Water Supply Outlook

October 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 below 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. The Potomac basin upstream of Washington, D.C., received 4.6 inches of rain in September, which is 0.8 inches above normal. As of September 30, the 12-month cumulative basin precipitation is 1.2 inches above normal. Following a dry period through mid-September, substantial rainfall occurred leading to overall improved conditions. Streamflow is currently above normal. Groundwater levels have improved but remain below normal levels in many observation wells in the basin. As of September 21, ICPRB suspended daily drought monitoring which had been initiated on September 11. As of October 3, the U.S. Drought Monitor reports that 14% of the Potomac Basin area is under severe drought and 26% under moderate drought conditions. Extreme drought conditions remain in a small western corner of the basin. Most regions in Pennsylvania, Maryland, and Virginia are under normal conditions according to state drought status reports. The Shenandoah region remains under a drought warning. The Climate Prediction Center indicates that normal precipitation is likely over the next three months. The U.S. Seasonal Drought Outlook, as of September 30, 2024, indicates that drought removal is likely in the central parts of the Potomac Basin over the coming months, while drought is likely to persist in western areas. 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 1 to 4 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.

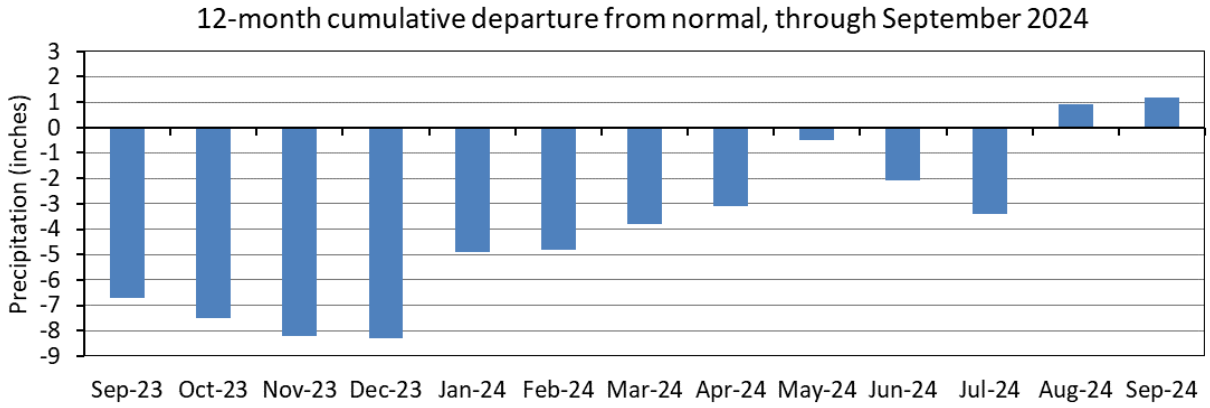
The conditional probability is estimated by analyzing the historical stream flow records and considering recent stream flow values, precipitation totals for the prior 12 months, current groundwater levels, and the current Palmer Drought Index. Past years in which watershed conditions most closely resemble 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 1 to 4 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, 2024

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%	59%
1000	1548	28%	27%
800	1238	9%	7%
700	1084	5%	4%
600	929	3%	1%

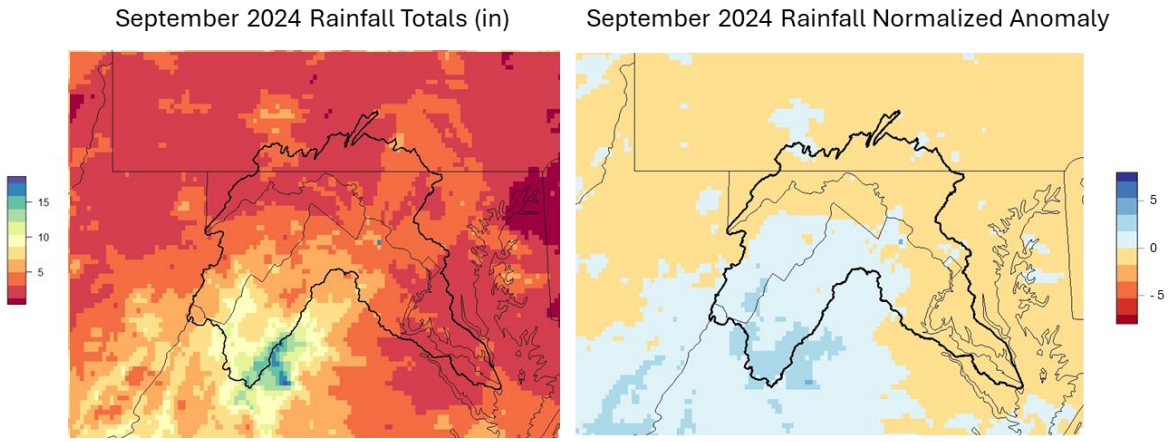
Past Precipitation

Data from the National Weather Service's Middle Atlantic River Forecast Center (MARFC) shows that the Potomac basin upstream of Washington, D.C., received 4.6 inches of precipitation in the month of September, which is 0.8 inches above normal. The 12-month cumulative basin precipitation is 1.2 inches above normal as of September 30 (see graph below).



Source: Middle Atlantic River Forecast Center, National Weather Service

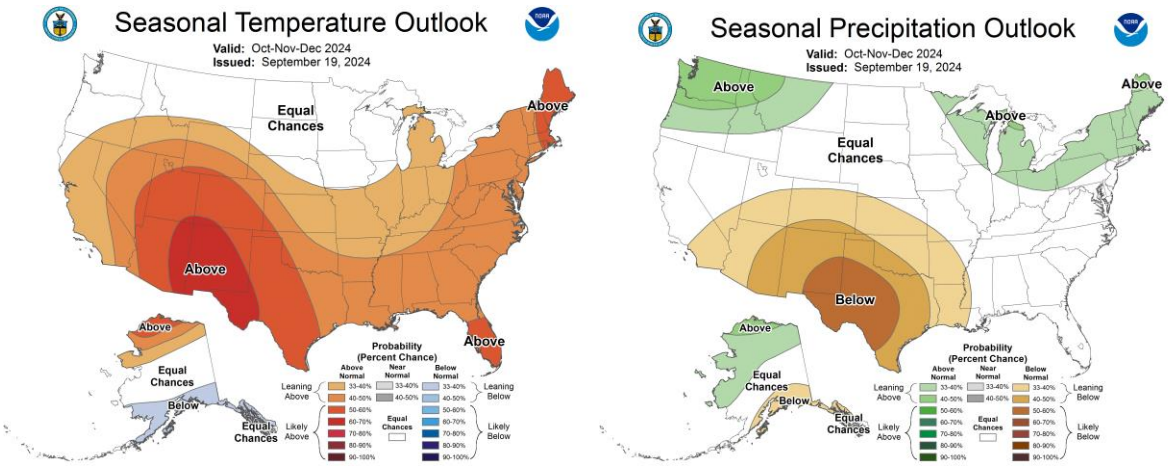
The maps below illustrate the spatial variability of rainfall over the Potomac Basin in September based on PRISM (Parameter-elevation Regressions on Independent Slopes Model) data. Normalized rainfall anomaly, indicating departure from normal conditions, reveals a wide variability with normal to below normal in northern and eastern parts of the basin, and much above normal in southern and western parts of the basin.



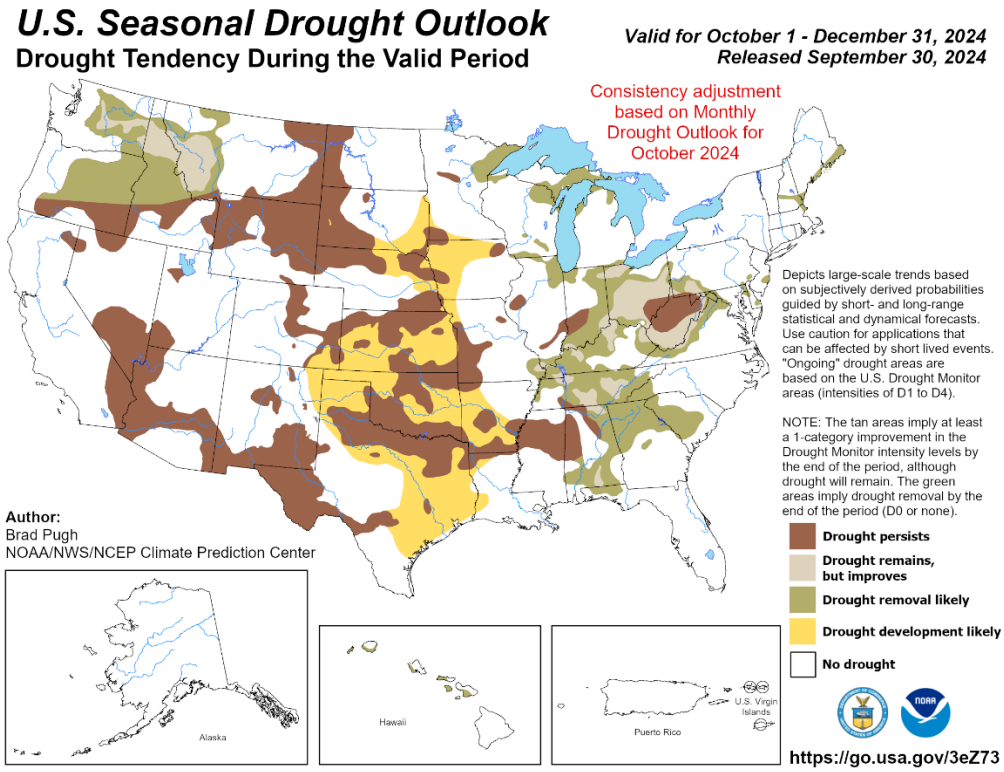
Source: PRISM Climate Group, Oregon State University, https://prism.oregonstate.edu

Precipitation and Drought Outlook for October, November, and December 2024

The Climate Prediction Center's October outlook calls for normal temperatures and normal precipitation in the Potomac Basin. The 90-day outlook (September-December) calls for above-normal temperatures and normal precipitation.

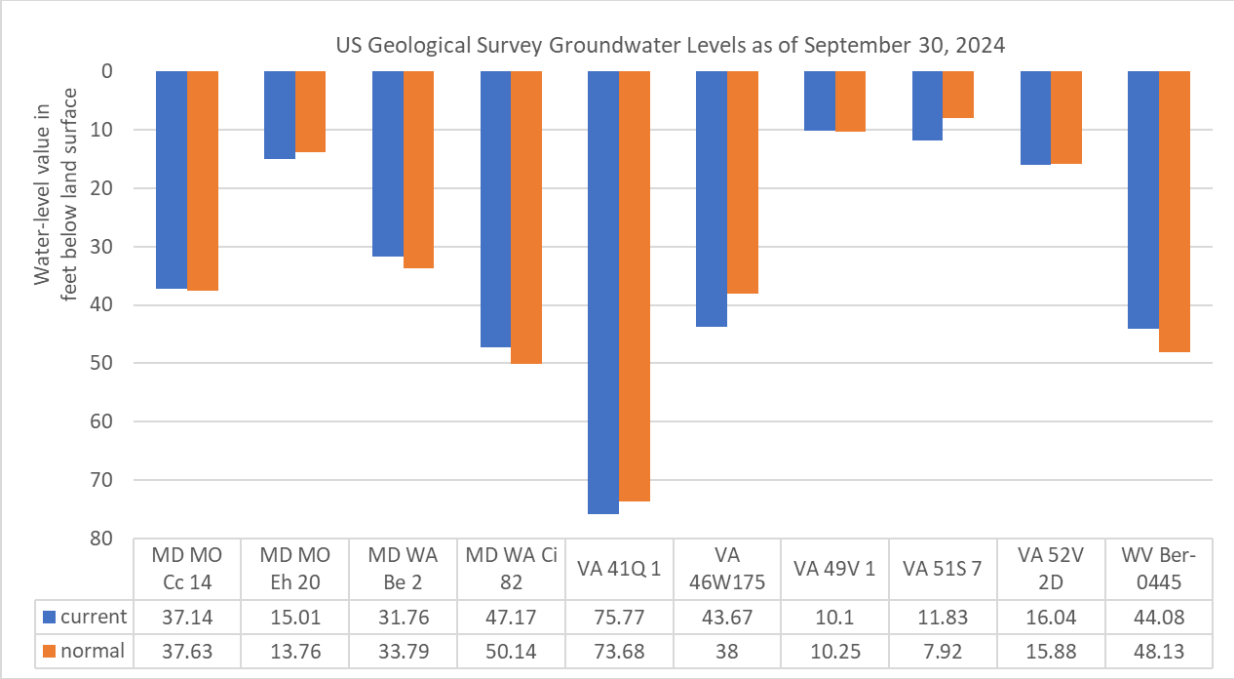


The Climate Prediction Center's U.S. Seasonal Drought Outlook, as of September 30, 2024, indicates drought removal is likely in central parts of the basin, but drought is likely to persist in western parts of the basin.



Groundwater – Current Conditions

Based on U.S. Geological Survey (USGS) data, the depth to groundwater level (measured in feet) shows a mix of conditions, with about half the wells below normal levels and half above normal, while a few are near normal. Although groundwater levels have improved, many wells remain below their normal levels for September.



	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	37.14	15.01	31.76	47.17	75.77	43.67	10.1	11.83	16.04	44.08
normal	37.63	13.76	33.79	50.14	73.68	38	10.25	7.92	15.88	48.13

Reservoir Storage – Current Conditions

There have been no water supply releases from the CO-OP shared system so far this year. Due to prolonged hot and dry conditions this summer and early fall, the U.S. Army Corps of Engineers canceled two scheduled artificially varied flow releases and a whitewater release in August and September to conserve water quality storage.

Reservoir storage as of September 30, 2024

Facility	Percent Full	Current usable storage, BG	Total usable capacity, BG
WSSC Water's Patuxent reservoirs[1]	78	8.2	10.5
Fairfax Water's Occoquan Reservoir[2]	100	8.2	8.2
Little Seneca Reservoir[3]	100	3.9	3.9
Jennings Randolph water supply[4]	100	13.1	13.1
Jennings Randolph water quality[4]	25	4.1	16.3
Savage Reservoir[5]	35	2.2	6.3

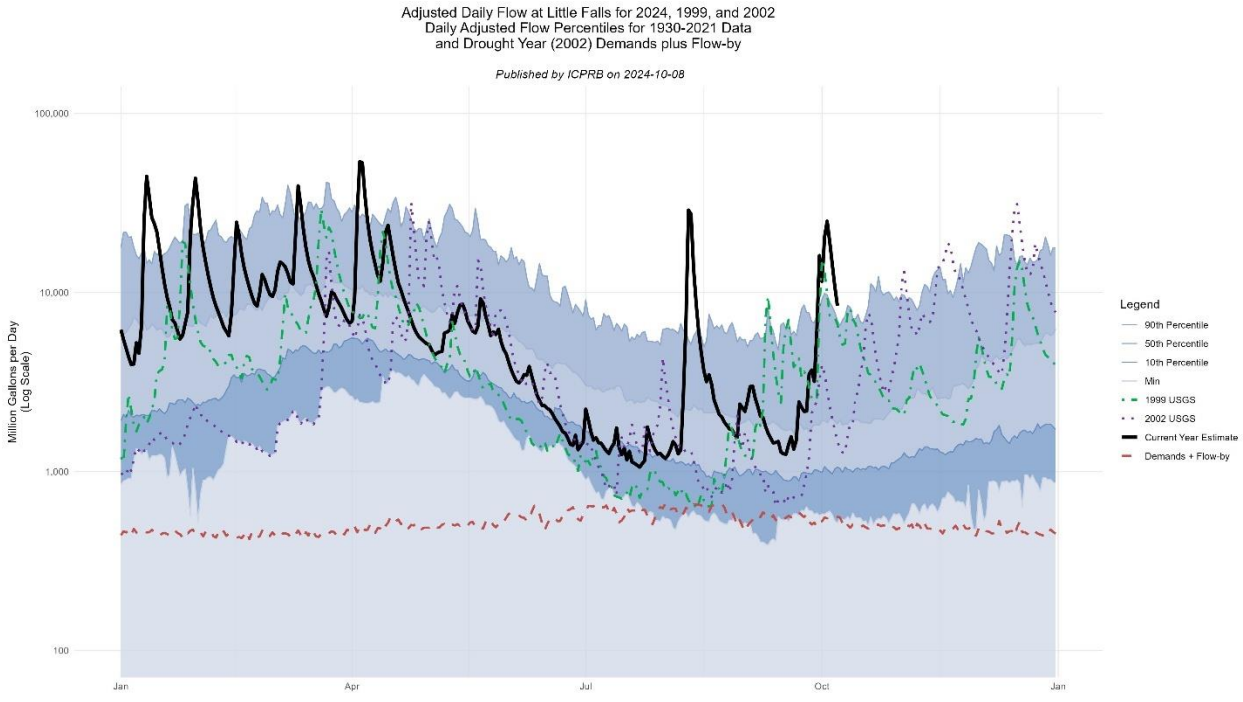
[1] Bathymetric study conducted December 2015 with revisions in December 2016, and unusable storage corrected June 2017.
[2] Bathymetric study conducted in 2019.
[3] Usable capacity consistent with Ortt, *el al.* (2011).
[4] 2013 revised stage-storage curve provided by Bill Haines, US Army Corps of Engineers, 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 October 1 was 11.5 billion gallons per day (BGD). For this day of the year, this value was above the 90th percentile flow value 9.2 BGD and below the maximum value for the day of of 41.4 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 8.2 BGD for the past five months and 2.6 BGD in September.

Environmental Flow-by

The average observed Potomac flow at Little Falls in September 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.

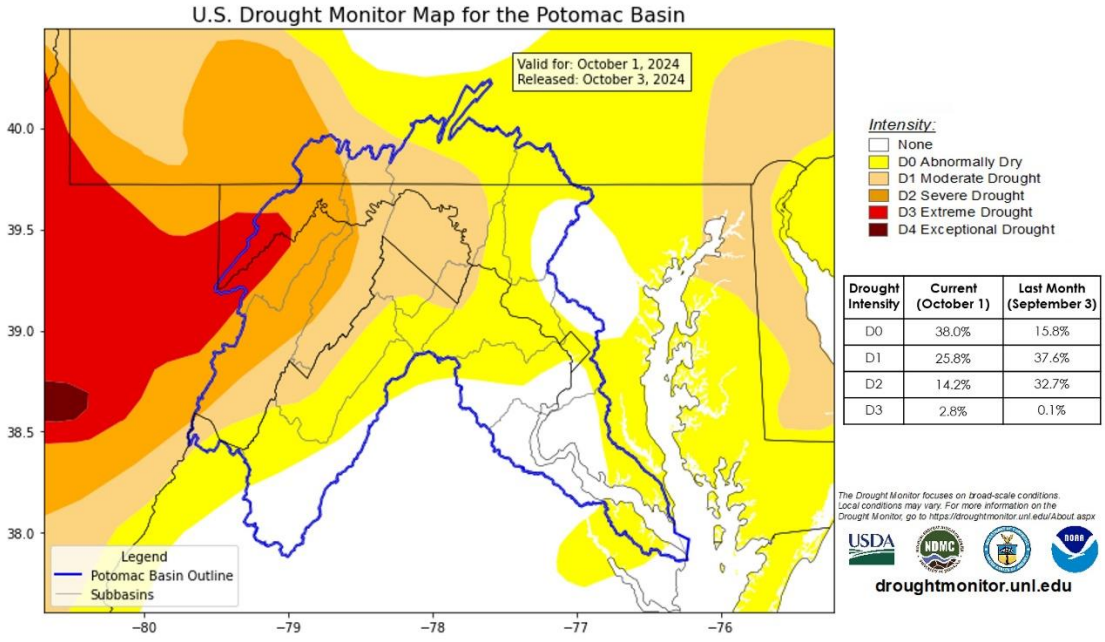
Drought Status

The drought status in Pennsylvania is normal. In Maryland, the Western region remains under a drought watch. In Virginia, the Northern Virginia region, and the Big Sandy and New River regions to the west are under a drought watch, while the Shenandoah region is under a drought warning. The drought watch declared on July 29 by the Metropolitan Washington Council of Governments (MWCOG) is still in effect.

Drought Monitor and Soil Moisture

The U.S. Drought Monitor map from the NOAA Climate Prediction Center (refer to the first figure on the next page) indicates that moderate to severe drought conditions are present in the Potomac Basin. According to the data, 14% of the Potomac Basin is experiencing severe drought conditions, while 26% is facing moderate drought conditions. Despite overall improvements, a small area of the basin in western Maryland is still experiencing extreme 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 western areas.



Drought Intensity	Current (October 1)	Last Month (September 3)
D0	38.0%	15.8%
D1	25.8%	37.6%
D2	14.2%	32.7%
D3	2.8%	0.1%

Retrieved from: https://droughtmonitor.unl.edu/data/json/usdm_20241001.json
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