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

January 2015 – Seventy-three percent of groundwater levels and 74 percent of monthly mean streamflows were normal in Maryland, Delaware, and the District of Columbia.

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

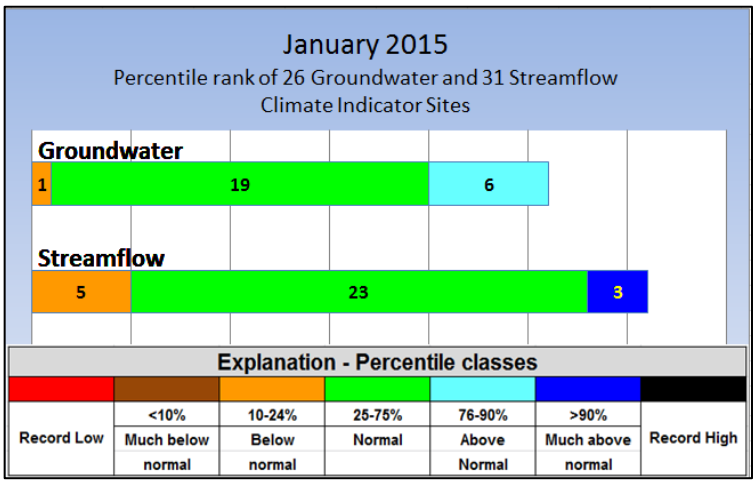
USGS water data are valuable to the public, researchers, water managers, planners, and agricultural users, especially during floods and droughts. These data can be used to assess how water resources respond to changes in climate. Scientists at the USGS have measured streamflow and groundwater levels 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 2015 Water Conditions Summary

In January, 73 percent of groundwater levels and 74 percent of monthly mean streamflows were normal (between the 25th and 75th percentiles) at sites used to monitor the response of water resources to changes in climatic conditions in Maryland, Delaware, and the District of Columbia.



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.

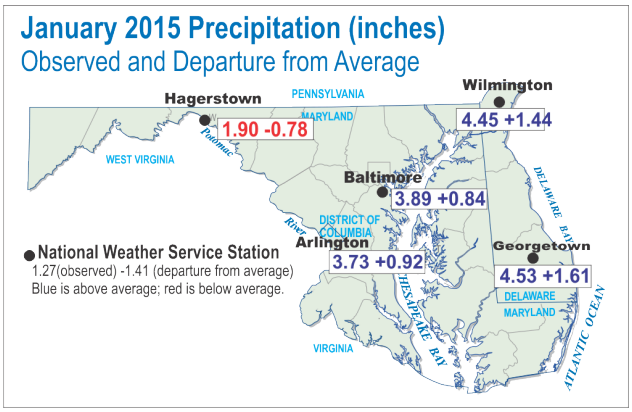
Groundwater levels were normal (between the 25th and 75th percentiles) in 73 percent, or 19 of 26 of the wells used to monitor climatic conditions in Maryland and Delaware in January. Groundwater levels were above normal in six wells and below normal in one well.

January monthly mean streamflows were normal at 74 percent, or 23 of the 31 streamgages. Streamflow was above normal at two streamgages, and below normal at five streamgages, although ice may be influencing the rank of streams in western Maryland.

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

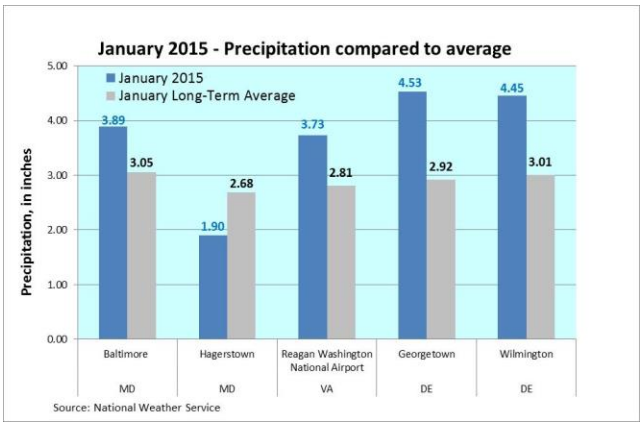
January 2015 Precipitation and Weather

Precipitation in January was above the long-term average at the National Weather Service (NWS) Mid-Atlantic weather stations except for Hagerstown, Maryland, which was 0.78 inches below the long-term average. The highest amount of monthly precipitation was in Georgetown, Delaware with 4.53 inches and the lowest was in Hagerstown, Maryland with 1.90 inches.



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



The NWS Middle Atlantic River Forecast Center's (MARFC) 365-day precipitation data showed that all counties in Maryland and Delaware, and the District of Columbia were classified as average (between the 25th and 75th percentiles) to above average.

In Maryland, Harford County had the highest surplus of rain with 11.3 inches and Dorchester County had the largest deficit of 4.4 inches over the 365-day period from January 2014 to January 2015. See the links below to view the NWS MARFC data.

January air temperatures were between 0.4 – 2.1 degrees Fahrenheit below the long-term average at all five NWS Mid-Atlantic weather stations. The temperatures ranged from 29.2 degrees Fahrenheit in Hagerstown, Maryland to 35.6 degrees Fahrenheit in Arlington, Virginia near the District of Columbia.

Sources:
National Weather Service
MD and DC: http://www.weather.gov/climate/index.php?wfo=lwx
DE: http://www.weather.gov/climate/index.php?wfo=phi
Middle Atlantic River Forecast Center (MARFC): http://www.erh.noaa.gov/marfc/Precipitation/Departures/

Groundwater

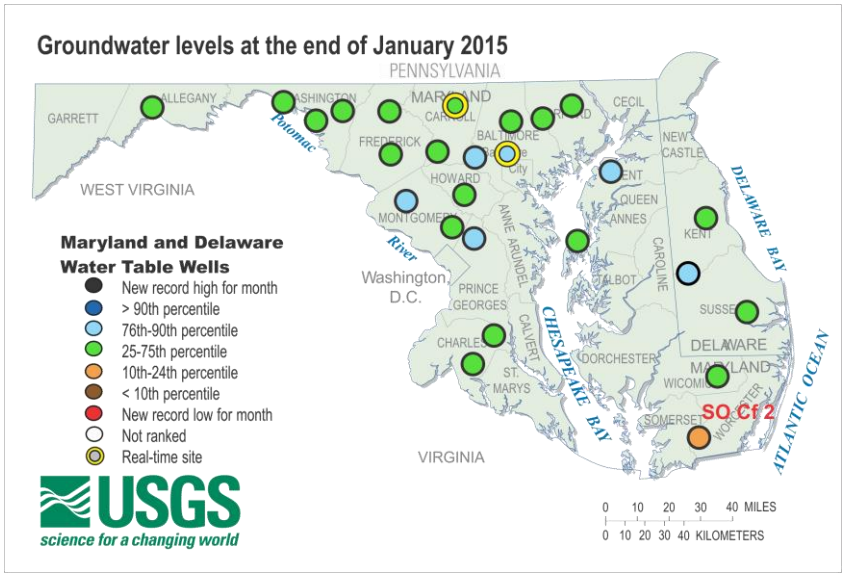
The USGS monitors groundwater levels in unconfined aquifers, providing observations that can be compared to both short-term and long-term changes in climatic conditions. Twenty-six groundwater wells were selected based on the following criteria:

- 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 2015 Groundwater Levels

For the second consecutive month, groundwater levels were normal (between the 25th and 75th percentiles) in 19 of the 26 wells used to monitor climatic conditions in Maryland and Delaware in January. In six observation wells, groundwater levels were above normal, while the groundwater level was below normal in the observation well in Somerset County, Maryland.

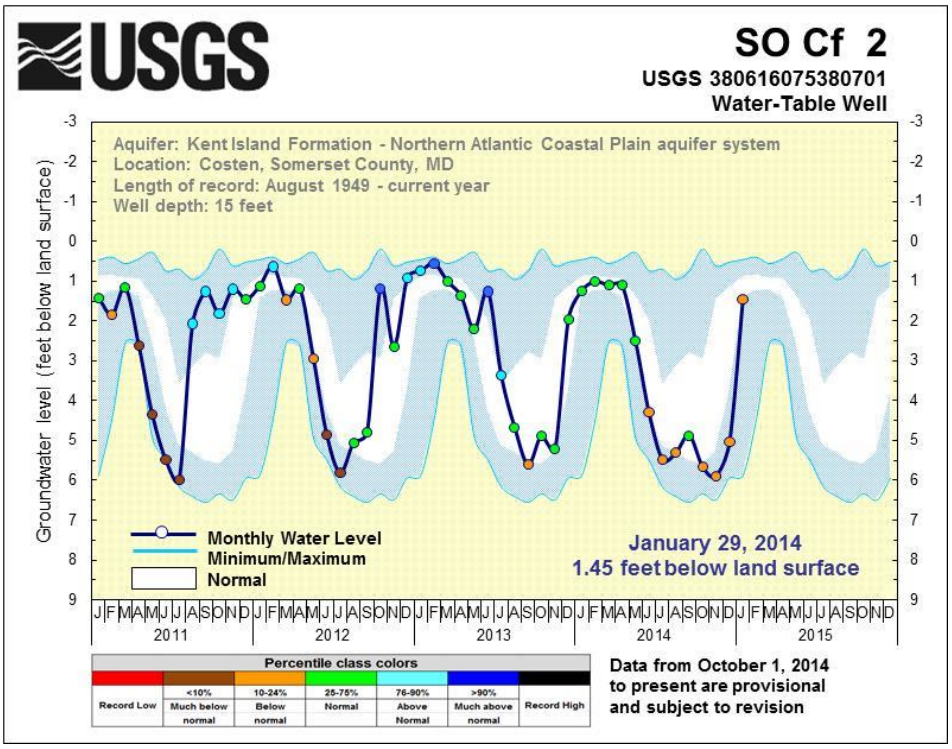
Groundwater levels in Delaware were normal in two USGS observation wells and above normal in one observation well.



To access the clickable groundwater map, go to:
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

In Somerset County, Maryland, the groundwater level in USGS observation well SO Cf 2 has risen 3.95 feet since December, however, streamflow remains in the below normal range and it has been below normal for the previous three months.



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

Streamflow

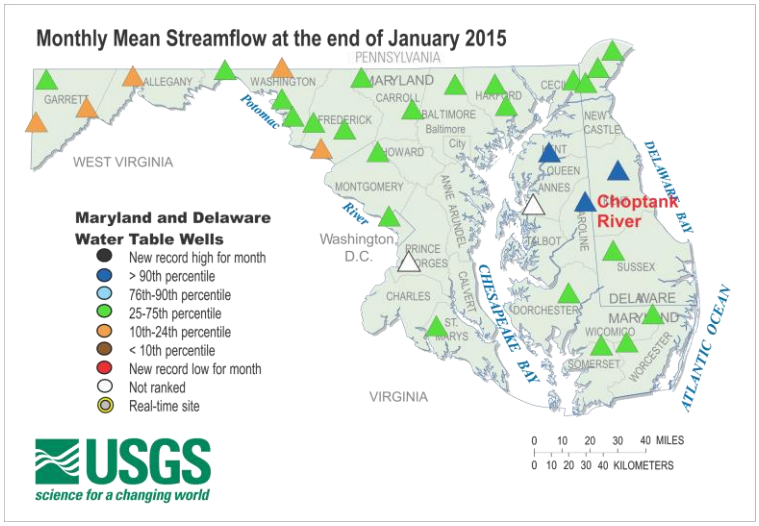
Streamflow data are used for many purposes. A few of the most obvious uses are to assess water supply and the risk of droughts and floods. Streamflow data are also used to calculate loads of chemical constituents and assess how biological communities are affected by hydrologic conditions. The USGS operates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

January 2015 Streamflow

Monthly mean streamflows were normal at 23 of the 31 USGS streamgages used to monitor climatic response in Maryland, Delaware, and the District of Columbia in January. Normal is considered to be between the 25th and 75th percentiles. There were periods of extremely cold temperatures in January, which could cause streamflow values to be higher or lower than the provisional values due to ice formation in the stream channel. There were two sites where a monthly mean was not available because of technical difficulties. Since August 2014, more than 70 percent (at least 22 of the 33 USGS streamgages) of the monthly mean streamflows have been in the normal range.

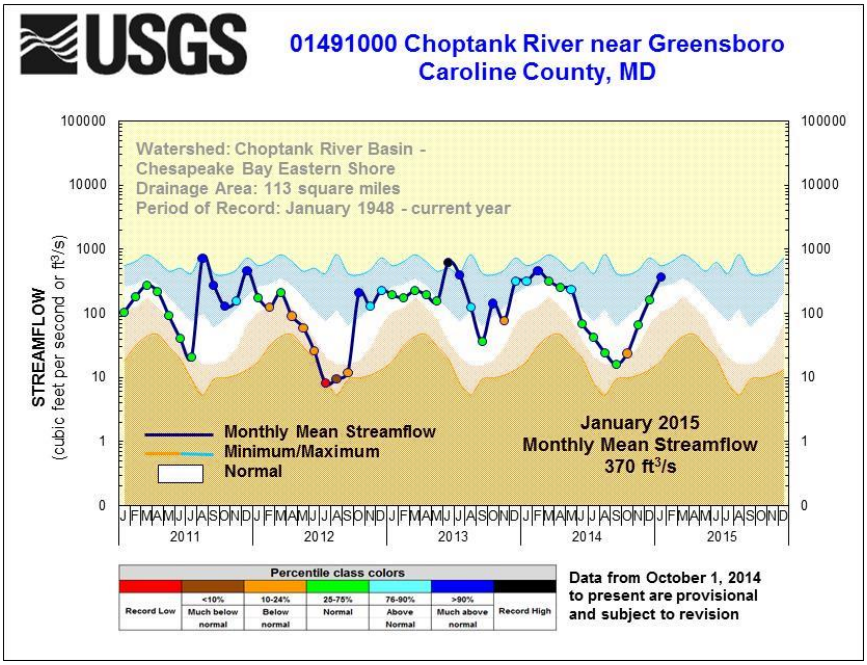


Monthly mean streamflow was below normal at five USGS streamgages in western Maryland in January, but streamflow could be below normal because of the cold temperatures and ice. Streamflow was above the 90th percentile at three streams on the upper Delmarva Peninsula, including the Choptank River.

In Delaware, all monthly mean streamflows were normal in January, except for the St Jones River in Kent County, which was the only stream that was above normal for two consecutive months.

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

The monthly mean streamflow on the Choptank River in Caroline County, Maryland was above the 90th percentile in January 2015. Streamflow had been normal (25th – 75th percentiles) during the preceding 2 months. The monthly mean streamflow typically climbs at this time of year with the average peak in March on the Choptank River. The January 2015 monthly mean streamflow was above the long-term average peak that is typically in March.

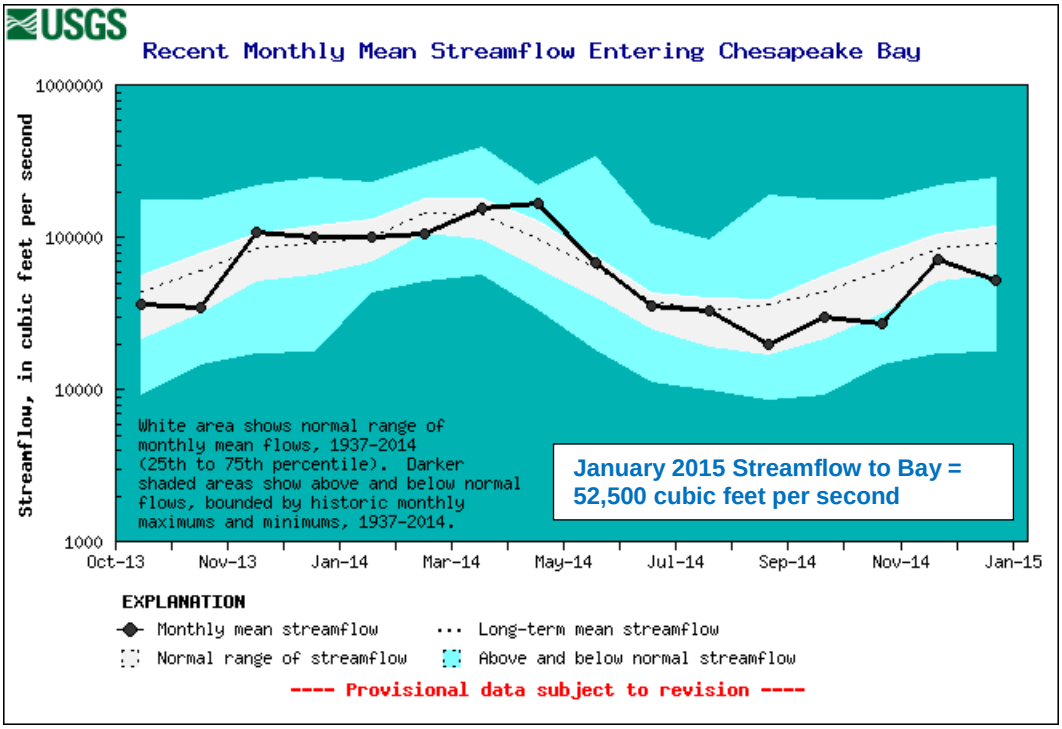


Five-year hydrographs can be viewed at:
http://md.water.usgs.gov/surfacewater/streamflow/

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.

Estimated Streamflow to the Chesapeake Bay

The estimated monthly mean freshwater streamflow to Chesapeake Bay was below normal in January 2015 at 52,500 cubic feet per second (ft^3/s; provisional, and subject to revision). The average (mean) monthly streamflow for January is 91,500 ft^3/s. The normal range for average (mean) monthly streamflow for January is between 57,200 ft^3/s and 120,000 ft^3/s, the 25th and 75th percentiles of all January values. These provisional statistics are based on a 78-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/**

Reservoir Levels

Available reservoir storage at the end of January 2015 in the Baltimore reservoirs (Loch Raven, Liberty, and Prettyboy) was 100 percent of available storage capacity, or 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 Maryland around the District of Columbia, increased 12 percent since December to 94.5 percent of normal storage capacity at the end of January 2015, with 10.03 billion gallons of water. Not all of the water in the Patuxent Reservoirs is usable; for operational purposes, percent of normal storage capacity is used, but this value can exceed 100 percent of the usable storage.

January 2015	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	91	5.11	
Duckett	98	4.92	
Total	94.5	10.03	