

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

**October 2014 – Sixty-five percent of groundwater levels and 76 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.

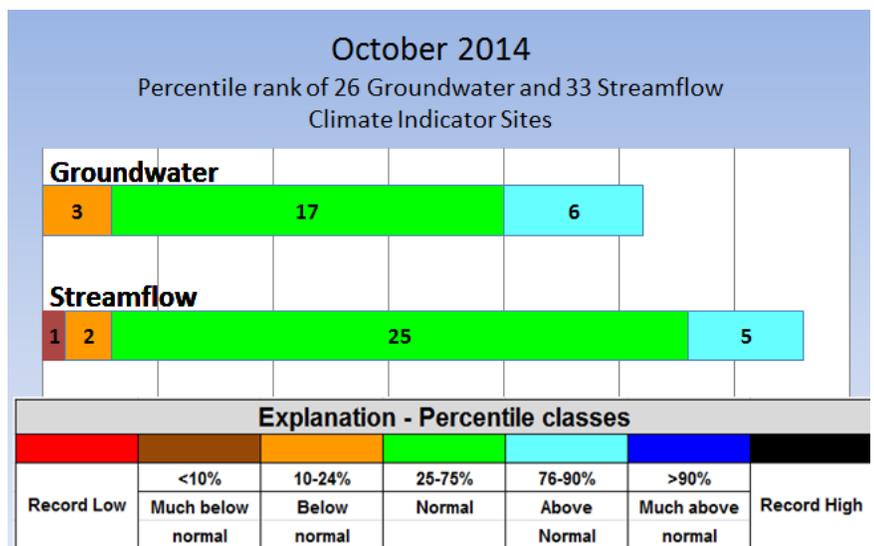
The sites used in this water summary were carefully selected to show the response of streamflow and groundwater levels to weather conditions. Ideally, these sites will show no effects from human influences. The streamflow and groundwater data are ranked in comparison to the historical record and summarized.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

## USGS October 2014 Water Conditions Summary

Sixty-five percent of the groundwater levels and 76 percent of the monthly mean streamflow values were normal (between the 25<sup>th</sup> and 75<sup>th</sup> percentiles) at sites used to monitor the response of water resources to changes in climatic conditions in Maryland, Delaware, and the District of Columbia in October.

Groundwater levels were normal in 17 of the 26 wells and above normal (above the 76<sup>th</sup> percentile) in 6 of 26 wells in October. Groundwater levels were below normal (between the 10<sup>th</sup> and 24<sup>th</sup> percentiles) in three wells in Maryland.

October monthly mean streamflows were above normal at four streamgages. Streamflow was normal at 26 streamgages, and below normal at 3 streamgages, one of which was below the 10<sup>th</sup> percentile in Maryland.



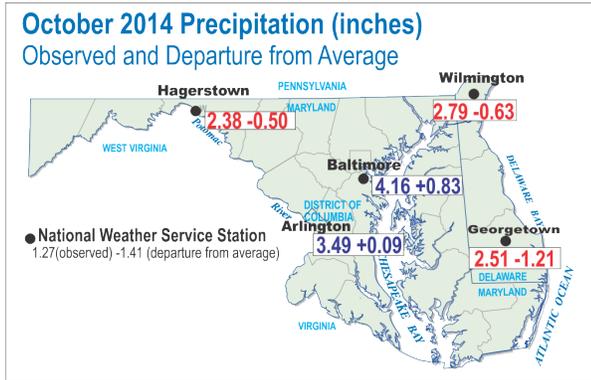
A **percentile** is a value on a scale from 0 to 100 that indicates the percent of a distribution that is equal to or below it. A percentile between 25 and 75 is considered normal.

For example, a groundwater level in the 90th percentile is equal to or greater than 90 percent of the values recorded for that month.

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

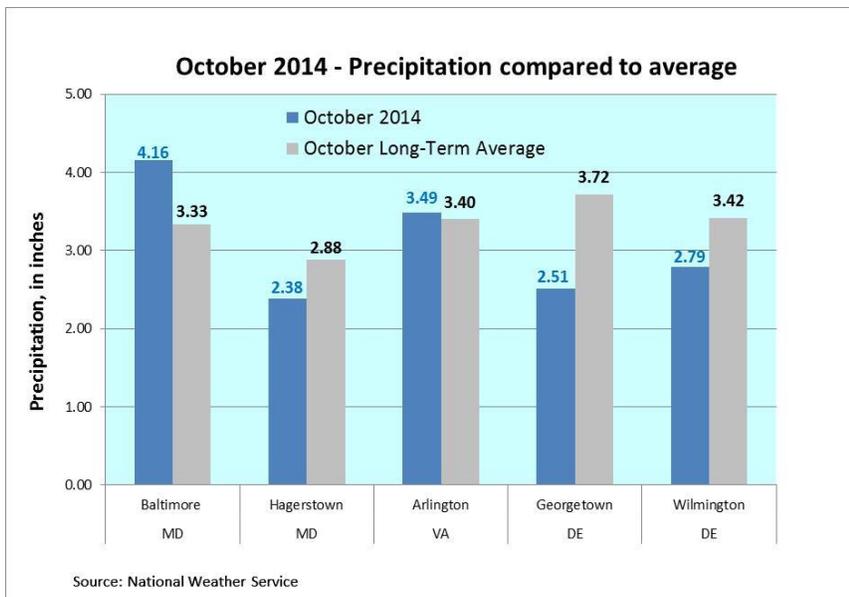
## October 2014 Precipitation and Weather

Precipitation in October was above the long-term average at two National Weather Service (NWS) Mid-Atlantic weather stations, and below average at three weather stations. The highest monthly amount of rainfall was in Baltimore, Maryland with 4.16 inches and the lowest was in Hagerstown, Maryland with 2.38 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 365-day precipitation data showed that all counties in Maryland and Delaware, and the District of Columbia were classified as average (between the 25<sup>th</sup> and 75<sup>th</sup> percentiles). Two counties in Maryland, Harford and Montgomery Counties, were more than 10 inches over the 365-day average from October 2013 to October 2014. See the links below to view the NWS data.

October air temperatures were more than 2 degrees Fahrenheit above the long-term average at all five NWS Mid-Atlantic weather stations. The temperatures ranged from 58.2 degrees Fahrenheit or 2.1 degrees Fahrenheit above the long-term average in Baltimore, Maryland to 62.9 degrees Fahrenheit, or 3.4 degrees Fahrenheit above the long-term average 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/>

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

## Groundwater

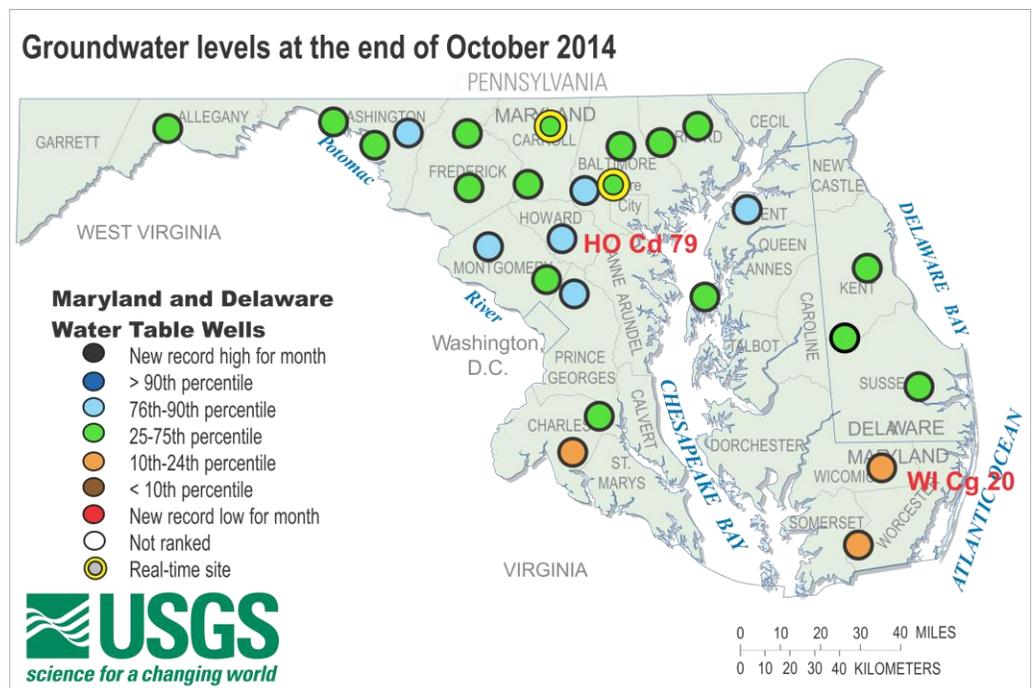
The USGS monitors groundwater levels in unconfined aquifers, providing observations that can be compared to both short-term and long-term changes in climatic conditions. Twenty-six groundwater wells were selected based on the following criteria:

- 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.

## October 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 October. Groundwater levels were above normal at 6 of 26 wells and below normal at one well in southern Maryland and two wells on the southern end of the Delmarva Peninsula.

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

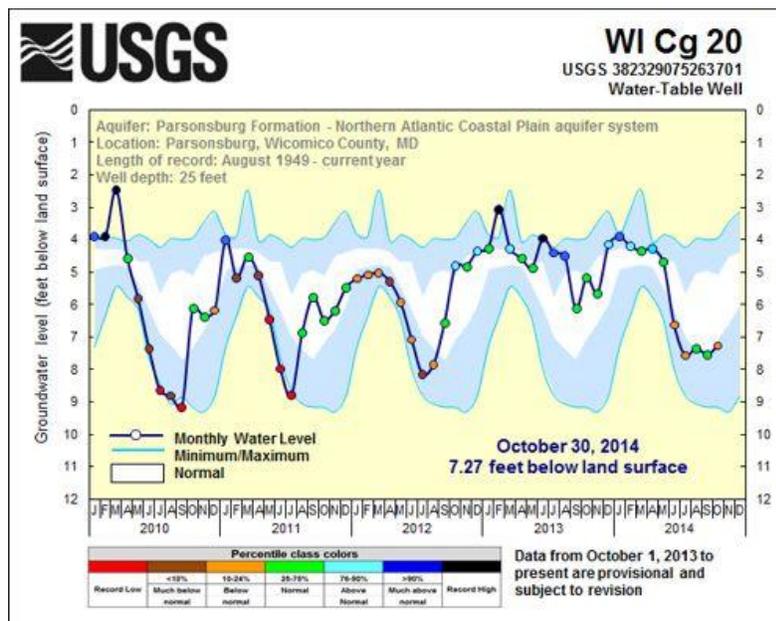
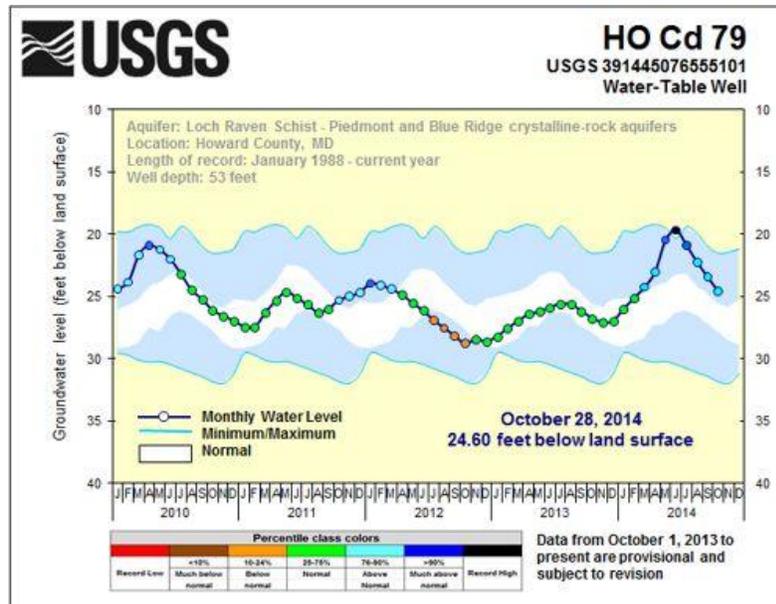


To access the clickable groundwater map, go to:  
[http://md.water.usgs.gov/groundwater/web\\_wells/current/water\\_table/counties/](http://md.water.usgs.gov/groundwater/web_wells/current/water_table/counties/)

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

The groundwater level in observation well HO Cd 79 in Howard County, Maryland, has decreased from the record high levels in June but remains above normal. In Wicomico County, Maryland, observation well WI Cg 20 was slightly below normal in October and has been below normal during 3 of the last 5 months.

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.



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)

# 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.

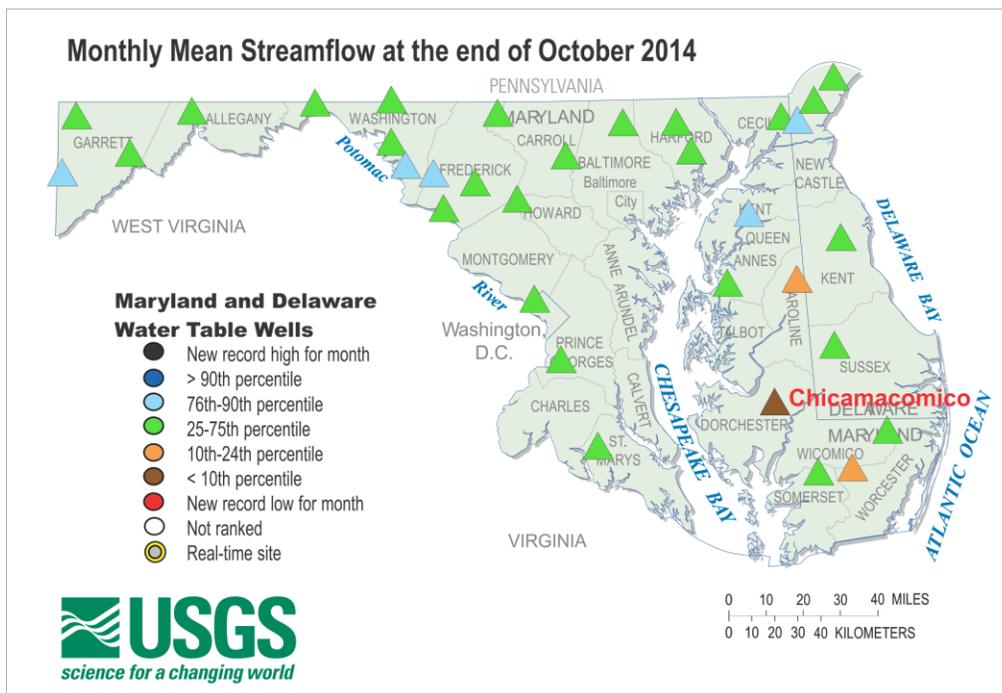
The streamflow locations chosen for the monthly water summary were selected based on the following criteria:

- 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.

## October 2014 Streamflow

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

October monthly mean streamflow was below normal at the USGS streamgages on the Choptank River, Nassawango Creek, and below the 10<sup>th</sup> percentile at the streamgage on the Chicamacomico River in Dorchester County, Maryland. All three sites are on the Delmarva Peninsula.

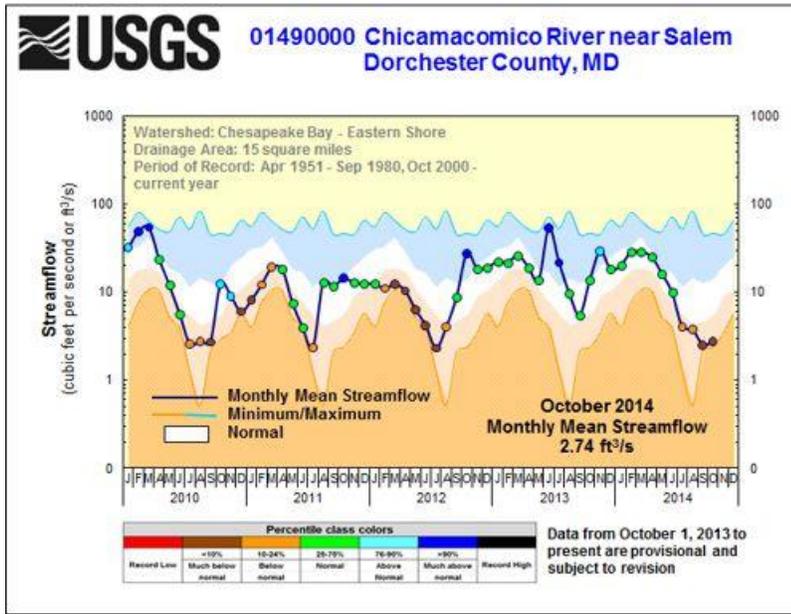


In Delaware, all monthly mean streamflows were normal in October, except for the Christina River, which was above normal.

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

Monthly mean streamflow was below the 10<sup>th</sup> percentile in September and October on the Chicamacomico River in Dorchester County, Maryland. The last time monthly mean streamflow was at this level was in 2012. Rainfall at the nearest NWS weather station in Georgetown, Delaware was 1.21 inches below the long-term average in October, which could explain the low streamflow at this streamgauge.



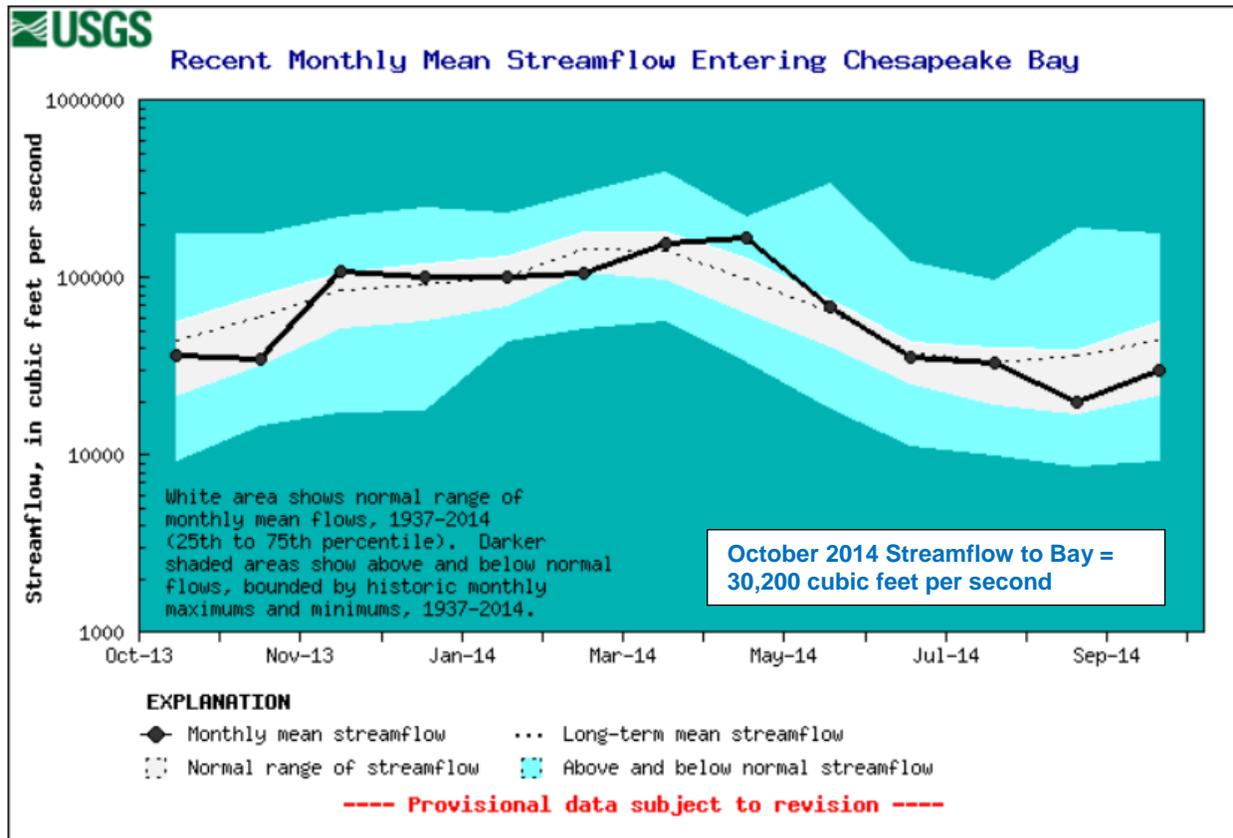
The dark line in the 5-year hydrograph represents the monthly mean streamflow for this period and the white band shows the normal range (25<sup>th</sup> to 75<sup>th</sup> percentiles) based on the period of record. The maximum monthly mean streamflow is at the top of the blue shaded section, and the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

## Estimated Streamflow to the Chesapeake Bay

The estimated monthly mean freshwater streamflow to Chesapeake Bay was normal in October 2014 at 30,200 cubic feet per second (ft<sup>3</sup>/s; provisional, and subject to revision). The average (mean) monthly streamflow for October is 44,900 ft<sup>3</sup>/s. The normal range for average (mean) monthly streamflow for October is between 21,600 ft<sup>3</sup>/s and 56,600 ft<sup>3</sup>/s, the 25<sup>th</sup> and 75<sup>th</sup> percentiles of all October 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/>

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

**Reservoir Levels**

Available reservoir storage at the end of October in the Baltimore reservoirs (Loch Raven, Liberty, and Prettyboy) decreased 2 percent to 98 percent of available storage capacity, or a total of 74.12 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 areas around the District of Columbia, decreased 5.5 percent to 77 percent of normal storage capacity at the end of October, with 8.23 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>October 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	35.40	
Loch Raven	99	21.02	
Prettyboy	99	17.70	
<b>Total</b>	<b>98</b>	<b>74.12</b>	
<b>Patuxent Reservoirs</b>			<b>Washington Suburban Sanitary Commission (WSSC)</b>
Triadelphia	88	4.93	
Duckett	66	3.30	
<b>Total</b>	<b>77</b>	<b>8.23</b>	