

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

**January 2014 – Ninety-six percent of groundwater levels and 100 percent of streamflow levels were in the normal to above normal range in the Maryland-Delaware-District of Columbia region.**

## Why is it important for the USGS to collect and analyze water-resources data?

USGS water data are 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 resources conditions they might encounter in the future.

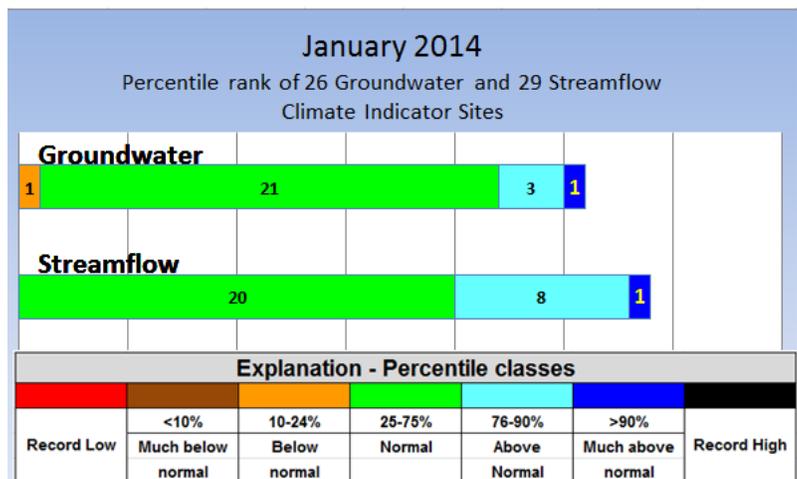
The sites used in this water summary were carefully selected to show the response of streamflow and groundwater levels to weather conditions. Ideally, these sites will show no effects from human influences. The streamflow and groundwater data are ranked in comparison to the historical record and summarized. Precipitation and reservoir data are also presented to give a more complete picture of the region’s water resources.

## USGS January 2014 Water Conditions Summary

Ninety-six percent of the groundwater levels and 100 percent of the monthly mean streamflow at sites used to monitor the response of water resources to changes in climatic conditions in Maryland, Delaware, and the District of Columbia were in the normal (between the 25<sup>th</sup> and 75<sup>th</sup> percentiles) to above normal range in January.

Groundwater levels were in the normal range in 21 of the 26 USGS observation wells used to monitor climatic conditions in Maryland and Delaware. Four wells had above normal groundwater levels, one of which was above the 90<sup>th</sup> percentile, and the groundwater level in one well was below normal.

Monthly mean streamflow in January was normal at 20 of the 29 streamgages used as climate indicator sites, and above normal at 9 other streamgages. January data were incomplete for four additional sites in the climate network, likely due to ice accumulation at four streamgages, so monthly means could not be calculated at those four stations.



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.

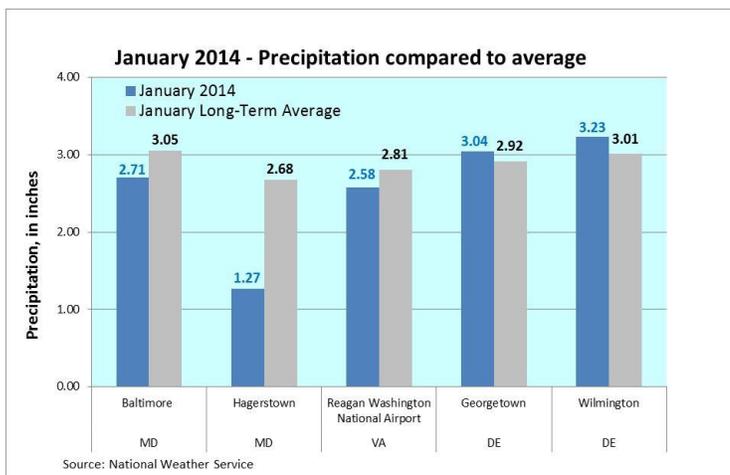
For example, a groundwater level in the 90th percentile is equal to or greater than 90 percent of the values recorded for that month.

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## January 2014 Precipitation and Weather

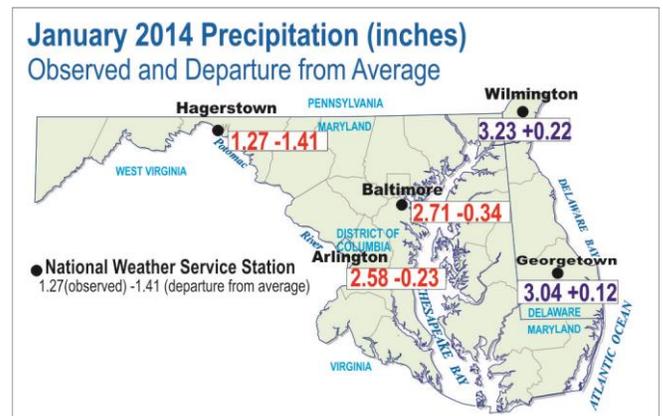
January precipitation ranged from more than an inch below the long-term average to slightly above the long-term average at the five National Weather Service (NWS) stations in Maryland, Delaware, and Arlington, Virginia (adjacent to the District of Columbia). Of the five weather stations, Wilmington, Delaware had the greatest amount of precipitation with 3.23 inches. The lowest amount of precipitation in January was in Hagerstown, Maryland, with 1.27 inches, which is 1.41 inches below the long-term average.

The NWS Middle Atlantic River Forecast Center's 365-day precipitation data show that all counties in Maryland and Delaware were in the average to above average range for the 365-day period ending in January. All counties on the Delmarva Peninsula had above average 365-day precipitation except for Dorchester and Talbot Counties in Maryland, which had average precipitation.



### National Weather Service Stations

- Baltimore** = Baltimore/Washington International Thurgood Marshall Airport (BWI)
- Georgetown** = Georgetown, Sussex County Airport
- Hagerstown** = Hagerstown Regional Airport
- Arlington** = Ronald Reagan Washington National Airport
- Wilmington** = New Castle Airport



January temperatures were more than 3.8 degrees Fahrenheit below the long-term average at the five NWS stations in the Mid-Atlantic region. Temperatures in Baltimore, Hagerstown, Maryland and Wilmington, Delaware were more than 5 degrees Fahrenheit below the long-term average.

\*The NWS normal (long-term average) period used for determining records is from 1981–2010.

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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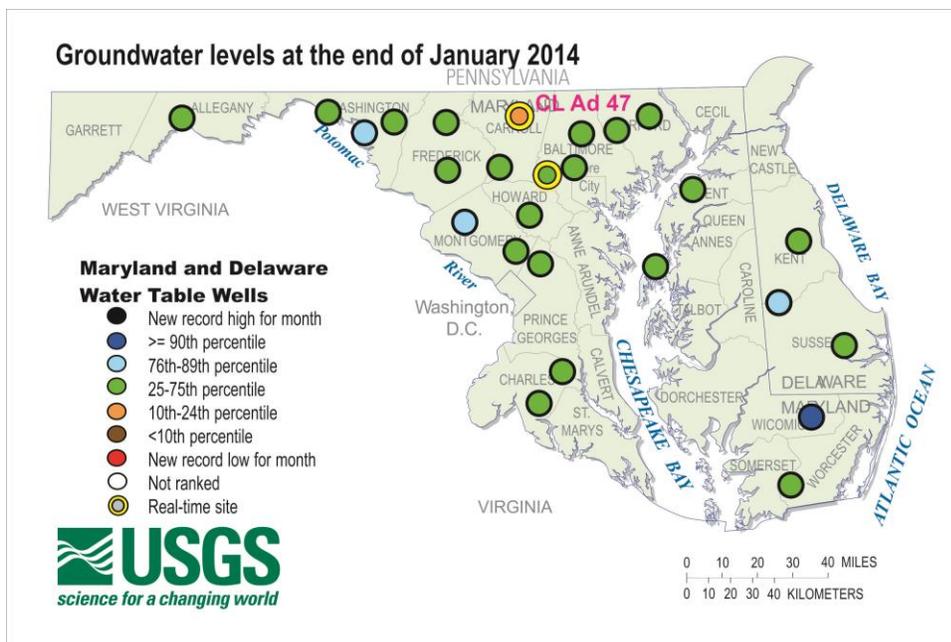
## Groundwater

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

## January 2014 Groundwater Levels

January groundwater levels were normal (between the 25th and 75th percentiles) in 21 of the 26 wells used to monitor climatic conditions in Maryland and Delaware. There was one well with a below normal groundwater level in January in Carroll County, Maryland. Groundwater levels in wells in Montgomery, Washington, and Wicomico Counties in Maryland were above normal and the groundwater level in the Wicomico County well was in the 90<sup>th</sup> percentile.

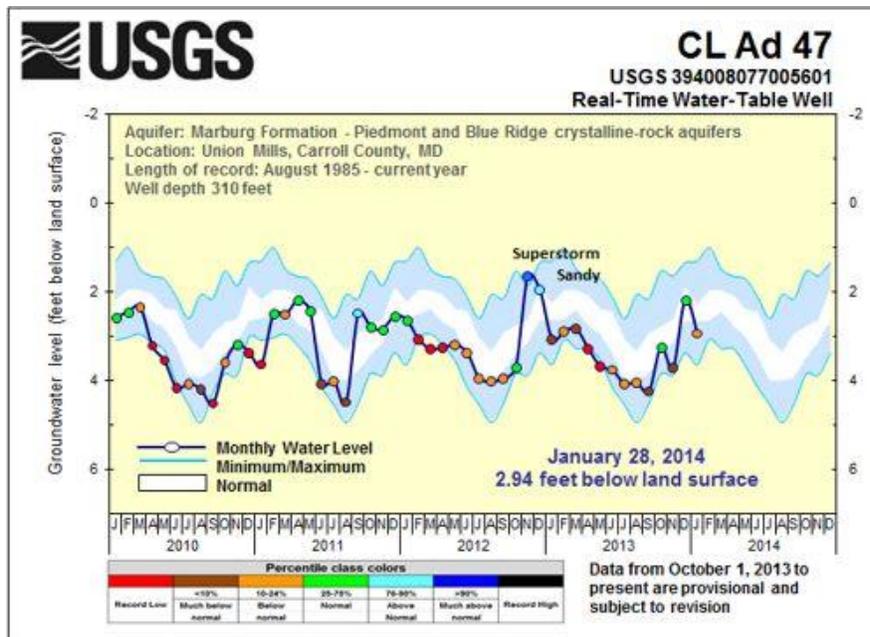


Groundwater levels in Delaware were normal in two wells and above normal in one well in Kent County in January. The well in Kent County **has had** been at normal to above normal levels since fall of 2012, or during the last 17 months.

To access the clickable groundwater map, go to:  
[http://md.water.usgs.gov/groundwater/web\\_wells/current/water\\_table/counties/](http://md.water.usgs.gov/groundwater/web_wells/current/water_table/counties/)

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

The groundwater level in observation well CL Ad 47 in Carroll County, Maryland went from normal in December to below normal in January 2014. This well was the only well in the region that had a below normal groundwater level in January.



Five-year groundwater hydrographs can be viewed at:  
[http://md.water.usgs.gov/groundwater/web\\_wells/current/water\\_table/counties](http://md.water.usgs.gov/groundwater/web_wells/current/water_table/counties)

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 upper blue section and the minimum water level is at the bottom of the lower blue section in the graph. Each monthly measurement is colored according to the percentile rank in which it falls for the month.

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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.

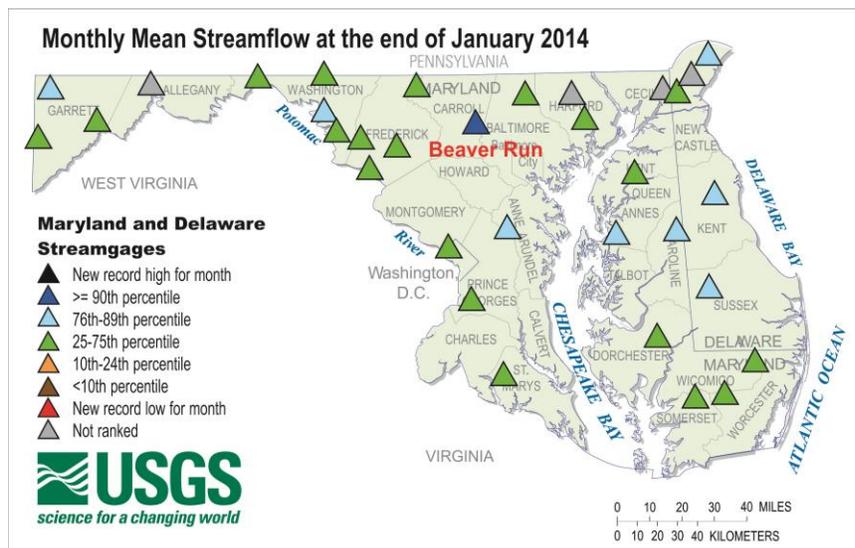
The streamflow locations chosen for the monthly water summary were selected based on the following criteria:

- 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.

## January 2014 Streamflow

The temperatures in January were extremely cold, which could make streamflow values higher or lower than the provisional values. The cold temperatures can lead to the formation of ice dams, or the freezing of intake pipes and orifice lines. Additionally, because the ground is frozen and the temperatures are so cold, there is a lack of melting and runoff, which could result in lower streamflow.

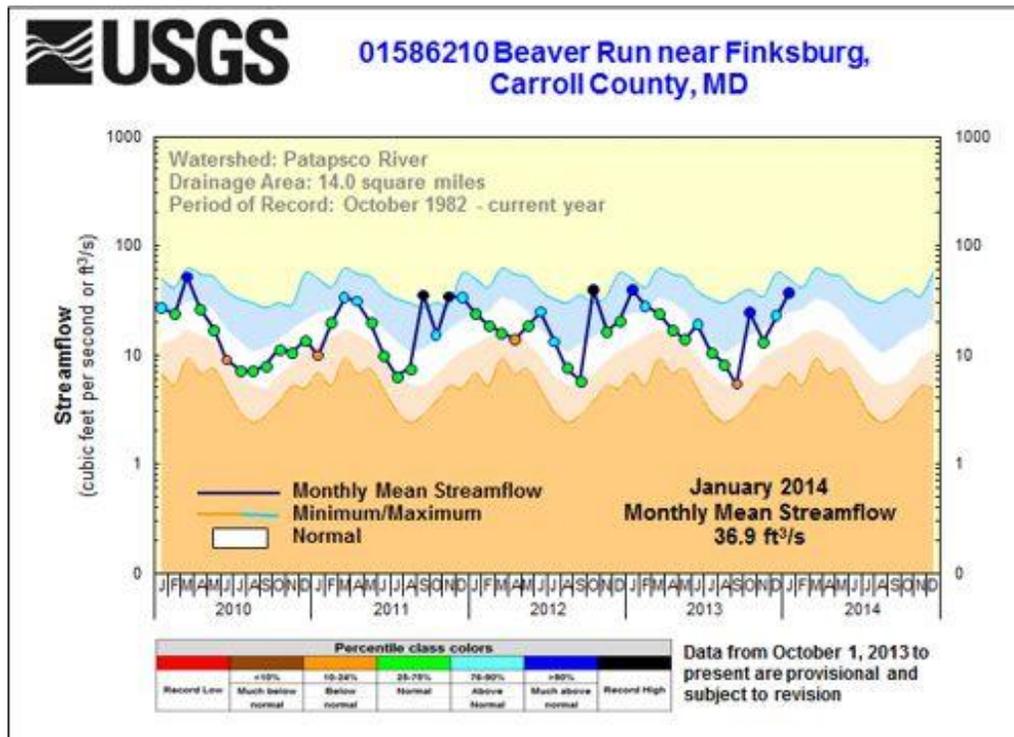
Monthly mean streamflows were normal at 20 of the 29 USGS streamgages used to monitor climatic response in Maryland, Delaware, and the District of Columbia. Normal is considered to be between the 25th and 75th percentiles. Streamflow was between the 76<sup>th</sup> and 89<sup>th</sup> percentiles at the remaining eight USGS streamgages and in the 90<sup>th</sup> percentile at Beaver Run in Carroll County, Maryland. January monthly mean streamflow was not calculated at four streamgages because of incomplete data due to equipment problems or icing conditions.



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

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

In January, only one USGS streamgage had a monthly mean streamflow in the 90<sup>th</sup> percentile and that was at Beaver Run in Carroll County, Maryland. Streamflow at this streamgage had been below normal in September 2013, but otherwise at normal to above normal levels since the summer of 2012.



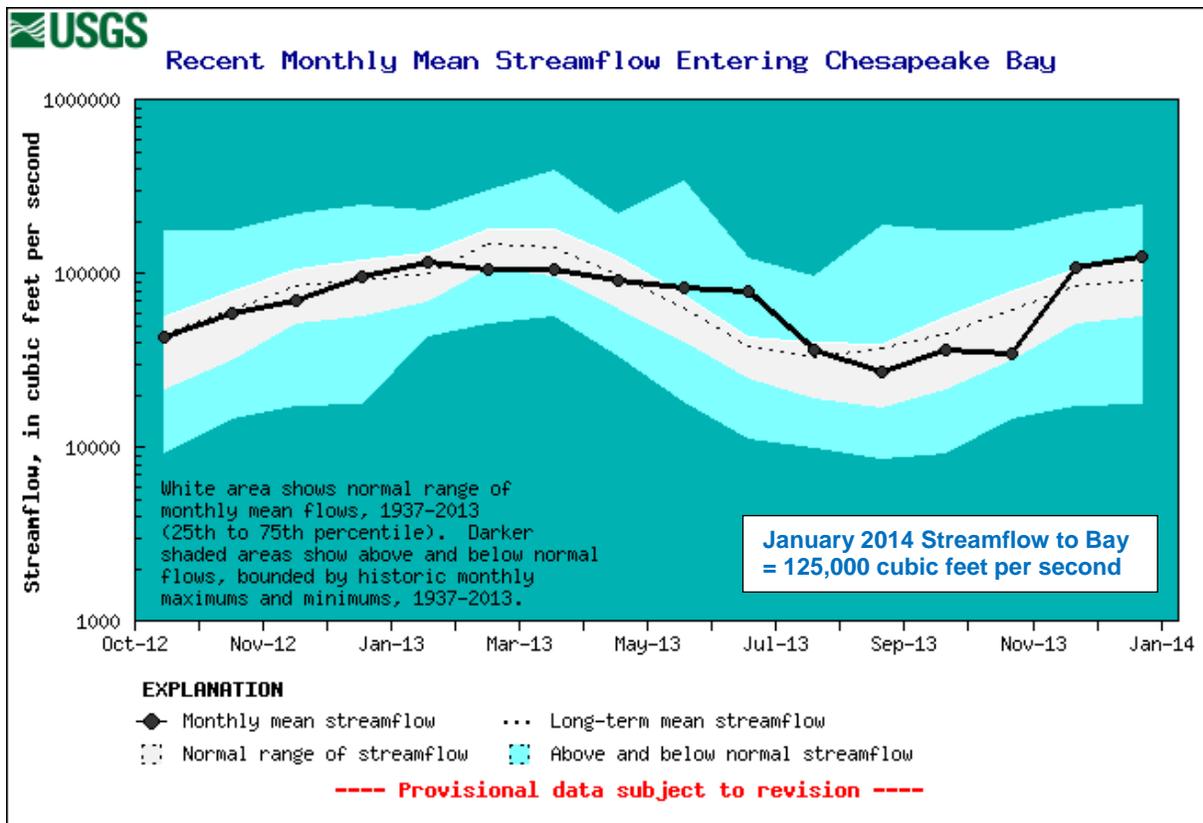
Five-year hydrographs can be viewed at:  
<http://md.water.usgs.gov/surfacewater/streamflow/>

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 percentiles) 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. Each monthly mean measurement is colored according to the percentile rank in which it falls for the month.

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## Estimated Streamflow to the Chesapeake Bay

The estimated monthly mean freshwater streamflow to Chesapeake Bay was in the above normal range in January 2014, at 125,000 cubic feet per second (ft<sup>3</sup>/s; provisional, and subject to revision). The average (mean) monthly streamflow for January is 91,300 ft<sup>3</sup>/s. The normal range for average (mean) monthly streamflow for January is between 57,200 ft<sup>3</sup>/s and 120,000 ft<sup>3</sup>/s, the 25th and 75th percentiles of all January values. These provisional statistics are based on a 77-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/>

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### Reservoir Levels

Available reservoir storage at the end of January in the Baltimore reservoirs (Loch Raven, Liberty, and Prettyboy) remained the same as December values with 100 percent of available storage capacity, with a total of 75.85 billion gallons of water.

Total normal 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 98 percent of normal storage capacity in January, with 10.49 billion gallons of water. 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.

January 2014	Percent available/ normal storage	Volume (billion gallons)	Source
<b>Baltimore Reservoirs</b>			<b>Baltimore City – Environmental Services Division</b>
Liberty	100	36.80	
Loch Raven	100	21.20	
Prettyboy	100	17.85	
Total	100	75.85	
<b>Patuxent Reservoirs</b>			<b>Washington Suburban Sanitary Commission (WSSC)</b>
Triadelphia	106	5.94	
Duckett	91	4.55	
Total	98	10.49	