

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

December 2012 –More than 70 percent of groundwater and streamflow sites at normal levels as year ends

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.

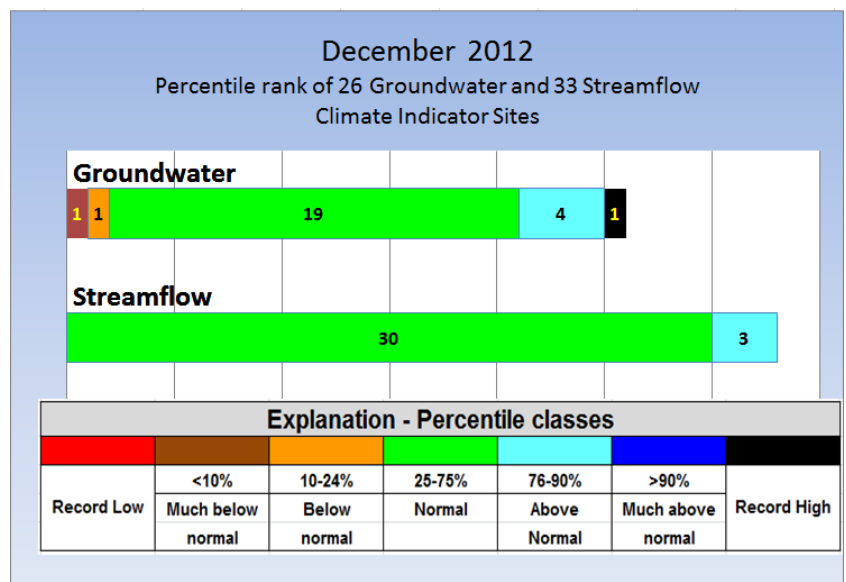
In addition to providing the most extensive set of historical streamflow and groundwater data available to the public, the USGS collects water data and quality-assures the data by employing standardized techniques across the country. The uniformity of the dataset allows for multi-state comparisons and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

USGS December 2012 Water Conditions Summary

Groundwater and streamflow levels stabilized in December with 19 of the 26 wells and 30 of the 33 streamflow gaging stations in the normal range (25th-75th percentiles). Precipitation was near normal throughout the area. In October, rainfall had been significantly above normal from Superstorm Sandy and in November, rainfall had been much lower than average.

Groundwater levels were normal in 19 of the 26 USGS monitoring wells in December. Groundwater levels ranged from a record high December groundwater level at an observation well in Queen Anne's County on the Eastern Shore, to a site with a groundwater level below the 10th percentile in Prince George's County, Maryland.



Over 90 percent of the streamflow sites in the Maryland, Delaware, and District of Columbia region had monthly mean streamflow in the normal range. The remaining 3 sites had above normal monthly mean streamflow and are adjacent to each other on the upper Delmarva Peninsula.

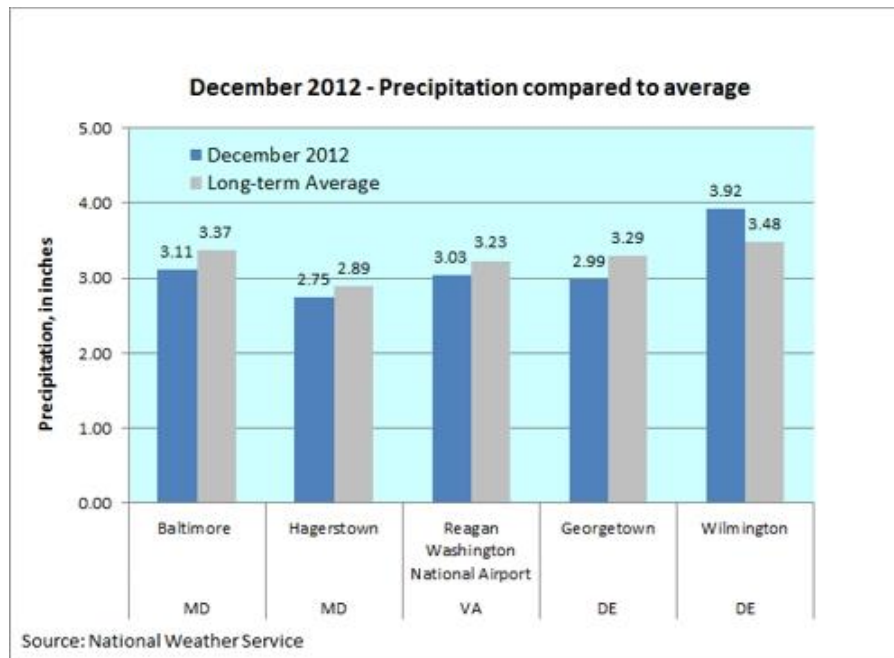
A **percentile** is a value on a scale from 0 to 100 that indicates the percent of a distribution that is equal to or below it. A percentile between 25 and 75 is considered normal.

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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December 2012 Precipitation and Weather

Rainfall was near the long-term average at five National Weather Service (NWS) stations in Maryland, Delaware, and the District of Columbia in December. Rainfall at four of the weather stations was slightly below average; only rainfall at Wilmington, Delaware was above average in December.



Average monthly temperatures were more than 5 degrees Fahrenheit above the long-term average at all five weather stations and several daily high temperature records were set.

The Middle Atlantic River Forecast Center web site shows that precipitation was average to above average for December and all of 2012. There is no drought designation on the map on the U.S. Drought Monitor web site (http://droughtmonitor.unl.edu/DM_northeast.htm) issued on December 25, 2012 for Maryland, Delaware, or the District of Columbia.

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

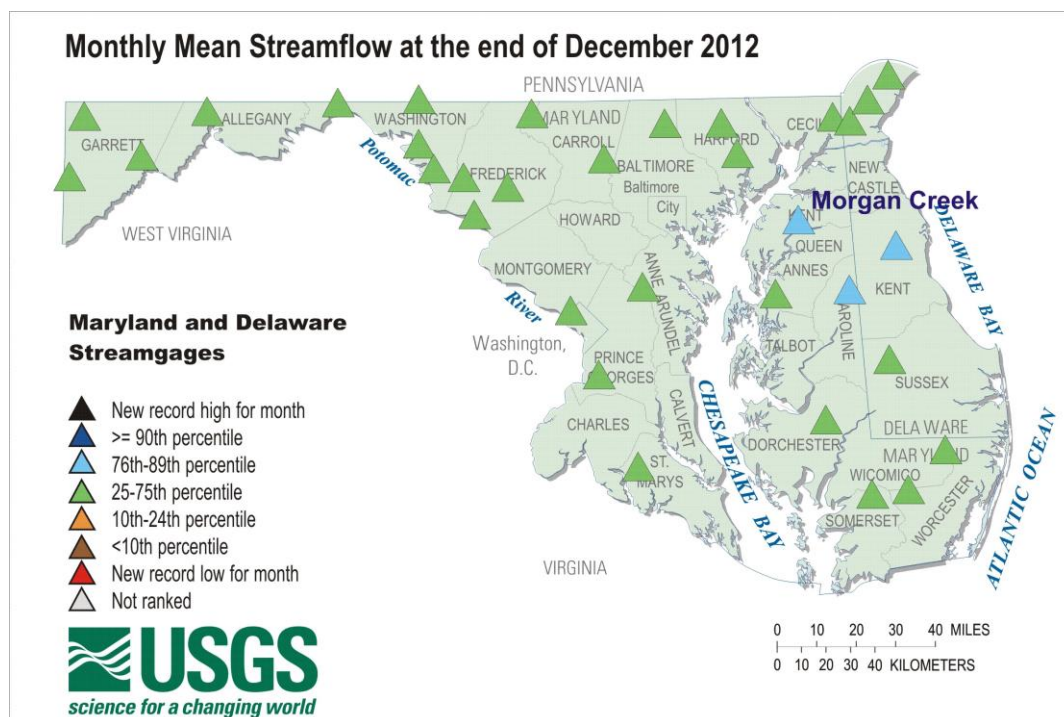
Streamflow data are used for many purposes. A few of the most obvious uses are to assess water supply and the risk of droughts and floods. Streamflow data are also used to calculate loads of chemical constituents and assess how biological communities are affected by hydrologic conditions. The USGS operates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

December 2012 Streamflow

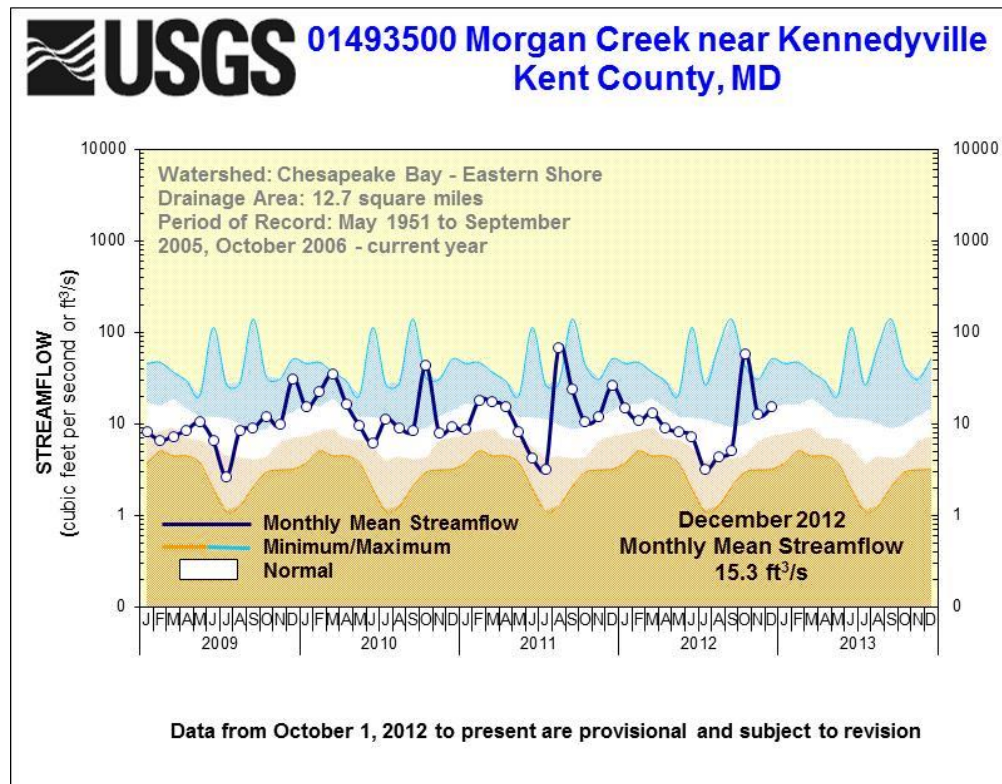
Monthly mean streamflow was normal to above normal at 30 of the 33 USGS streamflow-gaging stations used to monitor climatic response in Maryland, Delaware, and the District of Columbia in December. Normal is considered to be between the 25th and 75th percentiles. This is the largest number of streamflow levels in the normal range since July 2009. The normal to above normal streamflow levels were made possible from the extensive rainfall from Superstorm Sandy in October and near average precipitation in December. There were three sites on the upper Delmarva Peninsula with above normal monthly mean streamflows: Choptank River and Morgan Creek on the Eastern Shore of Maryland, and St. Jones River in Delaware.



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

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Monthly mean streamflow on Morgan Creek in Kent County, Maryland was above normal in December. Streamflow at Morgan Creek was at a record high in October after rainfall from Superstorm Sandy, but November rainfall was minimal and the monthly mean streamflow level dropped.



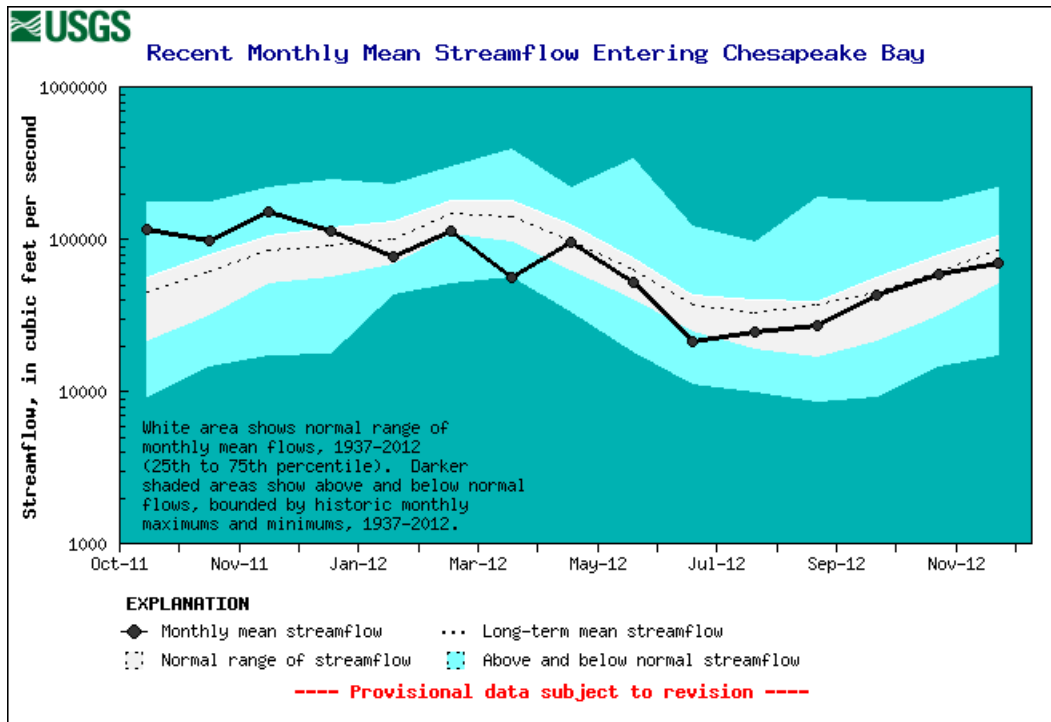
Five-year hydrographs can be viewed at:
<http://md.water.usgs.gov/surfacewater/streamflow/>

The dark line in the 5-year hydrograph represents the monthly mean streamflow for this period 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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Estimated Streamflow to the Chesapeake Bay

The estimated monthly mean freshwater streamflow to Chesapeake Bay remained in the normal range in December 2012, at 70,200 cubic feet per second (ft³/s; provisional and subject to revision). The normal range for average (mean) monthly streamflow for December is between 50,800 ft³/s and 107,000 ft³/s, the 25th and 75th percentiles of all December values. These statistics are based on a 76-year period of record.



Data and more information on the freshwater flow to the Bay can be found here:
<http://md.water.usgs.gov/waterdata/chesinflow/recent/>

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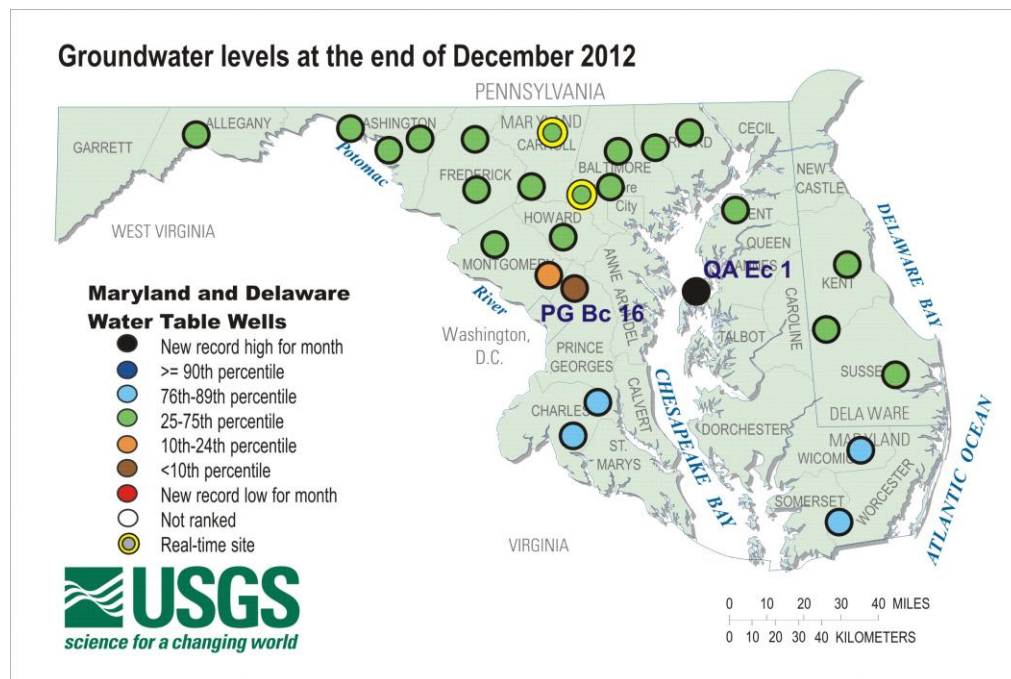
Groundwater

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.

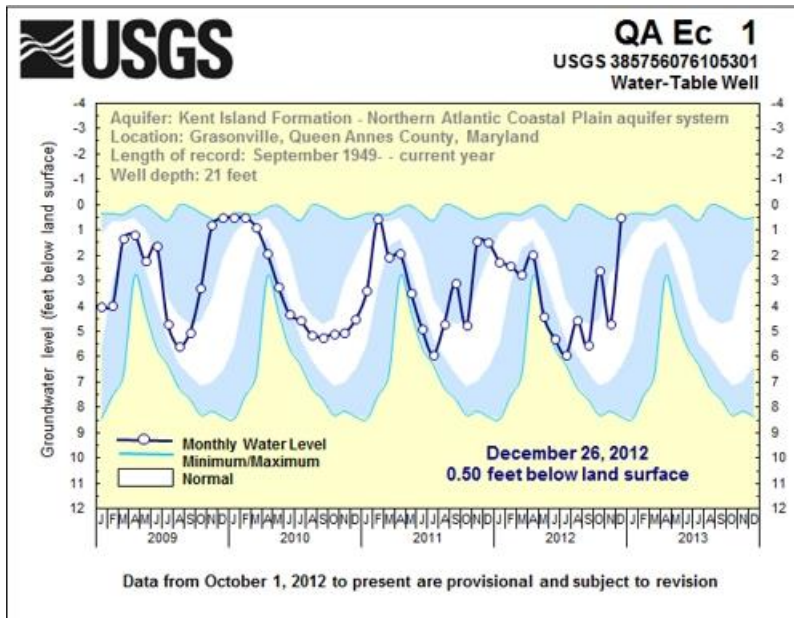
December 2012 Groundwater Levels

Groundwater levels used to monitor climatic conditions in Maryland and Delaware were normal at 19 of the 26 wells in December 2012. Normal is considered to be between the 25th and 75th percentiles. These wells included those in the northern and western counties of Maryland, and all three wells in Delaware. Wells with above normal groundwater levels were located in southern Maryland and on the lower Delmarva Peninsula.



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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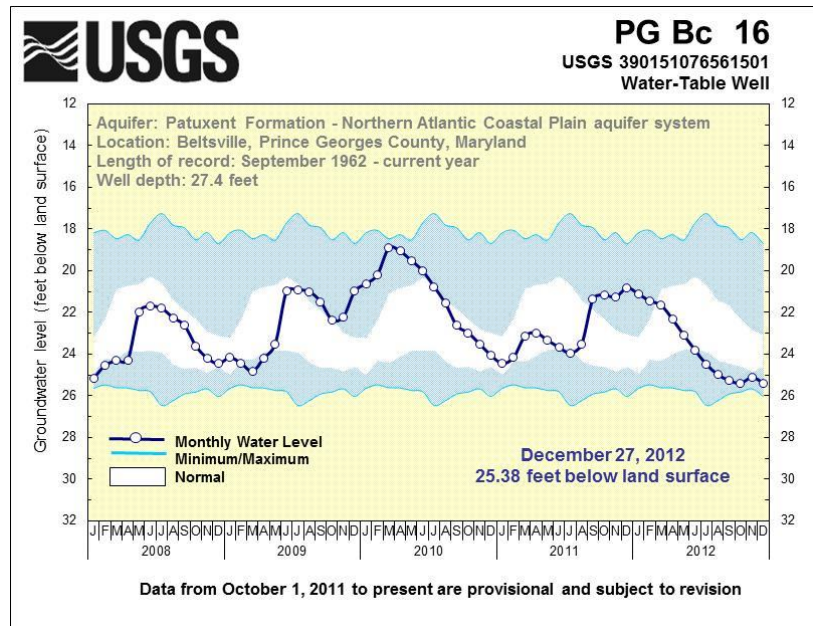
These 5-year hydrographs show groundwater levels as a dark blue line, the minimum and maximum monthly values, and the normal range (between the 25th and 75th percentiles) as a white band based on the period of record. The maximum water level is at the top of the blue section and the minimum water level is at the bottom of the blue section in the graph.

The groundwater level in USGS monitoring well QA Ec 1 in Queen Anne's County, on Maryland's Eastern Shore, rose 4.2 feet since November 2012 and was tied for a record

December high at 0.05 feet below land surface (black circle on map).

At about the same latitude on the western shore of the Chesapeake Bay, the water level in the monitoring well in Prince George's County (PG Bc 16) was below the 10th percentile in December (brown circle on map). The nearby well in Montgomery County was also below normal, which supports the low groundwater level found in the Prince George's well.

Except for a minor increase in November, the groundwater level in well PG Bc 16 has dropped consistently since January 2012, when the water level was unusually high compared to the normal range (white band).



Five-year groundwater hydrographs can be viewed at:

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

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Reservoir Levels

Reservoir storage at the end of December in the Baltimore reservoirs (Loch Raven, Liberty, and Prettyboy) remained at 100 percent of available storage capacity, with a total of 75.85 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 over 100 percent of normal storage capacity or 89 percent of usable capacity at the end of December with 10.77 billion gallons. The difference between these values reflects the fact that not all of the water in the reservoir is usable; for operational purposes, percent of normal storage capacity is used, but this value can exceed 100 percent.

December 2012	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	101%	5.68	Above normal storage; 89% of Usable Capacity (6.374 bg)
Duckett	102%	5.09	Above normal storage; 89% of Usable Capacity (5.7189 bg)
Total	102%	10.77	