

April 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.

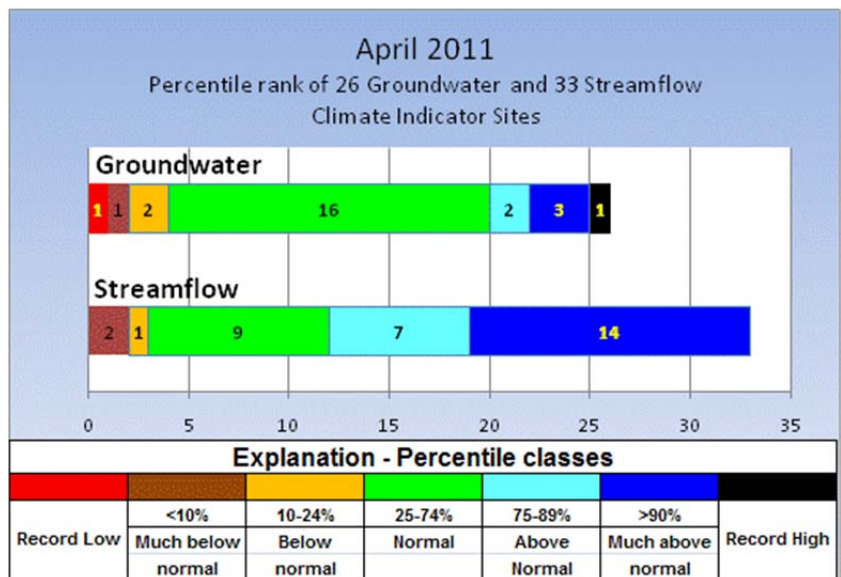
In addition to providing the most extensive dataset of historical streamflow and groundwater data available to the public, the USGS collects water data and quality-assures the data by employing standardized techniques across the country. The uniformity of the dataset allows for multi-state comparisons 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 April 2011 Water Conditions Summary

In April, groundwater levels ranged from a record high at a well in Frederick County to a record low in a Somerset County well. Overall, 22 of the 26 wells were normal to above normal in the wells monitored by the USGS to assess the response to climatic conditions in Maryland, Delaware, and the District of Columbia region.

Plentiful April rainfall in western Maryland resulted in above normal monthly mean streamflows at 21 of the 33 sites. Streamflow was normal at 9 of the sites. Monthly mean streamflow varied from the highest 10th percentile in western Maryland, to the lowest 10th percentile in the southern part of the Delmarva Peninsula.



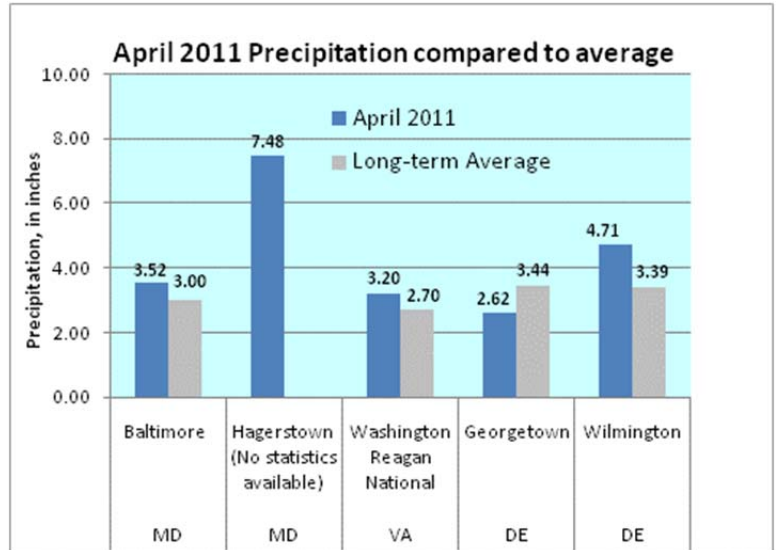
A **percentile** is a value on a scale from 0 to 100 that indicates the percent of a distribution that is equal to or below it. For example, a groundwater level in the 90th percentile is equal to or greater than 90 percent of the values recorded for that month.

Precipitation

In April, precipitation and temperatures were above normal at National Weather Service (NWS) stations in Maryland and the District of Columbia. In Delaware, precipitation was above normal in Wilmington, and below normal in Georgetown. Temperatures were above normal at both Delaware stations.

Rainfall at the NWS station in Hagerstown was 7.48 inches. This weather station does not have enough record to calculate statistics, but normal monthly precipitation at other stations is between

The Middle Atlantic River Forecast Center's maps for departure from the average precipitation in April showed the largest precipitation deficit (1.2 inches) in Somerset County, Maryland. In contrast, Garrett County, Maryland had the highest precipitation surplus with 3.0 inches. From Carroll County westward, precipitation was more than 6 inches, which is close to double the average monthly precipitation. This excess and lack of precipitation is reflected in the streamflow and groundwater levels.



Sources:

National Weather Service

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

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

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

Streamflow

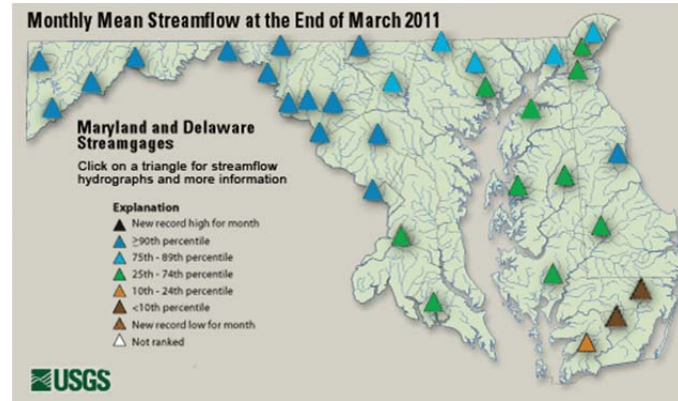
Streamflow data is used to assess water supply, water chemistry, and the risk of droughts and floods, which can affect the health and well being of people and animals, and have economic consequences. The USGS operates the most extensive network of stream-gaging stations in the region. The data provided 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, or has relatively natural flow;
- Streamflow data reflects climatic conditions; and
- The surrounding area and watershed is not urban.

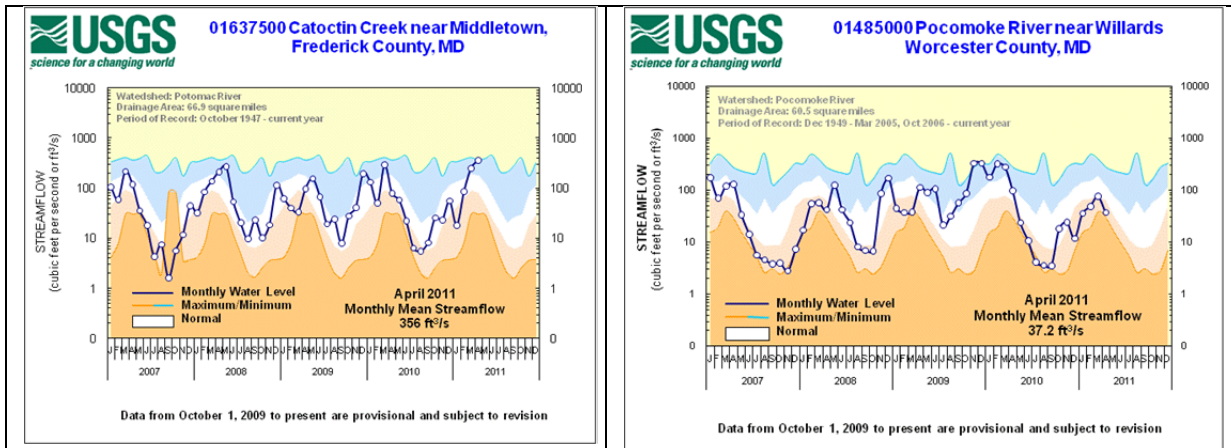
April monthly mean streamflow varied from the highest 10th percentile in western Maryland, to the lowest 10th percentile in the southern part of the Delmarva Peninsula.

Streamflow was normal to above normal at 30 of the 33 USGS streamgages used to assess climatic conditions in Maryland, Delaware, and the District of Columbia.



The streamflow hydrographs below shows streamflow on the Catoctin Creek climb to close to a record high level in April. The high flow reflects the over 6 inches of rainfall in April. In Worcester County, Maryland, the streamflow dropped and continues to be below normal and has been for nearly a year.

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/>

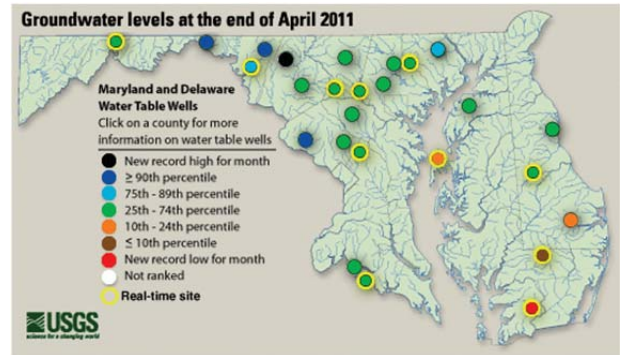
Groundwater

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.

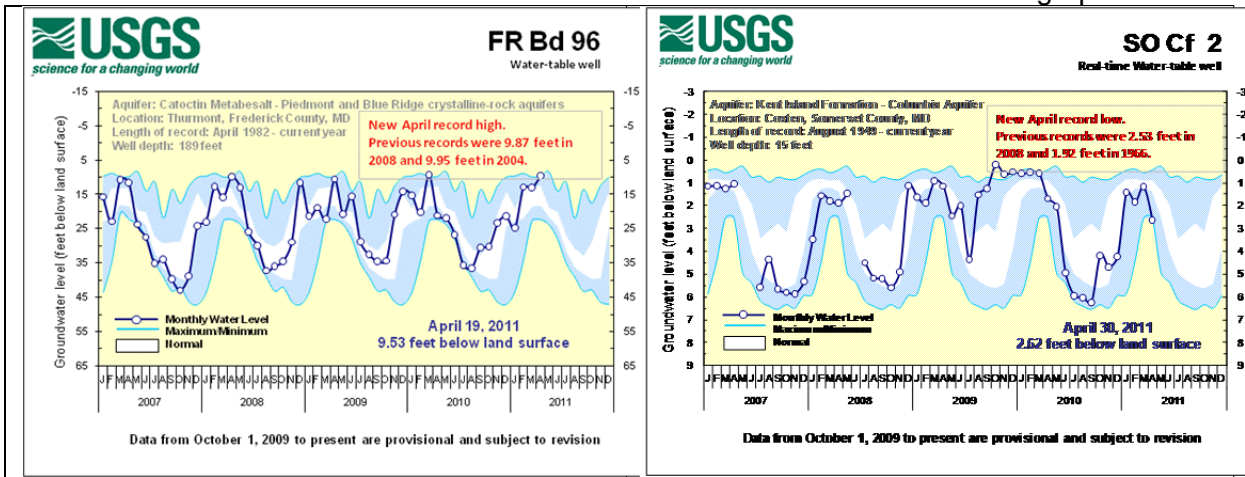
Twenty-six wells were selected for indicating climatic conditions based on the following criteria:

1. Located in an unconfined (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 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.

April groundwater levels ranged from record low in a well in Somerset County, to record high in a well in Frederick County, Maryland. Although there were extremes at both ends, groundwater levels were normal in more than half the wells in April, 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 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 again at 100 percent of storage capacity at the end of April. Storage in the Baltimore reservoirs (Loch Raven, Liberty, and Prettyboy) remained at 100 percent of available storage capacity, with 75.85 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 second month, with 11.16 billion gallons at the end of April.

April 2011	Percent available/ normal storage	Volume (billion gallons)	Source
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%	5.83	
Duckett	100%	5.33	
Total	100%	11.16	