

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

June 2014 – Record high groundwater levels in Baltimore County and Howard County, Maryland.

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.

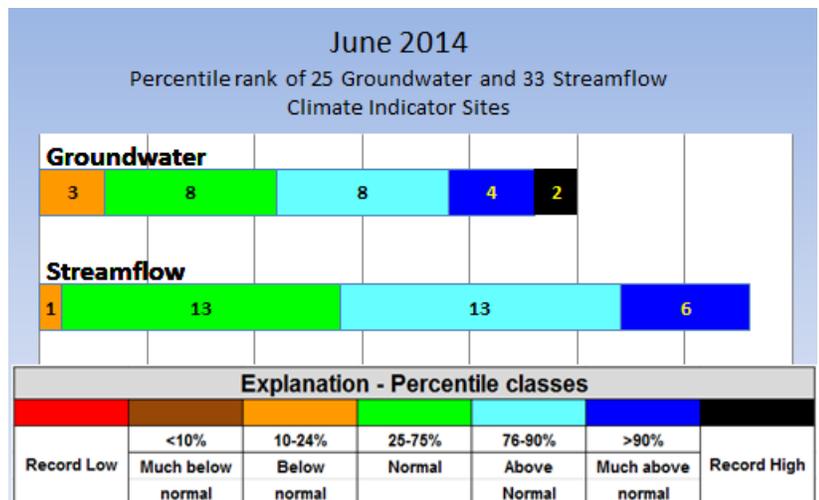
The sites used in this water summary were carefully selected to show the response of streamflow and groundwater levels to weather conditions. Ideally, these sites will show no effects from human influences. The streamflow and groundwater data are ranked in comparison to the historical record and summarized.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

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Thirty-two percent of the groundwater levels and 39 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 25th and 75th percentile) in June.

Groundwater levels were at a record high at two observation wells in June. In 14 of the 24 USGS observation wells used to monitor climatic conditions in Maryland and Delaware, the groundwater levels were above the 75th percentile. There were 3 wells with below normal groundwater levels (between the 10-24th percentile).

Monthly mean streamflows were below normal at one streamgauge, but normal to above normal in the remaining 32 streams in Maryland and Delaware in June.



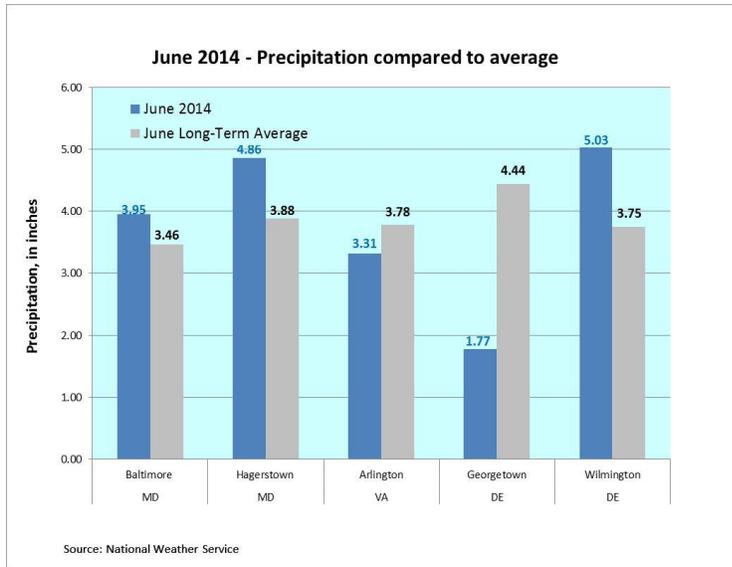
A **percentile** is a value on a scale from 0 to 100 that indicates the percent of a distribution that is equal to or below it. A percentile between 25 and 75 is considered normal.

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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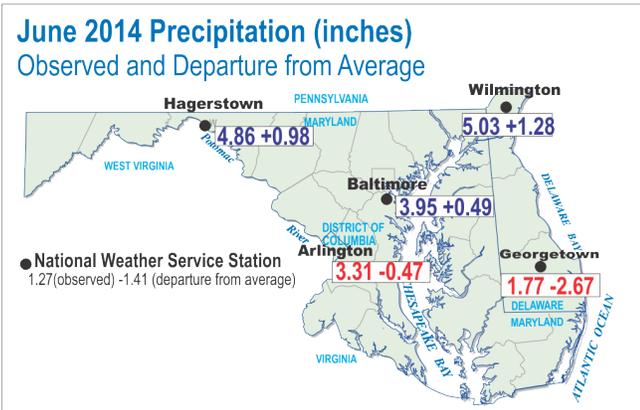
June 2014 Precipitation and Weather

June precipitation was above the long-term monthly average at National Weather Service (NWS) stations in Maryland, but below normal at Georgetown, Delaware and at Reagan Washington National Airport in Arlington, Virginia. The lowest amount of precipitation was in Georgetown, Delaware, with 1.77 inches, or 2.67 inches below the long-term average.



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, Delaware, and the District of Columbia were classified as average to above average. Two counties in Maryland were more than 10 inches over the 365-day average from June 2013 to June 2014. See the links below to view the NWS data.

June air temperatures ranged from 0.5 degrees Fahrenheit above the long-term average in Wilmington, Delaware to 2.0 degrees Fahrenheit above the long-term average in Arlington, Virginia among the five NWS stations in the Mid-Atlantic region.

*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=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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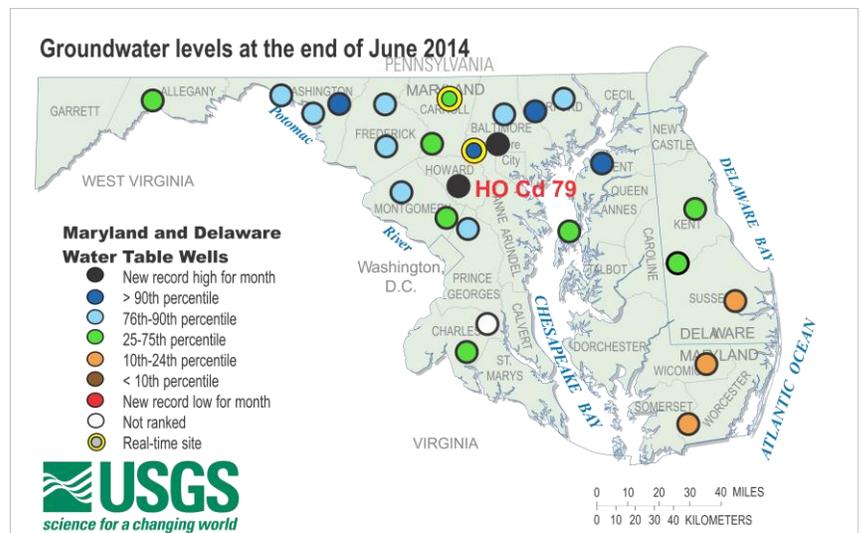
Groundwater

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.

June 2014 Groundwater Levels

Record high June groundwater levels were set in Baltimore and Howard Counties in Maryland. Four more wells were above the 90th percentile and other groundwater levels were normal to above normal, except for those on the southern Delmarva Peninsula, where the groundwater levels in three wells dropped below normal. Groundwater levels were normal (between the 25th and 75th percentiles) in 8 of the 24 wells used to monitor climatic conditions in Maryland and Delaware in June.

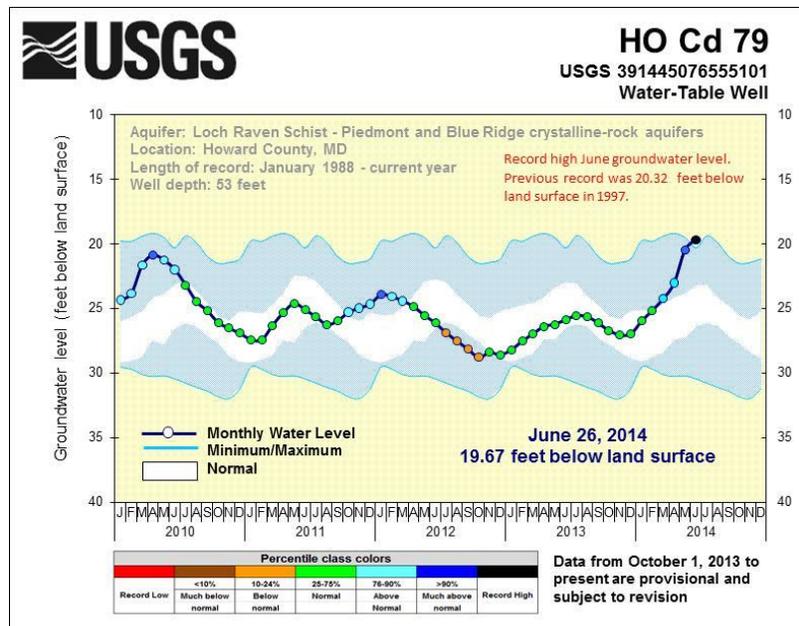


Groundwater levels in Delaware were normal at the two observation wells in Kent County in June, and below normal in the well in Sussex County.

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 HO Cd 79 in Howard County, Maryland, set a new record high for June at 19.67 feet below land surface. The previous record was 20.32 feet below land surface in 1997. Data collection began at this site in 1988.



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

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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.

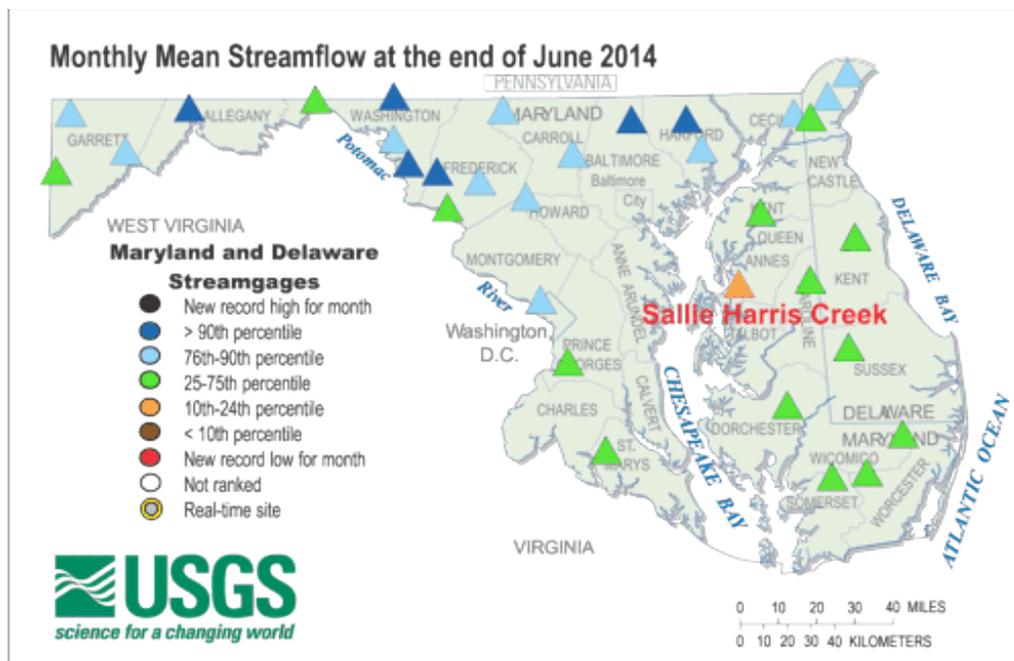
The streamflow locations chosen for the monthly water summary were selected based on the following criteria:

- 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.

June 2014 Streamflow

Monthly mean streamflows were normal at 13 of the 33 USGS streamgages used to monitor climatic response in Maryland, Delaware, and the District of Columbia in June. Normal is considered to be between the 25th and 75th percentiles.

Streamflow was above the 90th percentile at 6 USGS streamgages and below normal at Sallie Harris Creek in Queen Anne's County, Maryland.

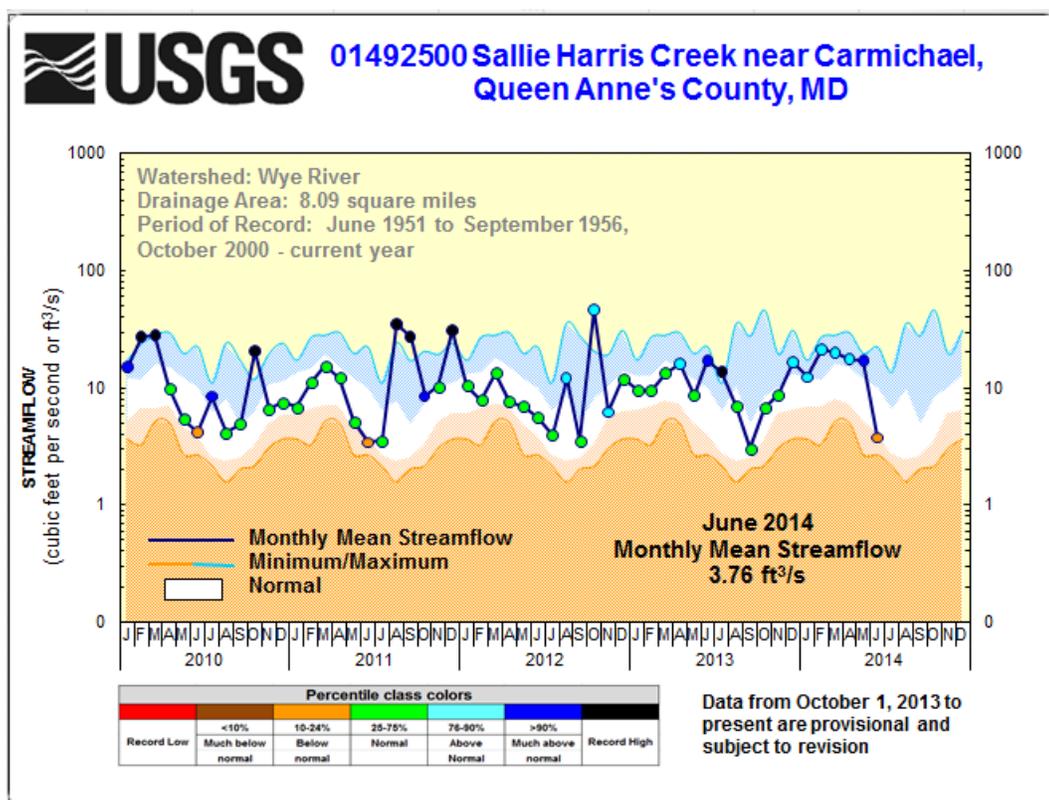


To access the clickable streamflow map, go to:
<http://md.water.usgs.gov/surfacewater/streamflow/>

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The monthly mean streamflow at Sallie Harris Creek in Queen Anne’s County, Maryland, went from above normal in May to below normal in June. Precipitation at the nearest NWS station in Georgetown, Delaware was 2.67 inches below normal in June at 1.77 inches.

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.

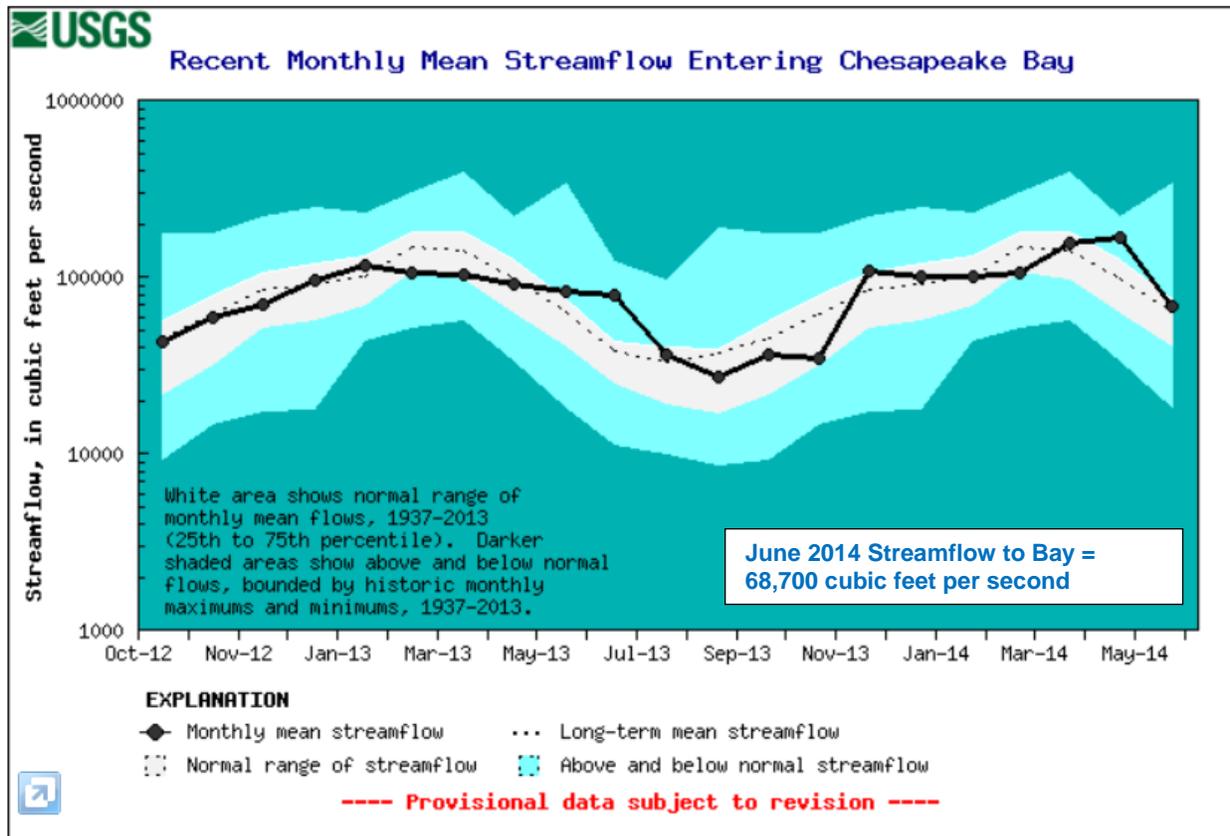


Five-year hydrographs can be viewed at:
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Estimated Streamflow to the Chesapeake Bay

The estimated monthly mean freshwater streamflow to Chesapeake Bay was normal in June 2014 at 68,700 ft³/s (provisional, and subject to revision). The average (mean) monthly streamflow for June is 64,500 ft³/s. The normal range for average (mean) monthly streamflow for June is between 40,500 ft³/s and 75,800 ft³/s, the 25th and 75th percentiles of all June values. These provisional statistics are based on a 77-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 June in the Baltimore reservoirs (Loch Raven, Liberty, and Prettyboy) remained at 100 percent of available storage capacity, or a total of 75.77 billion gallons of water. The Baltimore reservoirs have been full since December 2013.

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, was 98 percent of normal storage capacity in June, with 10.44 billion gallons of water. Not all of the water in the reservoir is usable; for operational purposes, percent of normal storage capacity is used, but this value can exceed 100 percent of the usable storage.

June 2014	Percent available/ normal storage	Volume (billion gallons)	Source
Baltimore Reservoirs			Baltimore City – Environmental Services Division
Liberty	100	36.72	
Loch Raven	100	21.20	
Prettyboy	100	17.85	
Total	100	75.77	
Patuxent Reservoirs			Washington Suburban Sanitary Commission (WSSC)
Triadelphia	101	5.64	
Duckett	96	4.80	
Total	98	10.44	