

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

November 2014 – Sixty-two percent of groundwater levels and 73 percent of monthly mean streamflows were normal in 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 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.

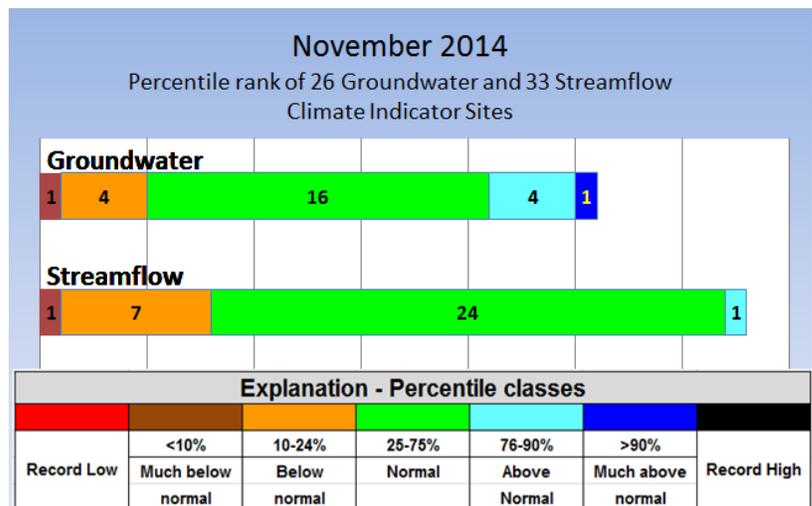
The sites used in this water summary were carefully selected to show the response of streamflow and groundwater levels to weather conditions. Ideally, these sites will show no effects from human influences. The streamflow and groundwater data are ranked in comparison to the historical record and summarized.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

USGS November 2014 Water Conditions Summary

In November, sixty-two percent of the groundwater levels and 73 percent of the monthly mean streamflows were normal (between the 25th and 75th percentiles) 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 62 percent, or 16 of the 26 wells used to monitor climatic conditions in Maryland and Delaware in November. For the remaining 10 wells, groundwater levels were above normal at 5 wells and below normal at 5 wells.

November monthly mean streamflows were normal at 73 percent, or 24 of the 33 streamgages. Streamflow was above normal at one streamgage, and below normal at eight streamgages, one of which was below the 10th percentile in Maryland.



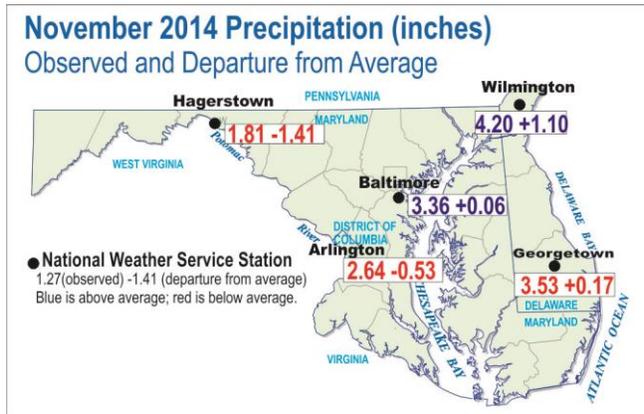
A **percentile** is a value on a scale from 0 to 100 that indicates the percent of a distribution that is equal to or below it. A percentile between 25 and 75 is considered normal.

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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November 2014 Precipitation and Weather

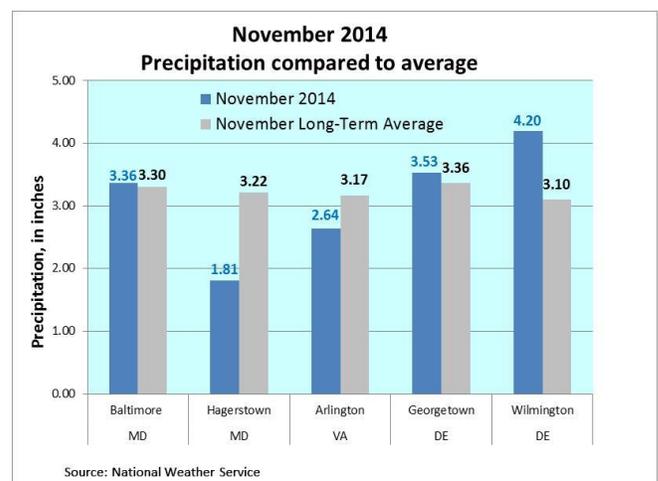
Precipitation in November was above the long-term average at the National Weather Service (NWS) Mid-Atlantic weather stations in Baltimore, Maryland and the two NWS stations in Delaware, and below average at the NWS stations in Arlington, Virginia and Hagerstown, Maryland. The highest amount of monthly rainfall was in Wilmington, Delaware, with 4.20 inches, and the lowest was in Hagerstown, Maryland, with 1.81 inches.



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 (MARFC) 365-day precipitation data showed that all counties in Maryland and Delaware, and the District of Columbia were classified as average (between the 25th and 75th percentiles) to above average. In Maryland, Harford County had the highest surplus of rain with 12.9 inches and Allegheny County had the largest deficit of 5.6 inches over the 365-day period from November 2013 to November 2014. See the links below to view the NWS MARFC data.



November air temperatures were between 1.6 and 3.1 degrees Fahrenheit below the long-term average at all five NWS Mid-Atlantic weather stations. The monthly mean temperatures ranged from 42.4 degrees Fahrenheit in Hagerstown, Maryland to 48.0 degrees Fahrenheit in Arlington, Virginia near the District of Columbia.

Sources:

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

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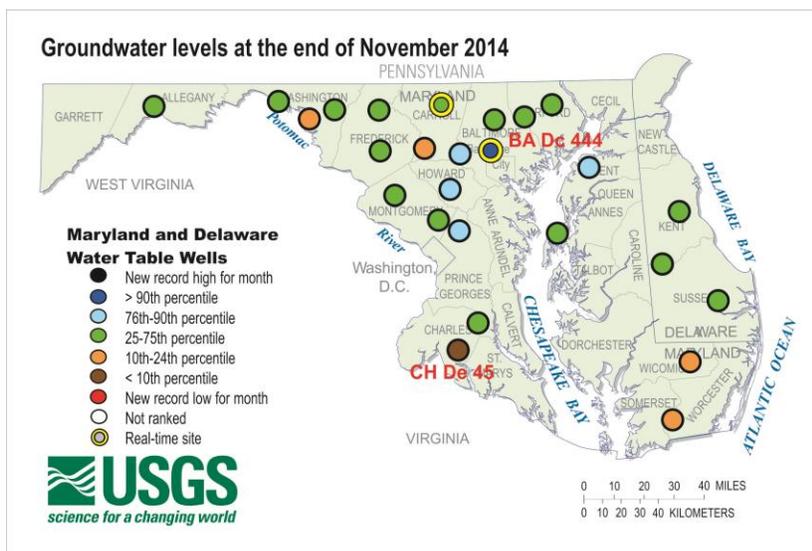
Groundwater

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 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.

November 2014 Groundwater Levels

Groundwater levels were normal (between the 25th and 75th percentiles) in 16 of the 26 wells used to monitor climatic conditions in Maryland and Delaware in November. For the remaining 10 wells, groundwater levels were above normal at 5 wells and below normal at 5 wells. The November groundwater level in well BA Dc 444 in Baltimore County was above the 90th percentile, and the groundwater level in well CH De 45 in Charles County was below the 10th percentile.



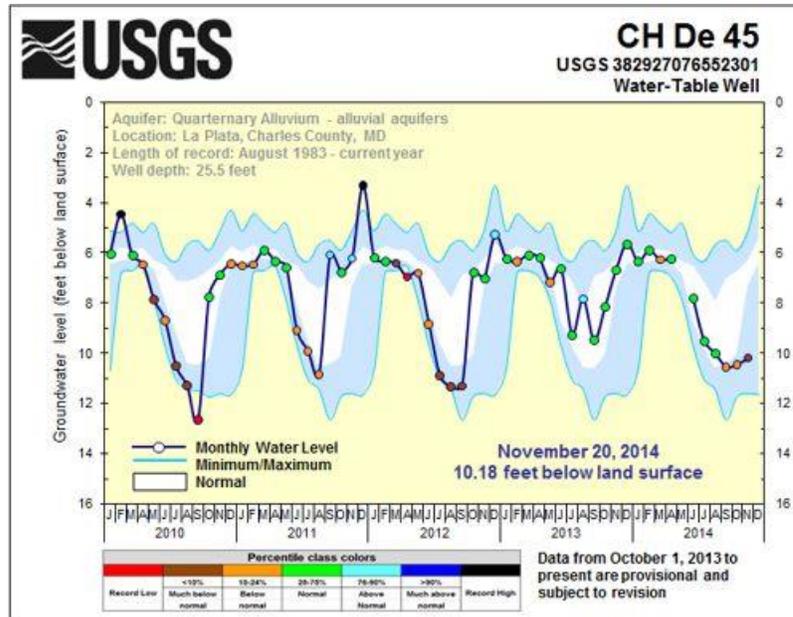
Groundwater levels in Delaware were normal at the three observation wells.

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

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The groundwater level in observation well CH De 45 in Charles County, Maryland, remained below normal for the third consecutive month, and now ranks below the 10th percentile after November.

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. Each monthly measurement is colored according to the percentile rank in which it falls for the month.



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

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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 streamgages in the region.

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

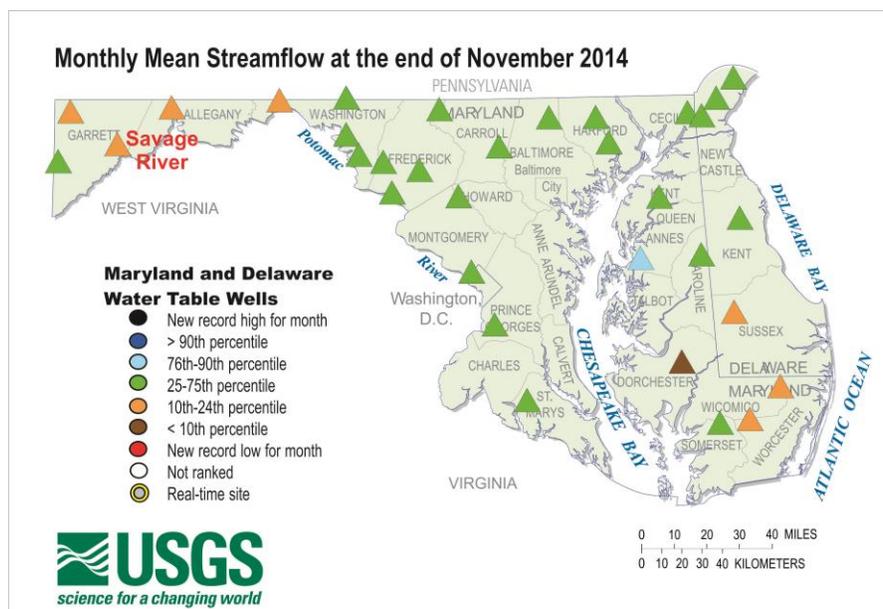
- Minimum period of record is 10 years of continuous data;
- Watershed areas greater than 5 square miles;
- Streamflow is not regulated, or has relatively natural flow;
- Streamflow data reflect climatic conditions; and
- The surrounding area and watershed are not urban.

November 2014 Streamflow

Monthly mean streamflows were normal at 24 of the 33 USGS streamgages used to monitor climatic response in Maryland, Delaware, and the District of Columbia in November. Normal is considered to be between the 25th and 75th percentiles. Since July, approximately 70 percent (at least 22 of the 33 USGS streamgages) of the monthly mean streamflows have been in the normal range.

November monthly mean streamflow was below normal at four USGS streamgages in western Maryland, and four USGS streamgages on the southern Delmarva Peninsula, including the Chicamacomico River in Dorchester County, Maryland, which was below the 10th percentile for the third consecutive month.

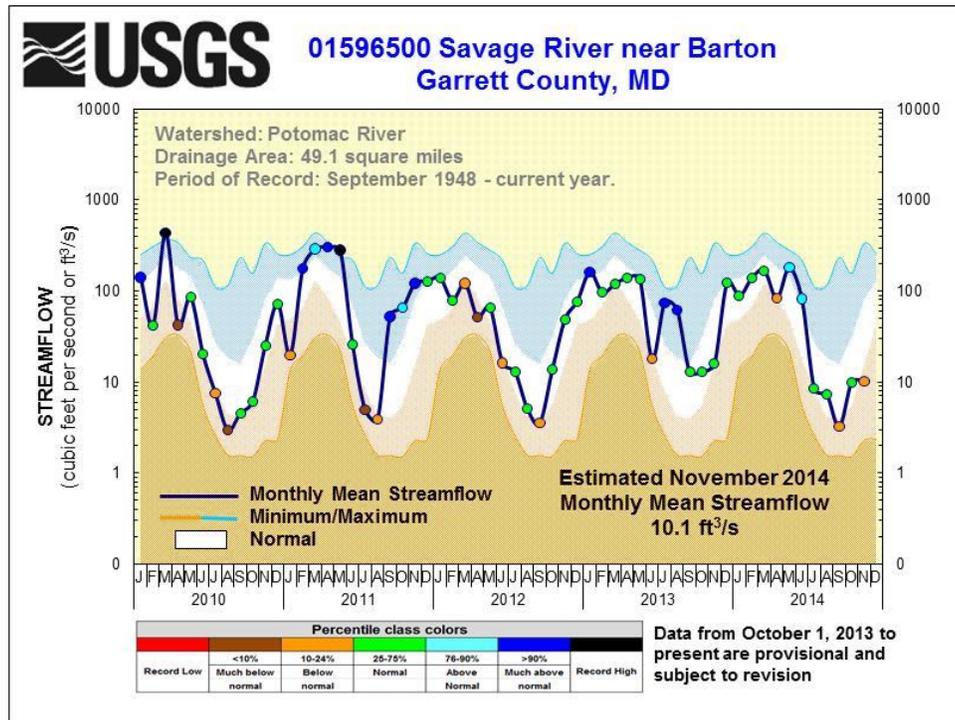
In Delaware, all monthly mean streamflow was normal in November, except for the Nanticoke River in Sussex County, which was below normal.



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

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November monthly mean streamflow was between the 10th and 24th percentiles on the Savage River in Garrett County, Maryland. Precipitation at the nearest NWS Station in Morgantown, West Virginia was 1.89 inches, or 1.57 inches below the long-term average and 1.81 inches in Hagerstown, Maryland. Other streams in western Maryland with below normal streamflow in November include the Potomac River near Hancock and Wills Creek.



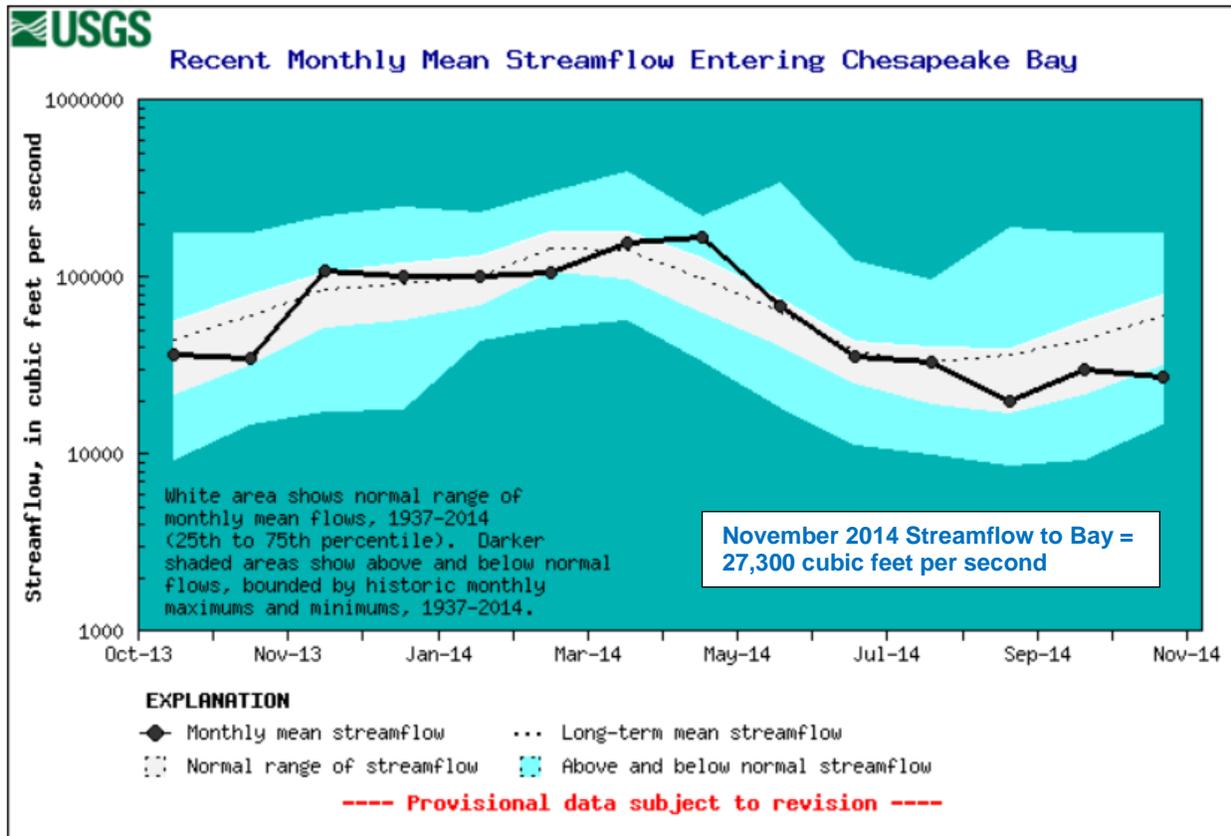
Five-year hydrographs can be viewed at:
<http://md.water.usgs.gov/surfacewater/streamflow/>

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 estimated monthly mean freshwater streamflow to Chesapeake Bay was below normal in November 2014 at 27,300 cubic feet per second (ft³/s; provisional, and subject to revision). The average (mean) monthly streamflow for November is 61,300 ft³/s. The normal range for average (mean) monthly streamflow for November is between 31,800 ft³/s and 79,200 ft³/s, the 25th and 75th percentiles of all November values. These provisional statistics are based on a 78-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

Available reservoir storage at the end of November in the Baltimore reservoirs (Loch Raven, Liberty, and Prettyboy) increased 2 percent since October to 100 percent of available storage capacity, or a total of 75.69 billion 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 Maryland around the District of Columbia, decreased 2 percent since October to 75 percent of normal storage capacity at the end of November, with 7.97 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.

November 2014	Percent available/normal storage	Volume (billion gallons)	Source
Baltimore Reservoirs			Baltimore City – Environmental Services Division
Liberty	100	36.64	
Loch Raven	100	21.20	
Prettyboy	100	17.85	
Total	100	75.69	
Patuxent Reservoirs			Washington Suburban Sanitary Commission (WSSC)
Triadelphia	80	4.48	
Duckett	70	3.49	
Total	75	7.97	