

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

**August 2015 Highlights: Sixty-eight percent of groundwater and 85 percent of streamflow levels were 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.

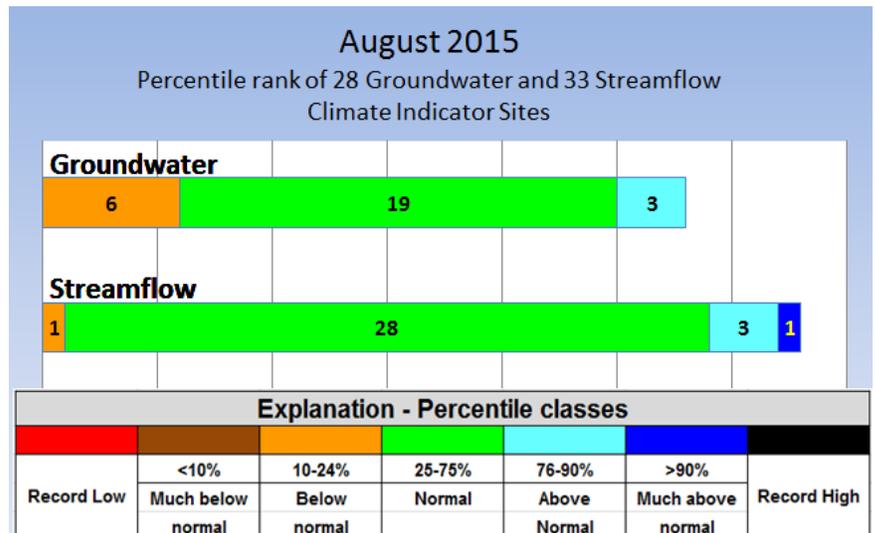
The sites used in this water summary were carefully selected to show the response of streamflow and groundwater levels to weather conditions. Ideally, these sites will show no effects from human influences. The streamflow and groundwater data are ranked in comparison to the historical record and summarized.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

## USGS August 2015 Water Conditions Summary

Sixty-eight percent of the groundwater levels and 85 percent of the monthly mean streamflows were 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 25<sup>th</sup> and 75<sup>th</sup> percentiles) in 19 of 28 USGS monitoring wells. Of the remaining wells, the groundwater levels were above normal in three wells and below normal in six wells.

August monthly mean streamflows levels were normal at 28 of 33 streamgages. Streamflow was above normal at four streamgages and below normal at one streamgage.



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.

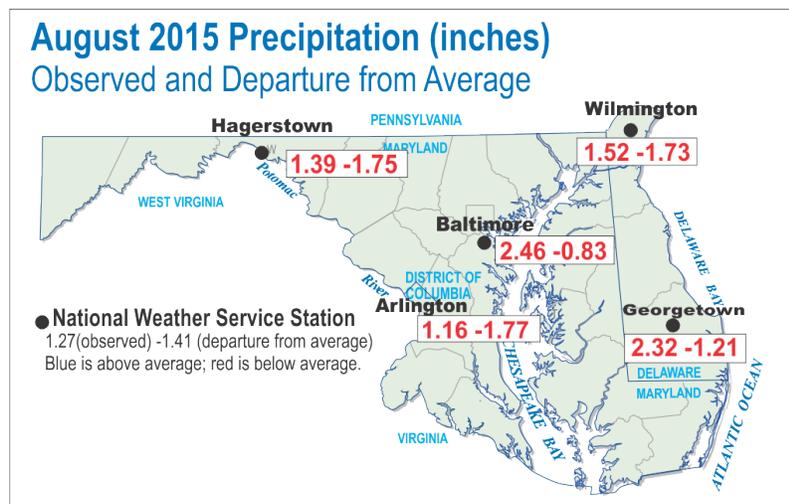
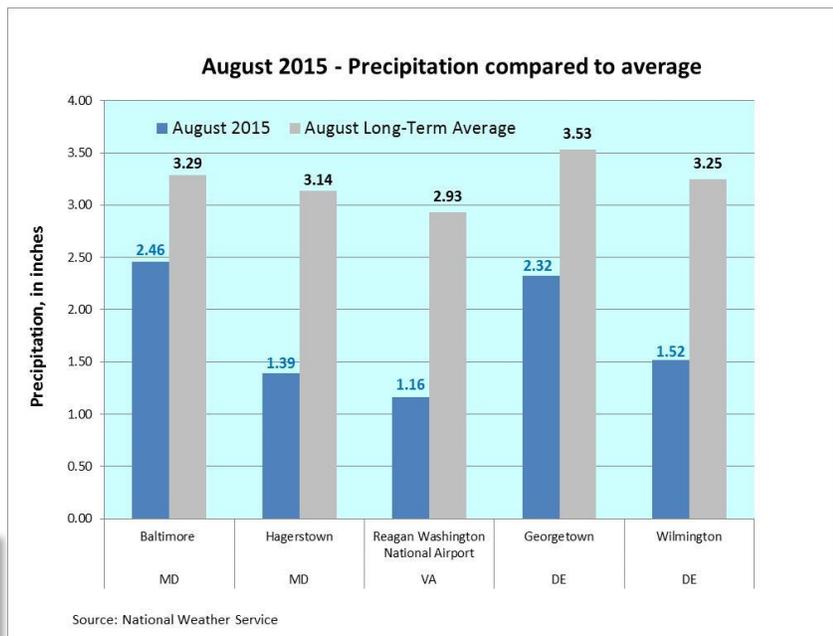
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## August 2015 Precipitation and Weather

Precipitation was below the long-term average at all five of the National Weather Service (NWS) Mid-Atlantic weather stations in Delaware and Maryland. The lowest precipitation was 1.16 inches at the NWS weather station in Arlington, Virginia near the District of Columbia. Average August precipitation at this station is 2.93 inches and in July, this station was 1.28 inches above average. The highest precipitation of the five Mid-Atlantic weather stations was in Baltimore, Maryland with 2.46 inches, which was 0.83 inches below average.

National Weather Service Stations	
<b>Baltimore</b>	= Baltimore/Washington International Thurgood Marshall Airport (BWI)
<b>Georgetown</b>	= Georgetown, Sussex County Airport
<b>Hagerstown</b>	= Hagerstown Regional Airport
<b>Arlington</b>	= Ronald Reagan Washington National Airport
<b>Wilmington</b>	= 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 that all of the counties were in the normal to above normal range with the exception of Allegany County, Maryland, which was 7.6 inches below average for the second consecutive month.



For the fifth consecutive month, air temperatures were normal to above the long-term average at four of the five NWS Mid-Atlantic weather stations. At Hagerstown, Maryland, temperatures were 2.1 degrees Fahrenheit above average. Average August temperatures were exactly average with no departure from average at Baltimore, Maryland for the second consecutive month. The average air temperature was consistent across the region at 75 degrees in Baltimore (75.1°F) and Hagerstown (75.4°F) in Maryland and Georgetown (75.0°F) and Wilmington (75.7°F) in Delaware. The lowest average August temperature was in Georgetown, Delaware where the temperature averaged 75.0 degrees Fahrenheit. The warmest August temperature was 79.3 degrees Fahrenheit in Arlington, Virginia near the District of Columbia, which was 1.2 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=lwj>  
 DE: <http://www.weather.gov/climate/index.php?wfo=phi>  
 MARFC <http://www.erh.noaa.gov/marfc/Precipitation/Departures/>

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## Groundwater

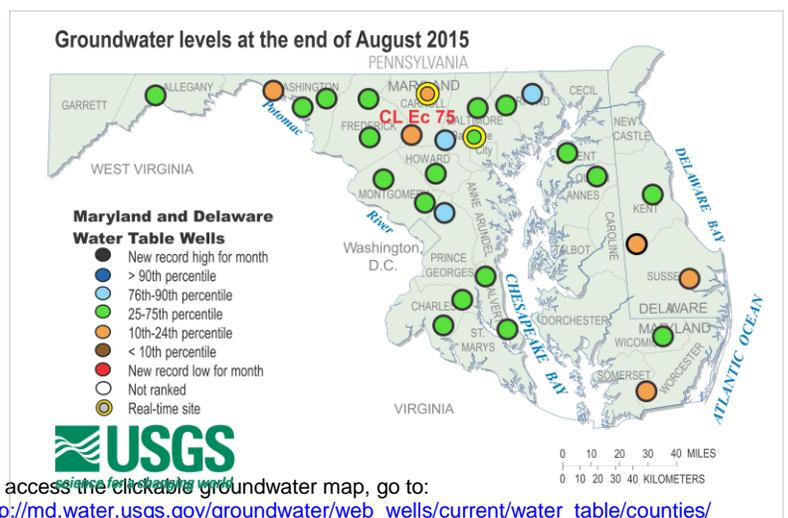
The USGS monitors groundwater levels in unconfined aquifers, providing observations that can be compared to both short-term and long-term changes in climatic conditions. Twenty-eight groundwater wells were selected based on the following criteria:

- 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.

## August 2015 Groundwater Levels

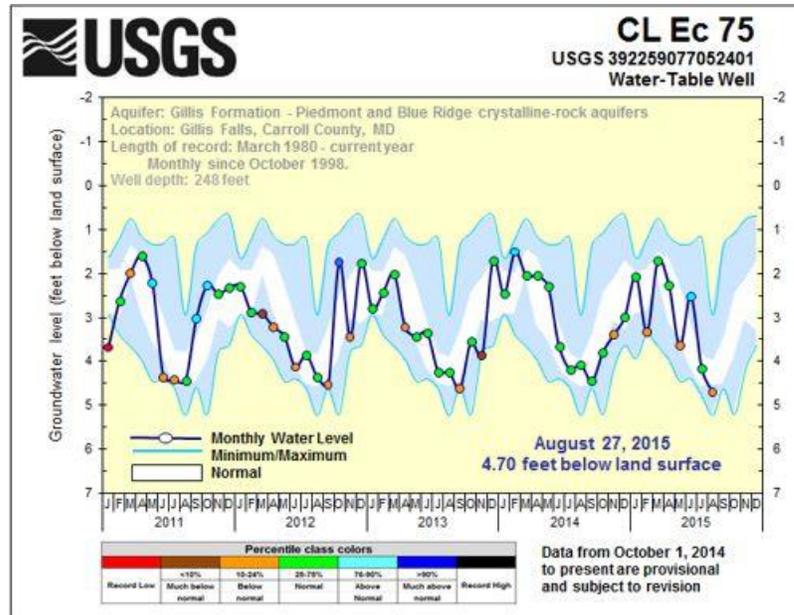
In Maryland, groundwater levels were below normal (10<sup>th</sup> – 24<sup>th</sup> percentiles) at four USGS observation wells, and above normal (76<sup>th</sup>-90<sup>th</sup> percentiles) in three USGS observation wells in August. Sixty-eight percent (19 of the 28 wells) of the groundwater levels were in the normal range (between the 25<sup>th</sup> and 75<sup>th</sup> percentiles) at USGS wells used to monitor climatic conditions in Maryland and Delaware. Data are provisional and subject to revision.

In Delaware, groundwater levels were below normal in wells in Kent and Sussex Counties and normal in another well in Kent County.-



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

The groundwater level in observation well CL Ec 75 in Carroll County, Maryland dropped to below normal in August. Groundwater levels typically decline in the summer, with the lowest groundwater levels occurring at the end of August at this observation well.



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)

The 5-year hydrograph shows groundwater levels as a dark blue line, the minimum and maximum monthly values, and the normal range (between the 25<sup>th</sup> and 75<sup>th</sup> 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.

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

## 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.

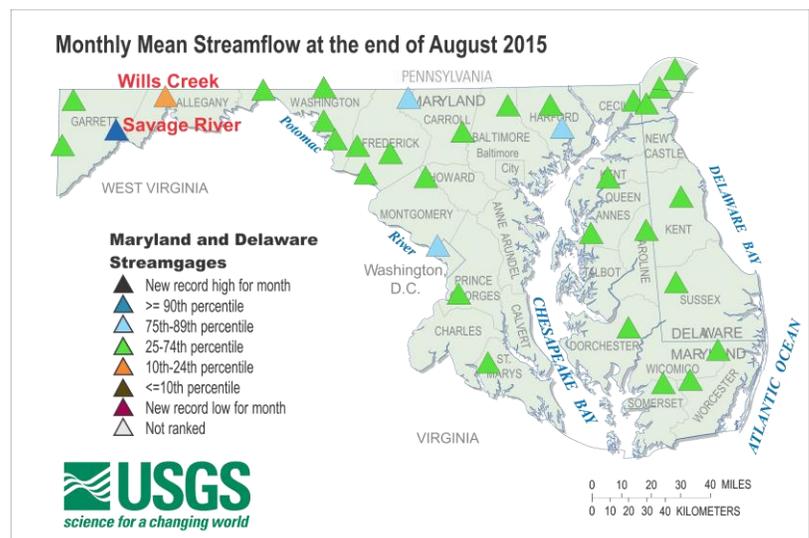
The streamflow locations chosen for the monthly water summary were selected based on the following criteria:

- 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.

## August 2015 Streamflow

August monthly mean streamflows were normal in 85 percent of the USGS streamgages used to monitor climatic response in Maryland, Delaware, and the District of Columbia. In Delaware, monthly mean streamflow was normal at all five streamgages. At the streamgage on the Savage River, monthly mean streamflow was above the 90<sup>th</sup> percentile, and at three streamgages, the monthly mean streamflow was between the 76<sup>th</sup> and 90<sup>th</sup> percentiles (shown in cyan). Streamflow at the streamgage on Wills Creek was the only location with below normal monthly mean streamflow (10<sup>th</sup> – 24<sup>th</sup> percentiles) in August.

In spite of below average rainfall at the five NWS weather stations, most of the monthly mean streamflows were normal to above normal in Maryland, Delaware, and the District of Columbia.

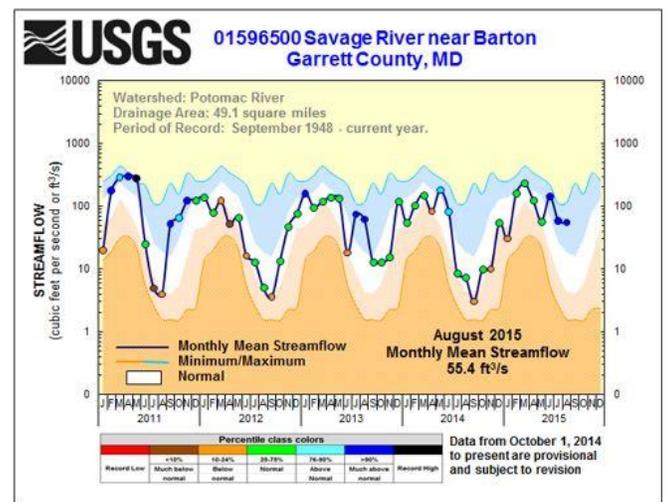
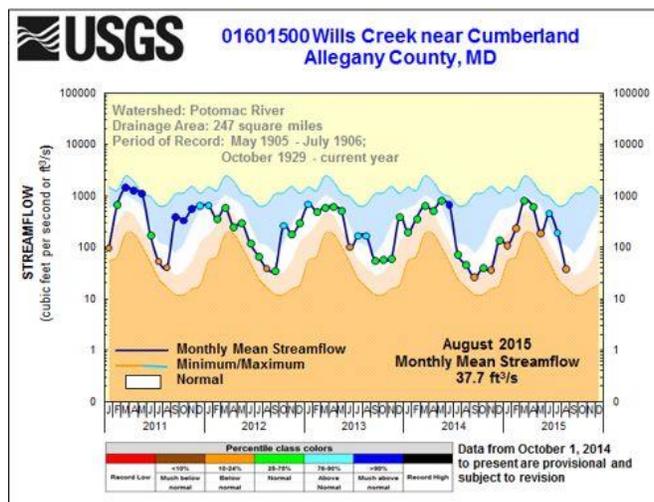


To access the clickable streamflow map, go to:  
<http://md.water.usgs.gov/surfacewater/streamflow/>

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The monthly mean streamflow on Wills Creek near Cumberland in Allegany County, Maryland dropped from above normal in June and July to below normal in August. Monthly mean streamflow typically decreases at this time of year with the lowest levels occurring between October and November. At the Savage River In Garrett County, Maryland, the monthly mean streamflow has been above normal for the past three consecutive months.

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



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

### Reservoir Levels

Available reservoir storage at the end of August 2015 in the Baltimore reservoirs (Loch Raven, Liberty, and Prettyboy) was 96.85 percent of available storage capacity, or a total of 73.46 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 79.25 percent of normal storage capacity at the end of August 2015, with 8.42 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.

August 2015	Percent available/normal storage	Volume (billion gallons)
<b>Baltimore Reservoirs</b>		
<b>Baltimore City – Environmental Services Division</b>		
Liberty	96.20%	35.40
Loch Raven	96.51%	20.46
Prettyboy	98.60%	17.60
Total	96.85%	73.46
<b>Patuxent Reservoirs</b>		
<b>Washington Suburban Sanitary Commission (WSSC)</b>		
Triadelphia	80.88%	4.53
Duckett	77.63%	3.89
Total	79.25%	8.42