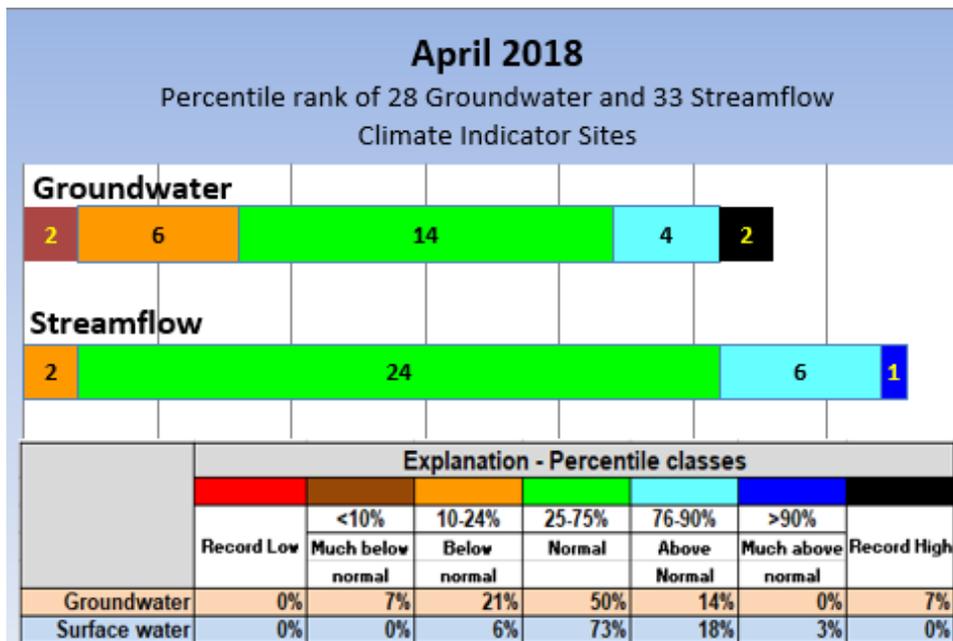


U.S. Geological Survey (USGS) Maryland-Delaware-District of Columbia Monthly Water Conditions Summary

USGS April 2018 Water Conditions Summary

Hydrologic data from 28 wells and 33 streamgages are used to monitor the monthly groundwater and streamflow response to weather conditions in Maryland, Delaware, and the District of Columbia. In April 2018, groundwater levels and monthly mean streamflows ranged from below normal to above normal.

The number of groundwater and surface-water sites, and the percentage of the total number of groundwater or surface-water sites, that fall within each percentile range are shown in the graphic for April 2018.



*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.*

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 extreme conditions like floods and droughts. The USGS is known for its consistent measurement techniques and the most extensive set of historical groundwater and streamflow data available to the public. Since these long-term data were collected during wet and dry periods, they can be used to assess how water resources respond to changes in weather, and to evaluate how current data compare to the historical data. The uniformity of the dataset enables multi-state comparisons and other comparative statistical analyses that can better inform policy makers of possible water-resources conditions they might encounter in the future.

The sites used in this water summary were carefully selected to include long-term datasets and show the response of streamflow and groundwater levels to weather conditions, rather than the effects of human influences. Of the USGS sites presented in this summary, 13 wells and 29 streamgages have more than 50 years of data. The current streamflow and groundwater data are ranked in comparison to the historical record and summarized. In addition to groundwater and streamflow data, this summary includes precipitation data to give a more complete picture of the region's water resources. Hydrologic and weather data have not been reviewed and are therefore provisional and subject to revision.

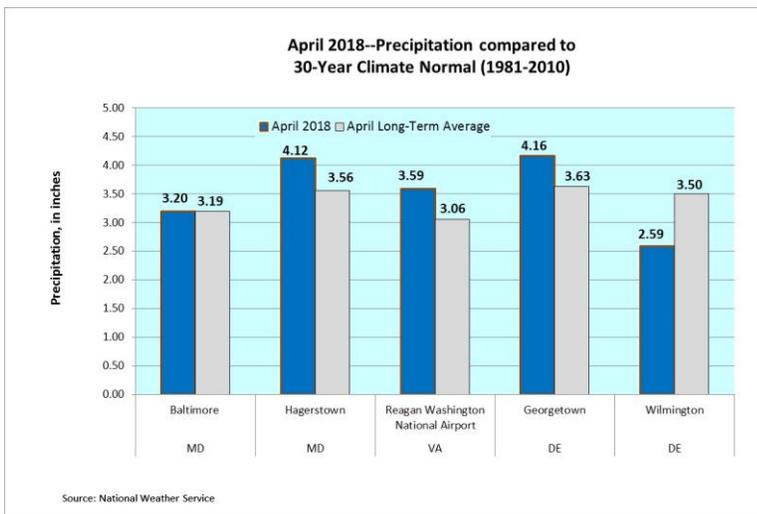
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Precipitation

Monthly data from five Mid-Atlantic National Weather Service (NWS) stations are used to present monthly precipitation data to compare to the response of groundwater and streamflow. The NWS uses averages of data over the 30-year climate normal period from 1981 through 2010.

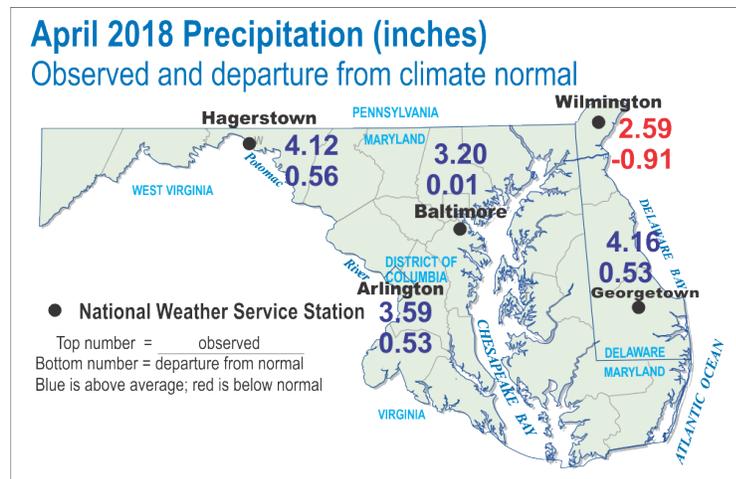
April 2018 Precipitation

The long-term average April precipitation for the five Mid-Atlantic NWS weather stations is shown in the graph and map.



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



Source: National Weather Service
 DC and MD: <http://w2.weather.gov/climate/index.php?wfo=lxw>
 DE: <http://www.weather.gov/climate/index.php?wfo=phi>;
 MARFC: http://www.weather.gov/marfc/Precipitation_Departures

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Groundwater

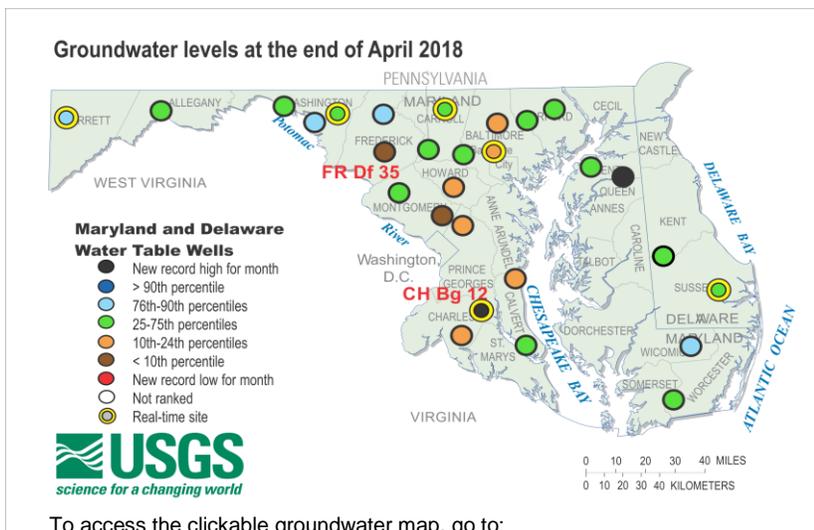
The USGS monitors groundwater levels in surficial or unconfined aquifers, providing observations that can be compared to both short-term and long-term changes in weather conditions. The groundwater wells used for the monthly water summary were selected based on the following criteria:

- Located in a surficial or unconfined (water-table) aquifer
- Open to a single, known hydrogeologic unit/aquifer
- Groundwater hydrograph generally reflects response to weather
- No indicated nearby pumpage, and likely to remain uninfluenced by pumpage 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 a casing – dug wells are generally not used
- Water levels show no apparent hydrologic connection to nearby streams
- Well rarely goes dry
- Long-term accessibility likely, such as on public land

In the Maryland, Delaware, and District of Columbia region, it is useful to compare current data to historical data, such as data from the droughts of 1999-2002 and the 1960s. There are 11 wells that have over 60 years of groundwater data, and 23 wells that have more than 30 years of groundwater data as of 2018.

April 2018 Groundwater Levels

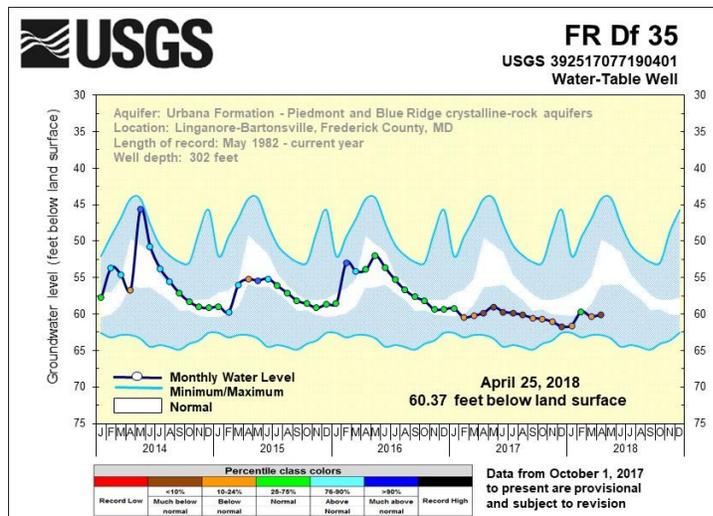
Fifty percent, or 14 USGS observation wells, had groundwater levels within the normal range (25th-75th percentiles) in April. Groundwater levels were above normal at six wells, including two record April high groundwater levels and 4 wells with groundwater levels in the 76th-90th percentile range. There were eight wells with below normal groundwater levels, including six wells in the 10th-24th percentile range, and two wells below the 10th percentile. Between March and April, groundwater levels decreased at 8 wells (29 percent) and increased at 20 wells (71 percent).



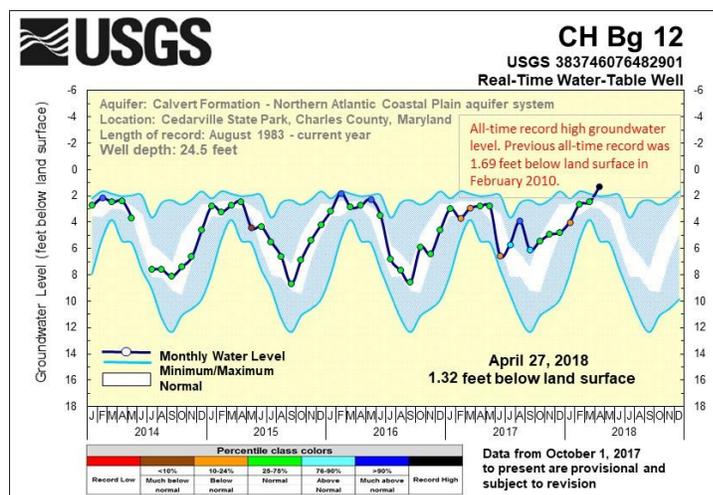
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In the 5-year hydrographs for the selected wells, groundwater levels are shown as a dark blue line. Each monthly measurement is colored according to the percentile rank compared to the historical values at the site for the month. The normal range is displayed as a white band and is 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 area in the graph.

The groundwater level at observation well FR Df 35, in Frederick County, Maryland, was below the 10th percentile in April at 60.37 feet below land surface. Normal April groundwater levels at this well range from 50.09 to 56.68 feet below land surface. Monthly record-keeping at this well began in May 1982.



The groundwater level at USGS observation well CH Bg 12, in Charles County, Maryland, was 1.32 feet below land surface, which is an all-time record high. The previous all-time record high was 1.69 feet below land surface in February 2010. The prior April record was 2.05 feet below land surface in 2007. The normal range of groundwater levels for April at this well is between 2.39 and 2.94 feet below land surface. Record-keeping at this well began in August 1983.



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 most commonly used for assessing water supply and to determine the risk of droughts and floods. Streamflow data are also used to calculate loads of chemical constituents, and to assess how biological communities are affected by hydrologic conditions.

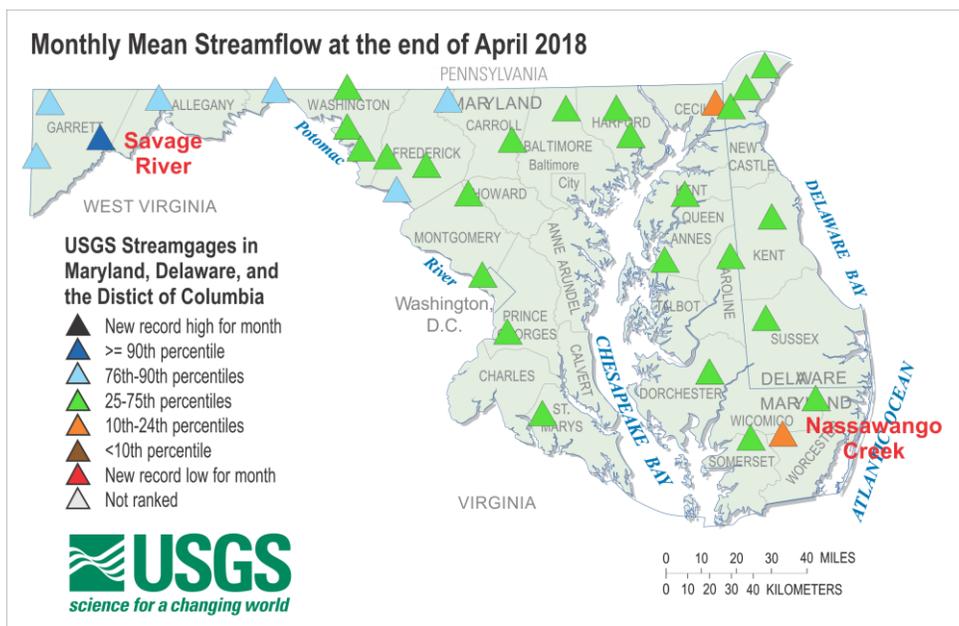
The USGS streamgages chosen for the monthly water summary were selected based on the following criteria:

- Minimum period of record is 10 years of continuous data
- Watershed areas greater than 5 square miles
- Streamflow is not regulated, such as by a dam or diversion, and has relatively natural flow
- Streamflow data reflect a response to weather conditions
- Most of the surrounding area and watershed are not urban

Of the 33 streamgages used in this summary, 22 have more than 60 years of data, allowing for comparison to data from the historical droughts of 1999-2002 and the 1960s. All 33 streamgages have at least 30 years of monthly mean streamflow data.

April 2018 Streamflow

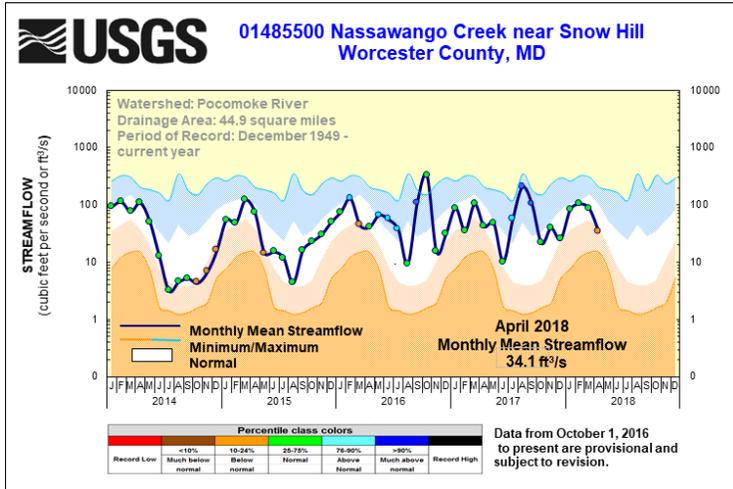
Monthly mean streamflows were in the normal range at 73 percent, or 24 of 33 selected USGS streamgages. Streamflow was below normal (10-24th percentile) at two streamgages and above normal at seven streamgages including six streamgages in the 76th-90th percentile range and one greater than the 90th percentile. Streamflow decreased at 12 streamgages (36 percent) and increased at 21 streamgages (64 percent) in April.



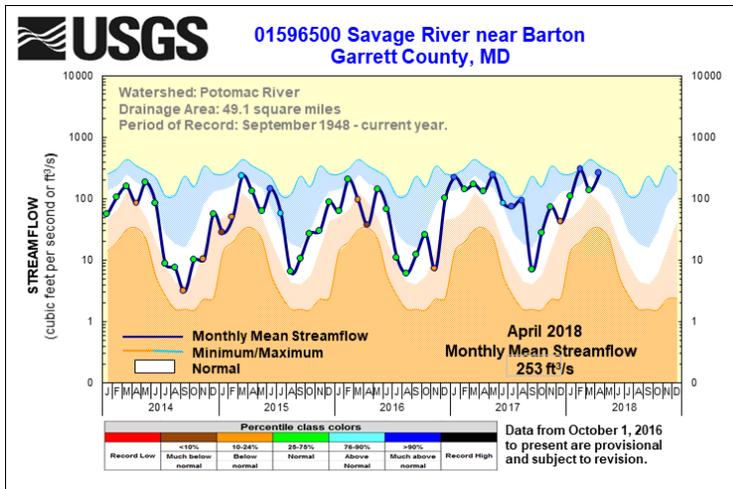
To access the clickable streamflow map, go to:
<http://md.water.usgs.gov/surfacewater/streamflow/>

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

In the hydrograph for the selected streamgages, 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-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 bottom of the tan area. Each monthly mean streamflow is colored according to the percentile rank compared to the historical data for the month.



Monthly mean streamflow at Nassawango Creek near Snow Hill in Worcester County, Maryland, was 34.1 cubic feet per second (ft³/s), which is below normal. The normal streamflow range for April is between 37.5 ft³/s and 95.4 ft³/s. Record-keeping at this streamgage began in December 1949.



At the Savage River near Barton streamgage, in Garrett County, Maryland, the monthly mean streamflow was 253 ft³/s, which is above normal. The normal streamflow range for March is between 85.9 ft³/s and 148 ft³/s. Record-keeping at this streamgage began in September 1948.