

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

August 2013 – Record high monthly mean streamflow in Garrett County, Maryland. More than half of groundwater and streamflow levels were in the 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.

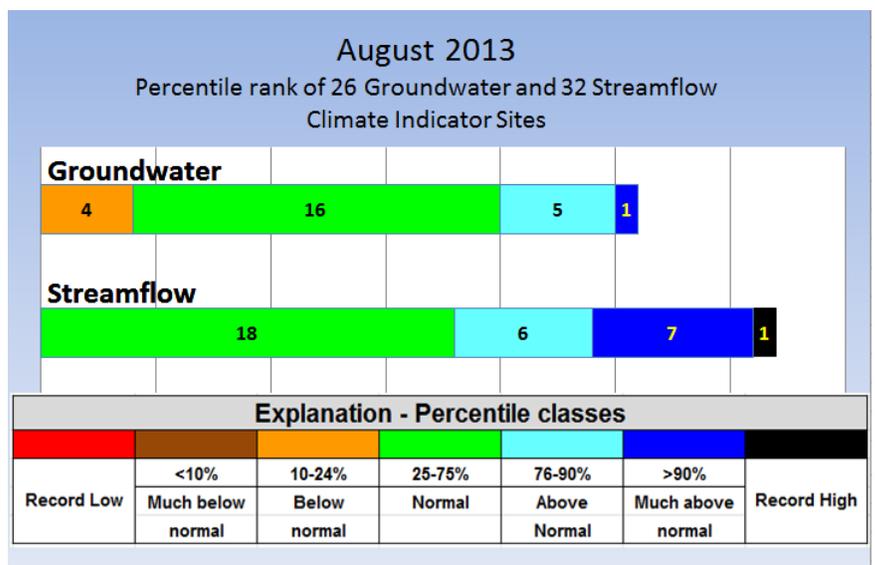
In addition to providing the most extensive set of historical streamflow and groundwater data available to the public, the USGS collects water data and quality-assures the data by employing standardized techniques across the country. The uniformity of the dataset allows for multi-state comparisons and 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 August 2013 Water Conditions Summary

For the third consecutive month, rainfall at the weather station in Georgetown, Delaware was above the long-term average, causing nearby groundwater and streamflow levels to be above normal. Rainfall in Georgetown and at the National Weather Service (NWS) station closest to Garrett County, Maryland exceeded 8 inches in August. Bear Creek in Garrett County, Maryland set a record high August monthly mean streamflow. The groundwater level in the USGS observation well in Wicomico County, Maryland remains high after 3 months of above-average rainfall in the region. .

Over 85 percent of the monthly groundwater levels and 100 percent of the monthly mean streamflows 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 to above normal range (above the 25th percentile).



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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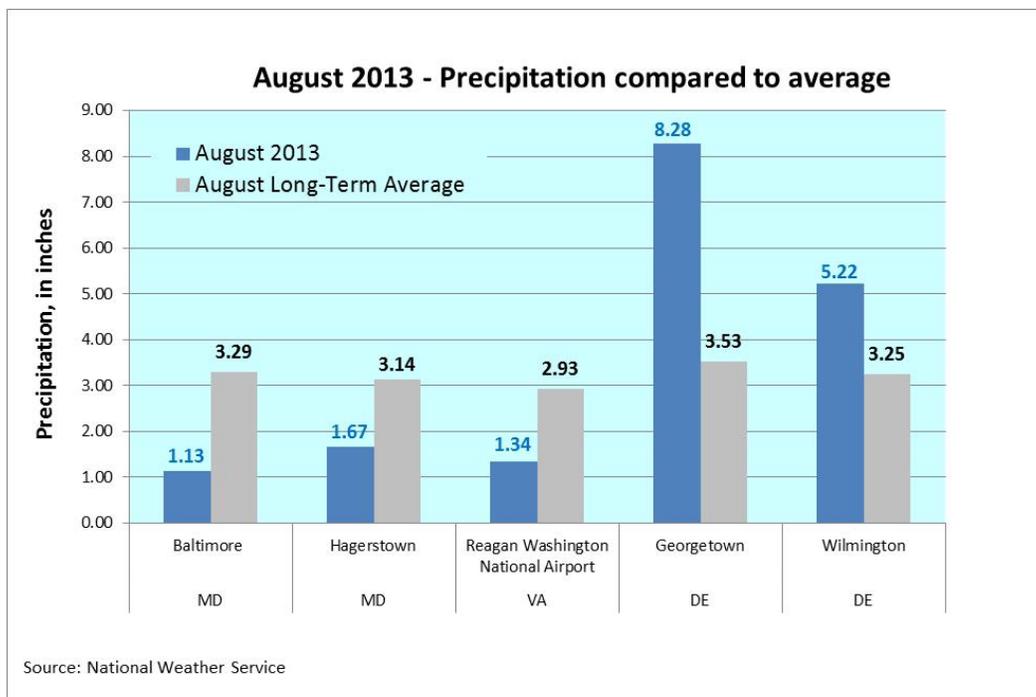
August 2013 Precipitation and Weather

Rainfall at the NWS station in Georgetown, Delaware was 8.28 inches in August, which is 4.75 inches above the long-term average. In August, rainfall at Georgetown was over 2 inches on two separate days, and was measurable (greater than 0.01 inch) on 12 days. Since June, rainfall at Georgetown was 27.15 inches, which is 14.82 inches above normal for this 3-month period. Rainfall was also above normal in Wilmington, Delaware with 5.22 inches, or 1.97 inches above average.

The NWS station in Elkins, West Virginia, which is the closest weather station to Garrett County, received 8.04 inches of rainfall in August, which is 4.20 inches above normal. This Water Conditions Summary does not usually track precipitation at Elkins, but it is noteworthy this month due to the above-average streamflows and ground water levels in far western Maryland.

Rainfall at the remaining two NWS stations in Maryland and the District of Columbia was more than an inch below the long-term average. August rainfall at the NWS stations in Baltimore and Ronald Reagan Washington National Airport near the District of Columbia was close to one third of the long-term average. In Hagerstown, Maryland, rainfall was slightly above half of the long-term average. At the Baltimore Washington International Thurgood Marshall Airport weather station, there was never more than a half an inch of rainfall during any day in August.

August temperatures were 0.9 to 1.7 degrees Fahrenheit below the long-term average at all five weather stations, according to the NWS. 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=lxw>
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

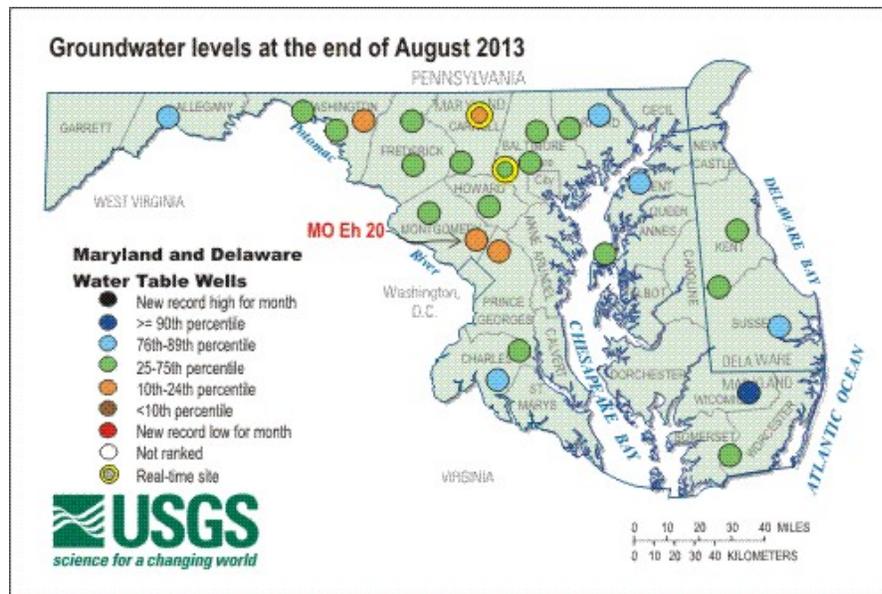
The USGS monitors groundwater levels in unconfined aquifers, providing observations that can be compared to both short-term and long-term changes in climatic conditions. Twenty-six groundwater wells were selected based on the following criteria:

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

August 2013 Groundwater Levels

Plants and trees intercept much of the rain that falls in summer. High temperatures lead to more evaporation than when it is cooler, and transpiration rates from vegetation is at their greatest. As a result, groundwater levels dropped as expected during the late summer in 23 of the 26 observation wells in August. The rank and distribution of groundwater levels were very similar to those in July – the below normal levels were in the Great Valley and Piedmont region while the well in Wicomico County, Maryland on the lower Delmarva Peninsula remains in the 90th percentile from high rainfall in June, July, and August.

Groundwater levels were in the normal range in 16 of the 26 wells used to monitor climatic conditions in Maryland and Delaware. Normal is considered to be between the 25th and 75th percentiles.

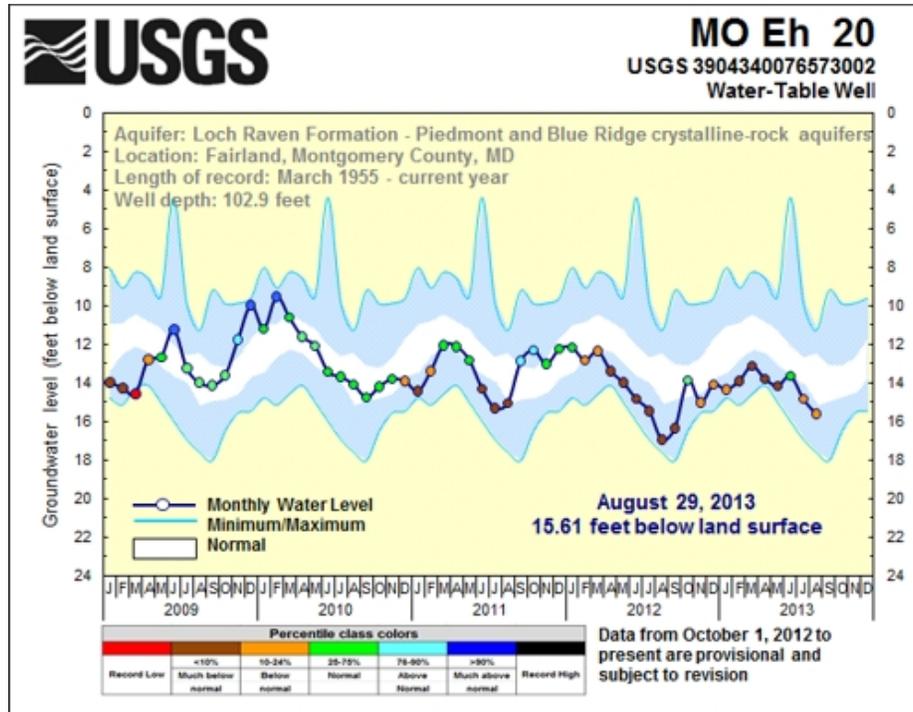


To access the clickable groundwater map, go to:

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

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The groundwater level in observation well MO Eh 20 in Montgomery County, Maryland was below normal for the second consecutive month (15.61 feet below land surface).



Five-year groundwater hydrographs can be viewed at:
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.

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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.

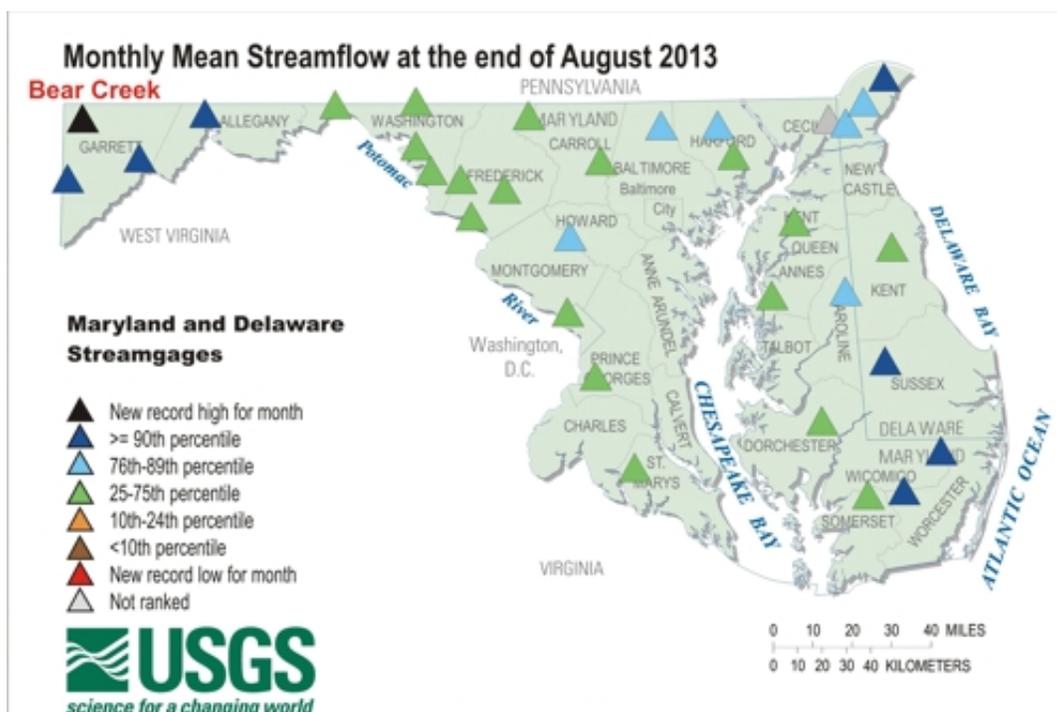
The streamflow locations chosen for the monthly water summary were selected based on the following criteria:

- 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.

August 2013 Streamflow

A record high monthly mean streamflow for August was set at one site in western Maryland, and monthly mean streamflow was in the 90th percentile or greater at seven sites, three in western Maryland, three on the Delmarva Peninsula, and one in northeastern Maryland and northern Delaware.

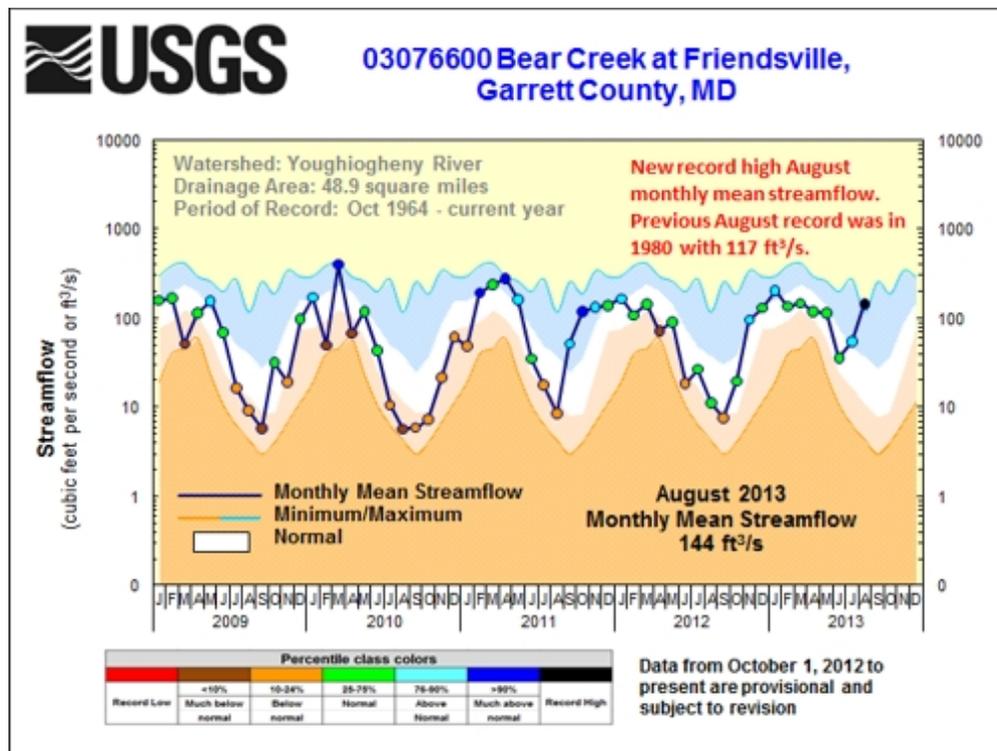
Streamflow at 18 of the 33 USGS streamgages used to monitor climatic response in Maryland, Delaware, and the District of Columbia was in the normal range. Normal is considered to be between the 25th and 75th percentiles. Streamflow at the remaining 14 streamgages was above normal, and there were no below normal monthly mean streamflows at sites used to assess monthly water conditions in August.



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

Monthly mean streamflow at Bear Creek in Garrett County, Maryland was at a record August high at 144 cubic feet per second (ft³/s), exceeding the previous record set in 1980 by 27 ft³/s. The NWS station in Elkins, West Virginia is about 75 miles southeast and received 8.04 inches of rainfall in August. There were 3.32 inches of rain on August 28, which is nearly equivalent to a normal amount of monthly rainfall occurring in a single day.



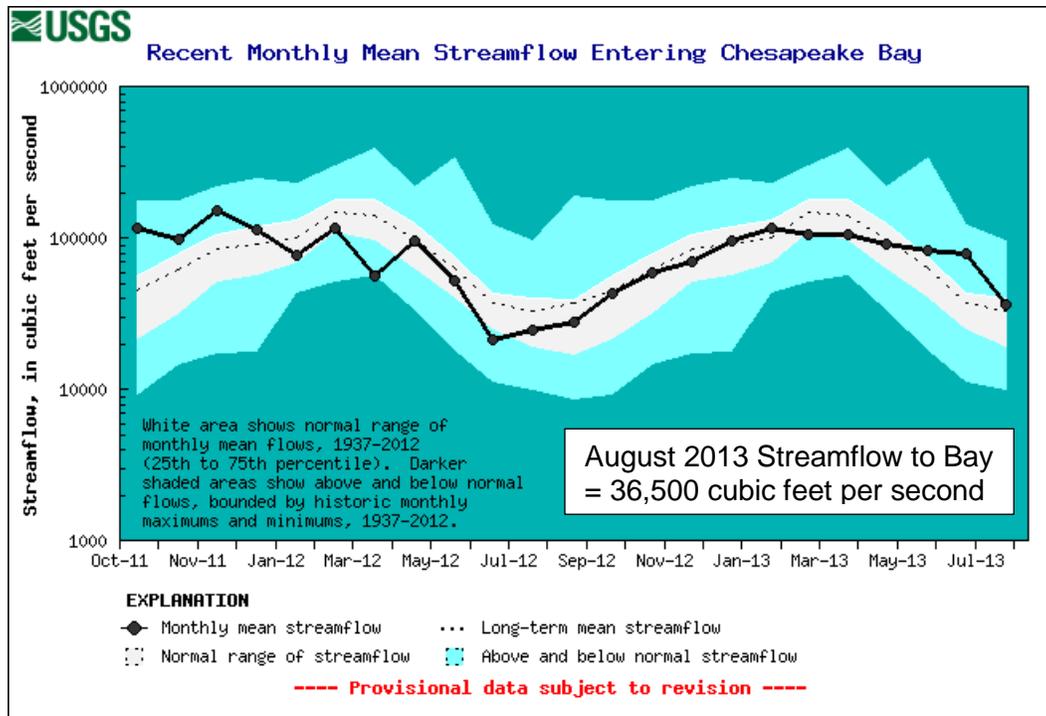
Five-year hydrographs can be viewed at:
<http://md.water.usgs.gov/surfacewater/streamflow/>

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 was in the normal range in August 2013, at 36,500 ft³/s (provisional, and subject to revision). Average (mean) monthly streamflow for August is 33,400 ft³/s. The normal range for average (mean) monthly streamflow for August is between 19,200 ft³/s and 40,300 ft³/s, the 25th and 75th percentiles of all August values. These provisional 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/>

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Reservoir Levels

Reservoir storage at the end of August in the Baltimore reservoirs (Loch Raven, Liberty, and Prettyboy) was at 97 percent of available storage capacity, with a total of 73.81 billion gallons of water.

Total 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, dropped to 92 percent of normal storage capacity, with 9.69 billion gallons of water in August.

August 2013	Percent available/ normal storage	Volume (billion gallons)	Source
Baltimore Reservoirs			Baltimore City – Environmental Services Division
Liberty	95	35.10	
Loch Raven	100	21.11	
Prettyboy	99	17.60	
Total	97	73.81	
Patuxent Reservoirs			Washington Suburban Sanitary Commission (WSSC)
Triadelphia	90	5.02	
Duckett	93	4.67	
Total	92	9.69	