

Water Supply Outlook



Interstate Commission on the Potomac River Basin (ICPRB)

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The ICPRB, through its Section for Cooperative Water Supply Operations on the Potomac (CO-OP), coordinates water supply operations during times of drought and recommends releases of stored water. These operations ensure adequate water supplies for Washington metropolitan area water users and for environmental flow levels. The water supply outlooks are published by CO-OP on a monthly basis between April and October. They are meant to provide an update on the possibility of low-flow conditions in the Potomac basin.

Summary/Conclusions:

There is below normal probability of releases from the Washington metropolitan area's back-up water supply reservoirs for the 2017 summer and fall seasons. Generally, the use of Jennings Randolph and Little Seneca reservoirs is triggered by low flows brought about by a combination of low summer precipitation and low groundwater levels. Multiple weeks of downpours and storms in the Potomac basin resulted in 51 to 75 percent above normal precipitation for the month of July. As a result, flow and groundwater conditions have much improved in the basin. According to the Middle Atlantic River Forecast Center, water resources and water supplies are good for Maryland, northern Virginia, and the eastern panhandle of West Virginia. Dry conditions, however, are present in the southern two thirds of Virginia, which has experienced persistent dry weather over the past few weeks. The rain forecast is promising for the next few weeks, so degradation in this outlook is unlikely unless the rain does not materialize. At present, there is sufficient flow in the Potomac River to meet the Washington metropolitan area's water demands without augmentation from upstream reservoirs. In the event that low-flow conditions do develop, the Washington metropolitan area is well-protected from a water supply shortage because of carefully designed drought-contingency plans.

ICPRB's Low Flow Outlook:

There is a 2 to 6 percent conditional probability that natural Potomac flow will drop below 600 to 700 million gallons per day (MGD) at Little Falls through December 31 of this year; at these flow levels, water supply releases from Jennings Randolph and Little Seneca reservoirs may occur. Releases occur when predicted flow is less than demand plus a required environmental flow. Drinking water demand ranges from 400 to 700 MGD during the summer months and the minimum flow-by at Little Falls is 100 MGD. Note that natural flow is defined as observed flow at the Little Falls gage plus total Washington metropolitan Potomac withdrawals, with an adjustment made to remove the effect of North Branch reservoir releases on stream flow.

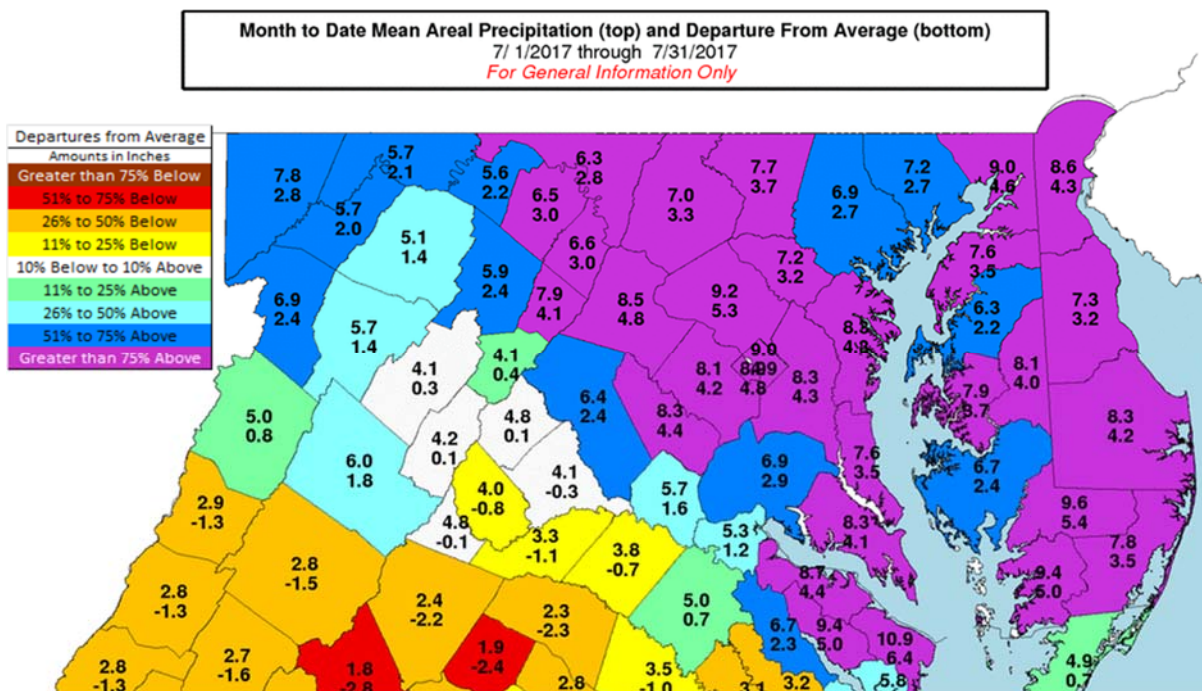
The conditional probability is estimated by analyzing the historical stream flow records and giving consideration to recent stream flow values, precipitation totals for the prior 12 months, current groundwater levels, and the current Palmer Drought Index. Past years in which watershed conditions most closely resemble current conditions are weighted more heavily in the determination of conditional probability. The historical, or unconditional, probability is based on an analysis of the historical record without weighing for current conditions. The conditional probability of 2 to 6 percent compares to a historical probability of 7 to 15 percent and is considered the more reliable indicator.

Outlook for natural Potomac River flow at Little Falls – Watershed conditions as of August 1, 2017

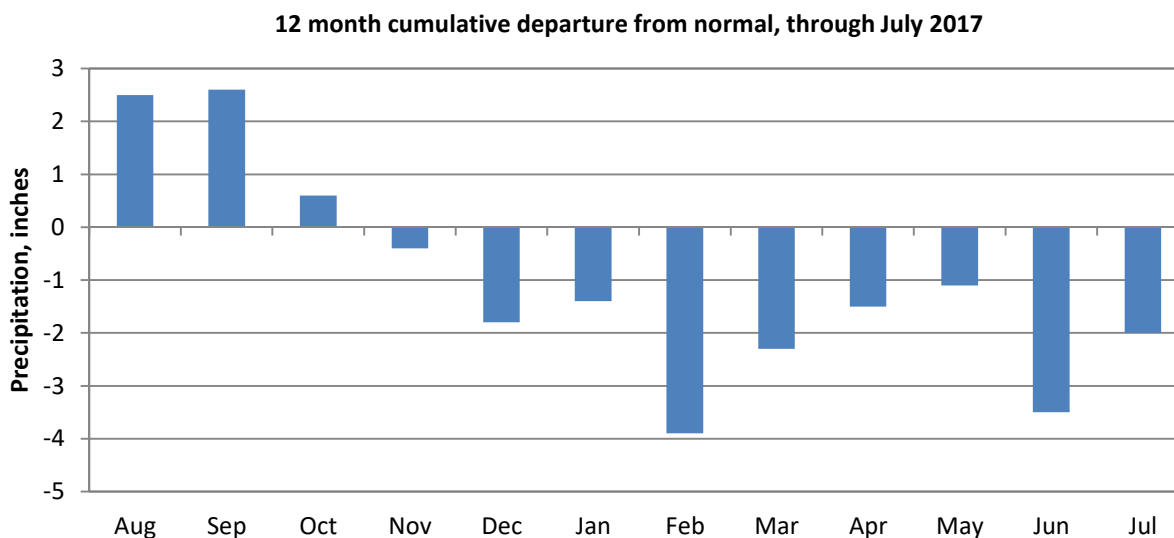
Low flow threshold (MGD)	Low flow threshold (cfs)	Historical probability of lower flow August 1 through December 31	Conditional probability of lower flow August 1 through December 31
1200	1858	67%	70%
1000	1548	47%	44%
800	1238	24%	15%
700	1084	15%	6%
600	929	7%	2%

Past Precipitation:

Data from the National Weather Service's Middle Atlantic River Forecast Center (MARFC) shows that the Potomac basin upstream of Washington, D.C. has received a precipitation total of 6 inches for the month of July, which is 2.1 inches above normal. The map below shows that July precipitation ranged between 1 to 4 inches above normal in Delaware, Maryland, northeastern Virginia, and northern parts of the eastern West Virginia panhandle. The driest area has been the southern two thirds of Virginia where rain has been 1 to 3 inches below. The 12-month cumulative basin precipitation shows improvement from 3.5 inches below normal in June to 2.0 inches below normal in July (see graph).

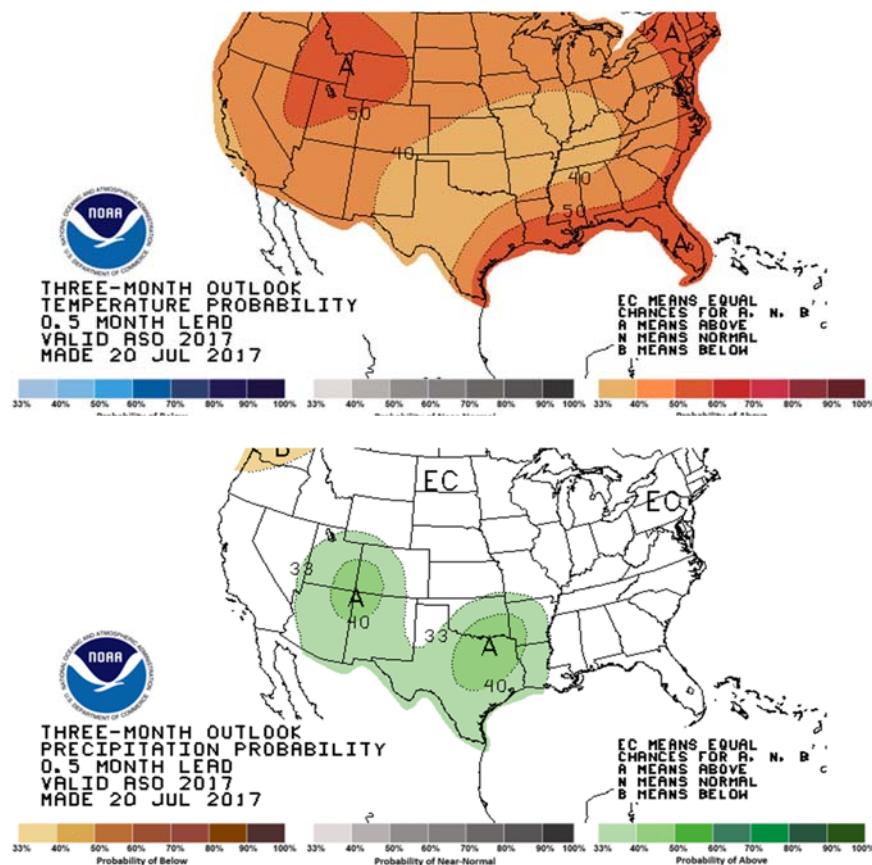


Source: Middle Atlantic River Forecast Center, National Weather Service



Information provided by the USGS, the Middle Atlantic River Forecast Center, and the National Weather Service.

Precipitation and Drought Outlook for August, September, and October 2017:

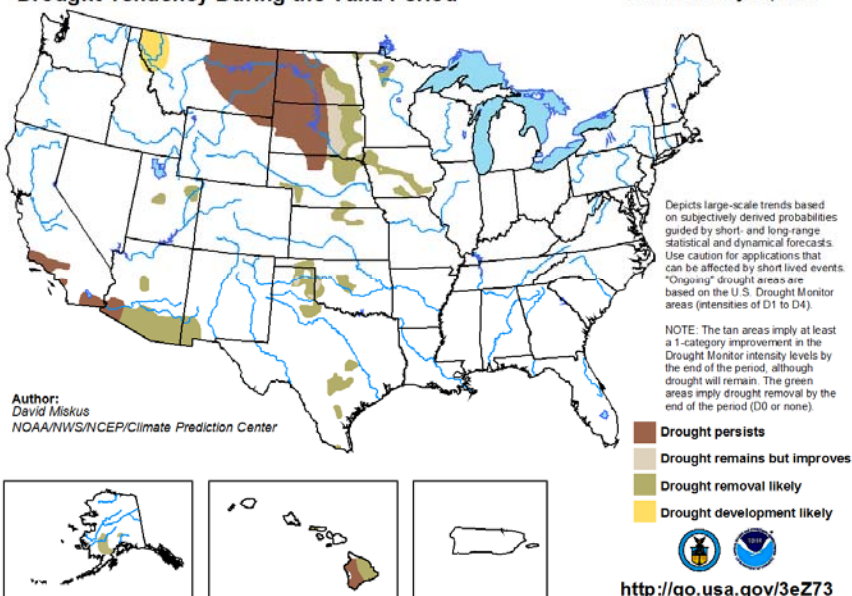


MARFC's Water Resource Outlook for the southern portion of the Middle Atlantic calls for near or above average rainfall and near average temperatures over the next couple of weeks.

The National Weather Service Climate Prediction Center's 30 day outlook for August as well as the 90 day outlook for August through October calls for near average precipitation and above average temperatures.

U.S. Seasonal Drought Outlook Drought Tendency During the Valid Period

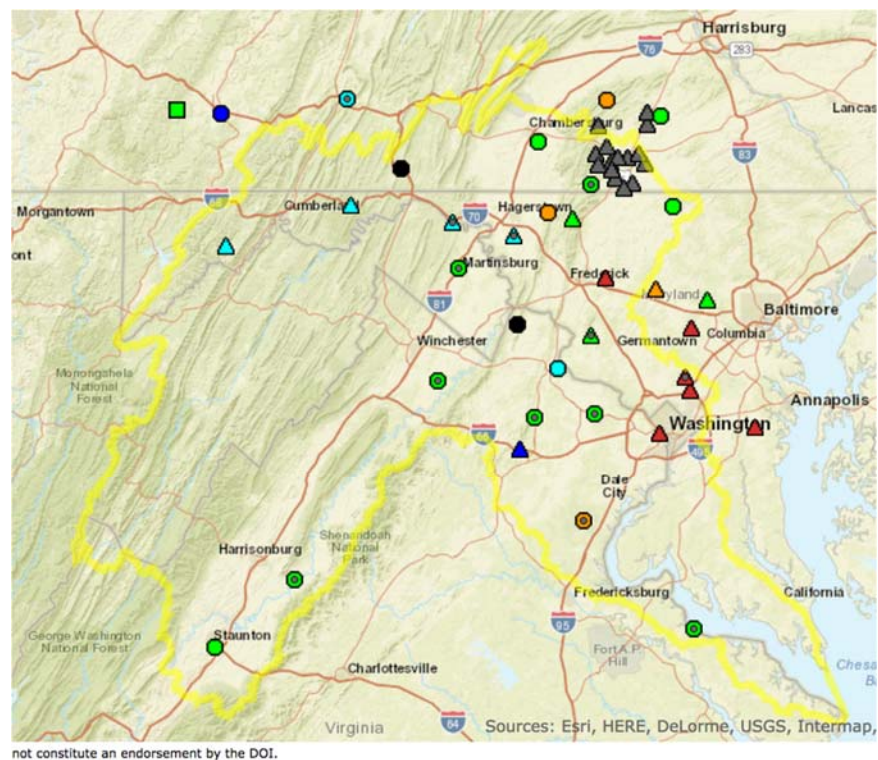
Valid for July 20 - October 31, 2017
Released July 20, 2017



As of July 20, the Climate Prediction Center's U.S. Seasonal Drought Outlook reports no drought development in the Potomac basin.

Groundwater – Current Conditions:

MARFC's Water Resource Outlook for the Southern portion of the Middle Atlantic (July 26, 2017) reports that groundwater is near normal. The groundwater map below, created by the U.S. Geological Survey (USGS), Pennsylvania Water Science Center, shows that current water levels in monitoring wells in the Potomac basin range from "Much Below Normal" to "Much Above Normal." Wells with a gray dot inside the symbol identify Water Supply Outlook wells, the majority of which fall in the "Normal" and "Above Normal" categories. In this map, the USGS defines "Normal" as between the 25th and 75th percentiles, and "Below Normal" as between the 10th and 24th percentile.



Wells with a gray dot inside the symbol identify water supply outlook wells

Explanation - Percentile classes (symbol color based on most recent measurement)						
Low	<10	10-24	25-75	76-90	>90	High
	Much Below Normal	Below Normal	Normal	Above Normal	Much Above Normal	Not Ranked

Wells

- Real Time
- Continuous
- Periodic Measurement
- Periodic Measurement

Reservoir Storage – Current Conditions:

No water supply releases from the CO-OP shared system have been made this year. Triadelphia Reservoir is low and will remain so for the next two years because of rehabilitation work being done at the dam.

An artificially varied flow from Jennings Randolph Reservoir is scheduled for August 26th and 27th. Releases from Jennings Randolph and Savage reservoirs are made for a variety of purposes. The flow values reported for whitewater and artificially varied flow (AVF) come entirely from water quality storage and may be increased or decreased without prior notice, depending on changing climatic and hydrologic conditions.

Information provided by the USGS, the Middle Atlantic River Forecast Center, and the National Weather Service.

Reservoir storage as of August 1, 2017

Facility	Percent Full	Current usable storage, BG	Total usable capacity, BG
WSSC's Patuxent reservoirs ⁴	57	6.8	11.9
Fairfax Water's Occoquan Reservoir	100	8.1	8.1
Little Seneca Reservoir ¹	100	3.9	3.9
Jennings Randolph water supply ²	100	13.1	13.1
Jennings Randolph water quality ²	100	16.3	16.3
Savage Reservoir ³	94	5.9	6.3

¹ Usable capacity consistent with Ortt, *et al.* (2011).

² 2013 revised stage-storage curve provided by Bill Haines, US Army Corps of Engineers, Baltimore District.

³ 1998 revised stage-storage curve provided by Bill Haines, US Army Corps of Engineers, Baltimore District.

⁴ Bathymetric study conducted December 2015 with revisions in December 2016, and unusable storage corrected June 2017.

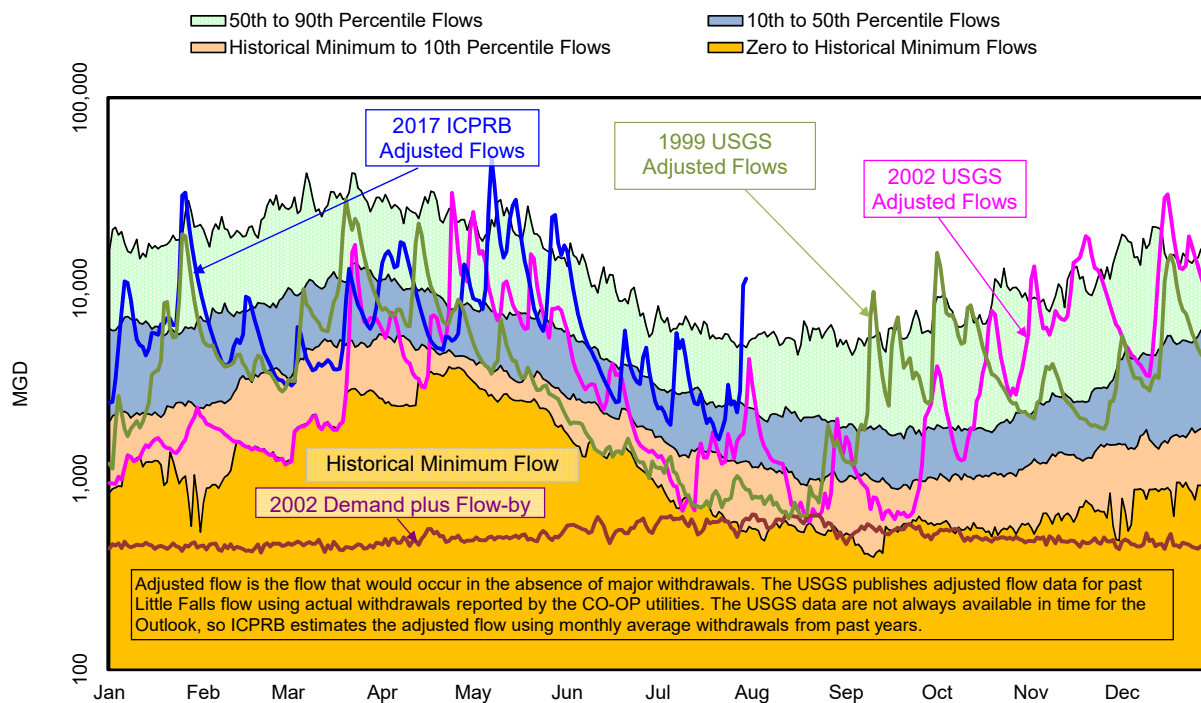
Potomac River Flow:

The estimated adjusted Potomac flow at Little Falls on July 31 was 10.5 billion gallons per day (BGD). For this day of the year, this value was above the 90th percentile flow value of 5.3 BGD and below the maximum flow value of 13.7 BGD. Adjusted flow, shown in the figure below, is the flow that would occur in the absence of major Washington metropolitan area withdrawals, but includes releases from upstream reservoirs. Adjusted flow averaged 8.0 BGD for the first seven months of the year and 3.5 BGD in July.

Environmental Flow-by:

Average observed Potomac flow at Little Falls in July was well above the minimum recommendation of 100 MGD.

Adjusted Daily Flow at Little Falls for 2017, 1999 and 2002,
Daily Adjusted Flow Percentiles for 1930-2014 Data,
and Drought Year (2002) Demands plus Flow-by



Little Falls flow statistics are based on 1930 through 2014 USGS published gage flow, "USGS 01646502 POTOMAC RIVER (ADJUSTED) NEAR WASH, DC". To create this flow record, the USGS has added historical water supply withdrawals from the Potomac as reported by FW, WSSC, the Aqueduct, and Rockville to the Little Falls gage flow record.

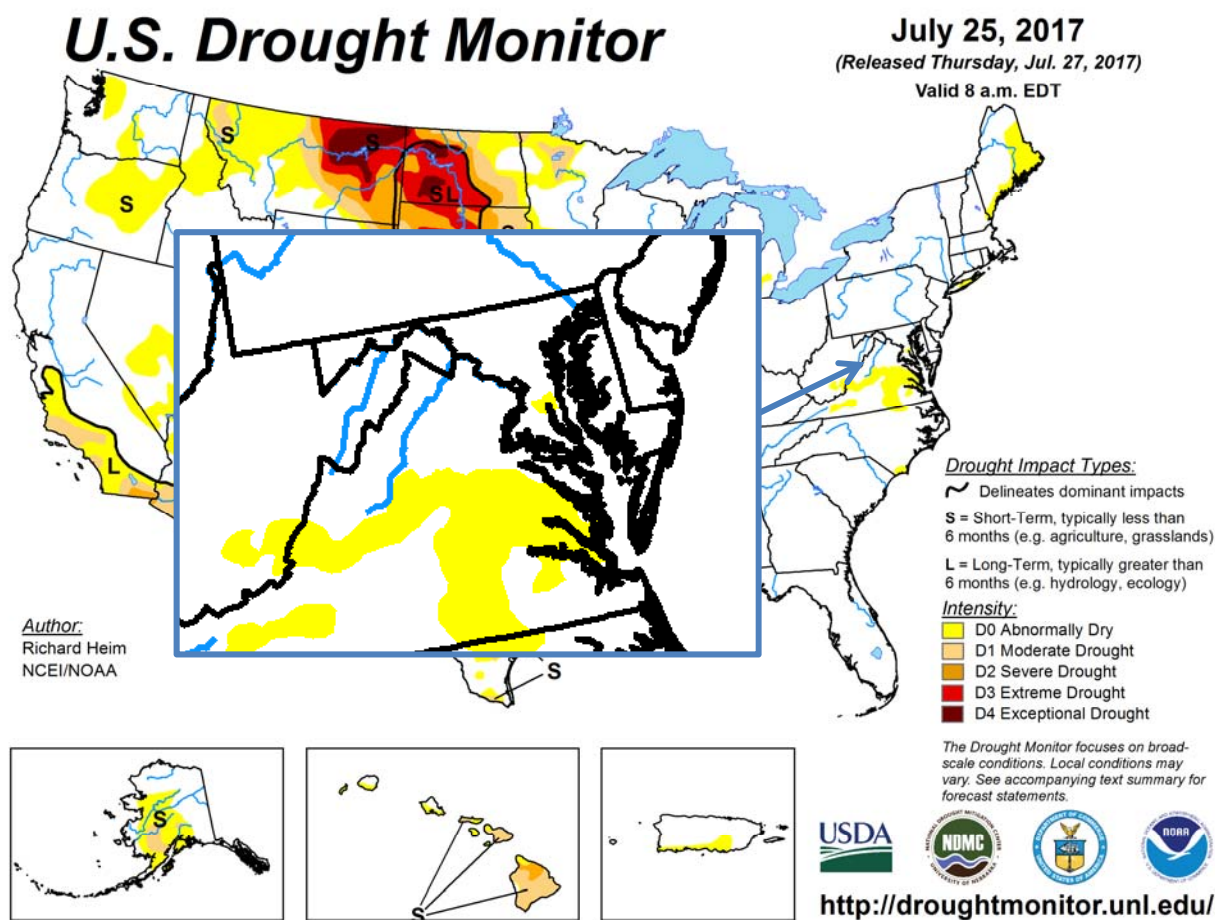
Information provided by the USGS, the Middle Atlantic River Forecast Center, and the National Weather Service.

Drought Status:

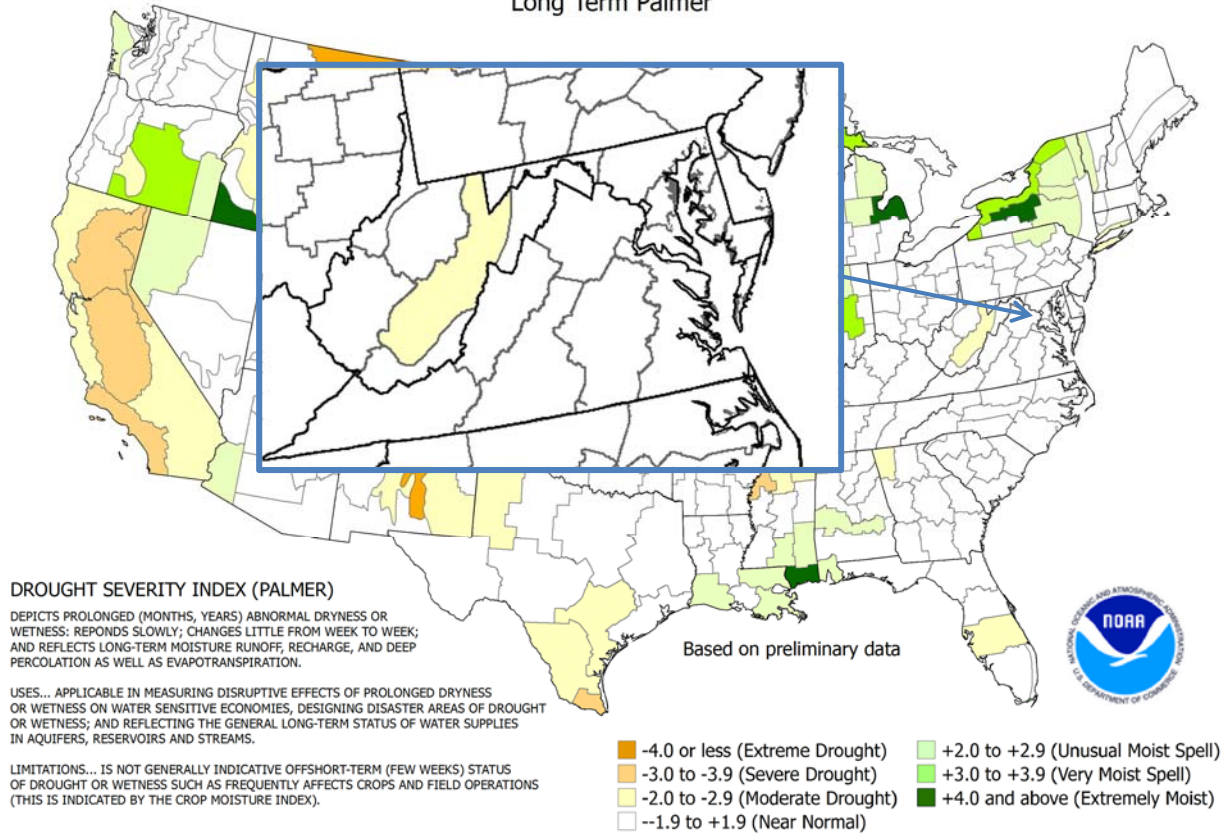
The Metropolitan Washington Council of Government's Drought Awareness Response Plan status is "Normal". The state of [Maryland](#) has a "Drought Watch" in effect for central parts of the state. The state of [Virginia](#) has a "Drought Watch" in effect for north-central parts of the state. The state of [Pennsylvania](#) remains "Normal" for the entire state.

Drought Monitor and Soil Moisture:

The NOAA Climate Prediction Center's U.S. Drought Monitor map (see first figure below) indicates abnormal dry (D0) conditions in parts of the Potomac basin. Widespread rain fell across parts of West Virginia, Maryland, and Pennsylvania this week resulting in a reduction of D0 conditions around the D.C. area and West Virginia. However, persistent dryness over the last couple of months, low streamflow, and growing agricultural impacts resulted in the expansion of D0 in much of Virginia. The Palmer Drought Severity Index by Division map (see second figure on next page) indicates moderate drought conditions occurring in West Virginia.



Drought Severity Index by Division
Weekly Value for Period Ending Jul 29, 2017
Long Term Palmer



Information provided by the USGS, the Middle Atlantic River Forecast Center, and the National Weather Service.