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 a below normal probability of releases from the Washington metropolitan area's back-up water supply reservoirs for the 2018 fall season. 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. Precipitation for the month of September ended with greater than 75 percent above normal rainfall totals across the Potomac basin. Current (September 28) data from the U.S. Geological Survey shows that streamflow are much above normal. In particular, the Potomac River flow near Little Falls (gage 01646500) was above the historical October 1 maximum flow value of 63,400 cubic feet per second, which occurred in 2005 based on 88 years of record. Groundwater levels are above or much above normal. According to the Middle Atlantic River Forecast Center, the outlook for water resources and water supplies is very good or excessive for most areas in the Potomac Basin. 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 minimal (<1 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.

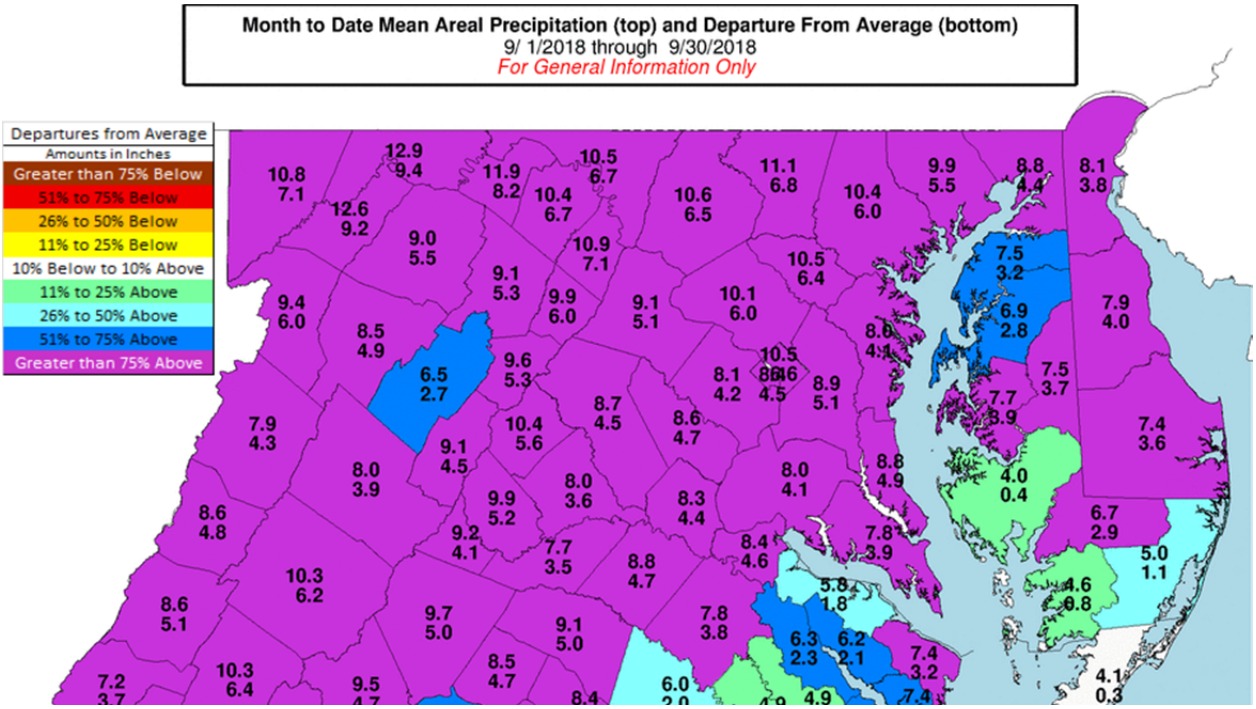
The conditional probability is estimated by analyzing the historical stream flow records and giving consideration to recent stream flow values, precipitation totals for the prior 12 months, current groundwater levels, and the current Palmer Drought Index. Past years in which watershed conditions most 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 minimal (<1 percent) conditional probability compares to the 3 to 5 percent historical probability and is considered the more reliable indicator.

Outlook for natural Potomac River flow at Little Falls – Watershed conditions as of October 1, 2018

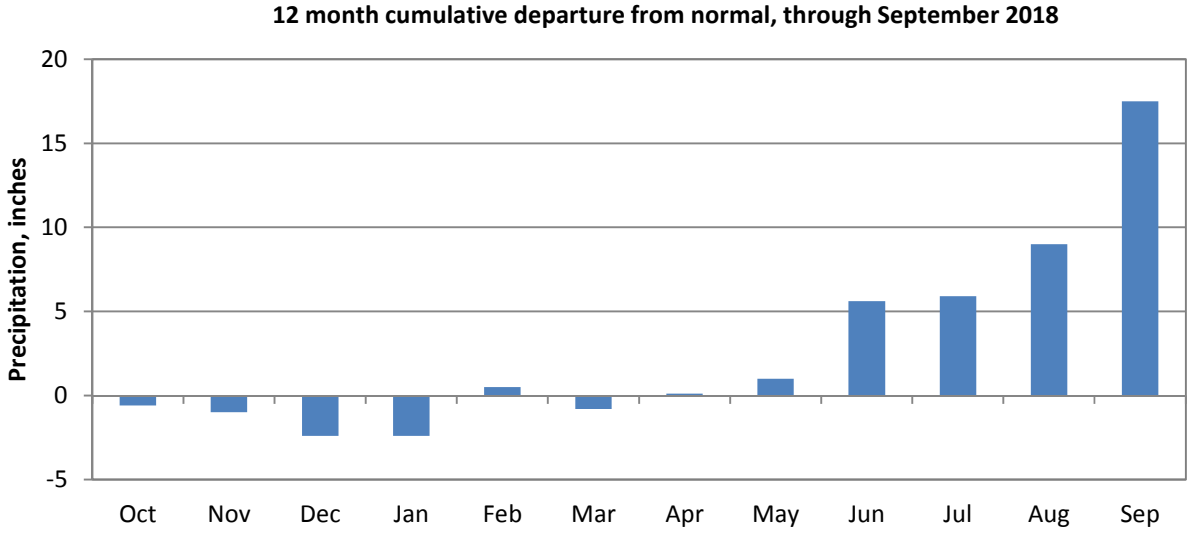
Low flow threshold (MGD)	*Low flow threshold (cfs)*	*Historical probability of lower flow October 1 through December 31*	*Conditional probability of lower flow October 1 through December 31*
1200	1858	49%	<1%
1000	1548	28%	<1%
800	1238	9%	<1%
700	1084	5%	<1%
600	929	3%	<1%

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 10.0 inches in the month of September, which is 6.1 inches above normal. The map below shows that September precipitation has been more than 75% above normal across the Potomac Basin. The 12-month cumulative basin precipitation is currently 17.5 inches above normal (see graph).

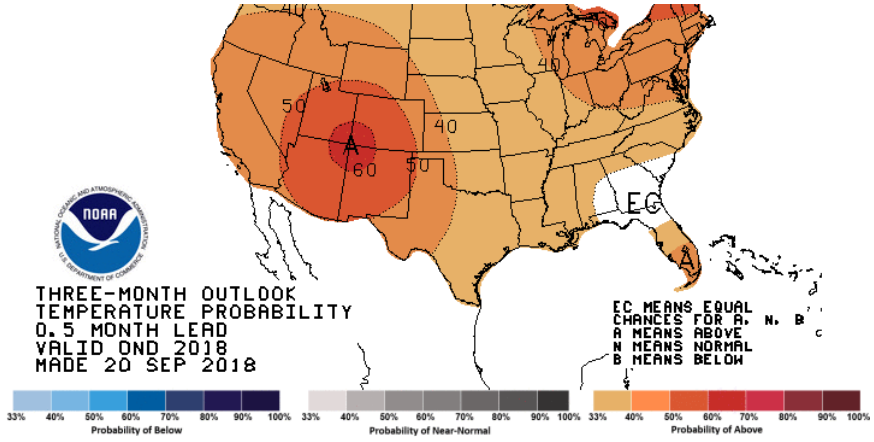


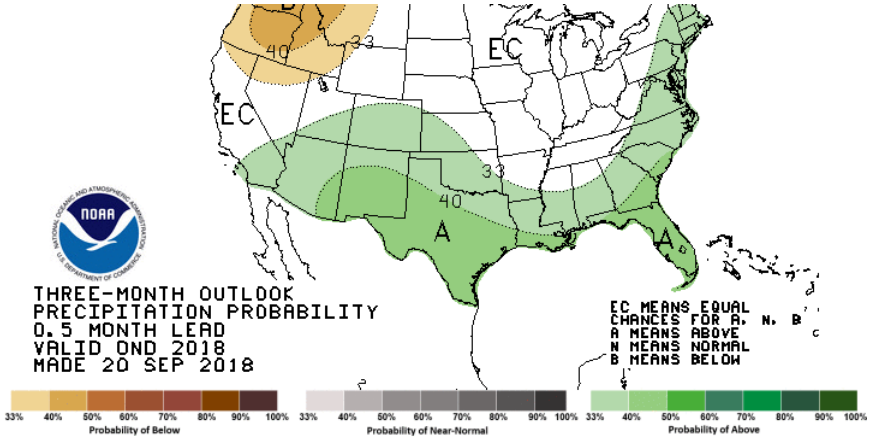
Source: Middle Atlantic River Forecast Center, National Weather Service



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

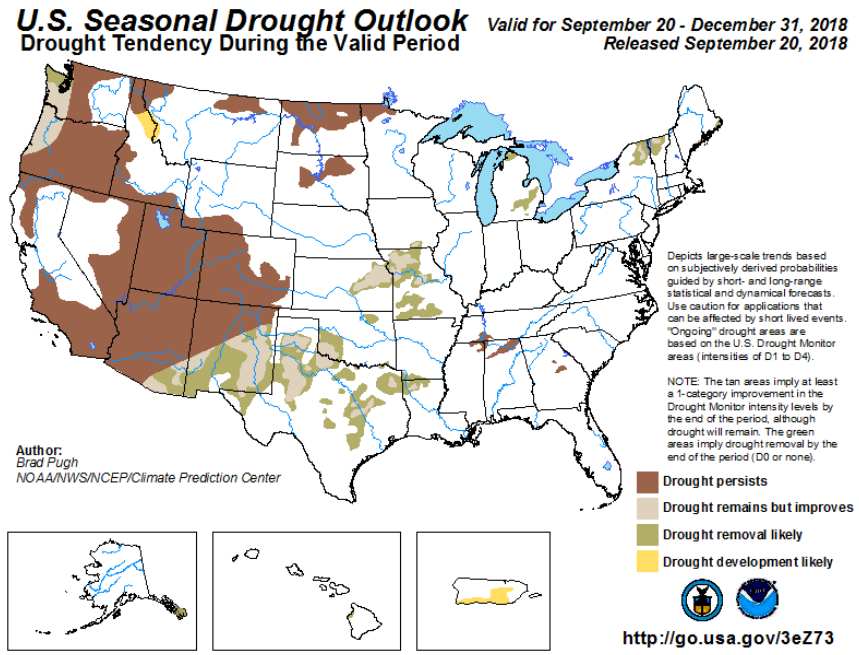
Precipitation and Drought Outlook for October, November, and December 2018





MARFC's Water Resource Outlook for the southern portion of the Middle Atlantic calls for rainfall to average about normal through the next couple of weeks. Temperatures are expected to be above or much above normal.

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

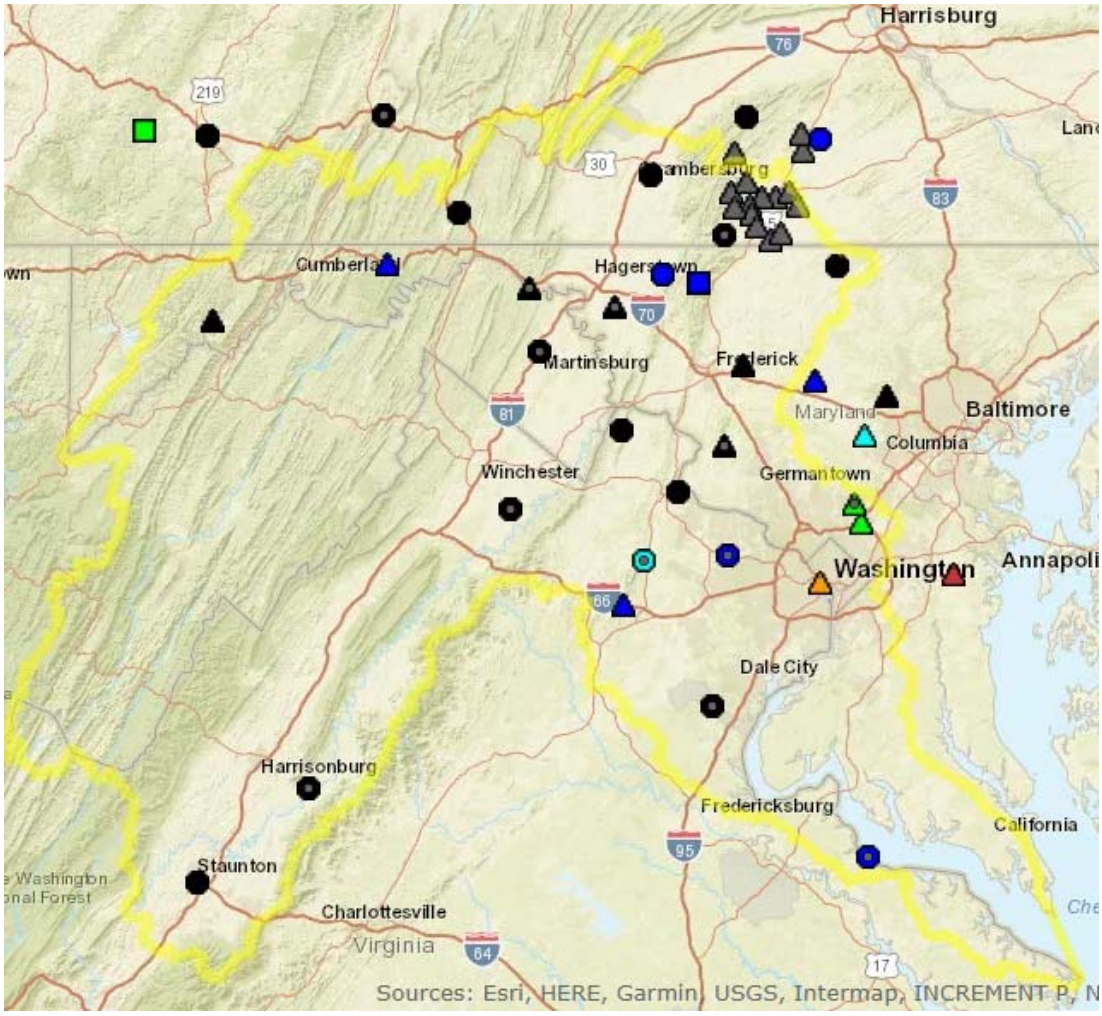


As of September 20, the Climate Prediction Center's U.S. Seasonal Drought Outlook reports no drought development in the Potomac basin.

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

Groundwater – Current Conditions:

MARFC's Water Resource Outlook for the Southern portion of the Middle Atlantic reports that groundwater levels are above or much above normal. The groundwater map below, by the U.S. Geological Survey (USGS), Pennsylvania Water Science Center, shows that the majority of current water levels in monitoring wells in the Potomac basin range from "Normal" to "Much Above Normal". The "Below Normal" and "Much Below Normal" locations on the map were last updated on July 18 and September 5 of this year, respectively. Wells with a gray dot inside the symbol identify Water Supply Outlook wells, the majority of which fall in the "Normal" and "Much Above Normal" categories.



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 Much Below Normal	10-24 Below Normal	25-75 Normal	76-90 Above Normal	>90 Much Above Normal	High	Not Ranked

Wells
- Real Time
- Continuous
- Periodic Measurement

Reservoir Storage – Current Conditions:

No water supply releases from the CO-OP shared system have been made this year. The water level in the Triadelphia Reservoir (one of the two Patuxent reservoirs) is low due to the ongoing dam rehabilitation project.

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

Reservoir storage as of October 1, 2018

Facility	Percent Full	Current usable storage, BG	Total usable capacity, BG
WSSC's Patuxent reservoirs[4,5]	80	8.5	10.5
Fairfax Water's Occoquan Reservoir	100	8.1	8.1
Little Seneca Reservoir[1]	99	3.9	3.9
Jennings Randolph water supply[2]	100	13.1	13.1
Jennings Randolph water quality[2]	97	15.8	16.3
Savage Reservoir[3]	78	4.9	6.3

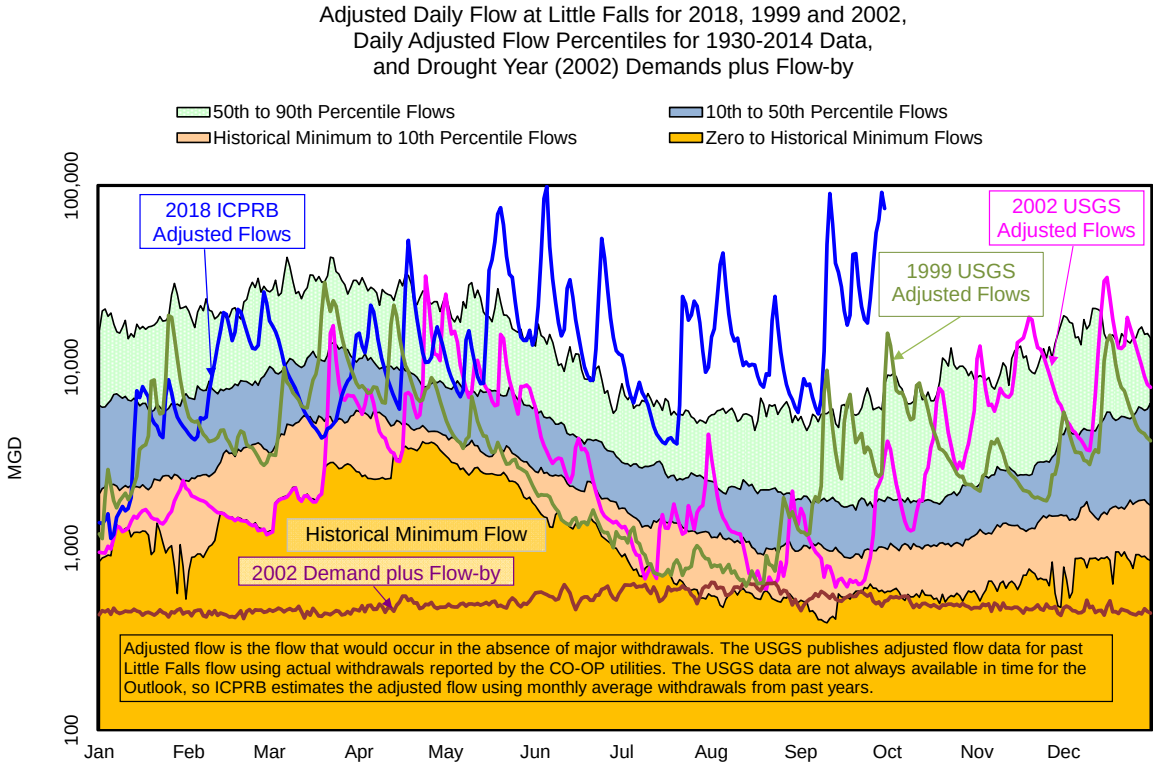
[1] Usable capacity consistent with Ortt, *el al.* (2011).
[2] 2013 revised stage-storage curve provided by Bill Haines, US Army Corps of Engineers, Baltimore District.
[3] 1998 revised stage-storage curve provided by Bill Haines, US Army Corps of Engineers, Baltimore District.
[4] Bathymetric study conducted December 2015 with revisions in December 2016, and unusable storage corrected June 2017.
[5] Patuxent usable storage currently reduced to approximately 6 BG due to the Brighton dam rehabilitation project

Potomac River Flow:

The estimated adjusted Potomac flow at Little Falls on September 30 was 75 billion gallons per day (BGD). For this day of the year, this value was above the maximum flow value of 70 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 16 BGD for the first nine months of the year and 31 BGD in September.

Environmental Flow-by:

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



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.

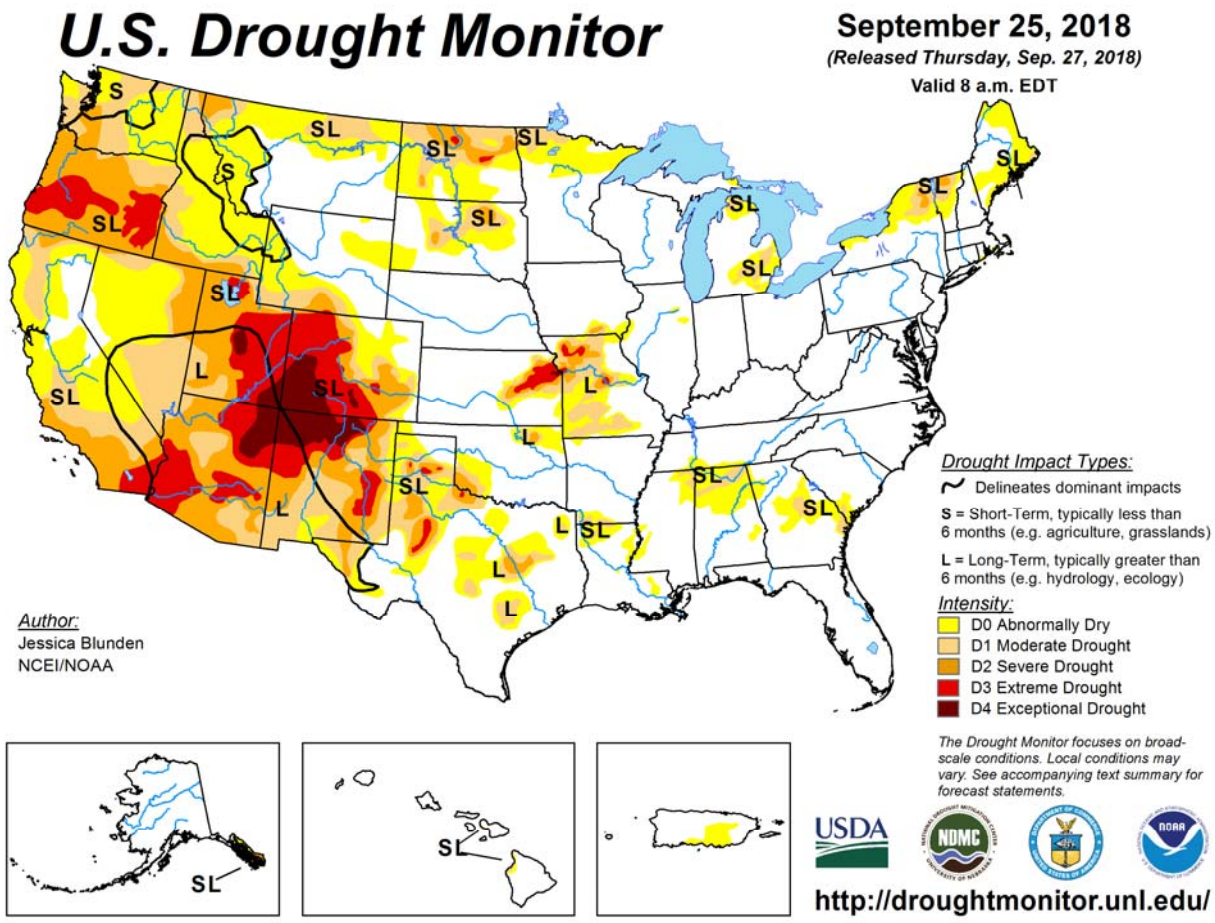
Information provided by the USGS, the Middle Atlantic River Forecast Center, the National Weather Service, and CO-OO suppliers.

Drought Status:

The states of Maryland and Pennsylvania have “Normal drought status.” The state of Virginia has a no Drought Advisories currently in effect.

Drought Monitor and Soil Moisture:

The NOAA Climate Prediction Center’s U.S. Drought Monitor map (see first figure below) indicates no drought conditions for the Potomac basin. The Palmer Drought Severity Index by Division map (see second figure on next page) indicates near normal to extremely moist conditions in the Potomac Basin.



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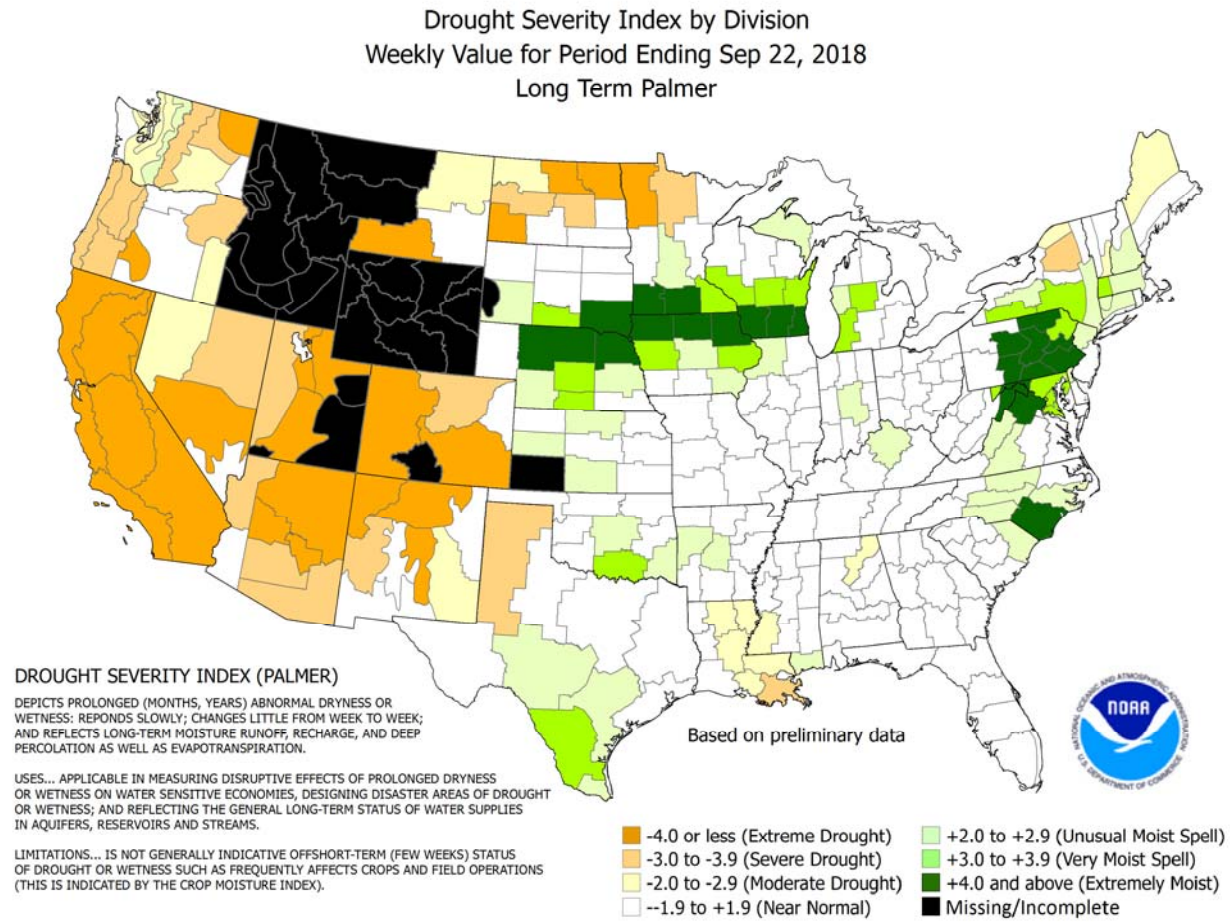

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