

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

July 2015 Highlights: **Ninety-two percent of groundwater and 100 percent of streamflow levels were normal to above normal at sites monitored by the U.S. Geological Survey across Maryland, Delaware, and the District of Columbia.**

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

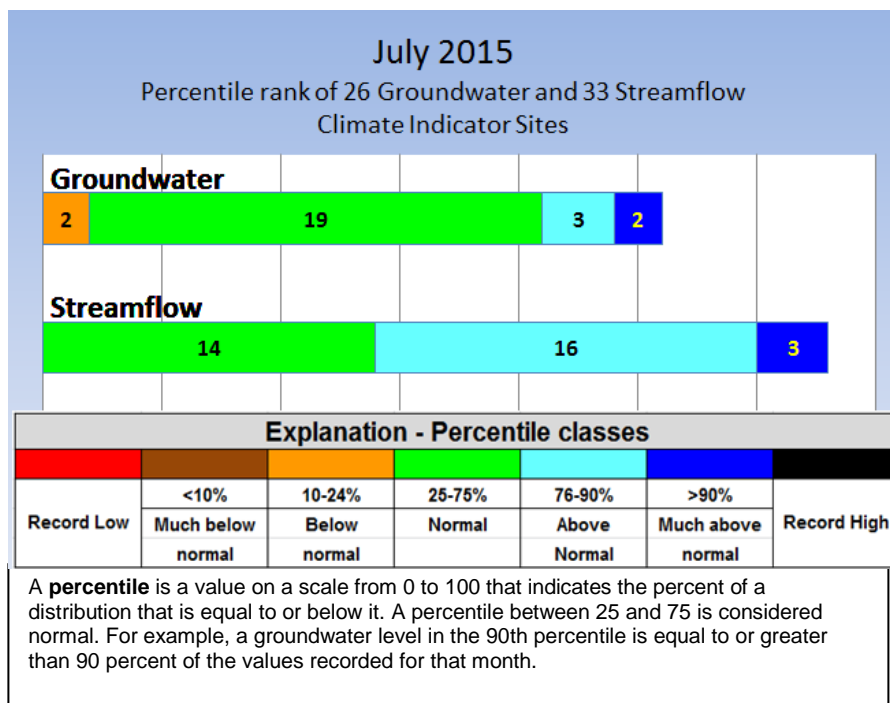
USGS water data are valuable to the public, researchers, water managers, planners, and agricultural users, especially during floods and droughts. These data can be used to assess how water resources respond to changes in climate. Scientists at the USGS have measured streamflow and groundwater levels to assess water resources for over 125 years.

In addition to providing the most extensive set of historical streamflow and groundwater data available to the public, the USGS continues to collect water data and quality-assures the data using standardized techniques across the country. The uniformity of the dataset enables multi-state comparisons and other comparative statistical analyses that better inform policy makers of the possible water-resources conditions they might encounter in the future.

The sites used in this water summary were carefully selected to show the response of streamflow and groundwater levels to weather conditions. Ideally, these sites will show no effects from human influences. The streamflow and groundwater data are ranked in comparison to the historical record and summarized. Precipitation and reservoir data are also presented to give a more complete picture of the region's water resources.

USGS July 2015 Water Conditions Summary

Ninety-two percent of the groundwater levels and 100 percent of the monthly mean streamflows were normal or above normal at sites used to monitor the response of water resources to changes in climatic conditions in Maryland, Delaware, and the District of Columbia.



Groundwater levels were normal (between the 25th and 75th percentiles) in 19 of 26 USGS monitoring wells. In the remaining wells, the groundwater levels were above normal in five wells and below normal in two wells.

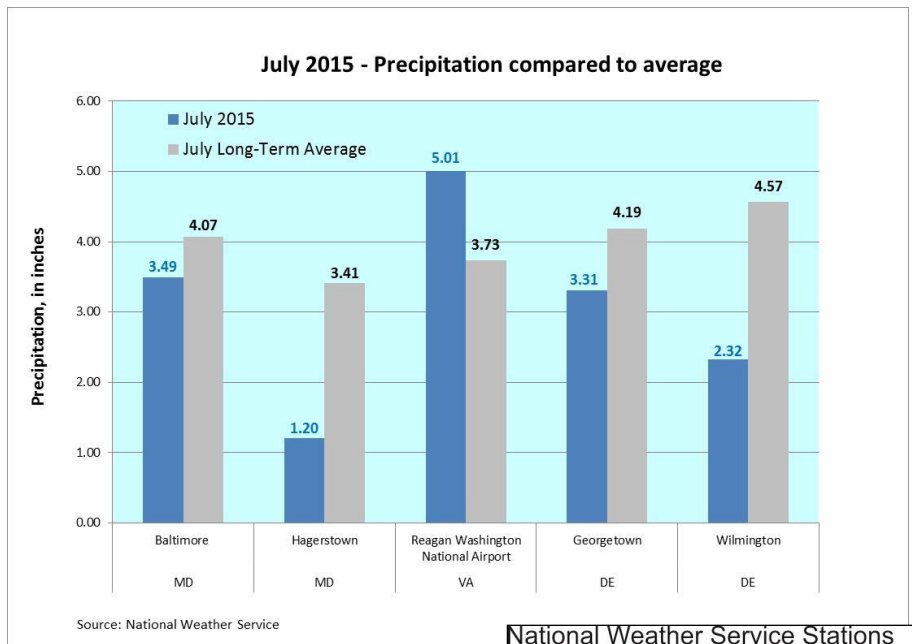
July monthly mean streamflows were normal at 14 of the 33 streamgages. Streamflow was above normal at the remaining 19 streamgages.

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July 2015 Precipitation and Weather

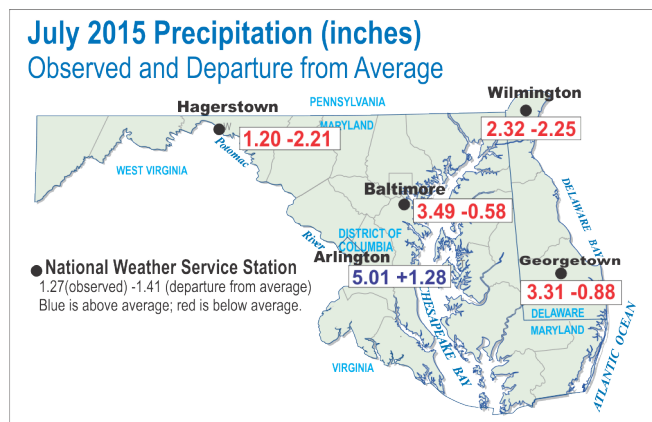
Precipitation was below the long-term average at four National Weather Service (NWS) Mid-Atlantic weather stations in Delaware and Maryland. At the NWS weather station in Arlington, Virginia near the District of Columbia, precipitation was above average and had the highest amount of the five weather stations with 5.01 inches, or 1.28 inches above the long-term average for July. The lowest precipitation was in Hagerstown, Maryland with 1.20 inches, which was 2.21 inches below average.

Streamflow and groundwater levels in July in western Maryland were generally normal to above normal even though precipitation at Hagerstown airport was well below average. The 30-day mean areal precipitation for counties in western Maryland also indicates below normal precipitation for July. The normal to above normal streamflow and groundwater conditions may be a lingering result of the higher than average June precipitation.



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

The NWS Middle Atlantic River Forecast Center's (MARFC) 365-day precipitation data for Maryland, Delaware, and the District of Columbia showed all the counties were in the normal to above normal range with the exception of Allegany County, Maryland, which was 7.5 inches below average.



For the fourth consecutive month, air temperatures were normal to above the long-term average at all five NWS Mid-Atlantic weather stations. July temperatures were exactly average with no departure from average at Baltimore, Maryland and Wilmington, Delaware. The lowest average July temperature was in Hagerstown, Maryland where the temperature averaged 76.5 degrees Fahrenheit. The warmest July temperature was 81.5 degrees Fahrenheit in Arlington, Virginia near the District of Columbia, which was 1.7 degrees Fahrenheit above average.

Sources: National Weather Service and Middle Atlantic River Forecast Center (MARFC)
MD and DC: <http://www.weather.gov/climate/index.php?wfo=lxw>
DE: <http://www.weather.gov/climate/index.php?wfo=phi>
MARFC <http://www.erh.noaa.gov/marfc/Precipitation/Departures/>

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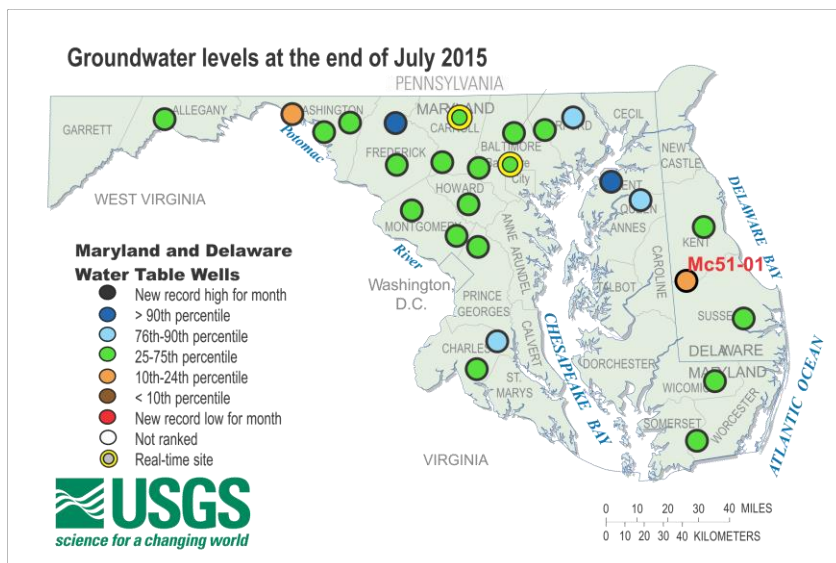
Groundwater

The USGS monitors groundwater levels in unconfined aquifers, providing observations that can be compared to both short-term and long-term changes in climatic conditions. Twenty-six groundwater wells were selected based on the following criteria:

- Located in an unconfined (water-table) aquifer;
- Open to a single, known hydrogeologic unit/aquifer;
- Groundwater hydrograph reflects changes in climatic conditions;
- No indicated nearby pumpage and likely to remain uninfluenced by pumpage, regulated streamflow, 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 has never gone dry; and
- Long-term accessibility likely.

July 2015 Groundwater Levels

Groundwater levels were below normal (10th – 24th percentiles) at one of the three USGS observation wells in Washington County, Maryland and above normal (76th-90th percentiles) in five USGS observation wells in Maryland in July. Seventy-three percent (19 of the 26 wells) of the groundwater levels were in the normal range (between the 25th and 75th percentiles) at USGS wells used to monitor climatic conditions in Maryland and Delaware. Groundwater levels in the normal range were spread throughout Maryland and Delaware. Data are provisional and subject to revision.

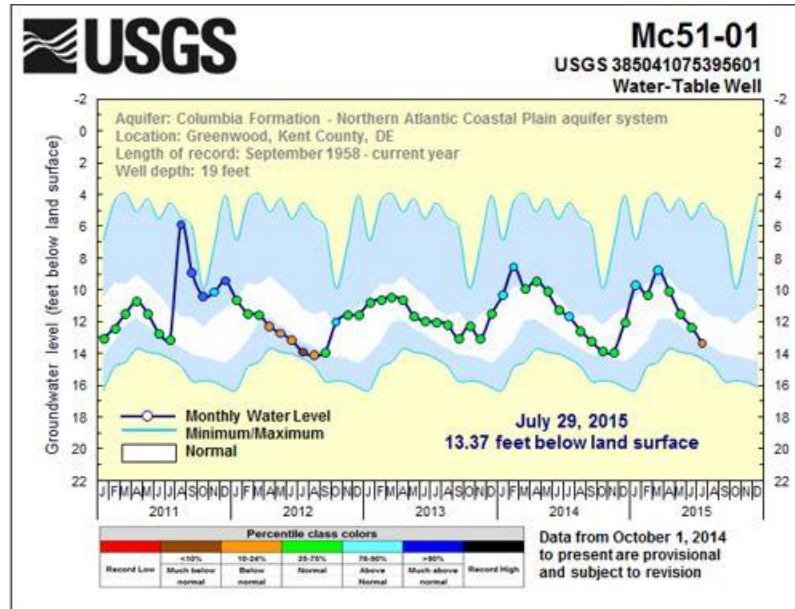


In Delaware, groundwater levels in two observation wells in Kent and Sussex Counties were normal, and the groundwater level was below normal in well Mc51-01 in Kent County.

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

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The groundwater level in observation well Mc51-01 in Kent County, Delaware dropped to below normal in July. Groundwater levels typically decline in the summer, with the lowest groundwater levels occurring in November and December at this observation well.



Five-year groundwater hydrographs can be viewed at:
http://md.water.usgs.gov/groundwater/web_wells/current/water_table/counties

The 5-year hydrograph shows groundwater levels as a dark blue line, the minimum and maximum monthly values, and the normal range (between the 25th and 75th percentiles) as a white band 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 section in the graph. Each monthly measurement is colored according to the percentile rank in which it falls for the month.

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Streamflow

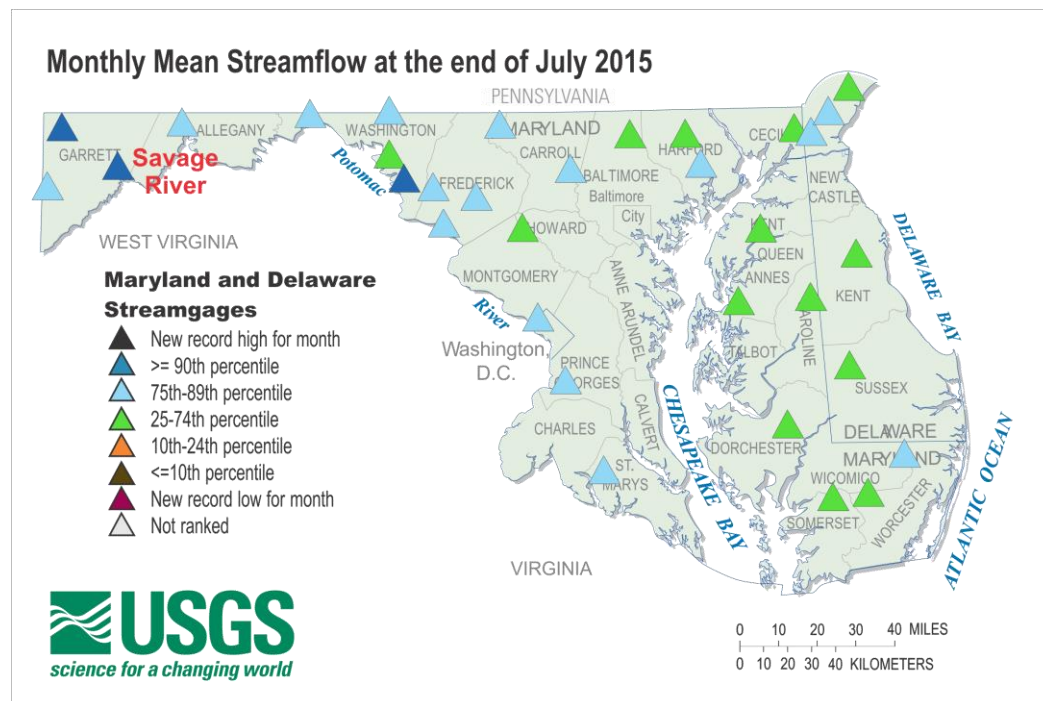
Streamflow data are used for many purposes. A few of the most common uses are to assess water supply and the risk of droughts and floods. Streamflow data are also used to calculate loads of chemical constituents and assess how biological communities are affected by hydrologic conditions. The USGS operates the most extensive network of streamgages in the region.

The streamflow locations 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, or has relatively natural flow;
- Streamflow data reflect climatic conditions; and
- The surrounding area and watershed are not urban.

July 2015 Streamflow

Monthly mean streamflow was above normal in 58 percent of the USGS streamgages used to monitor climatic response in Maryland, Delaware, and the District of Columbia. At 3 USGS streamgages, the monthly mean streamflow was above the 90th percentile, and at 16 streamgages, the monthly mean streamflow was between the 76th and 90th percentiles. Streamflow at the remaining 14 streamgages was in the normal range (25th – 75th percentiles).

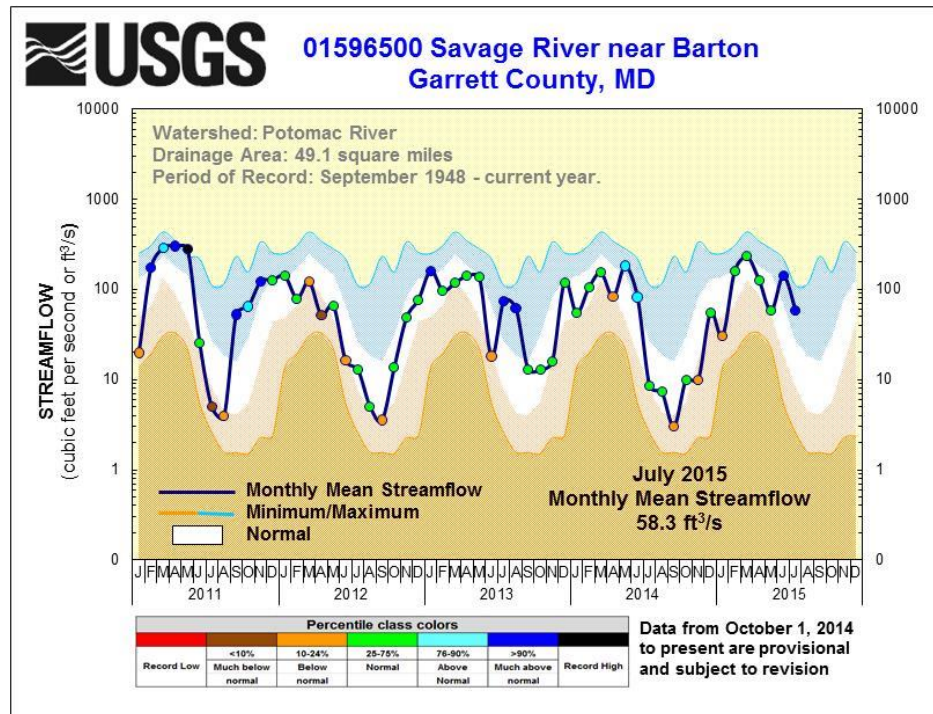


To access the clickable streamflow map, go to:
<http://md.water.usgs.gov/surfacewater/streamflow/>

Many of the monthly mean streamflows were above normal in western Maryland, despite the below normal precipitation. Rainfall at Hagerstown was 1.20 inches, which was 2.21 inches below normal in July. Rainfall at Morgantown, West Virginia, the nearest weather station outside of Maryland, was 3.60 inches, which was 1.02 inches below normal.

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The monthly mean streamflow on the Savage River near Barton in Garrett County, Maryland dropped since June, but remains in the 90th percentile. The long-term average monthly mean streamflow for July is 11.30 cubic feet per second (ft³/s). The monthly mean streamflow typically decreases at this time of year with the lowest levels occurring in September or October.



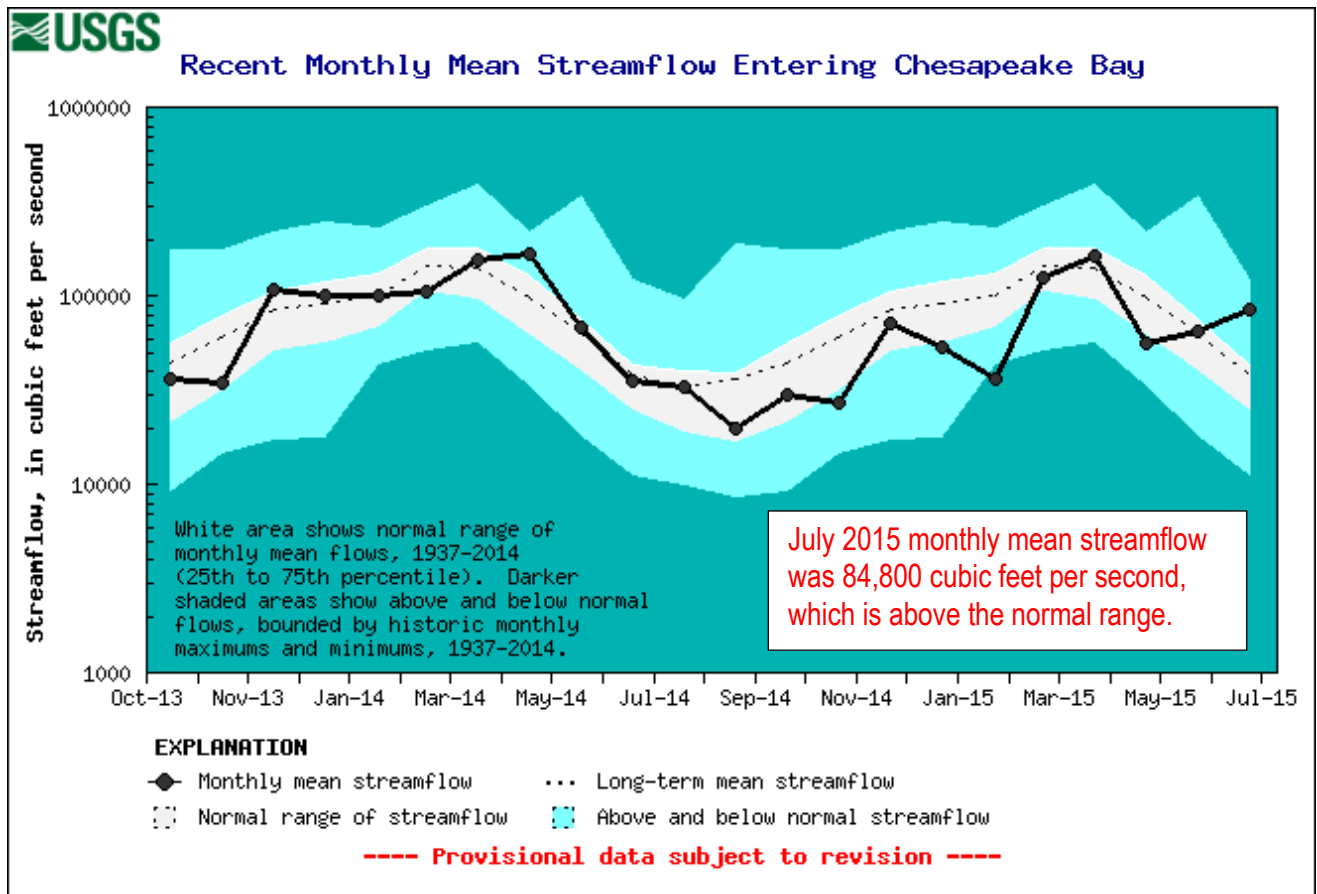
Five-year hydrographs can be viewed at:
<http://md.water.usgs.gov/surfacewater/streamflow/>

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 to 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 top of the dark orange area. Each monthly mean measurement is colored according to the percentile rank in which it falls for the month.

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Estimated Streamflow to the Chesapeake Bay

The USGS estimates monthly mean freshwater streamflow to the Chesapeake Bay using streamflow measurements from the Susquehanna, Potomac, and James Rivers. In July 2015, the monthly mean freshwater flow to the Chesapeake Bay was 84,800 cubic feet per second (ft³/s; provisional, and subject to revision) which is above the long-term July average (mean) of 38,200 ft³/s and above the normal range between 24,800 ft³/s and 43,800 ft³/s, the 25th and 75th percentiles of all July values. These provisional statistics are based on a 78-year period of record.



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

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 and it also affects the salinity levels that are important for fish, crabs, and oysters. Generally, as river flow increases, it brings more nutrient and sediment pollution to the Bay.

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Reservoir Levels

Available reservoir storage at the end of July 2015 in the Baltimore reservoirs (Loch Raven, Liberty, and Prettyboy) was 99.58 percent of available storage capacity, or a total of 75.53 billion gallons of water. The Baltimore City Environmental Services Division manages the Baltimore reservoirs.

Total normal storage in the Triadelphia and Duckett Reservoirs, which serve parts of Howard, Montgomery, and Prince George's Counties in suburban Maryland around the District of Columbia, was 93.57 percent of normal storage capacity at the end of July 2015, with 9.93 billion gallons of water. Not all of the water in the Patuxent Reservoirs is usable; for operational purposes, percent of normal storage capacity is used, but this value can exceed 100 percent of the usable storage. The Washington Suburban Sanitary Commission (WSSC) manages the Patuxent reservoirs.

July 2015	Percent available/normal storage	Volume (billion gallons)
Baltimore Reservoirs Baltimore City – Environmental Services Division		
Liberty	99.78%	36.72
Loch Raven	99.58%	21.11
Prettyboy	99.16%	17.70
Total	99.58%	75.53
Patuxent Reservoirs Washington Suburban Sanitary Commission (WSSC)		
Triadelphia	93.55%	5.24
Duckett	93.59%	4.69
Total	93.57%	9.93