

# May 2011

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

### Why is it important for the USGS to collect and analyze water-resources data?

USGS water data is valuable to the public, researchers, water managers, planners, and agricultural users, especially during floods and droughts. These data can be used to assess and predict how water resources respond to changes in climate. Scientists at the USGS have measured water in streams and groundwater levels in wells to assess water resources for over 125 years.

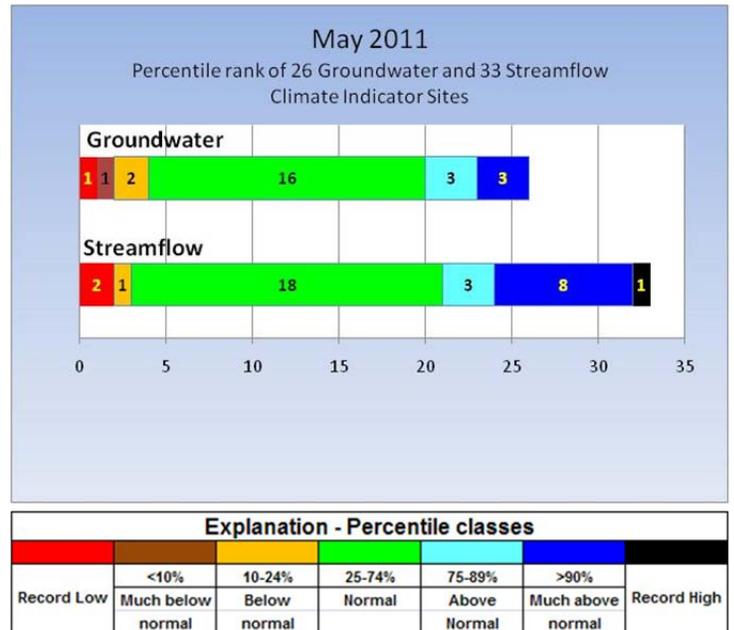
In addition to providing the most extensive dataset of historical streamflow and groundwater data available to the public, the USGS collects water data and quality-assures the data by employing standardized techniques across the country. The uniformity of the dataset allows for multi-state comparisons and other comparative statistical analyses that inform policy makers of the possibilities and limitations 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 precipitation. 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 May 2011 Water Conditions Summary

In May, groundwater levels remained low in the lower Delmarva Peninsula and a monthly record low groundwater level was set at a well in Wicomico County, Maryland. A monitoring well in Somerset County, Maryland was in the lowest 10<sup>th</sup> percentile. Despite these low groundwater levels, 22 of the 26 wells monitored by the USGS to assess the response to climatic conditions in Maryland, Delaware, and the District of Columbia region were normal to above normal.

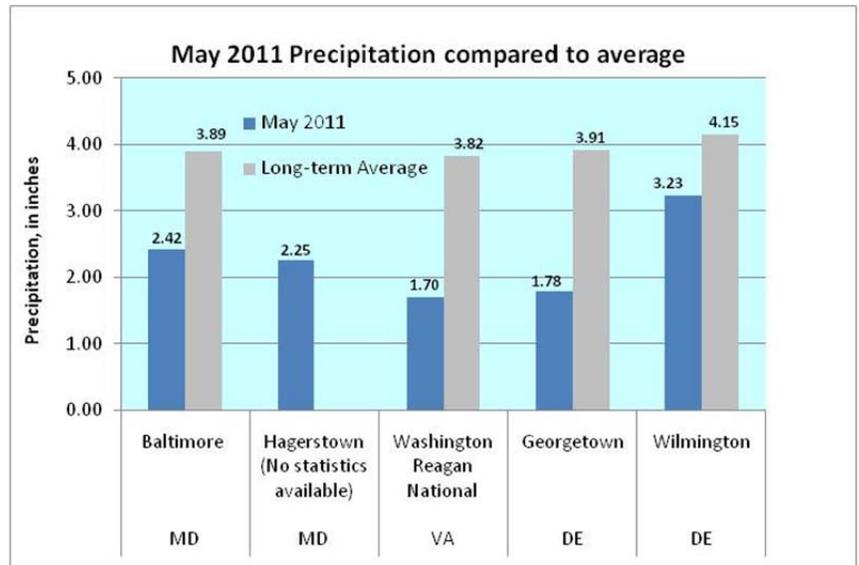
Monthly mean streamflow ranged from a record high in western Maryland, with another 11 sites that were above normal, to two record lows on the southern end of the Delmarva Peninsula. Streamflow was normal at 18 of the sites.



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

## Precipitation

Precipitation in May was below normal at National Weather Service (NWS) stations in Maryland, Delaware, and the District of Columbia. The largest deficit was at Georgetown, Delaware with 1.78 inches, or 2.13 inches below the long-term May average. Temperatures were above normal for the second consecutive month with the highest at Baltimore, which was 4.3 degrees above the long-term average. The NWS station in Hagerstown does not have enough record to calculate statistics, but based on statistics from surrounding stations, the 2.25 inches that fell during May would be considered below normal.



The Middle Atlantic River Forecast Center's maps for departure from the average precipitation in May showed the largest precipitation deficit (1.6 inches) in Somerset and Worcester Counties in Maryland. For the second consecutive month, Garrett County, Maryland had the highest precipitation surplus with 3.0 inches.

The Middle Atlantic River Forecast Center's 365-day and "year-to-date" departure from the average precipitation maps show three eastern counties with more than 6 inches below normal: Somerset, Wicomico, and Worcester Counties. Above normal precipitation (greater than 4.9 inches) occurred in the three westernmost counties of Maryland--Allegany, Garrett, and Washington Counties.

### Sources:

National Weather Service

MD and DC: <http://www.weather.gov/climate/index.php?wfo=lsx>

DE: <http://www.erh.noaa.gov/phi/>

Middle Atlantic River Forecast Center (MARFC): <http://www.erh.noaa.gov/marfc/Maps/precip.shtml>

## Streamflow

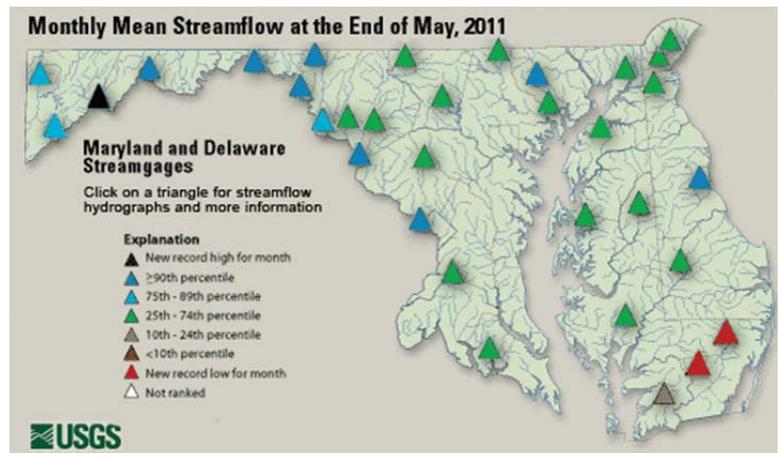
Streamflow data are used to assess water supply and the risk of droughts and floods, which can affect the health and well-being of people and animals, and have economic consequences. The USGS operates the most extensive network of stream-gaging stations in the region. The data provided by this network are used for monitoring water quantity and with water chemistry to interpret water-quality data.

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

- At least 10 years of continuous data;
- Watersheds greater than 5 square miles;
- Streamflow is not regulated, or has relatively natural flow;
- Streamflow data reflects climatic conditions; and
- The surrounding area and watershed are not urban.

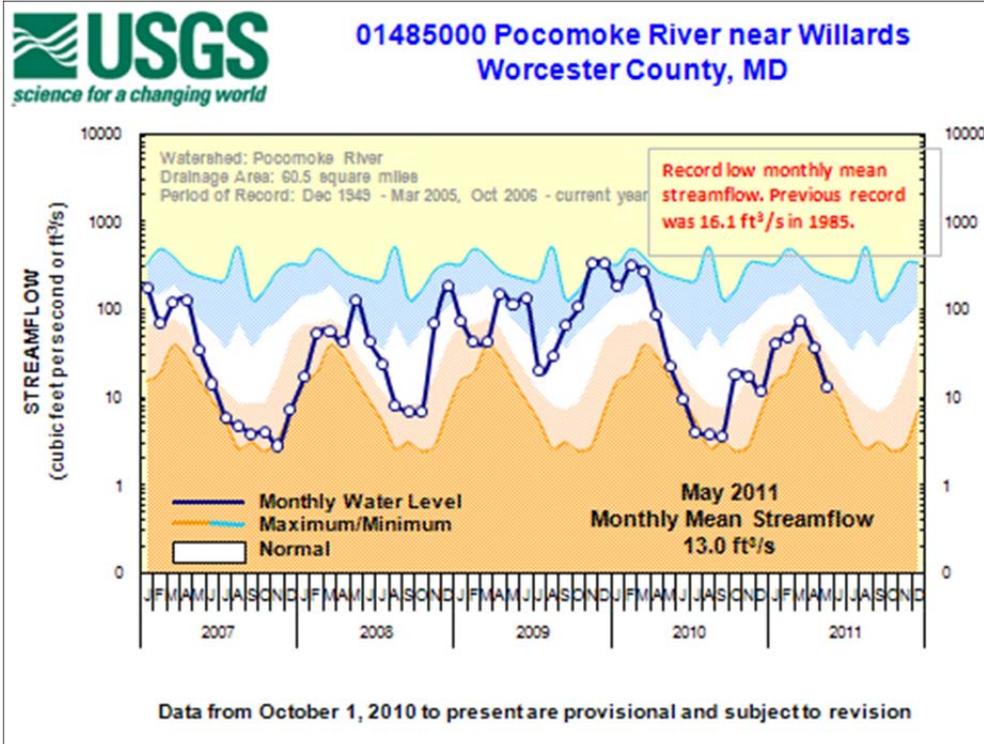
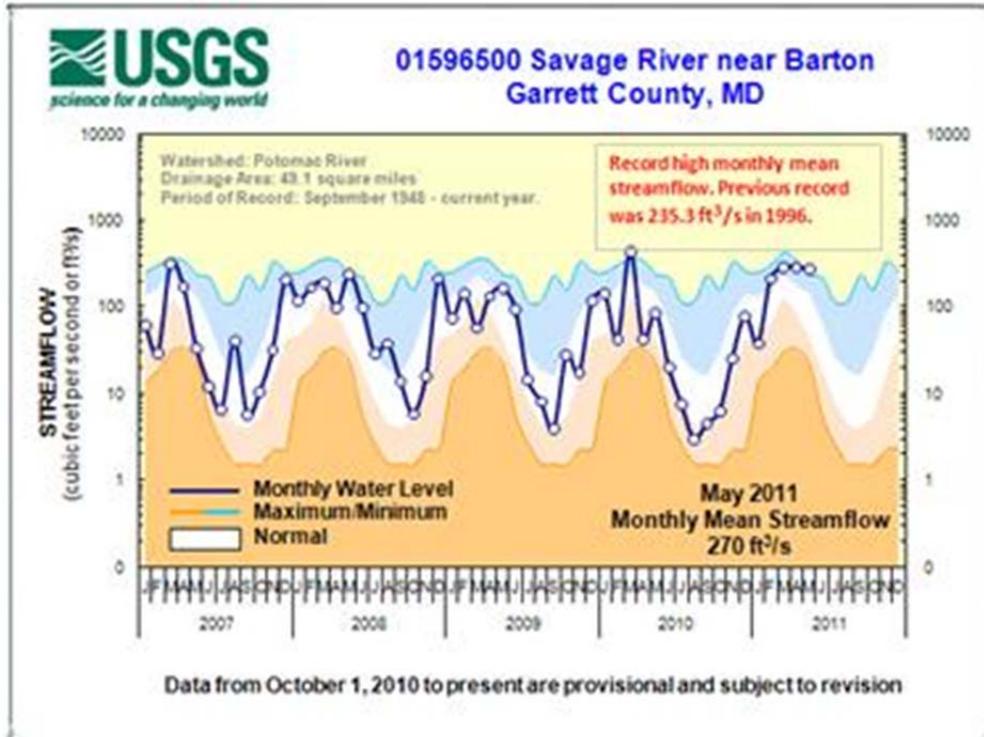
### Streamflow for May 2011

May monthly mean streamflow ranged from a record high on the Savage River in western Maryland to a record low on the Nassawango and Pocomoke Rivers in the southern part of the Delmarva Peninsula. Despite these extremes, streamflow was normal at more than half of the 33 USGS streamgages used to assess climatic conditions in Maryland, Delaware, and the District of Columbia.



The Savage River in western Maryland set a new May high monthly mean streamflow record, exceeding the discharge set in 1996. At the southern end of Maryland, the Pocomoke River set a monthly record low, exceeding the previous record from 1985. In May, record low daily streamflow were set on May 3 and during the last 8 days of May. Streamflow tied the record low during another 5 days in May. May 2011 streamflow on Nassawango Creek was the lowest May streamflow since record-keeping began in 1949. May 2011 monthly streamflow breaks the previous record of 10.7 cubic feet per second set in 1957. Streamflow has been below normal on the Nassawango Creek since last summer.

The dark line in the 5-year hydrograph represents the current monthly mean streamflow and the white band shows the normal range (25<sup>th</sup> to 74<sup>th</sup> percentile) based on the period of record. The maximum monthly streamflow is at the top of the blue section, and the lowest monthly streamflow is at the top of the dark orange area.



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

## Groundwater

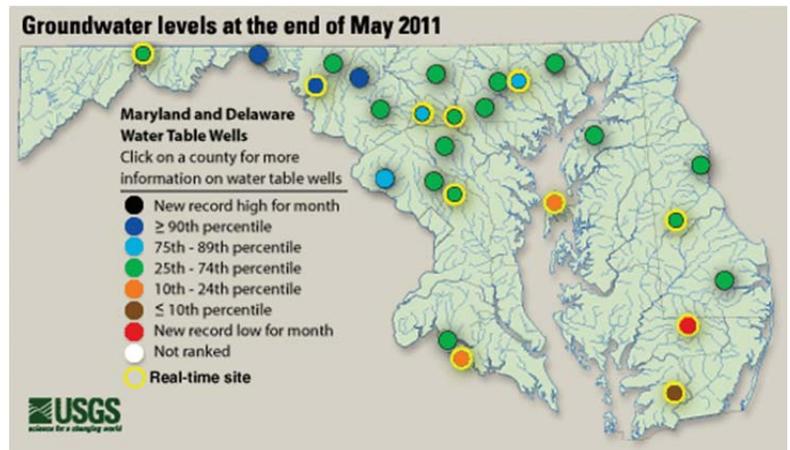
Groundwater levels show the depth to the water table in an aquifer, often measured in feet below land surface. Groundwater from wells is an important source of water supply, especially in areas not served by public water. If groundwater levels get too low, wells can run out of water. If the groundwater level is high, it may mean that the ground is saturated with water, which could lead to runoff and possible flooding when it rains.

Twenty-six groundwater wells were selected for indicating climatic conditions based on the following criteria:

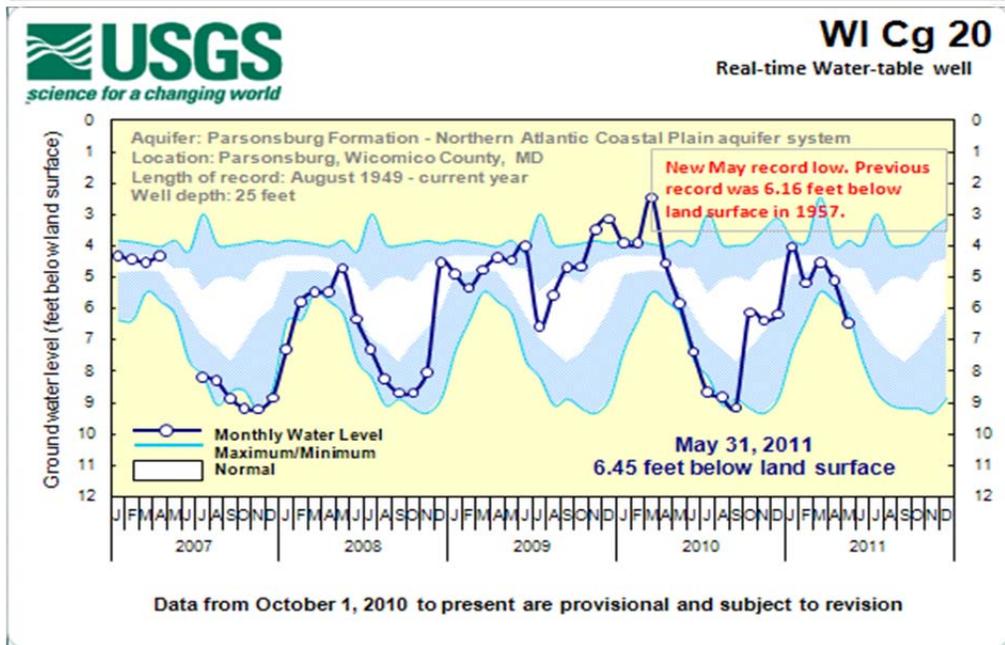
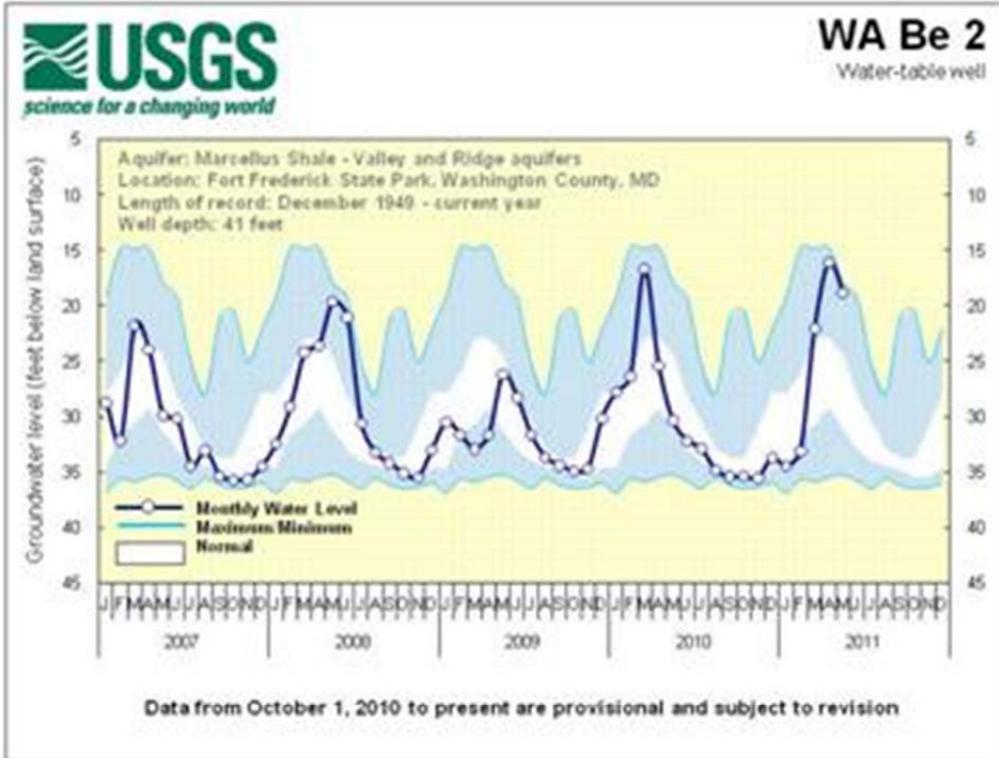
1. Located in an unconfined (water table) aquifer;
2. Open to a single, known hydrogeologic unit/aquifer;
3. Groundwater hydrograph reflects climatic conditions;
4. No indicated nearby pumpage and likely to remain uninfluenced by pumpage;
5. Minimum period of record is 10 years of continuous/monthly records;
6. Minimally affected by irrigation, canals, and other potential sources of artificial recharge;
7. Well has casing--dug wells not used;
8. Water levels show no apparent hydrologic connection to nearby streams;
9. Well has never gone dry; and
10. Long-term accessibility likely.

### May 2011

May groundwater levels ranged from a record low in a well in Wicomico County (Well WI Cg 20), to the highest 10<sup>th</sup> percentile in two wells, one in Frederick County and one in Washington County in Maryland (see hydrograph for well WA Be 2). The record low groundwater level in Wicomico County was the lowest May value since record-keeping began in 1949 and lower than the previous record set in 1957. Although there were extreme highs and lows, groundwater levels were normal in more than half the wells in May, or 16 of the 26 wells used by the USGS to assess climatic conditions in the region.



The 5-year hydrograph shows groundwater levels as a dark line, the maximum and minimum monthly values, and the normal range (between the 25<sup>th</sup> and 74<sup>th</sup> percentiles) as a white band based on the period of record. The maximum water level is at the top of the blue section and the minimum water level is at the bottom of the blue section in the graph.



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)

## Reservoir Levels

All of the water-supply reservoirs in the region, were at 100 percent of available storage capacity at the end of May, except for Liberty Reservoir, which dropped to 99 percent. Storage in the Baltimore reservoirs (Loch Raven, Liberty, and Prettyboy) remained at 100 percent of available storage capacity, with 75.45 billion gallons.

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 at 100 percent of normal storage capacity for the third consecutive month, with 11.20 billion gallons at the end of May.

May 2011	Percent available/ normal storage	Volume (billion gallons)	Source
<b>Baltimore Reservoirs</b>			<b>Baltimore City – Environmental Services Division</b>
Liberty	99%	36.40	
Loch Raven	100%	21.20	
Prettyboy	100%	17.85	
<b>Total</b>	<b>100%</b>	<b>75.45</b>	
<b>Patuxent Reservoirs</b>			<b>Washington Suburban Sanitary Commission (WSSC)</b>
Triadelphia	100%	5.89	
Duckett	100%	5.31	
<b>Total</b>	<b>100%</b>	<b>11.20</b>	