

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

**September 2014 –Sixty-five percent of groundwater levels and 88 percent of monthly mean streamflows were in the normal range.**

## 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.

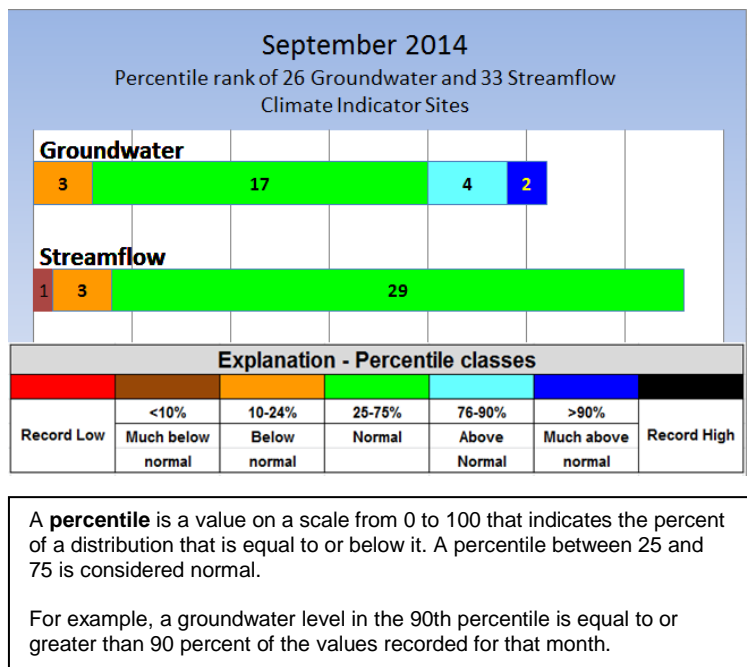
The sites used in this water summary were carefully selected to show the response of streamflow and groundwater levels to weather conditions. Ideally, these sites will show no effects from human influences. The streamflow and groundwater data are ranked in comparison to the historical record and summarized.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

## USGS September 2014 Water Conditions Summary

Sixty-five percent of the groundwater levels and 88 percent of the monthly mean streamflow values at sites used to monitor the response of water resources to changes in climatic conditions in Maryland, Delaware, and the District of Columbia were normal (between the 25<sup>th</sup> and 75<sup>th</sup> percentiles) in September.

September groundwater levels were above normal in 6 of 26 wells, including 2 wells above the 90<sup>th</sup> percentile. The groundwater level was below normal in three wells.

September monthly mean streamflows were normal at 29 of the 33 streamgages. Streamflow was below normal at four streamgages, and one of them was below the 10<sup>th</sup> percentile.

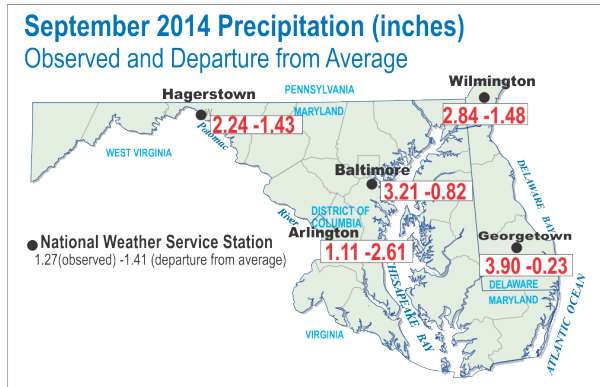


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## September 2014 Precipitation and Weather

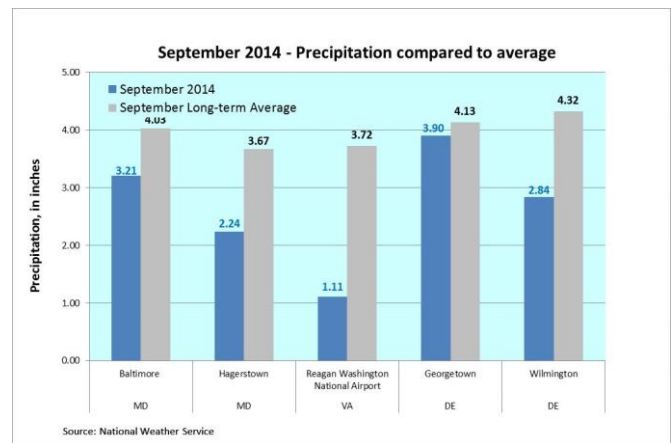
September rainfall was below the long-term average at the five National Weather Service (NWS) Mid-Atlantic weather stations. The highest September rainfall was in Georgetown, Delaware with 3.90 inches, and the lowest rainfall was in Arlington, Virginia with 1.11 inches.

The map below shows the departure from average at each of the five NWS weather stations.



### 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



The NWS Middle Atlantic River Forecast Center's 365-day precipitation data showed that all counties in Maryland and Delaware, and the District of Columbia were classified as average to above average except for Allegany County, Maryland. Three counties in Maryland (Baltimore, Harford, and Montgomery) were more than 10 inches over the 365-day average from September 2013 to September 2014. See the links below to view the NWS data.

September air temperatures were above normal at all five NWS Mid-Atlantic weather stations and ranged from 67.1 degrees Fahrenheit in Hagerstown, Maryland to 73.9 degrees Fahrenheit in Arlington, Virginia.

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

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

## Groundwater

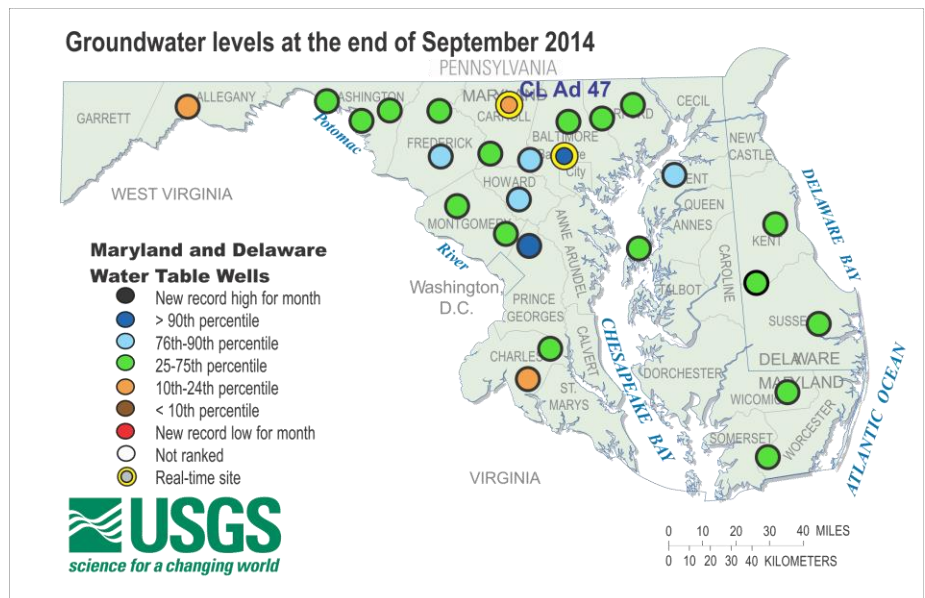
The USGS monitors groundwater levels in unconfined aquifers, providing observations that can be compared to both short-term and long-term changes in climatic conditions. Twenty-six groundwater wells were selected based on the following criteria:

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

## September 2014 Groundwater Levels

Groundwater levels were normal (between the 25<sup>th</sup> and 75<sup>th</sup> percentiles) in 17 of the 26 wells used to monitor climatic conditions in Maryland and Delaware in September. Groundwater levels were above normal at 6 of 26 wells and two of the wells had groundwater levels above the 90th percentile. Groundwater was below normal at 3 wells in Allegany, Carroll, and Charges County.

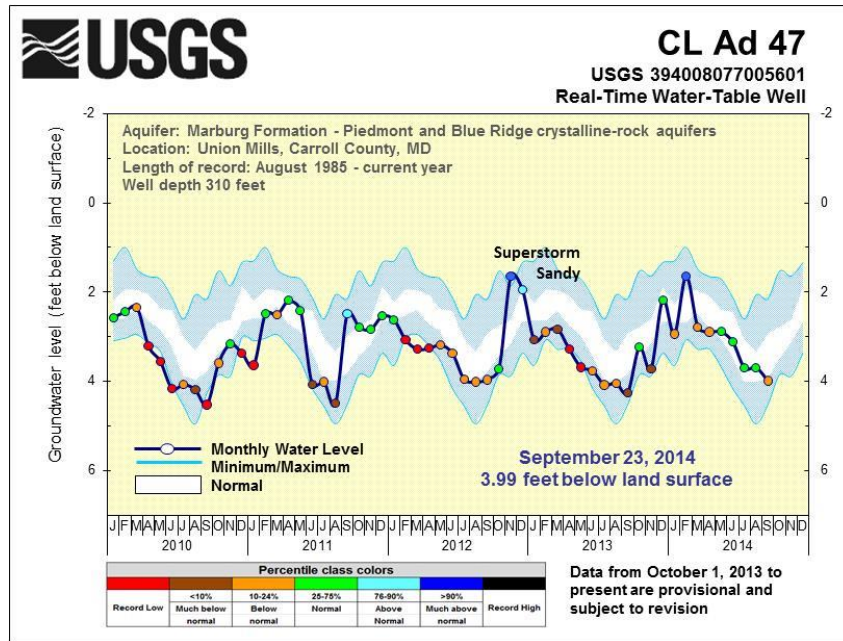
In Delaware, groundwater levels were normal at the three observation wells.



To access the clickable groundwater map, go to:  
[http://md.water.usgs.gov/groundwater/web\\_wells/current/water\\_table/counties/](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

The groundwater level in observation well CL Ad 47 in Carroll County, Maryland dropped to below normal in September. Based on historical data for this site, the groundwater level is usually at its lowest in August, and typically begins to rise in September and October.



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)

These 5-year hydrographs show 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

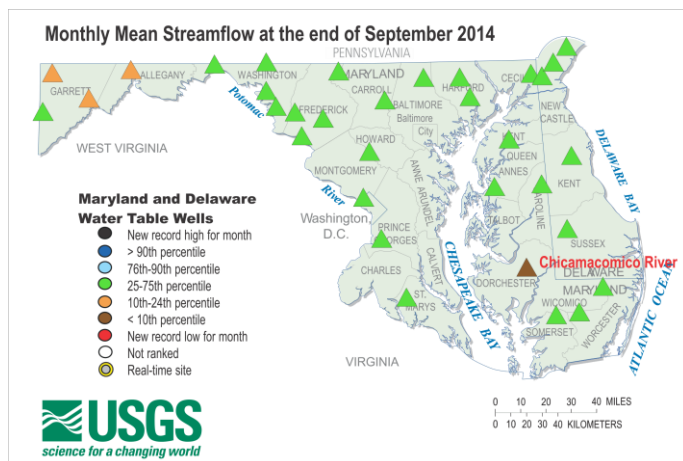
Streamflow data are used for many purposes. A few of the most obvious uses are to assess water supply and the risk of droughts and floods. Streamflow data are also used to calculate loads of chemical constituents and assess how biological communities are affected by hydrologic conditions. The USGS operates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

## September 2014 Streamflow

Monthly mean streamflows were normal at 29 of the 33 USGS streamgages used to monitor climatic response in Maryland, Delaware, and the District of Columbia in September. Normal is considered to be between the 25<sup>th</sup> and 75<sup>th</sup> percentiles.



Monthly mean streamflow was below normal at the Chicamaco River in Dorchester County, Maryland and at 3 stations in Allegany and Garrett Counties in western Maryland.

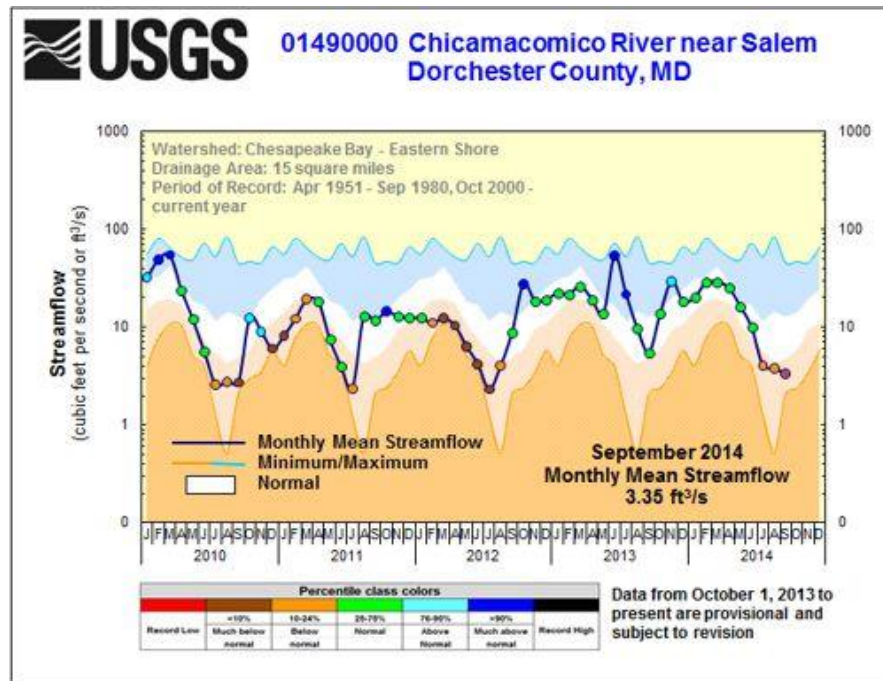
In Delaware, all monthly mean streamflows were normal in September.

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

The monthly mean streamflow at the Chicamacomico River in Dorchester County, Maryland was in the 10<sup>th</sup> percentile, with streamflow of 3.35 cubic feet per second (ft<sup>3</sup>/s).



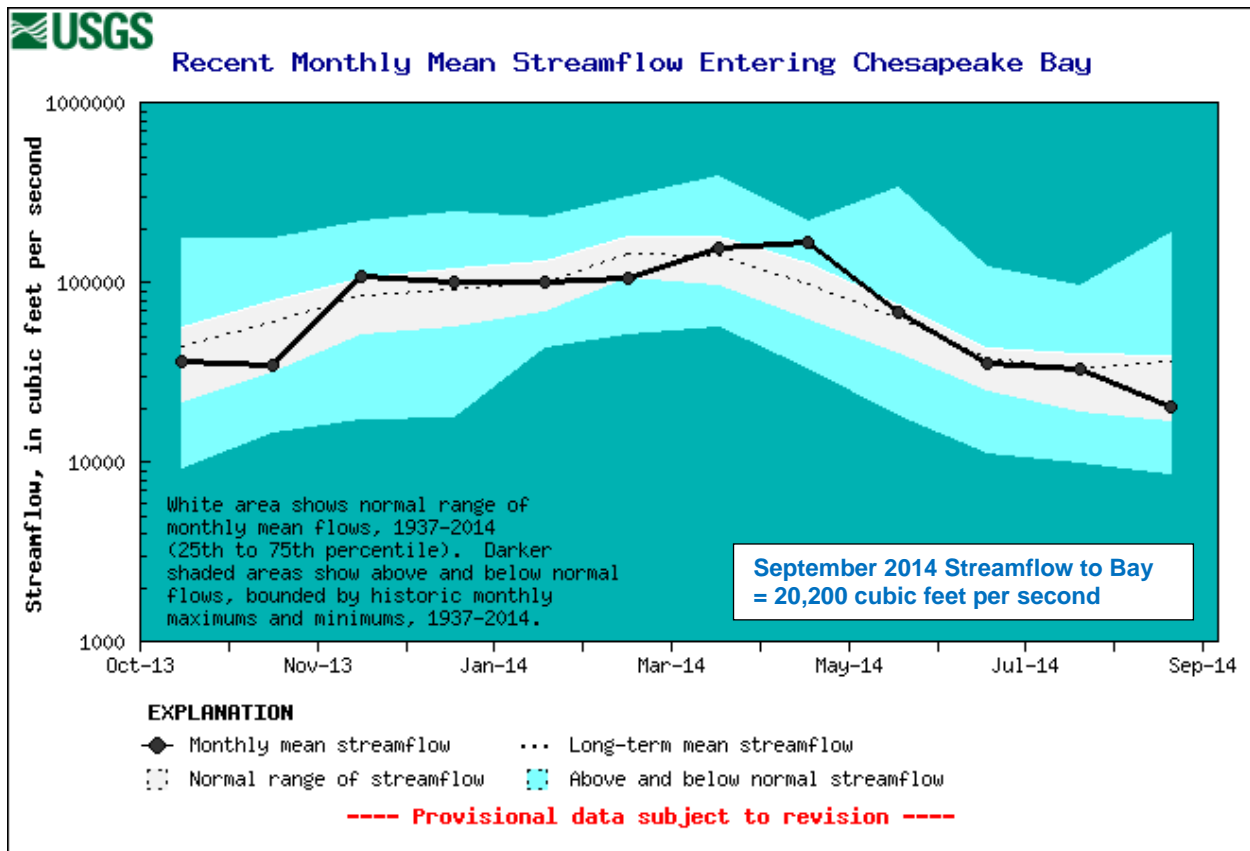
Five-year hydrographs can be viewed at:  
<http://md.water.usgs.gov/surfacewater/streamflow/>

The dark line in the 5-year hydrograph represents the monthly mean streamflow for this period and the white band shows the normal range (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.

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

## Estimated Streamflow to the Chesapeake Bay

The estimated monthly mean freshwater streamflow to Chesapeake Bay was normal in September 2014 at 20,200 ft<sup>3</sup>/s (provisional, and subject to revision). The average (mean) monthly streamflow for September is 36,900 ft<sup>3</sup>/s. The normal range for average (mean) monthly streamflow for September is between 17,200 ft<sup>3</sup>/s and 39,100 ft<sup>3</sup>/s, the 25<sup>th</sup> and 75<sup>th</sup> percentiles of all September values. These provisional statistics are based on a 78-year period of record.



Freshwater flow to the Bay and more information can be found here:  
<http://md.water.usgs.gov/waterdata/chesinflow/>

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

**Reservoir Levels**

Available reservoir storage at the end of September in the Baltimore reservoirs (Loch Raven, Liberty, and Prettyboy) was 97 percent of available storage capacity, or a total of 75.67billion gallons of water.

Total normal 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 10 percent to 82 percent of normal storage capacity in September, with 8.76 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.

<b>September 2014</b>	<b>Percent available/ normal storage</b>	<b>Volume (billion gallons)</b>	<b>Source</b>
<b>Baltimore Reservoirs</b>			<b>Baltimore City – Environmental Services Division</b>
Liberty	96	35.41	
Loch Raven	98	20.84	
Prettyboy	99	17.70	
<b>Total</b>	<b>97</b>	<b>73.94</b>	
<b>Patuxent Reservoirs</b>			<b>Washington Suburban Sanitary Commission (WSSC)</b>
Triadelphia	89	4.96	
Duckett	76	3.80	
<b>Total</b>	<b>82</b>	<b>8.76</b>	