

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

December 2011

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.

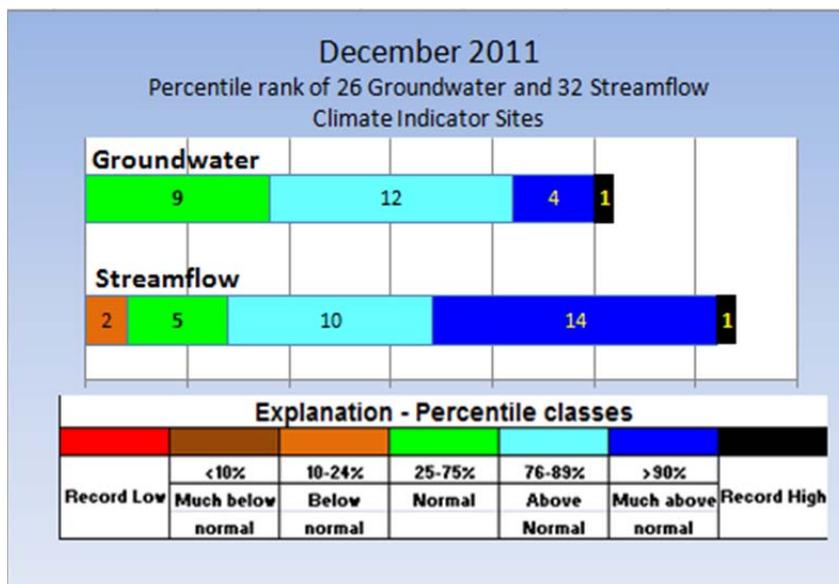
In addition to providing the most extensive set of historical streamflow and groundwater data available to the public, the USGS collects water data and quality-assures the data by employing standardized techniques across the country. The uniformity of the dataset allows for multi-state comparisons and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

In December 2011, there were two record highs in Maryland among the sites monitored by the USGS to assess the response to climatic conditions in Maryland, Delaware, and the District of Columbia region. The record highs included a record high groundwater level in Charles County, and a record high monthly mean streamflow in Queen Anne's County.

Monthly mean streamflow and groundwater levels were predominantly above normal across Maryland, Delaware, and the District of Columbia, including 25 of the 32 streamgaging sites (78 percent) and 17 of the 26 wells (65 percent). There were two streams on the southern Delmarva Peninsula with below normal monthly mean streamflow in December.



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.

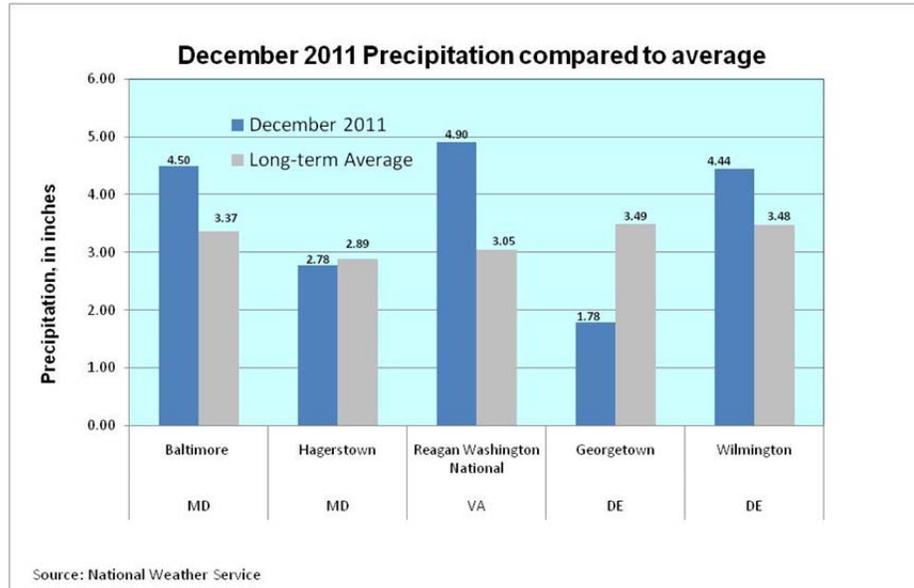
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Precipitation

December rainfall was above average* (see note) at National Weather Service (NWS) stations in Baltimore, Maryland, Wilmington, Delaware, and Ronald Reagan Washington National Airport in Virginia. Rainfall was below average for the climate normal period in Hagerstown, Maryland and Georgetown, Delaware.

The highest rainfall was at the Ronald Reagan Washington National Airport weather station, with 4.90 inches or 1.85 inches above the long-term average.

The Middle Atlantic River Forecast Center's data for December 2011 show that precipitation was below average in three counties in Maryland (Dorchester, Somerset, and Wicomico Counties) and Sussex County in Delaware. Precipitation in the remaining counties was considered average.



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=lwx>

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

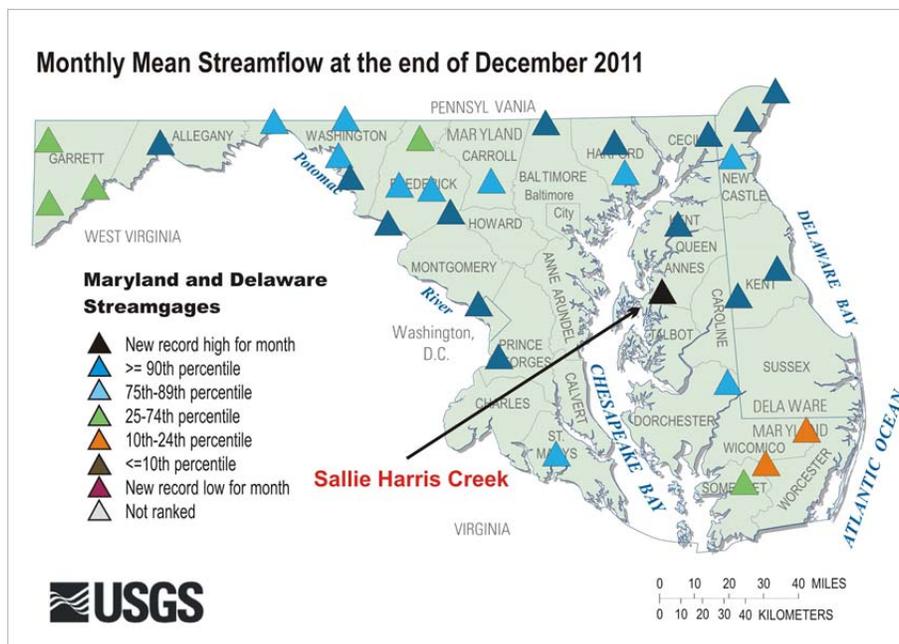
Streamflow data are used for many purposes. A few of the most obvious uses are to assess water supply and the risk of droughts and floods. Streamflow data are also used to calculate loads of chemical constituents and to assess how biological communities are affected by hydrologic conditions. The USGS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

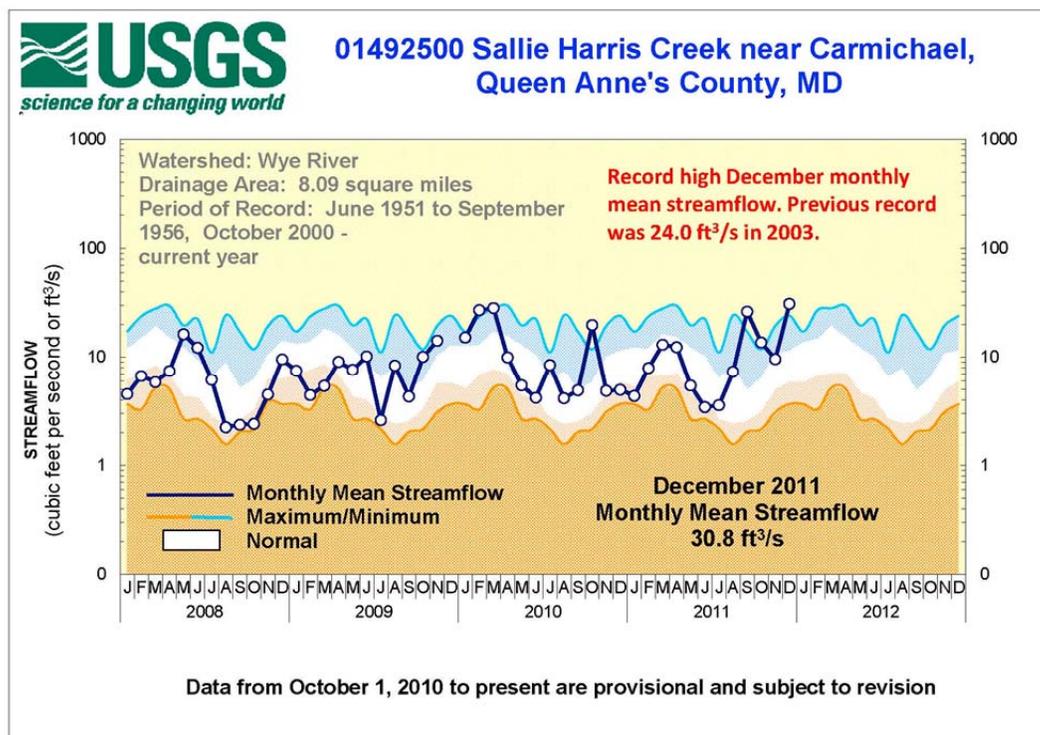
Streamflow for December 2011

December monthly mean streamflow was above normal at 25 of the 32 sites used to monitor climatic response in Maryland, Delaware, and the District of Columbia. One of these streams (Sallie Harris Creek in Queen Anne's County) set a record high monthly mean streamflow for December and this site is shown as a black triangle on the map. Although most of the monthly mean streamflow across the region was above normal, streamflow was below normal in the Pocomoke River and Nassawango Creek, both on the southern Delmarva Peninsula. There were five streams in the normal range. None of the 32 streams monitored for climate response had below normal monthly mean streamflow since August 2011.



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The December 2011 monthly mean streamflow on Sallie Harris Creek near Carmichael, Maryland on the Delmarva Peninsula set a record high at 30.8 ft³/s (cubic feet per second). The previous December record was 24.0 ft³/s, set in December 2003. Monthly mean streamflow in December 2011 was the highest December flow and highest all-time monthly mean streamflow since record-keeping began at this site in 1951.



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 74th 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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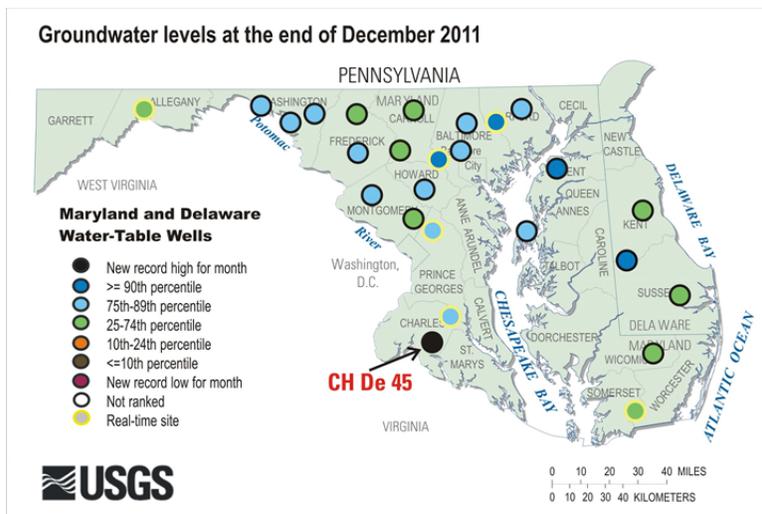
Groundwater

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.

December 2011 Groundwater Levels

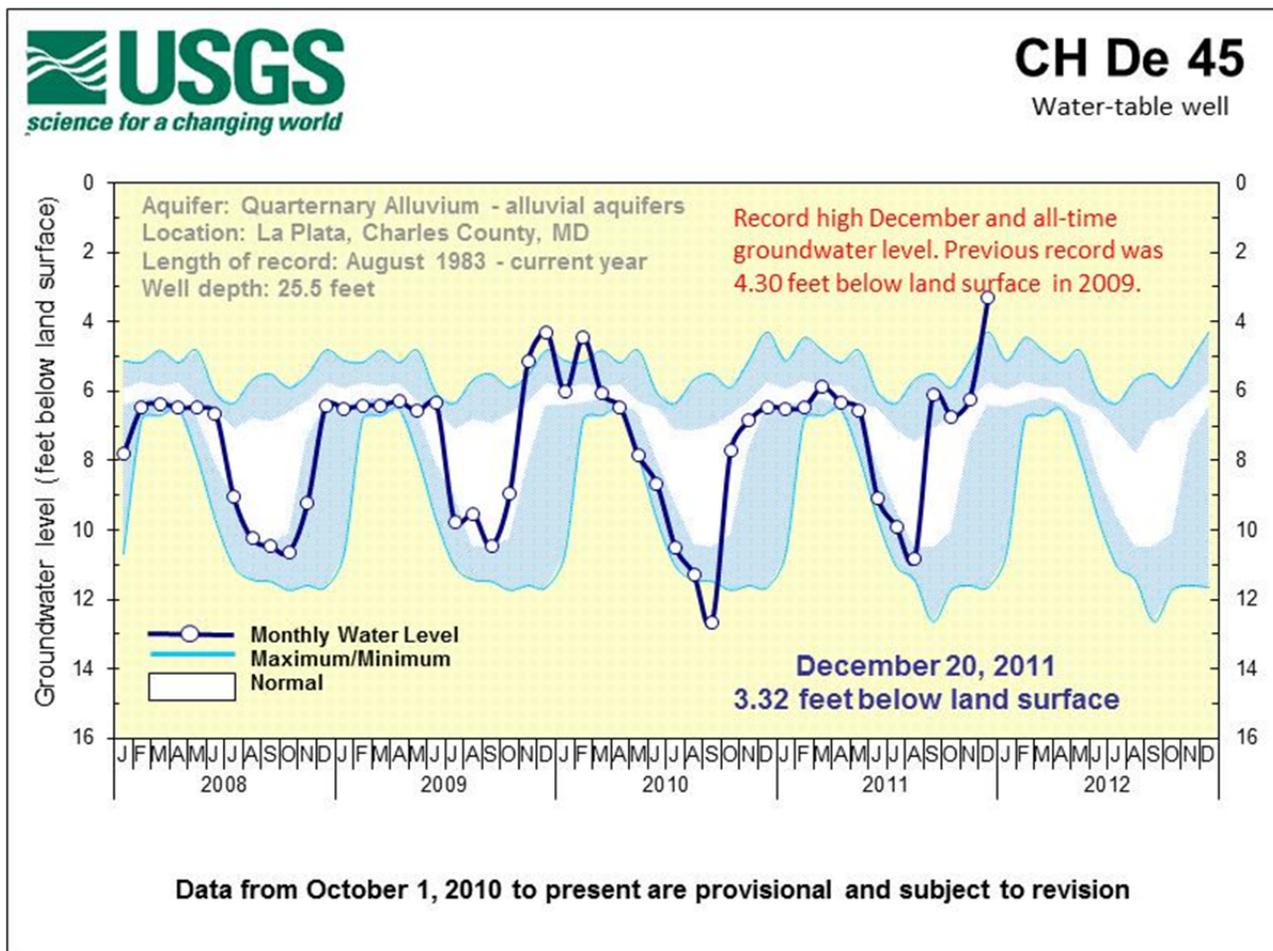
Groundwater levels were normal to above normal throughout Maryland and Delaware in December for the fourth consecutive month. The groundwater level in a monitoring well in Charles County, Maryland set a new December record high. There were 5 wells that had groundwater levels at or above the 90th percentile, which is much above normal. Across Maryland and Delaware, 65 percent of groundwater levels (17 of the 26 wells) used by the USGS to assess climatic conditions in the region had above normal water levels. Groundwater levels were normal in nine wells. There were no below normal groundwater levels in the Maryland and Delaware region in December 2011.



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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Observation well CH De 45 in Charles County, Maryland reached a record high water level of 3.32 ft bls (feet below land surface) in December, 2011. The previous December record high of 4.30 ft bls was set in 2009 and this was also the all-time high for the period of record. An all-time record low was set at this well in September 2010. Data collection began at this well in 1983.



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 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.

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Reservoir Levels

All regional reservoirs were full at the end of December 2011. Storage in the Baltimore reservoirs (Loch Raven, Liberty, and Prettyboy) remains at 100 percent of available storage capacity, or 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, remains at 100 percent of normal storage capacity, with 11.46 billion gallons of water at the end of December.

December 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%	6.02	
Duckett	100%	5.44	
Total	100%	11.46	