

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

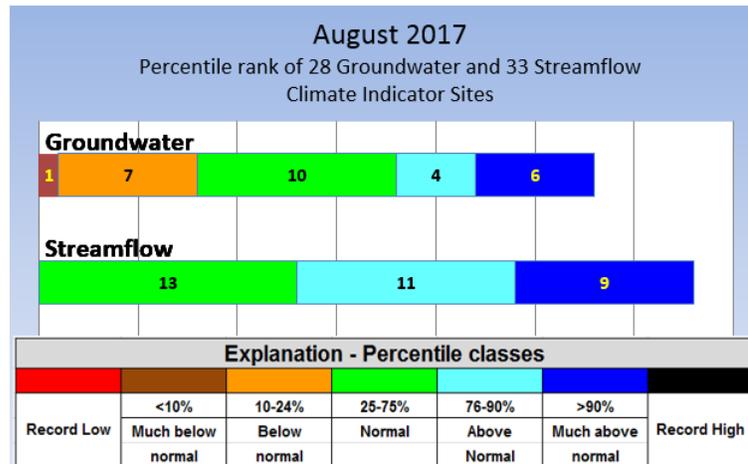
USGS August 2017 Water Conditions Summary

At sites used to monitor the response of water resources to changes in weather conditions in Maryland, Delaware, and the District of Columbia in August 2017, 32 percent of groundwater levels and 39 percent of monthly mean streamflows were in the normal range. Since July, groundwater levels decreased at 12 wells and increased at 16 wells. Monthly mean streamflows decreased at 17 streamgages and increased at 16 streamgages.

In August, groundwater levels at 10 of 28 USGS observation wells were in the normal range (25th-75th percentiles). Groundwater levels were above normal in 10 observation wells and below normal in 8 wells, with 1 well below the 10th percentile.

Monthly mean streamflows were in the normal range at 13 of 33 USGS streamgages. Streamflow was above normal at 20 streamgages, with 9 streamgages above the 90th percentile.

August 2017 freshwater flows to the Chesapeake Bay were in the above normal range. Precipitation was above the long-term average at four of 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.



*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 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

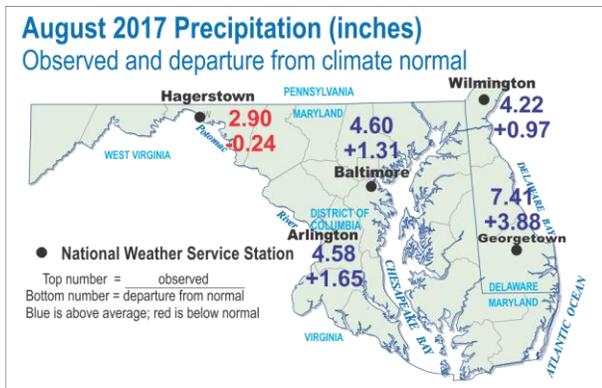
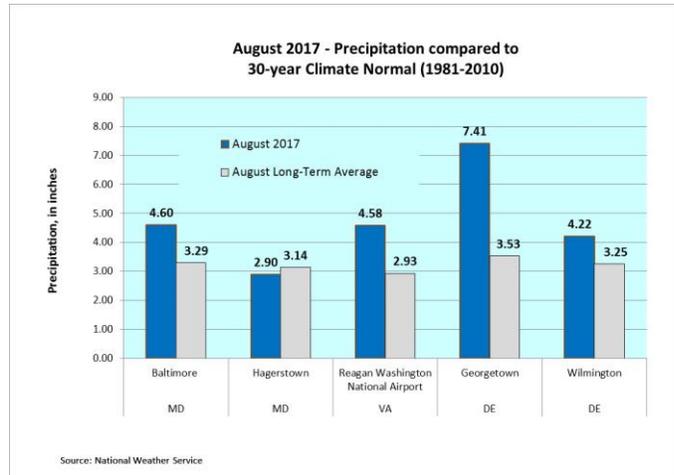
Data from five Mid-Atlantic NWS stations are used to present monthly precipitation and temperature data. The NWS uses averages of data over the 30-year climate normal period between 1981 through 2010.

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.

August 2017 Precipitation

August precipitation was above the long-term average and more than double the amount at one of the five Mid-Atlantic NWS weather stations. Precipitation at Georgetown, Delaware was 7.41 inches, or 3.88 inches above the long-term average. Eighty-three percent (6.14 inches) of the precipitation fell over 4 days.

Precipitation at Hagerstown, Maryland was below the long-term average at 2.90 inches. The precipitation graph and map show August precipitation and the departure from the 30-year climate normal.



National Weather Service Stations

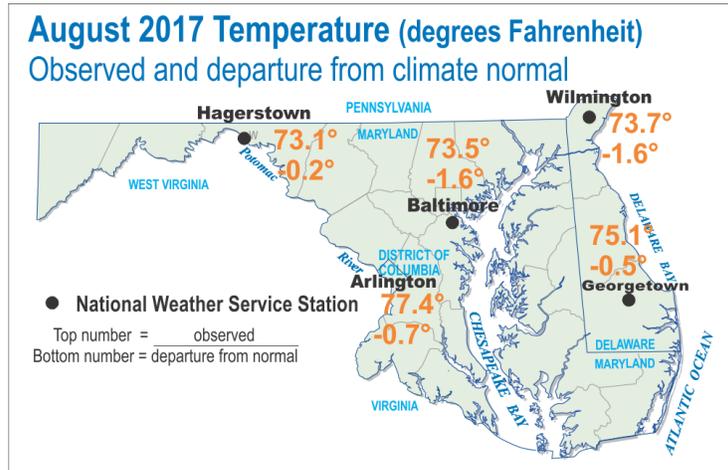
- Baltimore** = Baltimore/Washington International Thurgood Marshall Airport (BWI)
- Georgetown** = Georgetown, Sussex County Airport
- Hagerstown** = Hagerstown Regional Airport
- Arlington** = Ronald Reagan Washington National Airport
- Wilmington** = New Castle Airport

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

August 2017 Temperatures

August temperatures at the five Mid-Atlantic NWS stations were below the climate normal and ranged from 73.1 to 77.4 degrees Fahrenheit. The highest departures from average for August were in Baltimore, Maryland, and Wilmington, Delaware at 1.6 degrees Fahrenheit below normal.



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:

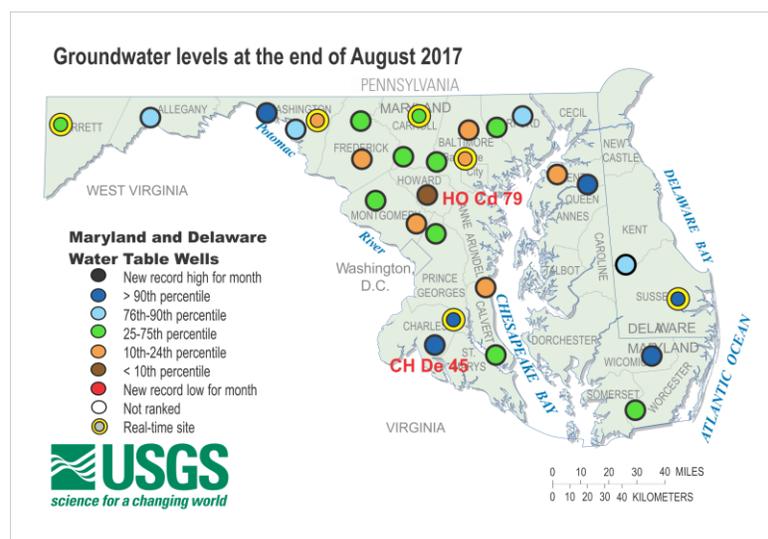
- Located in a surficial or unconfined (water-table) aquifer
- Open to a single, known hydrogeologic unit/aquifer
- Groundwater hydrograph generally reflects response to weather
- No indicated nearby pumpage, and likely to remain uninfluenced by pumpage or changes related to human activities
- Minimum 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 have more than 30 years of groundwater data as of 2017.

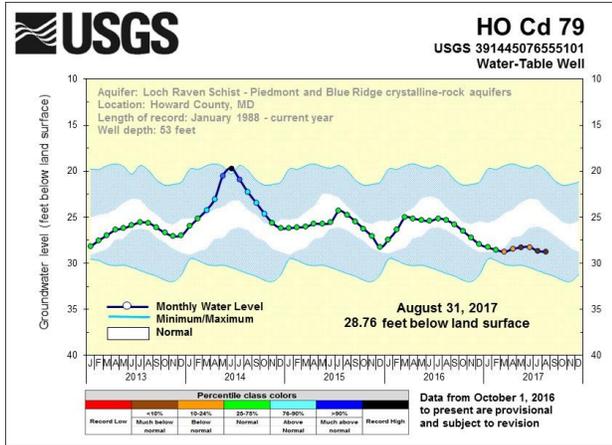
August 2017 Groundwater Levels

Thirty-six percent, or 10 USGS observation wells, had groundwater levels within the normal range in August. Groundwater levels were above normal at 10 observation wells with 6 wells having groundwater levels above the 90th percentile. Groundwater levels were below normal at 8 wells, including 7 wells in the 10th-24th percentile range, and 1 well below the 10th percentile. Between July and August, groundwater levels decreased at 12 of 28 wells and increased at 16 wells.

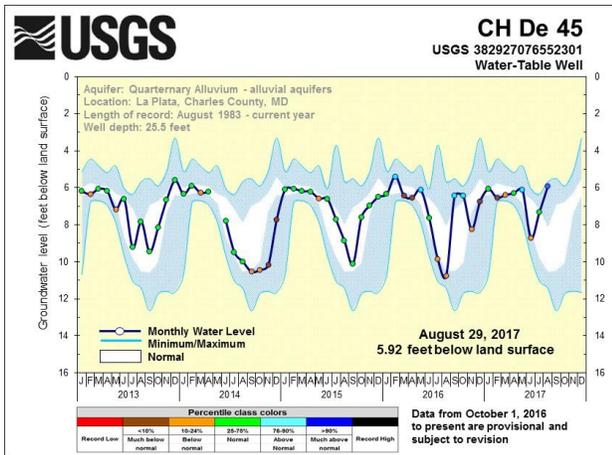
In the two 5-year hydrographs presented below, groundwater levels are shown as a dark blue line. Each monthly measurement is colored according to the percentile rank compared to the historical values at the site for the month. The normal range is displayed as a white band, and is based on the period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



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



For the sixth consecutive month, the groundwater level at observation well HO Cd 79, in Howard County, Maryland, was below normal. The groundwater level dropped between July and August, to 28.76 feet below land surface. Normal August groundwater levels at this well range from 24.18 to 26.39 feet below land surface. Record keeping at this well began in January 1988.



The groundwater level at USGS observation well CH De 45, in Charles County, Maryland, rose 1.42 feet between July and August. The groundwater level was 5.92 feet below land surface. The August normal range of groundwater levels is between 7.90 and 10.53 feet below land surface. Record keeping at this well began in August 1983.

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.

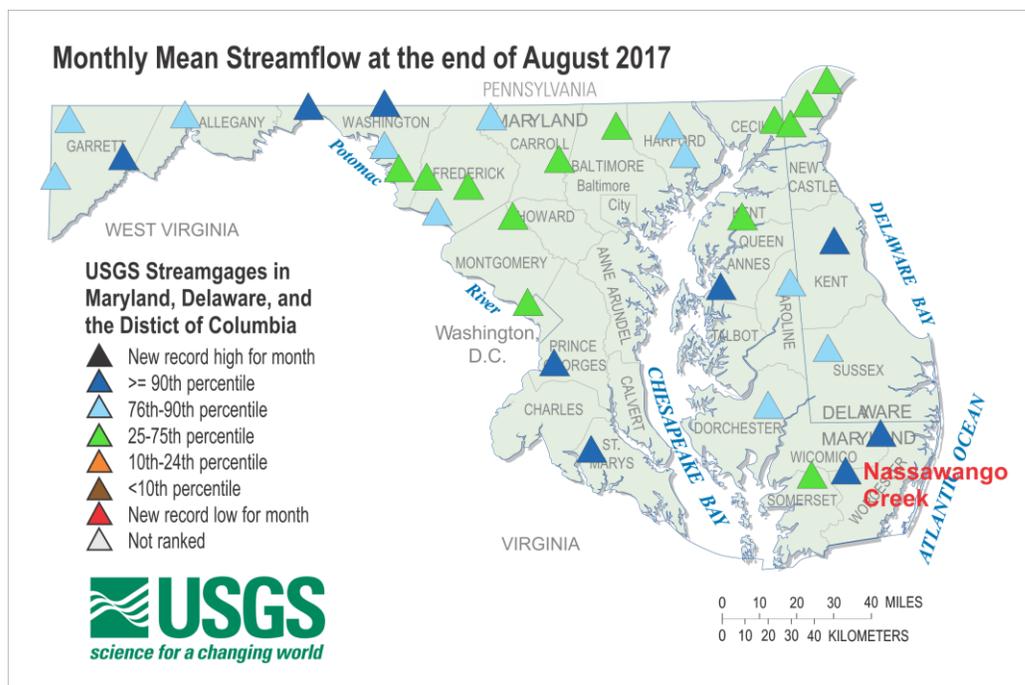
The USGS streamgages chosen for the monthly water summary were selected based on the following criteria:

- 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 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.

August 2017 Streamflow

Monthly mean streamflows were in the normal range at 39 percent or 13 of 33 selected USGS streamgages. Streamflow was above normal at 20 streamgages, including 11 streamgages between the 76th and 90th percentiles, and 9 streamgages above the 90th percentile. Streamflow decreased at 17 streamgages and increased at 16 streamgages between July and August.

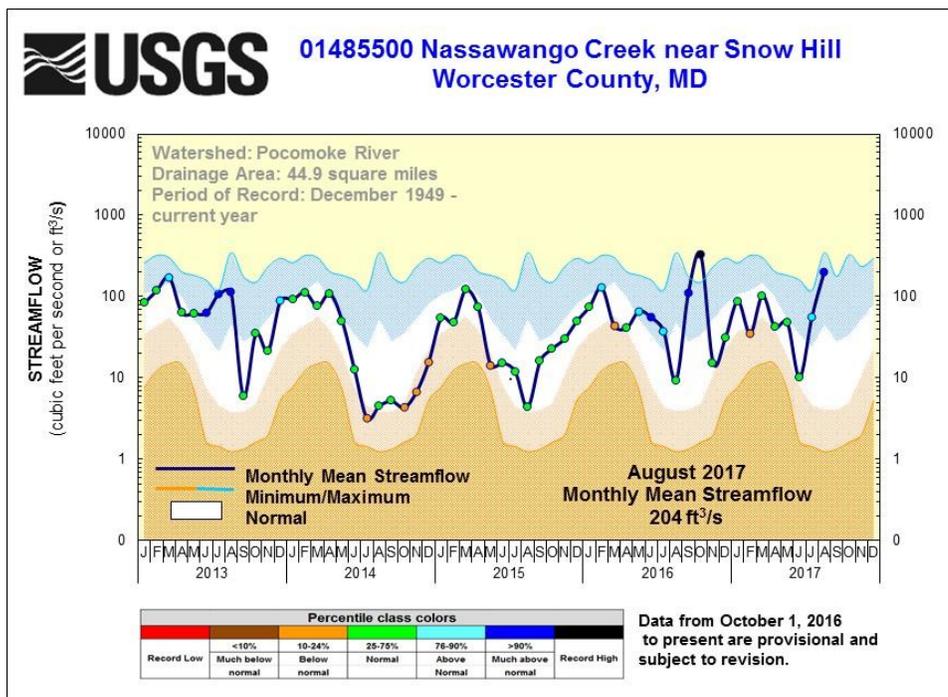


To access the clickable groundwater map, go to:
http://md.water.usgs.gov/groundwater/web_wells/current/water_table/counties/

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

In the hydrograph for the selected streamgage, 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 Nassawango Creek near Snow Hill in Worcester County, Maryland, the monthly mean streamflow increased between July and August, and was at 204 cubic feet per second (ft³/s), which is in the above normal range. The normal range for August is between 4.08 ft³/s and 52.83 ft³/s. Record-keeping at this streamgage began in December 1949.



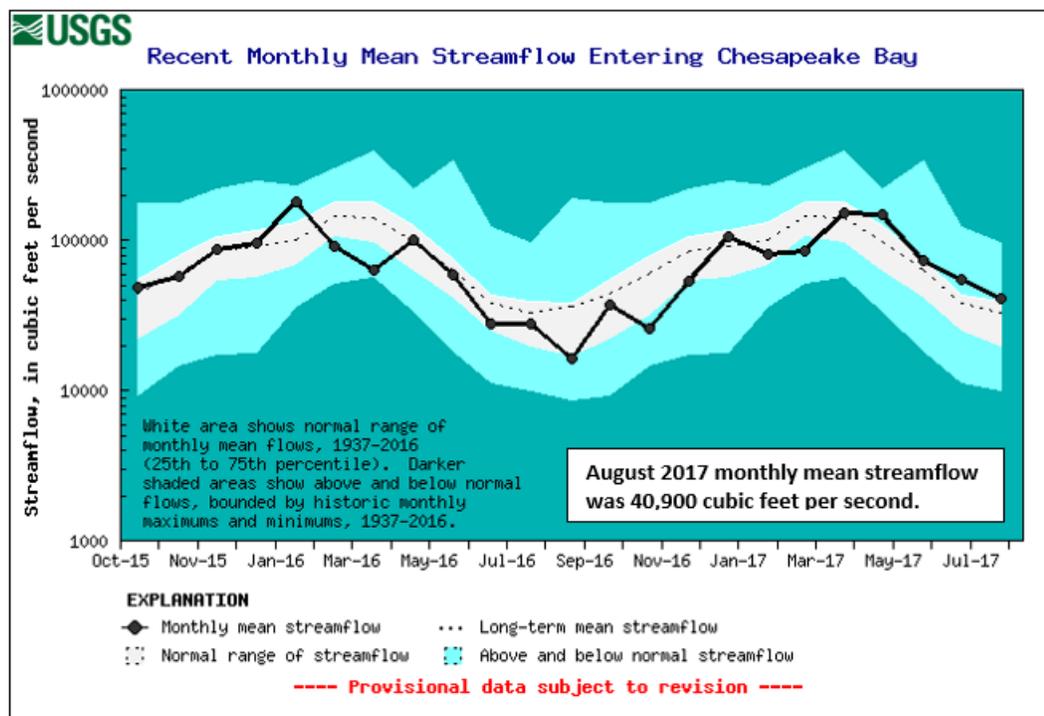
Five-year hydrographs can be viewed at:
<http://md.water.usgs.gov/surfacewater/streamflow/>

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 August 2017 was 40,900 ft³/s. This value, which is provisional and subject to revision, is considered to be in the above normal range. Normal August streamflow entering the Bay is between 19,300 and 39,600 ft³/s, the 25th and 75th percentiles, respectively, of all August values. Average (mean) monthly streamflow for August is 33,200 ft³/s. These statistics are based on an 80-year period of record.

Runoff in the Chesapeake Bay watershed carries pollutants, such as nutrients and sediment, to rivers and streams that drain to the Bay. The amount of water flowing into the Chesapeake Bay from its tributaries has a direct impact on how much pollution is in the estuary. It also affects the salinity levels that are important for the survival of fish, crabs, and oysters, with regard to the location and size of breeding and reproductive zones. Generally, as river flow increases, more nutrient and sediment pollution enters the Bay.



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 August 2017, available reservoir storage in the Baltimore Reservoirs was 73.49 billion gallons, or 97 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 August 2017 was 5.75 billion gallons, which is about 54 percent of normal storage capacity for the two Patuxent reservoirs. The storage numbers were updated in August 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: Water storage in the Triadelphia Reservoir was drawn down for anticipated construction during the summer of 2017.

