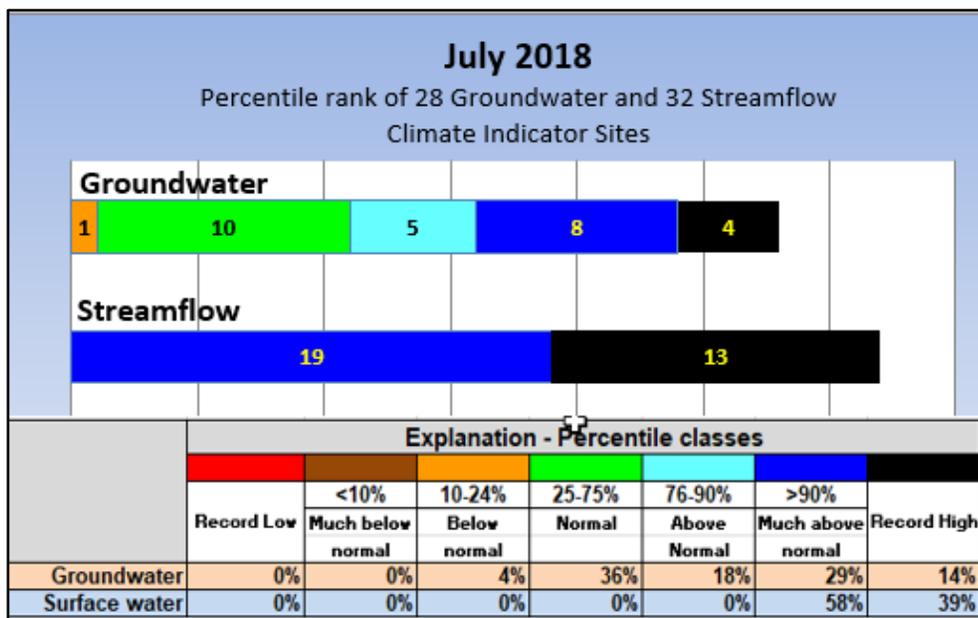


# U.S. Geological Survey (USGS) Maryland-Delaware-District of Columbia Monthly Water Conditions Summary

## USGS July 2018 Water Conditions Summary

Hydrologic data from 28 wells and 32 streamgages were used to monitor the monthly groundwater and streamflow response to weather conditions in Maryland, Delaware, and the District of Columbia. In July 2018, groundwater levels and monthly mean streamflows were at record July highs at 4 wells and 13 streamgages. Groundwater levels ranged from below normal to above normal, and streamflow was above normal at all 32 streamgages.

The number of groundwater and surface-water sites, and the percentage of the total number of groundwater or surface-water sites, that fall within each percentile range are shown in the graphic for July 2018.



*A **percentile** is a value on a scale from 0 to 100 that indicates the percent of a distribution that is equal to or below it. A percentile between 25 and 75 is considered normal. For example, a groundwater level in the 90th percentile is equal to or greater than 90 percent of the values recorded for that month.*

### Why is it important for the USGS to collect and analyze water-resources data?

USGS water data are valuable to the public, researchers, water managers, planners, and agricultural users, especially during extreme conditions like floods and droughts. The USGS is known for its consistent measurement techniques and the most extensive set of historical groundwater and streamflow data available to the public. Since these long-term data were collected during wet and dry periods, they can be used to assess how water resources respond to changes in weather, and to evaluate how current data compare to the historical data. The uniformity of the dataset enables multi-state comparisons and other comparative statistical analyses that can better inform policy makers of possible water-resources conditions they might encounter in the future.

The sites used in this water summary were carefully selected to include long-term datasets and show the response of streamflow and groundwater levels to weather conditions, rather than the effects of human influences. Of the USGS sites presented in this summary, 13 wells and 29 streamgages have more than 50 years of data. The current streamflow and groundwater data are ranked in comparison to the historical record and summarized. In addition to groundwater and streamflow data, this summary includes precipitation data to give a more complete picture of the region's water resources. Hydrologic and weather data have not been reviewed and are therefore provisional and subject to revision.

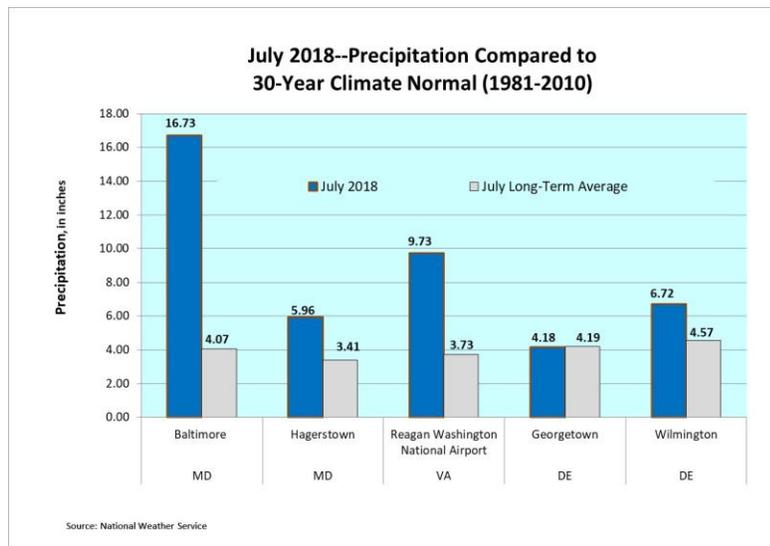
# U.S. Geological Survey (USGS) Maryland-Delaware-District of Columbia Monthly Water Conditions Summary

## Precipitation

Monthly data from five Mid-Atlantic National Weather Service (NWS) stations are used to present monthly precipitation to compare to the response of groundwater and streamflow. The NWS uses averages of data over the 30-year climate normal period from 1981 through 2010.

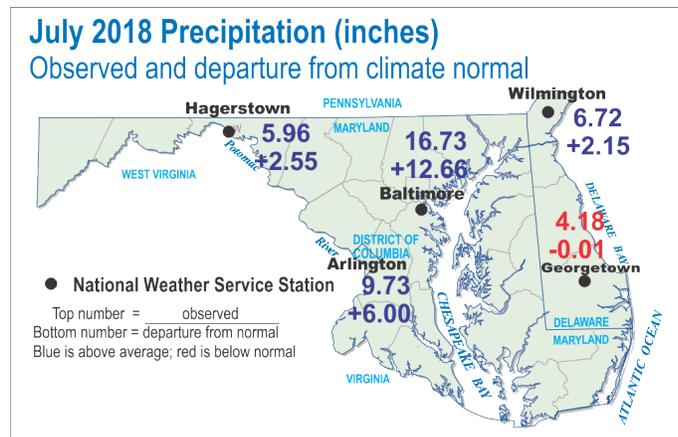
### July 2018 Precipitation

At the NWS station in Baltimore, Maryland, precipitation was 16.73 inches, which according to the NWS was the July record high (previous record was 11.03 inches in 1889) and precipitation in July was the second highest for a calendar month. The long-term average July 2018 precipitation for the five Mid-Atlantic NWS weather stations is shown in the precipitation graph and map below.



### National Weather Service Stations

- Baltimore** = Baltimore/Washington International Thurgood Marshall Airport (BWI)
- Georgetown** = Georgetown, Sussex County Airport
- Hagerstown** = Hagerstown Regional Airport
- Arlington** = Ronald Reagan Washington National Airport
- Wilmington** = New Castle Airport



Source: National Weather Service  
 DC and MD: <http://w2.weather.gov/climate/index.php?wfo=lwx>  
 DE: <http://www.weather.gov/climate/index.php?wfo=phi>  
 MARFC: [http://www.weather.gov/marfc/Precipitation\\_Departures](http://www.weather.gov/marfc/Precipitation_Departures)

# U.S. Geological Survey (USGS) Maryland-Delaware-District of Columbia Monthly Water Conditions Summary

## Groundwater

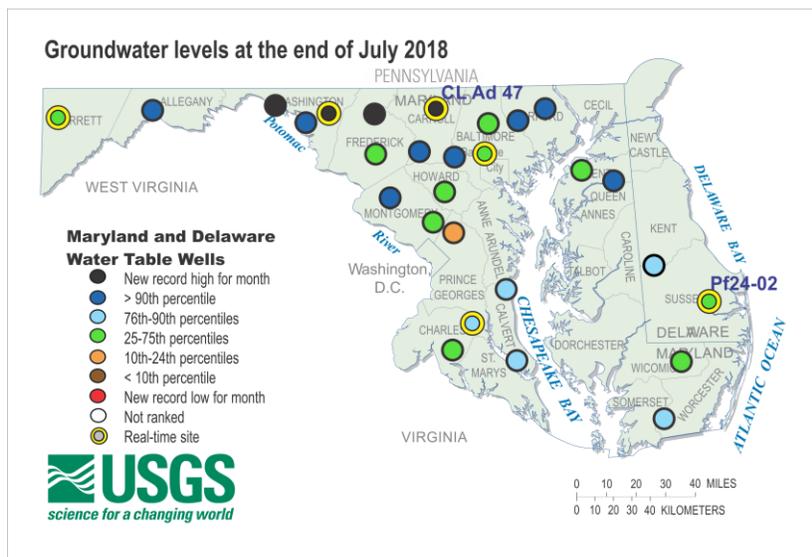
The USGS monitors groundwater levels in surficial or unconfined aquifers, providing observations that can be compared to both short-term and long-term changes in weather conditions. The groundwater wells used for the monthly water summary were selected based on the following criteria:

- Located in a surficial or unconfined (water-table) aquifer
- Open to a single, known hydrogeologic unit/aquifer
- Groundwater hydrograph generally reflects response to weather
- No indicated nearby pumpage, and likely to remain uninfluenced by pumpage or changes related to human activities
- Minimum period of record is 10 years of continuous/monthly records
- Minimally affected by irrigation, canals, drains, pipelines, and other potential sources of artificial recharge
- Well has a casing – dug wells are generally not used
- Water levels show no apparent hydrologic connection to nearby streams
- Well rarely goes dry
- Long-term accessibility likely, such as on public land

In the Maryland, Delaware, and District of Columbia region, it is useful to compare current data to historical data, such as data from the droughts of 1999--2002 and the 1960s. There are 11 wells that have over 60 years of groundwater data, and 23 wells that have more than 30 years of groundwater data as of 2018.

## July 2018 Groundwater Levels

Thirty-six percent, or 10 of 28 USGS observation wells, had groundwater levels within the normal range (25<sup>th</sup>-75<sup>th</sup> percentiles) in July. Groundwater levels were above normal at 17 wells, including 4 record high July groundwater levels, 8 wells with groundwater levels greater than the 90<sup>th</sup> percentile, and 5 wells in the 76<sup>th</sup>-90<sup>th</sup> percentile range. There was one well in Prince George's County with below normal groundwater levels (between the 10<sup>th</sup> and 24<sup>th</sup> percentile) in July. Between June and July, groundwater levels decreased at 15 wells (54 percent) and increased at 13 wells (46 percent).

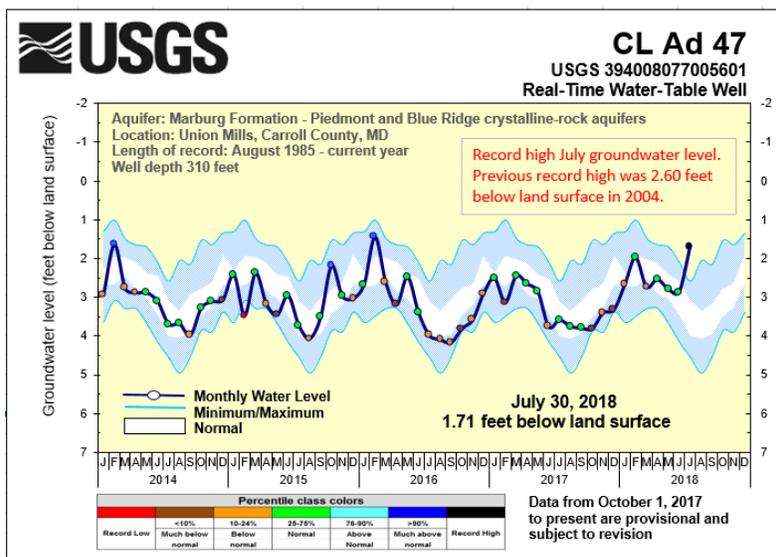


To access the clickable groundwater map, go to:  
[http://md.water.usgs.gov/groundwater/web\\_wells/current/water\\_table/counties/](http://md.water.usgs.gov/groundwater/web_wells/current/water_table/counties/)

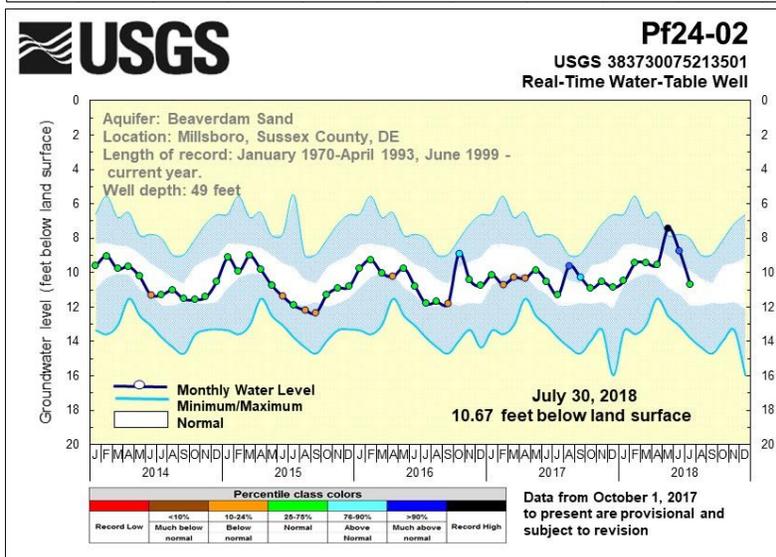
## U.S. Geological Survey (USGS) Maryland-Delaware-District of Columbia Monthly Water Conditions Summary

In the 5-year hydrographs for the selected wells, groundwater levels are shown as a dark blue line. Each monthly measurement is colored according to the percentile rank compared to the historical values at the site for the month. The normal range is displayed as a white band and is based on the period of record. The maximum water level is at the top of the upper blue section, and the minimum water level is at the bottom of the lower blue area in the graph.

The groundwater level at observation well CL Ad 47, in Carroll County, Maryland was 1.71 feet below land surface, which is a July record high. The previous record was 2.60 feet below land surface in 2004. Normal July groundwater levels at this well range from 3.09 to 4.01 feet below land surface. Monthly record-keeping at this well began in August 1985.



The groundwater level at USGS observation well Pf24-02, in Sussex County, Delaware was 10.67 feet below land surface, which is in the normal range (between 9.93 and 11.87 feet below land surface) for July. Record-keeping at this well began in January 1970.



Five-year groundwater hydrographs can be viewed at:  
[http://md.water.usgs.gov/groundwater/web\\_wells/current/water\\_table/counties](http://md.water.usgs.gov/groundwater/web_wells/current/water_table/counties)

# U.S. Geological Survey (USGS) Maryland-Delaware-District of Columbia Monthly Water Conditions Summary

## Streamflow

Streamflow data are most commonly used for assessing water supply and to determine the risk of droughts and floods. Streamflow data also are used to calculate loads of chemical constituents, and to assess how biological communities are affected by hydrologic conditions.

The USGS streamgages chosen for the monthly water summary were selected based on the following criteria:

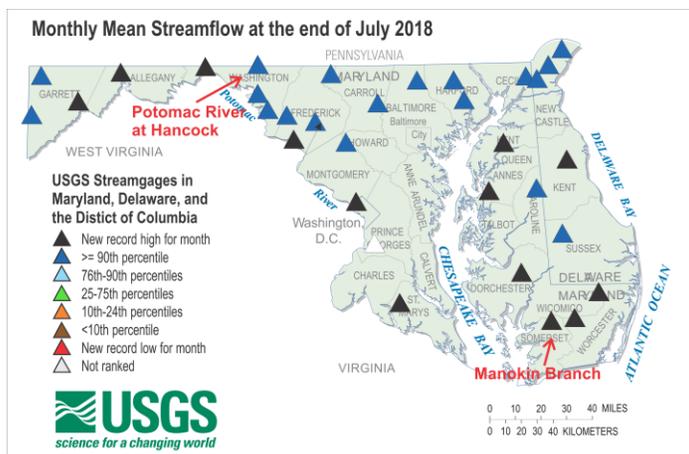
- Minimum period of record is 10 years of continuous data
- Watershed areas greater than 5 square miles
- Streamflow is not regulated, such as by a dam or diversion, and has relatively natural flow
- Streamflow data reflect a response to weather conditions
- Most of the surrounding area and watershed are not urban

Of the 32 streamgages used in this summary, 22 have more than 60 years of data, allowing for comparison to data from the historical droughts of 1999--2002 and the 1960s. All 32 streamgages have at least 30 years of monthly mean streamflow data.

## July 2018 Streamflow

Monthly mean streamflows were above normal at all 32 streamgages, and at record highs at 13 streamgages. Three July records broke the previous records set in 1949, and five of the record highs broke the records set in 1975. Streamflow at the remaining 18 streamgages was above the 90<sup>th</sup> percentile.

Streamflow on Piscataway Creek was not available in July 2018. Streamflow decreased at 8 streamgages (25 percent) and increased at 24 streamgages (75 percent) between June and July.

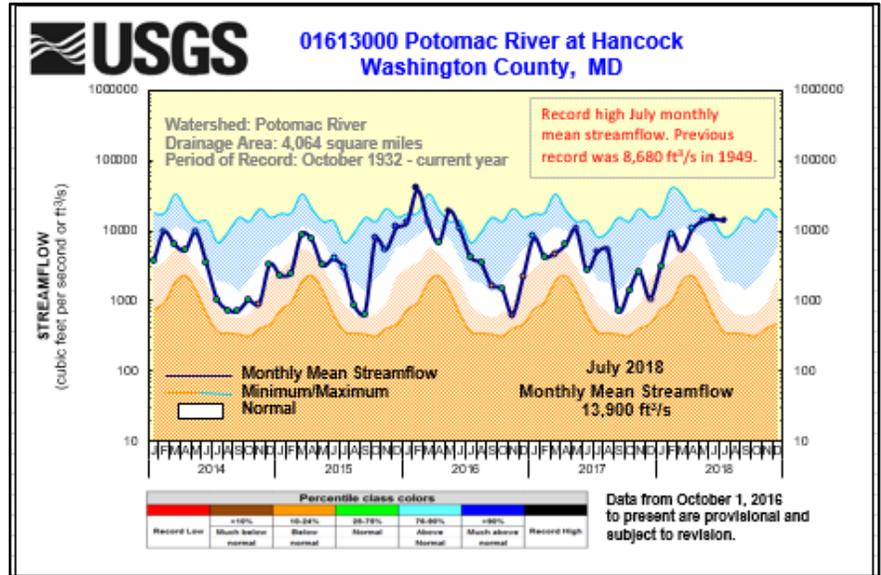


To access the clickable streamflow map, go to:  
<http://md.water.usgs.gov/surfacewater/streamflow/>

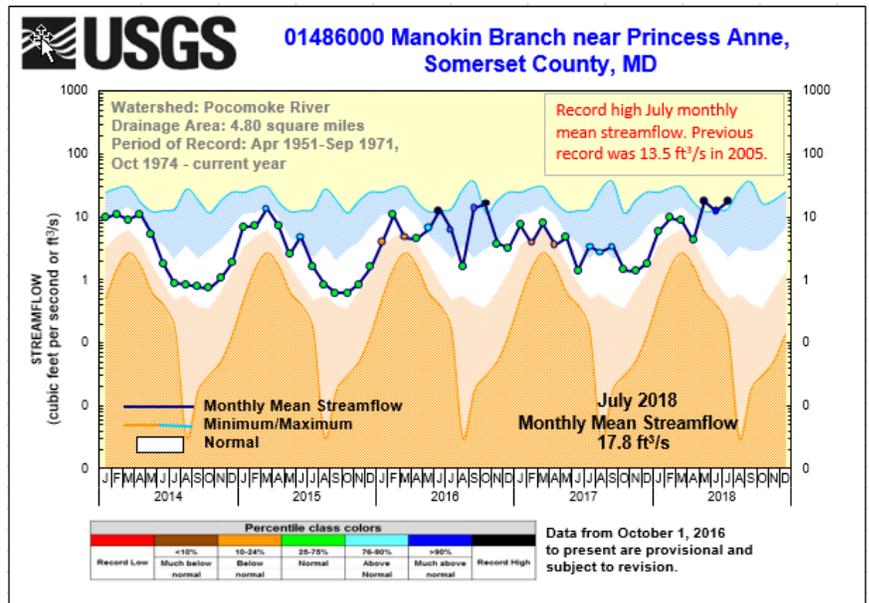
## U.S. Geological Survey (USGS) Maryland-Delaware-District of Columbia Monthly Water Conditions Summary

In the hydrograph for the selected streamgages, the dark line in the 5-year hydrograph represents the monthly mean streamflow for this period, and the white band shows the normal range (25<sup>th</sup>-75<sup>th</sup> percentiles) based on the period of record. The maximum monthly mean streamflow is at the top of the blue shaded section, and the lowest monthly mean streamflow is at the bottom of the tan area. Each monthly mean streamflow is colored according to the percentile rank compared to the historical data for the month.

Monthly mean streamflow at the Potomac River at Hancock in Washington County, Maryland, was 13,900 cubic feet per second (ft<sup>3</sup>/s), which is a July record high. This is the second consecutive month that streamflow at this streamgage was at a record high. The normal streamflow range for July is between 892 ft<sup>3</sup>/s and 1,950 ft<sup>3</sup>/s. Record-keeping at this streamgage began in October 1932.



At Manokin Branch near Princess Anne in Somerset County, Maryland, the monthly mean streamflow was 17.8 ft<sup>3</sup>/s, which is a record high. The previous record high was 13.5 ft<sup>3</sup>/s in 2005. Record-keeping at this streamgage began in April 1951.



Five-year hydrographs can be viewed at:  
<http://md.water.usgs.gov/surfacewater/streamflow/>

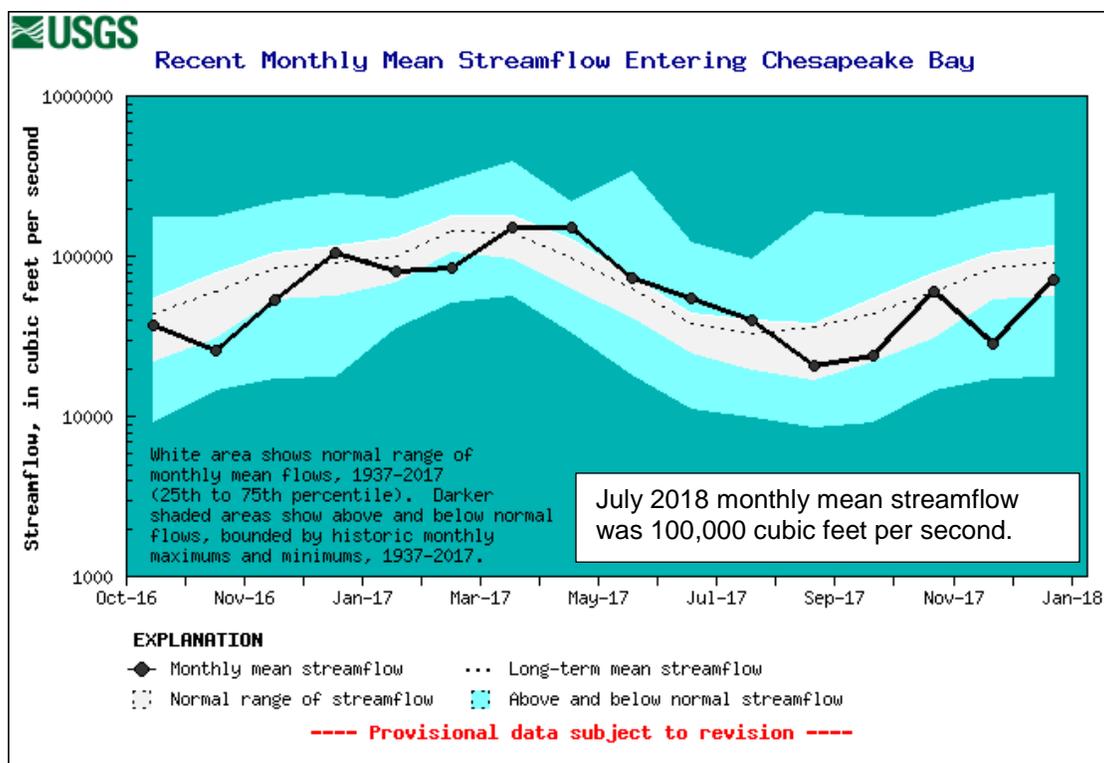
# U.S. Geological Survey (USGS) Maryland-Delaware-District of Columbia Monthly Water Conditions Summary

## Estimated Streamflow to the Chesapeake Bay

Estimated streamflow entering the Chesapeake Bay is computed on a monthly and annual basis using streamflow measurements from the Susquehanna, Potomac, and James Rivers. Data are presented in tables and graphs, typically grouped by water year — the natural, annual water cycle from October through September used by hydrologists.

The health of the Chesapeake Bay largely is driven by changes in streamflow and the amount of pollution it contains. Runoff in the Chesapeake Bay watershed carries pollutants, such as nutrients and sediments, to rivers and streams that drain to the Bay. Scientists can use estimated streamflow entering the Chesapeake Bay to assess the health of the Bay and make ecological forecasts.

The estimated monthly mean streamflow entering Chesapeake Bay during July 2018 was 100,000 ft<sup>3</sup>/s. This value, which is provisional and subject to revision, is considered to be in the above normal range. Normal July streamflow entering the Bay is between 25,000 and 44,100 ft<sup>3</sup>/s, the 25<sup>th</sup> and 75<sup>th</sup> percentiles, respectively, of all January values. Average (mean) monthly streamflow for July is 38,800 ft<sup>3</sup>/s. These statistics are based on an 81-year period of record.



More information on freshwater flow to the Bay can be found at:  
<http://md.water.usgs.gov/waterdata/chesinflow/>