

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

USGS November 2017 Water Conditions Summary

In November 2017, 50 percent of groundwater levels and 64 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 October, groundwater levels decreased at 17 wells and increased at 11 wells. Monthly mean streamflows decreased at 8 streamgages and increased at 22 streamgages.

Groundwater levels at 14 of 28 USGS observation wells were in the normal range (25th-75th percentiles) at the end of November. Groundwater levels were above normal in three observation wells, with one well at a record high. Groundwater levels were below normal in 11 wells, with two wells below the 10th percentile and one well at a record low.

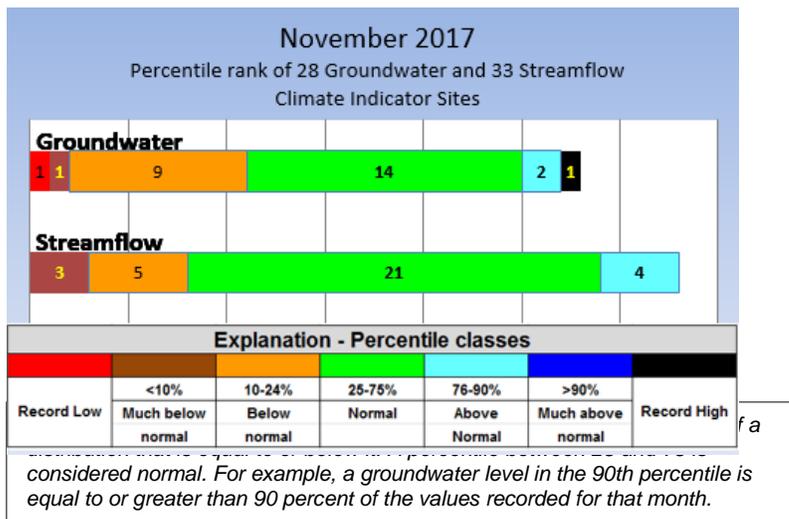
Monthly mean streamflows were in the normal range at 21 of 33 USGS streamgages. Streamflow was above normal (76th to 90th percentiles) at four streamgages, and below normal at eight streamgages, including five streamgages in the 10-24th percentiles and three streamgages below the 10th percentile in November.

November 2017 freshwater flows to the Chesapeake Bay were in the normal range. Precipitation was more than an inch below the long-term average at the five Mid-Atlantic National Weather Service (NWS) 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.



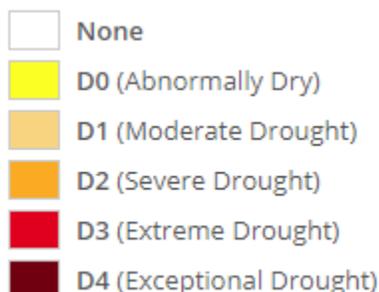
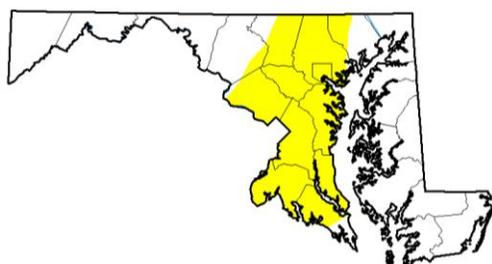
U.S. Geological Survey (USGS) Maryland-Delaware-District of Columbia Monthly Water Conditions Summary

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.

November 2017 Drought Status

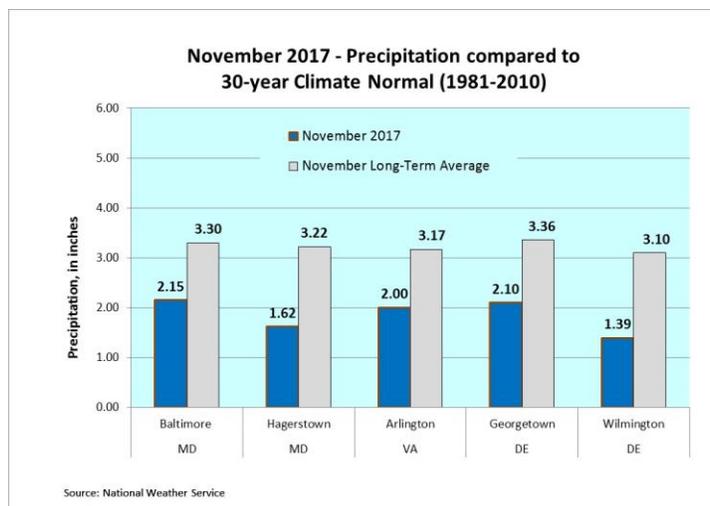
During drought periods, the status from the National Drought Mitigation Center ([U.S. Drought Monitor](#)) and the [Maryland Department of the Environment \(MDE\)](#) is included. The U.S. Drought Monitor shows that as of November 28, 2017, in Maryland, 38.77 percent of state was abnormally dry. In the District of Columbia, 100 percent was in abnormally dry. Delaware had no drought conditions in November.



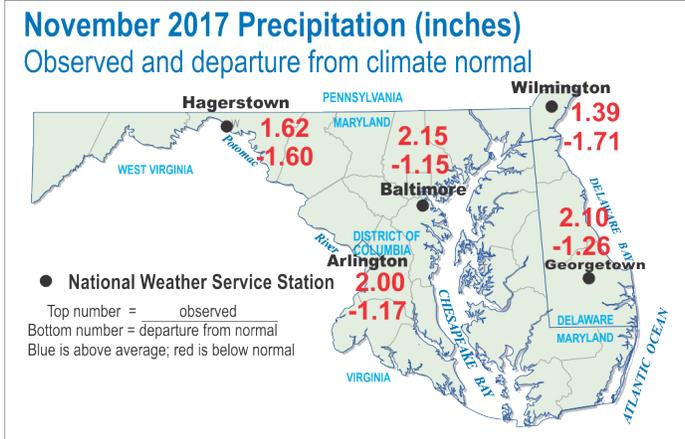
November 2017 Precipitation

November precipitation was more than an inch below the long-term average at five Mid-Atlantic NWS weather stations. Precipitation was lowest in Wilmington, Delaware, with 1.39 inches, or 1.71 inches below the long-term average. The highest precipitation in November was in Baltimore, Maryland, with 2.15 inches, which is 1.15 inches below the long-term November average..

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



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

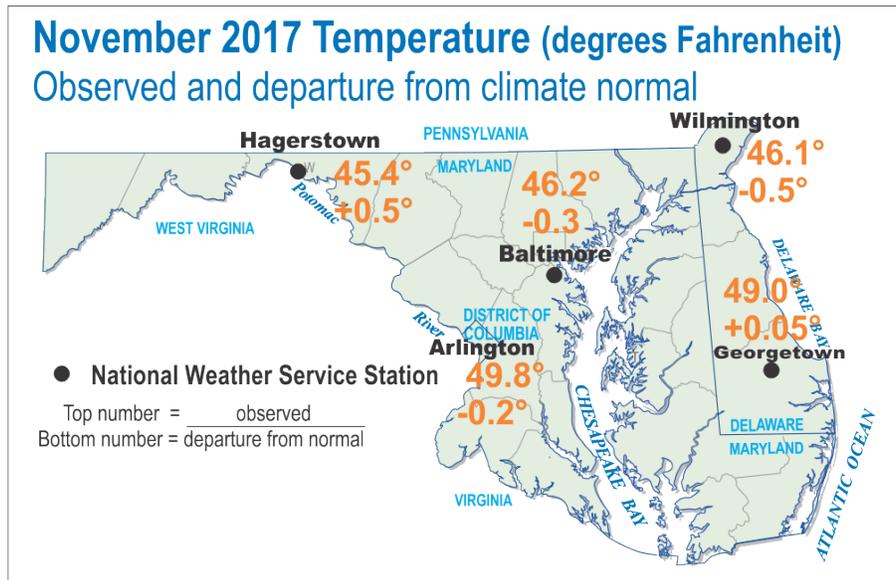


National Weather Service Stations

- 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

November 2017 Temperatures

November temperatures at the three Mid-Atlantic NWS stations were below the climate normal and ranged from 45.4 to 49.8 degrees Fahrenheit. There were two Mid-Atlantic NWS stations below the long-term average. The lowest November temperature was in Hagerstown, Maryland at 45.4 degrees. The highest temperature was in Arlington, Virginia at 49.8 degrees.



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

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

Groundwater

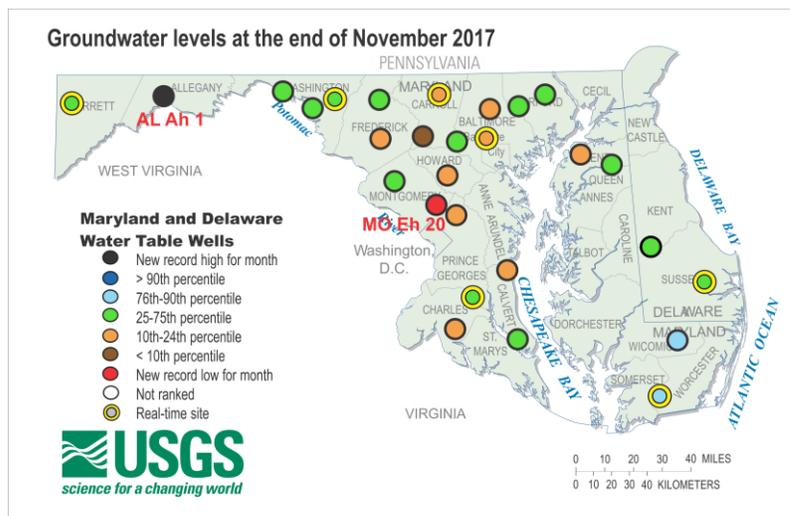
The USGS monitors groundwater levels in surficial or unconfined aquifers, providing observations that can be compared to both short-term and long-term changes in weather conditions. The groundwater wells used for the monthly water summary were selected based on the following criteria:

- 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.

November 2017 Groundwater Levels

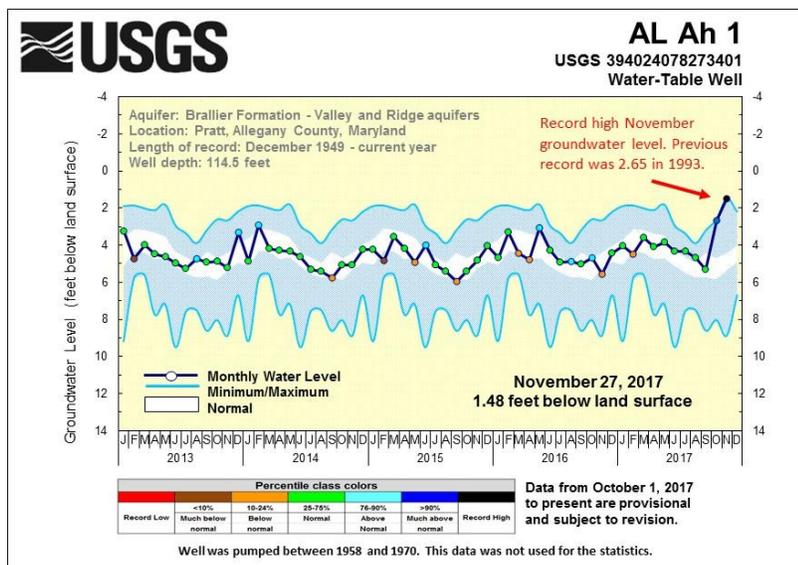
Fifty percent, or 14 USGS observation wells, had groundwater levels within the normal range in November. Groundwater levels were above normal at three observation wells, with the observation well in Allegany County at a record November high, exceeding the record set in 1981. Groundwater levels were below normal at 11 wells, including 9 wells in the 10th-24th percentile range, and two wells below the 10th percentile, including an observation well in Montgomery County, Maryland that set a new record November low. The groundwater record at observation well MO Eh 20 exceeded the previous November record of 15.66 feet below land surface set in 2016. Between October and November, groundwater levels decreased at 17 of 28 wells, and increased at 11 wells.



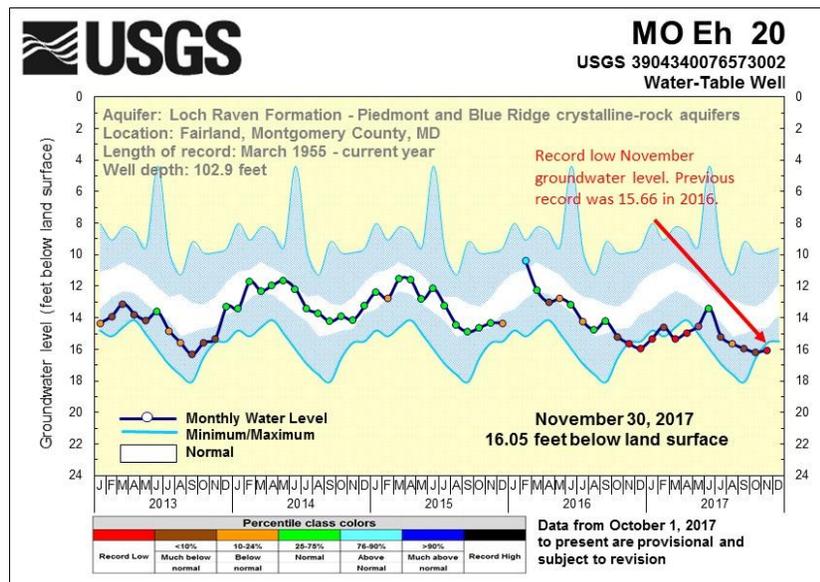
To access the clickable groundwater map, go to:
http://md.water.usgs.gov/groundwater/web_wells/current/water_table/counties/

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

In the 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.



The groundwater level at observation well AL Ah 1, in Allegany County, Maryland, rose 1.19 feet since October to 1.48 feet below land surface, which was a record November high. The previous record-high November groundwater level was 2.65 feet below land surface in 1993. Normal November groundwater levels at this well range from 4.40 to 5.32 feet below land surface. Record keeping at this well began in December 1949.



Although the groundwater level at USGS observation well MO Eh 20, in Montgomery County, Maryland, rose 0.16 feet between October and November, it was at a record November low at 16.05 feet below land surface. The previous record was 0.39 feet higher or 15.66 feet below land surface in 2016. The November normal range of groundwater levels at this well is between 12.84 and 14.72 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

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.

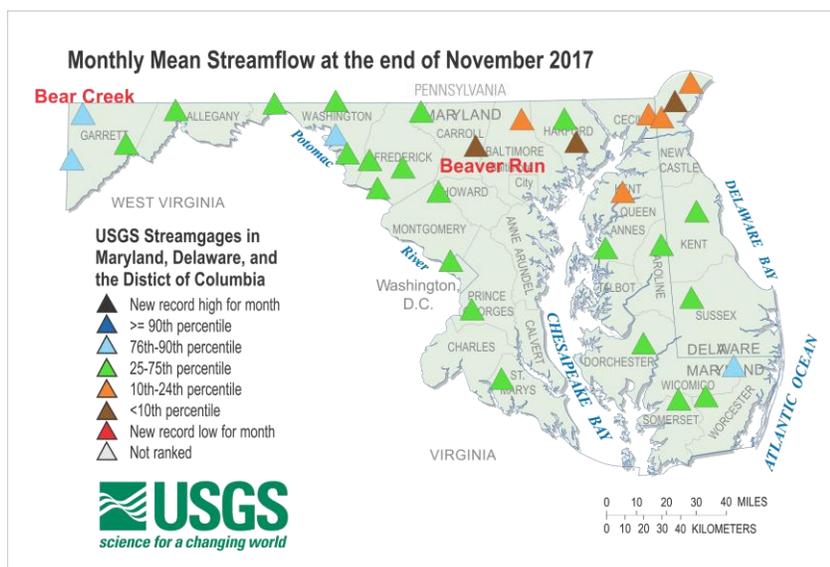
The USGS streamgages chosen for the monthly water summary were selected based on the following criteria:

- 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 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.

November 2017 Streamflow

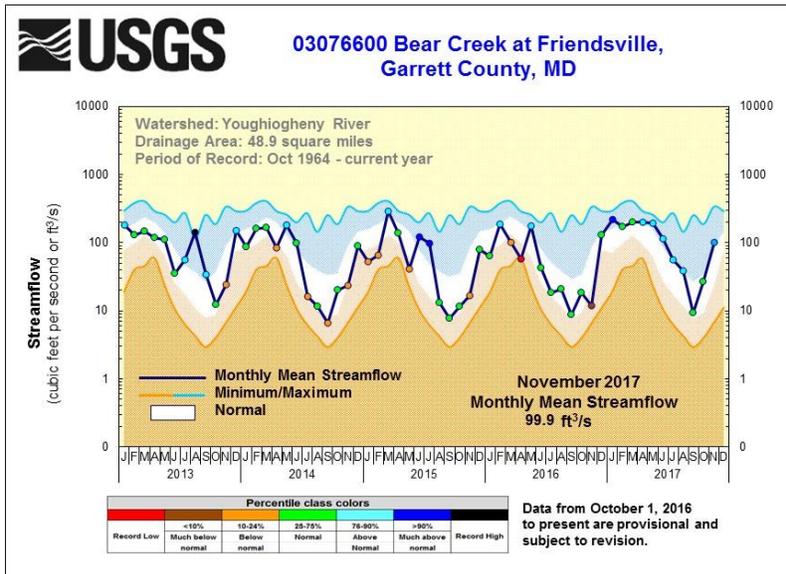
Monthly mean streamflows were in the normal range at 64 percent, or 21 of 33 selected USGS streamgages. Streamflow was above normal at four streamgages, all in the 76th to 90th percentiles. Streamflow was below normal at eight streamgages in Maryland, Delaware, and the District of Columbia, including five streamgages in the 10th -24th percentiles and three streamgages in less than the 10th percentile. Streamflow decreased at 8 streamgages and increased at 25 streamgages between October and November.



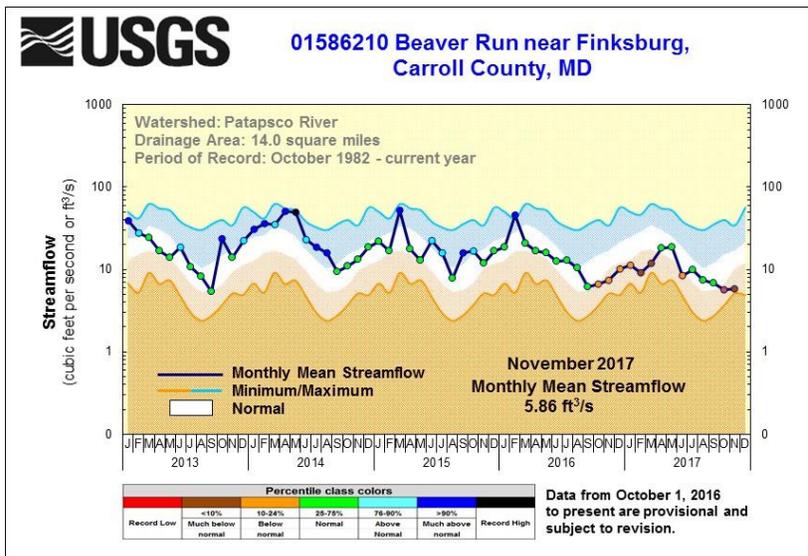
To access the clickable streamflow map, go to:
<http://md.water.usgs.gov/surfacewater/streamflow/>

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 (25th-75th 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 Bear Creek at Friendsville in Garrett County, Maryland, the monthly mean streamflow increased between October and November to 99.9 cubic feet per second (ft³/s), which is above normal. The normal streamflow range for November is between 22.0 ft³/s and 86.8 ft³/s. Continuous record-keeping at this streamgage began in October 1964.



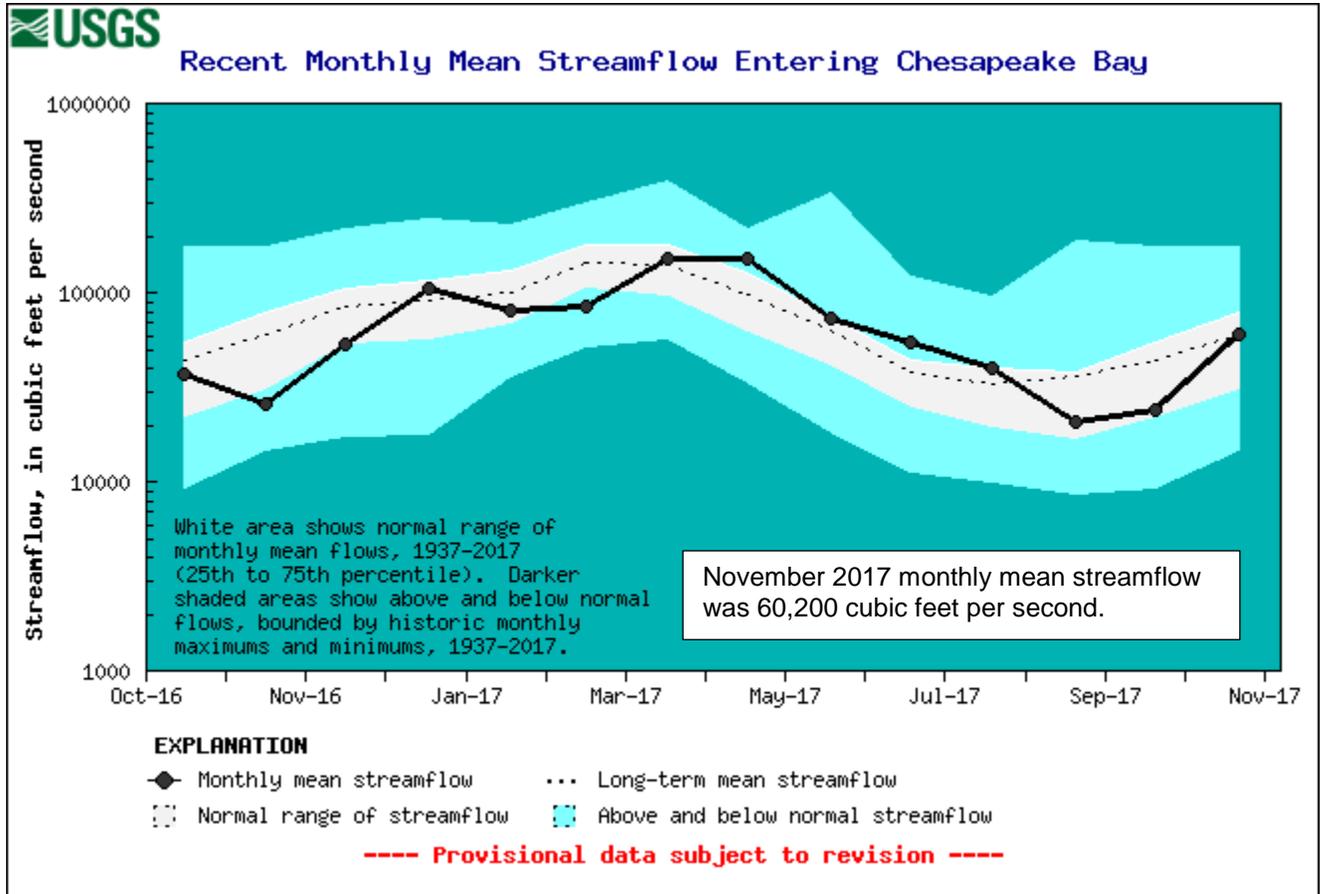
At Beaver Run near Finksburg in Carroll County, Maryland, the monthly mean streamflow decreased between October and November to 5.86 ft³/s, which is below normal (less than 10th percentile). The normal range for November is between 8.38 ft³/s and 16.7 ft³/s. Record-keeping at this streamgage began in October 1982.

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 November 2017 was 60,200 ft³/s. This value, which is provisional and subject to revision, is considered to be in the normal range. Normal November streamflow entering the Bay is between 31,100 and 78,900 ft³/s, the 25th and 75th percentiles, respectively, of all November values. Average (mean) monthly streamflow for November is 60,400 ft³/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 November 2017, available reservoir storage in the Baltimore Reservoirs was 68.72 billion gallons, or 91 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 November 2017 was 3.54 billion gallons, which is about 33 percent of normal storage capacity for the two Patuxent reservoirs. The storage capacity 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.

