 18.14 | |
| 10 PERCENT EXCEEDS | 669 | | 881 | | 680 | |
| 50 PERCENT EXCEEDS | 141 | | 319 | | 152 | |
| 90 PERCENT EXCEEDS | 38 | | 103 | | 39 | |

a From floodmark in well; floodmark on downstream side of bridge was 13.8 ft.
b Also Oct. 10, 2002
c Result of freezeup.
e Estimated.



## 03176500 NEW RIVER AT GLEN LYN, VA

LOCATION.--Lat 37°22'22", long 80°51'38", NAD83, 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 $mi^2$.

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 NGVD of 1929. Aug. 11, 1927, to Oct. 16, 1934, on left bank opposite present site at same datum, and Oct. 17, 1934, to June 16, 1939, on left bank at site 200 ft upstream at same datum.

REMARKS.--Records good except for period of doubtful gage-height record, Sept. 27-29, which is fair. 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 $ft^3/s$, from rating curve extended above 89,000 $ft^3/s$ 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.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2,800 | 5,500 | 2,440 | 7,120 | 4,210 | 10,400 | 6,810 | 5,570 | 6,650 | 6,810 | 6,360 | 6,160 |
| 2 | 2,620 | 5,810 | 2,350 | 8,440 | 2,200 | 8,930 | 8,290 | 6,990 | 5,780 | 11,100 | 6,090 | 6,370 |
| 3 | 1,980 | 2,160 | 2,610 | 9,740 | 2,660 | 10,000 | 9,580 | 6,900 | 5,530 | 29,300 | 6,390 | 5,510 |
| 4 | 1,810 | 1,870 | 2,810 | 11,100 | 4,920 | 9,960 | 8,990 | 6,340 | 5,790 | 26,400 | 7,930 | 5,630 |
| 5 | 1,420 | 2,920 | 3,820 | 8,640 | 6,170 | 9,840 | 8,400 | 6,820 | 5,890 | 14,700 | 8,070 | 7,790 |
| 6 | 1,300 | 2,910 | 4,330 | 6,690 | 6,160 | 10,000 | 6,070 | 6,720 | 5,970 | 11,100 | 7,250 | 6,100 |
| 7 | 1,200 | 4,180 | 4,730 | 7,010 | 6,400 | 9,090 | 6,320 | 6,940 | 6,610 | 12,100 | 6,980 | 4,170 |
| 8 | 1,190 | 4,780 | 2,990 | 6,550 | 5,530 | 7,780 | 8,060 | 6,980 | 12,000 | 11,300 | 11,400 | 4,560 |
| 9 | 1,210 | 3,970 | 1,910 | 6,330 | 2,370 | 5,720 | 13,700 | 6,460 | 17,800 | 10,300 | 13,100 | 4,070 |
| 10 | 1,180 | 2,910 | 3,780 | 6,080 | 2,230 | 6,510 | 17,700 | 6,320 | 14,200 | 8,150 | 14,200 | 3,970 |
| 11 | 1,300 | 3,430 | 4,830 | 5,800 | 4,100 | 7,620 | 36,800 | 5,940 | 10,600 | 8,420 | 12,700 | 3,250 |
| 12 | 1,340 | 9,150 | 7,110 | 3,110 | 4,640 | 6,230 | 31,700 | 5,980 | 11,600 | 7,720 | 11,600 | 3,320 |
| 13 | 1,540 | 14,200 | 8,680 | 2,910 | 4,270 | 6,470 | 20,300 | 5,470 | 15,100 | 6,610 | 10,200 | 4,000 |
| 14 | 1,600 | 10,200 | 12,700 | 5,080 | 3,830 | 6,480 | 14,700 | 4,910 | 12,700 | 7,010 | 8,980 | 2,880 |
| 15 | 1,600 | 7,430 | 12,700 | 4,490 | 5,640 | 6,060 | 12,000 | 4,460 | 13,400 | 6,550 | 7,930 | 3,320 |
| 16 | 3,810 | 7,730 | 9,440 | 4,780 | 18,400 | 3,010 | 10,000 | 5,470 | 15,300 | 5,970 | 7,700 | 3,440 |
| 17 | 4,320 | 8,550 | 8,310 | 3,510 | 19,500 | 4,360 | 9,220 | 6,230 | 17,300 | 5,320 | 8,140 | 3,980 |
| 18 | 5,430 | 12,300 | 7,610 | 3,320 | 13,700 | 9,260 | 8,530 | 8,220 | 17,500 | 5,170 | 8,800 | 3,990 |
| 19 | 4,410 | 9,090 | 5,870 | 2,120 | 10,600 | 7,990 | 14,900 | 10,900 | 21,000 | 5,170 | 7,020 | 5,310 |
| 20 | 2,970 | 6,640 | 7,240 | 2,020 | 10,100 | 9,840 | 16,300 | 8,700 | 25,300 | 5,040 | 5,840 | 5,490 |
| 21 | 1,660 | 5,830 | 10,900 | 2,930 | 11,600 | 13,300 | 14,700 | 7,590 | 17,000 | 4,390 | 5,370 | 3,900 |
| 22 | 1,980 | 7,460 | 8,730 | 2,550 | 33,200 | 12,400 | 11,100 | 7,630 | 12,400 | 4,540 | 4,940 | 3,220 |
| 23 | 1,610 | 7,330 | 7,430 | 3,260 | 74,000 | 9,650 | 10,300 | 7,160 | 9,840 | 5,950 | 5,440 | 4,620 |
| 24 | 1,420 | 4,860 | 7,070 | 5,370 | 37,700 | 7,190 | 8,990 | 6,740 | 8,280 | 5,960 | 4,520 | 7,850 |
| 25 | 1,580 | 3,220 | 11,800 | 4,860 | 21,300 | 7,860 | 8,780 | 6,350 | 7,680 | 4,780 | 4,300 | 6,300 |
| 26 | 2,490 | 5,370 | 11,600 | 1,990 | 16,100 | 8,060 | 8,010 | 6,570 | 6,730 | 4,430 | 4,320 | 4,840 |
| 27 | 1,720 | 5,550 | 10,100 | 1,830 | 14,600 | 6,700 | 6,770 | 6,630 | 6,190 | 3,980 | 3,710 | e4,300 |
| 28 | 1,540 | 4,780 | 7,910 | 4,160 | 12,400 | 7,150 | 7,150 | 6,290 | 5,820 | 3,650 | 4,010 | e4,500 |
| 29 | 3,770 | 2,710 | 4,530 | 2,740 | --- | 6,470 | 6,840 | 6,180 | 5,790 | 4,120 | 4,020 | e6,600 |
| 30 | 4,760 | 2,550 | 4,920 | 2,640 | --- | 4,550 | 6,030 | 5,970 | 5,770 | 8,430 | 3,710 | 5,560 |
| 31 | 5,430 | --- | 6,120 | 3,790 | --- | 5,130 | --- | 5,580 | --- | 7,070 | 4,380 | --- |
| TOTAL | 72,990 | 175,390 | 207,370 | 150,960 | 358,530 | 244,010 | 357,040 | 205,010 | 331,520 | 261,540 | 225,400 | 145,000 |
| MEAN | 2,355 | 5,846 | 6,689 | 4,870 | 12,800 | 7,871 | 11,900 | 6,613 | 11,050 | 8,437 | 7,271 | 4,833 |
| MAX | 5,430 | 14,200 | 12,700 | 11,100 | 74,000 | 13,300 | 36,800 | 10,900 | 25,300 | 29,300 | 14,200 | 7,850 |
| MIN | 1,180 | 1,870 | 1,910 | 1,830 | 2,200 | 3,010 | 6,030 | 4,460 | 5,530 | 3,650 | 3,710 | 2,880 |
| (†) | -1,765 | +857 | -1,160 | -907 | -1,765 | +3,529 | +454 | 0 | +202 | 0 | +252 | -101 |
| MEAN‡ | 2,298 | 5,875 | 6,652 | 4,840 | 12,740 | 7,985 | 11,920 | 6,613 | 11,060 | 8,437 | 7,279 | 4,830 |
| CFSM‡ | .61 | 1.56 | 1.77 | 1.28 | 3.38 | 2.12 | 3.16 | 1.76 | 2.94 | 2.24 | 1.93 | 1.28 |
| IN.‡ | .70 | 1.74 | 2.04 | 1.48 | 3.52 | 2.44 | 3.53 | 2.02 | 3.27 | 2.58 | 2.23 | 1.43 |

CAL YR 2002 MEAN‡ 3,368 CFSM‡ .89 IN.‡ 12.14
WTR YR 2003 MEAN‡ 7,491 CFSM‡ 1.99 IN.‡ 27.00

† 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.

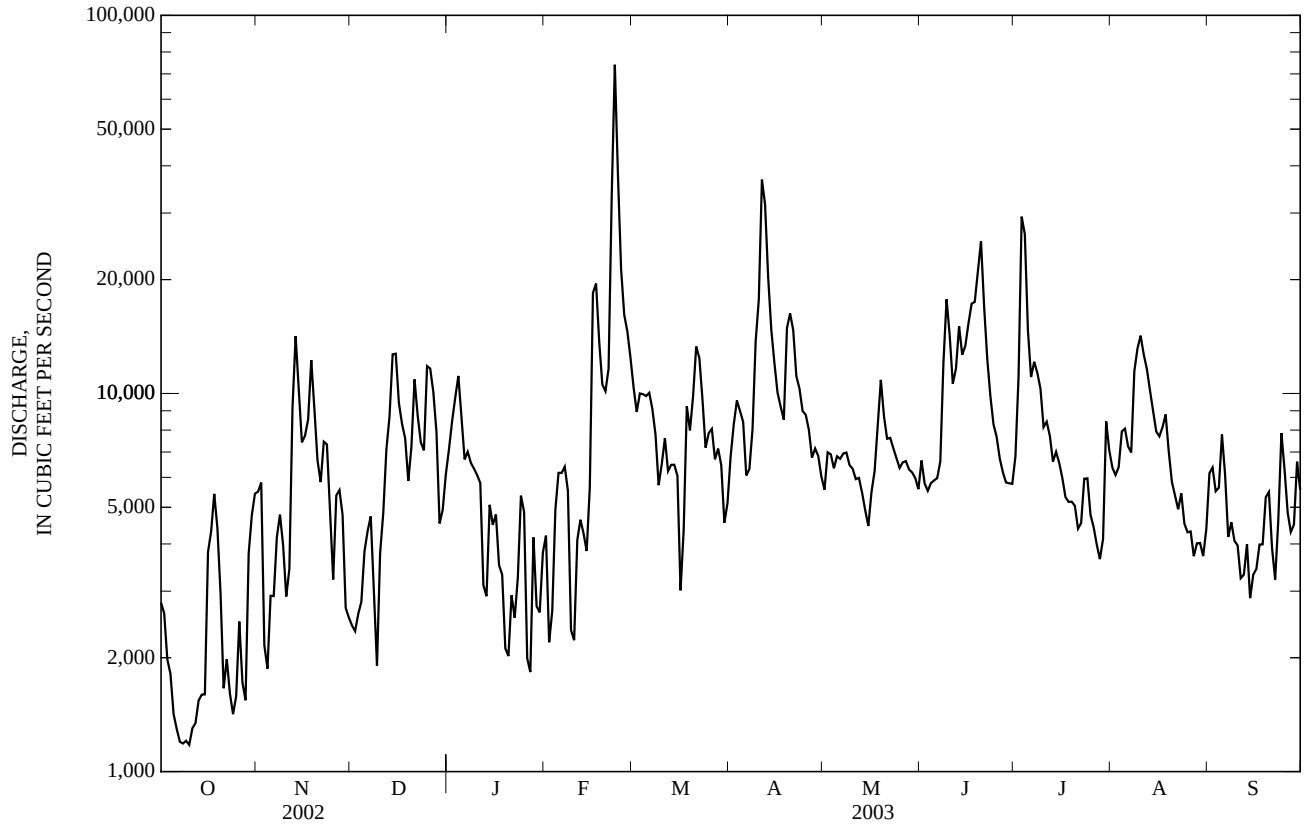
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 3,110 | 3,671 | 4,588 | 5,816 | 7,387 | 8,277 | 7,386 | 5,967 | 4,477 | 3,321 | 3,192 | 2,826 |
| MAX | 9,882 | 12,450 | 10,910 | 13,290 | 15,810 | 18,650 | 20,890 | 11,270 | 12,860 | 9,784 | 16,410 | 11,500 |
| (WY) | (1990) | (1978) | (1949) | (1996) | (1957) | (1993) | (1987) | (1984) | (1992) | (1949) | (1940) | (1989) |
| MIN | 1,204 | 1,258 | 1,305 | 1,489 | 2,285 | 2,407 | 2,673 | 2,397 | 1,373 | 1,390 | 1,040 | 1,127 |
| (WY) | (1989) | (1982) | (1998) | (1966) | (2002) | (1988) | (1986) | (1941) | (1999) | (1988) | (2002) | (1998) |

03176500 NEW RIVER AT GLEN LYN, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1939 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 1,231,070 | | 2,734,760 | | | |
| ANNUAL MEAN | 3,373 | | 7,492 | | 4,988 | |
| HIGHEST ANNUAL MEAN | | | | | 7,492 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 2,511 | 2002 |
| HIGHEST DAILY MEAN | 37,900 | Mar 19 | 74,000 | Feb 23 | 126,000 | Aug 15, 1940 |
| LOWEST DAILY MEAN | 831 | Sep 11 | 1,180 | Oct 10 | a557 | Aug 19, 1999 |
| ANNUAL SEVEN-DAY MINIMUM | 876 | Sep 8 | 1,250 | Oct 6 | 646 | Aug 13, 1999 |
| MAXIMUM PEAK FLOW | | | 82,700 | Feb 23 | b226,000 | Aug 14, 1940 |
| MAXIMUM PEAK STAGE | | | 15.71 | Feb 23 | b27.50 | Aug 14, 1940 |
| INSTANTANEOUS LOW FLOW | | | 1,130 | Oct 8 | a,c449 | dAug 13, 1999 |
| ANNUAL RUNOFF (CFSM) | 0.90 | | 1.99 | | 1.32 | |
| ANNUAL RUNOFF (INCHES) | 12.15 | | 27.00 | | 17.99 | |
| 10 PERCENT EXCEEDS | 7,280 | | 12,700 | | 9,630 | |
| 50 PERCENT EXCEEDS | 2,170 | | 6,290 | | 3,630 | |
| 90 PERCENT EXCEEDS | 1,050 | | 2,620 | | 1,510 | |

a Affected by withdrawals.
b Prior to regulation, 1928-38, maximum peak flow, 99,000 $ft^3/s$, Oct. 3, 1929, gage height, 16.75 ft.
c Prior to regulation, 1928-38, instantaneous low flow, 770 $ft^3/s$, Sept. 8, 1930.
d Also Aug. 19, 1999.
e Estimated.



## 03207800 LEVISA FORK AT BIG ROCK, VA

LOCATION.--Lat 37°21'13", long 82°11'44", NAD83, 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 $mi^2$.

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

GAGE.--Water-stage recorder. Datum of gage is 866.37 ft NGVD of 1929.

REMARKS.--Records good except for period with ice effect, Jan. 25-27, which is fair. U.S. Army Corps of Engineers satellite precipitation and gage-height telemeter at station. Maximum discharge, 56,000 $ft^3/s$, from rating curve extended above 7,000 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 16 | 0630 | *20,000 | *16.37 | Apr 11 | 0130 | 10,300 | 11.96 |
| Feb 22 | 1530 | 11,200 | 12.46 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 43 | 167 | 205 | 323 | 370 | 1,420 | 272 | 360 | 441 | 245 | 148 | 178 |
| 2 | 39 | 139 | 177 | 303 | 423 | 1,200 | 300 | 615 | 389 | 296 | 150 | 151 |
| 3 | 36 | 100 | 163 | 788 | 443 | 952 | 315 | 480 | 356 | 367 | 149 | 178 |
| 4 | 32 | 97 | 152 | 1,230 | 921 | 782 | 316 | 403 | 378 | 284 | 164 | 410 |
| 5 | 31 | 111 | 951 | 856 | 1,070 | 699 | 346 | 396 | 340 | 244 | 174 | 442 |
| 6 | 32 | 189 | 1,260 | 686 | 733 | 628 | 331 | 388 | 294 | 246 | 145 | 261 |
| 7 | 30 | 198 | 676 | 581 | 599 | 551 | 1,330 | 357 | 486 | 476 | 184 | 201 |
| 8 | 27 | 160 | 479 | 539 | 461 | 497 | 1,520 | 584 | 840 | 275 | 386 | 171 |
| 9 | 25 | 131 | 377 | 516 | 385 | 467 | 2,410 | 665 | 748 | 269 | 411 | 150 |
| 10 | 26 | 113 | 320 | 494 | 379 | 426 | 3,380 | 608 | 531 | 507 | 244 | 130 |
| 11 | 33 | 529 | 558 | 458 | 354 | 397 | 5,530 | 512 | 417 | 460 | 290 | 117 |
| 12 | 41 | 1,020 | 682 | 409 | 325 | 375 | 1,950 | 419 | 524 | 360 | 371 | 107 |
| 13 | 42 | 878 | 599 | 368 | 292 | 370 | 1,260 | 349 | 422 | 346 | 269 | 100 |
| 14 | 40 | 415 | 698 | 349 | 306 | 386 | 935 | 303 | 388 | 282 | 202 | 95 |
| 15 | 40 | 275 | 730 | 315 | 3,430 | 346 | 765 | 468 | 715 | 241 | 164 | 120 |
| 16 | 229 | 252 | 634 | 272 | 11,200 | 336 | 664 | 945 | 1,060 | 214 | 673 | 108 |
| 17 | 194 | 408 | 514 | 276 | 3,010 | 330 | 601 | 642 | 1,430 | 198 | 1,700 | 93 |
| 18 | 98 | 512 | 437 | 239 | 1,720 | 329 | 903 | 592 | 2,000 | 180 | 1,200 | 84 |
| 19 | 69 | 412 | 385 | 233 | 1,250 | 313 | 951 | 546 | 2,150 | 169 | 562 | 99 |
| 20 | 60 | 336 | 469 | 218 | 991 | 297 | 828 | 464 | 1,290 | 160 | 367 | 98 |
| 21 | 59 | 352 | 497 | 209 | 867 | 291 | 723 | 903 | 860 | 151 | 280 | 86 |
| 22 | 57 | 581 | 463 | 187 | 5,610 | 274 | 650 | 959 | 650 | 177 | 266 | 105 |
| 23 | 50 | 569 | 403 | 169 | 3,870 | 260 | 554 | 743 | 519 | 266 | 227 | 152 |
| 24 | 46 | 418 | 399 | 156 | 2,030 | 249 | 489 | 1,090 | 434 | 211 | 192 | 105 |
| 25 | 43 | 319 | 542 | e150 | 1,460 | 236 | 462 | 710 | 376 | 170 | 172 | 85 |
| 26 | 46 | 261 | 633 | e140 | 1,190 | 240 | 503 | 574 | 335 | 149 | 155 | 78 |
| 27 | 45 | 278 | 580 | e145 | 1,050 | 241 | 443 | 468 | 309 | 136 | 143 | 114 |
| 28 | 122 | 251 | 496 | 151 | 1,280 | 219 | 393 | 413 | 291 | 129 | 137 | 155 |
| 29 | 271 | 239 | 428 | 184 | --- | 219 | 378 | 416 | 308 | 183 | 136 | 114 |
| 30 | 381 | 232 | 369 | 261 | --- | 268 | 354 | 445 | 266 | 187 | 176 | 88 |
| 31 | 262 | --- | 332 | 309 | --- | 275 | --- | 437 | --- | 157 | 207 | --- |
| TOTAL | 2,549 | 9,942 | 15,608 | 11,514 | 46,019 | 13,873 | 29,856 | 17,254 | 19,547 | 7,735 | 10,044 | 4,375 |
| MEAN | 82.2 | 331 | 503 | 371 | 1,644 | 448 | 995 | 557 | 652 | 250 | 324 | 146 |
| MAX | 381 | 1,020 | 1,260 | 1,230 | 11,200 | 1,420 | 5,530 | 1,090 | 2,150 | 507 | 1,700 | 442 |
| MIN | 25 | 97 | 152 | 140 | 292 | 219 | 272 | 303 | 266 | 129 | 136 | 78 |
| CFSM | 0.28 | 1.12 | 1.70 | 1.25 | 5.53 | 1.51 | 3.35 | 1.87 | 2.19 | 0.84 | 1.09 | 0.49 |
| IN. | 0.32 | 1.25 | 1.95 | 1.44 | 5.76 | 1.74 | 3.74 | 2.16 | 2.45 | 0.97 | 1.26 | 0.55 |

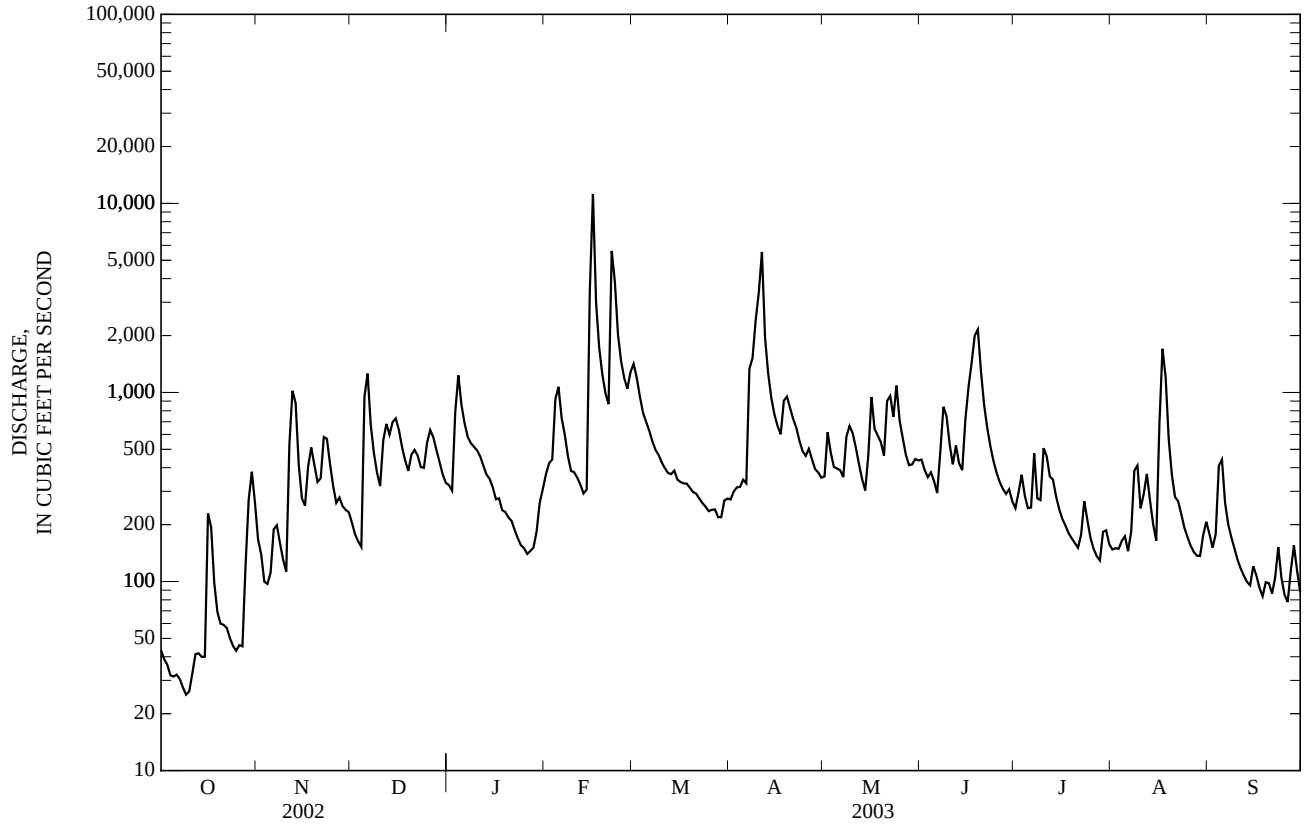
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1968 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 122 | 201 | 346 | 539 | 683 | 739 | 699 | 517 | 284 | 172 | 131 | 82.9 |
| MAX | 692 | 911 | 1,201 | 1,596 | 1,644 | 2,107 | 2,355 | 1,323 | 1,135 | 630 | 422 | 273 |
| (WY) | (1990) | (1978) | (1973) | (1974) | (2003) | (1975) | (1987) | (1984) | (1979) | (1979) | (2000) | (1989) |
| MIN | 6.85 | 19.3 | 54.4 | 82.7 | 168 | 139 | 154 | 113 | 40.2 | 29.1 | 33.3 | 12.6 |
| (WY) | (1970) | (1970) | (2001) | (1981) | (1968) | (1988) | (1986) | (1976) | (1970) | (1970) | (1969) | (1969) |

03207800 LEVISA FORK AT BIG ROCK, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1968 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 121,729 | | 188,316 | | | |
| ANNUAL MEAN | 334 | | 516 | | 375 | |
| HIGHEST ANNUAL MEAN | | | | | 606 | 1979 |
| LOWEST ANNUAL MEAN | | | | | 121 | 1988 |
| HIGHEST DAILY MEAN | 6,210 | May 3 | 11,200 | Feb 16 | 24,800 | Apr 4, 1977 |
| LOWEST DAILY MEAN | 24 | Sep 14 | 25 | Oct 9 | 5.1 | Oct 19, 1969 |
| ANNUAL SEVEN-DAY MINIMUM | 27 | Sep 9 | 29 | Oct 4 | 5.5 | Oct 13, 1969 |
| MAXIMUM PEAK FLOW | | | 20,000 | Feb 16 | 56,000 | Apr 4, 1977 |
| MAXIMUM PEAK STAGE | | | 16.37 | Feb 16 | 27.38 | Apr 4, 1977 |
| INSTANTANEOUS LOW FLOW | | | 24 | Oct 8 | 5.0 | aOct 1, 1969 |
| ANNUAL RUNOFF (CFSM) | 1.12 | | 1.74 | | 1.26 | |
| ANNUAL RUNOFF (INCHES) | 15.25 | | 23.59 | | 17.14 | |
| 10 PERCENT EXCEEDS | 690 | | 951 | | 826 | |
| 50 PERCENT EXCEEDS | 159 | | 346 | | 180 | |
| 90 PERCENT EXCEEDS | 40 | | 100 | | 37 | |

a Also Oct. 13, 14, 17-20, 1969.
e Estimated.



## 03208500 RUSSELL FORK AT HAYSI, VA

LOCATION.--Lat 37°12'25", long 82°17'45", NAD83, 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 $mi^2$.

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 NGVD of 1929. 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. 24-28, and for period of no gage-height record, May 15-21, which are poor. U.S. Army Corps of Engineers satellite precipitation and gage-height telemeter at station. Maximum discharge, 59,000 $ft^3/s$, from rating curve extended above 32,000 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 16 | 0700 | *28,300 | *18.89 | Apr 9 | 0500 | 6,530 | 8.07 |
| Feb 22 | 1430 | 15,900 | 13.35 | Apr 10 | 2330 | 18,800 | 14.75 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 40 | 117 | 123 | 278 | 341 | 1,460 | 340 | 300 | 307 | 148 | 358 | 196 |
| 2 | 36 | 91 | 106 | 258 | 353 | 1,170 | 392 | 400 | 252 | 253 | 232 | 124 |
| 3 | 33 | 76 | 98 | 680 | 354 | 904 | 402 | 325 | 227 | 378 | 199 | 126 |
| 4 | 32 | 78 | 94 | 1,100 | 722 | 742 | 385 | 277 | 251 | 228 | 170 | 310 |
| 5 | 30 | 87 | 970 | 820 | 922 | 664 | 414 | 311 | 219 | 176 | 172 | 358 |
| 6 | 31 | 128 | 1,140 | 663 | 678 | 601 | 408 | 370 | 176 | 226 | 161 | 184 |
| 7 | 32 | 138 | 604 | 553 | 540 | 518 | 2,050 | 322 | 539 | 555 | 248 | 135 |
| 8 | 33 | 114 | 409 | 521 | 407 | 469 | 2,230 | 355 | 996 | 297 | 334 | 108 |
| 9 | 31 | 95 | 303 | 480 | 320 | 441 | 5,240 | 807 | 773 | 292 | 229 | 94 |
| 10 | 30 | 89 | 245 | 417 | 322 | 400 | 7,800 | 635 | 510 | 711 | 175 | 84 |
| 11 | 36 | 732 | 785 | 345 | 289 | 373 | 8,050 | 453 | 369 | 600 | 166 | 77 |
| 12 | 45 | 1,070 | 918 | 283 | 265 | 354 | 2,390 | 339 | 342 | 419 | 198 | 71 |
| 13 | 42 | 792 | 675 | 280 | 233 | 348 | 1,420 | 260 | 279 | 625 | 126 | 66 |
| 14 | 37 | 356 | 843 | 251 | 243 | 370 | 1,010 | 215 | 250 | 439 | 108 | 64 |
| 15 | 39 | 217 | 815 | 219 | 3,280 | 329 | 809 | e500 | 393 | 314 | 95 | 73 |
| 16 | 206 | 194 | 639 | 220 | e15,000 | 323 | 694 | e840 | 1,150 | 243 | 522 | 70 |
| 17 | 165 | 392 | 484 | 205 | 3,370 | 316 | 628 | e600 | 1,750 | 205 | 594 | 62 |
| 18 | 89 | 478 | 385 | 184 | 1,760 | 320 | 2,650 | e580 | 2,390 | 166 | 399 | 57 |
| 19 | 63 | 351 | 321 | 186 | 1,180 | 305 | 1,940 | e540 | 1,950 | 148 | 202 | 61 |
| 20 | 56 | 261 | 769 | 156 | 922 | 290 | 1,170 | e480 | 1,030 | 130 | 139 | 62 |
| 21 | 58 | 291 | 911 | 152 | 801 | 286 | 867 | e840 | 663 | 118 | 113 | 56 |
| 22 | 57 | 517 | 646 | 134 | 7,770 | 267 | 705 | 736 | 488 | 126 | 105 | 59 |
| 23 | 49 | 463 | 473 | 128 | 4,700 | 250 | 574 | 660 | 374 | 163 | 99 | 101 |
| 24 | 44 | 323 | 443 | e120 | 2,120 | 240 | 489 | 721 | 298 | 169 | 92 | 79 |
| 25 | 44 | 235 | 635 | e120 | 1,430 | 230 | 451 | 507 | 250 | 121 | 82 | 64 |
| 26 | 45 | 186 | 731 | e125 | 1,150 | 236 | 494 | 435 | 216 | 101 | 76 | 58 |
| 27 | 42 | 185 | 623 | e130 | 1,030 | 237 | 426 | 350 | 194 | 92 | 73 | 82 |
| 28 | 78 | 158 | 509 | e135 | 1,430 | 217 | 368 | 302 | 181 | 89 | 74 | 109 |
| 29 | 146 | 140 | 415 | 139 | --- | 215 | 352 | 297 | 171 | 217 | 94 | 75 |
| 30 | 241 | 135 | 336 | 233 | --- | 280 | 322 | 355 | 157 | 189 | 92 | 61 |
| 31 | 185 | --- | 290 | 293 | --- | 307 | --- | 327 | --- | 608 | 200 | --- |
| TOTAL | 2,095 | 8,489 | 16,738 | 9,808 | 51,932 | 13,462 | 45,470 | 14,439 | 17,145 | 8,546 | 5,927 | 3,126 |
| MEAN | 67.6 | 283 | 540 | 316 | 1,855 | 434 | 1,516 | 466 | 572 | 276 | 191 | 104 |
| MAX | 241 | 1,070 | 1,140 | 1,100 | 15,000 | 1,460 | 8,050 | 840 | 2,390 | 711 | 594 | 358 |
| MIN | 30 | 76 | 94 | 120 | 233 | 215 | 322 | 215 | 157 | 89 | 73 | 56 |
| CFSM | 0.24 | 0.99 | 1.89 | 1.11 | 6.49 | 1.52 | 5.30 | 1.63 | 2.00 | 0.96 | 0.67 | 0.36 |
| IN. | 0.27 | 1.10 | 2.18 | 1.28 | 6.75 | 1.75 | 5.91 | 1.88 | 2.23 | 1.11 | 0.77 | 0.41 |

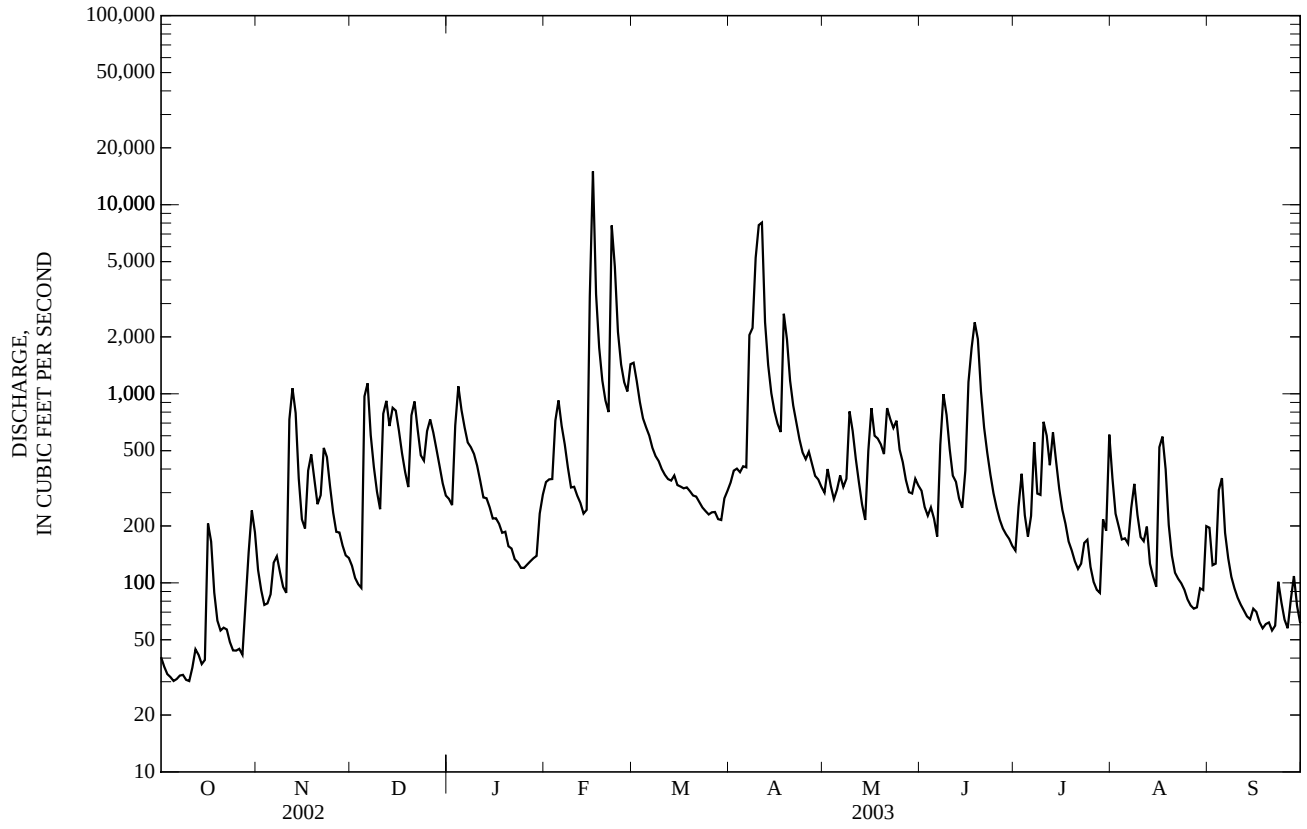
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1926 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 85.2 | 161 | 323 | 508 | 654 | 769 | 596 | 418 | 192 | 159 | 123 | 64.0 |
| MAX | 838 | 961 | 1,326 | 2,083 | 1,855 | 2,331 | 1,994 | 1,429 | 738 | 862 | 561 | 608 |
| (WY) | (1990) | (1978) | (1927) | (1937) | (2003) | (1955) | (1977) | (1958) | (1998) | (2001) | (1966) | (1989) |
| MIN | 0.98 | 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) |

03208500 RUSSELL FORK AT HAYSI, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1926 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 133,521 | | 197,177 | | | |
| ANNUAL MEAN | 366 | | 540 | | 336 | |
| HIGHEST ANNUAL MEAN | | | | | 568 | 1994 |
| LOWEST ANNUAL MEAN | | | | | 100 | 1941 |
| HIGHEST DAILY MEAN | 14,800 | Mar 18 | e15,000 | Feb 16 | 30,600 | Apr 4, 1977 |
| LOWEST DAILY MEAN | 17 | aSep 13 | 30 | bOct 5 | 0.20 | Jun 27, 1936 |
| ANNUAL SEVEN-DAY MINIMUM | 18 | Sep 9 | 31 | Oct 4 | 0.56 | Jun 24, 1936 |
| MAXIMUM PEAK FLOW | | | 28,300 | Feb 16 | 59,000 | Apr 4, 1977 |
| MAXIMUM PEAK STAGE | | | 18.89 | Feb 16 | 28.24 | Apr 4, 1977 |
| INSTANTANEOUS LOW FLOW | | | 27 | cOct 4 | d0.20 | fJun 27, 1936 |
| ANNUAL RUNOFF (CFSM) | 1.28 | | 1.89 | | 1.18 | |
| ANNUAL RUNOFF (INCHES) | 17.37 | | 25.65 | | 15.99 | |
| 10 PERCENT EXCEEDS | 717 | | 922 | | 736 | |
| 50 PERCENT EXCEEDS | 136 | | 291 | | 132 | |
| 90 PERCENT EXCEEDS | 32 | | 71 | | 16 | |

a Also Sept. 14, 2002.
b Also Oct. 10, 2002.
c Also Oct. 5, 2002.
d Observed.
e Estimated.
f Also June 28, 1936.



## 03208680 NORTH FORK OF POUND LAKE AT POUND, VA

LOCATION.--Lat 37°07'27", long 82°37'52", NAD83, 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 $mi^2$.

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 NGVD of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Aug. 29, 1966, nonrecording gage at same site and datum.

REMARKS.--Lake is formed by rockfill dam. Spillway with crest at elevation 1,644.0 ft is in a saddle 350 ft southeast of dam. Except during major floods, all discharge will be through a diversion tunnel, the invert of the entrance of which is at elevation 1,556.5 ft. Storage began in September 1964 during construction with peak discharge affected thereafter; initial filling for regular operation started July 13, 1966. Total capacity at elevation 1,644.0 ft, top of spillway, is 11,290 acre-ft of which 8,110 acre-ft is flood-control storage for summer operations between elevations 1,611.0 ft, top of summer conservation pool, and 1,644.0 ft; an additional 1,290 acre-ft is available for flood control during the period December to March between elevations 1,601.0 ft, top of winter conservation pool, and 1,611.0 ft; contents at established minimum pool, 1,601.0 ft, is 1,900 acre-ft; dead storage is 7 acre-ft below elevation 1,556.5 ft. Figures given herein represent total contents. Lake is used for flood control, low-water augmentation for water-quality control, and recreation. U.S. Army Corps of Engineers satellite precipitation and elevation telemeter at station.

COOPERATION.--Records were provided by the U.S. Army Corps of Engineers.

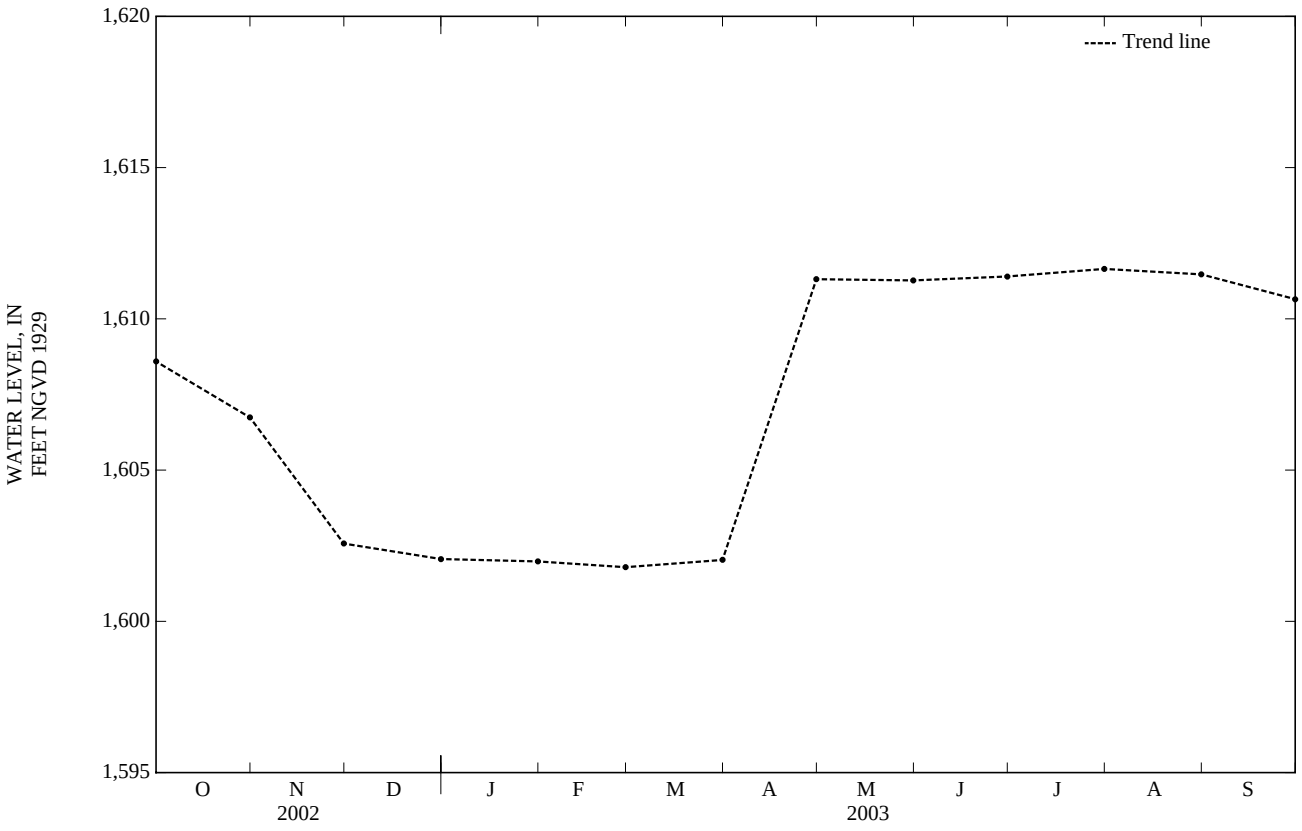
EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 6,920 acre-ft, Apr. 8, 1977, elevation, 1,629.41 ft; minimum (after initial filling for regular operation), 1,660 acre-ft, Jan. 23, 1969, elevation, 1,598.62 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 4,420 acre-ft, Apr. 11, elevation, 1,618.18 ft; minimum, 1,960 acre-ft, Feb. 22, elevation, 1,601.60 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Elevation (feet) | Contents (acre-feet) | Change in contents (acre-feet) |
|---|---|---|---|
| Sept. 30 | 1,608.59 | 2,830 | |
| Oct. 31 | 1,606.74 | 2,580 | -250 |
| Nov. 30 | 1,602.57 | 2,060 | -520 |
| Dec. 31 | 1,602.06 | 2,010 | -50 |
| CAL YR 2002 | | | -10 |
| Jan. 31 | 1,601.98 | 2,000 | -10 |
| Feb. 28 | 1,601.79 | 1,980 | -20 |
| Mar. 31 | 1,602.03 | 2,000 | +20 |
| Apr. 30 | 1,611.34 | 3,240 | +1,240 |
| May 31 | 1,611.27 | 3,220 | -20 |
| June 30 | 1,611.40 | 3,250 | +30 |
| July 31 | 1,611.65 | 3,290 | +40 |
| Aug. 31 | 1,611.47 | 3,260 | -30 |
| Sept. 30 | 1,610.65 | 3,130 | -130 |
| WTR YR 2003 | | | +300 |

03208680 NORTH FORK OF POUND LAKE AT POUND, VA—Continued



## 03208950 CRANES NEST RIVER NEAR CLINTWOOD, VA

LOCATION.--Lat 37°07'26", long 82°26'20", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except for period with ice effect, Jan. 24-27, which is fair. U.S. Army Corps of Engineers satellite precipitation and gage-height telemeter at station. Maximum discharge, 18,000 $ft^3/s$, from rating curve extended above 3,100 $ft^3/s$ on basis of slope-area measurement of peak flow. 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 16 | 0800 | *5,970 | *16.82 | Apr 10 | 2130 | 3,130 | 12.36 |
| Feb 22 | 1400 | 2,940 | 11.96 | Apr 18 | 0800 | 1,400 | 8.00 |
| Apr 9 | 0100 | 1,360 | 7.88 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 15 | 27 | 28 | 66 | 61 | 219 | 61 | 78 | 96 | 55 | 47 | 55 |
| 2 | 13 | 21 | 25 | 63 | 58 | 194 | 61 | 97 | 79 | 72 | 40 | 37 |
| 3 | 12 | 19 | 25 | 92 | 58 | 164 | 60 | 79 | 71 | 78 | 39 | 32 |
| 4 | 11 | 20 | 25 | 108 | 137 | 142 | 59 | 69 | 76 | 56 | 36 | 122 |
| 5 | 11 | 20 | 108 | 99 | 136 | 132 | 75 | 99 | 64 | 52 | 38 | 85 |
| 6 | 12 | 35 | 116 | 92 | 104 | 123 | 76 | 115 | 56 | 142 | 32 | 50 |
| 7 | 11 | 33 | 81 | 82 | 92 | 109 | 413 | 98 | 176 | 105 | 146 | 39 |
| 8 | 11 | 27 | 63 | 79 | 75 | 100 | 509 | 89 | 193 | 66 | 87 | 34 |
| 9 | 10 | 23 | 53 | 76 | 71 | 92 | 1,000 | 122 | 163 | 117 | 57 | 30 |
| 10 | 11 | 21 | 48 | 70 | 66 | 84 | 1,580 | 107 | 118 | 153 | 49 | 28 |
| 11 | 13 | 163 | 195 | 61 | 62 | 79 | 1,230 | 89 | 92 | 147 | 47 | 26 |
| 12 | 13 | 143 | 157 | 53 | 59 | 75 | 420 | 73 | 86 | 126 | 110 | 24 |
| 13 | 12 | 106 | 117 | 65 | 54 | 75 | 268 | 62 | 71 | 136 | 55 | 23 |
| 14 | 12 | 62 | 182 | 51 | 57 | 82 | 199 | 56 | 62 | 95 | 47 | 22 |
| 15 | 12 | 45 | 147 | 47 | 617 | 72 | 164 | 128 | 104 | 71 | 40 | 22 |
| 16 | 54 | 44 | 112 | 55 | 2,850 | 69 | 144 | 199 | 269 | 60 | 39 | 21 |
| 17 | 31 | 76 | 89 | 47 | 564 | 67 | 134 | 178 | 478 | 52 | 38 | 20 |
| 18 | 20 | 73 | 75 | 45 | 316 | 68 | 772 | 208 | 519 | 45 | 40 | 19 |
| 19 | 16 | 58 | 66 | 44 | 220 | 64 | 360 | 165 | 413 | 42 | 33 | 19 |
| 20 | 15 | 49 | 208 | 41 | 177 | 61 | 235 | 125 | 233 | 39 | 30 | 19 |
| 21 | 16 | 54 | 161 | 41 | 157 | 61 | 185 | 155 | 164 | 37 | 30 | 18 |
| 22 | 15 | 69 | 115 | 38 | 1,480 | 56 | 156 | 153 | 130 | 41 | 32 | 20 |
| 23 | 13 | 60 | 89 | 32 | 866 | 52 | 133 | 172 | 108 | 48 | 30 | 34 |
| 24 | 13 | 49 | 89 | e31 | 399 | 51 | 118 | 232 | 89 | 62 | 27 | 22 |
| 25 | 12 | 42 | 115 | e30 | 276 | 50 | 111 | 144 | 77 | 39 | 26 | 19 |
| 26 | 13 | 37 | 111 | e30 | 224 | 52 | 130 | 127 | 69 | 34 | 24 | 18 |
| 27 | 13 | 38 | 97 | e31 | 207 | 50 | 110 | 106 | 64 | 32 | 23 | 20 |
| 28 | 14 | 33 | 85 | 33 | 233 | 48 | 98 | 93 | 61 | 35 | 27 | 32 |
| 29 | 25 | 30 | 76 | 44 | --- | 47 | 90 | 104 | 55 | 85 | 31 | 21 |
| 30 | 62 | 30 | 67 | 63 | --- | 60 | 83 | 125 | 52 | 56 | 41 | 18 |
| 31 | 40 | --- | 61 | 58 | --- | 61 | --- | 114 | --- | 46 | 67 | --- |
| TOTAL | 551 | 1,507 | 2,986 | 1,767 | 9,676 | 2,659 | 9,034 | 3,761 | 4,288 | 2,224 | 1,408 | 949 |
| MEAN | 17.8 | 50.2 | 96.3 | 57.0 | 346 | 85.8 | 301 | 121 | 143 | 71.7 | 45.4 | 31.6 |
| MAX | 62 | 163 | 208 | 108 | 2,850 | 219 | 1,580 | 232 | 519 | 153 | 146 | 122 |
| MIN | 10 | 19 | 25 | 30 | 54 | 47 | 59 | 56 | 52 | 32 | 23 | 18 |
| CFSM | 0.27 | 0.76 | 1.45 | 0.86 | 5.20 | 1.29 | 4.53 | 1.82 | 2.15 | 1.08 | 0.68 | 0.48 |
| IN. | 0.31 | 0.84 | 1.67 | 0.99 | 5.41 | 1.49 | 5.05 | 2.10 | 2.40 | 1.24 | 0.79 | 0.53 |

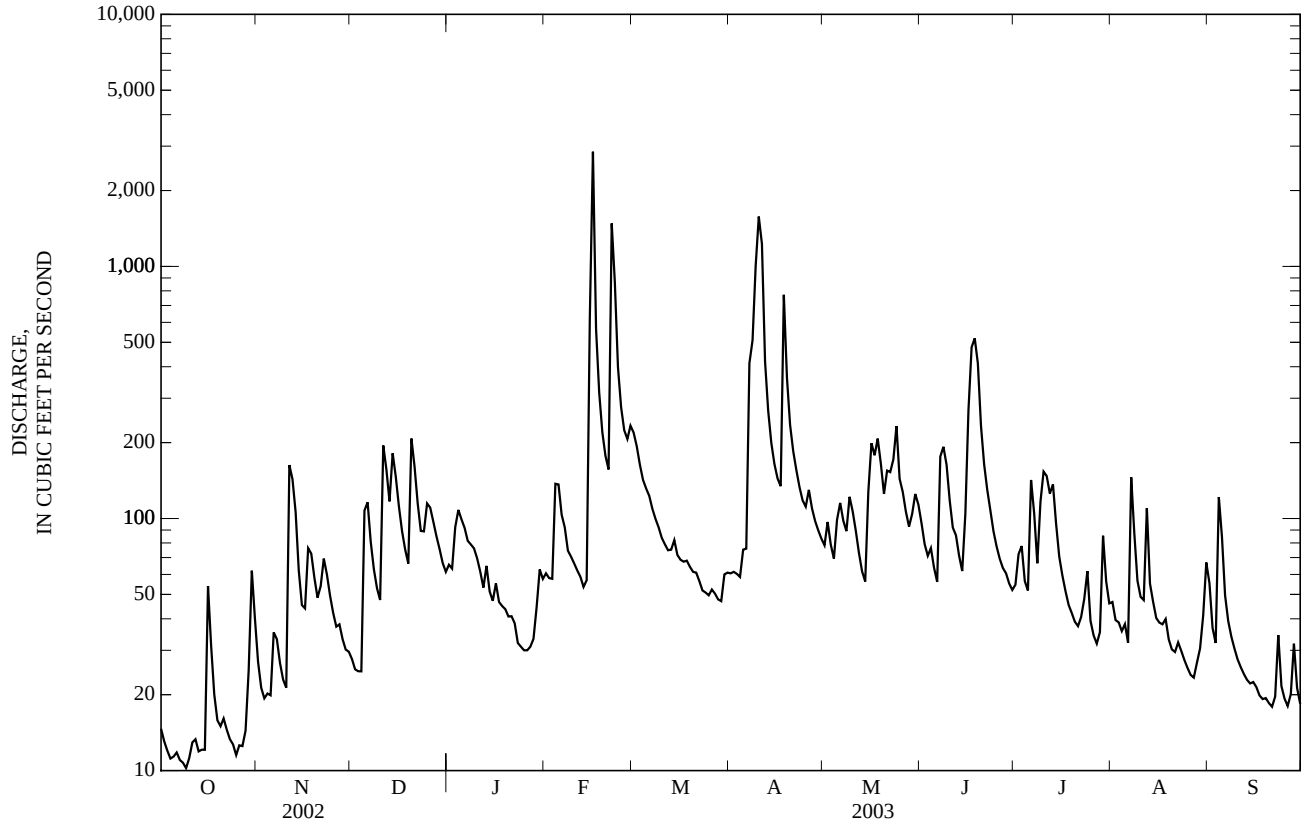
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1964 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 28.2 | 44.4 | 78.7 | 114 | 144 | 164 | 138 | 95.7 | 52.4 | 33.8 | 32.7 | 23.3 |
| MAX | 191 | 164 | 228 | 338 | 367 | 434 | 498 | 262 | 236 | 80.7 | 142 | 116 |
| (WY) | (1990) | (1978) | (1992) | (1972) | (1994) | (1975) | (1977) | (1984) | (1989) | (2001) | (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) |

03208950 CRANES NEST RIVER NEAR CLINTWOOD, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1964 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 27,581.5 | | 40,810 | | | |
| ANNUAL MEAN | 75.6 | | 112 | | 78.8 | |
| HIGHEST ANNUAL MEAN | | | | | 126 | 1994 |
| LOWEST ANNUAL MEAN | | | | | 34.7 | 1988 |
| HIGHEST DAILY MEAN | 3,750 | Mar 18 | 2,850 | Feb 16 | 8,000 | Apr 4, 1977 |
| LOWEST DAILY MEAN | 7.6 | Sep 14 | 10 | Oct 9 | 0.70 | Sep 17, 1964 |
| ANNUAL SEVEN-DAY MINIMUM | 7.9 | Sep 10 | 11 | Oct 4 | 0.93 | Sep 12, 1964 |
| MAXIMUM PEAK FLOW | | | 5,970 | Feb 16 | 18,000 | Apr 4, 1977 |
| MAXIMUM PEAK STAGE | | | 16.82 | Feb 16 | a26.09 | Apr 4, 1977 |
| INSTANTANEOUS LOW FLOW | | | 8.2 | Oct 5 | 0.48 | Sep 28, 1964 |
| ANNUAL RUNOFF (CFSM) | 1.14 | | 1.68 | | 1.18 | |
| ANNUAL RUNOFF (INCHES) | 15.43 | | 22.83 | | 16.10 | |
| 10 PERCENT EXCEEDS | 126 | | 188 | | 168 | |
| 50 PERCENT EXCEEDS | 34 | | 62 | | 38 | |
| 90 PERCENT EXCEEDS | 12 | | 20 | | 8.2 | |

a From floodmark.
e Estimated.



## 03208990 JOHN W. FLANNAGAN RESERVOIR NEAR HAYSI, VA

LOCATION.--Lat 37°14'00", long 82°20'56", NAD83, Dickenson County, Hydrologic Unit 05070202, in control tower of John W. Flannagan Dam on Pound River, 1.3 mi upstream from Blacklog Branch, and 3.7 mi northwest of Haysi.

DRAINAGE AREA.--221 $mi^2$.

PERIOD OF RECORD.--September 1964 to current year.

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Mar. 31, 1965, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by rockfill dam. Spillway with crest at elevation 1,410.0 ft is in a saddle 0.3 mi upstream from dam and is equipped with 6 radial gates 36 ft high by 42 ft wide. Except during major floods, all discharge will be through a diversion tunnel, the invert of the entrance of which is at elevation 1,230.0 ft. Storage began in September 1961 during construction with peak discharge affected thereafter; initial filling for regular operations started in March 1965. Total capacity at elevation 1,446.0 ft, top of gates, is 145,700 acre-ft of which 78,600 acre-ft is controlled flood storage for summer operations between elevations 1,396.0 ft, top of summer conservation pool, and 1,446.0 ft; an additional 16,500 acre-ft is available for flood control during the period December to March between elevations 1,380.0 ft, top of winter conservation pool, and 1,396.0 ft; contents at established minimum pool, 1,314.0 ft, is 12,000 acre-ft; dead storage is 300 acre-ft below elevation 1,230.0 ft. Figures given herein represent total contents. Reservoir is used for flood control, low-water augmentation for water-quality control, and recreation. U.S. Army Corps of Engineers satellite precipitation and elevation telemeter at station.

COOPERATION.--Records were provided by the U.S. Army Corps of Engineers.

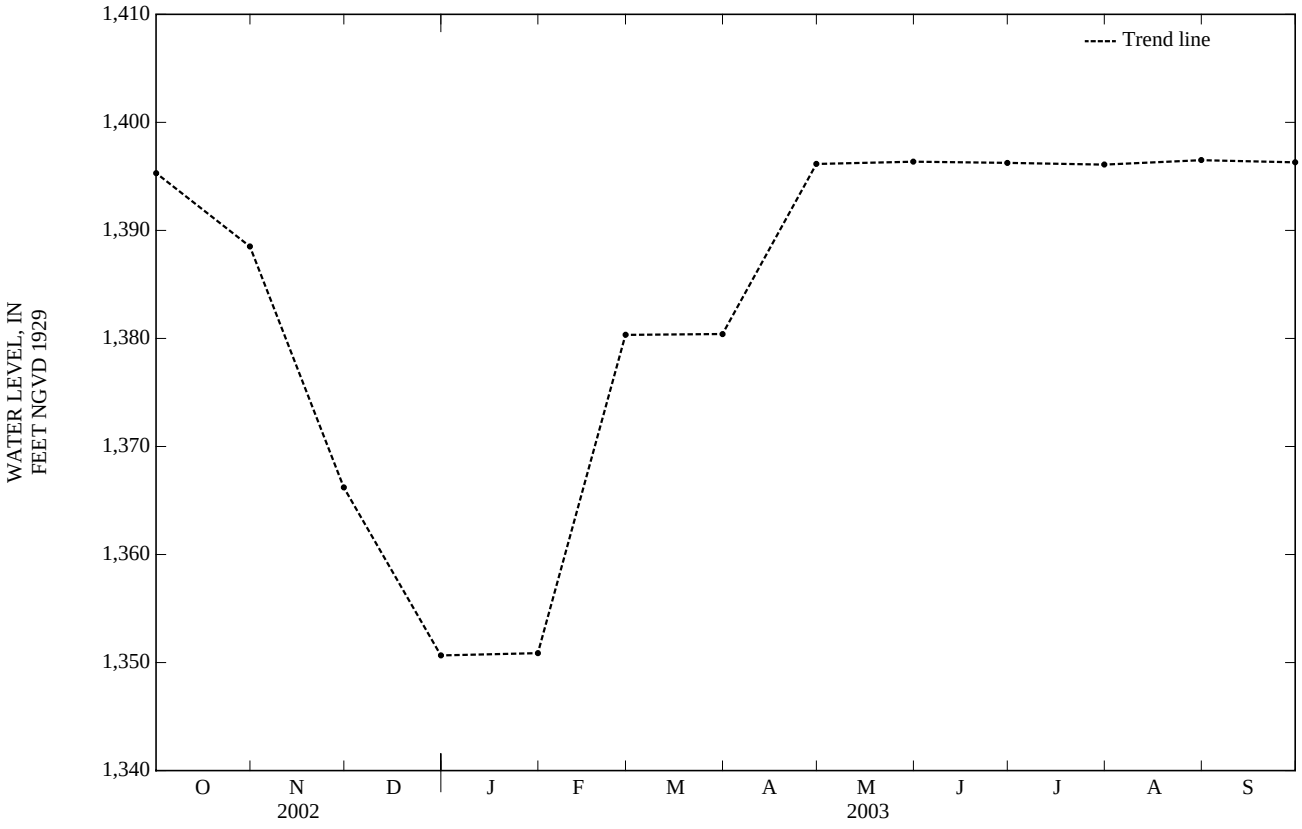
EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 116,500 acre-ft, Apr. 7, 1977, elevation, 1,430.80 ft; minimum (after initial filling for regular operation), 11,800 acre-ft, Apr. 1, 1965, elevation, 1,313.42 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 82,420 acre-ft, Apr. 11, elevation, 1,408.40 ft; minimum, 27,430 acre-ft, Dec. 26, elevation, 1,349.20 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

| Date | Elevation (feet) | Contents (acre-feet) | Change in contents (acre-feet) |
|---|---|---|---|
| Sept. 30 | 1,395.31 | 66,300 | |
| Oct. 31 | 1,388.51 | 58,920 | -7,380 |
| Nov. 30 | 1,366.20 | 38,920 | -20,000 |
| Dec. 31 | 1,350.66 | 28,300 | -10,620 |
| CAL YR 2002 | | | -22,300 |
| Jan. 31 | 1,350.87 | 28,430 | +130 |
| Feb. 28 | 1,380.33 | 50,870 | +22,440 |
| Mar. 31 | 1,380.41 | 50,940 | +70 |
| Apr. 30 | 1,396.15 | 67,270 | +16,330 |
| May 31 | 1,396.36 | 67,500 | +230 |
| June 30 | 1,396.25 | 67,380 | -120 |
| July 31 | 1,396.09 | 67,190 | -190 |
| Aug. 31 | 1,396.50 | 67,670 | +480 |
| Sept. 30 | 1,396.30 | 67,430 | -240 |
| WTR YR 2003 | | | +1,130 |

03208990 JOHN W. FLANNAGAN RESERVOIR NEAR HAYSI, VA—Continued



## 03209000 POUND RIVER BELOW FLANNAGAN DAM, NEAR HAYSI, VA

LOCATION.--Lat 37°14'13", long 82°20'36", NAD83, 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 $mi^2$.

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 NGVD of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Dec. 20, 1939, nonrecording gage at site 3.8 mi upstream at different datum. Dec. 20, 1939, to Sept. 30, 1963, water-stage recorder at site 4.6 mi upstream at datum 79.91 ft higher.

REMARKS.--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 $ft^3/s$, from rating curve extended above 1,750 $ft^3/s$. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 53 | 506 | 510 | 192 | 46 | 889 | 89 | 201 | 315 | 173 | 77 | 346 |
| 2 | 53 | 495 | 509 | 192 | 46 | 888 | 52 | 350 | 265 | 223 | 173 | 91 |
| 3 | 53 | 350 | 649 | 423 | 32 | 558 | 36 | 420 | 248 | 265 | 165 | 131 |
| 4 | 53 | 301 | 515 | 439 | 17 | 412 | 22 | 324 | 238 | 140 | 131 | 621 |
| 5 | 269 | 414 | 554 | 286 | 17 | 412 | 23 | 173 | 239 | 96 | 247 | 481 |
| 6 | 267 | 478 | 859 | 286 | 17 | 412 | 23 | 509 | 240 | 223 | 256 | 197 |
| 7 | 66 | 477 | 889 | 314 | 17 | 412 | 18 | 480 | 599 | 395 | 930 | 159 |
| 8 | 87 | 475 | 881 | 392 | 17 | 350 | 15 | 355 | 957 | 194 | 397 | 100 |
| 9 | 176 | 472 | 493 | 337 | 17 | 319 | 88 | 890 | 697 | 109 | 296 | 88 |
| 10 | 235 | 472 | 413 | 188 | 17 | 127 | 616 | 659 | 414 | 271 | 150 | 79 |
| 11 | 234 | 472 | 965 | 225 | 17 | 166 | 2,040 | 341 | 209 | 425 | 124 | 80 |
| 12 | 345 | 1,090 | 1,180 | 225 | 17 | 231 | 3,960 | 343 | 163 | 308 | 238 | 66 |
| 13 | 264 | 1,160 | 978 | 210 | 17 | 234 | 3,930 | 243 | 242 | 383 | 230 | 52 |
| 14 | 53 | 899 | 979 | 179 | 17 | 235 | 2,270 | 194 | 283 | 323 | 95 | 53 |
| 15 | 79 | 591 | 805 | 179 | 20 | 237 | 607 | 357 | 655 | 218 | 95 | 53 |
| 16 | 352 | 591 | 721 | 179 | 23 | 237 | 537 | 1,260 | 1,300 | 170 | 96 | 53 |
| 17 | 243 | 587 | 378 | 179 | 1,950 | 237 | 397 | 891 | 1,260 | 148 | 209 | 53 |
| 18 | 84 | 691 | 285 | 179 | 3,830 | 238 | 1,390 | 1,120 | 1,690 | 148 | 137 | 51 |
| 19 | 281 | 857 | 237 | 137 | 3,150 | 217 | 1,840 | 949 | 2,900 | 126 | 64 | 50 |
| 20 | 262 | 594 | 532 | 70 | 1,800 | 178 | 902 | 612 | 3,120 | 72 | 60 | 50 |
| 21 | 178 | 191 | 462 | 111 | 665 | 179 | 688 | 1,070 | 1,330 | 72 | 60 | 50 |
| 22 | 198 | 630 | 420 | 135 | 240 | 179 | 566 | 1,060 | 468 | 72 | 66 | 56 |
| 23 | 179 | 606 | 515 | 135 | 1,620 | 179 | 363 | 854 | 421 | 122 | 74 | 141 |
| 24 | 179 | 557 | 557 | 104 | 3,170 | 100 | 265 | 998 | 263 | 158 | 74 | 108 |
| 25 | 182 | 499 | 670 | 73 | 3,100 | 51 | 504 | 571 | 275 | 135 | 82 | 67 |
| 26 | 381 | 510 | 380 | 73 | 2,810 | 139 | 340 | 495 | 275 | 83 | 78 | 56 |
| 27 | 307 | 518 | 197 | 112 | 1,300 | 186 | 218 | 367 | 251 | 83 | 72 | 55 |
| 28 | 51 | 515 | 197 | 163 | 844 | 168 | 424 | 308 | 188 | 83 | 72 | 54 |
| 29 | 255 | 513 | 198 | 189 | --- | 138 | 407 | 308 | 138 | 411 | 72 | 63 |
| 30 | 455 | 513 | 411 | 189 | --- | 138 | 267 | 555 | 138 | 359 | 97 | 75 |
| 31 | 486 | --- | 401 | 147 | --- | 170 | --- | 470 | --- | 152 | 236 | --- |
| TOTAL | 6,360 | 17,024 | 17,740 | 6,242 | 24,833 | 8,616 | 22,897 | 17,727 | 19,781 | 6,140 | 5,153 | 3,579 |
| MEAN | 205 | 567 | 572 | 201 | 887 | 278 | 763 | 572 | 659 | 198 | 166 | 119 |
| MAX | 486 | 1,160 | 1,180 | 439 | 3,830 | 889 | 3,960 | 1,260 | 3,120 | 425 | 930 | 621 |
| MIN | 51 | 191 | 197 | 70 | 17 | 51 | 15 | 173 | 138 | 72 | 60 | 50 |
| (†) | -3,847 | -10,342 | -5,379 | +61 | +11,300 | +45 | +8,858 | +106 | -45 | -76 | +227 | -187 |
| MEAN‡ | 81.1 | 223 | 399 | 203 | 1,290 | 279 | 1,058 | 575 | 658 | 196 | 174 | 113 |
| CFSM‡ | .37 | 1.01 | 1.81 | .92 | 5.84 | 1.26 | 4.79 | 2.60 | 2.98 | .89 | .79 | .51 |
| IN.‡ | .42 | 1.13 | 2.08 | 1.06 | 6.08 | 1.46 | 5.34 | 3.00 | 3.32 | 1.02 | .91 | .57 |

CAL YR 2002 MEAN‡ 293 CFSM‡ 1.33 IN.‡ 18.00
WTR YR 2003 MEAN‡ 430 CFSM‡ 1.95 IN.‡ 26.42

† 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 change in contents.

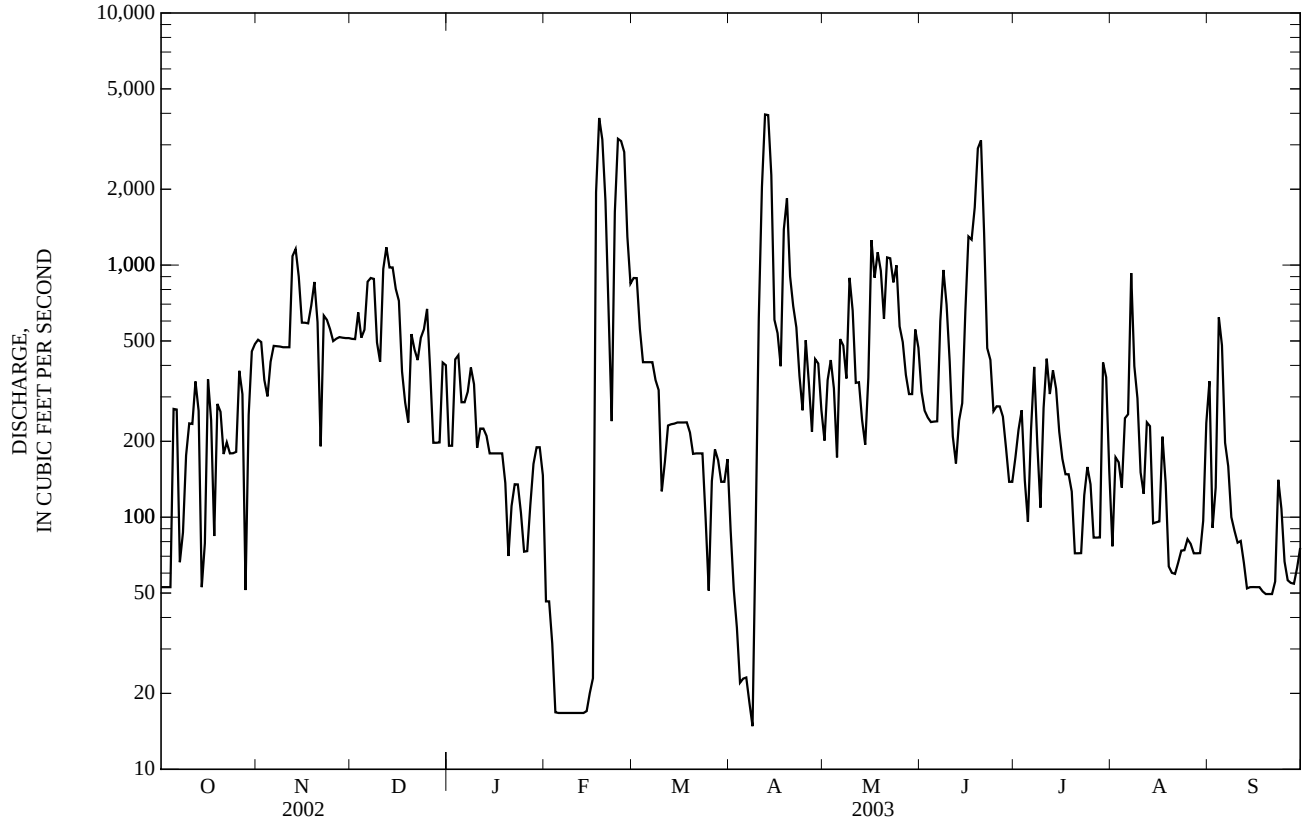
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 231 | 303 | 324 | 420 | 495 | 514 | 302 | 356 | 190 | 121 | 109 | 94.7 |
| MAX | 927 | 679 | 1,003 | 1,171 | 1,343 | 1,181 | 1,004 | 1,074 | 756 | 348 | 268 | 405 |
| (WY) | (1990) | (1978) | (1992) | (1972) | (1994) | (1975) | (1977) | (1975) | (1989) | (2001) | (2001) | (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) |

03209000 POUND RIVER BELOW FLANNAGAN DAM, NEAR HAYSI, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1965 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 118,144.3 | | 156,092 | | | |
| ANNUAL MEAN | 324 | | 428 | | 288 | |
| HIGHEST ANNUAL MEAN | | | | | 481 | 1975 |
| LOWEST ANNUAL MEAN | | | | | 120 | 1966 |
| HIGHEST DAILY MEAN | 2,930 | Jan 26 | 3,960 | Apr 12 | 4,410 | Apr 9, 1977 |
| LOWEST DAILY MEAN | 9.3 | Mar 16 | 15 | Apr 8 | 2.3 | aJun 26, 1965 |
| ANNUAL SEVEN-DAY MINIMUM | 19 | Mar 11 | 17 | Feb 4 | 2.5 | Jun 25, 1965 |
| MAXIMUM PEAK FLOW | | | 4,060 | Feb 17 | b4,540 | Apr 8, 1977 |
| MAXIMUM PEAK STAGE | | | 7.81 | Feb 17 | b8.20 | Apr 8, 1977 |
| INSTANTANEOUS LOW FLOW | | | 14 | Apr 8 | c,d0.00 | Sep 22, 2000 |
| ANNUAL RUNOFF (CFSM) | 1.46 | | 1.94 | | 1.30 | |
| ANNUAL RUNOFF (INCHES) | 19.89 | | 26.27 | | 17.68 | |
| 10 PERCENT EXCEEDS | 657 | | 900 | | 640 | |
| 50 PERCENT EXCEEDS | 173 | | 242 | | 140 | |
| 90 PERCENT EXCEEDS | 51 | | 53 | | 46 | |

a Also June 27-29, 1965.
b Prior to regulation, 1926-64, maximum peak flow, 30,000 $ft^3/s$, Mar. 23, 1929, gage height, 16.50 ft, from floodmarks, site and datum then in use.
c Prior to regulation, 1926-64, instantaneous low flow, less than .10 $ft^3/s$, on several days in September 1932.
d Practically no flow, due to regulation.



## 03209500 LEVISA FORK AT PIKEVILLE, KY

LOCATION.--Lat 37°27'51", long 82°31'35", Pike County, Hydrologic Unit 05070203, on right bank 20 ft downstream from bridge on State Highway 1426, 0.75 mi downstream from Lanks Branch, 1.0 mi south of Pikeville, 1.5 mi upstream from Harolds Branch, and at mile 117.3.

DRAINAGE AREA.--1,232 $mi^2$.

PERIOD OF RECORD.--October 1937 to current year. Gage-height records collected in this vicinity since 1907 are contained in reports of National Weather Service.

REVISED RECORDS.--WRD KY 78-1: Drainage area.

GAGE.--Water-stage recorder with telemetry. Datum of gage is 631.98 ft above NGVD of 1929. Prior to Sept. 23, 1944, nonrecording gage at site 2.3 mi downstream at datum 2.65 ft higher. Sept. 23, 1944 to Sept. 30, 1952, water-stage recorder 2.3 mi downstream at datum 1.65 ft higher. Oct. 1, 1952 to Sept. 30, 1979, at site 2.1 mi downstream at same datum.

REMARKS.--Records good. Flow regulated since March 1965 by John W. Flannagan Lake (station 03208990), since August 1966 by North Fork Pound River Lake (station 03208680) and since October 1968 by Fishtrap Lake (station 03207995).

COOPERATION.--U.S. Army Corps of Engineers, Huntington District.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

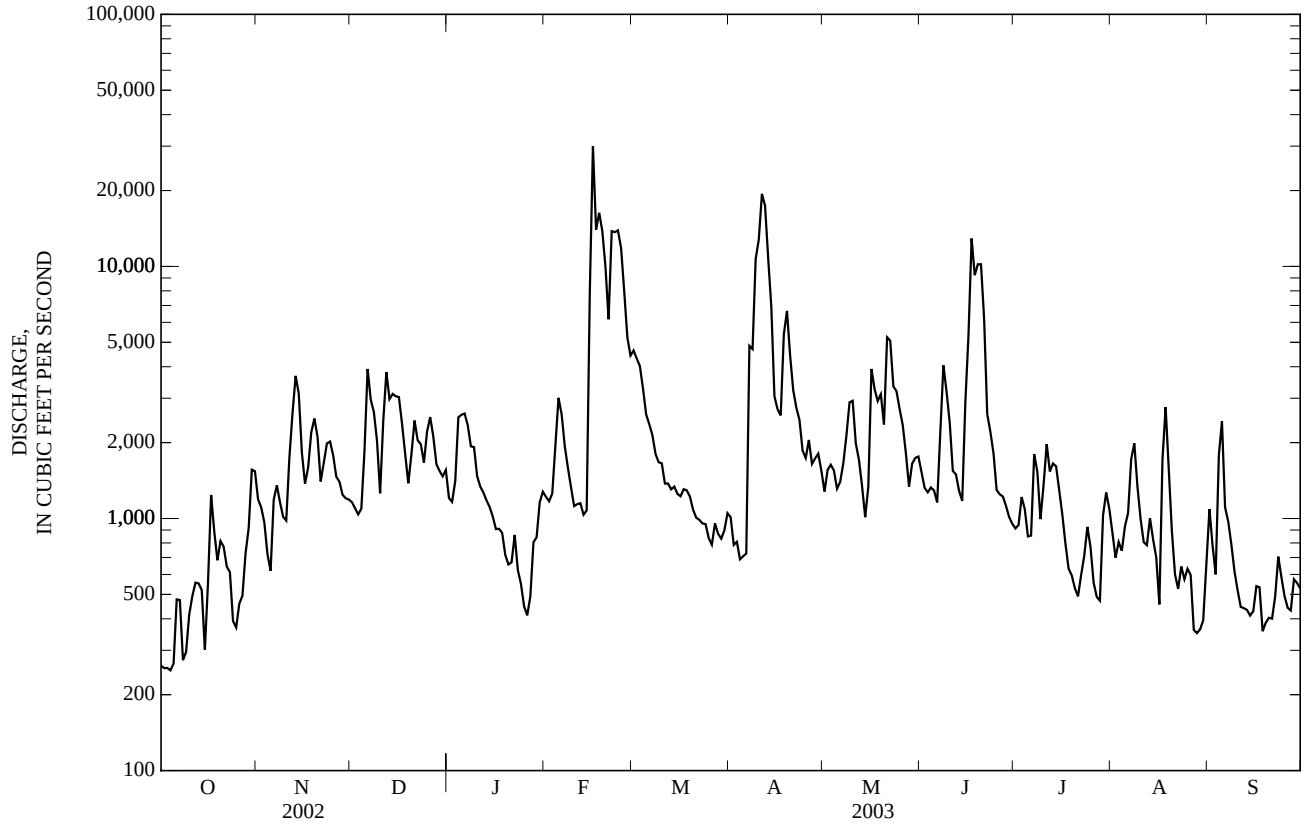
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 261 | 1,190 | 1,160 | 1,210 | 1,220 | 4,640 | 1,010 | 1,280 | 1,530 | 913 | 877 | 1,090 |
| 2 | 255 | 1,110 | 1,100 | 1,160 | 1,170 | 4,310 | 785 | 1,560 | 1,320 | 942 | 700 | 781 |
| 3 | 255 | 965 | 1,040 | 1,410 | 1,260 | 4,020 | 808 | 1,630 | 1,270 | 1,220 | 806 | 600 |
| 4 | 250 | 721 | 1,090 | 2,520 | 1,940 | 3,280 | 689 | 1,550 | 1,330 | 1,090 | 745 | 1,780 |
| 5 | 266 | 621 | 1,850 | 2,580 | 3,010 | 2,590 | 708 | 1,310 | 1,290 | 849 | 931 | 2,430 |
| 6 | 478 | 1,190 | 3,920 | 2,610 | 2,590 | 2,370 | 726 | 1,400 | 1,160 | 856 | 1,050 | 1,110 |
| 7 | 475 | 1,350 | 2,960 | 2,340 | 1,940 | 2,140 | 4,840 | 1,650 | 2,200 | 1,800 | 1,720 | 973 |
| 8 | 274 | 1,160 | 2,640 | 1,930 | 1,590 | 1,800 | 4,700 | 2,130 | 4,050 | 1,540 | 1,990 | 790 |
| 9 | 296 | 1,020 | 2,040 | 1,920 | 1,330 | 1,670 | 10,700 | 2,890 | 3,180 | 994 | 1,340 | 618 |
| 10 | 416 | 981 | 1,260 | 1,470 | 1,120 | 1,660 | 12,800 | 2,930 | 2,410 | 1,360 | 996 | 519 |
| 11 | 493 | 1,740 | 2,440 | 1,340 | 1,140 | 1,380 | 19,400 | 1,990 | 1,550 | 1,970 | 806 | 446 |
| 12 | 556 | 2,610 | 3,810 | 1,270 | 1,150 | 1,380 | 17,400 | 1,710 | 1,500 | 1,540 | 784 | 441 |
| 13 | 553 | 3,680 | 2,980 | 1,180 | 1,040 | 1,300 | 10,800 | 1,340 | 1,290 | 1,650 | 1,000 | 434 |
| 14 | 520 | 3,130 | 3,120 | 1,110 | 1,080 | 1,340 | 6,910 | 1,010 | 1,170 | 1,610 | 826 | 412 |
| 15 | 302 | 1,820 | 3,050 | 1,020 | 7,870 | 1,250 | 3,050 | 1,340 | 2,890 | 1,290 | 702 | 429 |
| 16 | 557 | 1,380 | 3,030 | 908 | 30,000 | 1,230 | 2,710 | 3,920 | 5,310 | 1,030 | 456 | 539 |
| 17 | 1,240 | 1,590 | 2,380 | 910 | 14,000 | 1,310 | 2,570 | 3,260 | 12,900 | 791 | 1,720 | 534 |
| 18 | 889 | 2,200 | 1,810 | 877 | 16,300 | 1,290 | 5,370 | 2,930 | 9,230 | 632 | 2,770 | 357 |
| 19 | 683 | 2,490 | 1,380 | 716 | 13,800 | 1,220 | 6,660 | 3,110 | 10,200 | 595 | 1,570 | 386 |
| 20 | 814 | 2,110 | 1,800 | 657 | 9,980 | 1,080 | 4,450 | 2,360 | 10,200 | 529 | 891 | 404 |
| 21 | 774 | 1,400 | 2,450 | 670 | 6,170 | 1,010 | 3,230 | 5,230 | 6,200 | 491 | 600 | 401 |
| 22 | 645 | 1,670 | 2,040 | 861 | 13,800 | 988 | 2,750 | 5,070 | 2,600 | 597 | 526 | 490 |
| 23 | 612 | 1,990 | 1,970 | 625 | 13,700 | 956 | 2,460 | 3,340 | 2,210 | 712 | 645 | 706 |
| 24 | 392 | 2,020 | 1,670 | 550 | 13,900 | 951 | 1,860 | 3,200 | 1,820 | 927 | 575 | 585 |
| 25 | 370 | 1,780 | 2,220 | 448 | 11,800 | 836 | 1,740 | 2,720 | 1,300 | 770 | 632 | 492 |
| 26 | 459 | 1,460 | 2,530 | 413 | 7,960 | 787 | 2,050 | 2,350 | 1,250 | 556 | 597 | 442 |
| 27 | 494 | 1,400 | 2,110 | 490 | 5,220 | 956 | 1,650 | 1,820 | 1,220 | 489 | 362 | 432 |
| 28 | 727 | 1,240 | 1,640 | 805 | 4,430 | 870 | 1,730 | 1,340 | 1,120 | 472 | 351 | 574 |
| 29 | 916 | 1,200 | 1,540 | 842 | --- | 832 | 1,810 | 1,650 | 1,010 | 1,030 | 363 | 555 |
| 30 | 1,560 | 1,190 | 1,470 | 1,160 | --- | 898 | 1,550 | 1,740 | 953 | 1,270 | 394 | 529 |
| 31 | 1,540 | --- | 1,560 | 1,280 | --- | 1,050 | --- | 1,760 | --- | 1,090 | 652 | --- |
| TOTAL | 18,322 | 48,408 | 66,060 | 37,282 | 190,510 | 51,394 | 137,916 | 71,520 | 95,663 | 31,605 | 28,377 | 20,279 |
| MEAN | 591 | 1,614 | 2,131 | 1,203 | 6,804 | 1,658 | 4,597 | 2,307 | 3,189 | 1,020 | 915 | 676 |
| MAX | 1,560 | 3,680 | 3,920 | 2,610 | 30,000 | 4,640 | 19,400 | 5,230 | 12,900 | 1,970 | 2,770 | 2,430 |
| MIN | 250 | 621 | 1,040 | 413 | 1,040 | 787 | 689 | 1,010 | 953 | 472 | 351 | 357 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1969 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 774 | 1,088 | 1,500 | 2,230 | 2,832 | 2,924 | 2,330 | 1,995 | 1,072 | 643 | 510 | 455 |
| MAX | 3,939 | 3,991 | 5,385 | 6,861 | 6,804 | 8,081 | 7,646 | 6,067 | 3,492 | 2,028 | 1,150 | 1,606 |
| (WY) | (1990) | (1978) | (1973) | (1974) | (2003) | (1975) | (1977) | (1984) | (1979) | (2001) | (2001) | (1989) |
| MIN | 158 | 312 | 300 | 278 | 814 | 529 | 388 | 349 | 210 | 200 | 203 | 168 |
| (WY) | (1970) | (2001) | (1981) | (1981) | (1992) | (1988) | (1986) | (1976) | (1988) | (1988) | (1969) | (1969) |

03209500 LEVISA FORK AT PIKEVILLE, KY—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1969 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 540,874 | | 797,336 | | | |
| ANNUAL MEAN | 1,482 | | 2,184 | | 1,523 | |
| HIGHEST ANNUAL MEAN | | | | | 2,459 | 1979 |
| LOWEST ANNUAL MEAN | | | | | 522 | 1988 |
| HIGHEST DAILY MEAN | 22,100 | Mar 18 | 30,000 | Feb 16 | 69,300 | Apr 5, 1977 |
| LOWEST DAILY MEAN | 192 | Jan 4 | 250 | Oct 4 | 66 | Dec 3, 1970 |
| ANNUAL SEVEN-DAY MINIMUM | 211 | Aug 30 | 320 | Oct 1 | 103 | Oct 10, 1968 |
| MAXIMUM PEAK FLOW | | | 33,000 | Feb 16 | 85,500 | Jan 30, 1957 |
| MAXIMUM PEAK STAGE | | | 39.97 | Feb 16 | 52.72 | Jan 30, 1957 |
| INSTANTANEOUS LOW FLOW | | | | | 66 | Dec 3, 1970 |
| 10 PERCENT EXCEEDS | 2,930 | | 4,030 | | 3,480 | |
| 50 PERCENT EXCEEDS | 742 | | 1,280 | | 754 | |
| 90 PERCENT EXCEEDS | 234 | | 491 | | 233 | |



## 03471500 SOUTH FORK HOLSTON RIVER AT RIVERSIDE, NEAR CHILHOWIE, VA

LOCATION.--Lat 36°45'37", long 81°37'52", NAD83, 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 $mi^2$.

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 NGVD of 1929. 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. 24-28, which is fair. Prior to August 1951, diurnal fluctuation at low flow caused by mill 500 ft upstream from station. Maximum discharge, 9,600 $ft^3/s$, from rating curve extended above 3,700 $ft^3/s$ on basis of slope-area measurement of peak flow. Minimum discharge recorded, 2 $ft^3/s$, 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 650 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 16 | 0415 | 1,150 | 4.82 | Jun 12 | 0030 | 696 | 4.00 |
| Feb 22 | 1800 | *3,320 | *7.03 | Jul 3 | 0100 | 821 | 4.25 |
| Apr 10 | 2315 | 2,340 | 6.23 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 26 | 51 | 68 | 136 | 161 | 335 | 97 | 143 | 135 | 110 | 140 | 80 |
| 2 | 26 | 48 | 64 | 176 | 141 | 326 | 198 | 204 | 133 | 379 | 147 | 68 |
| 3 | 25 | 45 | 60 | 204 | 132 | 272 | 203 | 162 | 120 | 665 | 164 | 61 |
| 4 | 24 | 46 | 59 | 221 | 183 | 227 | 172 | 138 | 113 | 363 | 172 | 84 |
| 5 | 23 | 46 | 104 | 203 | 234 | 202 | 180 | 131 | 98 | 237 | 144 | 92 |
| 6 | 23 | 66 | 125 | 175 | 199 | 228 | 183 | 129 | 87 | 181 | 117 | 74 |
| 7 | 22 | 87 | 107 | 150 | 174 | 247 | 188 | 124 | 101 | 237 | 103 | 66 |
| 8 | 22 | 80 | 95 | 135 | 146 | 230 | 181 | 131 | 251 | 175 | 113 | 62 |
| 9 | 22 | 71 | 86 | 127 | 125 | 202 | 216 | 124 | 264 | 162 | 128 | 58 |
| 10 | 22 | 63 | 79 | 118 | 122 | 174 | 782 | 120 | 190 | 161 | 117 | 55 |
| 11 | 25 | 149 | 108 | 107 | 111 | 153 | 1,330 | 113 | 228 | 148 | 110 | 54 |
| 12 | 25 | 259 | 172 | 96 | 102 | 138 | 574 | 105 | 478 | 132 | 120 | 49 |
| 13 | 24 | 277 | 241 | 91 | 93 | 127 | 384 | 97 | 331 | 139 | 125 | 49 |
| 14 | 24 | 182 | 364 | 89 | 94 | 121 | 288 | 89 | 256 | 120 | 109 | 47 |
| 15 | 26 | 133 | 262 | 84 | 275 | 110 | 233 | 89 | 299 | 108 | 94 | 53 |
| 16 | 52 | 121 | 201 | 79 | 912 | 112 | 201 | 101 | 343 | 100 | 142 | 52 |
| 17 | 49 | 225 | 161 | 78 | 482 | 111 | 178 | 86 | 550 | 94 | 179 | 47 |
| 18 | 38 | 222 | 135 | 71 | 313 | 113 | 221 | 97 | 420 | 85 | 166 | 46 |
| 19 | 34 | 165 | 121 | 70 | 238 | 111 | 250 | 92 | 403 | 80 | 135 | 51 |
| 20 | 32 | 130 | 275 | 69 | 209 | 146 | 227 | 90 | 395 | 75 | 113 | 48 |
| 21 | 33 | 120 | 364 | 68 | 207 | 223 | 220 | 94 | 305 | 72 | 98 | 45 |
| 22 | 31 | 130 | 256 | 65 | 1,500 | 195 | 203 | 95 | 236 | 70 | 92 | 47 |
| 23 | 29 | 132 | 195 | 61 | 1,520 | 163 | 188 | 112 | 191 | 71 | 93 | 64 |
| 24 | 28 | 120 | 194 | e58 | 706 | 141 | 169 | 148 | 158 | 65 | 80 | 55 |
| 25 | 28 | 106 | 268 | e52 | 438 | 124 | 155 | 131 | 135 | 61 | 73 | 52 |
| 26 | 28 | 95 | 250 | e50 | 341 | 116 | 144 | 118 | 120 | 58 | 68 | 49 |
| 27 | 28 | 91 | 206 | e52 | 291 | 106 | 130 | 105 | 120 | 56 | 64 | 50 |
| 28 | 31 | 81 | 177 | e52 | 292 | 97 | 117 | 94 | 110 | 54 | 62 | 58 |
| 29 | 39 | 76 | 156 | 99 | --- | 92 | 109 | 101 | 102 | 167 | 62 | 52 |
| 30 | 49 | 73 | 137 | 189 | --- | 102 | 112 | 117 | 98 | 113 | 58 | 50 |
| 31 | 54 | --- | 127 | 184 | --- | 95 | --- | 118 | --- | 95 | 63 | --- |
| TOTAL | 942 | 3,490 | 5,217 | 3,409 | 9,741 | 5,139 | 7,833 | 3,598 | 6,770 | 4,633 | 3,451 | 1,718 |
| MEAN | 30.4 | 116 | 168 | 110 | 348 | 166 | 261 | 116 | 226 | 149 | 111 | 57.3 |
| MAX | 54 | 277 | 364 | 221 | 1,520 | 335 | 1,330 | 204 | 550 | 665 | 179 | 92 |
| MIN | 22 | 45 | 59 | 50 | 93 | 92 | 97 | 86 | 87 | 54 | 58 | 45 |
| CFSM | 0.40 | 1.53 | 2.21 | 1.45 | 4.57 | 2.18 | 3.43 | 1.53 | 2.97 | 1.96 | 1.46 | 0.75 |
| IN. | 0.46 | 1.71 | 2.55 | 1.67 | 4.76 | 2.51 | 3.83 | 1.76 | 3.31 | 2.26 | 1.69 | 0.84 |

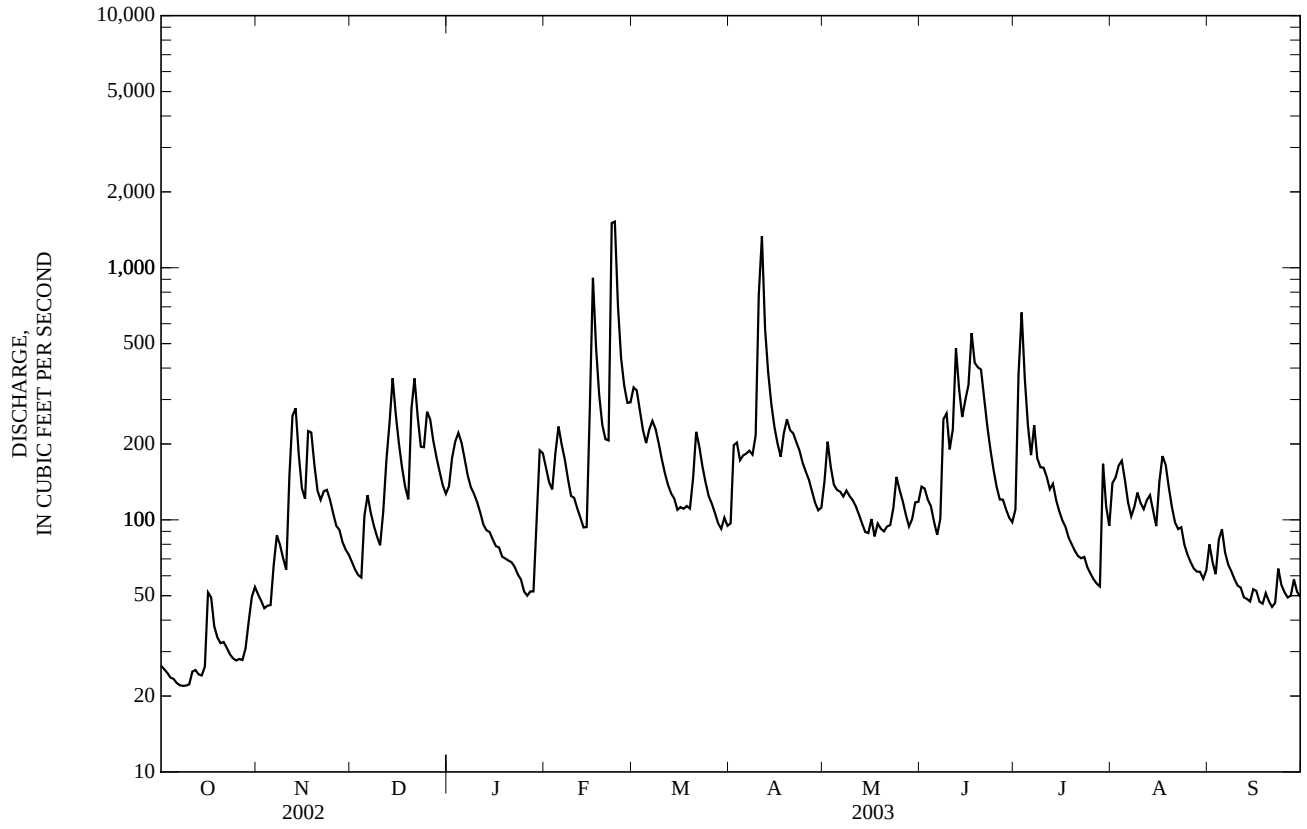
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1921 - 1932, 1942 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 48.2 | 67.9 | 108 | 149 | 201 | 206 | 170 | 137 | 91.5 | 62.1 | 56.0 | 44.3 |
| MAX | 162 | 409 | 272 | 353 | 508 | 512 | 570 | 278 | 322 | 213 | 209 | 254 |
| (WY) | (1990) | (1978) | (1973) | (1996) | (1957) | (1955) | (1987) | (1945) | (1923) | (2001) | (1942) | (1989) |
| MIN | 18.7 | 17.6 | 25.3 | 28.8 | 54.3 | 51.3 | 52.6 | 49.1 | 31.1 | 22.5 | 17.5 | 20.6 |
| (WY) | (1932) | (1932) | (2001) | (1956) | (2002) | (1988) | (1986) | (1926) | (1988) | (1988) | (1988) | (1988) |

03471500 SOUTH FORK HOLSTON RIVER AT RIVERSIDE, NEAR CHILHOWIE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1921 - 1932, 1942 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 29,492 | | 55,941 | | | |
| ANNUAL MEAN | 80.8 | | 153 | | 111 | |
| HIGHEST ANNUAL MEAN | | | | | 162 | 1974 |
| LOWEST ANNUAL MEAN | | | | | 53.8 | 1988 |
| HIGHEST DAILY MEAN | 1,800 | Mar 18 | 1,520 | Feb 23 | 4,040 | Nov 6, 1977 |
| LOWEST DAILY MEAN | 19 | Sep 10 | 22 | aOct 7 | 8.0 | Jul 19, 1926 |
| ANNUAL SEVEN-DAY MINIMUM | 20 | Sep 6 | 23 | Oct 4 | 15 | Jul 17, 1926 |
| MAXIMUM PEAK FLOW | | | 3,320 | Feb 22 | 9,600 | Nov 6, 1977 |
| MAXIMUM PEAK STAGE | | | 7.03 | Feb 22 | 10.20 | Nov 6, 1977 |
| INSTANTANEOUS LOW FLOW | | | 20 | bOct 6 | 2.0 | cAug 26, 1943 |
| ANNUAL RUNOFF (CFSM) | 1.06 | | 2.01 | | 1.46 | |
| ANNUAL RUNOFF (INCHES) | 14.42 | | 27.35 | | 19.85 | |
| 10 PERCENT EXCEEDS | 172 | | 266 | | 225 | |
| 50 PERCENT EXCEEDS | 47 | | 117 | | 70 | |
| 90 PERCENT EXCEEDS | 23 | | 48 | | 27 | |

a Also Oct. 8-10, 2002.
b Also Oct. 7-10, 2002.
c Also Oct. 15, 1943, Aug. 9, 11, 1944, and Oct. 19, 1945.
e Estimated.



## 03473000 SOUTH FORK HOLSTON RIVER NEAR DAMASCUS, VA

LOCATION.--Lat 36°39'06", long 81°50'38", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except for period with ice effect, Jan. 24-28, which is fair. Prior to 1980, some diurnal fluctuation at low flow caused by powerplant upstream from station. Maximum discharge, 22,000 $ft^3/s$, from rating curve extended above 10,000 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 16 | 0445 | 5,650 | 9.04 | Apr 11 | 0030 | 6,510 | 9.71 |
| Feb 22 | 1815 | *8,900 | *11.39 | Jul 2 | 2245 | 4,300 | 7.91 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 120 | 428 | 336 | 559 | 908 | 1,570 | 441 | 678 | 603 | 524 | 1,260 | 958 |
| 2 | 110 | 347 | 307 | 674 | 744 | 1,380 | 726 | 719 | 554 | 2,860 | 1,150 | 497 |
| 3 | 104 | 294 | 292 | 834 | 664 | 1,140 | 796 | 679 | 496 | 3,330 | 920 | 390 |
| 4 | 97 | 278 | 285 | 942 | 1,030 | 948 | 696 | 616 | 465 | 1,690 | 775 | 535 |
| 5 | 94 | 264 | 1,060 | 857 | 1,230 | 852 | 792 | 624 | 408 | 1,040 | 1,010 | 571 |
| 6 | 92 | 645 | 1,210 | 739 | 957 | 1,250 | 805 | 676 | 363 | 802 | 778 | 454 |
| 7 | 88 | 793 | 828 | 619 | 808 | 1,400 | 835 | 664 | 435 | 1,370 | 657 | 390 |
| 8 | 86 | 560 | 634 | 556 | 665 | 1,140 | 796 | 701 | 872 | 1,210 | 814 | 357 |
| 9 | 85 | 440 | 523 | 524 | 569 | 947 | 956 | 670 | 881 | 1,020 | 1,050 | 328 |
| 10 | 85 | 373 | 458 | 498 | 556 | 796 | 2,900 | 609 | 664 | 1,000 | 737 | 300 |
| 11 | 104 | 1,280 | 685 | 452 | 510 | 692 | 4,710 | 564 | 581 | 957 | 644 | 280 |
| 12 | 110 | 1,850 | 792 | 404 | 475 | 614 | 2,500 | 499 | 1,140 | 871 | 668 | 264 |
| 13 | 97 | 1,670 | 979 | 383 | 440 | 577 | 1,720 | 450 | 956 | 866 | 725 | 245 |
| 14 | 102 | 972 | 1,390 | 382 | 441 | 596 | 1,230 | 410 | 774 | 700 | 569 | 237 |
| 15 | 152 | 678 | 1,110 | 358 | 1,530 | 519 | 957 | 409 | 880 | 602 | 486 | 261 |
| 16 | 618 | 629 | 867 | 329 | 4,510 | 527 | 804 | 424 | 1,080 | 541 | 620 | 257 |
| 17 | 416 | 1,040 | 696 | 335 | 2,290 | 512 | 706 | 370 | 1,380 | 508 | 681 | 225 |
| 18 | 282 | 1,060 | 584 | 291 | 1,420 | 512 | 1,090 | 400 | 1,180 | 444 | 600 | 213 |
| 19 | 221 | 800 | 522 | 301 | 1,040 | 491 | 1,130 | 361 | 1,350 | 407 | 509 | 237 |
| 20 | 191 | 647 | 1,120 | 303 | 892 | 580 | 969 | 345 | 1,300 | 379 | 446 | 220 |
| 21 | 203 | 640 | 1,430 | 307 | 844 | 722 | 964 | 379 | 1,010 | 357 | 398 | 206 |
| 22 | 180 | 749 | 1,050 | 296 | 4,750 | 687 | 897 | 394 | 791 | 390 | 381 | 229 |
| 23 | 160 | 736 | 796 | 262 | 5,430 | 606 | 809 | 392 | 636 | 428 | 407 | 437 |
| 24 | 144 | 624 | 850 | e230 | 2,920 | 549 | 716 | 600 | 535 | 351 | 351 | 287 |
| 25 | 136 | 527 | 1,410 | e220 | 1,870 | 499 | 648 | 508 | 468 | 323 | 323 | 248 |
| 26 | 144 | 458 | 1,310 | e210 | 1,430 | 478 | 599 | 461 | 421 | 303 | 305 | 234 |
| 27 | 136 | 477 | 983 | e220 | 1,360 | 456 | 541 | 409 | 478 | 285 | 290 | 235 |
| 28 | 178 | 413 | 792 | e230 | 1,620 | 414 | 484 | 374 | 433 | 281 | 295 | 343 |
| 29 | 325 | 386 | 668 | 584 | --- | 398 | 456 | 449 | 411 | 500 | 316 | 274 |
| 30 | 582 | 369 | 577 | 1,260 | --- | 453 | 555 | 527 | 398 | 458 | 296 | 244 |
| 31 | 575 | --- | 523 | 1,100 | --- | 426 | --- | 534 | --- | 458 | 553 | --- |
| TOTAL | 6,017 | 20,427 | 25,067 | 15,259 | 41,903 | 22,731 | 32,228 | 15,895 | 21,943 | 25,255 | 19,014 | 9,956 |
| MEAN | 194 | 681 | 809 | 492 | 1,497 | 733 | 1,074 | 513 | 731 | 815 | 613 | 332 |
| MAX | 618 | 1,850 | 1,430 | 1,260 | 5,430 | 1,570 | 4,710 | 719 | 1,380 | 3,330 | 1,260 | 958 |
| MIN | 85 | 264 | 285 | 210 | 440 | 398 | 441 | 345 | 363 | 281 | 290 | 206 |
| CFSM | 0.64 | 2.26 | 2.69 | 1.64 | 4.97 | 2.44 | 3.57 | 1.70 | 2.43 | 2.71 | 2.04 | 1.10 |
| IN. | 0.74 | 2.52 | 3.10 | 1.89 | 5.18 | 2.81 | 3.98 | 1.96 | 2.71 | 3.12 | 2.35 | 1.23 |

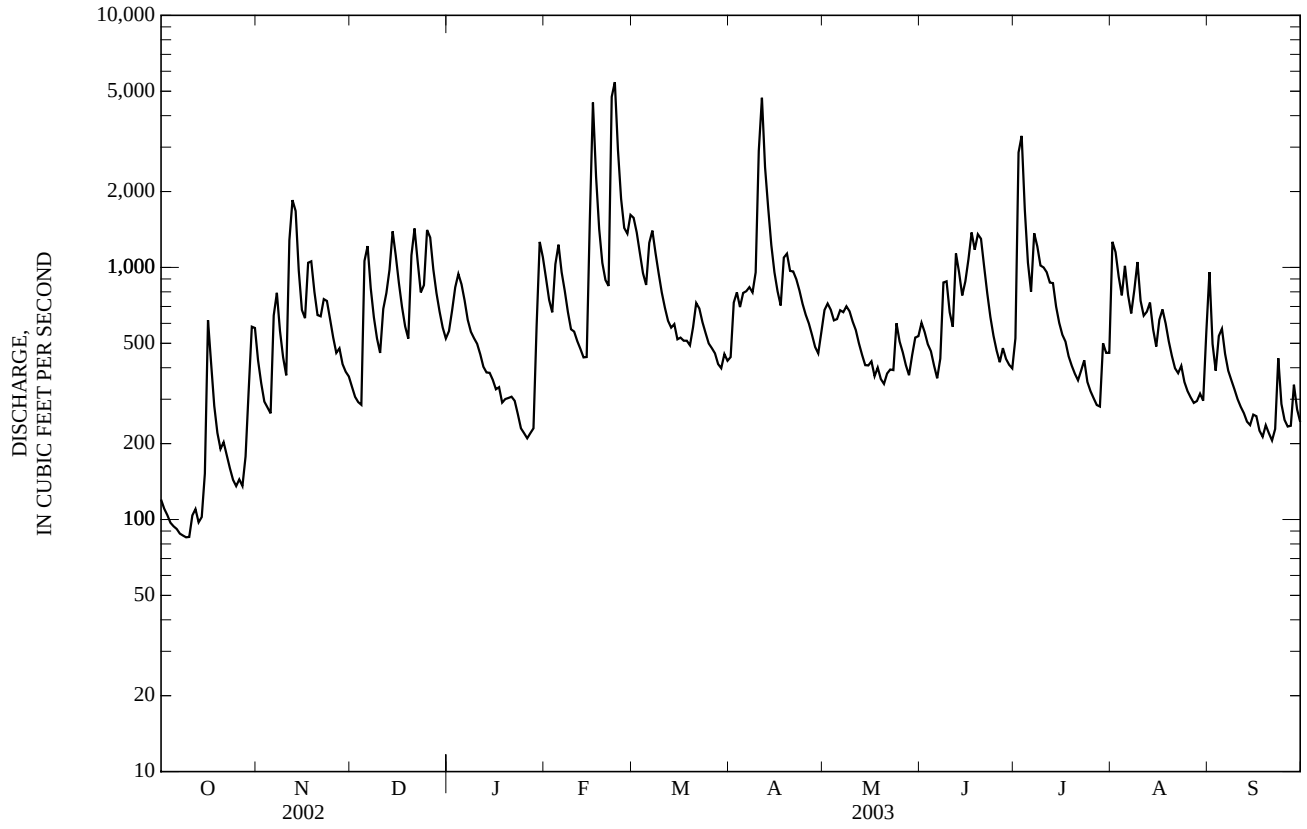
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1932 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 209 | 283 | 473 | 654 | 838 | 873 | 723 | 571 | 365 | 296 | 256 | 178 |
| MAX | 938 | 1,258 | 1,203 | 1,490 | 2,022 | 2,075 | 1,995 | 1,367 | 968 | 1,079 | 1,193 | 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) |

03473000 SOUTH FORK HOLSTON RIVER NEAR DAMASCUS, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1932 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 143,652 | | 255,695 | | | |
| ANNUAL MEAN | 394 | | 701 | | 475 | |
| HIGHEST ANNUAL MEAN | | | | | 712 | 1974 |
| LOWEST ANNUAL MEAN | | | | | 245 | 1988 |
| HIGHEST DAILY MEAN | 7,010 | Mar 18 | 5,430 | Feb 23 | 12,800 | Apr 5, 1977 |
| LOWEST DAILY MEAN | 65 | aSep 11 | 85 | bOct 9 | 40 | Dec 27, 1983 |
| ANNUAL SEVEN-DAY MINIMUM | 67 | Sep 8 | 90 | Oct 4 | 63 | Sep 13, 1954 |
| MAXIMUM PEAK FLOW | | | 8,900 | Feb 22 | 22,000 | Apr 5, 1977 |
| MAXIMUM PEAK STAGE | | | 11.39 | Feb 22 | 17.11 | Apr 5, 1977 |
| INSTANTANEOUS LOW FLOW | | | 85 | cOct 8 | 30 | dOct 14, 1941 |
| ANNUAL RUNOFF (CFSM) | 1.31 | | 2.33 | | 1.58 | |
| ANNUAL RUNOFF (INCHES) | 17.75 | | 31.60 | | 21.44 | |
| 10 PERCENT EXCEEDS | 837 | | 1,230 | | 988 | |
| 50 PERCENT EXCEEDS | 216 | | 556 | | 302 | |
| 90 PERCENT EXCEEDS | 94 | | 235 | | 110 | |

a Also Sept. 12, 13, 2002.
b Also Oct. 10, 2002.
c Also Oct. 9, 10, 2002.
d Also Dec. 24, 1943.
e Estimated.



## 03474000 MIDDLE FORK HOLSTON RIVER AT SEVEN MILE FORD, VA

LOCATION.--Lat 36°48'26", long 81°37'19", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except for period with ice effect, Jan. 25-28, which is fair. 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. 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 Sept. 30, 1987, and Oct. 1, 1989 to Sept. 30, 1996.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 16 | 0130 | 5,050 | 5.27 | Apr 10 | 2215 | 5,190 | 5.36 |
| Feb 22 | 1645 | *6,870 | *6.40 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 42 | 115 | 120 | 244 | 295 | 575 | 200 | 157 | 182 | 125 | 389 | 156 |
| 2 | 39 | 88 | 115 | 300 | 253 | 545 | 340 | 144 | 153 | 763 | 314 | 113 |
| 3 | 38 | 74 | 155 | 392 | 241 | 451 | 298 | 138 | 132 | 968 | 299 | 94 |
| 4 | 36 | 72 | 149 | 422 | 512 | 381 | 253 | 127 | 122 | 474 | 247 | 302 |
| 5 | 37 | 74 | 273 | 343 | 551 | 364 | 251 | 122 | 103 | 311 | 207 | 285 |
| 6 | 36 | 193 | 292 | 303 | 369 | 394 | 235 | 123 | 88 | 258 | 172 | 161 |
| 7 | 35 | 184 | 236 | 266 | 307 | 349 | 270 | 116 | 119 | 621 | 164 | 123 |
| 8 | 33 | 131 | 217 | 247 | 249 | 428 | 293 | 127 | 219 | 392 | 185 | 107 |
| 9 | 33 | 104 | 203 | 244 | 216 | 400 | 603 | 112 | 186 | 368 | 266 | 96 |
| 10 | 33 | 88 | 184 | 239 | 213 | 363 | 2,040 | 105 | 146 | 528 | 229 | 87 |
| 11 | 42 | 316 | 287 | 223 | 199 | 340 | 1,990 | 104 | 232 | 429 | 222 | 83 |
| 12 | 42 | 575 | 369 | 209 | 186 | 316 | 766 | 95 | 675 | 341 | 233 | 76 |
| 13 | 39 | 509 | 443 | 198 | 176 | 209 | 500 | 88 | 351 | 283 | 212 | 71 |
| 14 | 37 | 283 | 602 | 193 | 184 | 203 | 380 | 84 | 302 | 228 | 175 | 70 |
| 15 | 49 | 206 | 465 | 182 | 1,220 | 186 | 314 | 108 | 931 | 194 | 158 | 97 |
| 16 | 279 | 190 | 340 | 166 | 2,410 | 184 | 277 | 128 | 809 | 172 | 592 | 92 |
| 17 | 149 | 420 | 276 | 121 | 774 | 178 | 250 | 100 | 779 | 158 | 519 | 77 |
| 18 | 84 | 351 | 232 | 107 | 503 | 175 | 287 | 104 | 549 | 140 | 411 | 70 |
| 19 | 65 | 251 | 208 | 102 | 408 | 168 | 294 | 92 | 626 | 128 | 280 | 84 |
| 20 | 56 | 202 | 404 | 101 | 429 | 229 | 275 | 88 | 546 | 118 | 217 | 74 |
| 21 | 53 | 208 | 458 | 100 | 539 | 339 | 322 | 143 | 377 | 109 | 179 | 68 |
| 22 | 50 | 306 | 326 | 96 | 3,220 | 288 | 349 | 254 | 285 | 130 | 160 | 81 |
| 23 | 45 | 310 | 256 | 91 | 1,960 | 246 | 304 | 199 | 225 | 146 | 147 | 153 |
| 24 | 42 | 239 | 332 | 80 | 938 | 216 | 260 | 169 | 187 | 110 | 127 | 93 |
| 25 | 42 | 196 | 613 | e76 | 633 | 196 | 236 | 137 | 162 | 100 | 113 | 78 |
| 26 | 43 | 167 | 454 | e76 | 517 | 188 | 216 | 117 | 145 | 92 | 106 | 70 |
| 27 | 42 | 177 | 335 | e80 | 458 | 176 | 191 | 102 | 153 | 87 | 101 | 78 |
| 28 | 54 | 159 | 286 | e84 | 480 | 161 | 167 | 91 | 138 | 85 | 95 | 127 |
| 29 | 98 | 144 | 249 | 256 | --- | 155 | 157 | 110 | 122 | 570 | 90 | 90 |
| 30 | 265 | 136 | 231 | 445 | --- | 178 | 151 | 139 | 111 | 300 | 91 | 77 |
| 31 | 185 | --- | 232 | 350 | --- | 177 | --- | 140 | --- | 251 | 136 | --- |
| TOTAL | 2,123 | 6,468 | 9,342 | 6,336 | 18,440 | 8,758 | 12,469 | 3,863 | 9,155 | 8,979 | 6,836 | 3,233 |
| MEAN | 68.5 | 216 | 301 | 204 | 659 | 283 | 416 | 125 | 305 | 290 | 221 | 108 |
| MAX | 279 | 575 | 613 | 445 | 3,220 | 575 | 2,040 | 254 | 931 | 968 | 592 | 302 |
| MIN | 33 | 72 | 115 | 76 | 176 | 155 | 151 | 84 | 88 | 85 | 90 | 68 |
| CFSM | 0.52 | 1.63 | 2.28 | 1.55 | 4.99 | 2.14 | 3.15 | 0.94 | 2.31 | 2.19 | 1.67 | 0.82 |
| IN. | 0.60 | 1.82 | 2.63 | 1.79 | 5.20 | 2.47 | 3.51 | 1.09 | 2.58 | 2.53 | 1.93 | 0.91 |

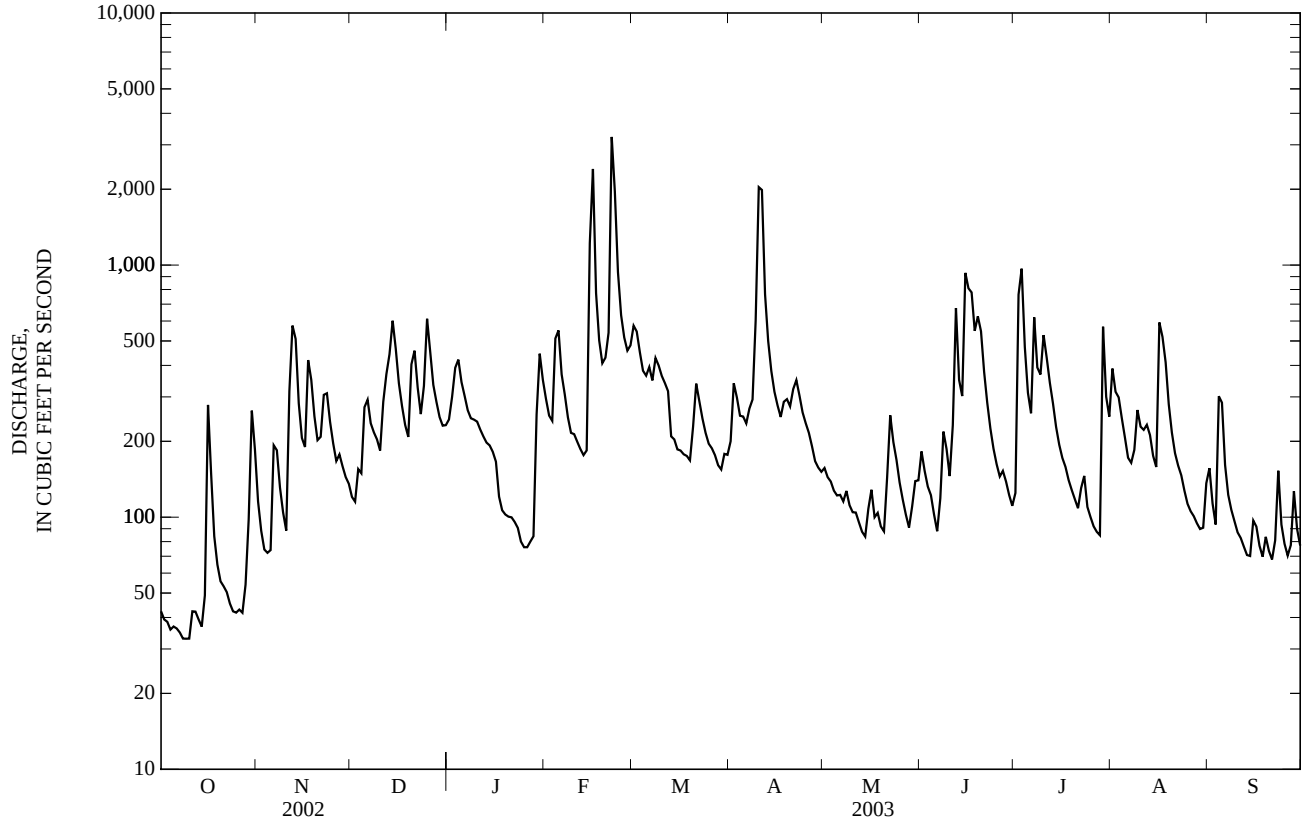
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1981, 1988 - 1989, 1997 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 68.7 | 93.3 | 160 | 224 | 295 | 307 | 245 | 201 | 126 | 94.6 | 79.7 | 65.6 |
| MAX | 298 | 580 | 534 | 708 | 870 | 844 | 630 | 433 | 305 | 366 | 221 | 256 |
| (WY) | (1977) | (1978) | (1973) | (1957) | (1957) | (1955) | (1977) | (1945) | (2003) | (2001) | (2003) | (1989) |
| MIN | 32.4 | 29.8 | 34.1 | 37.0 | 84.7 | 74.5 | 107 | 73.0 | 38.9 | 33.8 | 28.1 | 32.4 |
| (WY) | (1989) | (1954) | (1956) | (1966) | (2002) | (1988) | (1963) | (1964) | (1988) | (1988) | (1988) | (1988) |

03474000 MIDDLE FORK HOLSTON RIVER AT SEVEN MILE FORD, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1942 - 1981, 1988 - 1989, 1997 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 54,291 | | 96,002 | | | |
| ANNUAL MEAN | 149 | | 263 | | 163 | |
| HIGHEST ANNUAL MEAN | | | | | 263 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 79.2 | 1988 |
| HIGHEST DAILY MEAN | 5,720 | Mar 18 | 3,220 | Feb 22 | 5,990 | Apr 4, 1977 |
| LOWEST DAILY MEAN | 26 | aSep 10 | 33 | bOct 8 | 20 | cSep 26, 1944 |
| ANNUAL SEVEN-DAY MINIMUM | 27 | Sep 6 | 35 | Oct 4 | 24 | Sep 3, 1960 |
| MAXIMUM PEAK FLOW | | | 6,870 | Feb 22 | 14,500 | Nov 6, 1977 |
| MAXIMUM PEAK STAGE | | | 6.40 | Feb 22 | 10.75 | Jan 29, 1957 |
| INSTANTANEOUS LOW FLOW | | | 29 | Oct 10 | 9.0 | Sep 26, 1944 |
| ANNUAL RUNOFF (CFSM) | 1.13 | | 1.99 | | 1.23 | |
| ANNUAL RUNOFF (INCHES) | 15.30 | | 27.06 | | 16.76 | |
| 10 PERCENT EXCEEDS | 301 | | 501 | | 338 | |
| 50 PERCENT EXCEEDS | 68 | | 190 | | 92 | |
| 90 PERCENT EXCEEDS | 35 | | 76 | | 37 | |

a Also Sept. 11, 2002.
b Also Oct. 9, 10, 2002.
c Also Aug. 2, 1964.
e Estimated.



## 03475000 MIDDLE FORK HOLSTON RIVER NEAR MEADOWVIEW, VA

LOCATION.--Lat 36°42'47", long 81°49'07", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS.--Records good except those for period with ice effect, Jan. 25-28, and period of doubtful gage-height record, May 5-7, which are fair. Prior to 1954, flow regulated by powerplant 0.9 mi upstream from station. Maximum discharge, 12,500 $ft^3/s$, from rating curve extended above 12,000 $ft^3/s$. 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 $ft^3/s$, and flood of Dec. 10, 1972, reached a stage of 11.0 ft, from floodmark, discharge, 8,540 $ft^3/s$, from information by Tennessee Valley Authority. Flood of Mar. 30, 1975, reached a stage of 10.37 ft, discharge, 7,410 $ft^3/s$.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 16 | 0815 | 5,740 | 9.28 | Apr 11 | 0600 | 5,000 | 8.74 |
| Feb 23 | 0015 | *7,170 | *10.24 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 79 | 195 | 192 | 372 | 469 | 940 | 249 | 291 | 248 | 211 | 720 | 267 |
| 2 | 74 | 150 | 173 | 421 | 403 | 907 | 329 | 288 | 231 | 634 | 613 | 211 |
| 3 | 71 | 129 | 198 | 499 | 370 | 779 | 345 | 291 | 209 | 1,460 | 549 | 187 |
| 4 | 68 | 125 | 207 | 601 | 554 | 665 | 305 | 281 | 202 | 714 | 485 | 287 |
| 5 | 67 | 124 | 425 | 513 | 824 | 601 | 302 | e270 | 179 | 470 | 671 | 490 |
| 6 | 68 | 225 | 553 | 452 | 560 | 619 | 292 | e250 | 159 | 385 | 443 | 272 |
| 7 | 66 | 285 | 422 | 404 | 470 | 551 | 303 | e230 | 176 | 1,010 | 376 | 219 |
| 8 | 63 | 214 | 365 | 371 | 387 | 575 | 327 | 238 | 270 | 728 | 369 | 197 |
| 9 | 61 | 172 | 329 | 361 | 333 | 560 | 619 | 233 | 268 | 687 | 458 | 184 |
| 10 | 61 | 149 | 304 | 353 | 328 | 513 | 1,390 | 215 | 221 | 890 | 392 | 171 |
| 11 | 68 | 361 | 444 | 334 | 309 | 478 | 3,420 | 195 | 215 | 714 | 409 | 160 |
| 12 | 75 | 712 | 565 | 309 | 298 | 448 | 1,240 | 189 | 854 | 628 | 357 | 153 |
| 13 | 71 | 839 | 580 | 291 | 285 | 369 | 792 | 171 | 537 | 546 | 352 | 145 |
| 14 | 68 | 446 | 868 | 286 | 291 | 336 | 601 | 165 | 376 | 438 | 310 | 143 |
| 15 | 78 | 307 | 716 | 273 | 1,060 | 306 | 507 | 167 | 1,240 | 376 | 289 | 165 |
| 16 | 300 | 267 | 540 | 256 | 3,980 | 292 | 447 | 226 | 1,310 | 336 | 539 | 182 |
| 17 | 298 | 497 | 433 | 231 | 1,480 | 284 | 404 | 187 | 1,350 | 310 | 802 | 152 |
| 18 | 157 | 543 | 368 | 204 | 927 | 276 | 454 | 183 | 883 | 283 | 601 | 142 |
| 19 | 119 | 379 | 323 | 196 | 727 | 267 | 464 | 172 | 909 | 262 | 444 | 149 |
| 20 | 104 | 302 | 520 | 191 | 712 | 278 | 427 | 161 | 878 | 245 | 350 | 147 |
| 21 | 98 | 291 | 714 | 193 | 798 | 378 | 467 | 182 | 629 | 231 | 301 | 136 |
| 22 | 92 | 401 | 528 | 185 | 2,990 | 349 | 560 | 307 | 477 | 229 | 273 | 143 |
| 23 | 87 | 457 | 419 | 179 | 4,150 | 309 | 487 | 284 | 384 | 288 | 258 | 247 |
| 24 | 80 | 360 | 444 | 161 | 1,810 | 283 | 423 | 298 | 325 | 233 | 236 | 189 |
| 25 | 77 | 292 | 910 | e150 | 1,140 | 264 | 388 | 229 | 287 | 209 | 220 | 155 |
| 26 | 78 | 252 | 800 | e145 | 936 | 253 | 367 | 205 | 259 | 196 | 207 | 143 |
| 27 | 78 | 259 | 584 | e150 | 853 | 249 | 338 | 184 | 254 | 187 | 199 | 137 |
| 28 | 88 | 236 | 485 | e155 | 884 | 229 | 307 | 168 | 252 | 185 | 193 | 177 |
| 29 | 133 | 219 | 422 | 294 | --- | 222 | 291 | 179 | 224 | 978 | 186 | 167 |
| 30 | 301 | 209 | 378 | 697 | --- | 241 | 294 | 209 | 212 | 691 | 181 | 145 |
| 31 | 303 | --- | 372 | 576 | --- | 250 | --- | 206 | --- | 474 | 200 | --- |
| TOTAL | 3,431 | 9,397 | 14,581 | 9,803 | 28,328 | 13,071 | 17,139 | 6,854 | 14,018 | 15,228 | 11,983 | 5,662 |
| MEAN | 111 | 313 | 470 | 316 | 1,012 | 422 | 571 | 221 | 467 | 491 | 387 | 189 |
| MAX | 303 | 839 | 910 | 697 | 4,150 | 940 | 3,420 | 307 | 1,350 | 1,460 | 802 | 490 |
| MIN | 61 | 124 | 173 | 145 | 285 | 222 | 249 | 161 | 159 | 185 | 181 | 136 |
| CFSM | 0.52 | 1.48 | 2.23 | 1.50 | 4.79 | 2.00 | 2.71 | 1.05 | 2.21 | 2.33 | 1.83 | 0.89 |
| IN. | 0.60 | 1.66 | 2.57 | 1.73 | 4.99 | 2.30 | 3.02 | 1.21 | 2.47 | 2.68 | 2.11 | 1.00 |

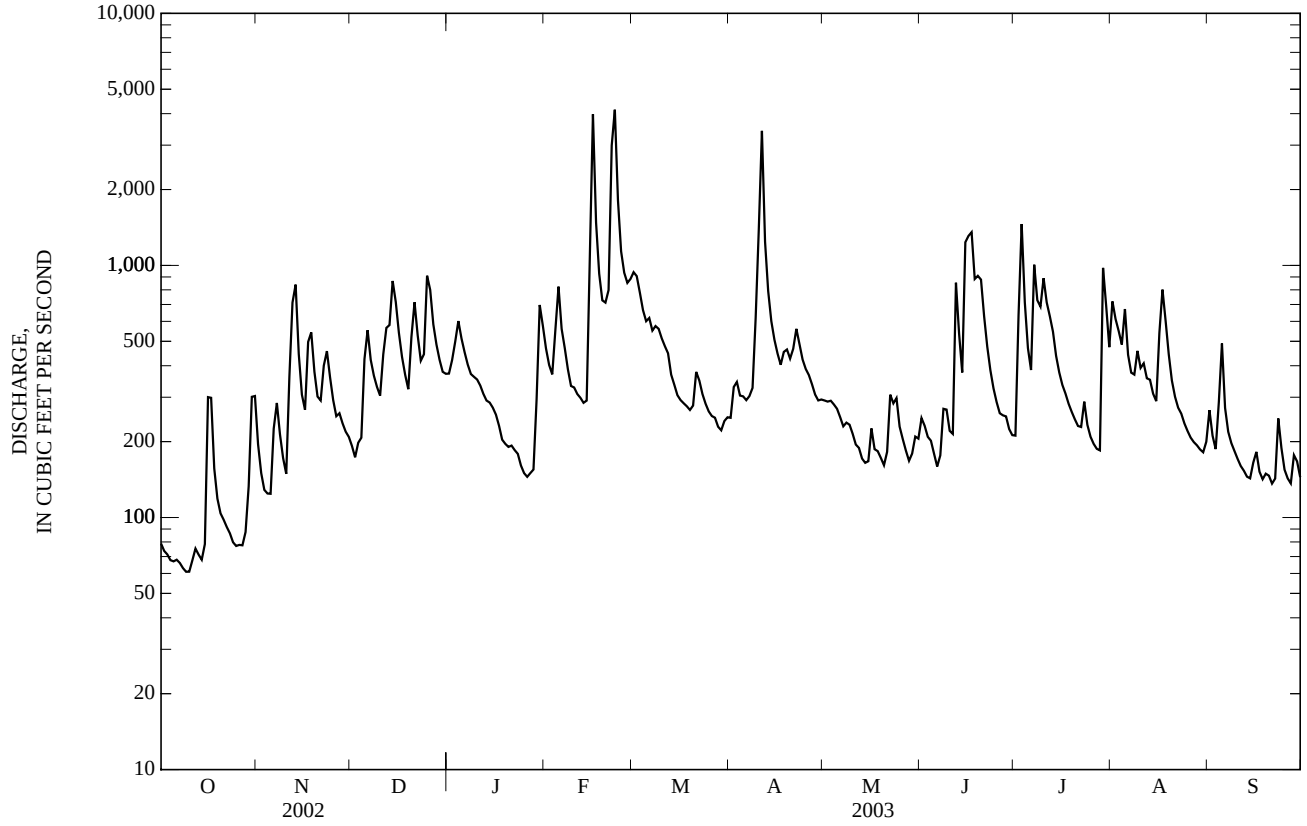
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1932 - 1953, 1976 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 110 | 132 | 208 | 337 | 452 | 452 | 355 | 294 | 197 | 158 | 151 | 99.4 |
| MAX | 479 | 739 | 526 | 731 | 1,050 | 899 | 1,158 | 677 | 485 | 491 | 649 | 357 |
| (WY) | (1977) | (1978) | (1943) | (1996) | (1994) | (1993) | (1987) | (1990) | (1981) | (2003) | (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) |

03475000 MIDDLE FORK HOLSTON RIVER NEAR MEADOWVIEW, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1932 - 1953 1976 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 82,727 | | 149,495 | | | |
| ANNUAL MEAN | 227 | | 410 | | 245 | |
| HIGHEST ANNUAL MEAN | | | | | 410 | 2003 |
| LOWEST ANNUAL MEAN | | | | | 105 | 1941 |
| HIGHEST DAILY MEAN | 7,040 | Mar 18 | 4,150 | Feb 23 | 8,220 | Apr 5, 1977 |
| LOWEST DAILY MEAN | 49 | aSep 11 | 61 | bOct 9 | c7.0 | Nov 19, 1950 |
| ANNUAL SEVEN-DAY MINIMUM | 51 | Sep 8 | 65 | Oct 4 | 38 | Oct 25, 1952 |
| MAXIMUM PEAK FLOW | | | 7,170 | Feb 23 | 12,500 | Nov 7, 1977 |
| MAXIMUM PEAK STAGE | | | 10.24 | Feb 23 | 13.41 | Nov 7, 1977 |
| INSTANTANEOUS LOW FLOW | | | 60 | dOct 8 | c6.0 | fNov 10, 1933 |
| ANNUAL RUNOFF (CFSM) | 1.07 | | 1.94 | | 1.16 | |
| ANNUAL RUNOFF (INCHES) | 14.59 | | 26.36 | | 15.77 | |
| 10 PERCENT EXCEEDS | 445 | | 748 | | 497 | |
| 50 PERCENT EXCEEDS | 118 | | 294 | | 147 | |
| 90 PERCENT EXCEEDS | 66 | | 145 | | 63 | |

a Also Sept. 12, 2002.
b Also Oct. 10, 2002.
c Flow was regulated by powerplant.
d Also Oct. 9, 10, 2002.
e Estimated.
f Also Dec. 4, 1936, Jan. 21, 22, Feb. 1, 1940, Jan. 8, 1942, and Oct. 15, 16, 31, 1943.



## 03478400 BEAVER CREEK AT BRISTOL, VA

LOCATION.--Lat 36°37'54", long 82°08'01", NAD83, 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 $mi^2$.

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 NGVD of 1929.

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 $ft^3/s$, from rating curve extended above 390 $ft^3/s$ 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.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 11 | 22 | 34 | 54 | 49 | 130 | 42 | 61 | 37 | 53 | 49 | 34 |
| 2 | 11 | 20 | 32 | 52 | 45 | 121 | 40 | 68 | 36 | 205 | 38 | 31 |
| 3 | 11 | 18 | 30 | 68 | 42 | 109 | 40 | 71 | 37 | 119 | 76 | 28 |
| 4 | 10 | 21 | 35 | 56 | 70 | 101 | 40 | 62 | 37 | 85 | 46 | 69 |
| 5 | 10 | 23 | 101 | 54 | 60 | 95 | 46 | 70 | 34 | 72 | 46 | 45 |
| 6 | 10 | 36 | 85 | 53 | 54 | 112 | 40 | 69 | 33 | 65 | 39 | 36 |
| 7 | 10 | 31 | 70 | 49 | 54 | 93 | 43 | 66 | 46 | 68 | 87 | 33 |
| 8 | 10 | 26 | 61 | 47 | 49 | 86 | 61 | 69 | 46 | 57 | 135 | 31 |
| 9 | 10 | 23 | 54 | 46 | 46 | 82 | 103 | 76 | 34 | 87 | 129 | 29 |
| 10 | 10 | 21 | 52 | 45 | 46 | 76 | 225 | 62 | 30 | 69 | 81 | 28 |
| 11 | 12 | 82 | 75 | 42 | 45 | 68 | 249 | 60 | 38 | 56 | 73 | 27 |
| 12 | 10 | 96 | 66 | 40 | 45 | 65 | 148 | 55 | 38 | 57 | 66 | 26 |
| 13 | 10 | 77 | 74 | 39 | 43 | 67 | 116 | 52 | 31 | 58 | 58 | 25 |
| 14 | 9.8 | 58 | 82 | 38 | 50 | 61 | 99 | 50 | 32 | 52 | 53 | 24 |
| 15 | 26 | 48 | 73 | 37 | 119 | 57 | 88 | 54 | 77 | 50 | 49 | 35 |
| 16 | 64 | 50 | 75 | 35 | 184 | 61 | 81 | 52 | 91 | 52 | 48 | 26 |
| 17 | 30 | 59 | 60 | 35 | 136 | 55 | 80 | 49 | 74 | 47 | 48 | 24 |
| 18 | 22 | 52 | 54 | 34 | 110 | 54 | 164 | 48 | 98 | 44 | 45 | 23 |
| 19 | 18 | 49 | 53 | 33 | 96 | 52 | 114 | 45 | 144 | 43 | 42 | 23 |
| 20 | 20 | 45 | 91 | 32 | 89 | 56 | 98 | 43 | 102 | 41 | 40 | 23 |
| 21 | 17 | 52 | 74 | 32 | 85 | 52 | 118 | 55 | 80 | 40 | 38 | 22 |
| 22 | 15 | 52 | 66 | 30 | 280 | 48 | 103 | 47 | 68 | 44 | 41 | 52 |
| 23 | 15 | 48 | 59 | 30 | 258 | 46 | 91 | 43 | 61 | 40 | 39 | 41 |
| 24 | 14 | 45 | 73 | 28 | 170 | 45 | 83 | 42 | 55 | 38 | 35 | 29 |
| 25 | 14 | 41 | 94 | 28 | 141 | 44 | 80 | 41 | 52 | 36 | 34 | 26 |
| 26 | 15 | 42 | 82 | 27 | 136 | 44 | 77 | 40 | 49 | 35 | 32 | 24 |
| 27 | 14 | 44 | 73 | 27 | 142 | 43 | 72 | 39 | 49 | 34 | 31 | 28 |
| 28 | 25 | 40 | 68 | 27 | 144 | 43 | 67 | 38 | 46 | 35 | 30 | 27 |
| 29 | 26 | 38 | 63 | 51 | --- | 43 | 65 | 43 | 43 | 43 | 35 | 24 |
| 30 | 37 | 36 | 58 | 58 | --- | 47 | 63 | 39 | 59 | 35 | 32 | 22 |
| 31 | 27 | --- | 55 | 52 | --- | 44 | --- | 41 | --- | 40 | 33 | --- |
| TOTAL | 543.8 | 1,295 | 2,022 | 1,279 | 2,788 | 2,100 | 2,736 | 1,650 | 1,657 | 1,800 | 1,628 | 915 |
| MEAN | 17.5 | 43.2 | 65.2 | 41.3 | 99.6 | 67.7 | 91.2 | 53.2 | 55.2 | 58.1 | 52.5 | 30.5 |
| MAX | 64 | 96 | 101 | 68 | 280 | 130 | 249 | 76 | 144 | 205 | 135 | 69 |
| MIN | 9.8 | 18 | 30 | 27 | 42 | 43 | 40 | 38 | 30 | 34 | 30 | 22 |
| CFSM | 0.63 | 1.56 | 2.35 | 1.49 | 3.59 | 2.45 | 3.29 | 1.92 | 1.99 | 2.10 | 1.90 | 1.10 |
| IN. | 0.73 | 1.74 | 2.72 | 1.72 | 3.74 | 2.82 | 3.67 | 2.22 | 2.23 | 2.42 | 2.19 | 1.23 |

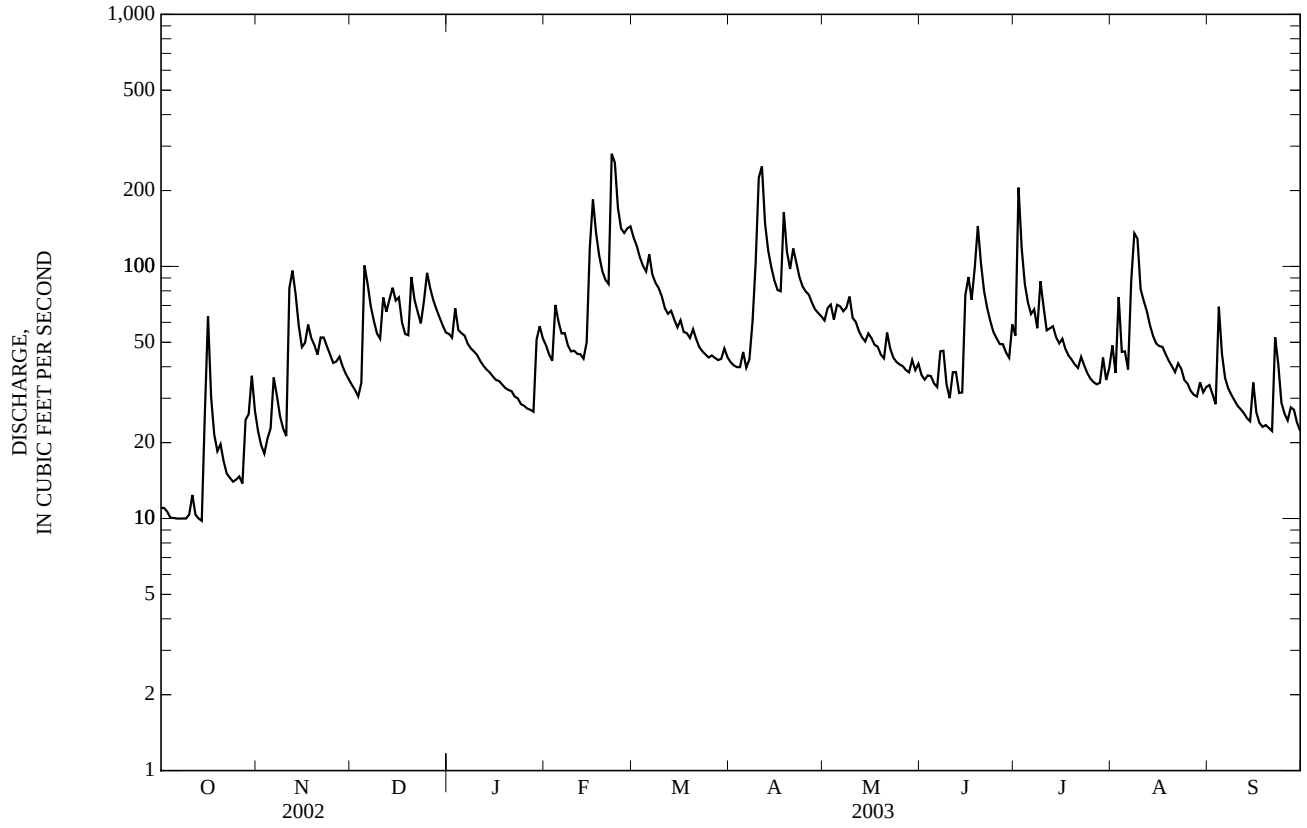
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 17.7 | 19.7 | 31.1 | 40.9 | 53.9 | 58.3 | 52.4 | 40.4 | 32.2 | 26.1 | 21.8 | 17.8 |
| MAX | 76.1 | 58.0 | 128 | 141 | 131 | 130 | 120 | 129 | 73.1 | 58.1 | 64.5 | 48.9 |
| (WY) | (1973) | (1978) | (1973) | (1974) | (1994) | (1963) | (1998) | (1958) | (1972) | (2003) | (1982) | (1982) |
| MIN | 8.08 | 9.62 | 9.13 | 8.92 | 19.5 | 19.7 | 19.3 | 16.9 | 13.0 | 10.2 | 9.96 | 9.23 |
| (WY) | (1970) | (2001) | (1966) | (1966) | (1981) | (1988) | (1985) | (2000) | (1988) | (1988) | (1988) | (1969) |

03478400 BEAVER CREEK AT BRISTOL, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1958 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 11,546.4 | | 20,413.8 | | | |
| ANNUAL MEAN | 31.6 | | 55.9 | | 34.3 | |
| HIGHEST ANNUAL MEAN | | | | | 62.8 | 1973 |
| LOWEST ANNUAL MEAN | | | | | 16.2 | 1988 |
| HIGHEST DAILY MEAN | 449 | Mar 18 | 280 | Feb 22 | 580 | Mar 12, 1963 |
| LOWEST DAILY MEAN | 8.9 | Jan 16 | 9.8 | Oct 14 | 7.1 | aDec 9, 2000 |
| ANNUAL SEVEN-DAY MINIMUM | 9.3 | Jan 12 | 10 | Oct 4 | 7.2 | Dec 7, 2000 |
| MAXIMUM PEAK FLOW | | | 415 | Apr 10 | 1,600 | Oct 2, 1977 |
| MAXIMUM PEAK STAGE | | | 6.38 | Apr 10 | 9.94 | Oct 2, 1977 |
| INSTANTANEOUS LOW FLOW | | | 9.7 | bOct 7 | 3.4 | Dec 30, 1963 |
| ANNUAL RUNOFF (CFSM) | 1.14 | | 2.02 | | 1.24 | |
| ANNUAL RUNOFF (INCHES) | 15.51 | | 27.41 | | 16.80 | |
| 10 PERCENT EXCEEDS | 66 | | 96 | | 63 | |
| 50 PERCENT EXCEEDS | 21 | | 47 | | 26 | |
| 90 PERCENT EXCEEDS | 10 | | 24 | | 12 | |

a Also Dec. 10, 11, 2000.
b Also Oct. 14, 15, 2002.



## 03488000 NORTH FORK HOLSTON RIVER NEAR SALTVILLE, VA

LOCATION.--Lat 36°53'48", long 81°44'46", NAD83, 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 $mi^2$.

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 NGVD of 1929. June 11, 1907, to Nov. 12, 1908, nonrecording gage on highway bridge 2.1 mi downstream at different datum. Nov. 2, 1920, to May 23, 1934, nonrecording gage on highway bridge 0.5 mi downstream at datum 7.74 ft lower.

REMARKS.--Records good except for period with ice effect, Jan. 25-28, which is fair. National Weather Service gage-height telemeter at station. Maximum discharge, 16,500 $ft^3/s$, from rating curve extended above 13,000 $ft^3/s$ 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.

REVISIONS.--The maximum discharge for the water year 2002 has been revised to 16,000 $ft^3/s$, Mar. 18, 2002, gage height, 14.83 ft, superseding the figure published in the report for 2002.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 16 | 0615 | 9,010 | 10.44 | Apr 11 | 0330 | 5,830 | 8.00 |
| Feb 22 | 2115 | *9,970 | *11.11 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 60 | 279 | 254 | 325 | 477 | 968 | 215 | 211 | 281 | 143 | 346 | 296 |
| 2 | 51 | 212 | 221 | 402 | 414 | 938 | 278 | 206 | 279 | 352 | 294 | 222 |
| 3 | 47 | 172 | 202 | 754 | 389 | 779 | 352 | 195 | 236 | 1,070 | 270 | 162 |
| 4 | 45 | 160 | 186 | 1,100 | 966 | 627 | 337 | 188 | 239 | 646 | 333 | 380 |
| 5 | 43 | 158 | 452 | 786 | 1,280 | 543 | 327 | 173 | 213 | 420 | 367 | 730 |
| 6 | 42 | 333 | 616 | 605 | 779 | 515 | 314 | 174 | 179 | 324 | 319 | 372 |
| 7 | 39 | 460 | 452 | 480 | 590 | 495 | 299 | 169 | 230 | 491 | 256 | 263 |
| 8 | 38 | 342 | 366 | 410 | 454 | 447 | 322 | 168 | 707 | 397 | 332 | 210 |
| 9 | 37 | 263 | 321 | 389 | 344 | 415 | 1,230 | 165 | 596 | 324 | 438 | 175 |
| 10 | 37 | 219 | 289 | 382 | 342 | 381 | 2,190 | 177 | 387 | 528 | 328 | 150 |
| 11 | 40 | 924 | 806 | 362 | 308 | 342 | 4,210 | 164 | 287 | 482 | 441 | 133 |
| 12 | 43 | 1,310 | 1,050 | 314 | 279 | 315 | 1,660 | 162 | 285 | 402 | 314 | 122 |
| 13 | 48 | 1,380 | 977 | 279 | 250 | 297 | 948 | 147 | 239 | 329 | 314 | 113 |
| 14 | 49 | 713 | 1,400 | 281 | 247 | 305 | 679 | 137 | 227 | 268 | 294 | 105 |
| 15 | 47 | 471 | 992 | 261 | 1,590 | 276 | 545 | 135 | 546 | 297 | 249 | 105 |
| 16 | 296 | 376 | 706 | 223 | 6,060 | 262 | 472 | 161 | 975 | 223 | 1,210 | 129 |
| 17 | 397 | 627 | 534 | 231 | 1,950 | 261 | 408 | 155 | 2,030 | 196 | 1,350 | 108 |
| 18 | 204 | 695 | 444 | 197 | 1,050 | 255 | 635 | 143 | 974 | 170 | 810 | 96 |
| 19 | 141 | 510 | 386 | 191 | 726 | 250 | 743 | 142 | 1,060 | 153 | 486 | 95 |
| 20 | 111 | 416 | 963 | 193 | 698 | 248 | 609 | 135 | 886 | 139 | 344 | 125 |
| 21 | 99 | 403 | 1,250 | 189 | 854 | 294 | 528 | 177 | 605 | 129 | 269 | 104 |
| 22 | 88 | 606 | 799 | 174 | 4,890 | 306 | 479 | 250 | 441 | 128 | 225 | 108 |
| 23 | 87 | 649 | 578 | 162 | 4,920 | 299 | 410 | 228 | 336 | 139 | 196 | 304 |
| 24 | 74 | 501 | 578 | 139 | 2,160 | 279 | 361 | 240 | 272 | 126 | 170 | 235 |
| 25 | 69 | 393 | 1,110 | e130 | 1,230 | 255 | 332 | 221 | 228 | 113 | 152 | 169 |
| 26 | 69 | 329 | 928 | e125 | 921 | 245 | 316 | 194 | 197 | 103 | 138 | 138 |
| 27 | 70 | 342 | 671 | e130 | 790 | 242 | 284 | 171 | 175 | 97 | 128 | 122 |
| 28 | 74 | 329 | 535 | e135 | 913 | 218 | 248 | 155 | 166 | 94 | 121 | 116 |
| 29 | 100 | 308 | 451 | 207 | --- | 207 | 224 | 162 | 158 | 194 | 115 | 121 |
| 30 | 284 | 288 | 381 | 537 | --- | 214 | 214 | 226 | 149 | 381 | 124 | 105 |
| 31 | 391 | --- | 340 | 542 | --- | 224 | --- | 231 | --- | 253 | 151 | --- |
| TOTAL | 3,220 | 14,168 | 19,238 | 10,635 | 35,871 | 11,702 | 20,169 | 5,562 | 13,583 | 9,111 | 10,884 | 5,613 |
| MEAN | 104 | 472 | 621 | 343 | 1,281 | 377 | 672 | 179 | 453 | 294 | 351 | 187 |
| MAX | 397 | 1,380 | 1,400 | 1,100 | 6,060 | 968 | 4,210 | 250 | 2,030 | 1,070 | 1,350 | 730 |
| MIN | 37 | 158 | 186 | 125 | 247 | 207 | 214 | 135 | 149 | 94 | 115 | 95 |
| CFSM | 0.47 | 2.13 | 2.80 | 1.55 | 5.77 | 1.70 | 3.03 | 0.81 | 2.04 | 1.32 | 1.58 | 0.84 |
| IN. | 0.54 | 2.37 | 3.22 | 1.78 | 6.01 | 1.96 | 3.38 | 0.93 | 2.28 | 1.53 | 1.82 | 0.94 |

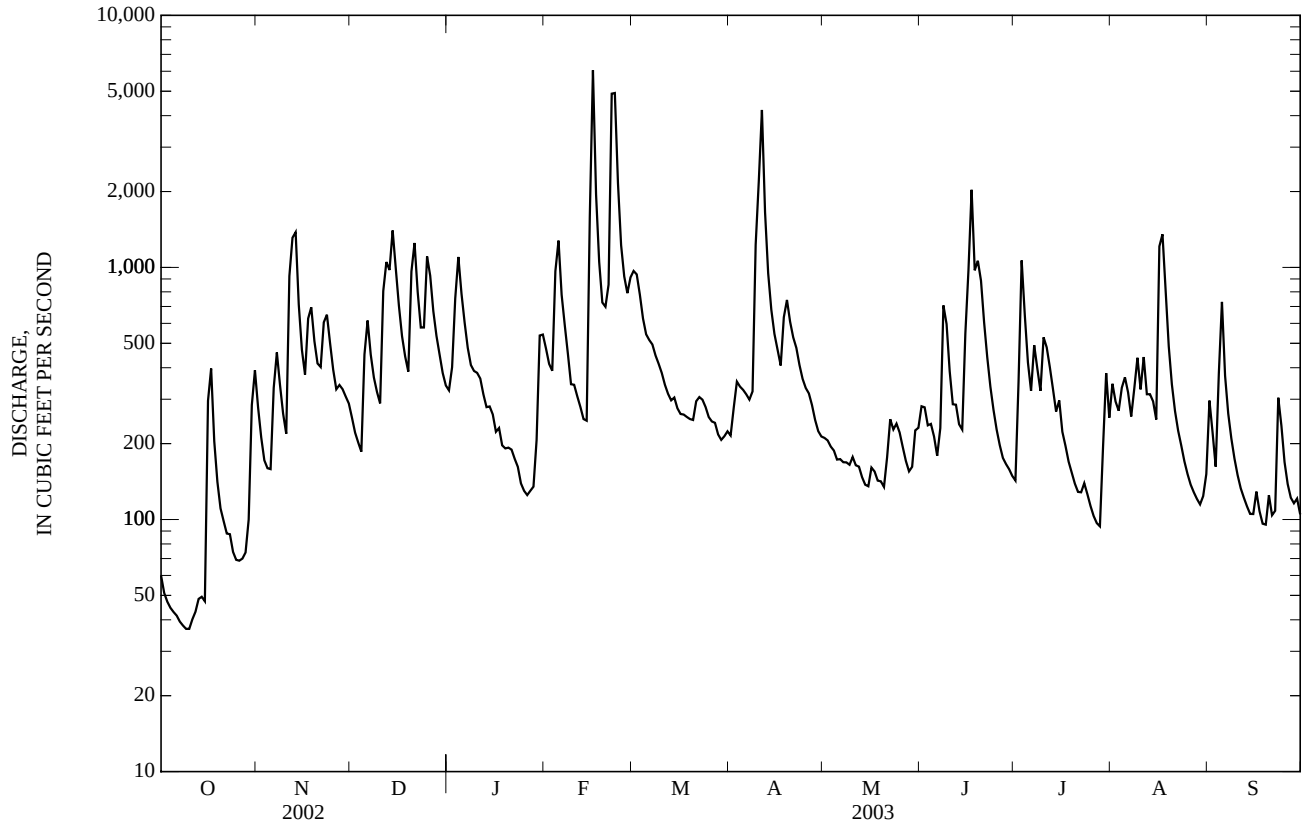
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1907 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 111 | 167 | 322 | 461 | 570 | 600 | 446 | 365 | 224 | 135 | 121 | 86.8 |
| MAX | 916 | 1,077 | 1,178 | 1,317 | 1,500 | 1,735 | 1,311 | 858 | 1,036 | 704 | 584 | 474 |
| (WY) | (1977) | (1978) | (1927) | (1957) | (1957) | (1955) | (1987) | (1990) | (1907) | (2001) | (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) |

03488000 NORTH FORK HOLSTON RIVER NEAR SALTVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1907 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 106,259 | | 159,756 | | | |
| ANNUAL MEAN | 291 | | 438 | | 298 | |
| HIGHEST ANNUAL MEAN | | | | | 457 | 1973 |
| LOWEST ANNUAL MEAN | | | | | 135 | 1988 |
| HIGHEST DAILY MEAN | 12,700 | Mar 18 | 6,060 | Feb 16 | 12,700 | Mar 18, 2002 |
| LOWEST DAILY MEAN | 25 | Sep 13 | 37 | aOct 9 | 2.0 | Oct 15, 1947 |
| ANNUAL SEVEN-DAY MINIMUM | 27 | Sep 8 | 39 | Oct 5 | 21 | Sep 8, 1952 |
| MAXIMUM PEAK FLOW | | | 9,970 | Feb 22 | 16,500 | Jan 29, 1957 |
| MAXIMUM PEAK STAGE | | | 11.11 | Feb 22 | 14.83 | Mar 18, 2002 |
| INSTANTANEOUS LOW FLOW | | | 37 | bOct 8 | c1.0 | dOct 15, 1947 |
| ANNUAL RUNOFF (CFSM) | 1.31 | | 1.97 | | 1.34 | |
| ANNUAL RUNOFF (INCHES) | 17.81 | | 26.77 | | 18.27 | |
| 10 PERCENT EXCEEDS | 597 | | 922 | | 643 | |
| 50 PERCENT EXCEEDS | 130 | | 285 | | 155 | |
| 90 PERCENT EXCEEDS | 42 | | 112 | | 39 | |

a Also Oct. 10, 2002.
b Also Oct. 9-11, 2002.
c Flow retarded by mine cave-in.
d Also Oct. 16, 1947.
e Estimated.



## 03524000 CLINCH RIVER AT CLEVELAND, VA

LOCATION.--Lat 36°56'41", long 82°09'17", NAD83, 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 $mi^2$.

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 NGVD of 1929. Prior to Nov. 1, 1931, nonrecording gage on highway bridge 500 ft downstream at datum 1.0 ft lower.

REMARKS.--Records good except those for period of no gage-height record, Jan. 14-16, and period with ice effect, Jan. 23-28, which are fair. Maximum discharge, 34,500 $ft^3/s$, from rating curve extended above 26,000 $ft^3/s$ on basis of contracted-opening measurement at gage height 24.40 ft. Several measurements of water temperature made during the year. Water-quality records for some prior periods have been collected at this location.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 16 | 1400 | *13,600 | *16.07 | Apr 11 | 0230 | 11,200 | 14.14 |
| Feb 23 | 0445 | 11,600 | 14.46 | | | | |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 123 | 386 | 619 | 699 | 1,030 | 2,900 | 460 | 497 | 731 | 394 | 686 | 314 |
| 2 | 111 | 298 | 515 | 690 | 953 | 2,350 | 494 | 492 | 681 | 527 | 554 | 293 |
| 3 | 100 | 246 | 451 | 1,310 | 874 | 1,870 | 554 | 468 | 580 | 890 | 1,770 | 263 |
| 4 | 92 | 239 | 415 | 2,340 | 1,710 | 1,500 | 556 | 474 | 564 | 823 | 1,250 | 571 |
| 5 | 89 | 291 | 2,120 | 1,810 | 2,780 | 1,270 | 555 | 453 | 516 | 602 | 1,220 | 681 |
| 6 | 86 | 434 | 3,340 | 1,450 | 1,770 | 1,130 | 568 | 438 | 430 | 620 | 1,400 | 463 |
| 7 | 84 | 683 | 1,890 | 1,200 | 1,360 | 1,010 | 726 | 412 | 581 | 1,880 | 1,690 | 338 |
| 8 | 80 | 606 | 1,270 | 1,030 | 1,070 | 872 | 990 | 403 | 1,410 | 1,260 | 2,130 | 285 |
| 9 | 79 | 434 | 974 | 950 | 850 | 794 | 3,260 | 471 | 1,220 | 991 | 1,850 | 254 |
| 10 | 81 | 346 | 796 | 899 | 784 | 725 | 5,440 | 625 | 924 | 1,300 | 1,310 | 232 |
| 11 | 85 | 2,170 | 1,200 | 835 | 727 | 666 | 9,540 | 501 | 713 | 1,250 | 1,220 | 214 |
| 12 | 85 | 3,700 | 1,920 | 733 | 658 | 619 | 4,540 | 457 | 800 | 1,020 | 1,140 | 199 |
| 13 | 88 | 3,550 | 1,630 | 640 | 595 | 594 | 2,680 | 388 | 694 | 955 | 814 | 187 |
| 14 | 88 | 1,720 | 1,920 | e620 | 568 | 623 | 1,830 | 342 | 553 | 729 | 657 | 178 |
| 15 | 96 | 1,060 | 1,780 | e580 | 2,540 | 582 | 1,420 | 343 | 818 | 590 | 584 | 198 |
| 16 | 693 | 804 | 1,450 | e540 | 12,000 | 541 | 1,170 | 750 | 1,290 | 511 | 1,700 | 254 |
| 17 | 763 | 1,010 | 1,170 | 498 | 6,620 | 520 | 1,010 | 770 | 1,850 | 449 | 2,810 | 244 |
| 18 | 406 | 1,340 | 964 | 454 | 3,480 | 510 | 2,410 | 649 | 1,540 | 394 | 2,890 | 210 |
| 19 | 258 | 1,060 | 827 | 418 | 2,340 | 498 | 2,540 | 638 | 2,800 | 354 | 1,420 | 197 |
| 20 | 201 | 888 | 1,290 | 415 | 1,830 | 472 | 1,820 | 536 | 2,340 | 319 | 947 | 202 |
| 21 | 174 | 857 | 1,720 | 401 | 1,610 | 475 | 1,490 | 655 | 1,480 | 293 | 726 | 226 |
| 22 | 160 | 1,310 | 1,390 | 372 | 5,230 | 464 | 1,300 | 752 | 1,070 | 291 | 596 | 203 |
| 23 | 149 | 1,540 | 1,110 | e350 | 9,800 | 434 | 1,080 | 619 | 828 | 326 | 518 | 264 |
| 24 | 137 | 1,150 | 1,040 | e300 | 4,960 | 414 | 916 | 621 | 669 | 323 | 447 | 269 |
| 25 | 124 | 873 | 1,710 | e280 | 3,220 | 396 | 824 | 644 | 562 | 284 | 393 | 254 |
| 26 | 121 | 711 | 2,010 | e270 | 2,490 | 386 | 788 | 570 | 485 | 249 | 350 | 216 |
| 27 | 120 | 929 | 1,570 | e280 | 2,450 | 394 | 712 | 501 | 428 | 228 | 318 | 196 |
| 28 | 118 | 999 | 1,250 | e290 | 3,040 | 375 | 625 | 438 | 395 | 242 | 297 | 196 |
| 29 | 137 | 845 | 1,030 | 430 | --- | 356 | 564 | 448 | 646 | 801 | 279 | 186 |
| 30 | 276 | 731 | 868 | 1,110 | --- | 389 | 542 | 632 | 499 | 1,150 | 286 | 170 |
| 31 | 467 | --- | 764 | 1,150 | --- | 453 | --- | 647 | --- | 910 | 345 | --- |
| TOTAL | 5,671 | 31,210 | 41,003 | 23,344 | 77,339 | 24,582 | 51,404 | 16,634 | 28,097 | 20,955 | 32,597 | 7,957 |
| MEAN | 183 | 1,040 | 1,323 | 753 | 2,762 | 793 | 1,713 | 537 | 937 | 676 | 1,052 | 265 |
| MAX | 763 | 3,700 | 3,340 | 2,340 | 12,000 | 2,900 | 9,540 | 770 | 2,800 | 1,880 | 2,890 | 681 |
| MIN | 79 | 239 | 415 | 270 | 568 | 356 | 460 | 342 | 395 | 228 | 279 | 170 |
| CFSM | 0.35 | 1.97 | 2.51 | 1.43 | 5.23 | 1.50 | 3.25 | 1.02 | 1.77 | 1.28 | 1.99 | 0.50 |
| IN. | 0.40 | 2.20 | 2.89 | 1.64 | 5.45 | 1.73 | 3.62 | 1.17 | 1.98 | 1.48 | 2.30 | 0.56 |

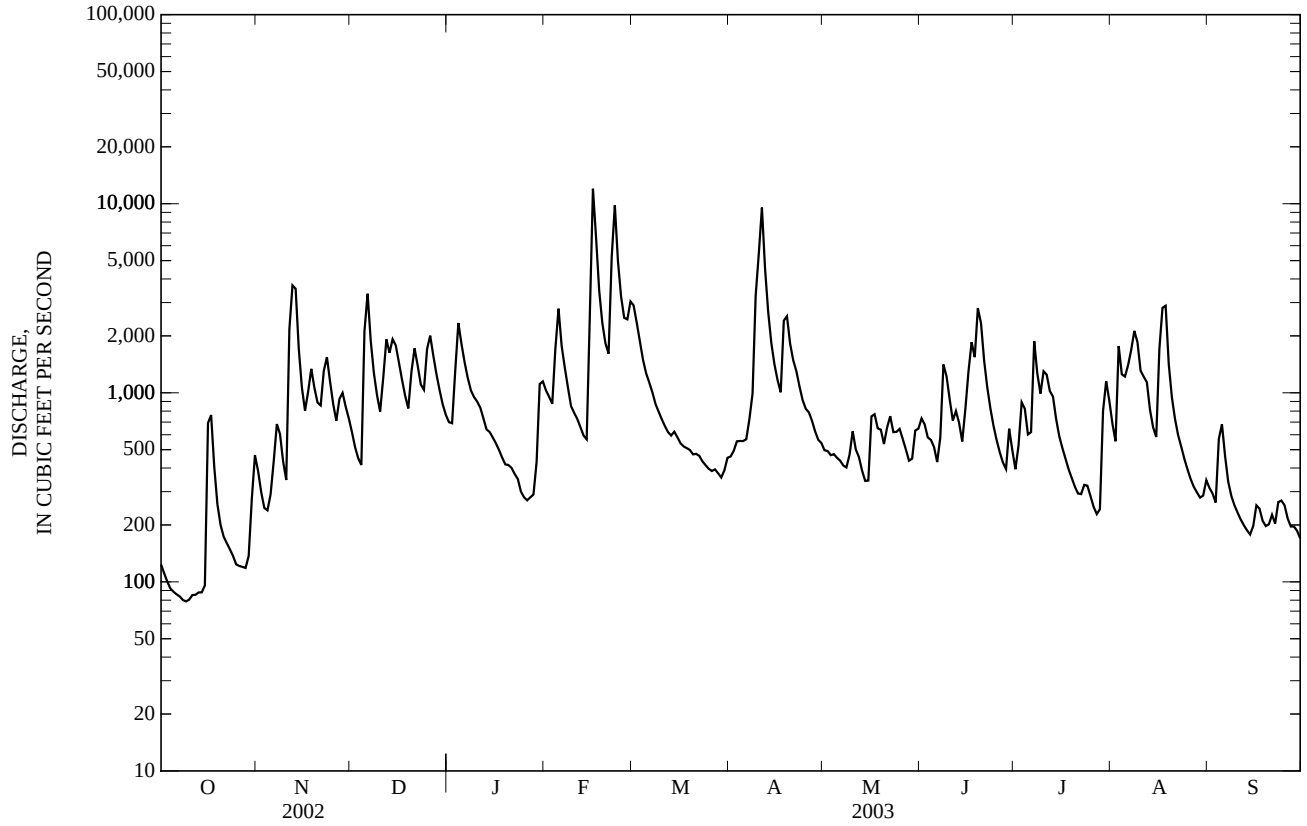
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1921 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 256 | 395 | 757 | 1,115 | 1,367 | 1,422 | 1,023 | 788 | 485 | 345 | 323 | 208 |
| MAX | 1,389 | 2,011 | 3,043 | 2,817 | 3,360 | 4,572 | 3,414 | 2,254 | 2,016 | 1,292 | 1,640 | 1,003 |
| (WY) | (1977) | (1978) | (1927) | (1937) | (1957) | (1955) | (1987) | (1958) | (1923) | (2001) | (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) |

03524000 CLINCH RIVER AT CLEVELAND, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1921 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 244,848 | | 360,793 | | | |
| ANNUAL MEAN | 671 | | 988 | | 704 | |
| HIGHEST ANNUAL MEAN | | | | | 1,076 | 1972 |
| LOWEST ANNUAL MEAN | | | | | 287 | 1988 |
| HIGHEST DAILY MEAN | 20,100 | Mar 18 | 12,000 | Feb 16 | 27,800 | Apr 5, 1977 |
| LOWEST DAILY MEAN | 54 | Sep 14 | 79 | Oct 9 | 37 | aSep 13, 1964 |
| ANNUAL SEVEN-DAY MINIMUM | 56 | Sep 9 | 83 | Oct 6 | 40 | Sep 13, 1964 |
| MAXIMUM PEAK FLOW | | | 13,600 | Feb 16 | 34,500 | Apr 5, 1977 |
| MAXIMUM PEAK STAGE | | | 16.07 | Feb 16 | 26.40 | Apr 5, 1977 |
| INSTANTANEOUS LOW FLOW | | | 78 | bOct 8 | 35 | Sep 28, 1964 |
| ANNUAL RUNOFF (CFSM) | 1.27 | | 1.87 | | 1.33 | |
| ANNUAL RUNOFF (INCHES) | 17.25 | | 25.42 | | 18.11 | |
| 10 PERCENT EXCEEDS | 1,440 | | 1,900 | | 1,560 | |
| 50 PERCENT EXCEEDS | 287 | | 638 | | 370 | |
| 90 PERCENT EXCEEDS | 88 | | 207 | | 97 | |

a Also Sept. 28, 1964.
b Also Oct. 9, 2002.
e Estimated.



## 03527000 CLINCH RIVER AT SPEERS FERRY, VA

LOCATION.--Lat 36°38'55", long 82°45'02", NAD83, Scott County, Hydrologic Unit 06010205, on right bank 200 ft downstream from bridge on U.S. Highway 58, 0.5 mi downstream from Copper Creek, 0.8 mi northwest of Speers Ferry, 1.8 mi south of Clinchport, and at mile 211.0.

DRAINAGE AREA.--1,126 $mi^2$.

PERIOD OF RECORD.--October 1920 to September 1976, October 1976 to September 1978 (annual maximum only), October 1978 to September 1981, October 1981 to September 1995 (annual maximum only), October 2001 to September 2002.

REVISED RECORDS.--WSP 823: Drainage area. WSP 1276: 1925(M), 1927, 1928-31(M), 1932, 1935(M). WSP 1306: 1922(M).

GAGE.--Water-stage recorder. Datum of gage is 1,196.52 ft NGVD of 1929. Prior to Nov. 23, 1926, nonrecording gage at site 400 ft upstream at datum 1.50 ft higher. Nov. 23, 1926 to Nov. 6, 1931, nonrecording gage.

REMARKS.--Records good except for period with ice effect, Jan. 26-28, which is fair. Maximum discharge, 89,000 $ft^3/s$, from rating curve extended above 45,000 $ft^3/s$ on basis of slope-area measurement of peak flow. Prior to May 1951, diurnal fluctuation at low flow caused by mills upstream from station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in February 1862 reached a stage of 33 ft, present site and datum, from reports of the Tennessee Valley Authority. Flood of Feb. 28, 1902 reached a stage of 26.6 ft, at site 400 ft upstream and at datum about 1 ft higher, from records of the National Weather Service.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 310 | 912 | 1,170 | 1,510 | 2,060 | 5,370 | 900 | 1,250 | 1,340 | 1,320 | 1,680 | 755 |
| 2 | 255 | 689 | 1,030 | 1,460 | 1,910 | 4,600 | 914 | 1,200 | 1,330 | 1,960 | 1,440 | 663 |
| 3 | 221 | 520 | 899 | 1,620 | 1,770 | 3,800 | 956 | 1,240 | 1,210 | 2,600 | 1,820 | 572 |
| 4 | 195 | 457 | 796 | 3,000 | 2,890 | 3,120 | 1,010 | 1,120 | 1,110 | 2,100 | 3,110 | 851 |
| 5 | 181 | 467 | 2,860 | 3,310 | 4,850 | 2,630 | 1,080 | 1,250 | 1,070 | 1,650 | 1,980 | 2,350 |
| 6 | 158 | 1,200 | 6,120 | 2,710 | 3,970 | 2,360 | 1,170 | 1,610 | 952 | 1,550 | 2,030 | 1,390 |
| 7 | 151 | 1,270 | 4,430 | 2,290 | 2,970 | 2,100 | 3,690 | 1,480 | 1,310 | 1,660 | 2,150 | 954 |
| 8 | 144 | 1,200 | 2,870 | 2,010 | 2,370 | 1,860 | 4,550 | 1,380 | 5,130 | 2,520 | 3,570 | 739 |
| 9 | 136 | 983 | 2,130 | 1,840 | 1,910 | 1,680 | 7,370 | 3,370 | 3,680 | 2,090 | 3,020 | 621 |
| 10 | 136 | 764 | 1,720 | 1,730 | 1,690 | 1,540 | 11,300 | 2,820 | 2,410 | 4,030 | 2,590 | 539 |
| 11 | 144 | 4,790 | 2,430 | 1,610 | 1,570 | 1,410 | 21,400 | 2,070 | 1,780 | 4,360 | 2,060 | 483 |
| 12 | 152 | 6,450 | 3,620 | 1,460 | 1,470 | 1,310 | 13,100 | 1,620 | 1,660 | 3,570 | 1,850 | 440 |
| 13 | 157 | 6,900 | 3,360 | 1,300 | 1,330 | 1,260 | 6,310 | 1,300 | 1,580 | 3,430 | 1,600 | 409 |
| 14 | 145 | 4,060 | 3,740 | 1,200 | 1,260 | 1,240 | 4,240 | 1,070 | 1,290 | 2,650 | 1,240 | 387 |
| 15 | 155 | 2,420 | 3,870 | 1,130 | 5,330 | 1,210 | 3,230 | 1,000 | 1,630 | 2,070 | 1,040 | 372 |
| 16 | 237 | 1,870 | 3,150 | 1,030 | 25,100 | 1,140 | 2,590 | 1,240 | 3,940 | 1,670 | 1,120 | 384 |
| 17 | 815 | 1,910 | 2,480 | 978 | 22,200 | 1,080 | 2,230 | 1,810 | 4,240 | 1,350 | 2,370 | 408 |
| 18 | 1,020 | 2,260 | 2,020 | 903 | 8,570 | 1,060 | 6,670 | 2,270 | 4,410 | 1,120 | 3,820 | 409 |
| 19 | 638 | 2,280 | 1,710 | 854 | 5,280 | 1,060 | 6,940 | 1,890 | 5,970 | 960 | 2,670 | 370 |
| 20 | 462 | 1,890 | 3,650 | 814 | 4,010 | 1,010 | 4,530 | 1,590 | 5,670 | 844 | 1,710 | 338 |
| 21 | 380 | 1,850 | 4,450 | 798 | 3,300 | 979 | 3,600 | 1,440 | 3,810 | 753 | 1,290 | 343 |
| 22 | 320 | 2,570 | 3,430 | 774 | 10,800 | 954 | 3,100 | 1,850 | 2,690 | 729 | 1,090 | 392 |
| 23 | 284 | 2,880 | 2,530 | 721 | 20,900 | 912 | 2,570 | 1,740 | 2,040 | 801 | 944 | 469 |
| 24 | 261 | 2,450 | 2,220 | 570 | 12,800 | 866 | 2,160 | 1,750 | 1,620 | 762 | 819 | 503 |
| 25 | 245 | 1,870 | 3,320 | 524 | 6,840 | 831 | 1,910 | 1,530 | 1,340 | 704 | 718 | 452 |
| 26 | 245 | 1,510 | 4,030 | e520 | 4,930 | 810 | 1,940 | 1,450 | 1,140 | 621 | 639 | 427 |
| 27 | 229 | 1,390 | 3,470 | e560 | 4,510 | 802 | 1,820 | 1,260 | 995 | 544 | 581 | 395 |
| 28 | 242 | 1,540 | 2,740 | e580 | 5,130 | 790 | 1,590 | 1,100 | 895 | 501 | 534 | 425 |
| 29 | 346 | 1,470 | 2,240 | 715 | --- | 762 | 1,420 | 1,080 | 840 | 644 | 504 | 429 |
| 30 | 927 | 1,290 | 1,900 | 1,340 | --- | 779 | 1,320 | 1,180 | 1,290 | 1,430 | 482 | 373 |
| 31 | 951 | --- | 1,640 | 2,170 | --- | 862 | --- | 1,350 | --- | 2,120 | 525 | --- |
| TOTAL | 10,242 | 62,112 | 86,025 | 42,031 | 171,720 | 50,187 | 125,610 | 48,310 | 68,372 | 53,113 | 50,996 | 17,642 |
| MEAN | 330 | 2,070 | 2,775 | 1,356 | 6,133 | 1,619 | 4,187 | 1,558 | 2,279 | 1,713 | 1,645 | 588 |
| MAX | 1,020 | 6,900 | 6,120 | 3,310 | 25,100 | 5,370 | 21,400 | 3,370 | 5,970 | 4,360 | 3,820 | 2,350 |
| MIN | 136 | 457 | 796 | 520 | 1,260 | 762 | 900 | 1,000 | 840 | 501 | 482 | 338 |
| CFSM | 0.29 | 1.84 | 2.46 | 1.20 | 5.45 | 1.44 | 3.72 | 1.38 | 2.02 | 1.52 | 1.46 | 0.52 |
| IN. | 0.34 | 2.05 | 2.84 | 1.39 | 5.67 | 1.66 | 4.15 | 1.60 | 2.26 | 1.75 | 1.68 | 0.58 |

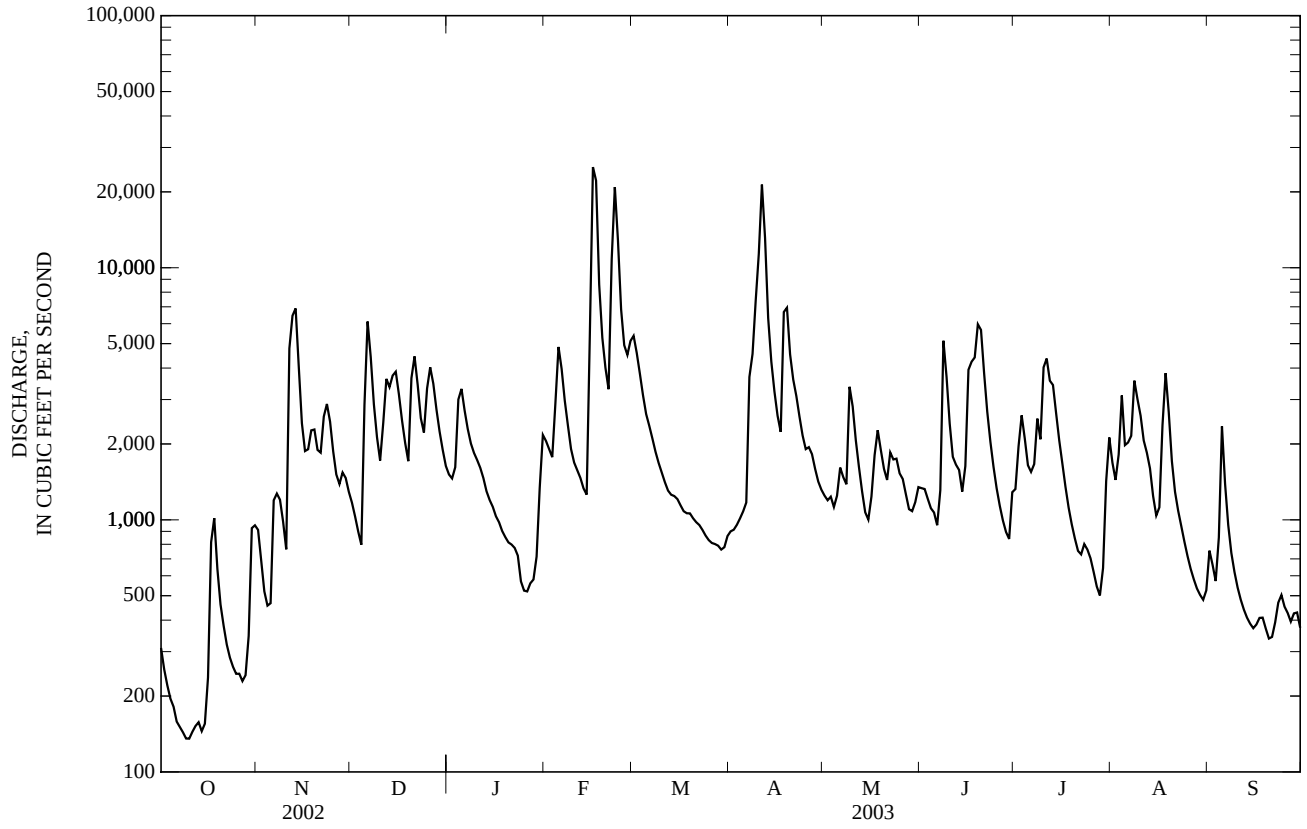
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1921 - 1976, 1979 - 1981, 2002 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 491 | 853 | 1,791 | 2,644 | 3,129 | 3,298 | 2,331 | 1,753 | 984 | 809 | 717 | 410 |
| MAX | 1,988 | 2,905 | 7,243 | 7,105 | 6,942 | 9,084 | 4,640 | 5,053 | 2,782 | 2,509 | 3,624 | 1,984 |
| (WY) | (1972) | (1930) | (1927) | (1937) | (1957) | (1963) | (1935) | (1958) | (1923) | (1938) | (1942) | (1928) |
| MIN | 93.6 | 116 | 157 | 203 | 486 | 1,067 | 551 | 408 | 219 | 183 | 132 | 110 |
| (WY) | (1931) | (1940) | (1940) | (1940) | (1941) | (1931) | (1942) | (1941) | (1941) | (1930) | (1925) | (1955) |

03527000 CLINCH RIVER AT SPEERS FERRY, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 546,381 | | 786,360 | | | |
| ANNUAL MEAN | 1,497 | | 2,154 | | 1,594 | |
| HIGHEST ANNUAL MEAN | | | | | 2,534 | 1927 |
| LOWEST ANNUAL MEAN | | | | | 668 | 1941 |
| HIGHEST DAILY MEAN | 43,600 | Mar 18 | 25,100 | Feb 16 | 43,600 | Mar 18, 2002 |
| LOWEST DAILY MEAN | 88 | aSep 12 | 136 | bOct 9 | 77 | cOct 7, 1930 |
| ANNUAL SEVEN-DAY MINIMUM | 91 | Sep 9 | 145 | Oct 8 | 81 | Oct 7, 1930 |
| MAXIMUM PEAK FLOW | | | 29,100 | Feb 16 | 89,000 | Apr 5, 1977 |
| MAXIMUM PEAK STAGE | | | 24.50 | Feb 16 | d36.69 | Apr 5, 1977 |
| INSTANTANEOUS LOW FLOW | | | 132 | Oct 9 | 42 | fSep 29, 1939 |
| ANNUAL RUNOFF (CFSM) | 1.33 | | 1.91 | | 1.42 | |
| ANNUAL RUNOFF (INCHES) | 18.05 | | 25.98 | | 19.24 | |
| 10 PERCENT EXCEEDS | 3,190 | | 4,240 | | 3,600 | |
| 50 PERCENT EXCEEDS | 623 | | 1,430 | | 860 | |
| 90 PERCENT EXCEEDS | 166 | | 409 | | 190 | |

a Also Sept. 14, 15, 2002.
b Also Oct. 10, 2002.
c Also Oct. 8, 14, 15, 22, 1930.
d From floodmarks.
e Estimated.
f Also Oct. 23, 1939.



## 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 $mi^2$.

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 NGVD of 1929. 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. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water-quality data.

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 $ft^3/s$.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 14,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Feb 17 | 0200 | *40,800 | *18.01 | Apr 12 | 0030 | 28,900 | 14.72 |
| Feb 23 | 1630 | 28,500 | 14.60 | | | | |

Minimum discharge, 192 $ft^3/s$, Oct. 9, 10, 11.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 469 | 1,140 | 1,520 | 2,030 | 2,940 | 7,100 | 1,120 | 1,740 | 1,630 | 1,910 | 2,600 | 764 |
| 2 | 376 | 1,010 | 1,340 | 1,910 | 2,640 | 6,420 | 1,140 | 1,630 | 1,550 | 2,580 | 1,900 | 920 |
| 3 | 312 | 814 | 1,190 | 1,880 | 2,410 | 5,260 | 1,150 | 1,640 | 1,510 | 3,570 | 1,680 | 822 |
| 4 | 275 | 678 | 1,110 | 2,330 | 2,970 | 4,290 | 1,190 | 1,570 | 1,420 | 2,950 | 2,670 | 798 |
| 5 | 253 | 640 | 3,830 | 3,710 | 5,330 | 3,610 | 1,310 | 1,540 | 1,310 | 2,380 | 2,890 | 1,550 |
| 6 | 230 | 1,280 | 7,230 | 3,420 | 5,630 | 3,240 | 1,450 | 2,490 | 1,240 | 1,860 | 2,040 | 2,230 |
| 7 | 218 | 1,820 | 6,870 | 2,930 | 4,210 | 2,930 | 4,000 | 2,860 | 1,410 | 1,870 | 2,310 | 1,430 |
| 8 | 203 | 1,530 | 4,360 | 2,570 | 3,330 | 2,600 | 7,900 | 2,490 | 4,780 | 2,250 | 2,900 | 1,070 |
| 9 | 194 | 1,380 | 3,120 | 2,330 | 2,720 | 2,340 | 9,360 | 2,760 | 6,040 | 2,550 | 3,450 | 866 |
| 10 | 192 | 1,150 | 2,470 | 2,160 | 2,330 | 2,140 | 15,600 | 4,530 | 3,700 | 3,350 | 2,910 | 746 |
| 11 | 197 | 5,000 | 2,710 | 2,000 | 2,130 | 1,960 | 26,300 | 3,200 | 2,620 | 5,020 | 2,860 | 663 |
| 12 | 199 | 8,520 | 4,100 | 1,840 | 2,000 | 1,810 | 24,800 | 2,530 | 2,300 | 5,060 | 2,160 | 603 |
| 13 | 201 | 8,510 | 4,450 | 1,670 | 1,850 | 1,720 | 11,500 | 1,990 | 2,180 | 3,830 | 1,970 | 559 |
| 14 | 199 | 6,410 | 4,400 | 1,520 | 1,770 | 1,740 | 6,460 | 1,640 | 1,950 | 3,670 | 1,650 | 528 |
| 15 | 205 | 3,630 | 4,870 | 1,420 | 5,860 | 1,670 | 4,690 | 1,430 | 3,310 | 2,700 | 1,360 | 505 |
| 16 | 264 | 2,560 | 4,300 | 1,340 | 30,800 | 1,600 | 3,680 | 1,500 | 5,870 | 2,310 | 1,410 | 481 |
| 17 | 330 | 2,330 | 3,460 | 1,260 | 37,400 | 1,520 | 3,160 | 1,730 | 8,450 | 1,930 | 2,110 | 484 |
| 18 | 866 | 2,490 | 2,810 | 1,170 | 19,900 | 1,460 | 4,200 | 3,020 | 7,420 | 1,580 | 3,610 | 499 |
| 19 | 959 | 2,790 | 2,370 | 1,110 | 8,410 | 1,440 | 9,430 | 2,800 | 7,970 | 1,340 | 4,170 | 509 |
| 20 | 691 | 2,520 | 4,270 | 1,060 | 5,830 | 1,400 | 6,580 | 2,300 | 8,750 | 1,170 | 2,480 | 476 |
| 21 | 560 | 2,460 | 6,400 | 1,030 | 4,590 | 1,340 | 4,850 | 2,050 | 6,100 | 1,040 | 1,790 | 439 |
| 22 | 462 | 3,230 | 4,970 | 1,010 | 11,500 | 1,280 | 4,120 | 2,080 | 4,080 | 988 | 1,440 | 476 |
| 23 | 394 | 3,390 | 3,750 | 977 | 26,800 | 1,230 | 3,460 | 2,320 | 3,030 | 1,090 | 1,260 | 604 |
| 24 | 350 | 3,220 | 3,070 | 803 | 23,000 | 1,170 | 2,940 | 2,050 | 2,390 | 1,040 | 1,100 | 610 |
| 25 | 324 | 2,610 | 3,620 | 750 | 11,500 | 1,120 | 2,560 | 2,020 | 1,950 | 956 | 964 | 611 |
| 26 | 318 | 2,080 | 4,840 | 759 | 7,230 | 1,080 | 2,550 | 1,810 | 1,660 | 877 | 860 | 564 |
| 27 | 318 | 1,800 | 4,660 | 777 | 6,320 | 1,060 | 2,550 | 1,670 | 1,450 | 788 | 781 | 561 |
| 28 | 330 | 1,680 | 3,780 | 870 | 6,550 | 1,030 | 2,250 | 1,470 | 1,290 | 709 | 719 | 625 |
| 29 | 500 | 1,870 | 3,090 | 1,080 | --- | 1,020 | 2,000 | 1,380 | 1,170 | 736 | 675 | 594 |
| 30 | 1,080 | 1,720 | 2,600 | 2,110 | --- | 1,030 | 1,820 | 1,390 | 1,180 | 1,020 | 637 | 559 |
| 31 | 1,390 | --- | 2,240 | 2,590 | --- | 1,070 | --- | 1,490 | --- | 1,850 | 687 | --- |
| TOTAL | 12,859 | 80,262 | 113,800 | 52,416 | 247,950 | 68,680 | 174,120 | 65,120 | 99,710 | 64,974 | 60,043 | 22,146 |
| MEAN | 415 | 2,675 | 3,671 | 1,691 | 8,855 | 2,215 | 5,804 | 2,101 | 3,324 | 2,096 | 1,937 | 738 |
| MAX | 1,390 | 8,520 | 7,230 | 3,710 | 37,400 | 7,100 | 26,300 | 4,530 | 8,750 | 5,060 | 4,170 | 2,230 |
| MIN | 192 | 640 | 1,110 | 750 | 1,770 | 1,020 | 1,120 | 1,380 | 1,170 | 709 | 637 | 439 |
| MED | 318 | 2,210 | 3,750 | 1,520 | 5,480 | 1,600 | 3,570 | 1,990 | 2,240 | 1,870 | 1,900 | 604 |
| CFSM | 0.28 | 1.82 | 2.49 | 1.15 | 6.01 | 1.50 | 3.94 | 1.43 | 2.25 | 1.42 | 1.31 | 0.50 |
| IN. | 0.32 | 2.03 | 2.87 | 1.32 | 6.26 | 1.73 | 4.39 | 1.64 | 2.52 | 1.64 | 1.52 | 0.56 |

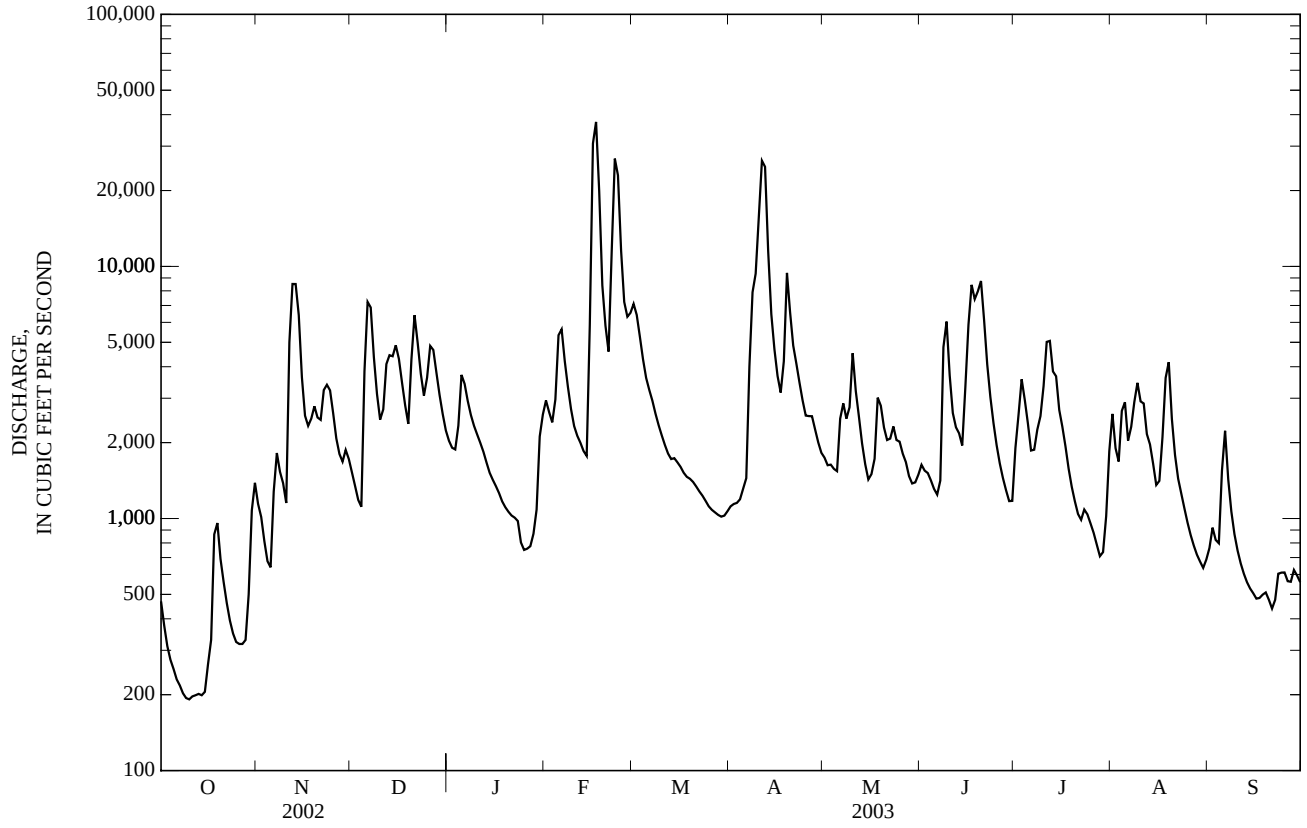
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1919 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 640 | 1,095 | 2,297 | 3,399 | 4,122 | 4,252 | 3,107 | 2,281 | 1,295 | 980 | 872 | 526 |
| MAX | 2,871 | 4,794 | 9,107 | 9,500 | 9,426 | 11,950 | 8,860 | 6,382 | 3,865 | 3,251 | 4,411 | 2,939 |
| (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) |

03528000 CLINCH RIVER ABOVE TAZEWELL, TN—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1919 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 681,768 | | 1,062,080 | | | |
| ANNUAL MEAN | 1,868 | | 2,910 | | 2,063 | |
| HIGHEST ANNUAL MEAN | | | | | 3,269 | 1927 |
| LOWEST ANNUAL MEAN | | | | | 850 | 1941 |
| HIGHEST DAILY MEAN | 51,200 | Mar 19 | 37,400 | Feb 17 | 83,300 | Apr 5, 1977 |
| LOWEST DAILY MEAN | 115 | Sep 16 | 192 | Oct 10 | 108 | Sep 11, 1925 |
| ANNUAL SEVEN-DAY MINIMUM | 118 | Sep 13 | 198 | Oct 8 | 116 | Sep 17, 1955 |
| MAXIMUM PEAK FLOW | | | 40,800 | Feb 17 | 98,100 | Apr 5, 1977 |
| MAXIMUM PEAK STAGE | | | 18.01 | Feb 17 | a29.32 | Apr 5, 1977 |
| INSTANTANEOUS LOW FLOW | | | b192 | Oct 9 | 108 | Sep 11, 1925 |
| ANNUAL RUNOFF (CFSM) | 1.27 | | 1.97 | | 1.40 | |
| ANNUAL RUNOFF (INCHES) | 17.21 | | 26.80 | | 19.02 | |
| 10 PERCENT EXCEEDS | 4,000 | | 5,840 | | 4,630 | |
| 50 PERCENT EXCEEDS | 733 | | 1,870 | | 1,100 | |
| 90 PERCENT EXCEEDS | 203 | | 560 | | 264 | |

a From floodmarks.
b Also occurred on Oct. 10, 11.



## 03529500 POWELL RIVER AT BIG STONE GAP, VA

LOCATION.--Lat 36°52'08", long 82°46'32", NAD83, Wise County, Hydrologic Unit 06010206, on right bank 10 ft upstream from bridge on U.S. Highway 23 at Big Stone Gap, 1 mi upstream from South Fork Powell River, 2.5 mi downstream from Pigeon Creek, and at mile 179.2.

DRAINAGE AREA.--112 $mi^2$.

PERIOD OF RECORD.--October 1944 to September 1959, October 1959 to September 1977 (annual maximum only), October 1978 to September 1981, October 1981 to July 1994 (annual maximum only), October 2001 to September 2002.

REVISED RECORDS.--WSP 1053: Drainage area. WSP 1276: 1948. WSP 1436: 1949(M), 1950(P), 1951-53(M), 1955(P).

GAGE.--Water-stage recorder. Datum of gage is 1,459.07 ft NGVD of 1929. Prior to Apr. 27, 1948, staff gage.

REMARKS.--Records good except for period with ice effect, Jan. 25-28, which is fair. Maximum discharge, 24,000 $ft^3/s$, from rating curve extended above 1,900 $ft^3/s$ on basis of slope-area measurements at gage heights 9.67 ft, 10.39 ft, and 16.50 ft.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,600 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Nov 11 | 0500 | 1,930 | 4.97 | Apr 8 | 2315 | 2,450 | 5.50 |
| Feb 16 | 0600 | *9,930 | *10.54 | Apr 10 | 2100 | 4,220 | 7.00 |
| Feb 22 | 1430 | 5,120 | 7.66 | Jun 7 | 1230 | 2,310 | 5.36 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 44 | 99 | 101 | 186 | 127 | 519 | 109 | 183 | 152 | 120 | 134 | 96 |
| 2 | 42 | 82 | 96 | 168 | 125 | 469 | 115 | 186 | 134 | 161 | 100 | 67 |
| 3 | 40 | 72 | 92 | 177 | 128 | 409 | 118 | 175 | 131 | 138 | 90 | 57 |
| 4 | 40 | 71 | 98 | 168 | 485 | 360 | 114 | 159 | 155 | 111 | 83 | 197 |
| 5 | 48 | 99 | 380 | 165 | 404 | 332 | 137 | 287 | 134 | 127 | 75 | 124 |
| 6 | 40 | 251 | 373 | 159 | 278 | 307 | 130 | 292 | 118 | 123 | 78 | 81 |
| 7 | 39 | 190 | 245 | 146 | 233 | 275 | 911 | 244 | 1,120 | 177 | 164 | 67 |
| 8 | 35 | 142 | 195 | 144 | 188 | 254 | 1,100 | 225 | 797 | 126 | 128 | 60 |
| 9 | 33 | 118 | 169 | 142 | 164 | 237 | 1,890 | 781 | 415 | 162 | 97 | 55 |
| 10 | 36 | 128 | 148 | 135 | 162 | 218 | 2,470 | 462 | 283 | 282 | 88 | 51 |
| 11 | 41 | 1,100 | 281 | 126 | 145 | 204 | 2,450 | 329 | 241 | 301 | 78 | 48 |
| 12 | 40 | 491 | 285 | 116 | 134 | 191 | 1,130 | 251 | 273 | 239 | 70 | 45 |
| 13 | 38 | 338 | 259 | 113 | 124 | 195 | 709 | 209 | 218 | 244 | 65 | 44 |
| 14 | 39 | 232 | 348 | 112 | 133 | 189 | 528 | 187 | 191 | 179 | 62 | 44 |
| 15 | 40 | 186 | 316 | 105 | 1,420 | 172 | 431 | 191 | 291 | 187 | 60 | 43 |
| 16 | 105 | 184 | 266 | 101 | 5,300 | 165 | 372 | 213 | 406 | 142 | 63 | 41 |
| 17 | 86 | 197 | 227 | 102 | 1,950 | 159 | 359 | 229 | 471 | 123 | 71 | 38 |
| 18 | 61 | 182 | 201 | 95 | 943 | 154 | 875 | 270 | 675 | 107 | 62 | 37 |
| 19 | 50 | 179 | 194 | 93 | 665 | 147 | 637 | 229 | 814 | 98 | 57 | 37 |
| 20 | 49 | 172 | 1,140 | 92 | 523 | 144 | 477 | 194 | 520 | 93 | 52 | 39 |
| 21 | 49 | 215 | 604 | 91 | 450 | 138 | 404 | 242 | 370 | 87 | 52 | 40 |
| 22 | 42 | 236 | 398 | 85 | 2,750 | 129 | 345 | 235 | 290 | 89 | 54 | 59 |
| 23 | 39 | 206 | 300 | 82 | 2,150 | 123 | 299 | 231 | 238 | 87 | 50 | 76 |
| 24 | 38 | 177 | 312 | 76 | 1,150 | 119 | 265 | 214 | 202 | 83 | 47 | 52 |
| 25 | 39 | 152 | 381 | e68 | 800 | 113 | 246 | 185 | 177 | 74 | 45 | 44 |
| 26 | 45 | 138 | 348 | e64 | 637 | 114 | 303 | 177 | 161 | 68 | 43 | 41 |
| 27 | 42 | 136 | 294 | e66 | 560 | 109 | 251 | 154 | 150 | 66 | 41 | 51 |
| 28 | 51 | 120 | 257 | e68 | 550 | 105 | 227 | 141 | 140 | 84 | 40 | 67 |
| 29 | 165 | 114 | 227 | 100 | --- | 106 | 212 | 159 | 128 | 126 | 41 | 49 |
| 30 | 238 | 111 | 202 | 125 | --- | 121 | 199 | 169 | 126 | 112 | 49 | 43 |
| 31 | 133 | --- | 186 | 121 | --- | 115 | --- | 165 | --- | 127 | 74 | --- |
| TOTAL | 1,827 | 6,118 | 8,923 | 3,591 | 22,678 | 6,392 | 17,813 | 7,368 | 9,521 | 4,243 | 2,213 | 1,793 |
| MEAN | 58.9 | 204 | 288 | 116 | 810 | 206 | 594 | 238 | 317 | 137 | 71.4 | 59.8 |
| MAX | 238 | 1,100 | 1,140 | 186 | 5,300 | 519 | 2,470 | 781 | 1,120 | 301 | 164 | 197 |
| MIN | 33 | 71 | 92 | 64 | 124 | 105 | 109 | 141 | 118 | 66 | 40 | 37 |
| CFSM | 0.53 | 1.82 | 2.57 | 1.03 | 7.23 | 1.84 | 5.30 | 2.12 | 2.83 | 1.22 | 0.64 | 0.53 |
| IN. | 0.61 | 2.03 | 2.96 | 1.19 | 7.53 | 2.12 | 5.92 | 2.45 | 3.16 | 1.41 | 0.74 | 0.60 |

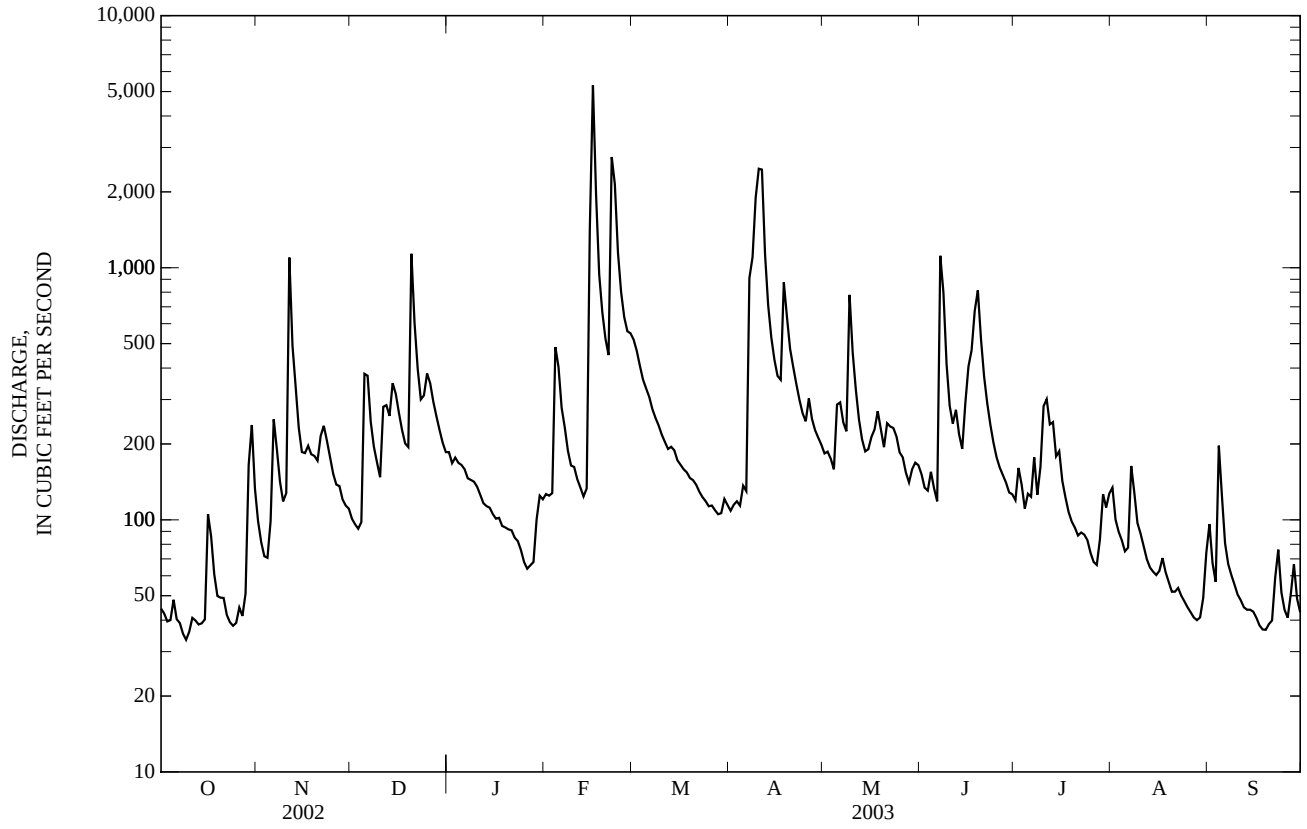
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1959, 1979 - 1981, 2002 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 35.0 | 97.7 | 229 | 365 | 447 | 412 | 316 | 235 | 122 | 76.6 | 71.1 | 38.4 |
| MAX | 136 | 290 | 622 | 745 | 982 | 1,054 | 621 | 486 | 317 | 152 | 283 | 94.0 |
| (WY) | (1950) | (1980) | (1952) | (1950) | (1948) | (1955) | (1956) | (1958) | (2003) | (1958) | (1947) | (1979) |
| MIN | 7.25 | 9.47 | 26.4 | 27.5 | 65.5 | 188 | 137 | 62.7 | 25.8 | 22.4 | 14.0 | 9.27 |
| (WY) | (1954) | (1954) | (1954) | (1981) | (1954) | (1957) | (1954) | (1957) | (1948) | (1948) | (1948) | (1955) |

03529500 POWELL RIVER AT BIG STONE GAP, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1945 - 1959, 1979 - 1981, 2002 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 72,026 | | 92,480 | | | |
| ANNUAL MEAN | 197 | | 253 | | 202 | |
| HIGHEST ANNUAL MEAN | | | | | 299 | 1979 |
| LOWEST ANNUAL MEAN | | | | | 101 | 1954 |
| HIGHEST DAILY MEAN | 7,280 | Mar 18 | 5,300 | Feb 16 | 7,860 | Feb 13, 1948 |
| LOWEST DAILY MEAN | 23 | Aug 14 | 33 | Oct 9 | 5.0 | aSep 16, 1955 |
| ANNUAL SEVEN-DAY MINIMUM | 25 | Sep 7 | 37 | Oct 7 | 5.7 | Sep 13, 1955 |
| MAXIMUM PEAK FLOW | | | 9,930 | Feb 16 | 24,000 | Apr 5, 1977 |
| MAXIMUM PEAK STAGE | | | 10.54 | Feb 16 | 16.50 | Apr 5, 1977 |
| INSTANTANEOUS LOW FLOW | | | 32 | Oct 9 | 4.0 | bSep 16, 1955 |
| ANNUAL RUNOFF (CFSM) | 1.76 | | 2.26 | | 1.81 | |
| ANNUAL RUNOFF (INCHES) | 23.92 | | 30.72 | | 24.56 | |
| 10 PERCENT EXCEEDS | 359 | | 473 | | 445 | |
| 50 PERCENT EXCEEDS | 105 | | 144 | | 99 | |
| 90 PERCENT EXCEEDS | 34 | | 45 | | 19 | |

a Also Sept. 17, 18, 1955.
b Also Sept. 17, 19, 1955.
e Estimated.



## 03531500 POWELL RIVER NEAR JONESVILLE, VA

LOCATION.--Lat 36°39'43", long 83°05'42", NAD83, 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 $mi^2$.

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 NGVD of 1929.

REMARKS,--Records good except for period with ice effect, Jan. 25-28, which is fair. Maximum discharge, 57,000 $ft^3/s$, from rating curve extended above 20,000 $ft^3/s$ 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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 $ft^3/s$ and maximum (*):

| Date | Time | Discharge ($ft^3/s$) | Gage height (ft) | Date | Time | Discharge ($ft^3/s$) | Gage height (ft) |
|---|---|---|---|---|---|---|---|
| Nov 11 | 1315 | 7,160 | 13.46 | Apr 9 | 0830 | 5,850 | 11.46 |
| Feb 16 | 1630 | *25,100 | *30.34 | Apr 11 | 0445 | 9,640 | 17.07 |
| Feb 22 | 2245 | 12,900 | 20.78 | Jun 7 | 2030 | 7,120 | 13.41 |

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 105 | 280 | 284 | 486 | 537 | 1,680 | 265 | 741 | 768 | 423 | 499 | 184 |
| 2 | 89 | 196 | 252 | 475 | 503 | 1,460 | 253 | 721 | 642 | 457 | 378 | 210 |
| 3 | 81 | 156 | 233 | 455 | 462 | 1,180 | 254 | 731 | 580 | 576 | 305 | 160 |
| 4 | 75 | 146 | 234 | 480 | 1,320 | 959 | 262 | 633 | 619 | 424 | 273 | 231 |
| 5 | 75 | 154 | 1,670 | 473 | 1,890 | 849 | 287 | 1,040 | 637 | 351 | 238 | 682 |
| 6 | 80 | 697 | 2,010 | 473 | 1,120 | 774 | 339 | 1,780 | 541 | 344 | 220 | 300 |
| 7 | 77 | 577 | 1,150 | 445 | 841 | 684 | 2,310 | 1,360 | 3,130 | 348 | 261 | 204 |
| 8 | 71 | 373 | 769 | 419 | 648 | 605 | 2,800 | 1,260 | 3,760 | 386 | 346 | 163 |
| 9 | 67 | 275 | 587 | 413 | 514 | 558 | 5,180 | 2,040 | 1,920 | 373 | 272 | 138 |
| 10 | 64 | 229 | 486 | 396 | 485 | 515 | 5,480 | 2,040 | 1,160 | 1,320 | 241 | 124 |
| 11 | 69 | 4,750 | 839 | 363 | 453 | 471 | 7,630 | 1,560 | 825 | 1,900 | 218 | 112 |
| 12 | 75 | 2,290 | 1,180 | 330 | 414 | 442 | 3,530 | 1,190 | 853 | 1,190 | 196 | 105 |
| 13 | 75 | 1,510 | 922 | 299 | 376 | 419 | 2,440 | 919 | 764 | 1,280 | 173 | 100 |
| 14 | 68 | 910 | 1,240 | 303 | 371 | 432 | 1,960 | 770 | 620 | 886 | 157 | 95 |
| 15 | 67 | 625 | 1,270 | 289 | 3,410 | 397 | 1,650 | 742 | 1,330 | 661 | 150 | 94 |
| 16 | 97 | 541 | 974 | 259 | 19,300 | 376 | 1,390 | 892 | 2,440 | 578 | 162 | 91 |
| 17 | 169 | 584 | 747 | 265 | 8,180 | 367 | 1,250 | 907 | 3,150 | 495 | 154 | 91 |
| 18 | 134 | 603 | 610 | 239 | 3,230 | 361 | 2,430 | 1,550 | 3,600 | 406 | 170 | 86 |
| 19 | 104 | 528 | 530 | 229 | 2,210 | 350 | 2,490 | 1,260 | 3,270 | 352 | 162 | 81 |
| 20 | 93 | 526 | 2,500 | 227 | 1,720 | 331 | 1,960 | 970 | 2,290 | 315 | 138 | 80 |
| 21 | 91 | 625 | 2,210 | 224 | 1,310 | 322 | 1,660 | 882 | 1,570 | 289 | 126 | 78 |
| 22 | 88 | 918 | 1,380 | 216 | 6,280 | 310 | 1,380 | 988 | 1,090 | 270 | 124 | 83 |
| 23 | 81 | 776 | 931 | 205 | 7,690 | 297 | 1,150 | 857 | 835 | 305 | 139 | 210 |
| 24 | 77 | 601 | 809 | 165 | 3,330 | 283 | 983 | 812 | 675 | 268 | 128 | 179 |
| 25 | 73 | 487 | 1,290 | e150 | 2,270 | 269 | 899 | 714 | 570 | 241 | 111 | 118 |
| 26 | 80 | 411 | 1,310 | e145 | 1,860 | 259 | 1,420 | 682 | 501 | 211 | 103 | 99 |
| 27 | 90 | 388 | 1,010 | e150 | 1,750 | 261 | 1,260 | 623 | 454 | 195 | 98 | 94 |
| 28 | 91 | 352 | 810 | e155 | 1,730 | 250 | 1,020 | 565 | 427 | 192 | 95 | 247 |
| 29 | 178 | 321 | 676 | 248 | --- | 240 | 895 | 624 | 388 | 284 | 95 | 196 |
| 30 | 950 | 305 | 574 | 647 | --- | 257 | 817 | 708 | 358 | 393 | 93 | 127 |
| 31 | 465 | --- | 507 | 588 | --- | 292 | --- | 717 | --- | 332 | 119 | --- |
| TOTAL | 3,999 | 21,134 | 29,994 | 10,211 | 74,204 | 16,250 | 55,644 | 31,278 | 39,767 | 16,045 | 5,944 | 4,762 |
| MEAN | 129 | 704 | 968 | 329 | 2,650 | 524 | 1,855 | 1,009 | 1,326 | 518 | 192 | 159 |
| MAX | 950 | 4,750 | 2,500 | 647 | 19,300 | 1,680 | 7,630 | 2,040 | 3,760 | 1,900 | 499 | 682 |
| MIN | 64 | 146 | 233 | 145 | 371 | 240 | 253 | 565 | 358 | 192 | 93 | 78 |
| CFSM | 0.40 | 2.21 | 3.03 | 1.03 | 8.31 | 1.64 | 5.81 | 3.16 | 4.16 | 1.62 | 0.60 | 0.50 |
| IN. | 0.47 | 2.46 | 3.50 | 1.19 | 8.65 | 1.89 | 6.49 | 3.65 | 4.64 | 1.87 | 0.69 | 0.56 |

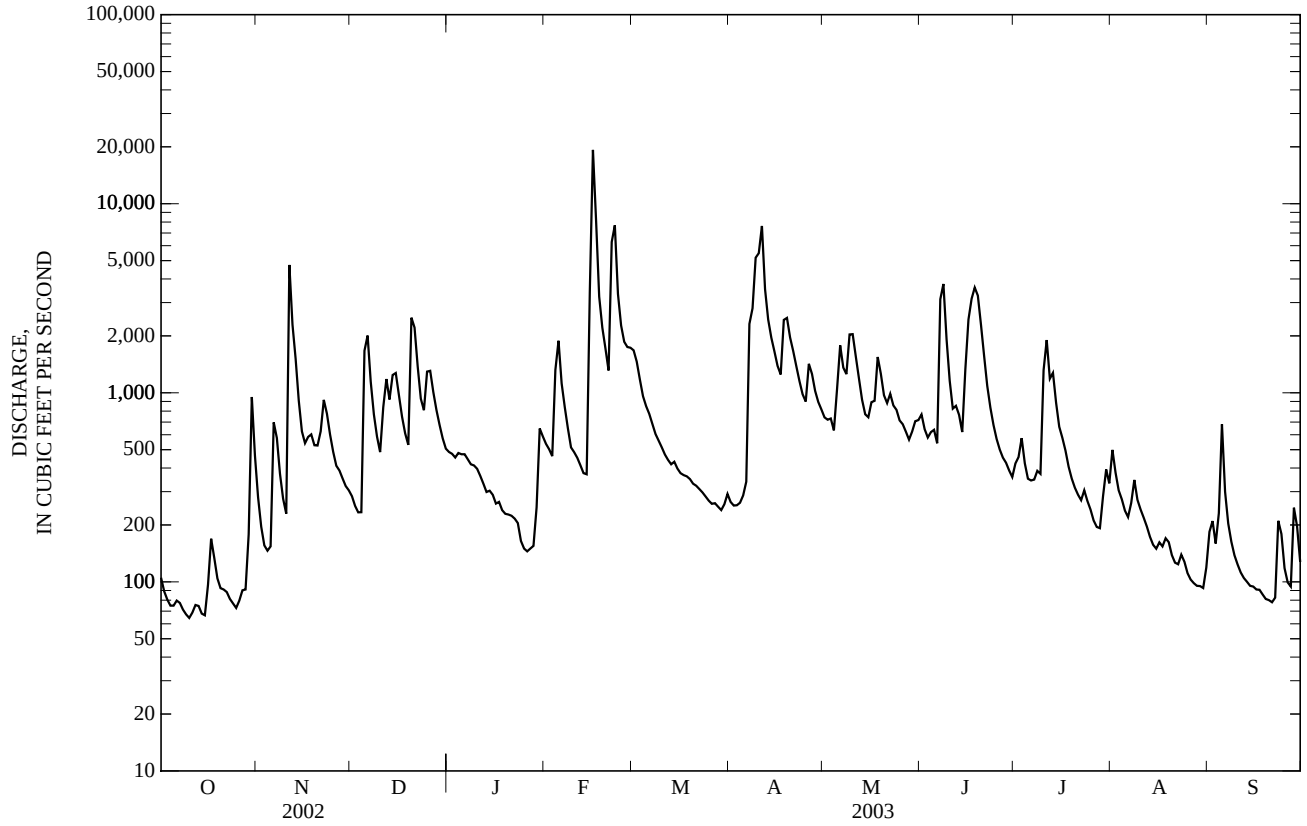
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1932 - 2003, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | 149 | 309 | 641 | 923 | 1,077 | 1,128 | 826 | 578 | 323 | 237 | 198 | 117 |
| MAX | 1,086 | 1,405 | 2,026 | 2,765 | 2,666 | 3,423 | 2,542 | 1,436 | 1,601 | 825 | 1,187 | 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) |

03531500 POWELL RIVER NEAR JONESVILLE, VA—Continued

| SUMMARY STATISTICS | FOR 2002 CALENDAR YEAR | | FOR 2003 WATER YEAR | | WATER YEARS 1932 - 2003 | |
|---|---|---|---|---|---|---|
| ANNUAL TOTAL | 210,439 | | 309,232 | | | |
| ANNUAL MEAN | 577 | | 847 | | 540 | |
| HIGHEST ANNUAL MEAN | | | | | 943 | 1974 |
| LOWEST ANNUAL MEAN | | | | | 218 | 1941 |
| HIGHEST DAILY MEAN | 21,400 | Mar 18 | 19,300 | Feb 16 | 35,000 | Apr 5, 1977 |
| LOWEST DAILY MEAN | 43 | Sep 13 | 64 | Oct 10 | 18 | Oct 3, 1933 |
| ANNUAL SEVEN-DAY MINIMUM | 44 | Sep 10 | 69 | Oct 9 | 18 | Sep 11, 1954 |
| MAXIMUM PEAK FLOW | | | 25,100 | Feb 16 | 57,000 | Apr 5, 1977 |
| MAXIMUM PEAK STAGE | | | 30.34 | Feb 16 | a44.32 | Apr 5, 1977 |
| INSTANTANEOUS LOW FLOW | | | 63 | Oct 10 | 17 | bSep 19, 1954 |
| ANNUAL RUNOFF (CFSM) | 1.81 | | 2.66 | | 1.69 | |
| ANNUAL RUNOFF (INCHES) | 24.54 | | 36.06 | | 22.98 | |
| 10 PERCENT EXCEEDS | 1,170 | | 1,890 | | 1,220 | |
| 50 PERCENT EXCEEDS | 226 | | 454 | | 252 | |
| 90 PERCENT EXCEEDS | 67 | | 96 | | 54 | |

a From floodmark.
b Also Sept. 20, 1954, and as a result of storage behind temporary dam Oct. 18, 1961.
e Estimated.



# DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

As the number of streams on which streamflow information is likely to be desired far exceeds the number of stream-gaging stations feasible to operate at one time, the Geological Survey collects limited streamflow data at sites other than stream-gaging stations. When limited streamflow data are collected on a systematic basis over a period of years for use in hydrologic analyses, the site at which the data are collected is called a partial-record station. Data collected at these partial-record stations are usable in low-flow or floodflow analyses, depending on the type of data collected. In addition, discharge measurements are made at other sites not included in the partial-record program. These measurements are generally made in times of drought or flood to give better areal coverage to these events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

Records collected at crest-stage partial-record stations are presented in the following table. Discharge measurements made at 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 2003

| Station name and number | Location and drainage area | Period of record (water years) | Water year 2003 maximum | | | Period of record maximum | | |
|---|---|---|---|---|---|---|---|---|
| | | | Date | Gage height (ft) | Discharge ($ft^3/s$) | Date | Gage height (ft) | Discharge ($ft^3/s$) |
| **POTOMAC RIVER BASIN** | | | | | | | | |
| Chub Run near Stanley, VA (01629945) | Lat 38°34’31”, long 78°27’31”, NAD83, 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 NGVD of 1929. Drainage area is 3.16 $mi^2$. | 1959-69a, 1970-03 | 9-19-03 | 8.23 | 1,100 | 9-6-96 | >10.08 | * |
| Crooked Run near Mt. Jackson, VA (01632970) | Lat 38°45’44”, long 78°41’05”, NAD83, Shenandoah County, Hydrologic Unit 02070006, on right upstream wingwall of culvert on State Highway 263, 0.4 mi upstream from mouth, and 2.3 mi west of Mt. Jackson. Datum of gage is 962.84 ft NGVD of 1929. Drainage area is 6.49 $mi^2$. | 1972-03 | 9-19-03 | 3.97 | 442 | 1-19-96 | 11.34 | 5,700 |
| Pughs Run near Woodstock, VA (01633650) | Lat 38°55’48”, long 78°32’42”, NAD83, Shenandoah County, Hydrologic Unit 02070006, on left upstream wingwall of culvert on State Highway 623, 4.0 mi northwest of Woodstock, and 5.4 mi upstream from mouth. Datum of gage is 1,027.27 ft NGVD of 1929. Drainage area is 3.66 $mi^2$. | 1971-03 | 9-19-03 | 6.29 | 236 | 9- 6-96 | 13.39 | 1,100 |
| **GREAT WICOMICO RIVER BASIN** | | | | | | | | |
| Bush Mill Stream near Heathsville, VA (01661800) | Lat 37°52’36”, long 76°29’41”, NAD83, Northumberland County, Hydrologic Unit 02080102, on right bank 12 ft upstream from bridge on State Highway 601, 2.2 mi northwest of Howland, and 3.0 mi southwest of Heathsville. Datum of gage is 22.22 ft NGVD of 1929. Drainage area is 6.82 $mi^2$. | 1964-69‡, 1970-86‡, 1987-03 | 5-26-03 | 6.11 | 212 | 9-16-99 | 11.50 | 1,390 |
| | | Correction | 4-22-02 | 3.46 | 21.8 | | | |

* Discharge not determined.
< Less than.
> Greater than.
a Records provided by U.S. Department of Agriculture, Soil Conservation Service.

Maximum discharge at crest-stage partial-record stations during water year 2003--Continued

| Station name and number | Location and drainage area | Period of record (water years) | Water year 2003 maximum | | | Period of record maximum | | |
|---|---|---|---|---|---|---|---|---|
| | | | Date | Gage height (ft) | Discharge ($ft^3/s$) | Date | Gage height (ft) | Discharge ($ft^3/s$) |
| **RAPPAHANNOCK RIVER BASIN** | | | | | | | | |
| Pony Mountain Branch near Culpeper, VA (01665050) | Lat 38°27'04", long 77°57'23", NAD83, 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 NGVD of 1929, from topographic map. Drainage area is 0.30 $mi^2$. | 1958-69a, 1970-03 | 2-22-03 | 5.80 | 312 | 2-22-03 | 5.80 | 312 |
| Farmers Hall Creek near Champlain, VA (01668300) | Lat 38°00'05", long 76°58'39", NAD83, Essex County, Hydrologic Unit 02080104, on left upstream wingwall of culvert on U.S. Highway 17, 1.0 mi upstream from Rouzie Swamp, and 1.2 mi southeast of Champlain. Datum of gage is 42.10 ft NGVD of 1929. Drainage area is 2.18 $mi^2$. | 1966-03 | 9-19-03 | 6.75 | 152 | 8-20-69 | 19.2 | 510 |
| **YORK RIVER BASIN** | | | | | | | | |
| Pamunkey Creek at Lahore, VA (01670180) | Lat 38°11'33", long 77°58'08", NAD83, 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 NGVD of 1929, from topographic map. Drainage area is 40.5 $mi^2$. | 1989-91‡, 1992-03 | 9-19-03 | 10.61 | 2,110 | 6-27-95 | 17.20 | 6,900 |
| Contrary Creek near Mineral, VA (01670300) | Lat 38°03'53", long 77°52'44", NAD83, 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 NGVD of 1929, from topographic map. Drainage area is 5.53 $mi^2$. | 1976-86‡, 1987-03 | 9-19-03 | 3.37 | 799 | 11-28-93 | 6.94 | 7,050 |
| Waldrop Creek near Louisa, VA (01671650) | Lat 38°00'09", long 78°04'21", NAD83, Louisa County, Hydrologic Unit 02080106 on left upstream wingwall of culvert on State Highway 632, 2.3 mi upstream from mouth, and 4.2 mi southwest of Louisa. Datum of gage is 361.41 ft NGVD of 1929. Drainage area is 2.85 $mi^2$. | 1969-03 | 9-19-00 | 9.21 | 605 | 8-20-69 | 21.00 | 2,500 |
| Reedy Creek near Dawn, VA (01674200) | Lat 37°52'56", long 77°21'34", NAD83, 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 $mi^2$. | 1951-69, 1972-03 | 9-19-03 | 5.95 | 270 | 8-20-69 | 7.28 | 2,500 |

‡ Operated as a continuous-record gaging station.
a Records provided by U.S. Department of Agriculture, Soil Conservation Service.

Maximum discharge at crest-stage partial-record stations during water year 2003--Continued

| Station name and number | Location and drainage area | Period of record (water years) | Water year 2003 maximum | | | Period of record maximum | | |
|---|---|---|---|---|---|---|---|---|
| | | | Date | Gage height (ft) | Discharge ($ft^3/s$) | Date | Gage height (ft) | Discharge ($ft^3/s$) |
| **JAMES RIVER BASIN** | | | | | | | | |
| Jackson River at Falling Spring, VA (02012500) | Lat 37°52'36", long 79°58'38", NAD83, 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 $mi^2$. | 1925-84‡, 1987-03 | 2-25-03 | 9.98 | 7,290 | 3-17-36<br>b1913 | 14.74<br>20 | 24,700<br>c50,000 |
| Cowpasture River near Head Waters, VA (02015600) | Lat 38°19'30", long 79°26'13", NAD83, Highland County, Hydrologic Unit 02080201, on left downstream wingwall of bridge on U. S. Highway 250, 1.2 mi west of Head Waters, and 3 mi upstream from Shaw Fork. Datum of gage is 1,985.65 ft NGVD of 1929. Drainage area is 11.3 $mi^2$. | 1949-94, 1996-03 | 9-19-03 | 8.74 | 790 | 6-17-49 | d6.5 | 5,650 |
| Craig Creek tributary near New Castle, VA (02017700) | Lat 37°33'21", long 79°59'51", NAD83, Craig County, Hydrologic Unit 02080201, on right upstream 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 $mi^2$. | 1968-03 | 2-22-03 | 7.29 | 323 | 11-4-85 | 13.45 | 1,100 |
| Renick Run near Buchanan, VA (02020100) | Lat 37°35'27", long 79°38'03", NAD83, Botetourt County, Hydrologic Unit 02080201, on left upstream wingwall of culvert on Frontage Road F054 of Interstate Highway 81 between Exits 168 and 169, 2.2 mi upstream from mouth, and 4.8 mi northeast of Buchanan. Datum of gage is 1,261.85 ft NGVD of 1929. Drainage area is 2.06 $mi^2$. | 1967-03 | 9-19-03 | 10.94 | 1,460 | 9-19-03 | 10.94 | 1,460 |
| Buffalo River tributary near Amherst, VA (02027700) | Lat 37°33'45", long 78°57'35", NAD83, 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 NGVD of 1929. Drainage area is 0.46 $mi^2$. | 1966-03 | 4-11-03 | 3.92 | 48 | 9-6-96 | 7.33 | 196 |

‡ Operated as a continuous-record gaging station.
b Maximum known historical peak outside period of record.
c Approximate.
d At different datum.

Maximum discharge at crest-stage partial-record stations during water year 2003--Continued

| Station name and number | Location and drainage area | Period of record (water years) | Water year 2003 maximum | | | Period of record maximum | | |
|---|---|---|---|---|---|---|---|---|
| | | | Date | Gage height (ft) | Discharge ($ft^3/s$) | Date | Gage height (ft) | Discharge ($ft^3/s$) |
| **JAMES RIVER BASIN--Continued** | | | | | | | | |
| Stockton Creek near Afton, VA (02030800) | Lat 38°01'48", long 78°48'29", NAD83, Albemarle County, Hydrologic Unit 02080204, on left upstream wingwall of culvert on State Highway 6, 1.7 mi east of Afton, and 4.3 mi upstream from Stony Run. Datum of gage is 835.27 ft NGVD of 1929. Drainage area is 2.80 $mi^2$. | 1967-03 | 9-19-03 | 5.48 | 163 | 6-21-72<br>11-23-92 | 9.68<br>e9.73 | 678<br>425 |
| Muddy Run near Stanardsville, VA (02032300) | Lat 38°14'05", long 78°37'01", NAD83, 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 $mi^2$. | 1967-03 | 9-19-03 | 7.11 | 62.9 | 5-13-78 | 8.33 | 92 |
| Moores Creek near Charlottesville, VA (02033300) | Lat 38°00'26", long 78°34'24", NAD83, Albemarle County, Hydro-Hydrologic unit 02080204, on right downstream wingwall of culvert on access road, 30 ft north of U.S. Highway 29, 2.8 mi upstream from Morey Creek, and 4 mi southwest of Charlottesville. Datum of gage is 505.40 ft NGVD of 1929. Drainage area is 3.52 $mi^2$. | 1967-03 | 9-19-03 | 15.47 | 434 | 6-2-79 | 18.74 | * |
| Falling Creek near Midlothian, VA (02037800) | Lat 37°27'16"long 77°35'19", NAD83, Chesterfield County, Hydrologic Unit 02080206, on downstream of bridge on State Highway 653,2.2 mi upstream from Horners Run and 4 mi southeast of Midlothian. Elevation of gage is 170 ft NGVD of 1929, from topographic map. Drainage area is 18.1$mi^2$. | 1951-93,<br>2002-03 | 9-18-03 | 27.49 | 1,800 | 9-30-79 | d11.71 | 5,170 |
| Falling Creek near Chesterfield, VA (02038000) | Lat 37°26'38"long 77°31'20", NAD83, 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. Datum of gage is 126.39 ft NGVD of 1929. Drainage area is 32.8 $mi^2$. | 1955-94‡,<br>1996-03 | 9-18-03 | 13.85 | 3,860 | 10-1-79 | 15.32 | 5,930 |

* Discharge not determined.
‡ Operated as a continuous-record gaging station.
d At different datum.
e Affected by debris jam at upstream end of culvert.

Maximum discharge at crest-stage partial-record stations during water year 2003--Continued

| Station name and number | Location and drainage area | Period of record (water years) | Water year 2003 maximum | | | Period of record maximum | | |
|---|---|---|---|---|---|---|---|---|
| | | | Date | Gage height (ft) | Discharge ($ft^3/s$) | Date | Gage height (ft) | Discharge ($ft^3/s$) |
| | | | JAMES RIVER BASIN--Continued | | | | | |
| Holiday Creek near Toga, VA (02038840) | Lat 37°25'59", long 78°41'11", NAD83, Buckingham County Hydrologic Unit 02080207, on left bank 40 ft downstream from State Forest Road 2307 (old Richmond Road), 1.8 mi upstream from confluence of North Holiday Creek, and 5.2 mi south-southwest of Toga. Datum of gage is 614.40 ft NGVD of 1929. Drainage area is 1.68 $mi^2$. | 1971-03 | 3-20-03 | 3.59 | 299 | 6-21-72 | 6.72 | 2,820 |
| Flat Creek near Amelia, VA (02040500) | Lat 37°23'28", long 78°03'44", NAD83, 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 $mi^2$. | 1947, 1954-70, 1972-03 | 9-18-03 | 12.73 | 4,940 | 4-16-87 | f12.38 | f5,260 |
| Bailey Branch tributary at Spring Grove, VA (02042250) | Lat 37°10'30", long 76°59'12", NAD83, Surry County, Hydrologic Unit 02080206, on right upstream wingwall of culvert on State Highway 10, 1.0 mi northwest of Spring Grove. Datum of gage is 61.39 ft NGVD of 1929. Drainage area is 0.71 $mi^2$. | 1967-03 | 9-18-03 | 5.35 | 168 | 9-16-99 | 8.12 | 474 |
| Jordans Branch at Richmond, VA (02042400) | Lat 37°35'11", long 77°29'54", NAD83, Henrico County, Hydrologic Unit 02080206, on left downstream wall of bridge on U.S. Highway 250 (Broad Street), at Richmond, and 2.0 mi upstream from mouth. Drainage area is 2.53 $mi^2$. | 1965-03 | 9-18-03 | 12.12 | 2,170 | 6-22-91 | 13.10 | 2,760 |
| | | | CHOWAN RIVER BASIN | | | | | |
| Falls Creek tributary near Victoria, VA (02044200) | Lat 37°02'05", long 78°10'25", NAD83, Lunenburg County, Hydrologic Unit 03010201, at upstream end of culvert on State Highway 49, 3.6 mi northeast of Victoria. Datum of gage is 409.21 ft above sea level. Drainage area is 0.34 $mi^2$. | 1962-03 | 9-18-03 | 6.54 | 184 | 6-21-72 | 9.15 | 343 |
| Blackwater River tributary near Holland, VA (02050050) | Lat 36°38'45", long 76°51'28", NAD83, Suffolk City, Hydrologic Unit 03010202, on left upstream 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 NGVD of 1929. Drainage area is 2.76 $mi^2$. | 1967-03 | 9-19-03 | 8.39 | 497 | 9-16-99 | 10.78 | 784 |

f From rating then in use.

Maximum discharge at crest-stage partial-record stations during water year 2003--Continued

| Station name and number | Location and drainage area | Period of record (water years) | Water year 2003 maximum | | | Period of record maximum | | |
|---|---|---|---|---|---|---|---|---|
| | | | Date | Gage height (ft) | Discharge ($ft^3/s$) | Date | Gage height (ft) | Discharge ($ft^3/s$) |
| **ROANOKE RIVER BASIN** | | | | | | | | |
| Powells Creek near Turbeville, VA (02075350) | Lat 36°34'51", long 79°11'19", NAD83, Halifax County, Hydrologic Unit 03010104, at culvert on U.S. Highway 58, 0.8 mi upstream from mouth, 1.1 mi east of Halifax-Pittsylvania County line, and 8.8 mi southwest of Turbeville. Datum of gage is 386.76 ft NGVD of 1929. Drainage area is 0.28 $mi^2$. | 1958-69a, 1970-03 | 9-23-03 | 6.94 | 178 | 7-11-65 | 7.86 | 384 |
| Bearskin Creek near Chatham, VA (02076200) | Lat 36°50'31", long 79°29'04", NAD83, Pittsylvania County, Hydrologic Unit 03010105, on left upstream wingwall of culvert on State Highway 57, 4.5 mi west of Chatham, and 6 mi upstream from mouth. Elevation of gage is 630 ft above sea level, from topographic map. Drainage area is 4.06 $mi^2$. | 1967-03 | 3-20-03 | 6.41 | 525 | 6-29-95 | 19.90 | 2,850 |
| Blacks Creek near Mt. Airy, VA (02076700) | Lat 36°56'41", long 79°09'55", NAD83, Pittsylvania County, Hydroogic 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. Elevation of gage is 420 ft NGVD of 1929, from topographic map. Drainage area is 3.44 $mi^2$. | 1966-03 | 3-20-03 | 6.36 | 364 | 9-8-87 | g19.5 | 2,200 |
| **KANAWHA RIVER BASIN** | | | | | | | | |
| Mira Fork tributary near Dugspur, VA (03167300) | Lat 36°50'16", long 80°34'43", NAD83, Carroll County, Hydrologic Unit 05050001, on left upstream wingwall of culvert on U.S. Highway 221, 1.3 mi upstream from mouth, and 2.2 mi northeast of Dugspur. Datum of gage is 2,602.96 ft NGVD of 1929. Drainage area is 0.62 $mi^2$. | 1967-03 | 8-7-03 | 4.21 | 93.4 | 4-21-92 | 7.20 | 257 |
| Thorne Springs Branch near Dublin, VA (03168750) | Lat 37°05'30", long 80°44'33", NAD83, 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 upstream from mouth. Elevation of gage is 1,975 ft above sea level, from topographic map. Drainage area is 4.77 $mi^2$. | 1957-69a, 1970-03 | 2-22-03 | 2.63 | 235 | 5-28-73 | 8.01 | 2,200 |

a Records provided by U.S. Department of Agriculture, Soil Conservation Service.
g From high-water marks.

Maximum discharge at crest-stage partial-record stations during water year 2003--Continued

| Station name and number | Location and drainage area | Period of record (water years) | Water year 2003 maximum | | | Period of record maximum | | |
|---|---|---|---|---|---|---|---|---|
| | | | Date | Gage height (ft) | Discharge ($ft^3/s$) | Date | Gage height (ft) | Discharge ($ft^3/s$) |
| **BIG SANDY RIVER BASIN** | | | | | | | | |
| Russell Fork at Council, VA (03208040) | Lat 37°04'41", long 82°03'55", NAD83, 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 $mi^2$. | 1981-83‡, 1984-03 | 2-16-03 | 4.49 | 656 | 7-29-01 | 8.17 | 1,870 |
| North Fork Pound River at Pound, VA (03208700) | Lat 37°07'32", long 82°37'36", NAD83, 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 $mi^2$. Prior to Oct. 1, 1965, at datum 44.88 ft higher. | 1963-87‡, 1988-03 | 2-16-03 | 51.61 | 360 | 3-12-63 | 61.58 | 4,480 |
| Pound River above Indian Creek, at Pound, VA (03208800) | Lat 37°07'26", long 82°36'29", NAD83, Wise County, Hydrologic Unit 05070202, on left bank at Pound, 1,600 ft downstream from confluence of North and South Forks, 0.5 mi upstream from bridge on U.S. Highway 23, and 0.7 mi upstream from Indian Creek. Datum of gage is 1,535.64 ft NGVD of 1929. Drainage area is 36.7 $mi^2$. | 1966-78‡, 1979-03 | 2-16-03 | 13.30 | 1,940 | 5-18-75 | 19.44 | 3,460 |
| Pound River near Georges Fork, VA (03208900) | Lat 37°09'51", long 82°31'30", NAD83, Dickenson County, Hydrologic Unit 05070202, on right bank 50 ft upstream from bridge on State Highway 624, 150 ft upstream from Camp Creek, and 2.6 mi northwest of Georges Fork. Datum of gage is 1,470.39 ft NGVD of 1929. Drainage area is 82.5 $mi^2$. | 1964-82‡, 1983-03 | 2-16-03 | 9.39 | 3,400 | 5-18-75 | 14.91 | 10,900 |
| Russell Fork at Bartlick, VA (03209200) | Lat 37°14'45", long 82°19'25", NAD83, Dickenson County, Hydrologic Unit 05070202, on left bank at Bartlick just upstream from bridge on State Highway 611, 0.2 mi downstream from Pound River, and 1.1 mi upstream from Fall Branch. Datum of gage is 1,165.00 ft NGVD of 1929. Drainage area is 526 $mi^2$. | 1963-82‡, 1983-03 | 2-16-03 | 19.74 | 20,700 | 5-2-02 | 27.55 | 50,000 |

‡ Operated as a continuous-record gaging station.

Maximum discharge at crest-stage partial-record stations during water year 2003--Continued

| Station name and number | Location and drainage area | Period of record (water years) | Water year 2003 maximum | | | Period of record maximum | | |
|---|---|---|---|---|---|---|---|---|
| | | | Date | Gage height (ft) | Discharge ($ft^3/s$) | Date | Gage height (ft) | Discharge ($ft^3/s$) |
| **BIG SANDY RIVER BASIN--Continued** | | | | | | | | |
| Knox Creek at Kelsa, VA (03213590) | Lat 37°27'02", long 82°03'33", NAD83, 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 $mi^2$. | 1980-81‡, 1982-03 | 2-16-03 | 13.00 | 6,210 | 5-2-02 | 23.14 | 16,100 |
| **TENNESSEE RIVER BASIN** | | | | | | | | |
| Middle Fork Holston River at Groseclose, VA (03473500) | Lat 36°53'19", long 81°20'50", NAD83, Smyth County, Hydrologic Unit 06010102, on left bank 10 ft downstream from culvert on State Highway 679 at Groseclose, 0.2 mi upstream from Rocky Spring Branch, 10 mi northeast of Marion, and at mile 54.7. Datum of gage is 2,442.86 ft NGVD of 1929. Drainage area is 7.39$mi^2$. | 1948-57‡, 1958-87, 1988-89‡, 1990-95, 2001-03 | 2-22-03 | 5.29 | 376 | 7-6-53 | 7.42 | 813 |
| Cedar Creek near Meadowview, VA (03475600) | Lat 36°44'50", long 81°51'19", NAD83, Washington County, Hydrologic Unit 06010102, on left downstream wingwall of culvert on U.S. Highway 11, 1.2 mi south of Meadowview, and 2.5 mi upstream from mouth. Datum of gage is 2,034.66 ft NGVD of 1929. Drainage area is 3.38 $mi^2$. | 1967-03 | 8-4-03 | 11.80 | * | 8-4-03 | 11.80 | * |
| Lick Creek near Chatham Hill, VA (03487800) | Lat 36°57'44", long 81°28'21", NAD83, 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 NGVD of 1929. Drainage area is 25.5 $mi^2$. | 1966-68‡, 1969-03 | 2-22-03 | 6.60 | 1,760 | 11-7-77 | 8.09 | 2,660 |
| Brumley Creek at Brumley Gap, VA (03488450) | Lat 36°47'30", long 82°01'09", NAD83, Washington County, Hydrologic 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 $mi^2$. | 1979-81‡, 1982-03 | 2-22-03 | 5.51 | 932 | 3-18-02 | 6.72 | 1,570 |

* Discharge not determined.
‡ Operated as a continuous-record gaging station.

Maximum discharge at crest-stage partial-record stations during water year 2003--Continued

| Station name and number | Location and drainage area | Period of record (water years) | Water year 2003 maximum | | | Period of record maximum | | |
|---|---|---|---|---|---|---|---|---|
| | | | Date | Gage height (ft) | Discharge ($ft^3/s$) | Date | Gage height (ft) | Discharge ($ft^3/s$) |
| **TENNESSEE RIVER BASIN--Continued** | | | | | | | | |
| Cove Creek near Shelleys, VA (03489800) | Lat 36°39'13", long 82°21'16", NAD83, Scott County, Hydrologic Unit 06010101, on right downstream 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 $mi^2$. | 1951-03 | 4-10-03 | 6.17 | 991 | 3-12-63 | 8.40 | 2,500 |
| North Fork Holston River near Gate City, VA (03490000) | Lat 36°36'31", long 82°34'05", NAD83, 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 NGVD of 1929. Drainage area is 672 $mi^2$. | 1932-81‡, 1982-03h | 2-16-03 | 13.47 | 20,800 | 4-5-77<br>b1862 | 19.79<br>h22.5 | 41,000<br>h54,000 |
| Clinch River at Richlands, VA (03521500) | Lat 37°05'10", long 81°46'51", NAD83, 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 NGVD of 1929. Drainage area | 1946-89‡, 1990-03 | 2-16-03 | 11.62 | 4,560 | b6-22-1901 | h21.3 | h11,500 |
| Big Cedar Creek near Lebanon, VA (03523000) | Lat 36°54'29", long 82°02'19", NAD83, (formerly published as Cedar Creek near lebanon) Russell County,Hydrologic Unit 06010205, on right bank 200 ft upstream from bridge on U.S Highway 19 (business), 0.2 mi upstream from Roaring Spring Creek, 1.3 mi downstream from Little Cedar Creek, and 2.3 mi east of Lebanon. Datum of gage is 1,895.76 ft NGVD of 1929. Drainage area is 51.5$mi^2$. | 1953-59‡, 1960-77, 1991-94, 2001-03 | 2-16-03 | 4.26 | 2,130 | 3-18-02 | 5.83 | c6,570 |
| Guest River at Coeburn, VA (03524500) | Lat 36°55'45", long 82°27'23", NAD83, 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 NGVD of 1929. Drainage area is 87.3 $mi^2$. | 1950-59‡, 1960-78, 1979-81‡, 1982-03 | 2-16-03 | 13.93 | 6,340 | 4-5-77 | 20.95 | 18,000 |

‡ Operated as a continuous-record gaging station.
b Maximum known historical peak outside period of record.
c Approximate.
h Records provided by Tennessee Valley Authority.

Maximum discharge at crest-stage partial-record stations during water year 2003--Continued

| Station name and number | Location and drainage area | Period of record (water years) | Water year 2003 maximum | | | Period of record maximum | | |
|---|---|---|---|---|---|---|---|---|
| | | | Date | Gage height (ft) | Discharge ($ft^3/s$) | Date | Gage height (ft) | Discharge ($ft^3/s$) |
| **TENNESSEE RIVER BASIN--Continued** | | | | | | | | |
| Stony Creek at Ka, VA (03524900) | Lat 36°48'57", long 82°37'02", NAD83, Scott County, Hydrologic Unit 06010205, at Ka, on left bank 300 ft upstream from bridge on State Highway 619, 600 ft downstream from Straight Fork, and 4.2 mi upstream from mouth. Elevation of gage is 1,510 ft NGVD of 1929, from topographic map. Drainage area is 30.9 $mi^2$. | 1981‡, 1982-03 | 2-16-03 | 7.51 | 2,800 | 7-29-01 | 13.11 | 11,300 |
| Copper Creek near Gate City, VA (03526000) | Lat 36°40'26", long 82°33'57", NAD83, 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 $mi^2$. | 1948-72‡, 1973-95, 1996-98‡, 1999-03 | 2-16-03 | 10.01 | 3,320 | 4-5-77 | 13.57 | 7,660 |
| North Fork Powell River at Pennington Gap VA (03530500) | Lat 36°46'26", long 83°01'59", NAD83, Lee County, Hydrologic Unit 06010206, near right bank on downstream side of abandoned highway bridge 75 fteast of U.S. Highway 421, 0.8 mi north of Pennington Gap, 1.3 mi downstream from Straight Creek, and at mile 4.7. Datum of gage is 1,363.02 ft above sea level. Drainage area is 71.4 $mi^2$. | 1945-51‡ 1952-77, 1979-81‡, 1982-93, 1994-95‡, 2001-03 | 2-16-03 | 12.17 | 9,380 | 4-5-77 | 16.14 | 17,000 |

‡ Operated as a continuous-record gaging station.

FOOTNOTES FOR CREST-STAGE PARTIAL-RECORD STATIONS: 2003 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 Maximum known historical peak outside period of record.
c Approximate.
d At different datum.
e Affected by debris jam at upstream end of culvert
f From rating then in use.
g From high-water marks.
h Records provided by Tennessee Valley Authority.

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 2003

| Stream | Tributary to | Location | Drainage area ($mi^2$) | Measured previously (water years) | Measurements | |
|---|---|---|---|---|---|---|
| | | | | | Date | Discharge ($ft^3/s$) |
| **POTOMAC RIVER BASIN** | | | | | | |
| 01614805 Opequon Creek | Potomac River | Lat 39°09'26", long 78°14'48", NAD83, Frederick County, at Route 622 at Opequon. | 2.47 | 1950<br>2001-02 | 10-2-02<br>11-6-02<br>12-18-02<br>3-25-03<br>6-4-03 | 0.34<br>.68<br>2.59<br>4.00<br>4.58 |
| 01614820 Opequon Creek | Potomac River | Lat 39°07'48", long 78°13'32", NAD83,Frederick County, at old Route 628 near Opequon. | 10.6 | 1952-54, 1963<br>2001-02 | 10-3-02<br>11-6-02<br>12-18-02<br>3-25-03<br>6-3-03 | 1.22<br>2.69<br>5.84<br>14.3<br>10.7 |
| 01615515 Old Town Spring | Town Run | Lat 39°11'16", long 78°10'35", NAD83, Frederick County, at Winchester at weir. | - | 2001-02 | 10-2-02<br>11-7-02<br>11-19-02<br>3-27-03<br>8-12-03 | 0.45<br>0.53<br>0.56<br>0.67<br>0.58 |
| 01615518 Town Run tributary from Shawnee Spring | Town Run | Lat 39°10'20", long 78°09'45", NAD83, Frederick County, 30 ft above confluence with Town Run, at Winchester. | - | 2001-02 | 10-2-02<br>11-7-02<br>12-19-02<br>3-27-03 | 1.03<br>1.22<br>1.40<br>1.45 |
| 01616075 Fay Spring | Redbud Run | Lat 39°12'18", long 78°07'50", NAD83, Frederick County, near Winchester at weir below springbox. | - | 2001-02 | 10-2-02<br>11-7-02<br>12-19-02<br>3-27-03<br>8-11-03 | 1.27<br>1.59<br>2.50<br>2.74<br>1.55 |
| 01616300 Opequon Creek[a] | Potomac River | Lat 39°15'53", long 78°01'58", NAD83, Clarke-Frederick Counties, at State Highway 667 ford, at Virginia-West Virginia line, 1.9 mi northeast of Brucetown, and 23.6 mi upstream from mouth. | 141 | 2002 | 1-22-03<br>4-22-03<br>6-10-03 | 91.9<br>226<br>241 |
| 01620826 Mossy Creek [b] | North River | Lat 38°20'29", long 79°05'01", NAD83, Augusta County, at bridge on State Highway 731, 0.2 mi southeast of Mt. Solon. | - | 1941, 1950-54, 2002 | 10-24-02<br>3-10-03<br>7-14-03 | .000<br>4.41<br>3.45 |
| 01620837 Big Spring [a] | Mossy Creek | Lat 38°20'29", long 79°05'07", NAD83, Augusta County, at bridge on State Highway 731, at Mt. Solon, and 0.2 mi upstream from mouth. | - | 2002 | 10-24-02<br>3-10-03<br>7-14-03 | 8.96<br>18.6<br>16.3 |
| 01620842 Mossy Creek [a] | North River | Lat 38°21'07", long 79°02'56", NAD83, Augusta County,at bridge on State Highway 613, 2.0 mi east of Mt. Solon. | - | 2002 | 10-24-02<br>3-10-03<br>7-14-03 | 8.96<br>18.6<br>16.3 |
| 01620850 Mossy Creek [a] | North River | Lat 38°23'13", long 79°00'51", NAD83, Rockingham County,at State Highway 727, 0.35 mi upstream from mouth, and 1.5 mi southeast of Spring Creek. | - | 2002 | 10-24-02<br>3-10-03<br>7-14-03 | 22.5<br>48.5<br>39.3 |
| 01621320 Long Glade Creek [a] | North River | Lat 38°17'43", long 78°02'43", NAD83, Augusta County, at culvert on State Highway 613, 2.4 mi southeast of Moscow. | - | 2002 | 11-22-02<br>3-10-03<br>4-23-03<br>7-14-03<br>9-8-03 | 2.01<br>8.37<br>4.14<br>4.62<br>.293 |

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 measurements made at special study and miscellaneous sites during water year 2003--Continued

| Stream | Tributary to | Location | Drainage area ($mi^2$) | Measured previously (water years) | Measurements | |
|---|---|---|---|---|---|---|
| | | | | | Date | Discharge ($ft^3/s$) |
| **POTOMAC RIVER BASIN--Continued** | | | | | | |
| 01621340 Long Glade Creek [a] | North River | Lat 38°22'38", long 78°58'58", NAD83, Rockingham County, at bridge on State Highway 42, 0.9 mi upstream from mouth, at Bridgewater. | - | 2002 | 11-22-02<br>3-10-03<br>4-23-03<br>7-14-03<br>9-8 03 | 8.13<br>28.3<br>16.6<br>15.4<br>3.39 |
| 01624155 Moffett Creek [a] | Middle River | Lat 38°15'43", long 79°06'04", NAD83, Augusta County, at bridge on State Highway 835, 0.15 mi upstream from Elk Run, and 2.4 mi south of Parnassus. | - | 2002 | 3-7-03<br>4-23-03<br>7-15-03<br>9-8-03 | 38.7<br>12.5<br>6.85<br>2.62 |
| 01624175 Elk Run [a] | Moffett Creek | Lat 38°15'45", long 79°06'21", NAD83, Augusta County, at bridge on State Highway 835, 0.2 mi upstream from mouth, and 2.3 mi south of Parnassus. | - | 2002 | 3-7-03<br>4-23-03<br>7-15-03<br>9-8-03 | 10.7<br>5.76<br>5.44<br>2.72 |
| 01624550 Lewis Creek [a] | Middle River | Lat 38°10'58", long 78°58'32", NAD83, Augusta County, at bridge on State Highway 612, 0.6 mi upstream from mouth, and 2.2 mi southeast of Verona. | - | 2002 | 10-1-02<br>3-7-03<br>4-16-03<br>7-15-03<br>9-8-03 | 5.78<br>36.1<br>33.6<br>38.2<br>17.5 |
| 01624960 Polecat Draft [a] | Middle River | Lat 38°13'42", long 78°53'01", NAD83, Augusta County, at bridge on State Highway 608, 0.1 mi upstream from mouth, and 1.2 mi northeast of Piedmont. | - | 2002 | 11-22-02<br>3-7-03<br>4-16-03<br>7-15-03<br>9-8-03 | .154<br>4.12<br>4.09<br>3.16<br>1.41 |
| 01628585 Cub Run [a] | South Fork Shenandoah River | Lat 38°23'17", long 78°48'17", NAD83, Rockingham County, at bridge on U.S. Highway 33, at Penn Laird. | - | 2002 | 10-1-02<br>10-24-02<br>11-22-02<br>2-3-03<br>4-16-03<br>7-34-03 | .759<br>1.24<br>9.17<br>3.75<br>24.0<br>6.50 |
| 01628630 Cub Run [a] | South Fork Shenandoah River | Lat 38°20'21, long 78°43'25", NAD83, Rockingham County, at bridge on State Highway 650, at mouth, at Rocky Bar, and 2.0 mi southwest of Island Ford. | 26.8 | 2002 | 11-22-02<br>2-3-03<br>4-16-03<br>7-31-03 | 21.2<br>4.03<br>39.2<br>7.93 |
| 01629070 Quail Run [a] | Boone Run | Lat 38°24'27", long 78°40'42", NAD83, Rockingham County, at bridge on State Highway 602, 2.9 mi west of Elkton, and 3.0 mi upstream from mouth. | - | 1975, 2002 | 4-16-03 | 7.00 |
| 01629935 Little Hawksbill Creek [a] | Hawksbill Creek | Lat 38°34'09", long 78°28'12", NAD83, Page County, at bridge on State Highway 626, 800 ft upstream from Beaver Run, and 1.6 mi east of Stanley. | - | 2002 | 10-22-02<br>1-21-03<br>4-15-03 | .776<br>3.74<br>10.1 |
| 01629945 Chub Run | Hawksbill Creek | Lat 38°34'31", long 78°27'31", NAD83, Page County, at culvert on State Highway 689, 2.2 mi east of Stanley, and 3.1 mi upstream from mouth. | 3.16 | 1994, 1998-99 | 9-19-03<br>9-23-03 | <br>71.5 |
| 0162994750 Hawksbill Creek [a] | South Fork Shenandoah River | Lat 38°37'40", long 78°28'06", NAD83, Page County, at bridge on State Highway 629, 2.6 mi south of Luray. | - | 2002 | 10-22-02<br>1-21-03<br>4-15-03 | .749<br>10.0<br>60.6 |

a Provided by the Virginia Department of Environmental Quality - Water Division.

Discharge measurements made at special study and miscellaneous sites during water year 2003--Continued

| Stream | Tributary to | Location | Drainage area ($mi^2$) | Measured previously (water years) | Measurements | |
|---|---|---|---|---|---|---|
| | | | | | Date | Discharge ($ft^3/s$) |
| **POTOMAC RIVER BASIN--Continued** | | | | | | |
| 01629980 East Hawksbill Creek [a] | Hawksbill Creek | Lat 38°38'55", long 78°27'13", NAD83, Page County, 0.3 mi downstream from State Highway 642, 0.8 mi upstream from mouth, and 1.2 mi southeast of Luray. | - | 2002 | 10-22-02<br>1-21-03<br>4-15-03 | 8.17<br>16.3<br>50.3 |
| 01630540 Hawksbill Creek [a] | South Fork Shenandoah River | Lat 38°42'29", long 78°27'23", NAD83, Page County, at bridge on State Highway 648, 0.96 mi upstream of mouth, and 3.0 mi north of Luray. | 68.9 | 1963, 1969, 1978-79, 1982, 2002 | 10-22-02<br>1-21-03<br>4-15-03 | 18.2<br>43.0<br>181 |
| 01630544 Pass Run [a] | Hawksbill Creek | Lat 38°42'30", long 78°27'22", NAD83, Page County, near bridge on State Highway 648, at mouth, at Springfield, and 3.1 mi north of Luray. | | 1963, 2002 | 10-22-02<br>1-21-03<br>4-15-03 | 7.88<br>14.5<br>55.0 |
| 01632825 Fridley Run [a] | Mountain Run | Lat 38°29'37", long 78°42'09", NAD83, Rockingham County, at Fridley Gapin George Washington National Forest, 0.02 mi upstream from mouth, and 4.8 mi southeast of Lacey Spring. | | - | 6-30-03<br>7-24-03<br>8-20-03<br>9-30-03 | 2.76<br>1.45<br>1.38<br>5.11 |
| 01632833 Mountain Run [a] | Smith Creek | Lat 38°29'58", long 78°44'22", NAD83, Rockingham County, at bridge on State Highway 620, 0.93 mi upstream from mouth, and 3.3 mi southeast of Lacey Spring. | | - | 6-30-03<br>7-24-03<br>8-20-03<br>9-30-03 | 5.65<br>3.61<br>2.48<br>9.26 |
| 016633730 Toms Brook [a] | North Fork Shenandoah River | Lat 38°56'42", long 78°26'31", NAD83, Shenandoah County, at bridge on U.S. Highway 11, at Toms Brook. | 9.35 | 1952-54, 1969, 1994-99 | 4-17-03 | |
| 01633731 Toms Brook [a] | North Fork Shenandoah River | Lat 38°56'36", long 78°26'12", NAD83, Shenandoah County, at bridge on State Highway 653, 2.22 mi upstream from mouth, and at Toms Brook. | | - | 4-17-03<br>5-29-03<br>6-30-03<br>7-24-03<br>8-20-03<br>9-30-03 | 15.9<br>9.06<br>7.78<br>4.29<br>3.37<br>8.62 |
| 01633735 Toms Brook [a] | North Fork Shenandoah River | Lat 38°55'43", long 78°25'36", NAD83, Shenandoah County, 100 ft upstream from Jordan Run, 0.7 mi from mouth, and 1.4 mi southeast of Toms Brook. | | - | 4-17-03<br>5-29-03<br>6-30-03<br>7-24-03<br>8-20-03<br>9-30-03 | 20.6<br>12.4<br>9.68<br>5.81<br>4.95<br>10.6 |
| 01633744 Jordan Run [a] | Toms Brook | Lat 38°55'43", long 78°25'52", NAD83, Shenandoah County, at bridge on State Highway 645, 0.29 mi upstream from mouth, and 1.3 mi south of Toms Brook. | | - | 4-17-03<br>5-29-03<br>6-30-06<br>7-24-03<br>8-20-03<br>9-30-03 | 5.06<br>2.85<br>3.03<br>1.76<br>1.13<br>2.36 |
| 01633745 Toms Brook [a] | North Fork Shenandoah River | Lat 38°55'35", long 78°25'29", NAD83, Shenandoah County, at bridge on State Highway 747, 0.2 mi downstream from Jordan Run, 0.54 mi upstream from mouth, and 1.6 mi southeast of Toms Brook. | 16.2 | 1969 | 4-17-03<br>5-29-03<br>6-30-03<br>7-24-03<br>8-20-03<br>9-30-03 | 29.8<br>18.8<br>13.4<br>8.40<br>6.20<br>13.9 |
| 01635005 Fawcett Run | Cedar Creek | Lat 39°04'58", long 78°19'21", NAD83, Frederick County, below Marlboro Spring at Marlboro. | 7.24 | 2001-02 | 10- 3-02<br>11- 6-02<br>12-18-02<br>3-26-03<br>6- 3-03 | 1.51<br>2.70<br>6.52<br>14.8<br>7.97 |

a Provided by the Virginia Department of Environmental Quality - Water Division.

Discharge measurements made at special study and miscellaneous sites during water year 2003--Continued

| Stream | Tributary to | Location | Drainage area ($mi^2$) | Measured previously (water years) | Measurements | |
|---|---|---|---|---|---|---|
| | | | | | Date | Discharge ($ft^3/s$) |
| **POTOMAC RIVER BASIN--Continued** | | | | | | |
| 01635008 Fawcett Run | Cedar Creek | Lat 39°04'44", long 78°19'36", NAD83, Frederick County, above mouth at Marlboro. | 7.38 | 2001-02 | 10- 3-02<br>11- 6-02<br>12-18-02<br>3-26-03<br>6- 3-03 | 1.54<br>2.64<br>6.94<br>14.1<br>8.47 |
| 01635070 Vaucluse Spring | Meadow Brook | Lat 39°03'45", long 78°15'37", NAD83, Frederick County, near Middletown. | - | 2001-02 | 10- 4-02<br>11- 6-02<br>12-18-02<br>3-26-03<br>6- 5-03<br>8- 12-03 | 1.39<br>2.27<br>3.17<br>5.52<br>4.96<br>4.67 |
| 01643715 Cromwells Run [a] | Goose Creek | Lat 38°58'20", long 77°47'26", NAD83, Fauquier County, at culvert on U.S. Highway 50, 0.4 mi upstream from Rocky Creek, and 3.0 mi west of Middleburg. | - | 2002 | 11-20-02<br>4-22-03<br>6-10-03 | 23.1<br>35.5<br>38.3 |
| 01643720 Rocky Creek [a] | Cromwells Run | Lat 38°58'25", long 77°47'42", NAD83, Fauquier County, at culvert on U.S. Highway 50, 0.4 mi upstream from mouth, and 3.0 mi west of Middleburg. | - | 2002 | 11-20-02<br>4-22-03<br>6-10-03 | 2.72<br>2.33<br>3.15 |
| 01643988 Little River [a] | Goose Creek | Lat 39°00'25", long 77°36'52", NAD83, Loudoun County, at bridge on U.S. Highway 15, 1.55 mi upstream from mouth, and 1.6 mi south of Oatlands. | 47.7 | 1942, 1963, 1968-69, 1979-80, 2002 | 11-20-02 | 68.9 |
| 01644110 Sycolin Creek [a] | Goose Creek | Lat 39°04'20", long 77°31'08", NAD83, Loudoun County, at proposed Goose Creek Industrial Park WWTP discharge, 0.2 mi upstream from mouth, and 3.8 mi southeast of Leesburg. | 17.3 | 1993-97, 1999, 2002 | 11-20-02 | 19.0 |
| 01655925 Licking Run [a] | Cedar Run | Lat 38°37'15", long 77°39'29", NAD83, Fauquier County, at bridge on State Highway 616, 1.0 mi south of Calverton, and 1.4 mi upstream from mouth. | - | 2002 | 10-3-02<br>12-3-02<br>2-13-03<br>4-2-03<br>6-12-03<br>7-7-03 | .040<br>3.49<br>8.10<br>36.2<br>47.5<br>8.03 |
| **RAPPAHANNOCK RIVER BASIN** | | | | | | |
| 01661995 Carter Run [a] | Rappahannock River | Lat 38°41'57", long 77°54'25", NAD83, Fauquier County, at bridge on State Highway 688, 0.25 mi upstream from mouth, and 4.2 mi north of Jeffersonton. | - | 1951-54, 2002 | 10-3-02<br>12-3-02<br>2-13-03<br>4-2-03<br>6-12-03<br>7-7-03 | .040<br>3.49<br>8.10<br>36.2<br>47.5<br>8.03 |
| 01662065 Great Run [a] | Rappahannock River | Lat 38°38'34", long 77°51'34", NAD83, Fauquier County, at bridge on State Highway 687, 1.7 mi upstream from mouth, and 1.7 mi south of Turnbull. | - | 1963, 2002 | 12-4-02<br>4-2-03<br>6-12-03<br>7-7-03 | 8.58<br>40.9<br>32.5<br>15.6 |
| 01663750 Muddy Run [a] | Hazel River | Lat 38°32'34", long 78°02'34", NAD83, Culpeper County, at bridge on State Highway 729, 0.75 mi upstream from Apperson Creek, and 2.4 mi northeast of Norman. | - | 2002 | 12-4-02<br>4-2-03<br>7-7-03 | 1.79<br>9.12<br>11.5 |

a Provided by the Virginia Department of Environmental Quality - Water Division.

Discharge measurements made at special study and miscellaneous sites during water year 2003--Continued

| Stream | Tributary to | Location | Drainage area ($mi^2$) | Measured previously (water years) | Measurements | |
|---|---|---|---|---|---|---|
| | | | | | Date | Discharge ($ft^3/s$) |
| **RAPPAHANNOCK RIVER BASIN--Continued** | | | | | | |
| 01663830 Muddy Run [a] | Hazel River | Lat 38°33'43", long 77°55'29", NAD83, Culpeper County, at bridge on State Highway 625, 0.9 mi upstream from mouth, and 3.1 mi southeast of Rixeyville. | - | 2002 | 12-4-02<br>4-2-03<br>7-7-03 | 6.73<br>41.2<br>43.6 |
| 01665220 Deep Run [a] | Rappahannock River | Lat 38°27'06", long 77°37'42", NAD83, Fauquier-Stafford County, at bridge on State Highway 615, 0.5 mi upstream from Alcotti Run, and 1.5 mi east of Goldvein. | 15.4 | 1963, 1981-84, 2002 | 10-3-02<br>12-3-02<br>2-13-03<br>4-2-03<br>6-12-03 | .013<br>2.17<br>6.25<br>23.6<br>14.8 |
| 01665228 Deep Run [a] | Rappahannock River | Lat 38°25'49", long 77°37'46", NAD83, Fauquier-Stafford County, at bridge on U.S. Highway 17, 1.7 mi upstream from mouth, and 1.9 mi southeast of Goldvein. | - | 2002 | 10-3-02<br>12-3-02<br>2-13-03<br>4-2 03<br>6-12-03 | .010<br>3.19<br>14.6<br>44.5<br>23.5 |
| 0166828230 Occupacia Creek [a] | Rappahannock River | Lat 38°02'39", long 77°00'20", NAD83, Essex County, at bridge on U.S. Highway 17, at Occupacia, 1.0 mi south of Chance, and 10.47 mi upstream of mouth | | - | 8-6-03<br>9-10-03 | 23.2<br>9.77 |
| 01668700 Mount Landing Creek [a] | Rappahannock River | Lat 37°57'44", long 76°56'10", NAD83, Essex County, at bridge on State Highway 716, 1.7 mi north of Mount Landing, and 4.5 mi upstream from mouth. | - | 2002 | 12-4-02<br>2-6-03<br>8-6-03<br>9-10-03 | 3.82<br>13.7<br>22.9<br>5.24 |
| **YORK RIVER BASIN** | | | | | | |
| 01673010 Mechumps Creek [a] | Pamunkey River | Lat 37°45'31", long 77°21'52", NAD83, Hanover County, at culvert on U.S. Highway 301, 0.3 mi south of Hanover. | - | 1976, 1983-84, 2002 | 10-16-02<br>10-23-02<br>1-13-03<br>3-12-03<br>4-24-03<br>5-19-03 | 39.1<br>1.28<br>8.54<br>16.5<br>19.7<br>40.7 |
| 01673600 Mata-dequin Creek [a] | Pamunkey River | Lat 37°37'03", long 77°08'16", NAD83, Hanover County, at bridge on State Highway 606, 1.3 mi upstream from mouth, and 3.2 mi northwest of Tunstall. | 29.1 | 1980-83, 1991, 2002 | 10-16-02<br>10-23-02<br>11-26-02 | 19.6<br>8.01<br>16.0 |
| 01674160 Polecat Creek [a] | Mattaponi River | Lat 37°58'09", long 77°32'19", NAD83, Caroline County, 150 ft downstream from culvert on State Highway 601, 0.7 mi northeast of Cedar Fork, and 2.1 mi west of Golansville. | 1.15 | 1994-02 | 10-1-02<br>12-10-02<br>2-12-03<br>4-9-03<br>6-10-03<br>8-12-03 | .000<br>.212<br>1.20<br>15.5<br>1.39<br>.215 |
| 01674172 Polecat Creek [a] | Mattaponi River | Lat 37°58'13", long 77°29'12", NAD83, Caroline County, 150 ft upstream from bridge on State Highway 652, 0.5 mi upstream fromStevens Mill Run, and 1.1 mi southeast of Golansville. | 10.8 | 1994-02 | 10-1-02<br>12-10-02<br>2-12-03<br>4-9-03<br>6-10-03<br>8-12-03 | .000<br>4.2<br>9.79<br>174<br>11.6<br>3.14 |
| 01674174 Stevens Mill Run [a] | Polecat Creek | Lat 37°59'20", long 77°29'49", NAD83, 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 | 1994-02 | 10-1-02<br>12-10-02<br>2-12-03<br>4-9-03<br>6-10-03<br>8-12-03 | .330<br>2.49<br>6.02<br>73.8<br>18.3<br>3.90 |

a Provided by the Virginia Department of Environmental Quality - Water Division.

Discharge measurements made at special study and miscellaneous sites during water year 2003--Continued

| Stream | Tributary to | Location | Drainage area ($mi^2$) | Measured previously (water years) | Measurements | |
|---|---|---|---|---|---|---|
| | | | | | Date | Discharge ($ft^3/s$) |
| **YORK RIVER BASIN--Continued** | | | | | | |
| 01674180 Polecat Creek [a] | Mattaponi River | Lat 37°57'20", long 77°22'07", NAD83, 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 | 1994-02 | 10-1-02<br>12-10-02<br>2-12-03<br>4-9-03<br>6-10-03<br>8-12-03 | .000<br>18.6<br>31.3<br>235<br>106<br>34.3 |
| **JAMES RIVER BASIN** | | | | | | |
| 02019480 Looney Creek [a] | James River | Lat 37°30'58", long 79°42'33", NAD83, Botetourt County, at bridge on State Highway 625, 500 ft upstream from Long Run, 0.4 mi upstream from mouth, and 1.8 mi west of Buchanan. | - | 2002 | 2-11-03<br>3-4-03<br>4-21-03<br>6-27-03<br>7-28-03 | 19.4<br>116<br>76.6<br>93.1<br>47.0 |
| 02019485 Long Run [a] | Looney Creek | Lat 37°31'02", long 79°42'34", NAD83,Botetourt County, at bridge on State Highway 625, 400 ft upstream from mouth, and 1.8 mi west of Buchanan. | - | 2002 | 3-4-03 | 3.41 |
| 02024760 Reed Creek [a] | James River | Lat 37°30'10", long 79°24'06", NAD83, at bridge on State Highway 637, 0.3 mi upstream from Meadow Creek, 3.0 mi southwest of Big Island, and 4.9 mi upstream from mouth. | 7.46 | 1981-84, 2002 | 1-15-03<br>3-4-03<br>4-21-03<br>6-27-03<br>7-28-03 | 8.13<br>20.1<br>16.4<br>15.6<br>6.07 |
| 02024765 Meadow Creek [a] | Reed Creek | Lat 37°30'13", long 79°24'09", NAD83, Bedford County, at bridge on State Highway 637, 0.3 mi upstream from mouth, and 3.0 mi southwest of Big Island. | - | 2002 | 1-15-03<br>3-4-03<br>4-21-03<br>6-27-03<br>7-28-03 | 6.29<br>14.2<br>13.1<br>14.6<br>5.66 |
| 0203668775 Tuckahoe Creek [a] | James River | Lat 37°34'09", long 77°38'10", NAD83, Goochland-Henrico County line, 0.2 mi upstream from mouth, and 2.2 mi south of Tuckahoe Village. | - | 2002 | 10-16-02<br>10-23-02<br>11-26-02<br>1-13-03<br>3-12-03<br>4-24-03 | 119<br>15.6<br>28.6<br>28.0<br>49.4<br>35.6 |
| 02037800 Falling Creek | James River | Lat 37°27'16", long 77°35'19", NAD83, Chesterfield County, at bridge on State Highway 653, upstream from Horners Run, and 4 mi southeast of Midlothian. | 18.1 | 1953, 1973, 1975 | 9-19-03 | 904 |
| 02038731 Fourmile Creek [a] | James River | Lat 37°25'58", long 77°19'32", NAD83, Henrico County, at bridge on State Highway 5, 0.9 mi downstream from Deerlick Branch, 3.6 upstream from mouth, and 4.4 mi southeast of Richmond Heights. | | - | 10-23-02<br>11-26-02<br>4-24-03<br>5-19-03<br>6-17-03<br>8-21-03 | 1.42<br>4.27<br>5.20<br>13.2<br>4.28<br>3.16 |
| 0203873175 Fourmile Creek [a] | James River | Lat 37°25'21", long 77°18'31", NAD83, Henrico County, at bridge on Kingsland Road, 200 ft downstream from Griggs Pond, and 5.0 mi southeast of Richmond Heights. | - | 2002 | 10-23-02<br>11-26-02<br>4-24-03<br>5-19-03<br>6-17-03<br>8-21-03 | 2.65<br>6.21<br>7.07<br>19.1<br>4.96<br>3.42 |
| 02038880 Vaughans Creek [b] | Appomattox River | Lat 37°21'09", long 78°35'56", NAD83, Appomattox County, at bridge on State Highway 626, 3.3 mi northeast of Hixburg, and 3.9 mi upstream from mouth. | 23.2 | 1980-81‡ | 12-17-02<br>3-17-03<br>4-29-03<br>6-23-03<br>7-21-03<br>9-9-03 | 18.0<br>23.3<br>13.9<br>20.7<br>14.5<br>12.5 |

‡ 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 measurements made at special study and miscellaneous sites during water year 2003--Continued

| Stream | Tributary to | Location | Drainage area ($mi^2$) | Measured previously (water years) | Measurements | |
|---|---|---|---|---|---|---|
| | | | | | Date | Discharge ($ft^3/s$) |
| **JAMES RIVER BASIN--Continued** | | | | | | |
| 02038892 Horesepen Creek [a] | Appomattox River | Lat 37°20'39", long 78°29'27", NAD83, Buckingham County, at bridge on State Highway 683, 0.4 mi upstream from mouth, and 3.3 mi south of Sheppards. | - | - | 12-17-02<br>3-17-03<br>4-29-03<br>6-23-03<br>7-21-03<br>9-9-03 | 4.31<br>3.19<br>3.09<br>3.77<br>2.09<br>1.72 |
| 02038945 Spring Creek [a] | Buffalo Creek | Lat 37°13'08", long 78°35'25", NAD83, Prince Edward County, at bridge on State Highway 659, 1.0 mi upstream from Mud Creek, and 1.5 mi northeast of Darlington Heights. | - | - | 12-17-02<br>3-17-03<br>4-29-03<br>6-23-03<br>7-21-03<br>9-9-03 | 16.7<br>15.8<br>10.2<br>16.9<br>9.78<br>10.4 |
| 02038955 Mud Creek [a] | Spring Creek | Lat 37°13'48", long 78°35'52", NAD83, Prince Edward County, at bridge on State Highway 659, 1.5 mi upstream from mouth, and 2.0 mi north of Darlington Heights. | - | - | 12-17-02<br>3-17-03<br>4-29-03<br>6-23-03<br>7-21-03<br>9-9-03 | 5.68<br>6.56<br>5.90<br>7.59<br>5.80<br>5.20 |
| 02038970 Spring Creek [a] | Buffalo Creek | Lat 37°13'58", long 78°31'13", NAD83, Prince Edward County, at bridge on State Highway 700, 1.46 mi upstream from mouth, and 3.3 mi west of Hampden Sydney. | - | - | 12-17-02<br>3-17-03<br>4-29-03<br>6-23-03<br>7-21-03<br>9-9-03 | 32.2<br>31.3<br>25.7<br>34.6<br>19.9<br>19.3 |
| 02039525 Bush River [a] | Sandy River | Lat 37°08'50", long 78°24'23", NAD83, Prince Edward County, at bridge on State Highway 630, 500 ft downstream from Goodes Branch, and 6.0 mi south of Worsham. | - | 1963 | 12-17-02<br>3-17-03<br>4-29-03<br>6-23-03<br>9-9-03 | 19.1<br>11.4<br>12.2<br>15.8<br>10.3 |
| 02039550 Bush River [a] | Sandy River | Lat 37°16'42", long 78°21'05", NAD83, Prince Edward County, at bridge on U.S. Highway 460, 2.8 mi upstream from mouth, and 3.1 mi west of Rice. | - | 1944,<br>1952-54,<br>1963,<br>1990 | 1-9-03<br>3-17-03<br>4-30-03<br>6-24-03 | 41.0<br>38.1<br>31.5<br>46.2 |
| 02039580 Tanyard Branch [a] | Briery Creek | Lat 37°14'27", long 78°25'13", NAD83, Prince Edward County, at culvert on State highway 646, at Farmville Lake spillway, and 2.0 mi east of Hampden Sydney. | - | - | 12-17-02<br>3-17-03<br>4-29-03<br>6-23-03<br>9-9-03 | 1.86<br>1.38<br>.938<br>1.70<br>.574 |
| 02039600 Briery Creek [a] | Bush River | Lat 37°16'50", long 78°21'50", NAD83, Prince Edward County, at bridge on U.S. Highway 460, 1.0 mi upstream from mouth, and 4.1 mi west of Rice. | 41.5 | 1951-54,<br>1963,<br>1981-85 | 1-9-03<br>3-18-03<br>4-30-03<br>6-25-03 | 66.7<br>11.7<br>21.1<br>35.2 |
| 02039680 Little Sandy Creek [a] | Sandy River | Lat 37°12'31", long 78°19'13", NAD83, Prince Edward County, at bridge on State Highway 612, 2.4 mi upstream from mouth, and 3.6 mi southwest of Moran. | - | 1963 | 1-9-03<br>3-17-03<br>4-29-03<br>6-24-03<br>9-11-03 | 4.24<br>4.47<br>4.12<br>4.81<br>2.10 |
| 02039760 Saylers Creek [a] | Appomattox River | Lat 37°19'36", long 78°15'32", NAD83, Prince Edward County, upstream from bridge on State Highway 619, upstream from Little Saylers Creek, 1.3 mi upstream from mouth, and 4.1 mi northeast of Rice. | - | - | 1-9-03<br>3-18-03<br>4-30-03<br>6-24-03<br>9-10-03 | 6.88<br>8.22<br>8.11<br>8.04<br>3.94 |
| 02039780 Little Saylers Creek [a] | Saylers Creek | Lat 37°19'36", long 78°15'33", NAD83, Prince Edward County, 50 ft upstream from bridge on State Highway 619, 50 ft upstream from mouth, and 4.1 mi northeast of Rice. | - | - | 1-9-03<br>3-18-03<br>4-30-03<br>6-24-03<br>9-10-03 | 8.61<br>10.1<br>9.15<br>10.4<br>5.14 |

a Provided by the Virginia Department of Environmental Quality - Water Division.

Discharge measurements made at special study and miscellaneous sites during water year 2003--Continued

| Stream | Tributary to | Location | Drainage area ($mi^2$) | Measured previously (water years) | Measurements | |
|---|---|---|---|---|---|---|
| | | | | | Date | Discharge ($ft^3/s$) |
| **JAMES RIVER BASIN--Continued** | | | | | | |
| 02039781 Saylers Creek [a] | Appomattox River | Lat 37°19'37", long 78°15'34", NAD83, Prince Edward County, at bridge on State Highway 619, downstream from Little Saylers Creek, and 4.1 mi northeast of Rice. | - | 1963 | 1-9-03<br>3-18-03<br>4-30-03<br>6-24-03<br>9-10-03 | 15.5<br>18.4<br>17.3<br>18.4<br>9.08 |
| 02039800 Angola Creek [a] | Appomattox River | Lat 37°22'18", long 78°17'48", NAD83, Cumberland County, at bridge on State Highway 664, 3.3 mi upstream from mouth, and 3.9 mi southwest of Angola. | 6.74 | 1981-84 | 1-8-03<br>3-18-03<br>4-30-03<br>6-24-03 | 3.74<br>3.77<br>2.52<br>4.06 |
| 02039817 Dawsons Creek [a] | Appomattox River | Lat 37°22'48", long 78°13'20", NAD83, Cumberland County, at culverts on State Highway 619, 0.44 mi upstream from mouth, and 1.8 mi southeast of Angola. | - | - | 1-8-03<br>3-18-03<br>4-30-03<br>6-24-03<br>9-10-03 | 2.81<br>3.22<br>2.64<br>4.02<br>2.10 |
| 02039825 Sandy Creek [a] | Appomattox River | Lat 37°22'41", long 78°12'30", NAD83, Cumberland County, at bridge on State Highway 650, 2.08 mi upstream from mouth, and 2.3 mi southeast of Angola. | - | 1963 | 1-8-03<br>3-18-03<br>4-30-03<br>6-24-03<br>9-10-03 | 7.83<br>6.39<br>3.24<br>4.92<br>2.05 |
| 02039850 Horsepen Creek [a] | Big Guinea Creek | Lat 37°25'03", long 78°16'48", NAD83, Cumberland County, at culverts on State Highway 660, 0.42 mi upstream from mouth, and 2.4 mi northwest of Angola. | - | - | 3-18-03<br>4-30-03<br>6-24-03<br>9-10-03 | 2.28<br>2.10<br>2.39<br>.786 |
| 02039865 Big Guinea Creek [a] | Appomattox River | Lat 37°26'33", long 78°12'25", NAD83, Cumberland County, at bridge on State highway 600, 0.4 mi downstream from Tear Wallet Creek, 1.4 mi upstream from mouth, and at Stony Point Mills. | - | 1963 | 1-8-03<br>3-18-03<br>4-30-03<br>6-24-03<br>9-10-03 | 25.3<br>23.8<br>18.7<br>21.7<br>7.48 |
| 02040590 Nibbs Creek [a] | Flat Creek | Lat 37°22'03", long 77°59'32", NAD83, 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. | 17.8 | 1996-01 | 1-10-03<br>3-19-03<br>6-25-03 | 6.25<br>7.46<br>9.15 |
| 02040610 Nibbs Creek [a] | Flat Creek | Lat 37°23'54", long 77°57'18", NAD83, Amelia County, at bridge on State Highway 636, 1.5 mi upstream from mouth, and 2.5 mi northwest of Winterham. | - | - | 1-10-03<br>3-19-03<br>6-25-03 | 11.2<br>12.2<br>15.3 |
| 02040685 Flat Creek [a] | Appomattox River | Lat 37°23'59", long 77°54'27", NAD83, Amelia County, at bridge on State Highway 632, 0.15 mi downstream from Barkhouse Branch, and 0.7 mi north of Chula. | - | - | 1-10-03<br>3-19-03<br>6-25-03 | 75.8<br>87.1<br>88.8 |
| 02040965 West Creek [a] | Deep Creek | Lat 37°15'21", long 77°58'54", NAD83, Amelia County, at bridge on State Highway 614, 0.6 mi north of Denaro, and 4.96 mi upstream from mouth. | - | - | 1-14-03<br>3-19-03<br>6-25-03 | 18.0<br>25.0<br>31.2 |
| 2041125 Long Branch [a] | Winticomack Creek | Lat 37°12'59", long 77°47'27", NAD83, Amelia County, at culvert on State Highway 600, 1.3 mi west of Ammon, and 1.9 mi upstream from mouth. | - | 2002 | 10-10-02<br>3-19-03<br>6-11-03<br>7-22-03 | .000<br>1.13<br>2.48<br>.393 |

a Provided by the Virginia Department of Environmental Quality - Water Division.

Discharge measurements made at special study and miscellaneous sites during water year 2003--Continued

| Stream | Tributary to | Location | Drainage area ($mi^2$) | Measured previously (water years) | Measurements | |
|---|---|---|---|---|---|---|
| | | | | | Date | Discharge ($ft^3/s$) |
| **JAMES RIVER BASIN--Continued** | | | | | | |
| 002041130 Wintico-mack Creek [a] | Appomattox River | Lat 37°15'14", long 77°49'19", NAD83, Amelia County at bridge on State Highway 622, 1.2 mi upstream from mouth, and 4.6 mi east of Mannboro. | - | 2002 | 10-10-02<br>1-14-03<br>3-19-03<br>6-11-03<br>7-22-03 | .000<br>6.92<br>12.4<br>24.9<br>2.58 |
| 02041150 Winter-pock Creek [b] | Lake Chesdin | Lat 37°21'39", long 77°42'55", NAD83, Chesterfield County, at State Highway 664, 1.2 mi north of Winterpock, and 4.1 mi upstream from Surline Branch. | 3.77 | 1981-84, 2002 | 10-10-02<br>1-14-03<br>3-19-03<br>6-11-03<br>7-22-03 | .000<br>1.04<br>1.57<br>4.26<br>.287 |
| 02041160 Winter-pock Creek [a] | Lake Chesdin | Lat 37°19'51", long 77°43'39", NAD83, Chesterfield County, at State Highway 602, 1.1 mi south of Winterpock, and 3.2 mi upstream from mouth. | - | 2002 | 10-10-02 | .000 |
| 02041810 Swft Creek [a] | Appomattox River | Lat 37°27'19", long 77°42'11", NAD83, Chesterfield County, at bridge on State Highway 667 and 2.6 mi southeast of Hallsboro. | - | 1987-88, 1991-93, | 1-14-03<br>3-19-03 | 4.47<br>6.78 |
| 02042272 Unnamed Tributary [a] (No. 13) | Chickahominy River | Lat 37°41'46", long 77°32'55", NAD83, Hanover County, at culvert on private road, 0.84 mi upstream from mouth, and 2.8 mi northwest of Glen Allen. | - | - | 10-16-02<br>11-26-03<br>1-13-03<br>3-12-03<br>4-7-03<br>4-24-03<br>5-19-03<br>6-17-03<br>8-21-03 | 2.37<br>1.44<br>1.49<br>1.16<br>13.0<br>1.12<br>2.65<br>1.94<br>.920 |
| 02042455 White Oak Swamp [b] | Chickahominy River | Lat 37°28'06", long 77°12'31", NAD83, Henrico County, at bridge on State Highway 156, at Elko. | 23.6 | 1984-85, 1987-89, 1991, 1995-98, 2002 | 10-23-02<br>11-26-02 | 4.38<br>7.70 |
| **CHOWAN RIVER BASIN** | | | | | | |
| 02044225 Big Hounds Creek [a] | Nottoway River | Lat 36°59'47", long 78°07'35", NAD83, Lunenburg County, at bridge on State Highway 653, 2.4 mi north of Kenbridge, and 3.73 mi upstream from mouth. | - | - | 9-11-03 | 5.46 |
| 02044290 Little Nottoway River [a] | Nottoway River | Lat 37°03'48", long 78°03'01", NAD83, Nottoway County, at bridge on State Highway 626, 2.9 mi southwest of Blackstone, and 4.68 mi upstream from mouth. | - | - | 9-11-03 | 20.3 |
| 02044405 Hurricane Branch [a] | Nottoway River | Lat 37°03'39", long 77°58'47", NAD83, Nottoway County, at bridge on State Highway 643 1.6 mi southeast of Blackstone. | 5.61 | 2000-02 | 7-19-03<br>9-9-03 | 3.37<br>1.52 |
| 02044410 Unnamed tributary [a] | Hurricane Branch | Lat 37°02'28", long 7757'18", NAD83, Nottoway County, at Fort Picket sewage treatment plant, 1.0 mi upstream from mouth, and 3.5 mi southeast of Blackstone. | - | 2000-02 | 7-9-03<br>9-9-03 | 2.60<br>1.33 |
| 020445500 Beaver Pond Creek [a] | Nottoway River | Lat 36°59'08", long 77°48'01", NAD83, Dinwiddie County, at bridge on State Highway 612, 0.12 mi upstream from mouth, and 2.7 mi northwest of Rawlings. | - | - | 9-11-03 | 3.56 |

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 measurements made at special study and miscellaneous sites during water year 2003--Continued

| Stream | Tributary to | Location | Drainage area ($mi^2$) | Measured previously (water years) | Measurements | |
|---|---|---|---|---|---|---|
| | | | | | Date | Discharge ($ft^3/s$) |
| **CHOWAN RIVER BASIN--Continued** | | | | | | |
| 02051625 Roses Creek [a] | Great Creek | Lat 36°48'44", long 77°52'56", NAD83, Brunswick County, at bridge on State Highway 646, 3.5 mi south of Alberta, and 6.7 mi upstream from mouth. | - | 2002 | 10-7-02 | .113 |
| | | | | | 11-25-02 | 1.61 |
| | | | | | 3-11-03 | 5.43 |
| | | | | | 6-17-03 | 7.38 |
| | | | | | 8-19-03 | 2.53 |
| 02051715 Roses Creek [a] | Great Creek | Lat 36°44'57", long 77°50'15", NAD83, Brunswick County, at bridge on U.S. Highway 58, 0.4 mi upstream from mouth, and 0.7 mi southeast of Lawrenceville. | - | 2002 | 10-7-02 | .610 |
| | | | | | 11-25-02 | 9.25 |
| | | | | | 3-11-03 | 24.8 |
| | | | | | 6-17-03 | 37.3 |
| | | | | | 8-19-03 | 13.6 |
| **ROANOKE RIVER BASIN** | | | | | | |
| 02054190 Wilson Creek [a] | North Fork Roanoke River | Lat 37°11'23", long 80°21'30", NAD83, Montgomery County, at bridge on State Highway 603 at Ellett, 400 ft downstream from Cedar Run, and 0.4 mi upstream from mouth. | - | 2002 | 10-9-02 | 2.10 |
| | | | | | 11-7-02 | 7.90 |
| | | | | | 2-6-03 | 5.84 |
| | | | | | 3-26-03 | 16.6 |
| | | | | | 6-4-03 | 25.9 |
| | | | | | 8-15-03 | 9.71 |
| | | | | | 8-27-03 | 6.69 |
| 02055370 Carvin Creek [a] | Tinker Creek | Lat 37°19'16", long 79°56'03", NAD83, Roanoke City, at culverts on State Highway 115, at Roanoke City - Roanoke County boundary, and 0.28 mi upstream from mouth. | - | - | 2-11-03 | 6.80 |
| | | | | | 3-28-03 | 25.1 |
| | | | | | 4-25-03 | 19.0 |
| | | | | | 7-18-03 | 10.4 |
| | | | | | 8-28-03 | 6.45 |
| 02055515 Lick Run [a] | Tinker Creek | Lat 37°16'20", long 79°56'07", NAD83 Roanoke City, along Norfolk Avenue, 300 ft downstream from U.S. Highway 220, and 1.0 upstream from mouth. | 5.00 | 1994-00, 2002 | 4-25-03 | 19.0 |
| 0205551610 Tinker Creek [a] | Roanoke River | Lat 37°16'43", long 79°57'15", NAD83, Roanoke City, at bridge on Wise Avenue, 0.2 mi upstream from Glade Creek, and 1.0 mi west of Vinton. | - | 2002 | 2-11-03 | 29.2 |
| | | | | | 3-28-03 | 78.9 |
| | | | | | 7-18-03 | 78.7 |
| | | | | | 8-28-03 | 55.6 |
| 0205551810 Laymantown Creek [a] | Glade Creek | Lat 37°20'23", long 79°51'08", NAD83, Botetourt County, at bridge on U.S. Highway 460, 0.37 mi upstream from mouth, and 1.4 mi north of Bonsack. | - | - | 2-11-03 | 2.06 |
| | | | | | 3-28-03 | 3.32 |
| | | | | | 4-25-03 | 3.97 |
| | | | | | 7-18-03 | 4.76 |
| | | | | | 8-28-03 | 4.25 |
| 02055520 Glade Creek [a] | Tinker Creek | Lat 37°16'45", long 79°54'26", NAD83, Roanoke County, at bridge on Walnut Avenue, at Vinton, and 0.2 mi upstream from mouth. | 32.9 | 1968, 2002 | 2-11-03 | 12.7 |
| | | | | | 3-28-03 | 24.7 |
| | | | | | 4-25-03 | 28.7 |
| | | | | | 7-18-03 | 25.9 |
| | | | | | 8-28-03 | 26.2 |
| 02063460 Falling River [a] | Roanoke River | Lat 37°15'45", long 78°54'01", NAD83, Appomattox County, at bridge on State Highway 650, 1.6 mi northeast of Spring Mills, and 25.34 mi upstream from mouth. | - | - | 1-15-03 | 18.0 |
| | | | | | 4-3-03 | 36.7 |
| | | | | | 6-18-03 | 68.5 |
| | | | | | 7-14-03 | 31.8 |
| | | | | | 8-13-03 | 30.3 |
| | | | | | 9-16-03 | 81.4 |
| 02063770 South Fork Falling River [a] | Falling River | Lat 37°12'10", long 78°57'45", NAD83, Campbell County, at bridge on State Highway 648, 0.66 mi upstream from mouth, and 3.8 mi southwest of Spring Mills. | - | 1953 | 1-15-03 | 22.6 |
| | | | | | 4-3-03 | 42.0 |
| | | | | | 6-18-03 | 79.9 |
| | | | | | 7-17-03 | 31.8 |
| | | | | | 8-13-03 | 26.6 |
| | | | | | 9-16-03 | 17.5 |

a Provided by the Virginia Department of Environmental Quality - Water Division.

Discharge measurements made at special study and miscellaneous sites during water year 2003--Continued

| Stream | Tributary to | Location | Drainage area ($mi^2$) | Measured previously (water years) | Measurements | |
|---|---|---|---|---|---|---|
| | | | | | Date | Discharge ($ft^3/s$) |
| **ROANOKE RIVER BASIN--Continued** | | | | | | |
| 02065260 Turnip Creek [a] | Roanoke River | Lat 37°00'53", long 78°51'04", NAD83, Charlotte County, at bridge on State Highway 619, 2.3 mi southwest of Aspem, and 2.55 mi upstream from mouth. | - | - | 8-18-03<br>9-29-03 | 12.1<br>24.1 |
| 02066455 Ash Camp Creek [a] | Roanoke Creek | Lat 37°01'58", long 78°33'50", NAD83, Charlotte County, at culvert on State Highway 654, 1.1 mi southwest of Eureka, and 2.6 mi upstream from mouth. | - | 1978, 2002 | 10-8-02<br>4-3-03<br>7-16-03 | .172<br>4.72<br>2.38 |
| 02066520 Twittys Creek [a] | Roanoke Creek | Lat 36°59'23", long 78°36'12", NAD83, Charlotte County, at Drakes Branch sewage treatment plant discharge, at Drakes Branch, 0.25 mi downstream from bridge on State Highway 47. | 22.7 | 1981,, 1995, 1997-98, 2002 | 4-3-03<br>7-16-03 | 16.4<br>4.53 |
| 02066525 Twittys Creek [a] | Roanoke Creek | Lat 36°55'43", long 78°39'41", NAD83, Charlotte County, at bridge on State Highway 637, at Saxe, and 0.3 mi upstream from mouth. | - | 2002 | 10-8-02<br>4-3-03<br>7-16-03<br>9-29-03 | .030<br>21.1<br>7.21<br>17.2 |
| 02067020 Buffalo Creek [a] | Roanoke River | Lat 36°48'04", long 78°38'33", NAD83, Charlotte County, at bridge on State Highway 608, 0.2 mi downstream from Bruce Spring Branch, 1.85 mi upstream from mouth, and 2.0 mi northwest of Red Oak. | - | - | 8-18-03<br>9-29-03 | 2.72<br>3.19 |
| 02067250 Difficult Creek [a] | John H. Kerr Reservoir | Lat 36°45'14", long 78°42'27", NAD83, Halifax County, at bridge on State Highway 716, 0.2 mi downstream from Wilmouth Branch, and 1.8 mi northeast of Dryburg. | - | 2002 | 10-8-02<br>2-12-03 | 2.76<br>52.3 |
| 02075350 Powells Creek | Dan River | Lat 36°34'51", long 79°11'19", NAD83, Halifax County, at culvert on U.S. Highway 58, 1.1 mi east of Halifax-Pittsylvania County line, and 8.8 mi southwest of Turbeville. | .28 | 1993, 1996, 1998-99 | 11-13-02<br>4-9-03 | .66<br>1.18 |
| 02075600 Birch Creek [b] | Dan River | Lat 36°42'12", long 79°13'02", NAD83, Pittsylvania County, at bridge on State Highway 729, 1.2 mi downstream from Gunther Branch, and 2.9 mi west of Birch. | 19.8 | 1981-84, 2002 | 10-8-02<br>2-12-03<br>7-17-03 | 1.22<br>16.2<br>25.4 |
| 02075690 Unnamed Tributary [a] (No. 1) | Birch Creek | Lat 37°41'44", long 79°04'13", NAD83, Halifax County, at bridge on State Highway 683, 0.94 mi upstream from mouth, and 3.2 mi northeast of Elmo. | - | - | 2-12-03<br>3-11-03<br>7-17-03<br>8-18-03 | 5.92<br>5.62<br>6.38<br>4.23 |
| 02075700 Birch Creek [a] | Dan River | Lat 36°40'20", long 79°03'39", NAD83, Halifax County, at bridge on State Highway 659, 0.9 mi upstream from mouth, and 2.8 mi northwest of Paces. | - | 2002 | 10-8-02<br>2-12-03<br>3-11-03<br>7-17-03<br>8-18-03 | 4.27<br>54.5<br>51.2<br>77.0<br>36.8 |

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 measurements made at special study and miscellaneous sites during water year 2003--Continued

| Stream | Tributary to | Location | Drainage area ($mi^2$) | Measured previously (water years) | Measurements | |
|---|---|---|---|---|---|---|
| | | | | | Date | Discharge ($ft^3/s$) |
| **ROANOKE RIVER BASIN--Continued** | | | | | | |
| 02079666 Flat Creek [a] | Roanoke River | Lat 36°42'04", long 78°07'55", NAD83, Mecklenburg County, above new STP discharge, 0.3 mi upstream from State Highway 642, and 1.7 mi south of South Hill. | - | 2002 | 10-7-02<br>11-25-02<br>2-12-03<br>3-31-03<br>6-17-03<br>6-26-03<br>7-16-03<br>8-19-03 | .040<br>.428<br>.593<br>2.56<br>1.60<br>.323<br>.399<br>.519 |
| 0207966605 Flat Creek [a] | Roanoke River | Lat 36°41'48", long 78°07'54", NAD83, Mecklenburg County, downstream side of STP discharge, at bridge on State Highway 642, and 2.0 mi south of South Hill. | - | 1977, 2002 | 10-7-02<br>11-25-02<br>2-12-03<br>3-31-03<br>6-17-03<br>6-26-03<br>7-16-03<br>8-19-03 | 1.90<br>1.82<br>2.48<br>4.86<br>3.92<br>2.13<br>1.94<br>1.87 |
| 0207966625 Flat Creek [a] | Roanoke River | Lat 36°37'56", long 78°10'16", NAD83, Mecklenburg County,at bridge on State highway 630, 2.0 mi southeast of Smiths Crossroads, and 2.3 mi upstream from mouth. | - | 1977, 2002 | 10-7-02<br>11-25-02<br>2-12-03<br>3-31-03<br>6-17-03<br>6-26-03<br>7-16-03<br>8-19-03 | .399<br>7.25<br>13.8<br>61.3<br>23.9<br>9.72<br>8.88<br>8.99 |
| 0207966630 Parham Creek [a] | Flat Creek | Lat 36°38'50", long 78°08'52", NAD83, Mecklenburg County,at State Highway 629, 2.2 mi east of Smiths Crossroads. | - | 2002 | 11-25-02 | 1.57 |
| **KANAWHA RIVER BASIN** | | | | | | |
| 03171170 Crab Creek [a] | New River | Lat 37°09'26", long 80°28'14", NAD83, Montgomery County, at Town of Christiansburg old discharge, 200 ft upstream from culvert on State Highway 660, and 3.9 mi northwest of Christiansburg. | 13.8 | 1995-00, 2002 | 10-9-02<br>11-7-03<br>3-26-03<br>6-4-03 | 3.34<br>7.20<br>14.0<br>18.8 |
| 03171215 Stroubles Creek [a] | New River | Lat 37°11'58", long 80°27'00", NAD83, Montgomery County, at bridge on State Highway 657, 2.3 mi east of Prices Fork, and 6.69 mi upstream from mouth. | - | 2002 | 10-9-02<br>11-7-03<br>2-6-03<br>3-26-03<br>6-4-03<br>8-15-03<br>8-27-03 | 2.08<br>5.96<br>3.58<br>7.20<br>17.6<br>6.95<br>5.18 |
| 03171220 Stroubles Creek [a] | New River | Lat 37°11'02", long 80°30'03", NAD83, Montgomery County, at bridge on State Highway 705, 0.35 mi upstream from Slate Branch, 2.41 mi upstream from mouth, and 5.0 mi northeast of Radford. | - | 2002 | 10-9-02<br>11-7-02<br>2-6-03<br>3-26-03<br>6-4-03<br>8-15-03<br>8-27-03 | 1.51<br>8.01<br>5.49<br>10.9<br>33.5<br>8.19<br>5.95 |
| 03171225 Slate Branch [a] | Stroubles Creek | Lat 37°10'45", long 80°29'52", NAD83, Montgomery County, at bridge on State Highway 705, 0.5 mi upstream from mouth, and 6.0 mi northwest of Christiansburg. | - | 2002 | 10-9-02<br>11-7-02<br>2-6-03<br>3-26-03 | .806<br>5.87<br>4.02<br>7.95 |
| 03171350 Back Creek [a] | New River | Lat37°10'01", long 80°42'07", NAD83, Pulaski County, at bridge on State Highway 100, 1.2 mi downstream from Carper Branch, and 1.5 mi west of Highland. | - | 2002 | 10-9-02<br>11-6-02<br>3-26-03<br>6-4-03<br>8-27-03 | 7.40<br>35.0<br>25.7<br>29.6<br>8.82 |

a Provided by the Virginia Department of Environmental Quality - Water Division.

Discharge measurements made at special study and miscellaneous sites during water year 2003--Continued

| Stream | Tributary to | Location | Drainage area ($mi^2$) | Measured previously (water years) | Measurements | |
|---|---|---|---|---|---|---|
| | | | | | Date | Discharge ($ft^3/s$) |
| **KANAWHA RIVER BASIN--Continued** | | | | | | |
| 03171405 Back Creek [a] | New River | Lat 37°12'10", long 80°36'41", NAD83, Pulaski County, at bridge on State Highway 600, at Parrott, and 0.3 mi downstream from Neck Creek. | - | 2002 | 10-9-02<br>11-6-03<br>3-26-03<br>6-4-03<br>8-27-03 | 9.48<br>57.8<br>48.5<br>56.0<br>18.7 |
| 03174680 Hunting Camp Creek [a] | Wolf Creek | Lat 37°09'25", long 81°08'54", NAD83, Bland County, at GIV Inc. discharge, 0.3 mi north of Bastian, and 1.1 mi upstream from mouth. | 29.8 | 1995, 1997-00 | 8-27-03 | 4.57 |
| 03177710 Bluestone River [b] | New River | Lat 37°16'17", long 81°18'17", NAD83, Tazewell County,at bridge on State Highway 717, 0.3 mi upstream from Brush Fork, and 0.4 mi southeast of Falls Mills. | 44.2 | 1981-95‡, 2002 | 11-6-02 | 77.8 |
| **TENNESSEE RIVER BASIN** | | | | | | |
| 03474700 Hutton Creek [b] | Middle Fork Holston River | Lat 36°47'03", long 81°44'04", NAD83, Washington County, at bridge on U.S. Highway 11, 3.2 mi west of Chilhowie. | 8.32 | 1969, 1972 1990, 1992, 2000, 2002 | 11-4-02<br>2-4-03<br>3-24-03<br>6-3-03<br>8-25-03 | 2.58<br>19.2<br>5.95<br>3.68<br>6.58 |
| 03474705 Unnamed tributary [a] (No. 2) | Hutton Creek | Lat 36°47'02", long 81°44'03", NAD83, Washington County, 200 ft downstream from bridge on U.S. Highway 11, on left bank, and 3.3 mi west of Chilhowie. | - | 2002 | 11-4-02<br>2-4-03<br>3-24-03<br>6-3-03<br>8-25-03 | 1.78<br>3.78<br>4.69<br>2.32<br>4.20 |
| 03474720 Hutton Creek[b] | Middle Fork Holston River | Lat 36°46'22", long 81°43'48", NAD83, Washington County, at old Huff Airport road, 0.26 mi upstream from mouth, and 2.3 mi southwest of Chilhowie. | 11.0 | 1987-89, 2000, 2002 | 11-4-02<br>3-24-03<br>6-3-03<br>8-25-03 | 5.76<br>14.1<br>8.82<br>13.9 |
| 03474800 Hall Creek [b] | Byers Creek | Lat 36°45'49", long 81°48'14", NAD83, Washington County, at bridge on U.S. Highway 11, 1.4 mi west of Old Glade Spring. | 7.9 | 1969, 1972 1990, 1992, 2000, 2002 | 11-4-02<br>2-4-03<br>6-3-03<br>8-25-03 | 5.26<br>16.4<br>7.47<br>11.2 |
| 03474860 Tattle Branch [a] | Hall Creek | Lat 36°44'40", long 81°47'47", NAD83, Washington County, at bridge on State Highway 736, 600 ft upstream from mouth, and 2.0 mi south of Old Glade Spring. | - | 2000, 2002 | 11-4-02<br>2-4-03<br>8-25-03 | 1.59<br>5.24<br>2.48 |
| 03474905 Byers Creek [a] | Middle Fork Holston River | Lat 36°44'16", long 81°47'50", NAD83, Washington County, at private bridge along State Highway 736, 0.2 mi upstream from mouth, and 2.5 mi southwest of Old Glade Spring. | - | 2000, 2002 | 11-4-02<br>2-4-03<br>3-24-03<br>6-3-03<br>8-25-03 | 9.43<br>30.6<br>20.6<br>13.8<br>20.0 |
| 03475595 East Fork Cedar Creek [a] | Cedar Creek | Lat 36°44'58", long 81°51'25", NAD83, Washington County, at Meadowview Elementary School sewage treatment plant, 0.1 mi north of Cedarville. | - | 1995, 1997-00, 2002 | 11-5-02 | .636 |

‡ 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 measurements made at special study and miscellaneous sites during water year 2003--Continued

| Stream | Tributary to | Location | Drainage area ($mi^2$) | Measured previously (water years) | Measurements | |
|---|---|---|---|---|---|---|
| | | | | | Date | Discharge ($ft^3/s$) |
| **TENNESSEE RIVER BASIN--Continued** | | | | | | |
| 03475600 Cedar Creek | Middle Fork Holston River | Lat 36°44'50", long 81°51'19", NAD83, Washington County, at culvert on U.S. Highway 11, 1.2 mi south of Meadowview, and 2.5 mi upstream from mouth. | 3.37 | 1969, 1990, 1992-94, 1998-99 | 9- 9-03 | 7.90 |
| 03475602 Cedar Creek [b] | Middle Fork Holston River | Lat 36°42'53", long 81°49'50", NAD83, Washington County, at bridge on State Highway 706, at mouth, and 2.6 mi south of Cedarville. | - | 1987-89, 2000, 2002 | 11-4-02<br>2-4-03<br>3-24-03<br>6-3-03<br>8-25-03 | 3.05<br>12.0<br>9.46<br>5.64<br>10.5 |
| 03487800 Lick Creek | North Fork Holston River | Lat 36°57'44", long 81°28'20", NAD83, 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, 1998-99 | 8- 6-03 | 9.69 |
| 03489800 Cove Creek | North Fork Holston River | Lat 36°39'13", long 82°21'16", NAD83, Scott County, at bridge on U.S. Highways 58 and 421, 1.5 mi northwest of Shelleys. | 17.3 | 1951-69, 1971, 1973, 1992 | 8-18-03 | 16.7 |
| 03520375 Clinch River [a] | Tennessee River | Lat 37°07'44", long 81°32'59", NAD83, Town of Tazewell, at bridgeon State Highway Alt. 16, 0.8 mi west of Tazewell. | - | 1980, 2002 | 11-6-02<br>2-5-03<br>3-24-03<br>6-3-03 | 46.4<br>100<br>31.3<br>42.7 |
| 03521500 Clinch River [b] | Tennessee River | Lat 37°05'10", long 81°46'51", NAD83, Tazewell County, 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. | 137 | 1946-89‡, 2002 | 11-6-02<br>2-5-03<br>3-25-03<br>6-3-03 | 139<br>43.3<br>116<br>155 |
| 03522595 Lewis Creek [a] | Clinch River | Lat 37°00'28", long 81°58'12", NAD83, Russell County, at Honaker sewage treatment plant, 0.2 mi upstream from bridge on State Highway 653, and 0.7 mi south of Honaker. | 20.8 | 1993-97, 2002 | 11-6-02<br>3-25-03 | 12.2<br>8.25 |
| 03523000 Big Cedar Creek | Clinch River | Lat 36°02'20", long 82°02'19", NAD83, Russell County, 200 ft upstream from bridge on U.S. Highway 19 (Business), 1.3 mi downstream from Little Burgess Creek, 1.9 mi upstream from Little Cedar Creek, and 2.3 mi east of Lebanon. | 51.5 | 1953-59, 1970-80, 1991-92, 1994 | 9- 9-03 | 41.9 |
| 03524300 Guest River [a] | Clinch River | Lat 36°58'35", long 82°37'16", NAD83, Wise County, at bridge on State Highway 625, 1.5 mi southwest of Stephens. | - | 1978, 2002 | 11-5-02<br>2-5-03<br>3-25-03<br>6-2-03<br>8-26-03 | 4.44<br>30.0<br>7.58<br>14.5<br>4.82 |
| 0352430750 Sepulcher Creek [a] | Rocky Fork | Lat 36°58'58", long 82°36'52", NAD83, Wise County, at confluence with Rocky Fork, just west of State Highway 625, and 1.0 mi southwest of Stephens. | - | 2002 | 11-5-02<br>2-5-03<br>3-25-03<br>6-2-03<br>8-26-03 | 1.66<br>5.14<br>1.22<br>1.38<br>.593 |

‡ 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 measurements made at special study and miscellaneous sites during water year 2003--Continued

| Stream | Tributary to | Location | Drainage area ($mi^2$) | Measured previously (water years) | Measurements | |
|---|---|---|---|---|---|---|
| | | | | | Date | Discharge ($ft^3/s$) |
| **TENNESSEE RIVER BASIN--Continued** | | | | | | |
| 03524308 Rocky Fork [a] | Guest River | Lat 36°58'49", long 82°36'51", NAD83, Wise County, at bridge on State Highway 625, 1,000 ft downstream from Sepulcher Creek, and 1.1 mi southwest of Stephens. | - | 2002 | 11-5-02<br>2-5-03<br>3-25-03<br>6-2-03<br>8-26-03 | 1.86<br>28.5<br>3.64<br>7.51<br>1.58 |
| 0352445 Toms Creek [b] | Guest River | Lat 36°56'33", long 82°28'09", NAD83, Wise County, at confluence with Little Toms Creek, 500 ft downstream from bridge on U.S. Highway 58 at Coeburn. | 10.5 | 1952, 1955, 2002 | 11-5-02<br>2-5-03<br>3-25-03<br>6-2-03<br>8-26-03 | 4.26<br>29.9<br>11.7<br>12.8<br>4.08 |
| 03524449 Little Toms Creek [a] | Toms Creek | Lat 36°56'32", long 82°28'08", NAD83, Wise County, at confluence with Toms Creek, at Coeburn. | 5.52 | 2002 | 11-5-02<br>2-5-03<br>3-25-03<br>6-2-03<br>8-26-03 | 1.90<br>16.4<br>2.49<br>3.84<br>.893 |
| 03524500 Guest River [b] | Clinch River | Lat 36°55'45", long 82°28'23", NAD83, Wise County, at bridge on State Highway 72, 1.0 mi southeast of Coeburn, and 6.5 mi upstream from mouth. | 87.3 | 1949-59‡, 1979-81‡, 1991-92, 2002 | 11-5-02<br>3-25-03 | 36.7<br>55.3 |
| 03524520 Crab Orchard Branch [a] | Guest River | Lat 36°54'52", long 82°26'06", NAD83, Wise County, 0.2 mi downstream from Boydton Road, 0.2 mi upstream from mouth, and 2.7 mi southeast of Coeburn. | - | 2002 | 11-5-02<br>2-5-03<br>3-25-03<br>6-2-03<br>8-26-03 | .668<br>7.86<br>.971<br>1.49<br>.232 |

‡ 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.

AND MISCELLANEOUS SITES

YORK RIVER BASIN

MISCELLANEOUS STATION ANALYSES

| Date | Time | Sample type | Ammonia + org-N, water, fltrd, mg/L as N (00623) | Ammonia water, fltrd, mg/L as N (00608) | Nitrite + nitrate water fltrd, mg/L as N (00631) | Nitrite water, fltrd, mg/L as N (00613) | Ortho-phos-phate, water, fltrd, mg/L as P (00671) | Phos-phorus, water, fltrd, mg/L (00666) |
|---|---|---|---|---|---|---|---|---|
| 01674160 POLECAT CREEK AT CEDAR FORK, VA (LAT 37 58 09N LONG 077 32 20W) | | | | | | | | |
| APR 2003 | | | | | | | | |
| 03... | 1550 | Environmental | 0.35 | <0.015 | 0.166 | <0.002 | <0.007 | E.004 |

Remark codes used in this table:
< -- Less than
E -- Estimated value

MISCELLANEOUS STATION ANALYSES

| Date | Time | Sample type | Depth at sample location, feet (81903) | Sampling depth, feet (00003) | Transparency Secchi disc, inches (00077) | Barometric pressure, mm Hg (00025) | Dissolved oxygen, mg/L (00300) | Dissolved oxygen, percent of saturation (00301) | pH, water, unfltrd field, std units (00400) | Specif. conductance, wat unf uS/cm 25 degC (00095) | Temperature, air, deg C (00020) | Temperature, water, deg C (00010) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01677850 HARWOOD MILL RESERVOIR ABOVE HWY 17 AT TABB, VA (LAT 37 08 16N LONG 076 27 40W) | | | | | | | | | | | | |
| OCT 2002 | | | | | | | | | | | | |
| 07... | 0945 | Environmental | 18.5 | 1.0 | 43.0 | 762 | 5.0 | 60 | 7.4 | 604 | 21.8 | 24.4 |
| 07... | 0950 | Environmental | 18.5 | 17.0 | -- | 762 | <1 | <12 | 6.9 | 527 | 21.8 | 23.6 |
| AUG 2003 | | | | | | | | | | | | |
| 11... | 1000 | Environmental | 18.5 | 18.0 | -- | 760 | <1 | <0.8 | 6.9 | 223 | -- | 17.5 |
| 11... | 1001 | Environmental | 18.5 | 17.0 | -- | 760 | <1 | <0.9 | 6.8 | 220 | -- | 18.4 |
| 11... | 1002 | Environmental | 18.5 | 16.0 | -- | 760 | <1 | <0.9 | 6.8 | 218 | -- | 19.5 |
| 11... | 1003 | Environmental | 18.5 | 15.0 | -- | 760 | <1 | <1 | 6.8 | 196 | -- | 21.0 |
| 11... | 1004 | Environmental | 18.5 | 14.0 | -- | 760 | <1 | <1 | 6.8 | 164 | -- | 23.8 |
| 11... | 1005 | Environmental | 18.5 | 13.0 | -- | 760 | <1 | <2 | 6.8 | 157 | -- | 23.5 |
| 11... | 1006 | Environmental | 18.5 | 12.0 | -- | 760 | <1 | <5 | 6.7 | 158 | -- | 24.1 |
| 11... | 1007 | Environmental | 18.5 | 10.0 | -- | 760 | <1 | <8 | 6.7 | 128 | -- | 24.7 |
| 11... | 1008 | Environmental | 18.5 | 8.0 | -- | 760 | 2.9 | 32 | 6.9 | 109 | -- | 25.1 |
| 11... | 1009 | Environmental | 18.5 | 6.0 | -- | 760 | 5.7 | 69 | 7.0 | 112 | -- | 25.6 |
| 11... | 1010 | Environmental | 18.5 | 4.0 | -- | 760 | 5.7 | 70 | 7.0 | 112 | -- | 25.6 |
| 11... | 1011 | Environmental | 18.5 | 2.0 | -- | 760 | 5.7 | 70 | 7.1 | 112 | -- | 25.6 |
| 11... | 1012 | Environmental | 18.5 | 1.0 | 33.0 | 760 | 6.0 | 74 | 7.3 | 112 | -- | 25.7 |

MISCELLANEOUS STATION ANALYSES

| Date | Residue total at 105 deg. C, suspended, mg/L (00530) | Residue volatile, suspended, mg/L (00535) | Ammonia + org-N, water, fltrd, mg/L as N (00623) | Ammonia + org-N, water, unfltrd mg/L as N (00625) | Ammonia water, fltrd, mg/L as N (00608) | Nitrite + nitrate water fltrd, mg/L as N (00631) | Nitrite water, fltrd, mg/L as N (00613) | Orthophosphate, water, fltrd, mg/L as P (00671) | Particulate nitrogen, susp, water, mg/L (49570) | Phosphorus, water, fltrd, mg/L (00666) | Phosphorus, water, unfltrd mg/L (00665) | Total carbon, suspnd sedimnt total, mg/L (00694) | Inorganic carbon, suspnd sedimnt total, mg/L (00688) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01677850 HARWOOD MILL RESERVOIR ABOVE HWY 17 AT TABB, VA (LAT 37 08 16N LONG 076 27 40W) | | | | | | | | | | | | | |
| OCT 2002 | | | | | | | | | | | | | |
| 07... | -- | -- | 0.47 | 0.64 | 0.142 | E.015 | 0.004 | <0.007 | 0.21 | 0.005 | 0.023 | 1.3 | <0.1 |
| 07... | -- | -- | 1.4 | 1.7 | 1.13 | <0.022 | <0.002 | <0.007 | 0.23 | 0.007 | 0.039 | 1.1 | <0.1 |
| AUG 2003 | | | | | | | | | | | | | |
| 11... | -- | -- | 1.8 | 2.0 | 1.29d | <0.022 | 0.005 | 0.047 | -- | 0.057 | 0.076 | -- | -- |
| 11... | -- | -- | 1.5 | 1.7 | 1.07d | <0.022 | 0.003 | 0.027 | -- | 0.037 | 0.052 | -- | -- |
| 11... | -- | -- | 1.4 | 1.5 | 0.940d | <0.022 | E.002n | 0.014 | -- | 0.024 | 0.041 | -- | -- |
| 11... | <10 | <10 | 1.1 | 1.2 | 0.662d | <0.022 | <0.002 | E.004n | -- | 0.014 | 0.028 | -- | -- |
| 11... | -- | -- | 0.94 | 1.1 | 0.539d | <0.022 | <0.002 | <0.007 | -- | 0.016 | 0.030 | -- | -- |
| 11... | <10 | <10 | 0.81 | 0.90 | 0.372d | <0.022 | <0.002 | E.005n | -- | 0.016 | 0.037 | -- | -- |
| 11... | -- | -- | 0.62 | 0.78 | 0.208 | <0.022 | <0.002 | E.005n | -- | 0.017 | 0.049 | -- | -- |
| 11... | -- | -- | 0.52 | 0.65 | 0.117 | E.016n | 0.006 | E.004n | -- | 0.015 | 0.041 | -- | -- |
| 11... | -- | -- | 0.52 | 0.61 | 0.088 | 0.027 | 0.004 | 0.009 | -- | 0.020 | 0.046 | -- | -- |
| 11... | -- | -- | 0.41 | 0.55 | E.011n | <0.022 | E.002n | <0.007 | -- | 0.016 | 0.043 | -- | -- |
| 11... | -- | -- | 0.42 | 0.53+c | <0.015 | <0.022 | <0.002 | <0.007 | -- | 0.011 | 0.041+c | -- | -- |
| 11... | -- | -- | 0.40 | 0.53 | <0.015 | <0.022 | <0.002 | <0.007 | -- | 0.014 | 0.046 | -- | -- |
| 11... | <10 | 10 | 0.40 | 0.56 | <0.015 | <0.022 | <0.002 | <0.007 | -- | 0.015 | 0.043 | -- | -- |

MISCELLANEOUS STATION ANALYSES

| Date | Organic carbon, suspnd sedimnt total, mg/L (00689) | Organic carbon, water, fltrd, mg/L (00681) | Pheo-phytin a, phyto-plank-ton, ug/L (62360) | Chloro-phyll a phyto-plank-ton, fluoro, ug/L (70953) | Copper, water, fltrd, ug/L (01040) | Copper, water, unfltrd recover-able, ug/L (01042) | Iron, water, fltrd, ug/L (01046) | Iron, water, unfltrd recover-able, ug/L (01045) | Deu-terium/ Protium ratio, water, unfltrd per mil (82082) | O-18 / O-16 ratio, water, unfltrd per mil (82085) |
|---|---|---|---|---|---|---|---|---|---|---|
| 01677850 HARWOOD MILL RESERVOIR ABOVE HWY 17 AT TABB, VA (LAT 37 08 16N LONG 076 27 40W) | | | | | | | | | | |
| OCT 2002 | | | | | | | | | | |
| 07... | 1.3 | 6.3 | 8.4 | 6.1 | 13.1 | 18.5 | E7 | 120 | -10.50 | -0.80 |
| 07... | 1.1 | 7.0 | 11.6 | 7.5 | 2.5 | 31.0 | 108 | 170 | -11.50 | -0.95 |
| AUG 2003 | | | | | | | | | | |
| 11... | -- | -- | -- | 23.1 | -- | -- | -- | -- | -- | -- |
| 11... | -- | -- | -- | 35.2 | -- | -- | -- | -- | -- | -- |
| 11... | -- | -- | -- | 37.8 | -- | -- | -- | -- | -- | -- |
| 11... | -- | -- | -- | 33.9 | -- | -- | -- | -- | -- | -- |
| 11... | -- | -- | -- | 21.5 | -- | -- | -- | -- | -- | -- |
| 11... | -- | -- | -- | 15.7 | -- | -- | -- | -- | -- | -- |
| 11... | -- | -- | -- | 9.1 | -- | -- | -- | -- | -- | -- |
| 11... | -- | -- | -- | 6.0 | -- | -- | -- | -- | -- | -- |
| 11... | -- | -- | -- | 7.1 | -- | -- | -- | -- | -- | -- |
| 11... | -- | -- | -- | 10.3 | -- | -- | -- | -- | -- | -- |
| 11... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 11... | -- | -- | -- | 11.6 | -- | -- | -- | -- | -- | -- |
| 11... | -- | -- | -- | 10.5 | -- | -- | -- | -- | -- | -- |

Remark codes used in this table:
< -- Less than
E -- Estimated value

Value qualifier codes used in this table:
+ -- Improper preservation
c -- See laboratory comment
d -- Diluted sample: method hi range exceeded
n -- Below the NDV

AND MISCELLANEOUS SITES##

JAMES RIVER BASIN

MISCELLANEOUS STATION ANALYSES

| Date | Time | Sample type | Depth at sample location, feet (81903) | Sampling depth, feet (00003) | Transparency Secchi disc, inches (00077) | Barometric pressure, mm Hg (00025) | Dissolved oxygen, mg/L (00300) | Dissolved oxygen, percent of saturation (00301) | pH, water, unfltrd field, std units (00400) | Specif. conductance, wat unf uS/cm 25 degC (00095) | Temperature, air, deg C (00020) | Temperature, water, deg C (00010) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0204279210 LEE HALL RESERVOIR ABOVE I-64 NEAR LEE HALL, VA (LAT 37 10 58N LONG 076 32 52W) | | | | | | | | | | | | |
| OCT 2002 | | | | | | | | | | | | |
| 08... | 0930 | Environmental | 9.0 | 1.0 | 27.5 | 767 | 7.7 | 90 | 8.2 | 328 | 22.2 | 23.7 |
| 08... | 0935 | Environmental | 9.0 | 8.0 | -- | 767 | 7.3 | 86 | 8.1 | 329 | 22.2 | 23.5 |
| 0204279220 CURTIS RUN AT RT 168 AT LEE HALL, VA (LAT 37 11 50N LONG 076 34 05W) | | | | | | | | | | | | |
| OCT 2002 | | | | | | | | | | | | |
| 07... | 1210 | Environmental | 2.0 | 1.0 | -- | 762 | 7.4 | 89 | 7.3 | 1,200 | -- | 24.7 |
| 07... | 1215 | Replicate | 2.0 | 1.0 | -- | -- | -- | -- | -- | -- | -- | -- |
| 0204279230 LEE HALL RESERVOIR AB RT 105 NR LEE HALL, VA (LAT 37 10 32N LONG 076 33 47W) | | | | | | | | | | | | |
| OCT 2002 | | | | | | | | | | | | |
| 08... | 1210 | Environmental | 12.0 | 1.0 | 38.0 | 771 | 7.5 | 88 | 7.5 | 569 | 23.5 | 23.9 |
| 08... | 1215 | Environmental | 12.0 | 11.0 | -- | 771 | 6.5 | 76 | 7.3 | 575 | 23.5 | 23.6 |
| 0204279240 LEE HALL RESERVIOR AT WTP NEAR LEE HALL, VA (LAT 37 10 13N LONG 076 33 23W) | | | | | | | | | | | | |
| OCT 2002 | | | | | | | | | | | | |
| 08... | 1100 | Environmental | 12.0 | 1.0 | 48.0 | 770 | 7.7 | 90 | 8.0 | 551 | 22.1 | 23.9 |
| 08... | 1105 | Environmental | 12.0 | 11.0 | -- | 770 | <1 | <12 | 7.0 | 548 | 22.1 | 23.8 |
| AUG 2003 | | | | | | | | | | | | |
| 12... | 1030 | Environmental | 12.0 | 1.0 | 27.0 | 765 | 6.2 | 78 | 7.0 | 151 | -- | 26.7 |
| 12... | 1031 | Environmental | 12.0 | 3.0 | -- | 765 | 5.4 | 74 | 7.0 | 150 | -- | 26.5 |
| 12... | 1032 | Environmental | 12.0 | 5.0 | -- | 765 | 4.0 | 48 | 7.0 | 140 | -- | 26.7 |
| 12... | 1033 | Environmental | 12.0 | 7.0 | -- | 765 | 3.3 | 41 | 7.0 | 139 | -- | 26.0 |
| 12... | 1034 | Environmental | 12.0 | 9.0 | -- | 765 | 2.5 | 30 | 6.9 | 146 | -- | 25.8 |
| 12... | 1035 | Environmental | 12.0 | 11.0 | -- | 765 | 1.4 | 17 | 6.8 | 144 | -- | 25.1 |

MISCELLANEOUS STATION ANALYSES

| Date | Residue total at 105 deg. C, suspended, mg/L (00530) | Residue volatile, suspended, mg/L (00535) | Ammonia + org-N, water, fltrd, mg/L as N (00623) | Ammonia + org-N, water, unfltrd mg/L as N (00625) | Ammonia water, fltrd, mg/L as N (00608) | Nitrite + nitrate water fltrd, mg/L as N (00631) | Nitrite water, fltrd, mg/L as N (00613) | Orthophosphate, water, fltrd, mg/L as P (00671) | Particulate nitrogen, susp, water, mg/L (49570) | Phosphorus, water, fltrd, mg/L (00666) | Phosphorus, water, unfltrd mg/L (00665) | Total carbon, suspnd sedimnt total, mg/L (00694) | Inorganic carbon, suspnd sedimnt total, mg/L (00688) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0204279210 LEE HALL RESERVOIR ABOVE I-64 NEAR LEE HALL, VA (LAT 37 10 58N LONG 076 32 52W) | | | | | | | | | | | | | |
| OCT 2002 | | | | | | | | | | | | | |
| 08... | -- | -- | 0.39 | 0.86 | <0.015 | <0.022 | <0.002 | <0.007 | 0.45 | 0.008 | 0.056 | 3.0 | <0.1 |
| 08... | -- | -- | 0.41 | 0.87 | <0.015 | <0.022 | <0.002 | <0.007 | 0.43 | 0.008 | 0.056 | 2.7 | <0.1 |
| 0204279220 CURTIS RUN AT RT 168 AT LEE HALL, VA (LAT 37 11 50N LONG 076 34 05W) | | | | | | | | | | | | | |
| OCT 2002 | | | | | | | | | | | | | |
| 07... | -- | -- | 0.32 | 0.47 | 0.017 | 0.037 | E.002 | <0.007 | 0.13 | 0.006 | 0.027 | 0.9 | <0.1 |
| 07... | -- | -- | 0.33 | 0.49 | 0.017 | 0.037 | E.002 | <0.007 | 0.11 | 0.006 | 0.027 | 1.3 | <0.1 |
| 0204279230 LEE HALL RESERVOIR AB RT 105 NR LEE HALL, VA (LAT 37 10 32N LONG 076 33 47W) | | | | | | | | | | | | | |
| OCT 2002 | | | | | | | | | | | | | |
| 08... | -- | -- | 0.39 | 0.61 | 0.048 | E.019 | 0.003 | <0.007 | 0.14 | 0.005 | 0.031 | 0.7 | <0.1 |
| 08... | -- | -- | 0.44 | 0.62 | 0.070 | E.018 | 0.003 | <0.007 | 0.23 | 0.005 | 0.038 | 1.6 | <0.1 |
| 0204279240 LEE HALL RESERVIOR AT WTP NEAR LEE HALL, VA (LAT 37 10 13N LONG 076 33 23W) | | | | | | | | | | | | | |
| OCT 2002 | | | | | | | | | | | | | |
| 08... | -- | -- | 0.35 | 0.56 | 0.062 | E.021 | 0.003 | <0.007 | 0.21 | E.003 | 0.024 | 1.3 | <0.1 |
| 08... | -- | -- | 0.35 | 0.61 | 0.063 | E.021 | 0.003 | <0.007 | 0.21 | E.004 | 0.028 | 1.2 | <0.1 |
| AUG 2003 | | | | | | | | | | | | | |
| 12... | <10 | <10 | 0.44 | 0.69 | 0.059 | 0.031 | E.002n | <0.007 | -- | 0.006 | 0.034 | -- | -- |
| 12... | -- | -- | 0.46 | 0.68 | 0.079 | 0.033 | E.002n | <0.007 | -- | 0.006 | 0.035 | -- | -- |
| 12... | -- | -- | 0.53 | 0.68 | 0.081 | E.020n | 0.003 | <0.007 | -- | 0.011 | 0.043 | -- | -- |
| 12... | -- | -- | 0.57 | 0.69 | 0.099 | E.017n | 0.003 | <0.007 | -- | 0.011 | 0.046 | -- | -- |
| 12... | -- | -- | 0.64 | 0.80 | 0.189 | E.017n | E.002n | <0.007 | -- | 0.011 | 0.050 | -- | -- |
| 12... | <10 | <10 | 0.69 | 0.90 | 0.231 | E.015n | E.002n | <0.007 | -- | 0.010 | 0.050 | -- | -- |

MISCELLANEOUS STATION ANALYSES

| Date | Organic carbon, suspnd sedimnt total, mg/L (00689) | Organic carbon, water, fltrd, mg/L (00681) | Chloro-phyll a phyto-plank-ton, fluoro, ug/L (70953) | Copper, water, fltrd, ug/L (01040) | Copper, water, unfltrd recover -able, ug/L (01042) | Iron, water, fltrd, ug/L (01046) | Iron, water, unfltrd recover -able, ug/L (01045) | Deu-terium/ Protium ratio, water, unfltrd per mil (82082) | O-18 / O-16 ratio, water, unfltrd per mil (82085) |
|---|---|---|---|---|---|---|---|---|---|
| 0204279210 LEE HALL RESERVOIR ABOVE I-64 NEAR LEE HALL, VA (LAT 37 10 58N LONG 076 32 52W) | | | | | | | | | |
| OCT 2002 | | | | | | | | | |
| 08... | 3.0 | 7.2 | 29.8 | 7.6 | 25.6 | E9 | 240 | -2.30 | 0.39 |
| 08... | 2.7 | 7.0 | 30.7 | 7.6 | 25.4 | 11 | 220 | -3.10 | 0.46 |
| 0204279220 CURTIS RUN AT RT 168 AT LEE HALL, VA (LAT 37 11 50N LONG 076 34 05W) | | | | | | | | | |
| OCT 2002 | | | | | | | | | |
| 07... | 0.9 | 6.1 | -- | 0.4 | <0.6 | E10 | 200 | -9.90 | -0.97 |
| 07... | 1.3 | 6.1 | -- | 0.4 | <0.6 | E8 | 180 | -10.70 | -1.04 |
| 0204279230 LEE HALL RESERVOIR AB RT 105 NR LEE HALL, VA (LAT 37 10 32N LONG 076 33 47W) | | | | | | | | | |
| OCT 2002 | | | | | | | | | |
| 08... | 0.7 | 6.9 | 9.5 | 7.2 | 13.3 | E9 | 270 | -9.00 | -0.54 |
| 08... | 1.6 | 6.9 | 10.7 | 6.5 | 20.5 | 15 | 390 | -7.60 | -0.66 |
| 0204279240 LEE HALL RESERVIOR AT WTP NEAR LEE HALL, VA (LAT 37 10 13N LONG 076 33 23W) | | | | | | | | | |
| OCT 2002 | | | | | | | | | |
| 08... | 1.3 | 6.7 | 10.5 | 7.6 | 12.1 | E5 | 180 | -7.20 | -0.51 |
| 08... | 1.2 | 6.3 | <0.5 | 7.1 | 12.8 | <10 | 200 | -7.50 | -0.52 |
| AUG 2003 | | | | | | | | | |
| 12... | -- | -- | 9.1 | -- | -- | -- | -- | -- | -- |
| 12... | -- | -- | 9.3 | -- | -- | -- | -- | -- | -- |
| 12... | -- | -- | 10.7 | -- | -- | -- | -- | -- | -- |
| 12... | -- | -- | 9.7 | -- | -- | -- | -- | -- | -- |
| 12... | -- | -- | 9.8 | -- | -- | -- | -- | -- | -- |
| 12... | -- | -- | 9.8 | -- | -- | -- | -- | -- | -- |

Remark codes used in this table:
< -- Less than
E -- Estimated value

Value qualifier codes used in this table:
n -- Below the NDV

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# Conversion Factors

| Multiply | By | To obtain |
|---|---|---|
| | **Length** | |
| inch (in.) | $2.54 \times 10^{1}$ | millimeter (mm) |
| | $2.54 \times 10^{-2}$ | meter |
| foot (ft) | $3.048 \times 10^{-1}$ | meter (m) |
| mile (mi) | $1.609 \times 10^{0}$ | kilometer (km) |
| | **Area** | |
| acre | $4.047 \times 10^{3}$ | square meter ($m^2$) |
| | $4.047 \times 10^{-1}$ | square hectometer ($hm^2$) |
| | $4.047 \times 10^{-3}$ | square kilometer ($km^2$) |
| square mile ($mi^2$) | $2.590 \times 10^{0}$ | square kilometer ($km^2$) |
| | **Volume** | |
| gallon (gal) | $3.785 \times 10^{0}$ | liter (L) |
| | $3.785 \times 10^{-3}$ | cubic meter ($m^3$) |
| | $3.785 \times 10^{0}$ | cubic decimeter ($dm^3$) |
| million gallons (Mgal) | $3.785 \times 10^{3}$ | cubic meter ($m^3$) |
| | $3.785 \times 10^{-3}$ | cubic hectometer ($hm^3$) |
| cubic foot ($ft^3$) | $2.832 \times 10^{-2}$ | cubic meter ($m^3$) |
| | $2.832 \times 10^{1}$ | cubic decimeter ($dm^3$) |
| cubic-foot-per-second-per-day [($ft^3$/s/d] | $2.447 \times 10^{3}$ | cubic meter ($m^3$) |
| | $2.447 \times 10^{-3}$ | cubic hectometer ($hm^3$) |
| acre-foot (acre-ft) | $1.223 \times 10^{3}$ | cubic meter ($m^3$) |
| | $1.223 \times 10^{-3}$ | cubic hectometer ($hm^3$) |
| | $1.223 \times 10^{-6}$ | cubic kilometer ($km^3$) |
| | **Flow rate** | |
| cubic foot per second ($ft^3$/s) | $2.832 \times 10^{1}$ | liter (L/s) |
| | $2.832 \times 10^{-2}$ | cubic meter per second ($m^3$/s) |
| | $2.832 \times 10^{1}$ | cubic decimeter per second ($dm^3$/s) |
| gallon per minute (gal/min) | $6.309 \times 10^{-2}$ | liter per second (L/s) |
| | $6.309 \times 10^{-5}$ | cubic meter per second ($m^3$/s) |
| | $6.309 \times 10^{-2}$ | cubic decimeter per second ($dm^3$/s) |
| million gallons per day (Mgal/d) | $4.381 \times 10^{-2}$ | cubic meter per second |
| | $4.381 \times 10^{1}$ | cubic decimeter per second ($dm^3$/s) |
| | **Mass** | |
| ton, short (2,000 lb) | $9.072 \times 10^{-1}$ | megagram (Mg) or metric ton |

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) as follows:

$$°F = (1.8 \times °C) + 32$$