Water Supply Outlook

Interstate Commission on the Potomac River Basin (ICPRB)
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August 6, 2021
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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 an above normal probability of releases from the Washington metropolitan area's back-up water supply reservoirs for the 2021 summer and fall seasons. The use of Jennings Randolph and Little Seneca reservoirs is generally triggered by low flows brought about by a combination of low summer precipitation and low groundwater levels. Average precipitation in the Potomac Basin in July was 1.4 inches below normal. The 12-month cumulative basin precipitation is 3.6 inches below normal as of July 31. Streamflow is currently below normal. Groundwater levels remain normal for most of the monitoring wells in the Basin. **On July 27, CO-OP initiated daily drought monitoring because Potomac River flow at the US Geological Survey's gage at Point of Rocks, Maryland fell below CO-OP's daily monitoring trigger of 2000 cfs**. This is the first time since September 2019 that CO-OP has initiated daily drought monitoring. At present, there is sufficient flow in the Potomac River to meet the Washington metropolitan area's water demands without releases from upstream reservoirs. If low-flow conditions continue to develop, the Washington metropolitan area is well-protected from a water supply shortage owing to carefully designed drought-contingency plans.

ICPRB's Low Flow Outlook:

There is a 7 to 21 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-by. 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.

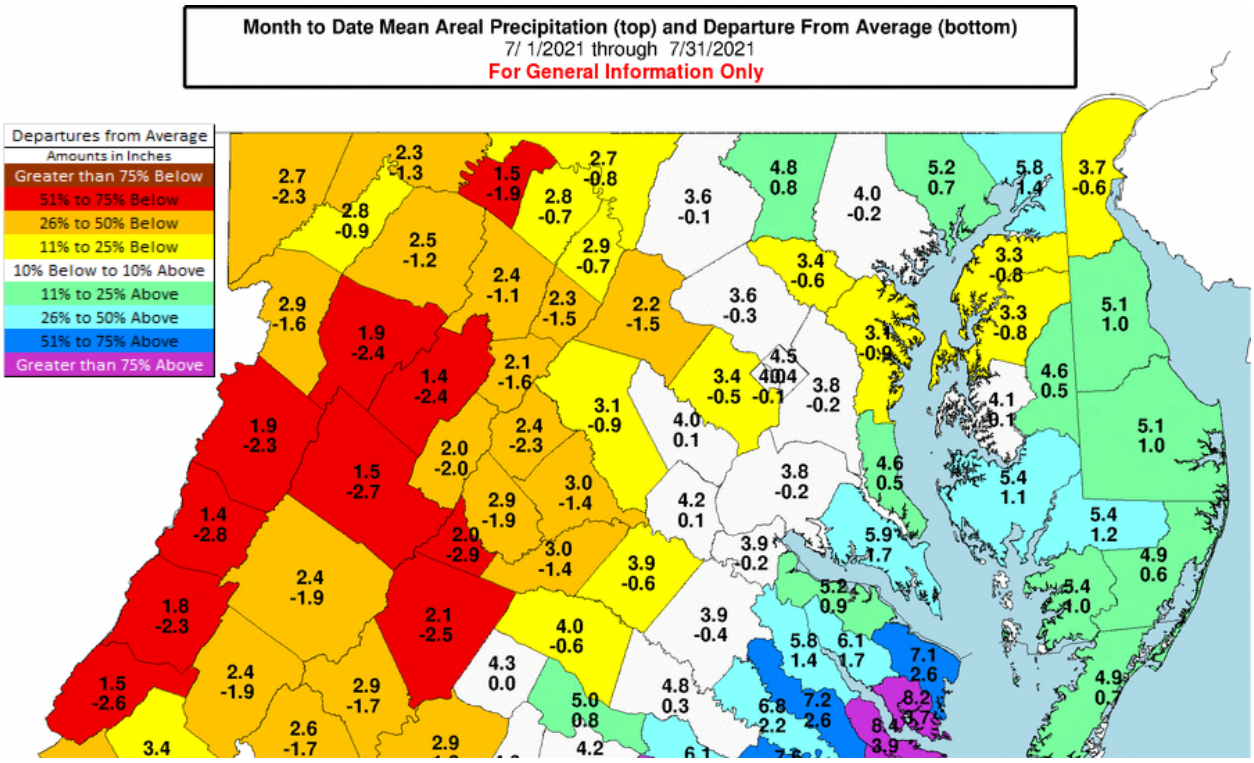
The conditional probability is estimated by analyzing the historical stream flow records and considering recent stream flow values, precipitation totals for the prior 12 months, current groundwater levels, and the current Palmer Drought Index. Past years in which watershed conditions most closely resemble 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 7 to 21 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 5, 2021

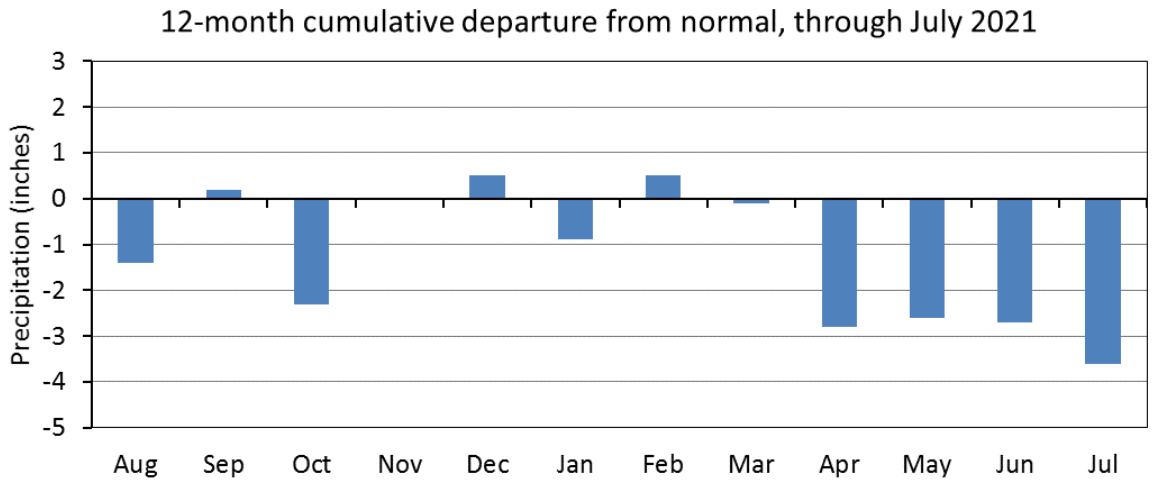
Low flow threshold (MGD)	*Low flow threshold (cfs)*	*Historical probability of lower flow August 5 through December 31*	*Conditional probability of lower flow August 5 through December 31*
1200	1858	67%	80%
1000	1548	47%	69%
800	1238	24%	32%
700	1084	15%	21%
600	929	7%	7%

Past Precipitation:

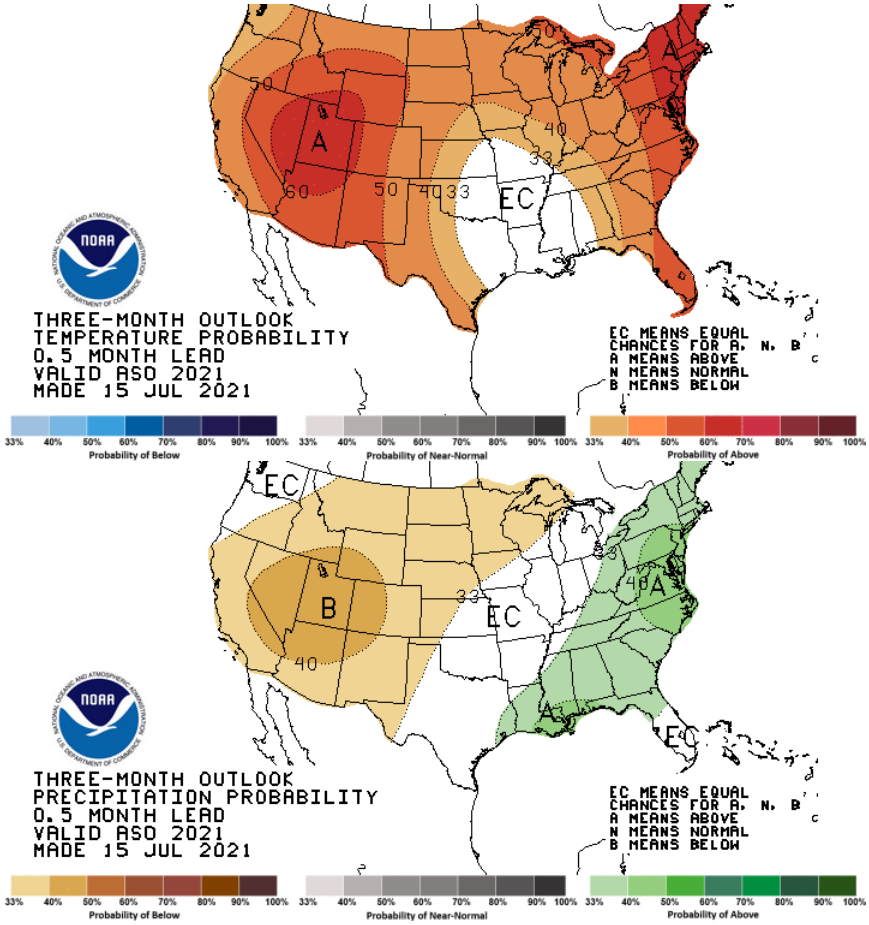
Data from the National Weather Service's Middle Atlantic River Forecast Center (MARFC) shows that the Potomac basin upstream of Washington, D.C. has received 2.5 inches of precipitation for the month of July, which is 1.4 inches below normal. The 12-month departure from average is now 3.6 inches as of July 31 (see graph).



Source: Middle Atlantic River Forecast Center, National Weather Service

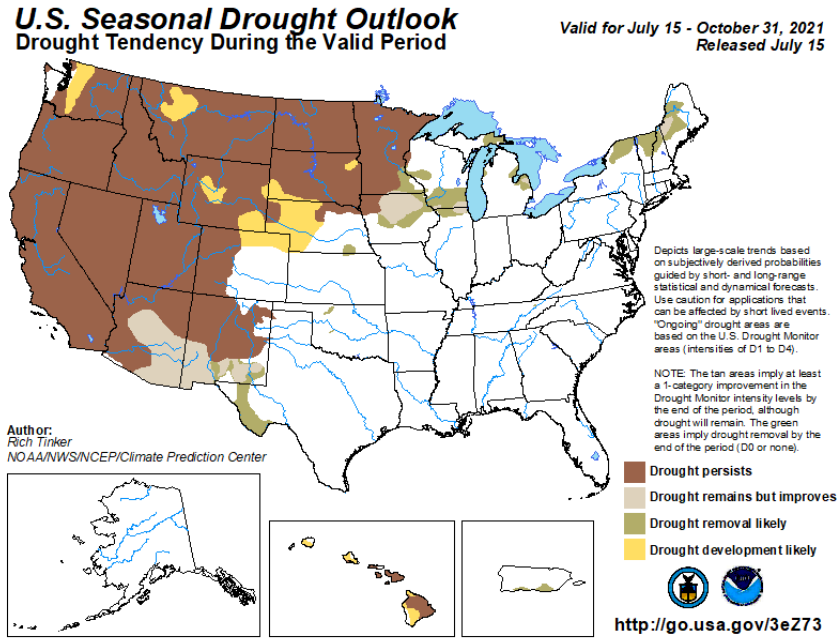


Precipitation and Drought Outlook for August, September, and October 2021:



The Middle Atlantic River Forecast Center's (MARFC) outlook for water resources and supplies is good.

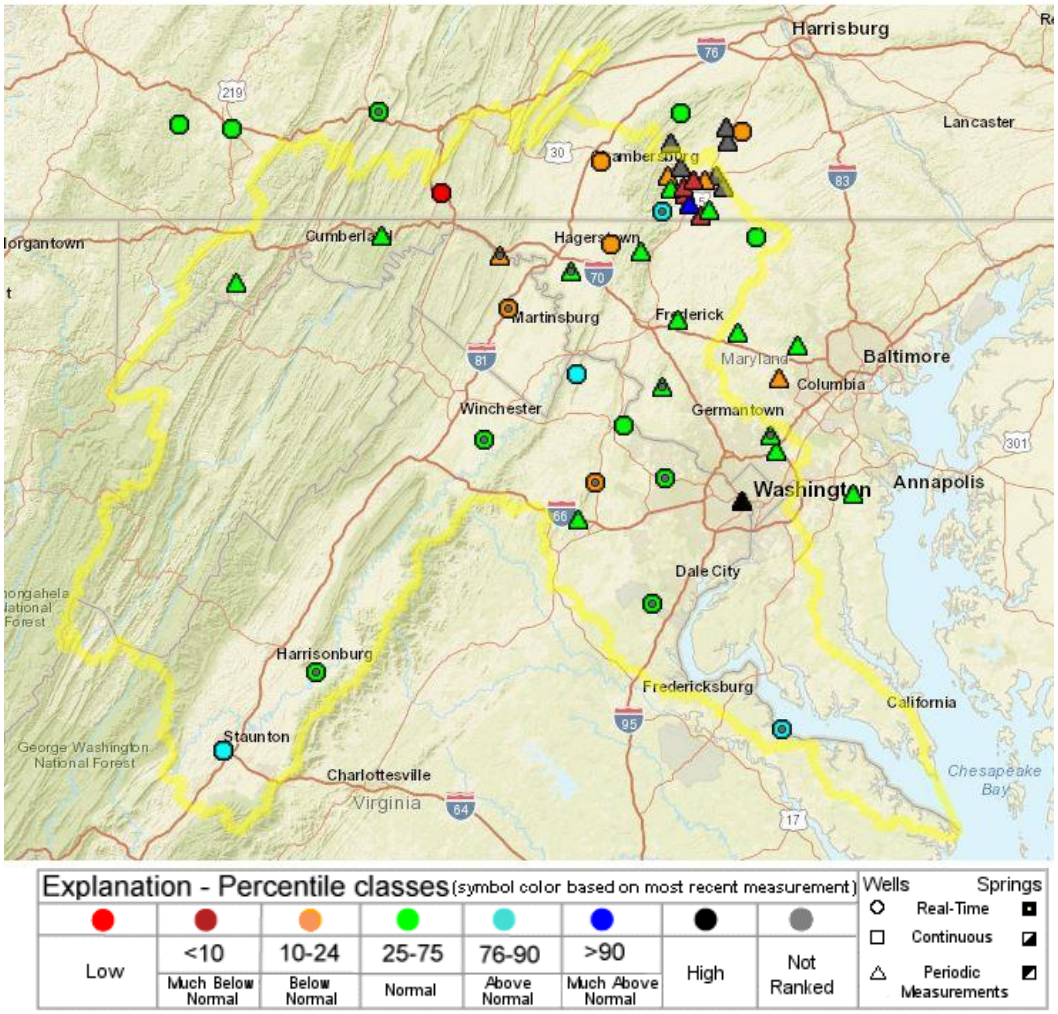
The National Weather Service Climate Prediction Center's one-month outlook for August calls for normal to above normal temperatures, and above normal precipitation in the Potomac Basin. The 90-day outlook for August through October calls for above normal temperatures and above normal precipitation.



As of July 15, 2021, the Climate Prediction Center's U.S. Seasonal Drought Outlook reports no drought development in the Potomac basin.

Groundwater – Current Conditions:

The groundwater map below, developed by the U.S. Geological Survey (USGS), shows the current water levels in the Maryland Real-Time Groundwater Level Network as of August 5th. Most wells displayed are in the "Normal" range. The map of Potomac Basin monitoring wells for the Water Supply Outlook was unavailable at the time of this update. In the map below, the USGS defines "Normal" as between the 25th and 75th percentiles, and "Below Normal" as between the 10th and 24th percentile. "Much Below Normal" is defined as below the 10th percentile.



Reservoir Storage – Current Conditions:

No water supply releases from the CO-OP shared system have been made this year.

Reservoir storage as of August 6, 2021

Facility	Percent Full	Current usable storage, BG	Total usable capacity, BG
WSSC Water's Patuxent reservoirs[1]	93	9.75	10.5
Fairfax Water's Occoquan Reservoir[2]	100	8.2	8.2
Little Seneca Reservoir[3]	98	3.8	3.9
Jennings Randolph water supply[4]	100	13.1	13.1
Jennings Randolph water quality[4]	74	12.1	16.3
Savage Reservoir[5]	67	4.2	6.3

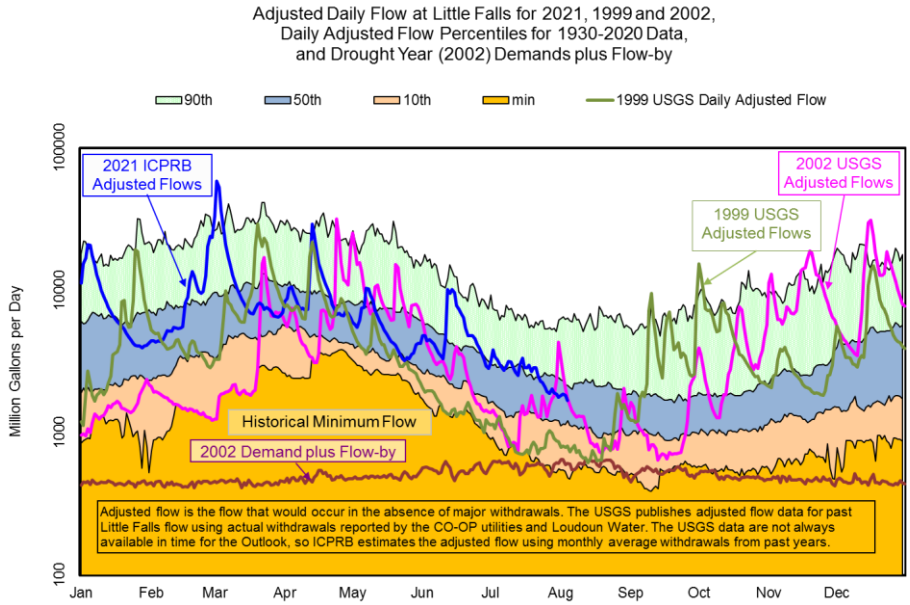
[1] Bathymetric study conducted December 2015 with revisions in December 2016, and unusable storage corrected June 2017. Note that 1.37 BG is not considered usable capacity because it is reserved for storm inflow (T. Supply, personal communication, August 3, 2018).
[2] Bathymetric study conducted in 2020.
[3] Usable capacity consistent with Ortt, *el al.* (2011).
[4] 2013 revised stage-storage curve provided by Bill Haines, US Army Corps of Engineers, Baltimore District.
[5] 1998 revised stage-storage curve provided by Bill Haines, US Army Corps of Engineers, Baltimore District.

Potomac River Flow:

The estimated adjusted Potomac flow at Little Falls on August 1 was 1.8 billion gallons per day (BGD). For this day of the year, this value was below the 50th percentile flow value of 2.37 BGD and above the 10th percentile flow value of 1.12 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 7.9 BGD for the past six months 2.7 BGD in July.

Environmental Flow-by:

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



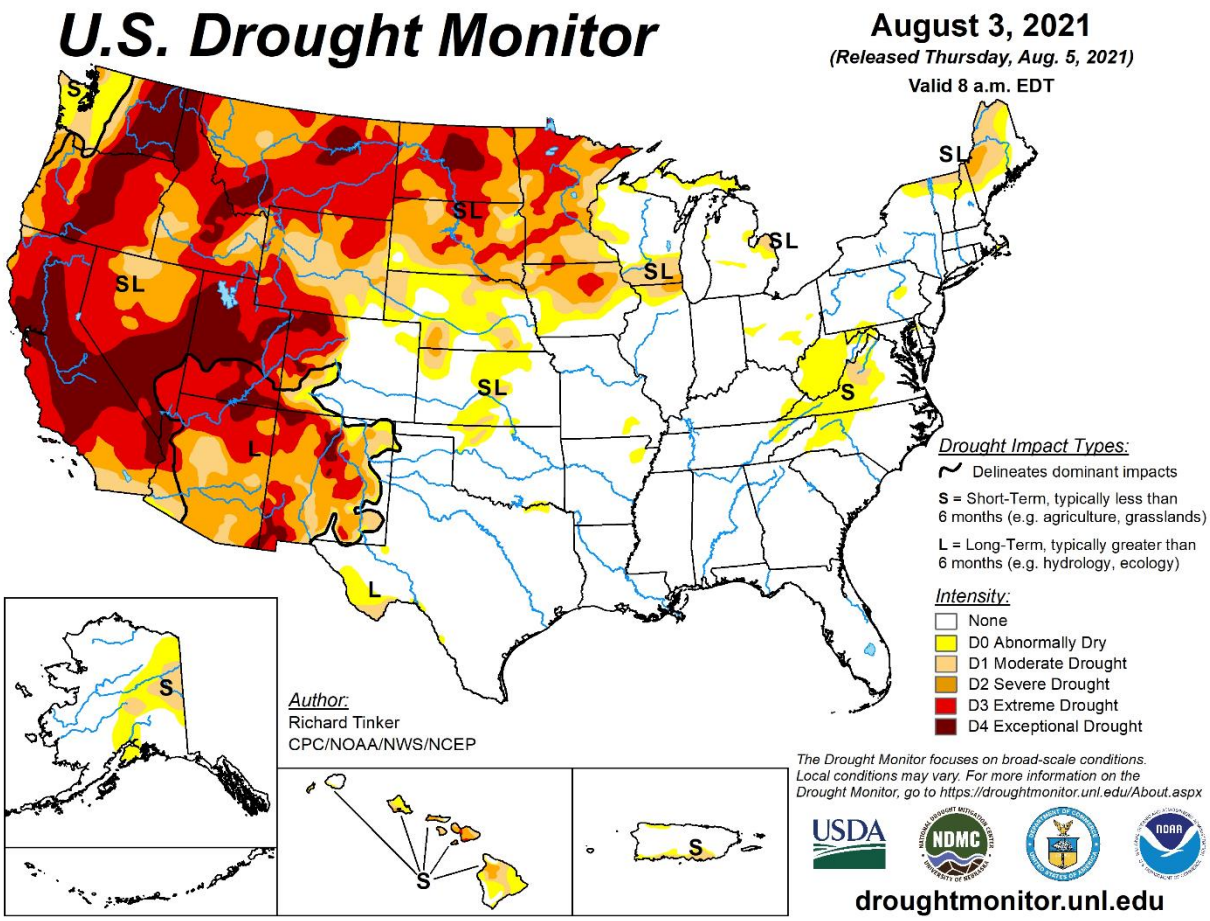
Little Falls flow statistics are based on 1930 through 2020 USGS published gage flow, "USGS 01646502 POTOMAC RIVER (ADJUSTED) NEAR WASH, DC". To create this flow record, the USGS has added historical water supply withdrawals from the Potomac as reported by U.S. Army Corps of Engineers, Washington Suburban Sanitary Commission, Fairfax County Water Authority, city of Rockville, and Loudoun Water to the Little Falls gage flow record.

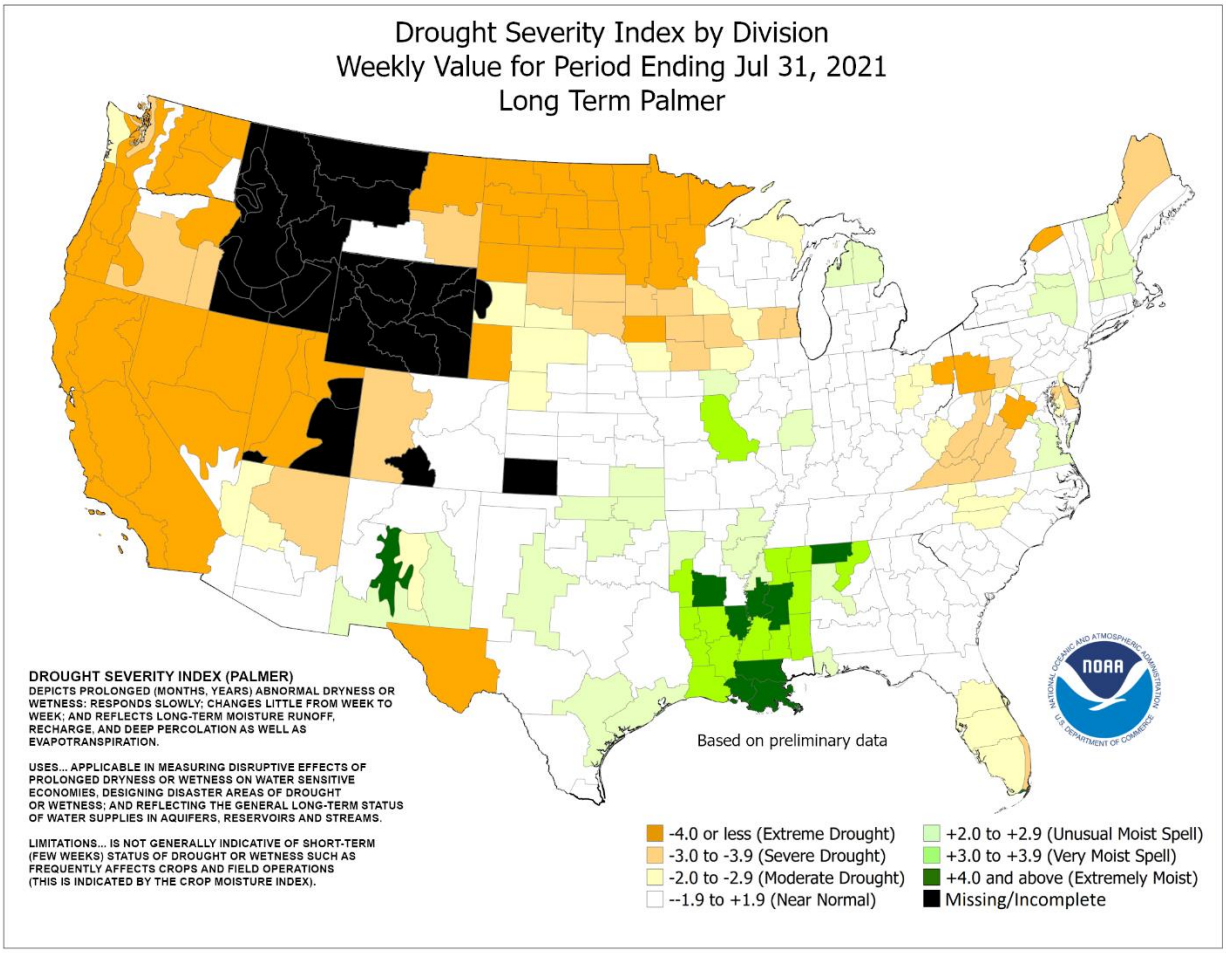
Drought Status:

Drought status in Maryland, Virginia and Pennsylvania is normal as of August 5. The current drought stage, as defined in the Metropolitan Washington Council of Governments (MWCOG)'s water supply and drought response awareness plan, is normal.

Drought Monitor and Soil Moisture:

The NOAA Climate Prediction Center's U.S. Drought Monitor map (see first figure below) indicates that abnormally dry conditions are present in West Virginia and Virginia. The Palmer Drought Severity Index by Division map (see second figure on next page) indicates moderate and severe drought conditions in some parts of the Basin.




Drought Severity Index by Division
Weekly Value for Period Ending Jul 31, 2021
Long Term Palmer
DROUGHT SEVERITY INDEX (PALMER)
DEPICTS PROLONGED (MONTHS, YEARS) ABNORMAL DRYNESS OR WETNESS: RESPONDS 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 OF SHORT-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
NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE