

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

September 2013 -- Approximately 70 percent of groundwater and streamflow levels were in the normal range in the Maryland-Delaware-District of Columbia region.

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 in wells to assess water resources for over 125 years.

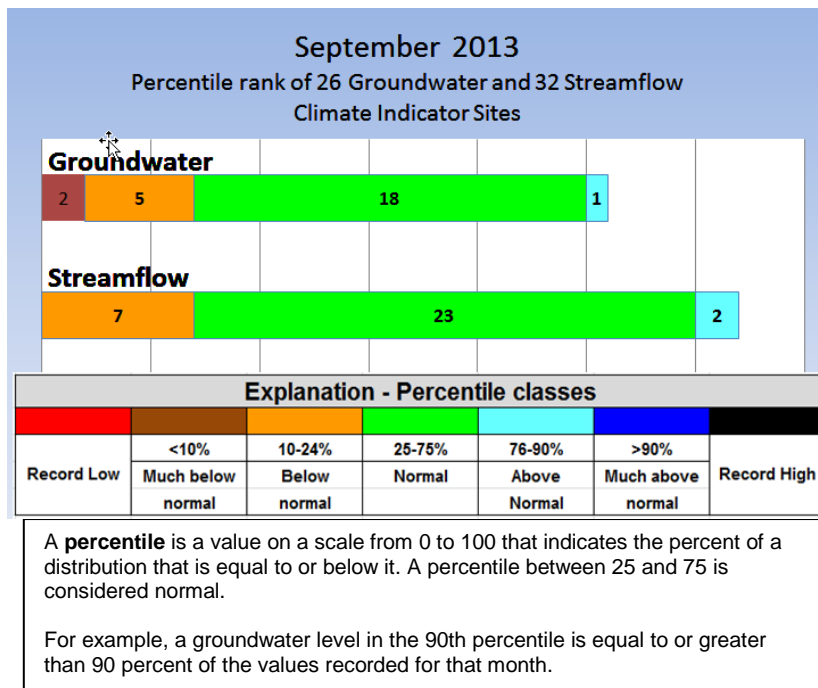
In addition to providing the most extensive set of historical streamflow and groundwater data available to the public, the USGS collects water data and quality-assures the data by employing standardized techniques across the country. The uniformity of the dataset allows for multi-state comparisons and 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 September 2013 Water Conditions Summary

In September, approximately 70 percent of the monthly groundwater levels and the monthly mean streamflow at sites used to monitor the response of water resources to changes in climatic conditions in Maryland, Delaware, and the District of Columbia were in the normal range (between the 25th and 75th percentiles).

Groundwater levels were in the normal range in 18 of the 26 USGS observation wells used to monitor climatic conditions in Maryland and Delaware. The groundwater level in the monitoring well in Kent County, Maryland was above normal. The remaining seven wells had below normal groundwater levels in September.



Monthly mean streamflow was above normal at two streamgages--one in western Maryland and the other in Delaware--and below normal at seven sites in central Maryland. Streamflow at the remaining 23 USGS streamgages used as climate indicator sites was in the normal range.

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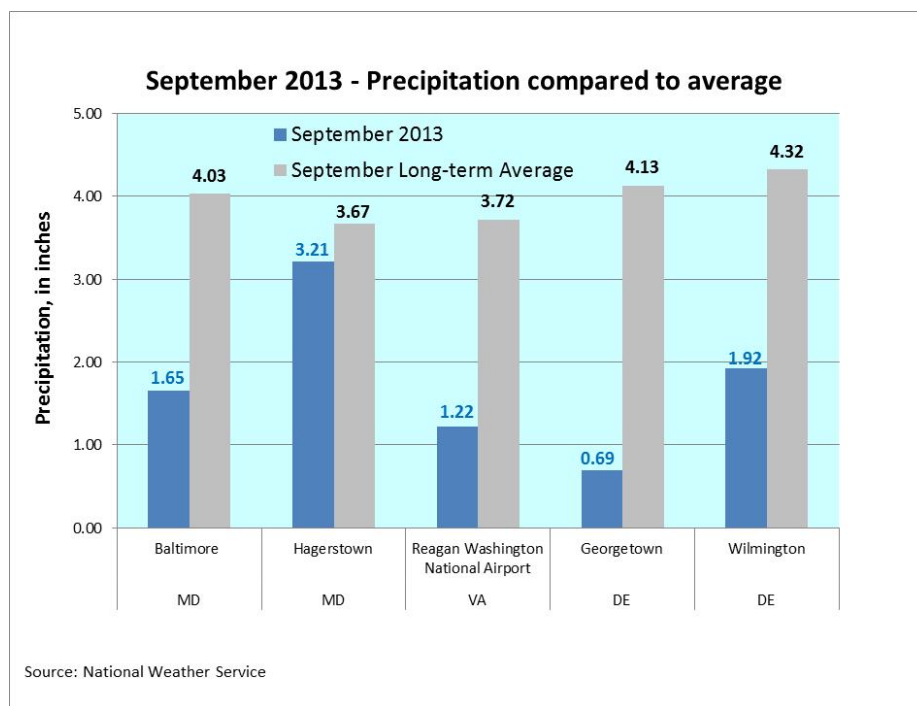
September 2013 Precipitation and Weather

Rainfall at the National Weather Service (NWS) station in Georgetown, Delaware has shown extreme variation during the last 2 months. Rainfall was 0.69 inch in September, which is 3.44 inches below the long-term average*. In August, rainfall at the Georgetown station was 8.28 inches, or 4.75 inches above the long-term average. Rainfall was also below normal in Wilmington, Delaware in September with 1.92 inches, or 2.40 inches below average.

September rainfall in Hagerstown, Maryland was 3.21 inches, which is 0.46 inches below the long-term average. Rainfall at the Baltimore Washington International Thurgood Marshall Airport (BWI) weather station in Maryland and at the Ronald Reagan Washington National Airport weather station near the District of Columbia was more than 2 inches below the long-term average.

Average September temperatures ranged from 65.5 degrees Fahrenheit in Hagerstown, Maryland to 71.3 degrees Fahrenheit at Ronald Reagan Washington National Airport.

*The NWS normal (long-term average) period used for determining records is from 1981–2010.



Sources:

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

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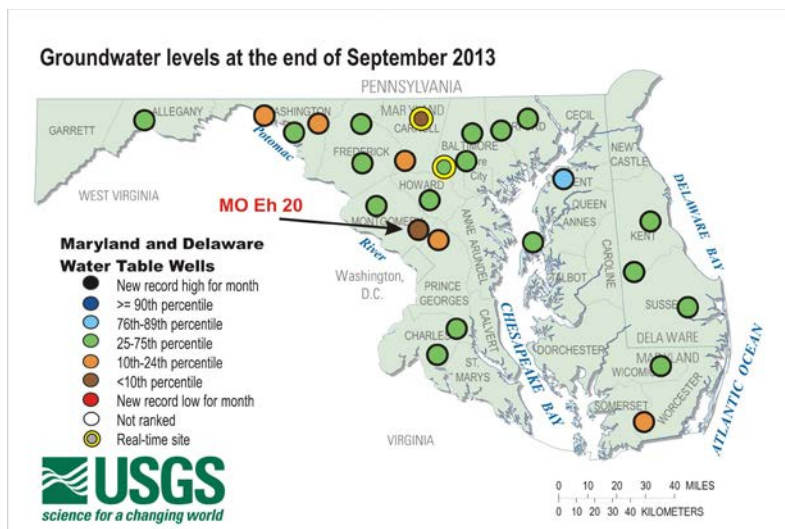
Groundwater

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 casing – dug wells are not used;
- Water levels show no apparent hydrologic connection to nearby streams;
- Well has never gone dry; and
- Long-term accessibility likely.

September 2013 Groundwater Levels

Eighteen of the 26 wells used to monitor climatic conditions in Maryland and Delaware had groundwater levels in the normal range (between the 25th and 75th percentiles). The observation well in Kent County, Maryland was the only well with an above normal groundwater level in September. Groundwater levels were lowest (10th percentile) in the USGS observation wells in Carroll and Montgomery County, Maryland in September. Groundwater levels in wells in Somerset, Prince George's, and Washington Counties in Maryland also were below normal.



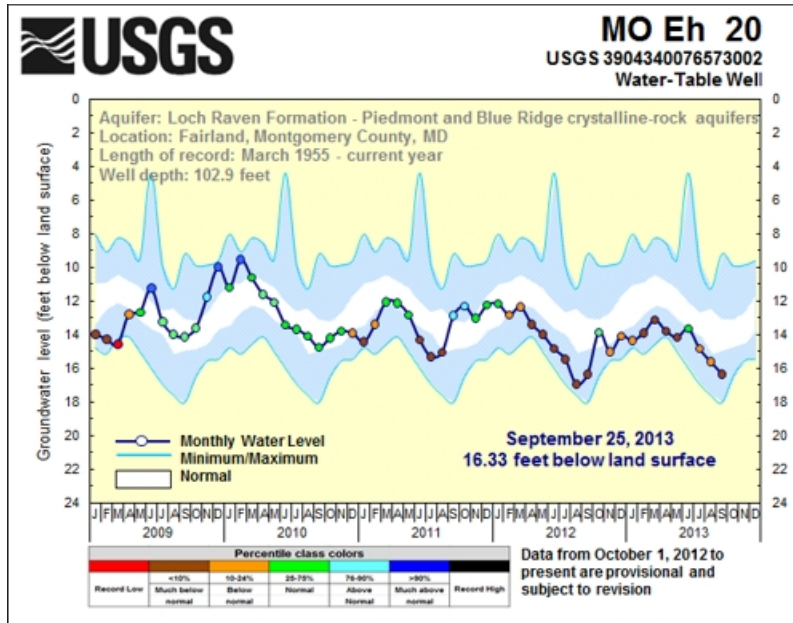
After 3 months of above average rainfall on the Delmarva Peninsula, September rainfall was less than an inch, which is more than 3 inches below normal. The lack of rainfall brought groundwater levels in the Delmarva Peninsula region down from the previously high levels and most of the groundwater levels were normal, except in Somerset County, Maryland, where levels were below normal and Kent County, Maryland where the groundwater level was above normal.

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 MO Eh 20 in Montgomery County, Maryland was below normal for the third consecutive month (16.33 feet below land surface) and has dropped to below the 10th percentile. Groundwater levels have been below normal since February 2012, except for October 2012 and June 2013.



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

These 5-year hydrographs show 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.

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Streamflow

Streamflow data are used for many purposes. A few of the most obvious 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 streamflow gages in the region.

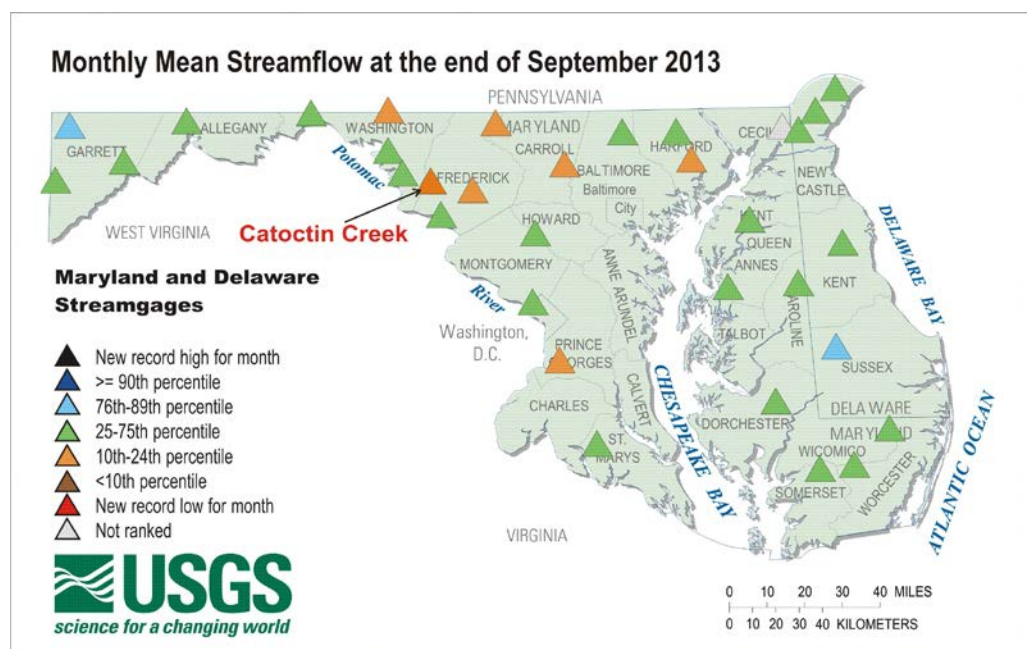
The streamflow locations chosen for the monthly water summary were selected based on the following criteria:

- 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.

September 2013 Streamflow

Monthly mean streamflow was normal at 23 of the 32 USGS streamgages used to monitor climatic response in Maryland, Delaware, and the District of Columbia. Normal is considered to be between the 25th and 75th percentiles. Streamflow in Maryland was above normal in Garrett County and below normal in Carroll, Frederick, Harford, Prince George's, and Washington Counties.

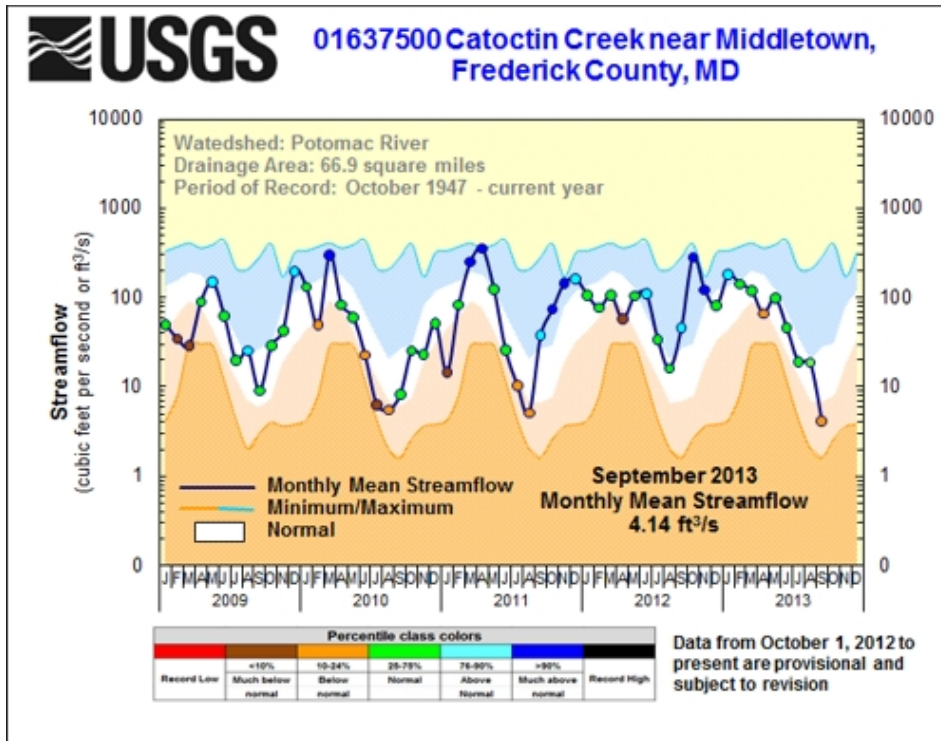
September monthly mean streamflow on the Delmarva Peninsula and in northern Delaware was normal except on the Nanticoke River in Sussex County, Delaware, where it was above normal.



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

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Monthly mean streamflow at Catoctin Creek in Frederick County, Maryland had been normal since May 2013, but streamflow dropped to below normal in September.

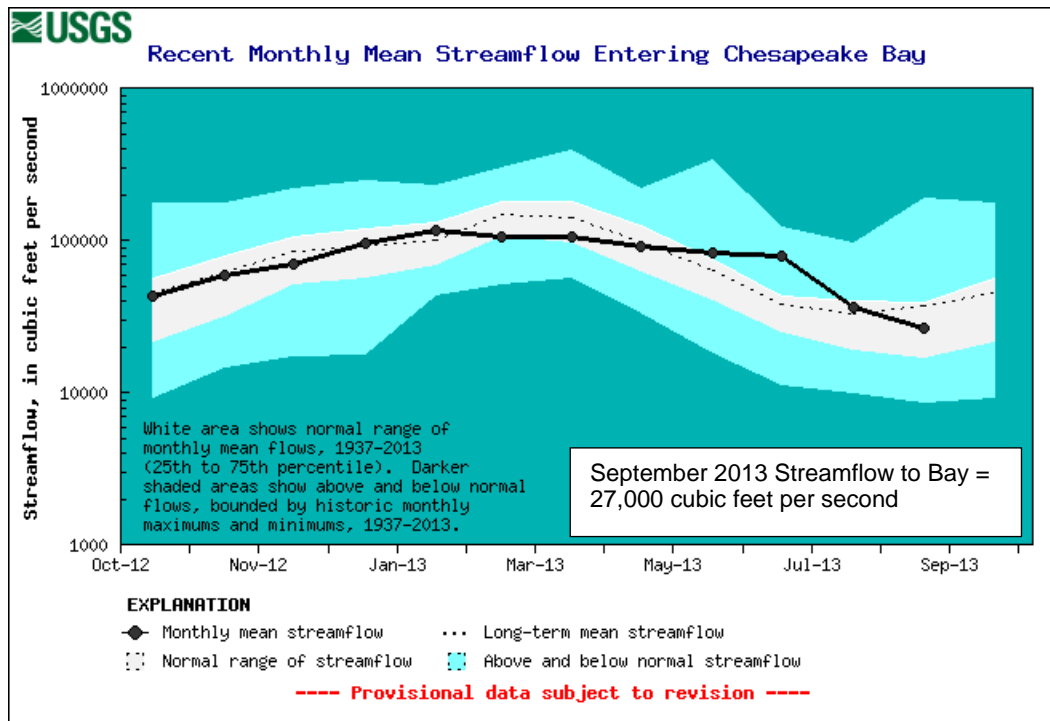


The dark line in the 5-year hydrograph represents the monthly mean streamflow for this period and the white band shows the normal range (25th to 75th percentiles) based on the period of record. The maximum monthly mean streamflow is at the top of the blue shaded section, and the lowest monthly mean streamflow is at the top of the dark orange area.

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Estimated Streamflow to the Chesapeake Bay

The estimated monthly mean freshwater streamflow to Chesapeake Bay was in the normal range in September 2013, at 27,000 cubic feet per second (ft³/s; provisional, and subject to revision). The average (mean) monthly streamflow for September is 37,100 ft³/s. The normal range for average (mean) monthly streamflow for September is between 17,000 ft³/s and 39,100 ft³/s, the 25th and 75th percentiles of all September values. These provisional statistics are based on a 76-year period of record.



Data and more information on the freshwater flow to the Bay can be found here:

<http://md.water.usgs.gov/waterdata/chesinflow/>

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Reservoir Levels

Reservoir storage at the end of September in the Baltimore reservoirs (Loch Raven, Liberty, and Prettyboy) was at 93 percent of available storage capacity, with a total of 70.17 billion gallons of water.

Total storage in the Triadelphia and Duckett Reservoirs, which serve parts of Howard, Montgomery, and Prince George’s Counties in suburban areas around the District of Columbia, dropped from 92 percent of normal storage capacity in August to 77 percent in September, with 8.12 billion gallons of water.

September 2013	Percent available/ normal storage	Volume (billion gallons)	Source
Baltimore Reservoirs			Baltimore City – Environmental Services Division
Liberty	88	32.55	
Loch Raven	88	19.97	
Prettyboy	99	17.65	
Total	93	70.17	
Patuxent Reservoirs			Washington Suburban Sanitary Commission (WSSC)
Triadelphia	74	4.12	
Duckett	80	4.00	
Total	77	8.12	