

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

USGS December 2017 Water Conditions Summary

In December 2017, all groundwater levels and monthly mean streamflows ranged from normal to a monthly record low. Forty-three percent of groundwater levels and 18 percent of monthly mean streamflows were in the normal range at sites used to monitor the response of water resources to changes in weather conditions in Maryland, Delaware, and the District of Columbia. Since November, groundwater levels decreased at 24 wells and increased at 4 wells. Monthly mean streamflows decreased at 27 streamgages and increased at 6 streamgages.

Groundwater levels at 12 of 28 USGS observation wells were in the normal range (25th-75th percentiles) at the end of December. Groundwater levels were below normal in 16 wells, including 8 wells in the 10th-24th percentiles, 7 wells below the 10th percentile, and 2 wells at a record December low.

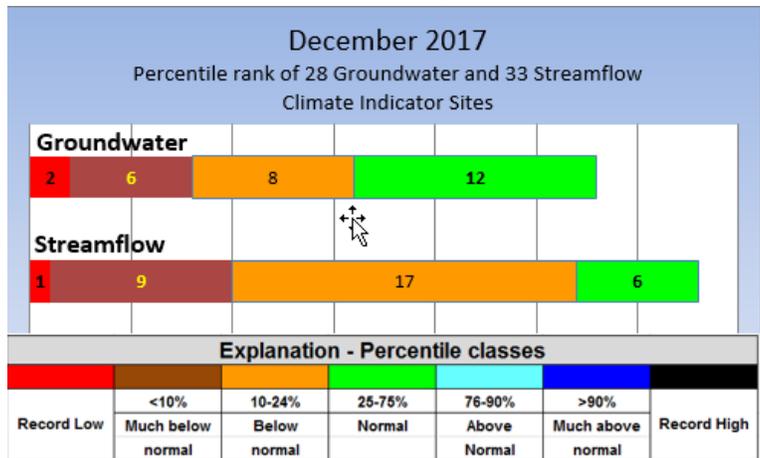
Monthly mean streamflows were in the normal range at 6 of 33 USGS streamgages. Streamflow was below normal at 27 streamgages, including 17 streamgages in the 10-24th percentiles, 9 streamgages below the 10th percentile, and at a record low at 1 streamgage in December.

December 2017 freshwater flow to the Chesapeake Bay was below normal. Precipitation was more than 2 inches below the long-term average at the five Mid-Atlantic National Weather Service (NWS) stations. Hydrologic and weather data have not been reviewed, and are therefore provisional and subject to revision.

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 extreme conditions like floods and droughts. The USGS is known for its consistent measurement techniques and the most extensive set of historical groundwater and streamflow data available to the public. Since these long-term data were collected during wet and dry periods, they can be used to assess how water resources respond to changes in temperature and precipitation, and to evaluate how current data compare to the historical data. The uniformity of the dataset enables multi-state comparisons and other comparative statistical analyses that can better inform policy makers of possible water-resources conditions they might encounter in the future.

The sites used in this water summary were carefully selected to include long-term datasets, and show the response of streamflow and groundwater levels to weather conditions, rather than the effects of human influences. Of the USGS sites presented in this summary, 13 wells and 29 streamgages have more than 50 years of data. The current streamflow and groundwater data are ranked in comparison to the historical record and summarized. In addition to groundwater and streamflow data, this summary includes precipitation and temperature data, reservoir levels, and freshwater streamflow to the Chesapeake Bay to give a more complete picture of the region's water resources.



*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.*

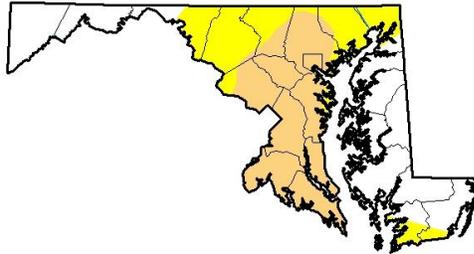
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Weather Conditions

Data from five Mid-Atlantic NWS stations are used to present monthly precipitation and temperature data. The NWS uses averages of data over the 30-year climate normal period from 1981 through 2010.

During drought periods, the status from the National Drought Mitigation Center ([U.S. Drought Monitor](#)) and the [Maryland Department of the Environment \(MDE\)](#) may be included. The U.S. Drought Monitor shows that as of December 28, 2017, 34.05 percent of Maryland was in moderate drought status and 24.97 percent was classified as abnormally dry. In Delaware, 12.07 percent was classified as abnormally dry. In the District of Columbia, 100 percent was in moderate drought status.

U.S. Drought Monitor Maryland



December 26, 2017
(Released Thursday, Dec. 28, 2017)
Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	40.97	59.03	34.05	0.00	0.00	0.00
Last Week 12-19-2017	40.97	59.03	33.25	0.00	0.00	0.00
3 Months Ago 09-26-2017	100.00	0.00	0.00	0.00	0.00	0.00
Start of Calendar Year 01-02-2017	33.63	66.37	32.68	0.00	0.00	0.00
Start of Water Year 09-26-2017	100.00	0.00	0.00	0.00	0.00	0.00
One Year Ago 12-27-2016	33.63	66.37	32.68	0.00	0.00	0.00

Intensity:
■ D0 Abnormally Dry ■ D3 Extreme Drought
■ D1 Moderate Drought ■ D4 Exceptional Drought
■ D2 Severe Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
David Miskus
NOAA/NWS/NCEP/CPC



<http://droughtmonitor.unl.edu/>

(released Thursday, Dec. 28, 2017)
Valid 7 a.m. EST

Delaware



	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	87.93	12.07	0.00	0.00	0.00	0.00
Last Week 12-19-2017	87.93	12.07	0.00	0.00	0.00	0.00
3 Months Ago 09-26-2017	100.00	0.00	0.00	0.00	0.00	0.00
Start of Calendar Year 01-02-2017	44.17	55.83	10.58	0.00	0.00	0.00
Start of Water Year 09-26-2017	100.00	0.00	0.00	0.00	0.00	0.00
One Year Ago 12-27-2016	44.17	55.83	10.58	0.00	0.00	0.00

Intensity:
■ D0 Abnormally Dry ■ D3 Extreme Drought
■ D1 Moderate Drought ■ D4 Exceptional Drought
■ D2 Severe Drought

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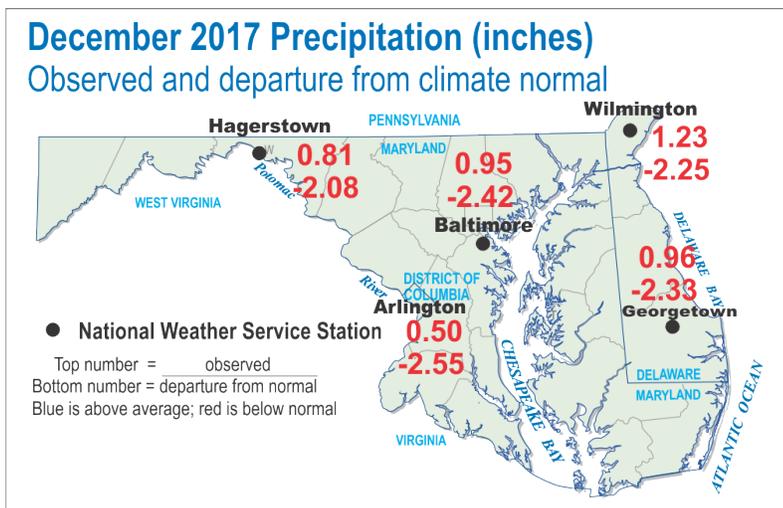
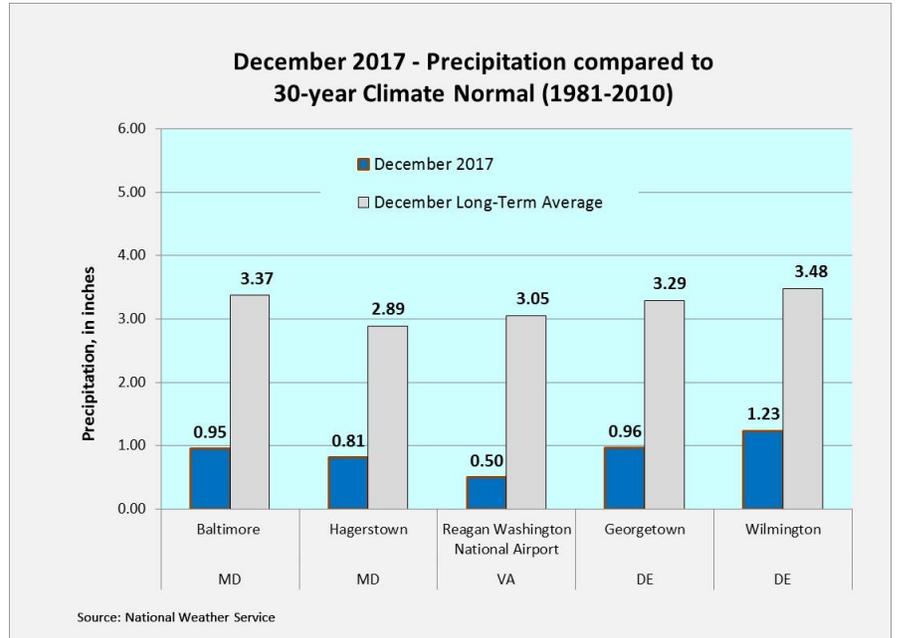
<http://droughtmonitor.unl.edu/>

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December 2017 Precipitation

December precipitation was more than 2 inches below the long-term average at five Mid-Atlantic NWS weather stations. Precipitation was lowest in Arlington, Virginia, with 0.50 inches, or 2.55 inches below the long-term average. The highest precipitation in December was in Wilmington, Delaware, with 1.23 inches, which is 2.25 inches below the long-term December average.

The precipitation graph and map show December precipitation and the departure from the 30-year climate normal from 1981-2010.



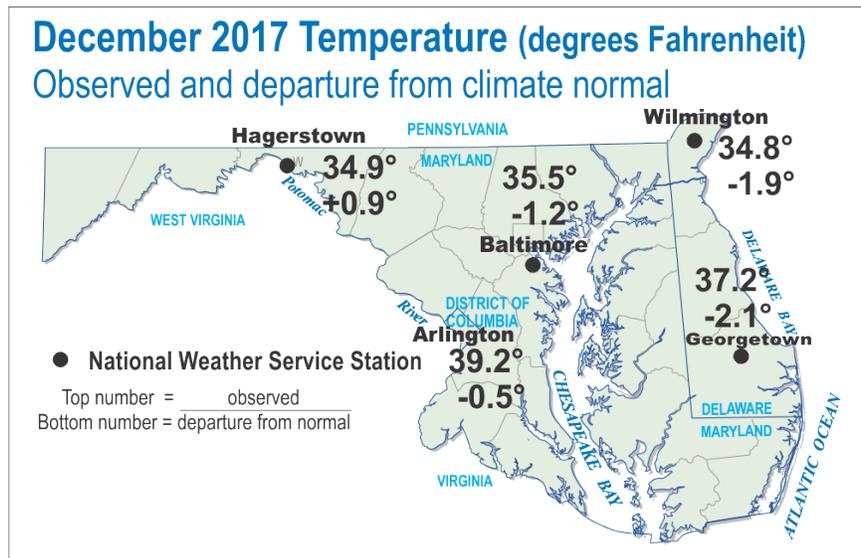
National Weather Service Stations

- 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

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December 2017 Temperatures

December temperatures at four of the five Mid-Atlantic NWS stations were below the climate normal and ranged from 34.8 to 39.2 degrees Fahrenheit. The temperature at Hagerstown, Maryland was above the long-term average and it was slightly warmer than the temperature at Wilmington, Delaware. Temperatures are typically colder in the mountains of Maryland than along the coast, so warmer temperatures in western Maryland are unusual. The temperature in Hagerstown, Maryland was 0.1 degree Fahrenheit warmer than in Wilmington. The lowest December temperature was in Wilmington, Delaware at 34.8 degrees. The highest temperature was in Arlington, Virginia at 39.2 degrees,.



Source: National Weather Service
MD and DC:
<http://www.weather.gov/climate/index.php?wfo=lxhttp://w2.weather.gov/climate/index.php?wfo=lx>
DE: <http://www.weather.gov/climate/index.php?wfo=phi>

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Groundwater

The USGS monitors groundwater levels in surficial or unconfined aquifers, providing observations that can be compared to both short-term and long-term changes in weather conditions. The groundwater wells used for the monthly water summary were selected based on the following criteria:

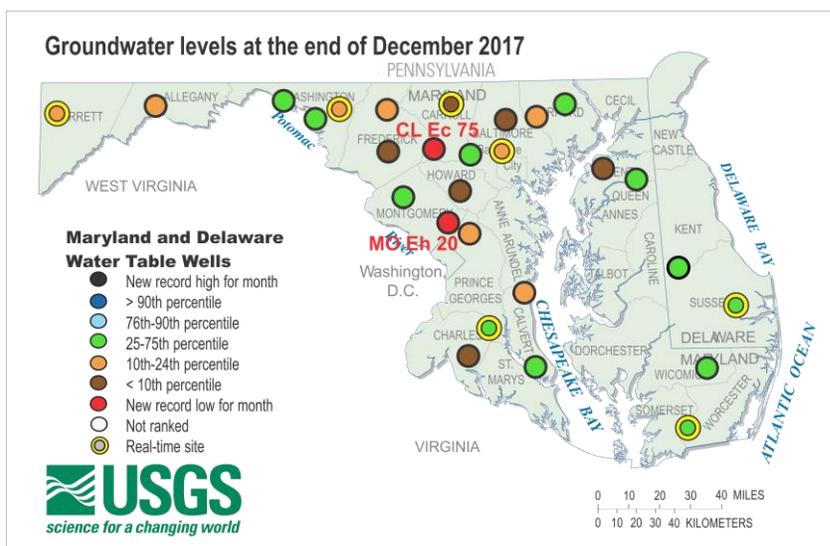
- Located in a surficial or unconfined (water-table) aquifer
- Open to a single, known hydrogeologic unit/aquifer
- Groundwater hydrograph generally reflects response to weather
- No indicated nearby pumpage, and likely to remain uninfluenced by pumpage or changes related to human activities
- Minimum 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 a casing – dug wells are generally not used
- Water levels show no apparent hydrologic connection to nearby streams
- Well rarely goes dry
- Long-term accessibility likely, such as on public land

In the Maryland, Delaware, and District of Columbia region, it is useful to compare current data to historical data, such as data from the droughts of 2002 and the 1960s. There are 11 wells that have over 60 years of groundwater data, and 23 wells that have more than 30 years of groundwater data as of 2018.

December 2017 Groundwater Levels

Forty-three percent, or 12 USGS observation wells, had groundwater levels within the normal range in December. Groundwater levels were below normal at the remaining 16 wells, including 8 wells in the 10th-24th percentile range, 6 wells below the 10th percentile, and two wells at record lows: USGS Observation wells CL Ec 75 and MO Eh 20. This is the second consecutive month that observation well MO Eh 20 in Montgomery County, Maryland set a new monthly record low.

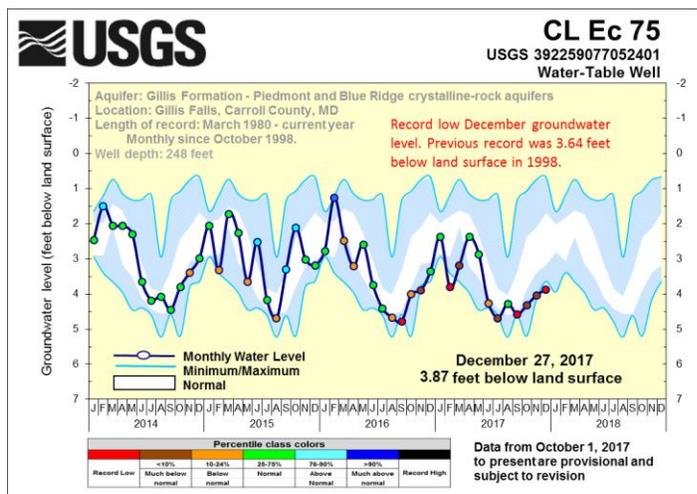
Between November and December, groundwater levels decreased at 24 of 28 wells, and increased at 4 wells in Charles and Carroll Counties in Maryland.



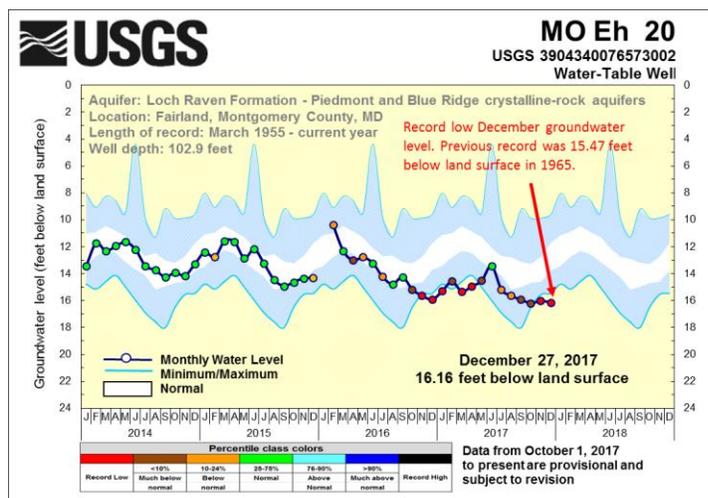
To access the clickable groundwater map, go to:
http://md.water.usgs.gov/groundwater/web_wells/current/water_table/counties/

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In the two 5-year hydrographs for the selected wells, groundwater levels are shown as a dark blue line. Each monthly measurement is colored according to the percentile rank compared to the historical values at the site for the month. The normal range is displayed as a white band, and is 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 area in the graph.



The groundwater level at observation well CL Ec 75, in Carroll County, Maryland, rose 0.17 feet since November to 3.87 feet below land surface, but was a record December low. The previous December record low was 3.64 feet below land surface in 1988. Normal December groundwater levels at this well range from 1.70 to 3.25 feet below land surface. Monthly record-keeping at this well began in October 1998.



For the second consecutive month, the groundwater level at USGS observation well MO Eh 20, in Montgomery County, Maryland, was at a record low at 16.16 feet below land surface, breaking the record of 15.47 feet below land surface set in 1965 by 0.69 feet. Groundwater levels have been below normal for the past 6 months at this well. The normal range of groundwater levels for December at this well is between 11.76 and 13.85 feet below land surface. Record-keeping at this well began in March 1955.

Five-year groundwater hydrographs can be viewed at:
http://md.water.usgs.gov/groundwater/web_wells/current/water_table/counties

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Streamflow

Streamflow data are most commonly used for assessing water supply and to determine 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.

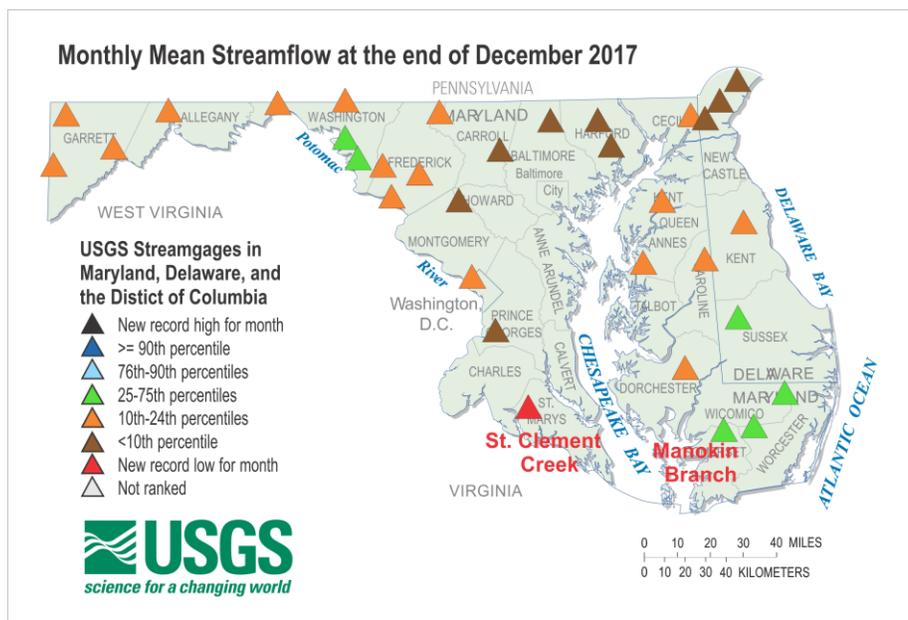
The USGS streamgages chosen for the monthly water summary were selected based on the following criteria:

- Minimum period of record is 10 years of continuous data
- Watershed areas greater than 5 square miles
- Streamflow is not regulated, such as by a dam or diversion, and has relatively natural flow
- Streamflow data reflect a response to weather conditions
- Most of the surrounding area and watershed are not urban

Of the 33 streamgages used in this summary, 22 have more than 60 years of data, allowing for comparison to data from the historical droughts of 2002 and the 1960s. All 33 streamgages have at least 30 years of monthly mean streamflow data.

December 2017 Streamflow

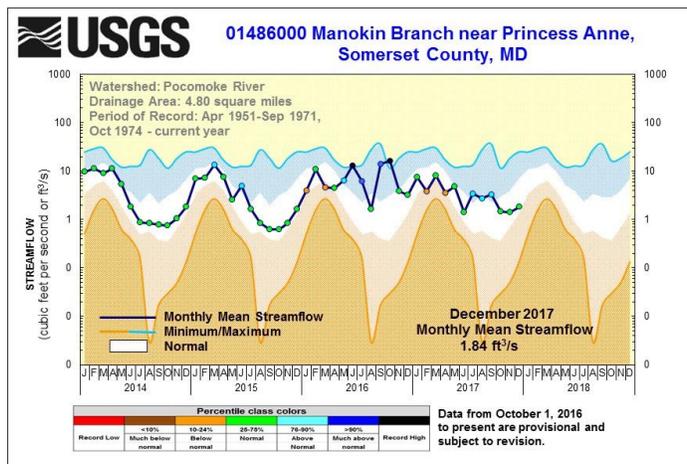
Monthly mean streamflows were in the normal range at 18 percent, or 6 of 33 selected USGS streamgages. Streamflow was below normal at 27 streamgages in Maryland, Delaware, and the District of Columbia, including 17 streamgages in the 10th -24th percentiles, 9 streamgages in less than the 10th percentile, and a record December low at St. Clement Creek in St. Mary's County, Maryland. Streamflow decreased at 27 streamgages and increased at 6 streamgages between November and December. Ice in the streams required estimates to be made at some stations.



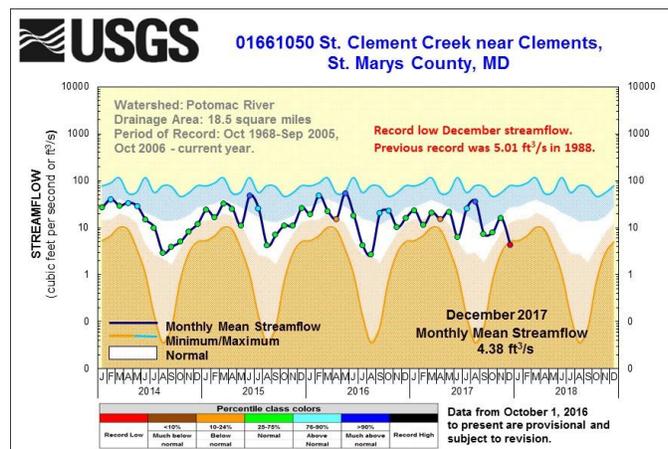
To access the clickable streamflow map, go to:
<http://md.water.usgs.gov/surfacewater/streamflow/>

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In the hydrograph for the selected streamgages, 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-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 bottom of the tan area. Each monthly mean streamflow is colored according to the percentile rank compared to the historical data for the month.



At Manokin Branch near Princess Anne in Somerset County, Maryland, the monthly mean streamflow increased between November and December to 1.84 cubic feet per second (ft³/s), which is in the normal range. The normal streamflow range for December at this streamgage is between 1.35 ft³/s and 6.98 ft³/s. Record-keeping at this streamgage began in April 1951.



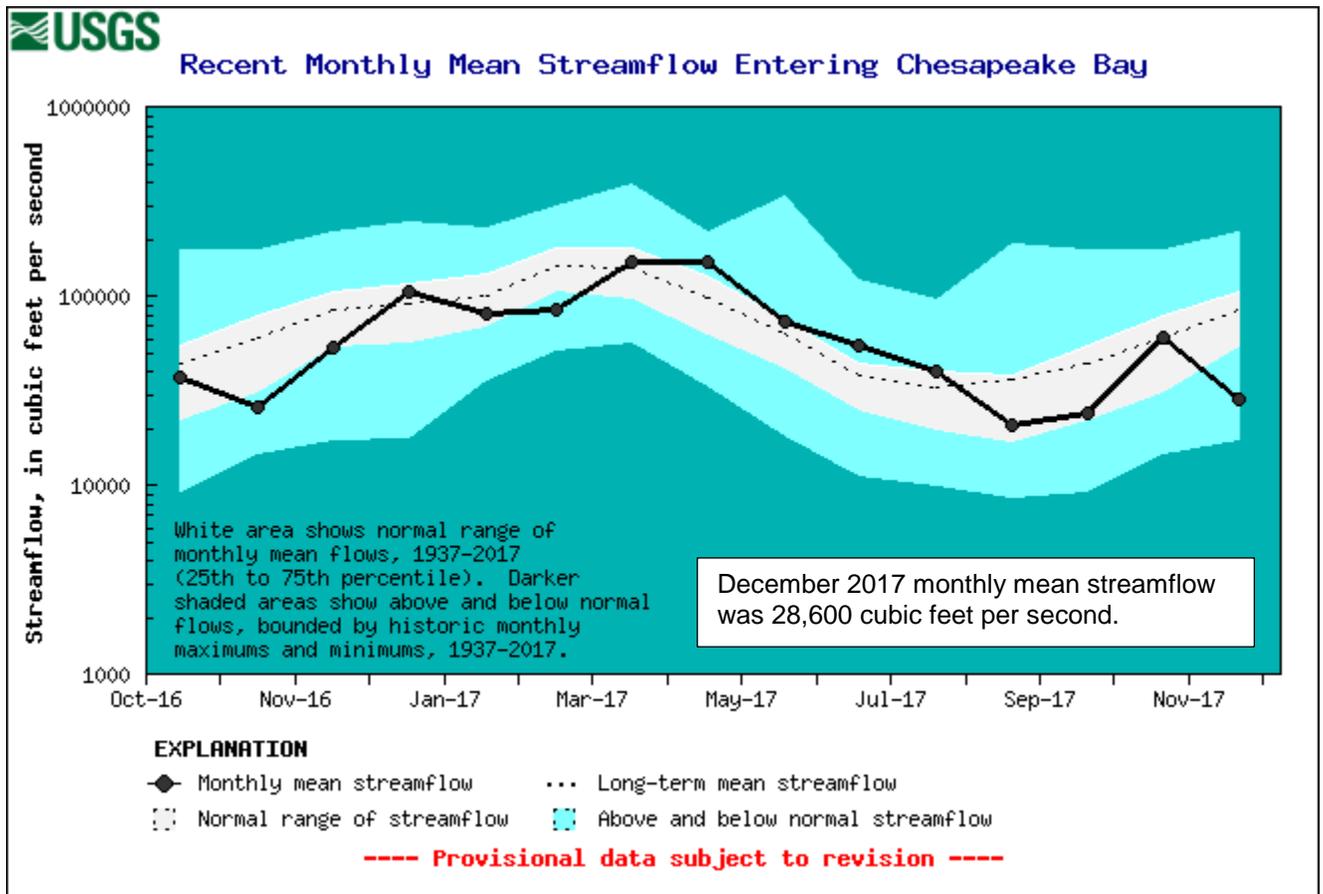
At St. Clement Creek near Clements in St. Mary's County, Maryland, the monthly mean streamflow decreased between November and December to 4.38 ft³/s, going from normal in November to a new December record low. The previous record was 5.01 ft³/s in 1988. The normal streamflow range for December is between 12.7 ft³/s and 27.5 ft³/s. Record-keeping at this streamgage began in October 1968.

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

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Estimated Streamflow to the Chesapeake Bay

The estimated monthly mean streamflow entering Chesapeake Bay during December 2017 was 28,600 ft³/s. This value, which is provisional and subject to revision, is considered to be in the below normal range. Normal December streamflow entering the Bay is between 54,100 and 107,000 ft³/s, the 25th and 75th percentiles, respectively, of all December values. Average (mean) monthly streamflow for December is 84,800 ft³/s. These statistics are based on an 81-year period of record.



More information on freshwater flow to the Bay can be found at:
<http://md.water.usgs.gov/waterdata/chesinflow/>

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Baltimore and Patuxent Reservoir Levels

Baltimore City’s Department of Public Works provides finished drinking water from three reservoirs (Loch Raven, Liberty, and Prettyboy) to 1.8 million people daily in Baltimore City and parts of Baltimore, Anne Arundel, and Howard Counties in Maryland. Carroll and Harford Counties in Maryland also receive raw water from the Baltimore reservoirs. At the end of December 2017, available reservoir storage in the Baltimore Reservoirs was 66.67 billion gallons, or 88 percent of available storage capacity (total or full storage is 75.85 billion gallons of water).

The Triadelphia and Duckett Reservoirs serve 1.8 million residents in parts of Charles, Howard, Montgomery, and Prince George’s Counties in suburban Maryland around the District of Columbia, and are managed by the Washington Suburban Sanitary Commission (WSSC).

The stored water quantity for the Triadelphia and Duckett Reservoirs at the end of December 2017 was 3.75 billion gallons, which is about 35 percent of normal storage capacity for the two Patuxent reservoirs. The storage capacity numbers were updated in June 2017 by the WSSC. Normal storage refers to the volume that is useable for water supply. The full capacity of the two Patuxent reservoirs is 11.93 billion gallons, which is higher than normal storage (10.57 billion gallons); therefore, full capacity values can exceed 100 percent of normal storage.

Note: The Triadelphia Reservoir storage level is low because of an ongoing project and will be kept low until 2019 or until the project is complete.

