

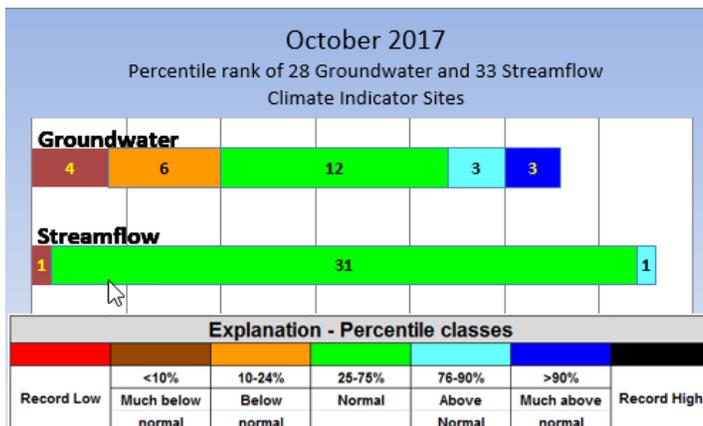
# U.S. Geological Survey (USGS) Maryland-Delaware-District of Columbia Monthly Water Conditions Summary

## USGS October 2017 Water Conditions Summary

In October 2017, 43 percent of groundwater levels and 94 percent of monthly mean streamflows were in the normal range at sites used to monitor the response of water resources to changes in weather conditions in Maryland, Delaware, and the District of Columbia. Since September, groundwater levels decreased at 19 wells and increased at 9 wells. Monthly mean streamflows decreased at 14 streamgages and increased at 19 streamgages.

Groundwater levels at 12 of 28 USGS observation wells were in the normal range (25<sup>th</sup>-75<sup>th</sup> percentiles) at the end of October. Groundwater levels were above normal in 6 observation wells, with groundwater levels in 3 wells above the 90<sup>th</sup> percentile, and below normal in 10 wells, with 4 wells below the 10<sup>th</sup> percentile.

Monthly mean streamflows were in the normal range at 31 of 33 USGS streamgages. Streamflow was above normal at one streamgage, and below the 10<sup>th</sup> percentile at one streamgage in October.



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.

October 2017 freshwater flows to the Chesapeake Bay were in the normal range. Precipitation was below the long-term average at three Mid-Atlantic National Weather Service (NWS) weather stations and more than a half inch above the long-term average at two weather stations. Hydrologic and weather data have not been reviewed, and are therefore provisional and subject to revision.

### 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 temperature and precipitation, 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 and temperature data, reservoir levels, and freshwater streamflow to the Chesapeake Bay to give a more complete picture of the region's water resources.

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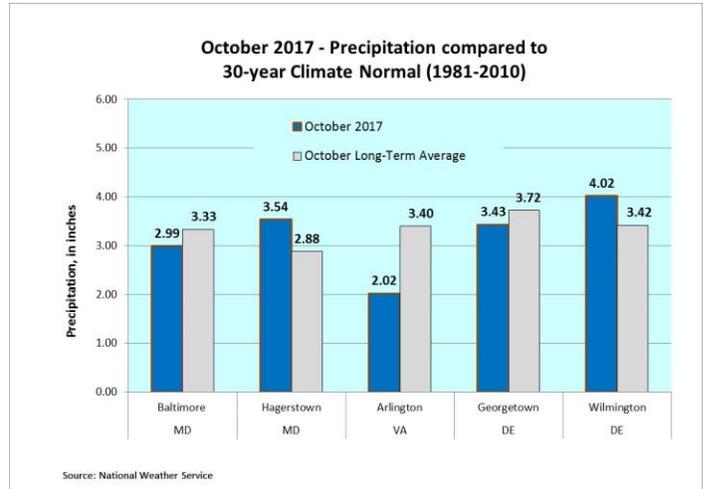
## Weather Conditions

Data from five Mid-Atlantic NWS stations are used to present monthly precipitation and temperature data. The NWS uses averages of data over the 30-year climate normal period from 1981 through 2010.

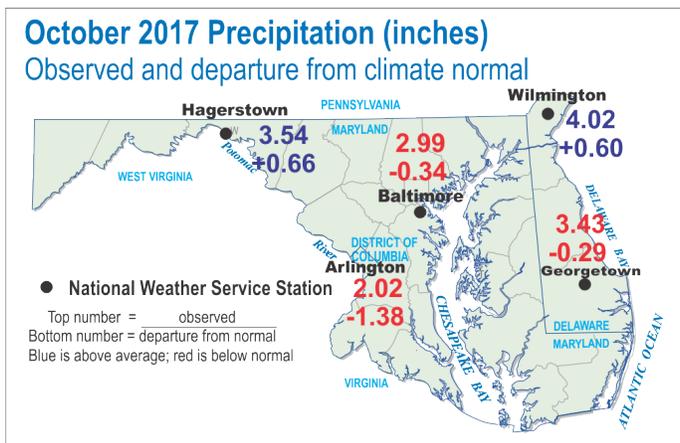
During drought periods, the status from the National Drought Mitigation Center ([U.S. Drought Monitor](#)) and the [Maryland Department of the Environment \(MDE\)](#) is included. There is currently no drought in Maryland, Delaware, or the District of Columbia, however, central Maryland is considered abnormally dry.

### October 2017 Precipitation

October precipitation was below the long-term average at three Mid-Atlantic NWS weather stations and above normal at two weather stations. Precipitation was lowest in Arlington, Virginia, with 2.02 inches, or 1.38 inches below the long-term average. The highest precipitation in October was in Wilmington, Delaware, with 4.02 inches.



The precipitation graph and map show October precipitation and the departure from the 30-year climate normal.



### National Weather Service Stations

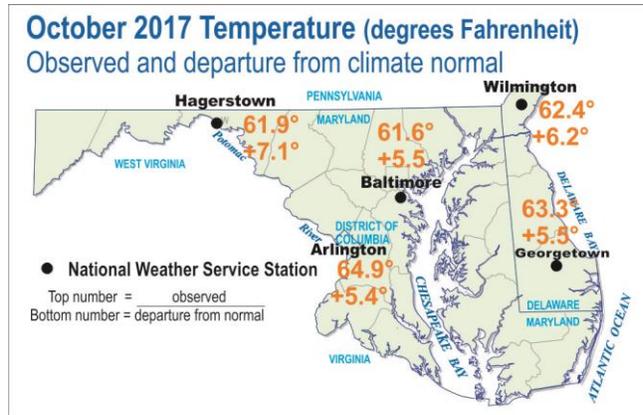
- Baltimore** = Baltimore/Washington International Thurgood Marshall Airport (BWI)
- Georgetown** = Georgetown, Sussex County Airport
- Hagerstown** = Hagerstown Regional Airport
- Arlington** = Ronald Reagan Washington National Airport
- Wilmington** = New Castle Airport

Source: National Weather Service  
MD and DC: <http://www.weather.gov/climate/index.php?wfo=lx&http://w2.weather.gov/climate/index.php?wfo=lx>  
DE: <http://www.weather.gov/climate/index.php?wfo=phi>

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

## October 2017 Temperatures

October temperatures at the five Mid-Atlantic NWS stations were more than 5.4 degrees Fahrenheit above the climate normal and ranged from 61.6 to 64.9 degrees. The highest departure from average for October was in Hagerstown, Maryland, at 7.1 degrees Fahrenheit above normal. Note that the temperature in Hagerstown was warmer than the temperature in Baltimore.



# 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:

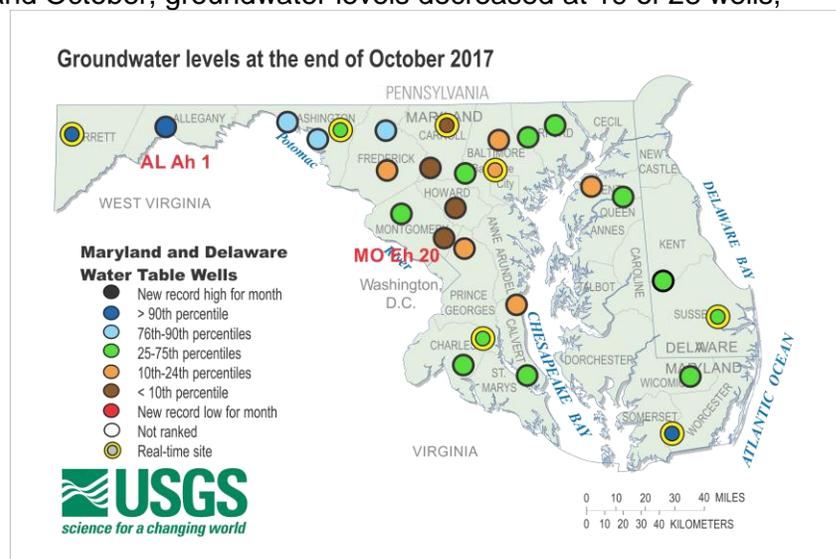
- Located in a surficial or unconfined (water-table) aquifer
- Open to a single, known hydrogeologic unit/aquifer
- Groundwater hydrograph generally reflects response to weather
- No indicated nearby pumpage, and likely to remain uninfluenced by pumpage or changes related to human activities
- Minimum 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 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 2017.

## October 2017 Groundwater Levels

Forty-three percent, or 12 USGS observation wells, had groundwater levels within the normal range in October. Groundwater levels were above normal at six observation wells, with three wells above the 90<sup>th</sup> percentile and three wells in the 76<sup>th</sup> – 90<sup>th</sup> percentiles. Groundwater levels were below normal at 10 wells, including 6 wells in the 10<sup>th</sup>-24<sup>th</sup> percentile range, and 4 wells below the 10<sup>th</sup> percentile. Between September and October, groundwater levels decreased at 19 of 28 wells, and increased at 9 wells.

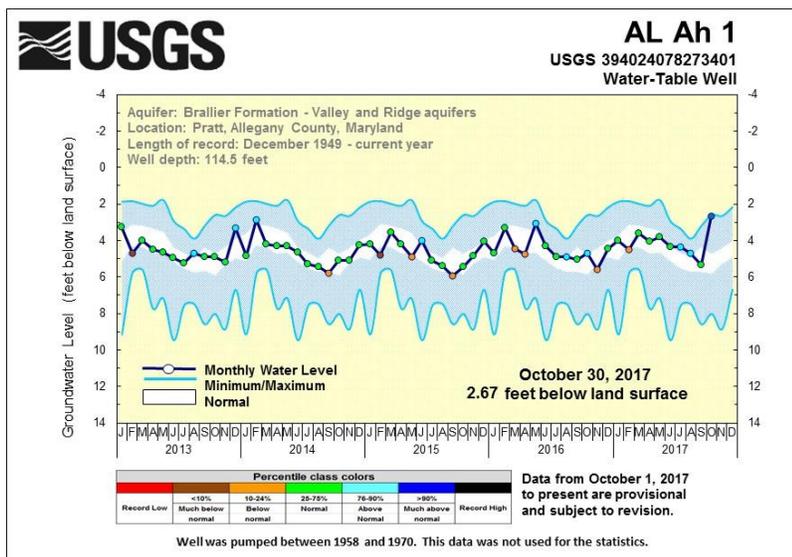
In the two 5-year hydrographs for the selected wells, groundwater levels are shown as a dark blue line. Each monthly measurement is colored according to the percentile rank compared to the historical values at the site for the month. The normal range is displayed as a white band, and is based on the 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.



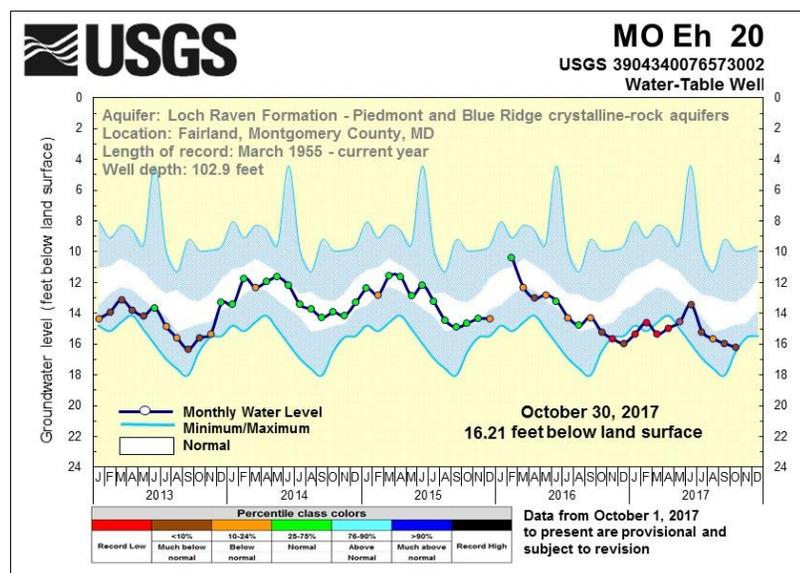
To access the clickable groundwater map, go to:

[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



The groundwater level at observation well AL Ah 1, in Allegany County, Maryland, was above normal. The water level rose 2.66 feet and went from normal in September, to above the 90<sup>th</sup> percentile in October. During the last consecutive 7 months, the groundwater level was normal. Normal October groundwater levels at this well range from 4.70 to 5.83 feet below land surface. Record keeping at this well began in December 1949.



The groundwater level at USGS observation well MO Eh 20, in Montgomery County, Maryland, dropped 0.25 feet between September and October 2017. The groundwater level was 16.21 feet below land surface, which is below normal. The October normal range of groundwater levels at this well is between 13.34 and 14.89 feet below land surface. Record keeping at this well began in March 1955.

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 are also used to calculate loads of chemical constituents, and to assess how biological communities are affected by hydrologic conditions.

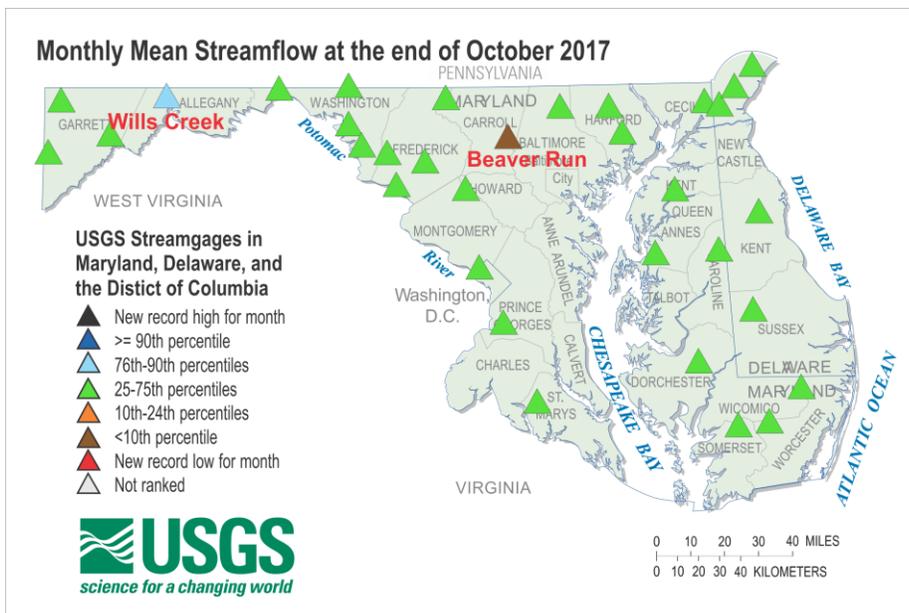
The USGS streamgages chosen for the monthly water summary were selected based on the following criteria:

- 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 it has relatively natural flow
- Streamflow data reflect a response to weather conditions
- Most of the surrounding area and watershed are not urban

Of the 33 streamgages used in this summary, 22 have more than 60 years of data, allowing for comparison to data from the historical droughts of 2002 and the 1960s. All 33 streamgages have at least 30 years of monthly mean streamflow data.

## October 2017 Streamflow

Monthly mean streamflows were in the normal range at 94 percent, or 31 of 33 selected USGS streamgages. Streamflow was above normal at Wills Creek in Allegany County, Maryland and below normal at Beaver Run in Carroll County, Maryland. Streamflow decreased at 14 streamgages and increased at 19 streamgages between September and October.

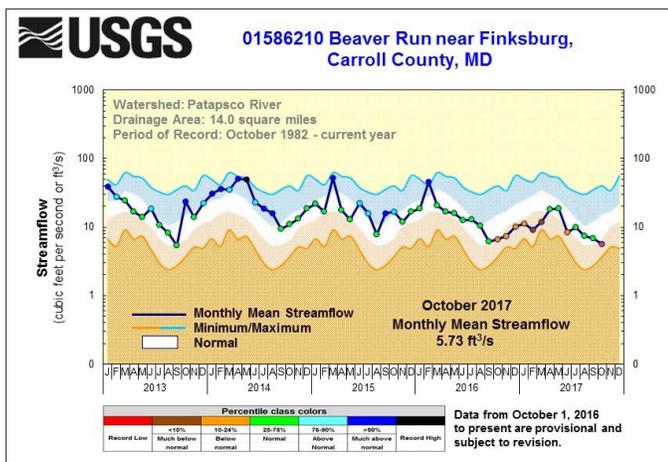


To access the clickable streamflow map, go to:  
<http://md.water.usgs.gov/surfacewater/streamflow/>

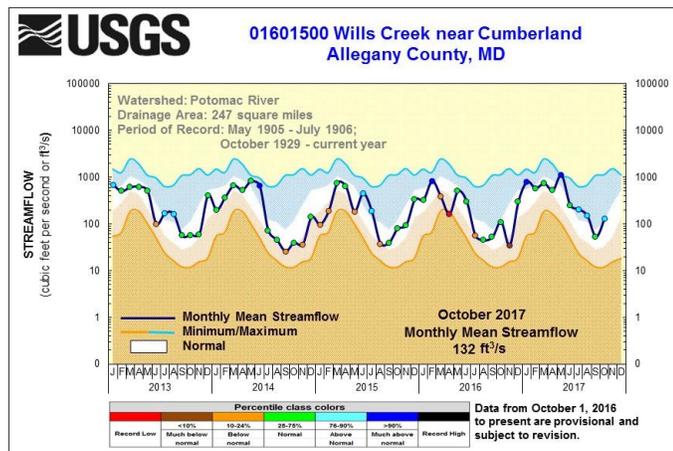
## U.S. Geological Survey (USGS) Maryland-Delaware-District of Columbia Monthly Water Conditions Summary

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.

At Beaver Run near Finksburg in Carroll County, Maryland, the monthly mean streamflow decreased between September and October to 5.73 cubic feet per second (ft<sup>3</sup>/s), which is below normal. The normal range for October is between 6.65 ft<sup>3</sup>/s and 15.3 ft<sup>3</sup>/s. Record-keeping at this streamgage began in October 1982.



At Wills Creek near Cumberland in Allegany County, Maryland, the monthly mean streamflow increased between September and October to 132 ft<sup>3</sup>/s, which is in the above normal range. The normal range for October is between 33.4 ft<sup>3</sup>/s and 116 ft<sup>3</sup>/s. Continuous record-keeping at this streamgage began in October 1929.

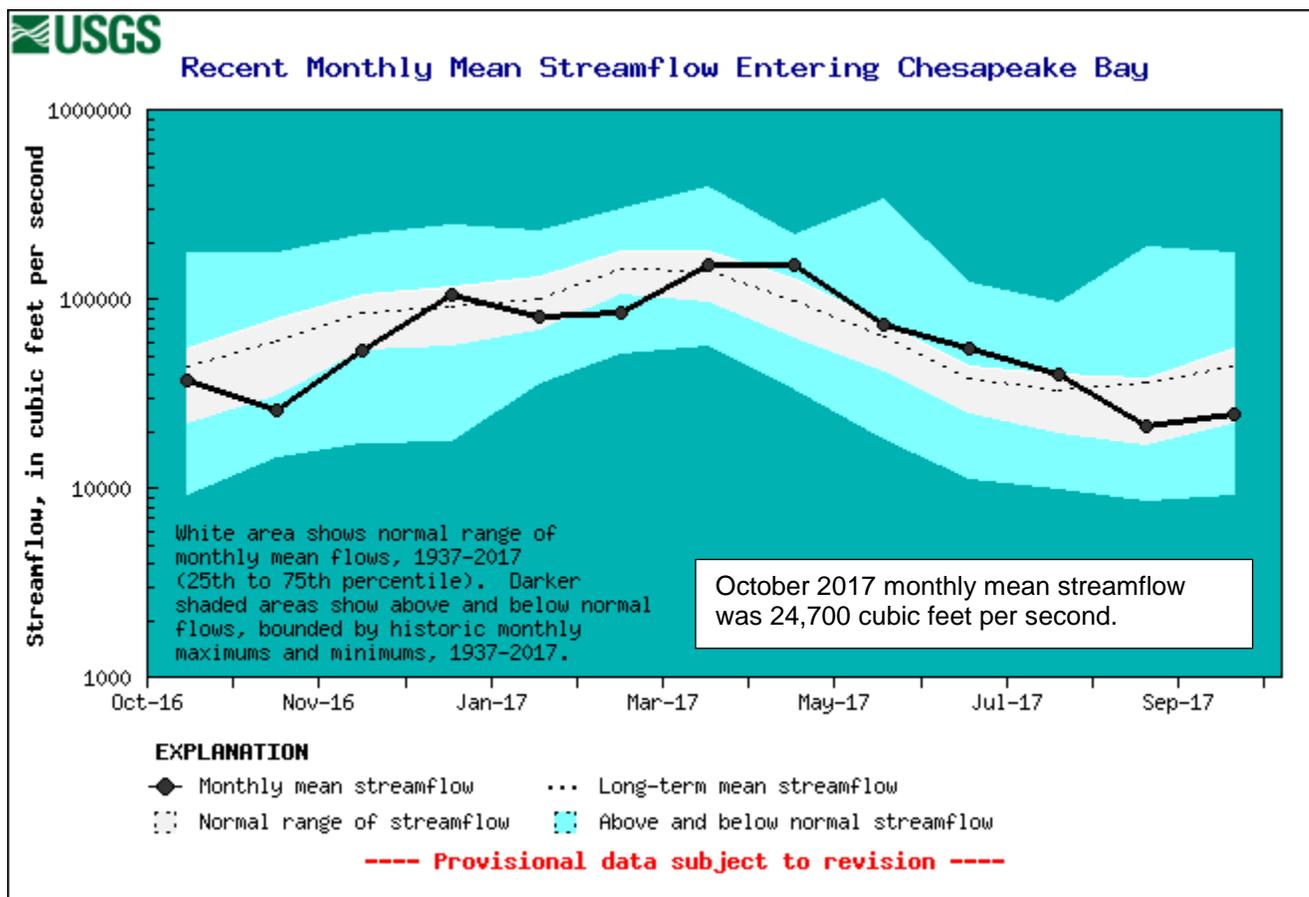


Five-year hydrographs can be viewed at:  
<http://md.water.usgs.gov/surfacewater/streamflow/>

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

**Estimated Streamflow to the Chesapeake Bay**

The estimated monthly mean streamflow entering Chesapeake Bay during October 2017 was 24,700 ft<sup>3</sup>/s. This value, which is provisional and subject to revision, is considered to be in the normal range. Normal October streamflow entering the Bay is between 22,100 and 55,700 ft<sup>3</sup>/s, the 25<sup>th</sup> and 75<sup>th</sup> percentiles, respectively, of all October values. Average (mean) monthly streamflow for October is 44,600 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/>

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

**Baltimore and Patuxent Reservoir Levels**

Baltimore City’s Department of Public Works provides finished drinking water from three reservoirs (Loch Raven, Liberty, and Prettyboy) to 1.8 million people daily in Baltimore City and parts of Baltimore, Anne Arundel, and Howard Counties in Maryland. Carroll and Harford Counties in Maryland also receive raw water from the Baltimore reservoirs. At the end of October 2017, available reservoir storage in the Baltimore Reservoirs was 70.23 billion gallons, or 93 percent of available storage capacity (total or full storage is 75.85 billion gallons of water).

The Triadelphia and Duckett Reservoirs serve 1.8 million residents in parts of Charles, Howard, Montgomery, and Prince George’s Counties in suburban Maryland around the District of Columbia, and are managed by the Washington Suburban Sanitary Commission (WSSC).

The stored water quantity for the Triadelphia and Duckett Reservoirs at the end of October 2017 was 3.69 billion gallons, which is about 35 percent of normal storage capacity for the two Patuxent reservoirs. The storage numbers were updated in June 2017 by the WSSC. Normal storage refers to the volume that is useable for water supply. The full capacity of the two Patuxent reservoirs is 11.93 billion gallons, which is higher than normal storage (10.57 billion gallons); therefore, full capacity values can exceed 100 percent of normal storage.

Note: The Triadelphia Reservoir storage level is low because of an ongoing project and will be kept low until 2019 or until the project is complete.-

