

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 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. Recent precipitation has left the majority of the Potomac basin with 3 to 8 inches above average rainfall for the month. Areas in western Maryland, western sections of the eastern West Virginia panhandle, and central/western Virginia are still 0.5 to 1.5 inches below average rainfall. The remainder of the area is near average or a couple of inches above. Current (July 28) streamflow data from the U.S. Geological Survey shows that stream flows are above or much above normal, though some are normal in west-central Virginia. Groundwater levels are near or above normal. According to the Middle Atlantic River Forecast Center, the outlook for water resources and water supplies is good 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.

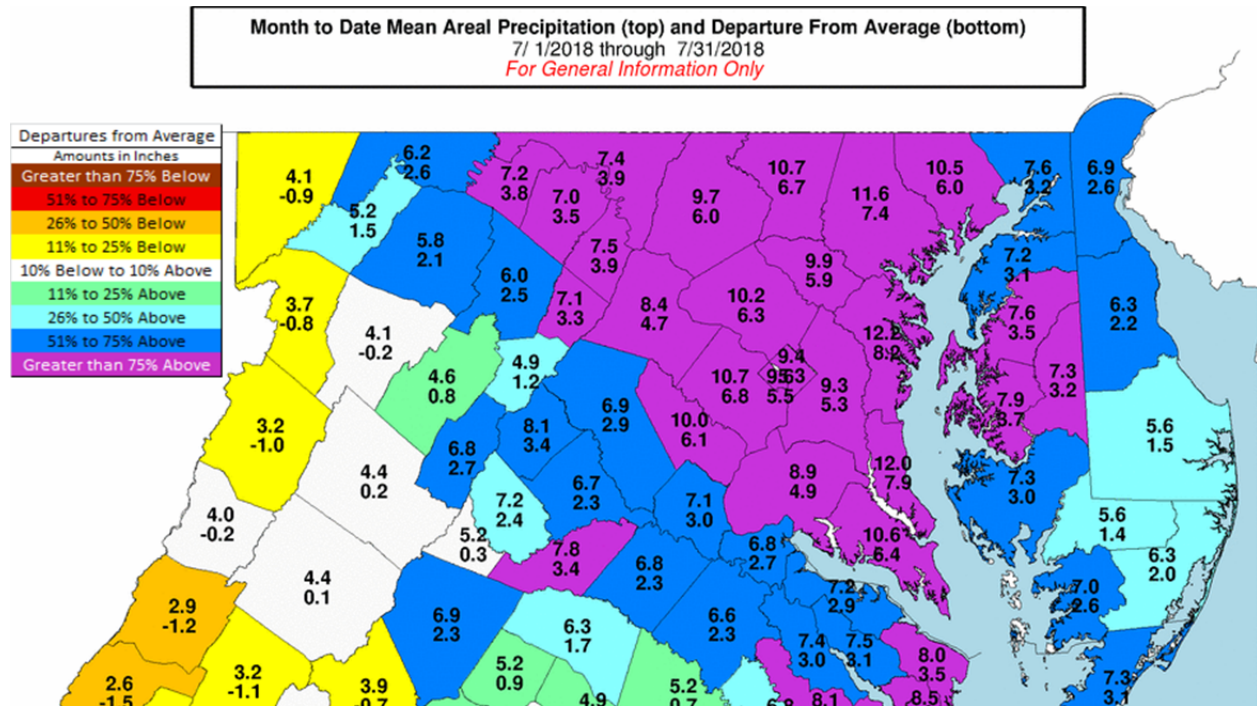
The conditional probability is estimated by analyzing the historical stream flow records and giving consideration to recent stream flow values, precipitation totals for the prior 12 months, current groundwater levels, and the current Palmer Drought Index. Past years in which watershed conditions most 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 7 to 15 percent historical probability and is considered the more reliable indicator.

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

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%	22%
1000	1548	47%	6%
800	1238	24%	1%
700	1084	15%	<1%
600	929	7%	<1%

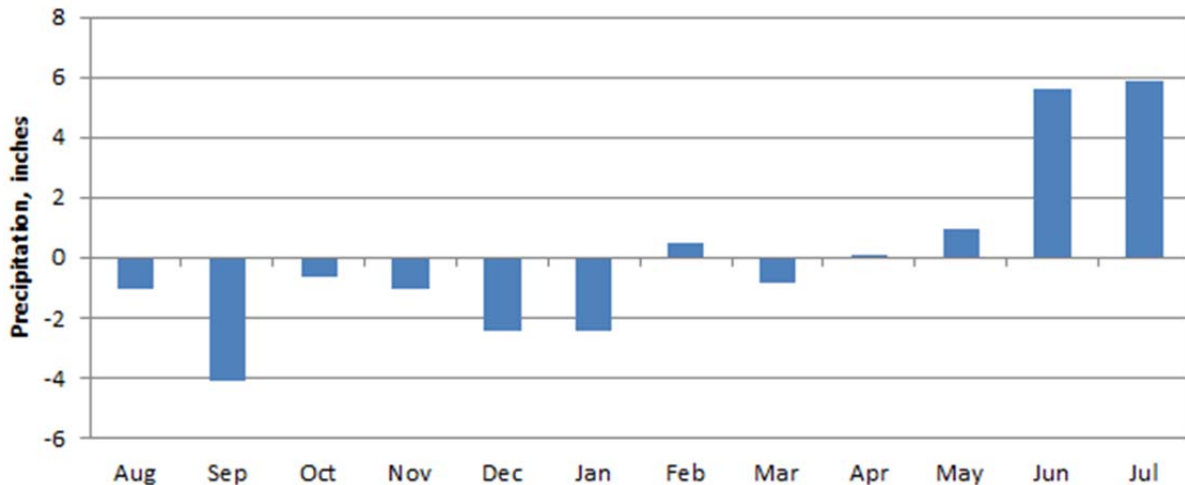
Past Precipitation:

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 6.3 inches in the month of July, which is 2.4 inches above normal. The map below shows that July precipitation has been 10% to more than 75% above normal over a large portion of the Potomac Basin. The North Branch of the Potomac basin in western Maryland, western sections of the eastern West Virginia panhandle, and central/western Virginia are still 0.5 to 1.5 inches below average rainfall. The 12-month cumulative basin precipitation is currently 5.9 inches above normal (see graph).



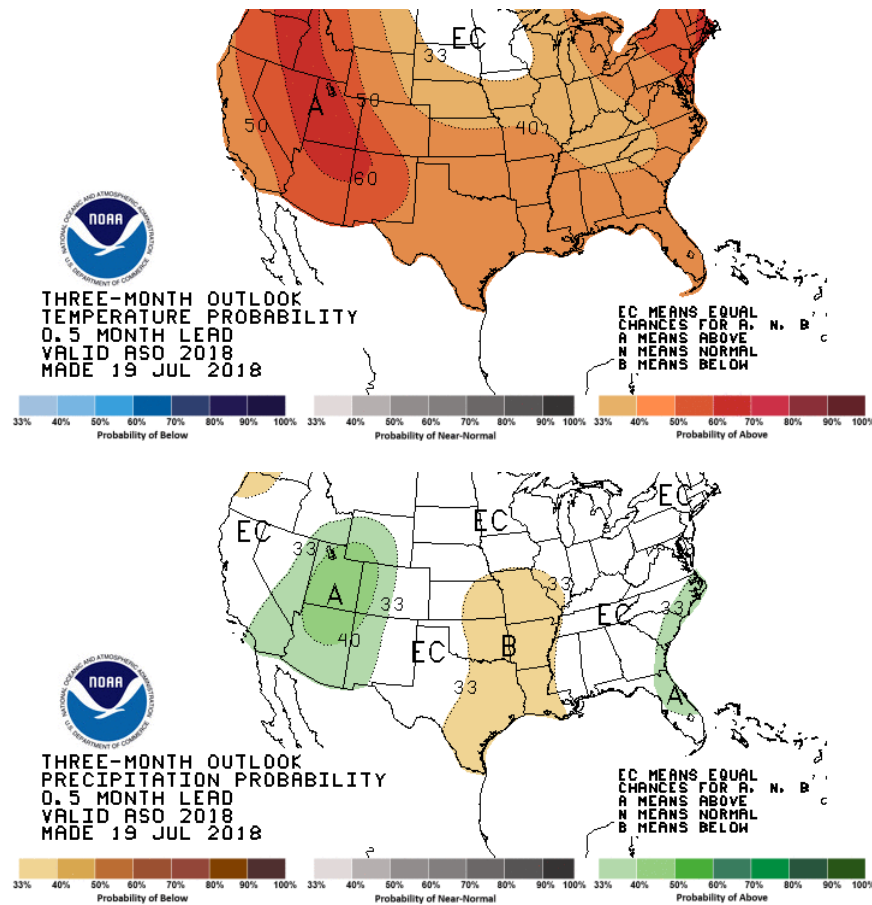
Source: Middle Atlantic River Forecast Center, National Weather Service

12 month cumulative departure from normal, through July 2018



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

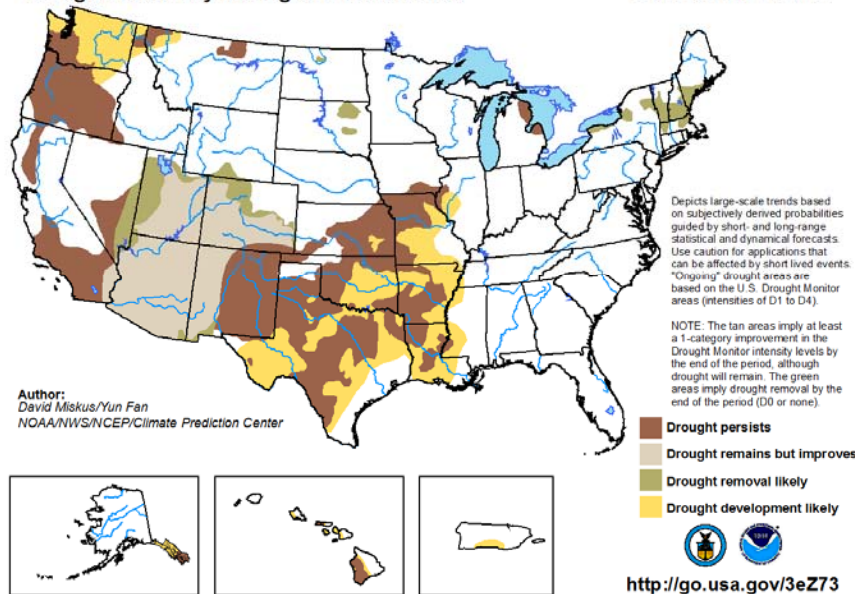
Precipitation and Drought Outlook for August, September, and October 2018



MARFC's Water Resource Outlook for the southern portion of the Middle Atlantic calls for above normal rainfall and near or above normal temperatures through 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 rainfall and above average temperatures.

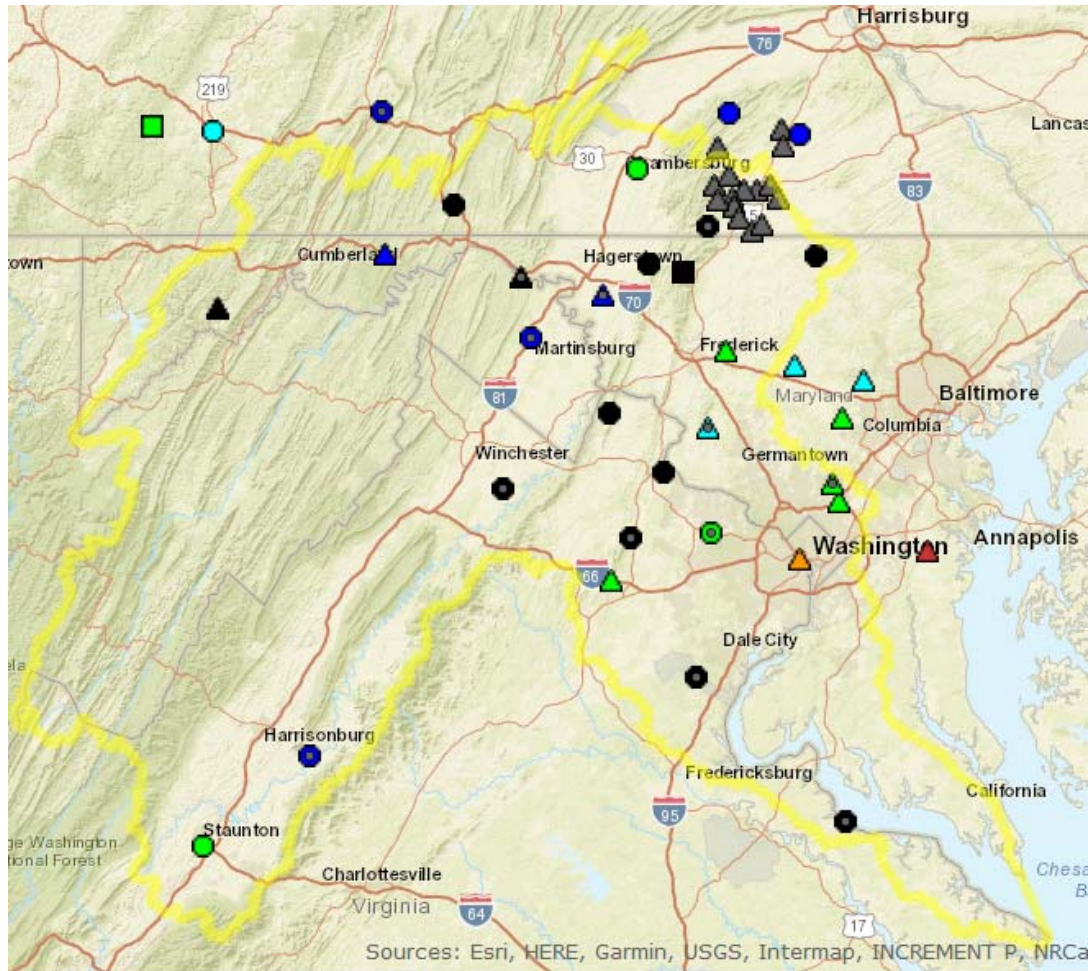
U.S. Seasonal Drought Outlook Valid for July 19 - October 31, 2018
 Drought Tendency During the Valid Period Released July 19, 2018



As of July 19, 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 reports that groundwater levels are near or above normal. The groundwater map below, 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 “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 “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	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

Reservoir Storage – Current Conditions:

No water supply releases from the CO-OP shared system have been made this year. Following recent rain events, all reservoirs in the CO-OP shared systems are currently close to 100% full, aside from Triadelphia Reservoir (one of the two Patuxent reservoirs). Water level in this reservoir is low due to the ongoing dam rehabilitation project. Jennings Randolph Reservoir will be having an artificial varied flow release Saturday 25 through Sunday 26 of August.

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

Reservoir storage as of August 1, 2018

Facility	Percent Full	Current usable storage, BG	Total usable capacity, BG
WSSC's Patuxent reservoirs ^{4,5}	70	7.4	10.5
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	97	15.9	16.3
Savage Reservoir ³	85	5.3	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.

⁵ Patuxent usable storage currently reduced to approximately 6 BG due to the Brighton dam rehabilitation project

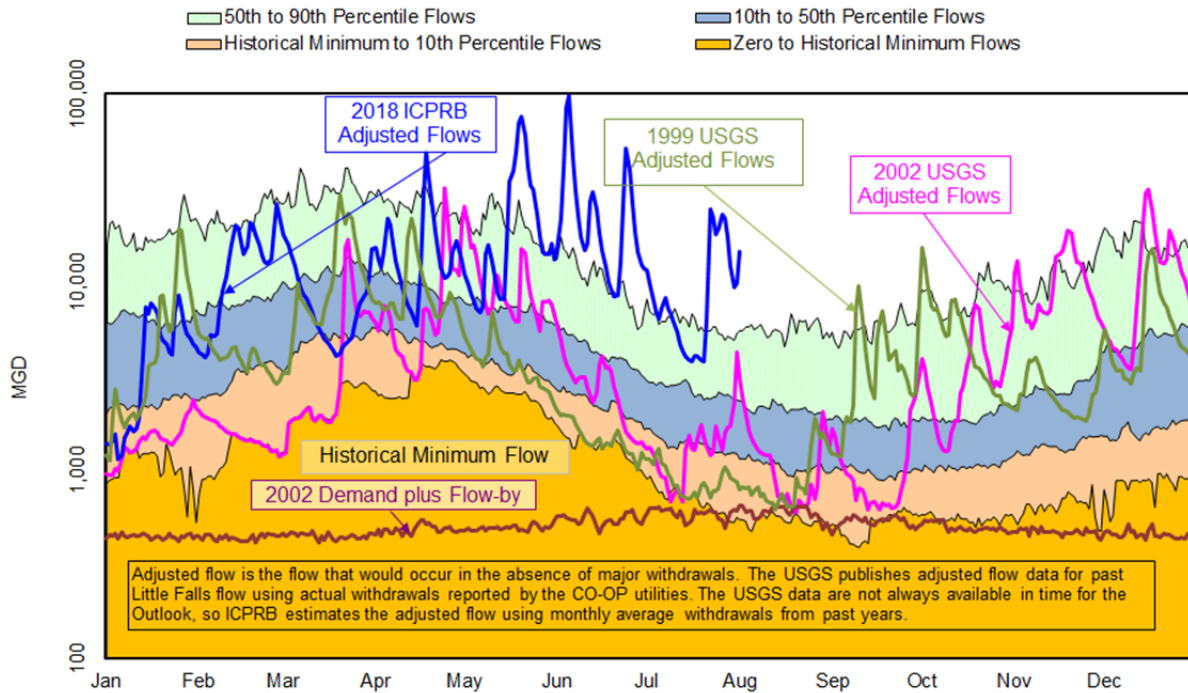
Potomac River Flow:

The estimated adjusted Potomac flow at Little Falls on August 1 was 14.6 billion gallons per day (BGD). For this day of the year, this value was above the 90th percentile flow value of 5.4 BGD and below the maximum flow value of 27.2 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 14.2 BGD for the first seven months of the year and 9.8 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 2018, 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.

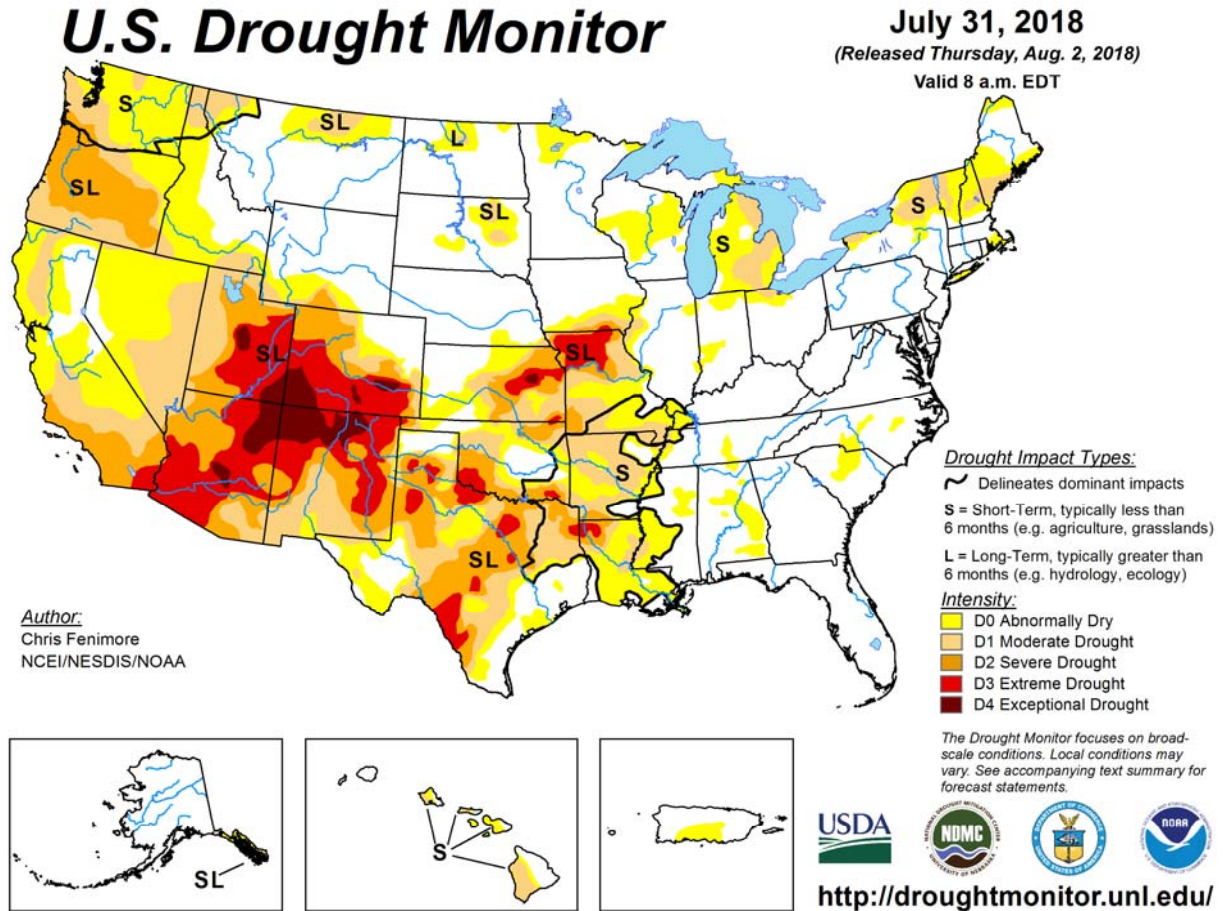
Information provided by the USGS, the Middle Atlantic River Forecast Center, the National Weather Service, and CO-OO suppliers.

Drought Status:

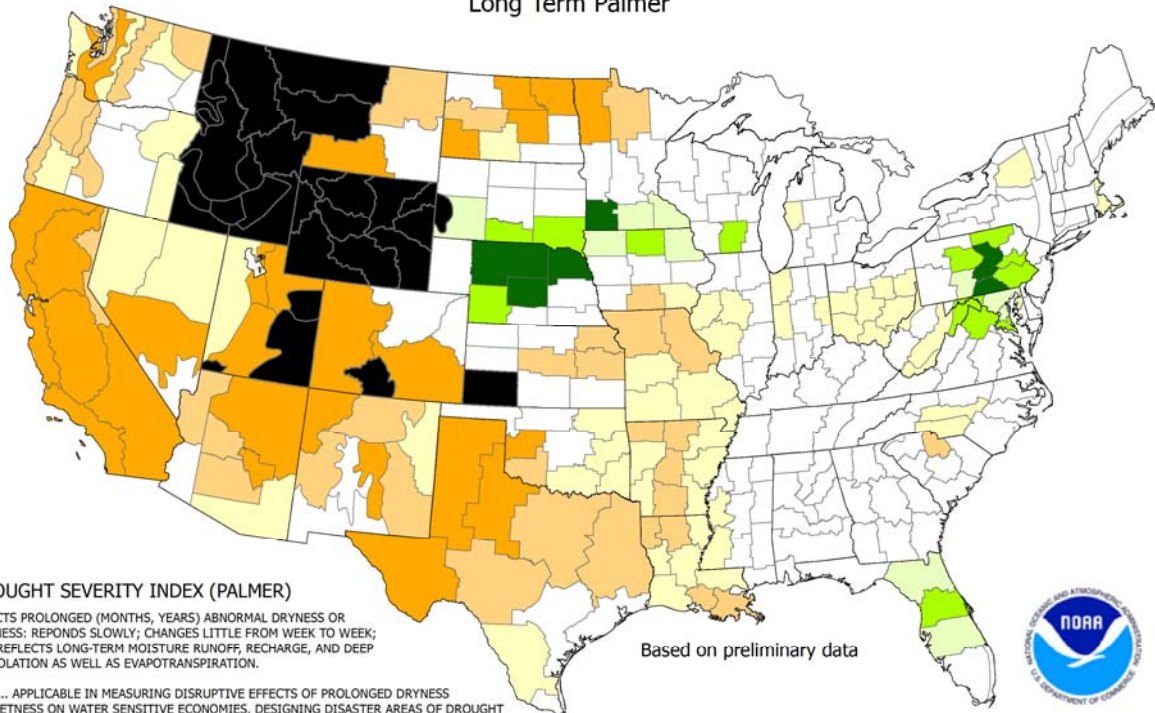
The states of [Maryland](#) and [Pennsylvania](#) have “Normal drought status.” The state of [Virginia](#) has a no Drought Advisories currently in effect.

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.



Drought Severity Index by Division
 Weekly Value for Period Ending Jul 28, 2018
 Long Term Palmer



DROUGHT SEVERITY INDEX (PALMER)

DEPICTS PROLONGED (MONTHS, YEARS) ABNORMAL DRYNESS OR WETNESS; REponds SLOWLY; CHANGES LITTLE FROM WEEK TO WEEK; AND REFLECTS LONG-TERM MOISTURE RUNOFF, RECHARGE, AND DEEP PERCOLATION AS WELL AS EVAPOTRANSPIRATION.

USES... APPLICABLE IN MEASURING DISRUPTIVE EFFECTS OF PROLONGED DRYNESS OR WETNESS ON WATER SENSITIVE ECONOMIES, DESIGNING DISASTER AREAS OF DROUGHT OR WETNESS; AND REFLECTING THE GENERAL LONG-TERM STATUS OF WATER SUPPLIES IN AQUIFERS, RESERVOIRS AND STREAMS.

LIMITATIONS... IS NOT GENERALLY INDICATIVE OFFSHORT-TERM (FEW WEEKS) STATUS OF DROUGHT OR WETNESS SUCH AS FREQUENTLY AFFECTS CROPS AND FIELD OPERATIONS (THIS IS INDICATED BY THE CROP MOISTURE INDEX).

Based on preliminary data



- 4.0 or less (Extreme Drought)
- 3.0 to -3.9 (Severe Drought)
- 2.0 to -2.9 (Moderate Drought)
- 1.9 to +1.9 (Near Normal)
- +2.0 to +2.9 (Unusual Moist Spell)
- +3.0 to +3.9 (Very Moist Spell)
- +4.0 and above (Extremely Moist)
- Missing/Incomplete