Water Supply Outlook

August 8, 2024
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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

The probability of releases from backup water supply reservoirs in the Washington metropolitan area during the summer and fall seasons of 2024 is currently above normal. 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. As of August 6, streamflow is below normal, and groundwater levels are below normal. The Potomac basin upstream of Washington, D.C., received 2.2 inches of precipitation in July, which is 1.7 inches below normal. As of July 31, the 12-month cumulative basin precipitation is 3.4 inches below normal. The U.S. Drought Monitor map by the NOAA Climate Prediction Center indicates that 59% of the Potomac Basin is experiencing extreme drought conditions, while 19% is experiencing severe drought conditions. The MWCOG issued a drought watch on July 29. Many regions in Maryland and Virginia are under a drought watch or warning. However, a respite from the dry conditions is on the horizon. The Middle Atlantic River Forecast Center (MARFC) indicates that there is an increased likelihood of cumulatively heavy rainfall and potential river flooding towards the end of week of August 5 into the week of August 12, associated with Tropical Storm Debby. The Climate Prediction Center indicates that above-normal precipitation is likely over the next three months. The U.S. Seasonal Drought Outlook, as of July 18, 2024, indicates that drought removal is likely in the Potomac Basin over the coming months. At present, there is sufficient flow in the Potomac River to meet the Washington metropolitan area's water demands without releasing water from upstream reservoirs. If low-flow conditions further develop, the Washington metropolitan area is protected from a water supply shortage owing to carefully designed drought-contingency plans.

ICPRB's Low Flow Outlook

There is a 19 to 36 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.

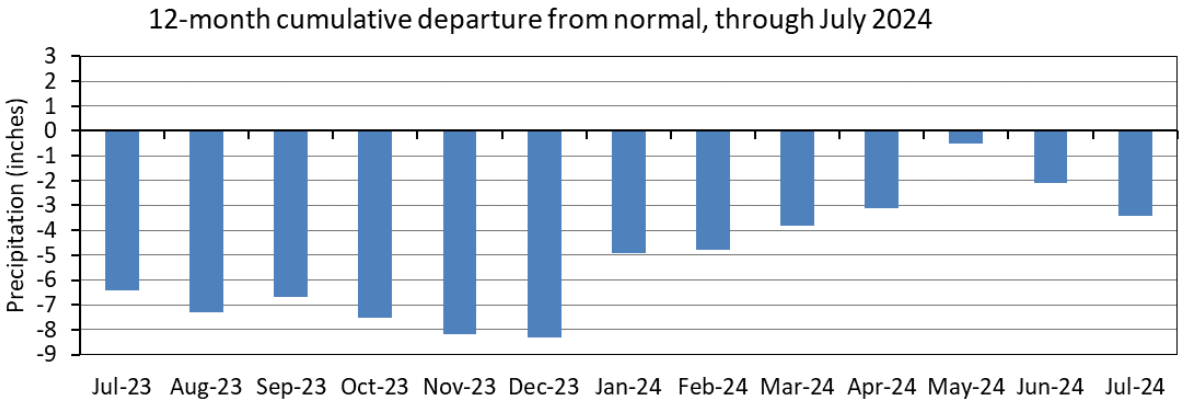
The conditional probability is estimated by analyzing the historical stream flow records and considering recent stream flow values, precipitation totals for the prior 12 months, current groundwater levels, and the current Palmer Drought Index. Past years in which watershed conditions most closely resemble 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 19 to 36 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, 2024

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%	91%
1000	1548	47%	71%
800	1238	24%	54%
700	1084	15%	36%
600	929	7%	19%

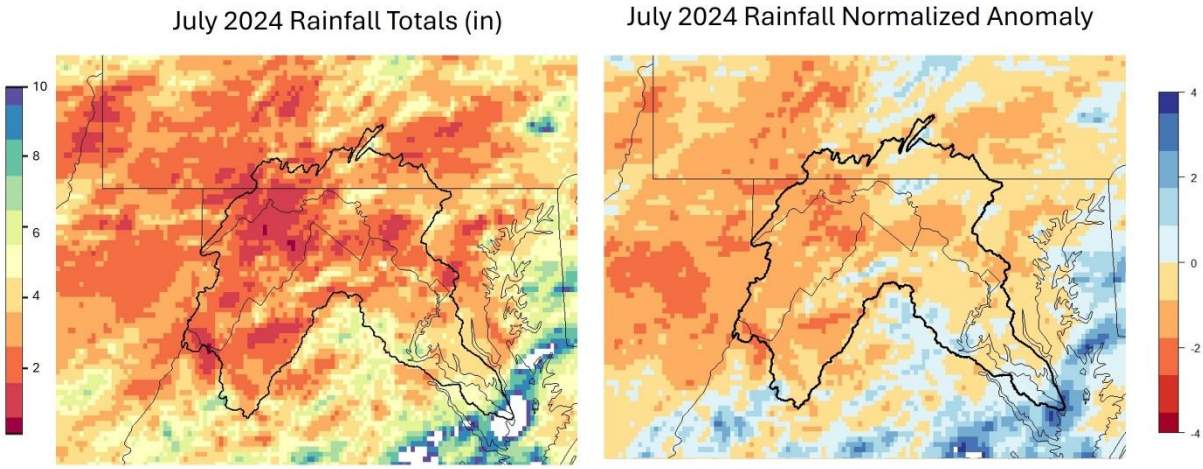
Past Precipitation

Data from the National Weather Service's Middle Atlantic River Forecast Center (MARFC) shows that the Potomac basin upstream of Washington, D.C., received 2.2 inches of precipitation for the month of July, which is 1.7 inches below normal. The 12-month cumulative basin precipitation is 3.4 inches below normal as of July 31 (see graph below).



Source: Middle Atlantic River Forecast Center, National Weather Service

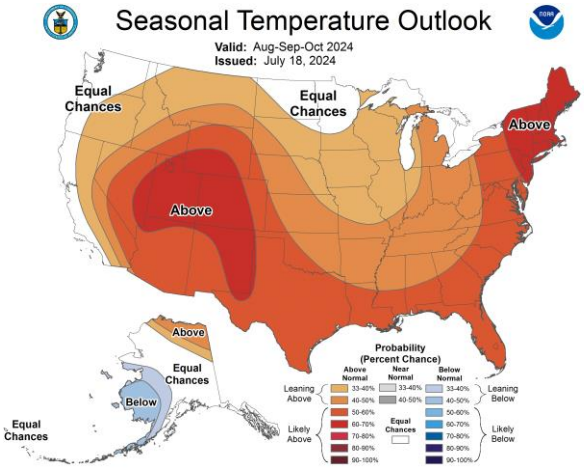
The maps below illustrate the spatial variability of rainfall over the Potomac Basin in July based on PRISM (Parameter-elevation Regressions on Independent Slopes Model). Normalized rainfall anomaly, indicating departure from normal conditions, reveals that rainfall was below normal for most of the basin, particularly in western areas.

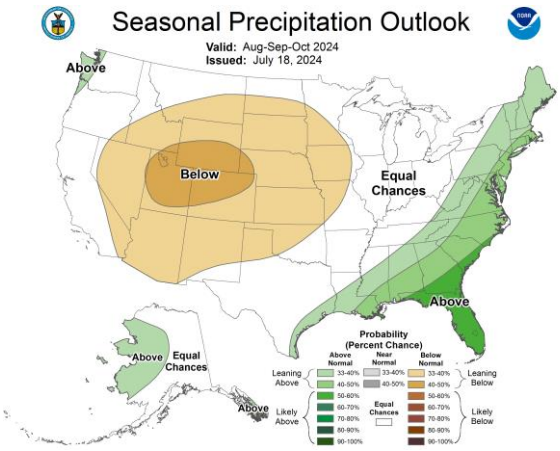


Source: PRISM Climate Group, Oregon State University, https://prism.oregonstate.edu

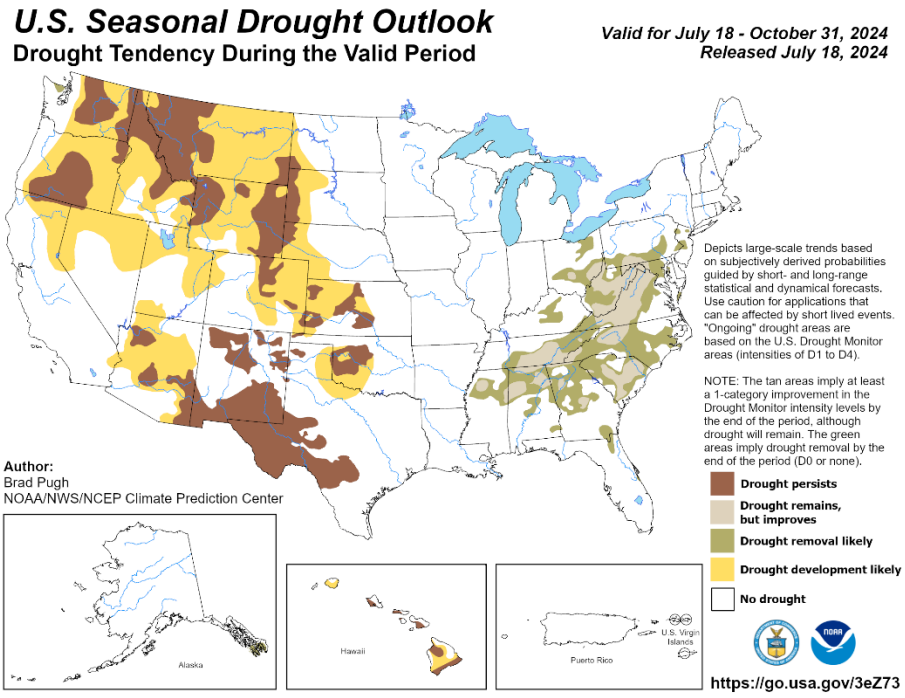
Precipitation and Drought Outlook for August, September, October 2024

The Climate Prediction Center's August outlook calls for above-normal temperatures and above-normal precipitation in the Potomac Basin. The 90-day outlook (August-October) calls for above-normal temperatures and above-normal precipitation. The Middle Atlantic River Forecast Center (MARFC) indicates that there is an increased likelihood of cumulatively heavy rainfall and potential river floodings associated with Tropical Storm Debby, towards the end of the week of August 5 into the week of August 12.



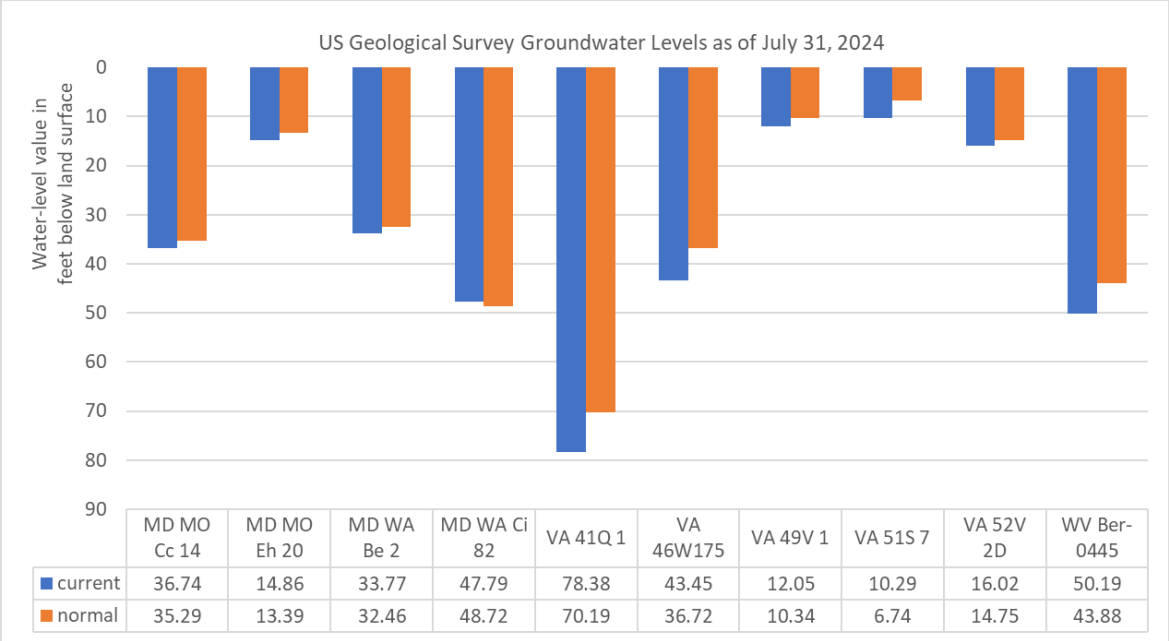


The Climate Prediction Center's U.S. Seasonal Drought Outlook, as of July 18, 2024, indicates drought is likely to remain but improve in the Potomac Basin over the coming months.



Groundwater – Current Conditions

Based on U.S. Geological Survey (USGS) data, the depth to groundwater level (measured in feet) for ten wells in the ICPRB water supply outlook shows below normal depths, as depicted in the graph below, displaying current and normal groundwater levels for July.



	MD MO Cc 14	MD MO Eh 20	MD WA Be 2	MD WA Ci 82	VA 41Q 1	VA 46W175	VA 49V 1	VA 51S 7	VA 52V 2D	WV Ber-0445
current	36.74	14.86	33.77	47.79	78.38	43.45	12.05	10.29	16.02	50.19
normal	35.29	13.39	32.46	48.72	70.19	36.72	10.34	6.74	14.75	43.88

Reservoir Storage – Current Conditions

There have been no water supply releases from the CO-OP shared system so far this year.

Reservoir storage as of August 7, 2024

Facility	Percent Full	Current usable storage, BG	Total usable capacity, BG
WSSC Water's Patuxent reservoirs[1]	82	8.7	10.5
Fairfax Water's Occoquan Reservoir[2]	95	7.6	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]	56	9.1	16.3
Savage Reservoir[5]	54	3.4	6.3

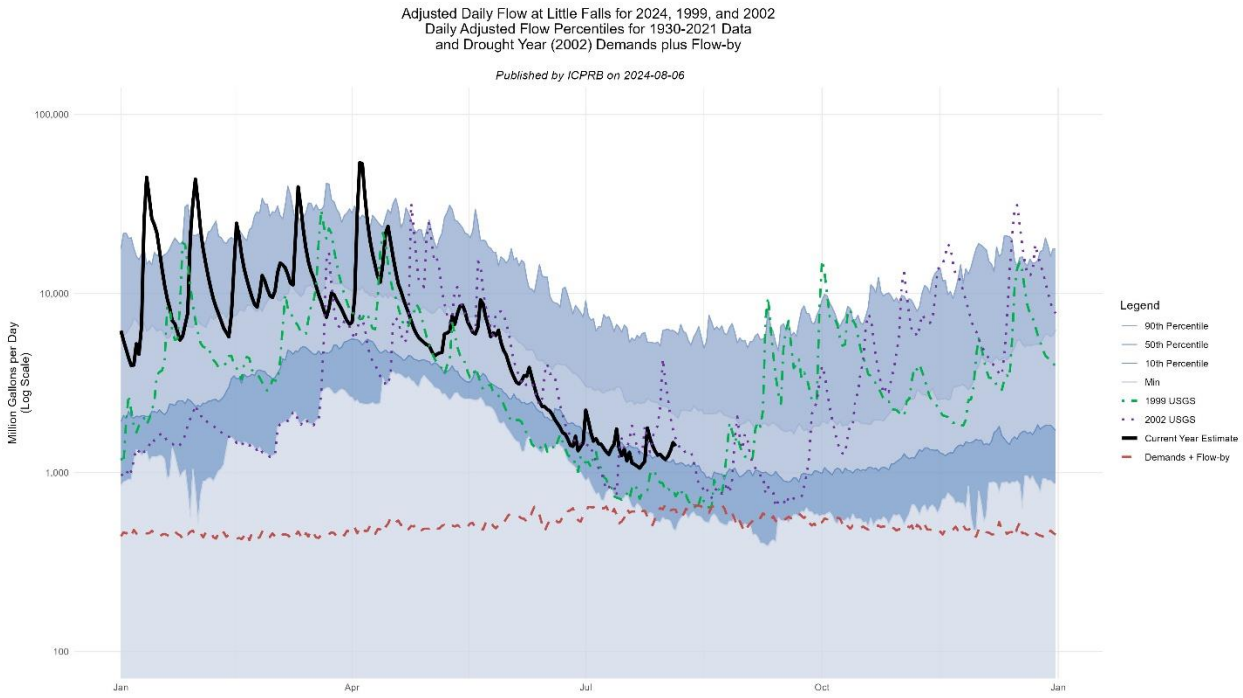
[1] Bathymetric study conducted December 2015 with revisions in December 2016, and unusable storage corrected June 2017.
[2] Bathymetric study conducted in 2019.
[3] Usable capacity consistent with Ortt, *el al.* (2011).
[4] 2013 revised stage-storage curve provided by Bill Haines, US Army Corps of Engineers, 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 1.1 billion gallons per day (BGD). For this day of the year, this value was about equal to the 10th percentile flow value. 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 9.5 BGD for the past five months and 1.3 BGD in July.

Environmental Flow-by

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



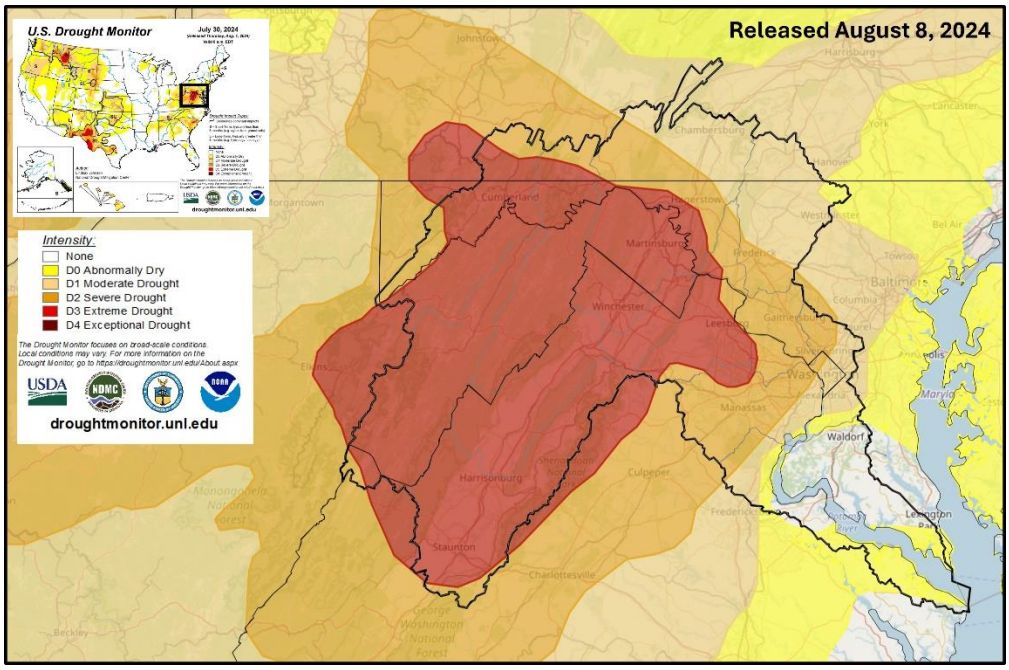
Adjusted flow represents the natural flow that would occur in the absence of major withdrawals. The USGS publishes adjusted flow data for Little Falls based on actual withdrawals reported by the CO-OP utilities and Loudoun Water. However, the USGS data may not always be available in time for the outlook. In such cases, ICPRB estimates the adjusted flow using a 20-day rolling average of past withdrawal data or observed data collected from the utilities.

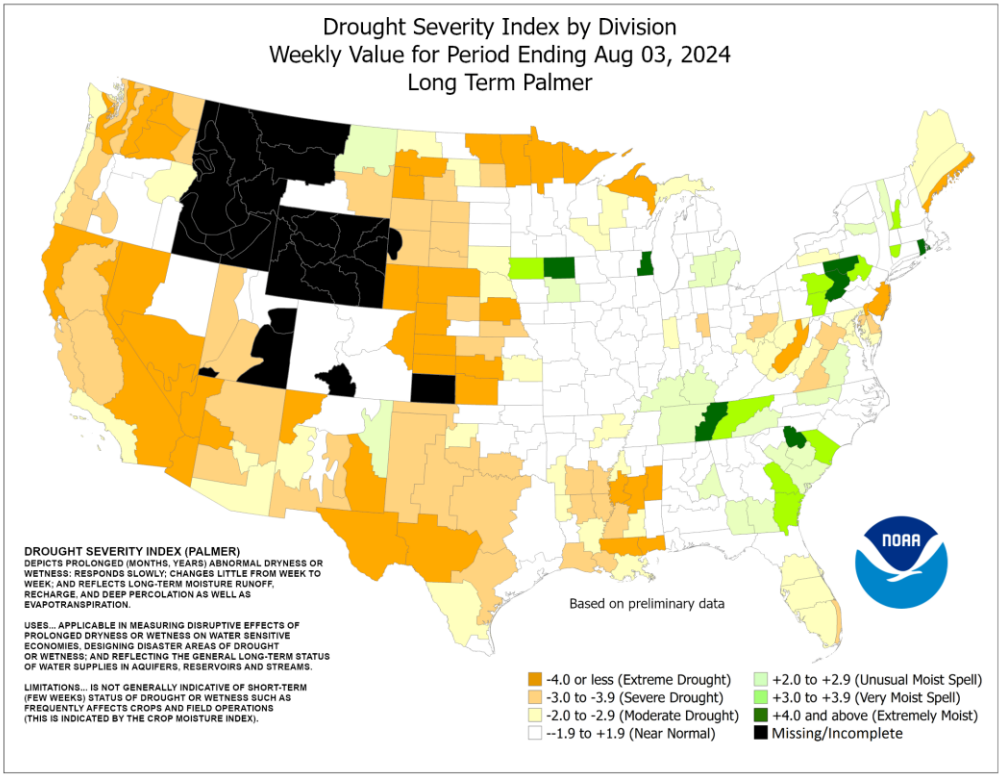
Drought Status

The drought status in Pennsylvania is normal. In Maryland, the Western, and Eastern regions are under a drought watch. In Virginia, all regions aside from the Chowan and Southeastern regions, are either under a drought warning or watch. The Metropolitan Washington Council of Governments (MWCOG) declared a drought watch on July 29.

Drought Monitor and Soil Moisture

The U.S. Drought Monitor map by the NOAA Climate Prediction Center (refer to the first figure on the next page) shows moderate to severe drought conditions are present in the Potomac Basin. According to the data, 59% of the Potomac Basin is experiencing extreme drought conditions, while 19% is experiencing severe drought conditions. The Palmer Drought Severity Index by Division map (refer to the second figure on the next page) indicates varying conditions across the basin from unusually wet conditions in Pennsylvania to moderate to extreme drought in the southern areas.


U.S. Drought Monitor
July 30, 2024
Released August 8, 2024
Intensity:
None
D0 Abnormally Dry
D1 Moderate Drought
D2 Severe Drought
D3 Extreme Drought
D4 Exceptional Drought
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx
droughtmonitor.unl.edu
Johnstown
Harrisburg
Lancaster
York
Chambersburg
Hanover
Cumberland
Hagerstown
Martinsburg
Frederick
Towson
Baltimore
Columbia
Winchester
Gaithersburg
Laurel
Leesburg
Annapolis
Manassas
Waldorf
Harrisonburg
Culpeper
Fredericksburg
Lexington
Staunton
Charlottesville
Beckley


Drought Severity Index by Division
Weekly Value for Period Ending Aug 03, 2024
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
NOAA
-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