

March 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?

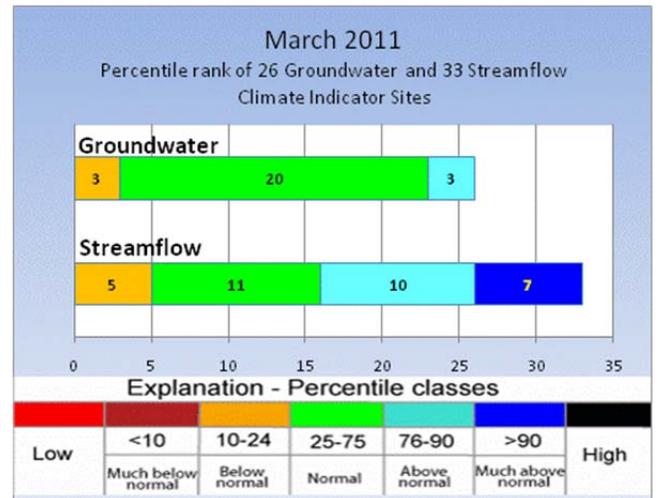
USGS water data are valuable to the public, researchers, water and natural resource managers, planners, and the agricultural community, especially during floods and droughts. These data can be used to assess and predict how water resources respond to changes in climate. Scientists at the USGS have measured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

In addition to providing an 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 minimal 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 March 2011 Water Conditions Summary

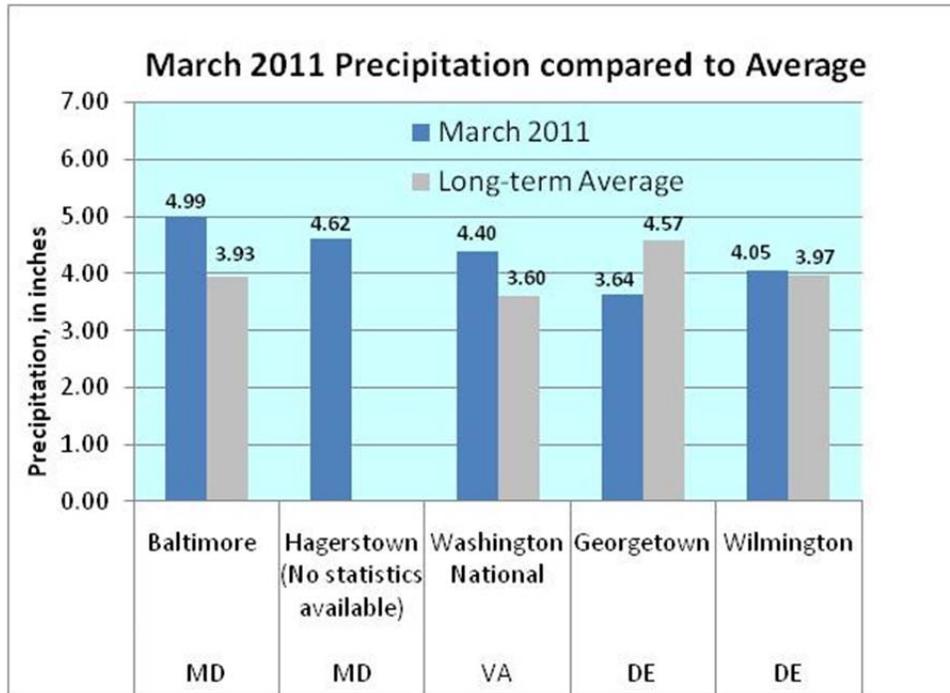
Streamflow was normal to above normal in 28 of the 33 streams and groundwater levels were normal to above normal in 23 of the 26 wells monitored by the USGS to assess the response to climatic conditions in Maryland, Delaware, and the District of Columbia region. The regions with the lowest streamflow were southern Maryland, and the southern part of the Delmarva Peninsula. Below normal groundwater levels occurred in Carroll and Queen Anne's Counties 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. 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

March precipitation was above normal at National Weather Service (NWS) stations in Maryland and the District of Columbia. In Delaware, precipitation was slightly above normal in Wilmington, and below normal in Georgetown and the surrounding counties on the lower Delmarva Peninsula.



The weather station with the highest amount of rainfall was in Baltimore, and there was a daily record maximum set on March 10, with 2.61 inches. The previous record for March 10 in Baltimore was 1.74 inches in 1883, according to preliminary data from the NWS.

The Middle Atlantic River Forecast Center's maps of 365-day departure from the average precipitation showed most of the region as normal to below normal at the end of March, except for some counties along the western side of Chesapeake Bay. The highest 365-day precipitation departures were in Garrett County and Worcester County in Maryland, with more than a 10-inch deficit.

Sources:

National Weather Service

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

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

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

Streamflow

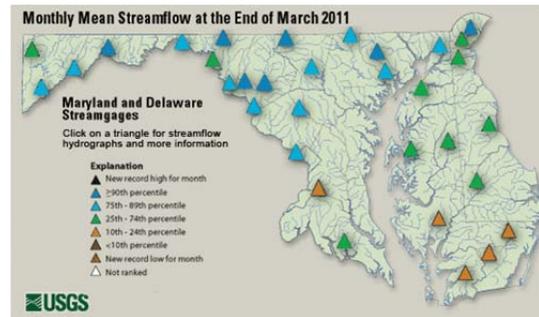
Streamflow data is used to assess water supply, water chemistry, and the risk of droughts and floods, which can affect the health and well being of people and animals, and have economic consequences. The USGS operates the most extensive network of stream-gaging stations in the region. The data provided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

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

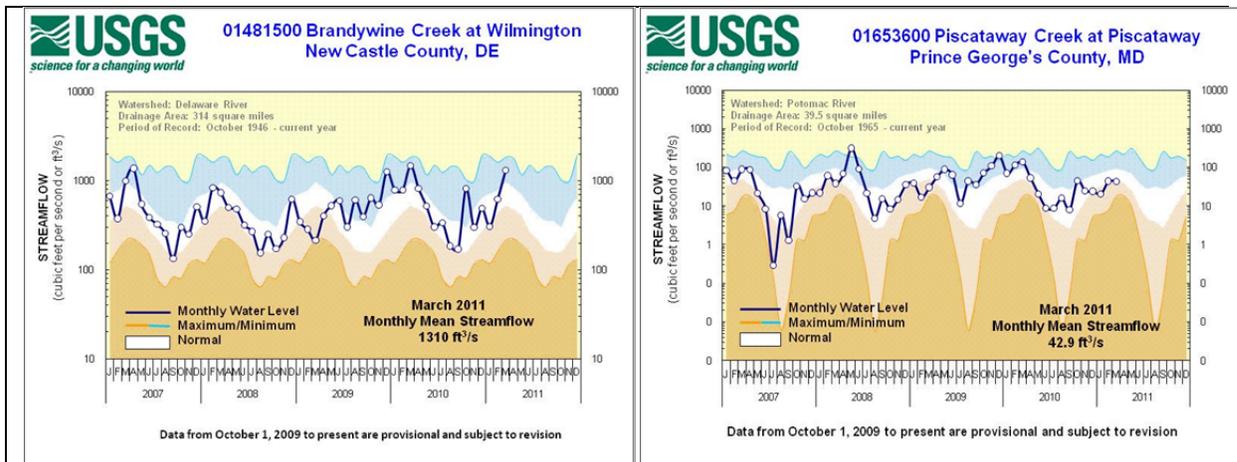
- At least 10 years of continuous data;
- Watersheds greater than 5 square miles;
- Streamflow is not regulated, but has natural flow;
- The streamflow data reflect climatic conditions; and
- The surrounding area and watershed is not urban.

March monthly mean streamflow was normal to above normal at 28 of the 33 USGS streamgages used to assess climatic conditions in Maryland, Delaware, and the District of Columbia. The five streams with below normal streamflow were located in southern Maryland and the lower Delmarva Peninsula.

Monthly mean streamflow increased in 29 of the 33 streams in March, for example, see the hydrograph for Brandywine Creek below. The streamflow level rose from below normal in January to above normal in March. Streamflow in the remaining four streams dropped slightly, as can be seen in the hydrograph for Piscataway Creek.



The dark line in the 5-year hydrograph represents the current monthly mean streamflow and the white band shows the normal range (25th to 74th 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

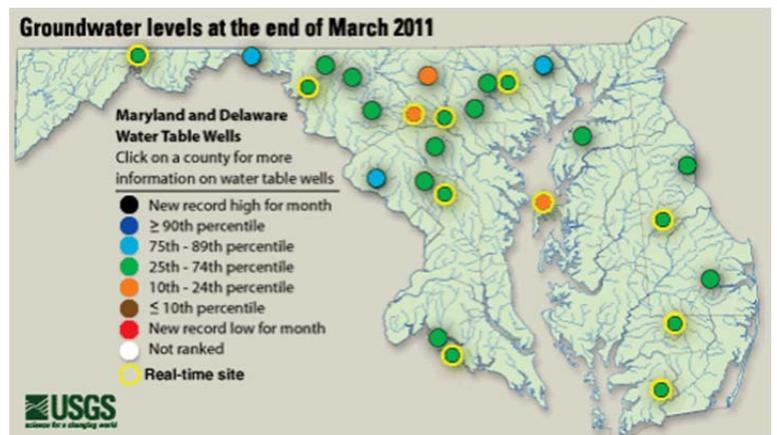
Groundwater levels show the depth to the water table in an aquifer, often measured in feet below land surface. Groundwater from wells is an important source of water supply, especially in areas not served by public water. If groundwater levels get too low, wells can run out of water. If the groundwater 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 wells were selected for indicating climatic conditions based on the following criteria:

1. Located in an unconfined aquifer (water table);
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 of 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 not influenced by nearby streams;
9. Well has never gone dry; and
10. Long-term accessibility likely.

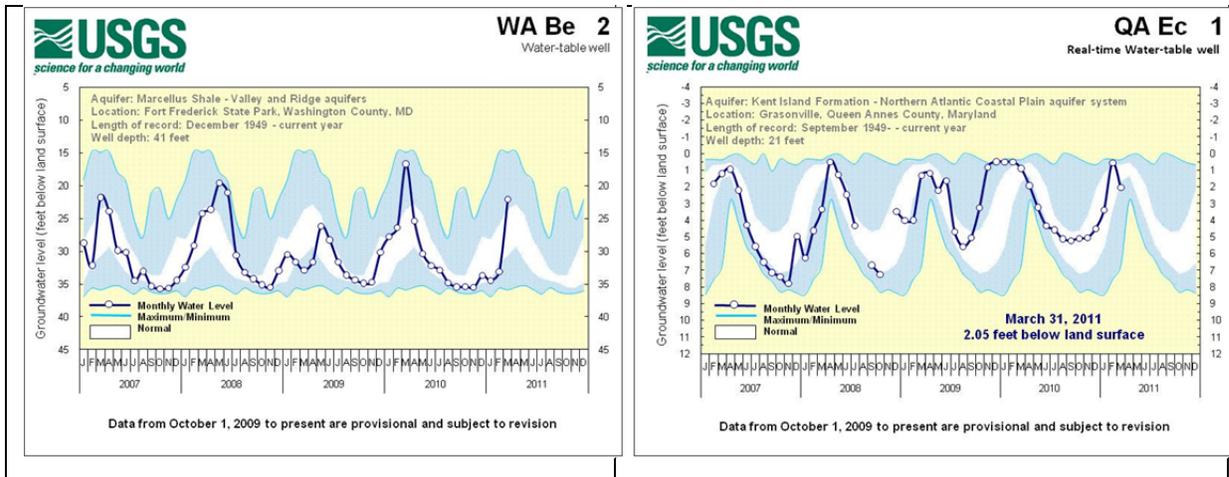
Groundwater levels were normal in 20 of the 26 wells used by the USGS to assess climatic conditions in the region in March. The water levels in the remaining six wells included three that were above normal, and three that were below normal in Maryland.

The three wells with below normal groundwater levels were in Carroll and Queen Anne's Counties (shown below). Water levels were above normal in wells in Harford, Montgomery, and Washington Counties (shown below).



The groundwater level in a Washington County well (WA Be 2) rose from below normal levels in February to above normal in March. In contrast, well QA Ec 1 in Queen Anne's County dropped from above normal in February to below normal in March.

The 5-year hydrograph shows groundwater levels as a dark line, the maximum and minimum monthly values, and the normal range (between the 25th and 74th 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

Reservoir Levels

All of the water supply reservoirs in the region were at 100 percent of storage capacity at the end of March. Storage in the Baltimore reservoirs (Loch Raven, Liberty, and Prettyboy) increased 7 percent to 100 percent of available storage capacity, with 75.85 billion gallons in available storage.

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, increased 13 percent to an average of 100 percent of normal storage capacity, with 11.07 billion gallons at the end of March.

	Percent available/ normal storage	Volume (billion gallons)	Source
March 2011			
Baltimore Reservoirs			Baltimore City – Environmental Services Division
Liberty	100%	36.80	
Loch Raven	100%	21.20	
Prettyboy	100%	17.85	
Total	100%	75.85	
Patuxent Reservoirs			Washington Suburban Sanitary Commission (WSSC)
Triadelphia	100%	5.79	
Duckett	100%	5.28	
Total	100%	11.07	