

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

March 2012

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 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 resource 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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Precipitation was below the long-term average for the second consecutive month, and monthly average temperatures were as much as 11 degrees Fahrenheit warmer than average in Maryland, Delaware, and the District of Columbia. Although precipitation was about half of the average March level, streamflow and groundwater levels were normal or above normal at more than 50 percent of the streams and wells used by the USGS to assess the response of streamflow and groundwater levels to climatic conditions in the Maryland, Delaware, and District of Columbia region.

Streamflow was normal at 25 of 33 sites (76 percent) throughout Maryland, Delaware, and the District of Columbia. Four of the remaining 8 sites with below normal monthly mean streamflow were in the southern Delmarva Peninsula region.

In March, groundwater levels were in the normal range in 13 of the 26 wells. Of the remaining 13 wells, groundwater levels were above normal at 4 wells, and below normal at 9 wells. At the observation well in Carroll County, Maryland, preliminary data for March shows the groundwater level at a record low for the second consecutive month.

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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March 2012 Precipitation and Weather

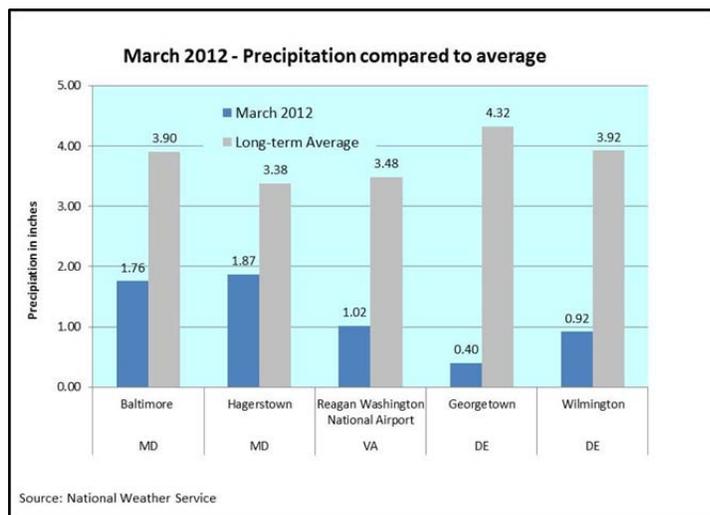
Precipitation has been below average since the start of 2012 in the Mid-Atlantic region. During this period, there was minimal snowfall and the average temperature was higher than the long-term average and many record highs were set.

March 2012 precipitation was less than half the average for the climate normal period* at National Weather Service (NWS) stations in Baltimore, Maryland, Wilmington, Delaware, and at Ronald Reagan Washington National Airport in Virginia. Precipitation at the Hagerstown, Maryland station was slightly above 50 percent of the long term average. In Delaware, precipitation at the Georgetown weather station was 0.40 inch and 0.92 inch in Wilmington, which is 3-4 inches below average for March.

Record-setting high temperatures occurred throughout the region during March 2012. Temperatures were the third highest on record in Baltimore and Wilmington, Delaware. In Washington and Baltimore, the average temperature for March 2012 was equal to the long-term average temperature for April. In Baltimore, the mean temperature was 10.1 degrees Fahrenheit above normal and 11 degrees Fahrenheit above normal in Hagerstown. Mean temperatures have been above normal for the fifth consecutive month in both Baltimore and Washington.

At Ronald Reagan Washington National Airport, the March average temperature of 56.8 degrees Fahrenheit set a record high, beating the previous record of 56.2 degrees Fahrenheit set in 1945. The winter of 2011—2012 was also the mildest at this weather station.

The warmer than average temperatures this past winter and spring have caused plants to grow 2-4 weeks earlier than usual in the Baltimore-Washington region. The unusually warmer temperatures, along with the lack of snowfall and the earlier growing season lead to an increased demand on water resources and these conditions may have an impact on streamflow and groundwater levels this summer.



**Note from the National Weather Service: September 2011 was the first month to incorporate the new 1981--2010 climate normals that were calculated by the National Climatic Data Center. The new normals replaced the 1971--2000 normals.*

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.weather.gov/marfc/Precipitation/Departures>

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Streamflow

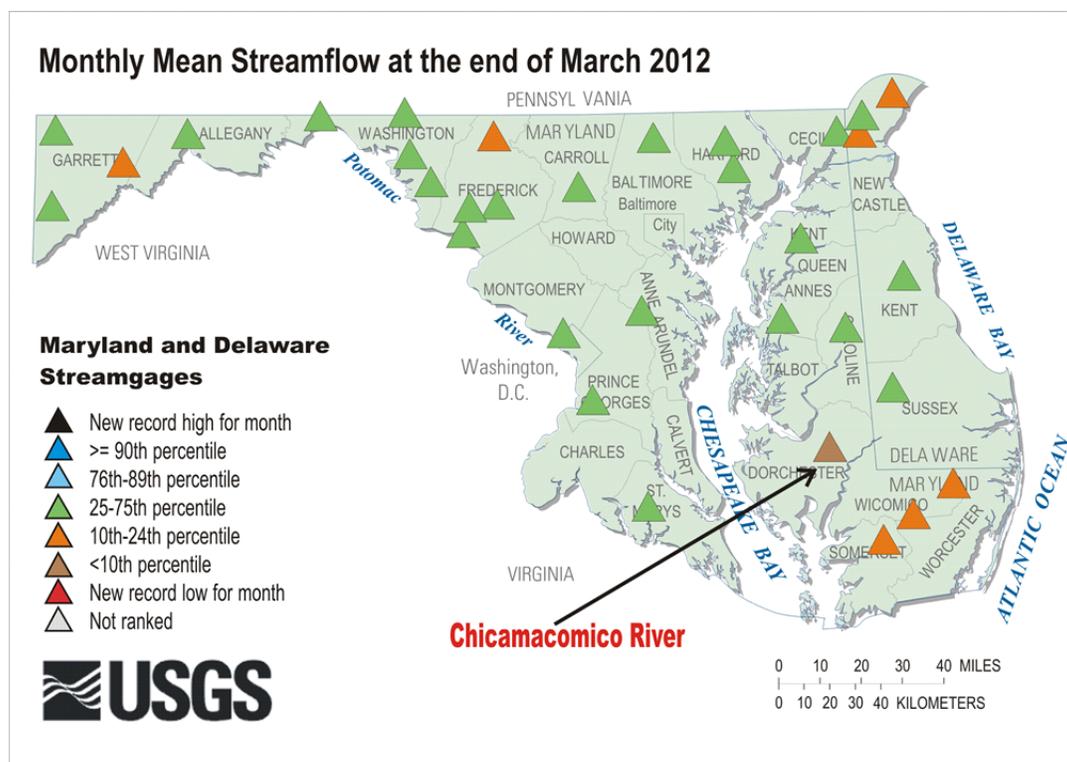
Streamflow data are used for many purposes. A few of the most obvious uses are to assess water supply and the risk of droughts and floods. Streamflow data are also used to calculate loads of chemical constituents and to assess how biological communities are affected by hydrologic conditions. The USGS operates the most extensive network of streamgages 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.

Streamflow for March 2012

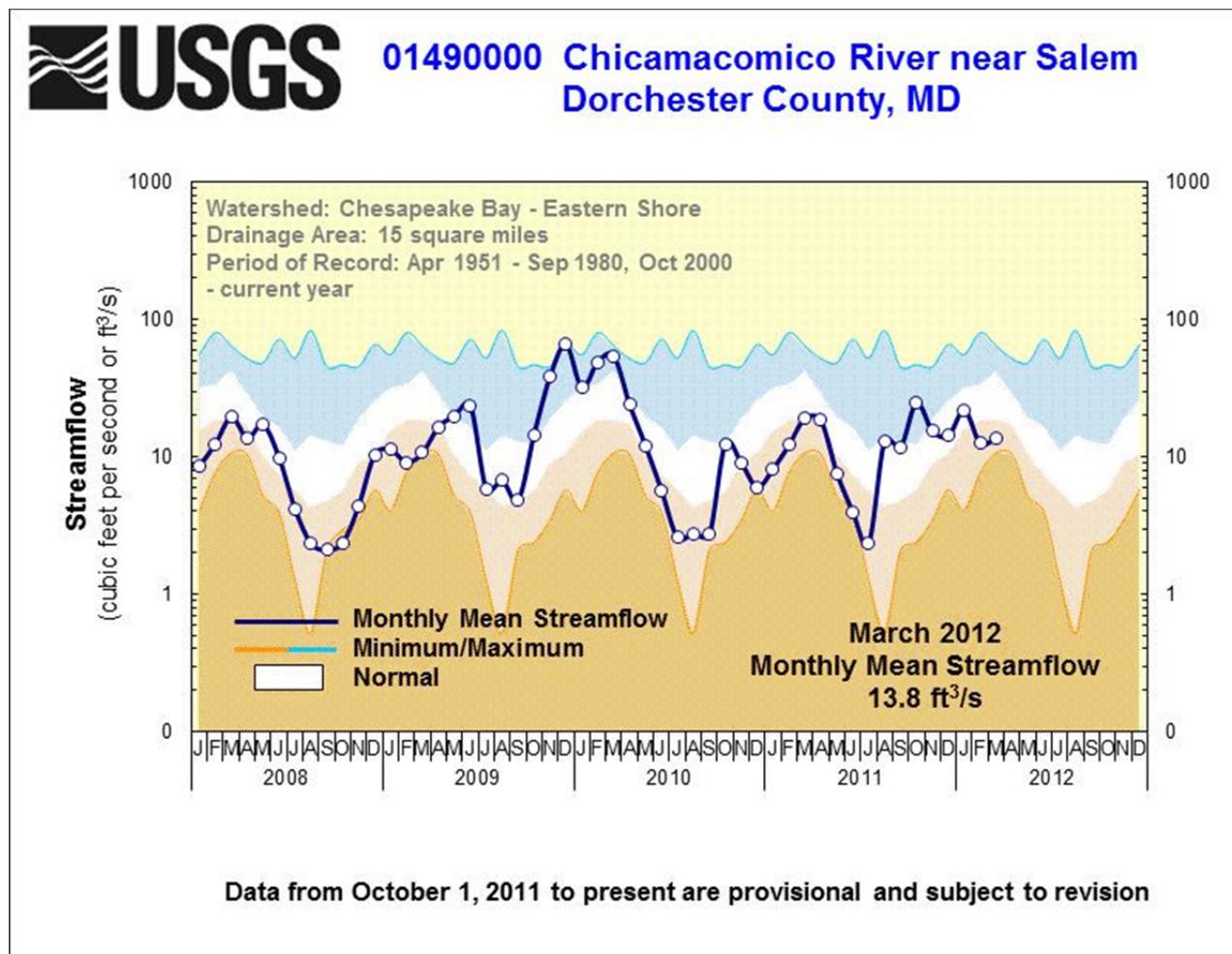
Monthly mean streamflow in March 2012 was normal at 25 of the 33 sites (76 percent) used to monitor climatic response in Maryland, Delaware, and the District of Columbia. Normal is considered between the 25th and 75th percentiles. The remaining eight sites had below normal monthly mean streamflows. Four of the sites with below normal streamflow were on the southern Delmarva Peninsula, where streamflow has been below normal for several months.



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

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Streamflow on the Chicamacomico River in Dorchester County, Maryland on the southern Delmarva Peninsula increased slightly since February, but remained below normal in March. The March 2012 monthly mean streamflow at the Chicamacomico River was 13.8 ft³/s (cubic feet per second), which is in the lowest 10th percentile.



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

The dark line in the 5-year hydrograph represents the current monthly mean streamflow and the white band shows the normal range (25th to 75th percentile) 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.

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Groundwater

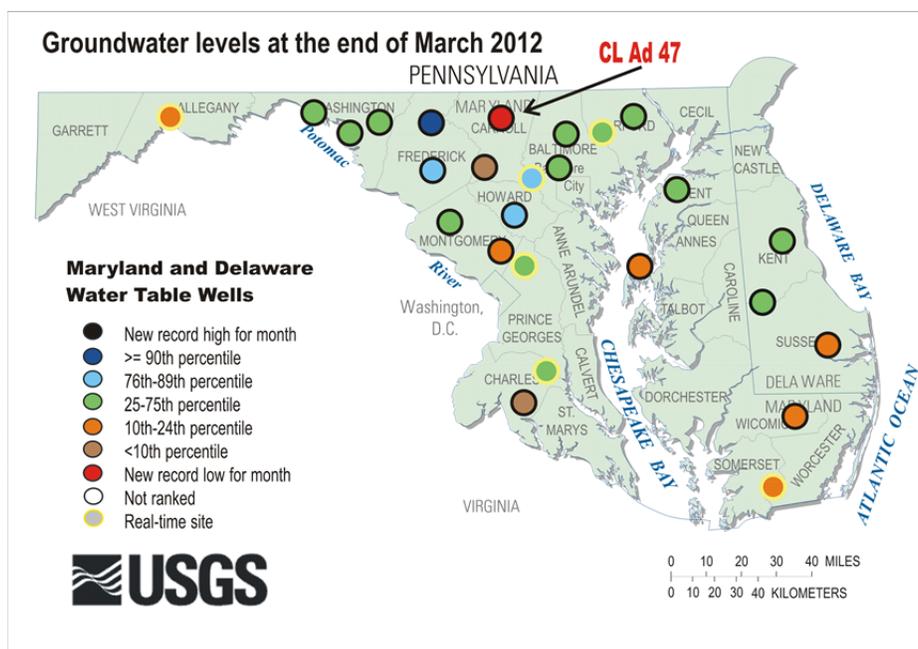
The USGS monitors groundwater levels in unconfined aquifers, providing observations that can be compared to both short-term and long-term changes in climatic conditions. Twenty-six groundwater wells were selected based on the following criteria:

- 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 not used;
- Water levels show no apparent hydrologic connection to nearby streams;
- Well has never gone dry; and
- Long-term accessibility likely.

March 2012 Groundwater Levels

For the second consecutive month, groundwater levels across Maryland and Delaware ranged from above normal to below normal. Normal is considered between the 25th and 75th percentiles.

Groundwater levels in March 2012 were normal at 13 of the 26 wells, used by the USGS to assess climatic conditions in the region. Groundwater levels were above normal in four observation wells in Baltimore, Frederick, and Howard Counties, and below normal in nine wells distributed across Maryland and Delaware. Groundwater levels were record-setting low in Carroll County, and in the lowest 10th percentile in wells in Charles and Carroll Counties.

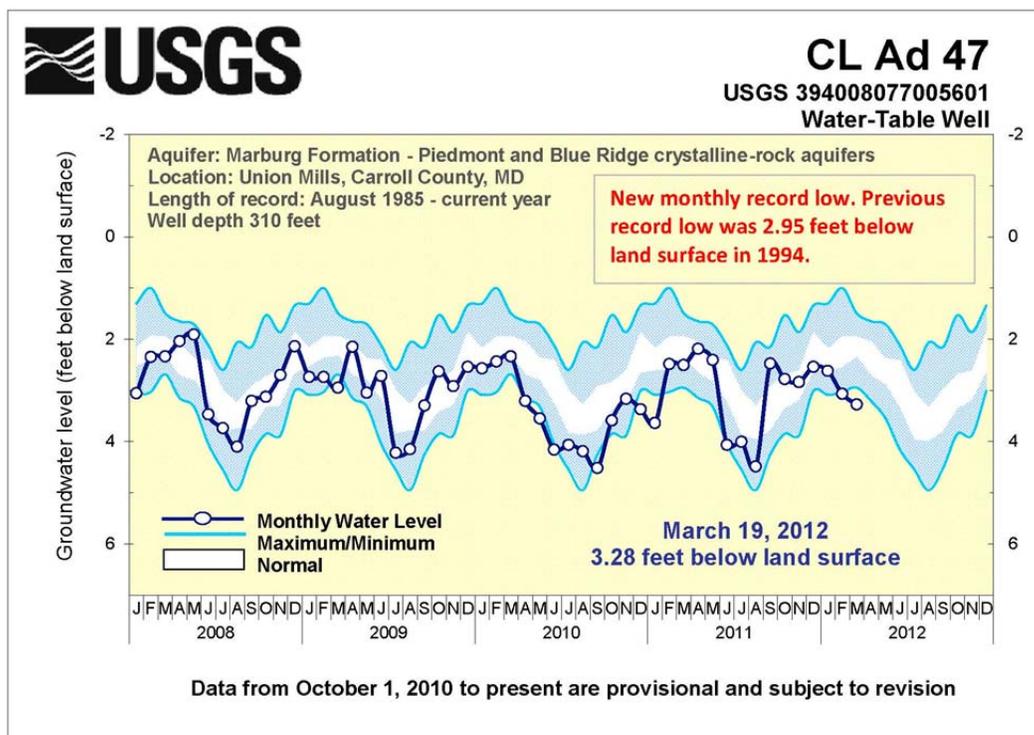


To access the clickable groundwater map, go to:

http://md.water.usgs.gov/groundwater/web_wells/current/water_table/counties/index.html

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Preliminary data show that the groundwater level in one USGS Carroll County observation well (CL Ad 47) was at a record low for the second consecutive month. The groundwater level at this well was below normal during the summer of 2011, then recovered and rose to above normal after Tropical Storm Lee. Groundwater levels have been dropping since January and are now at record low levels.



Five-year groundwater hydrographs can be viewed at:

http://md.water.usgs.gov/groundwater/web_wells/current/water_table/counties

The 5-year hydrograph shows 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 for 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.

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Reservoir Levels

All regional reservoirs were full at the end of March 2012, and have been since September 2011. Storage in the Baltimore reservoirs (Loch Raven, Liberty, and Prettyboy) remains at 100 percent of available storage capacity, or 75.77 billion gallons of water.

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 at the end of March 2012, with 11.01 billion gallons of water.

March 2012	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	100%	5.84	
Duckett	100%	5.17	
Total	100%	11.01	