Water Supply Outlook

April 7, 2025
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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 water supply releases from backup reservoirs in the Washington metropolitan area during the summer and fall seasons of 2025 is currently above normal. Releases from Jennings Randolph and Little Seneca reservoirs are typically triggered when Potomac River flow falls below the combined water supply demand and the required environmental flow-by. Such low-flow conditions are often the result of below-normal precipitation and reduced groundwater levels. As of early April, streamflow is below normal, and groundwater levels are mostly below normal across the Potomac basin. The basin received only 1.7 inches of precipitation in March, which is 1.8 inches below normal. The 12-month cumulative precipitation deficit stood at 6.2 inches below normal as of March 31. Early April rain may ease the 12-month deficit. NOAA forecasts up to 1 inch more and expects El Niño to bring more extreme wet events. However, slow, steady storms are best for groundwater recharge.

The likelihood of natural Potomac flow requiring water supply augmentation by December 31 is currently estimated between 22 and 35 percent, which is higher than the historical range of 8 to 15 percent. Although current flows are sufficient to meet the Washington metropolitan area's water demands without water supply releases from upstream reservoirs, drought conditions are forecasted to persist into the summer. The Metropolitan Washington Council of Governments' drought watch, along with state-level drought watches and warnings in Maryland, Virginia, and Pennsylvania, remains in effect. Nonetheless, the region is well-prepared for drought conditions, with well-established contingency plans designed to safeguard the reliability of the Washington metropolitan area's water supply.

ICPRB's Low Flow Outlook

There is a 22 to 35 percent conditional probability that natural Potomac flow will drop below 600 to 700 million gallons per day (MGD) at Little Falls through December 31, 2025. At these flow levels, water supply releases from Jennings Randolph and Little Seneca reservoirs may be necessary. 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.

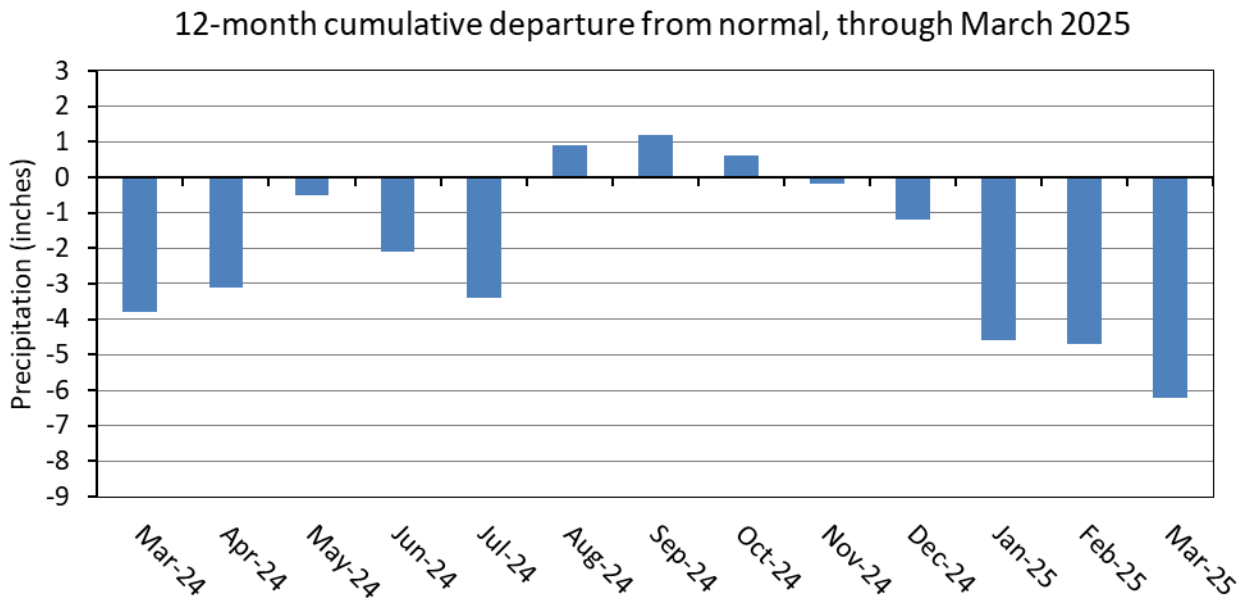
The conditional probability is estimated by analyzing historical stream flow records and considering recent stream flow values, precipitation totals for the prior 12 months, and current groundwater levels. The Palmer Drought Index is suspended due to discontinued data. Years with watershed conditions most similar to current conditions are weighted more heavily when determining conditional probability. In contrast, the historical, or unconditional, probability is based solely on the long-term record without adjustment for current conditions. The 22 to 35 percent conditional probability compares to the 8 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 April 1, 2025

Low flow threshold (MGD)	*Low flow threshold (cfs)*	*Historical probability of lower flow April 1 through December 31*	*Conditional probability of lower flow April 1 through December 31*
1200	1858	69%	86%
1000	1548	48%	70%
800	1238	25%	45%
700	1084	15%	35%
600	929	8%	22%

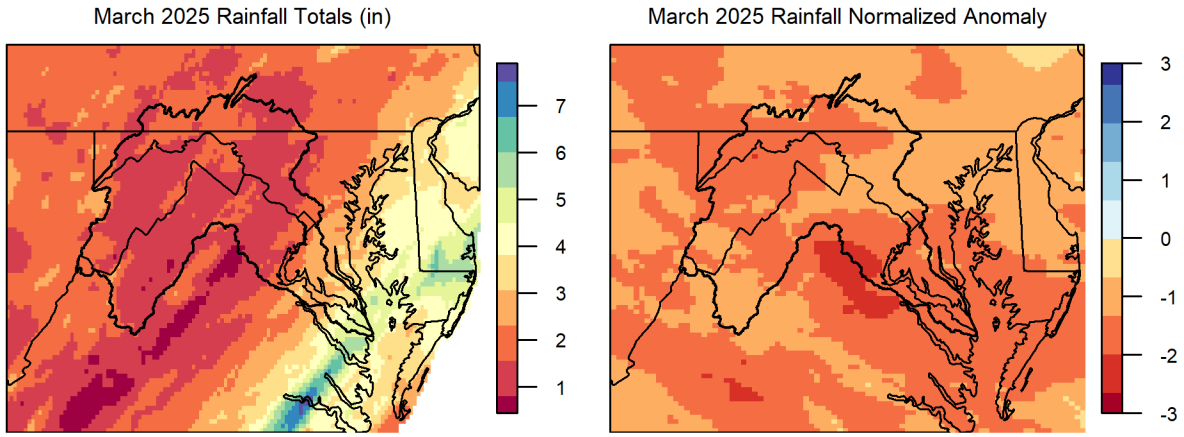
Past Precipitation

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 1.7 inches of precipitation for the month of March, which is 1.8 inches below normal. The 12-month cumulative basin precipitation is 6.2 inches below normal as of March 31 (see graph). Early April rain may ease the 12-month deficit. NOAA forecasts up to 1 inch more and expects El Niño to bring more extreme wet events. However, slow, steady storms are best for groundwater recharge.



Source: Middle Atlantic River Forecast Center, National Weather Service

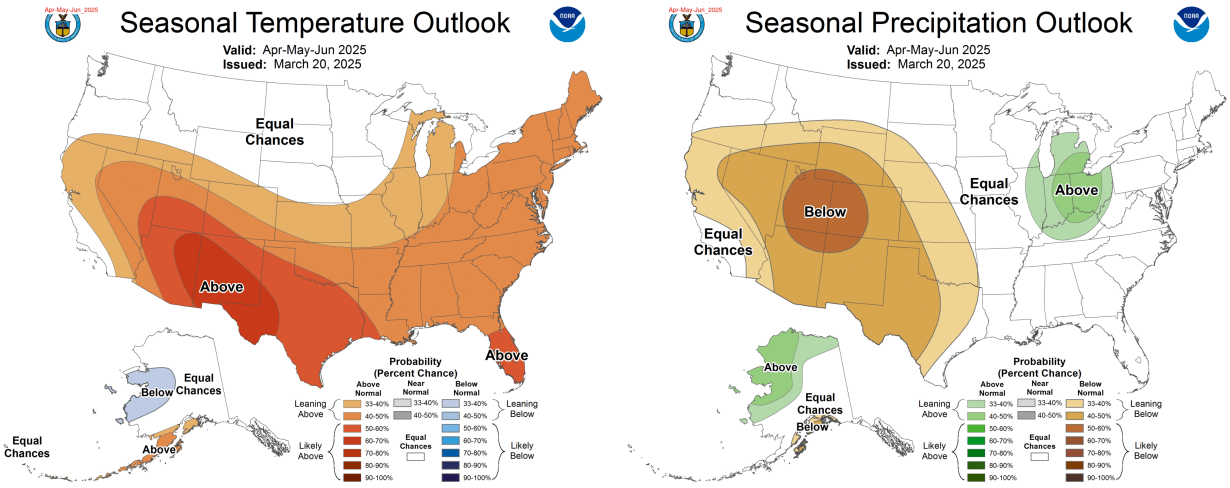
The maps below illustrate the spatial variability of rainfall over the Potomac Basin in March based on PRISM (Parameter-elevation Regressions on Independent Slopes Model) data. The normalized rainfall anomaly, indicating departure from normal conditions, reveals that rainfall was below normal for all the basin.



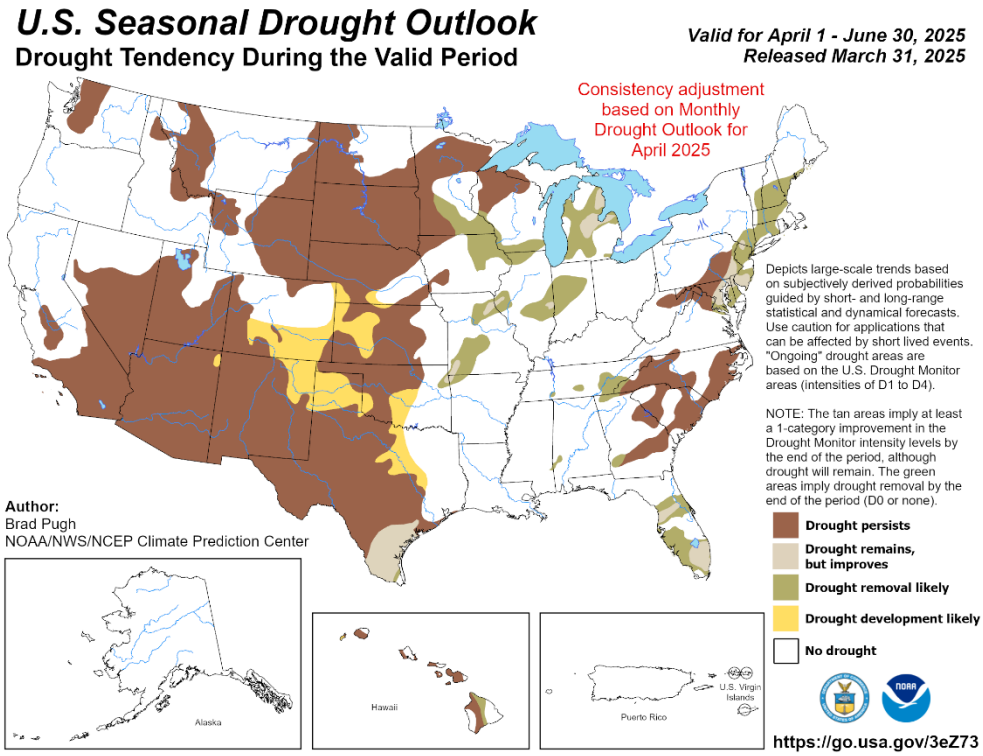
Source: PRISM Climate Group, Oregon State University, https://prism.oregonstate.edu

Precipitation and Drought Outlook for April, May, and June

The Climate Prediction Center's outlooks for April and the April–June 2025 period suggest a higher likelihood of above-normal temperatures across the Potomac River Basin. Precipitation forecasts remain uncertain, with no clear tendency toward wetter or drier conditions. These warmer-than-average temperatures combined with neutral precipitation outlooks may support ongoing drought conditions, particularly in the upper basin.

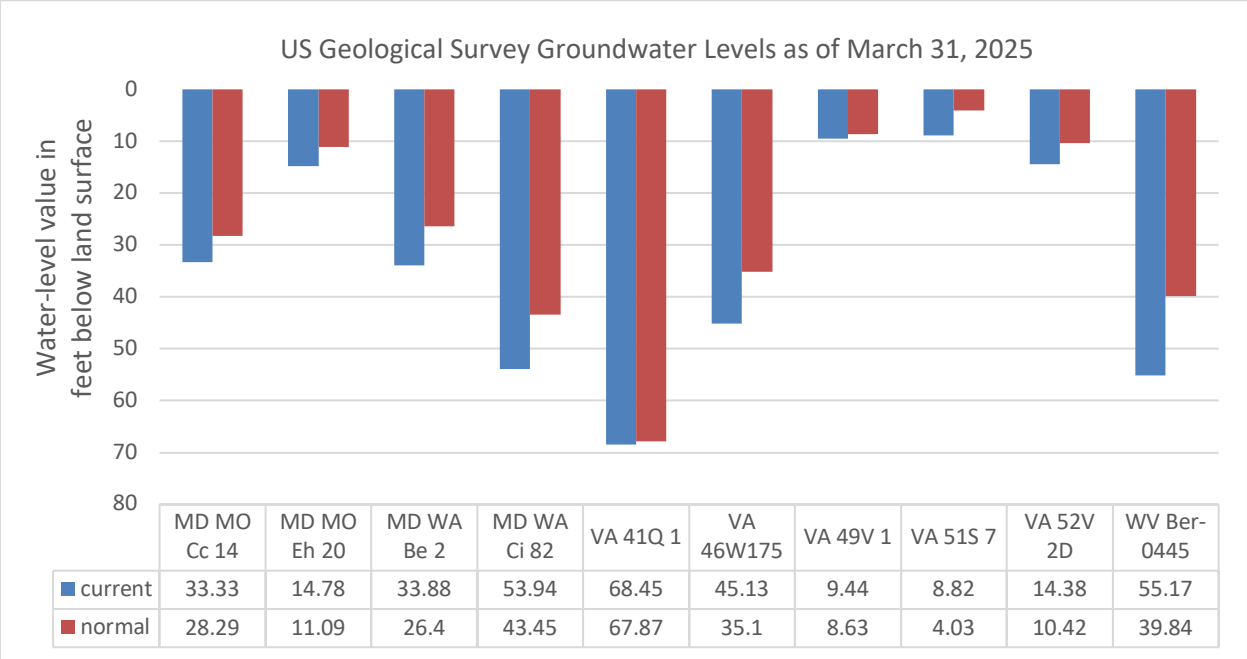


According to the Climate Prediction Center's U.S. Seasonal Drought Outlook released March 31, 2025, drought conditions are expected to persist in the upper Potomac Basin through June. However, parts of the lower basin may experience some improvement, with localized areas near the tidal Potomac likely to see drought removal.



Groundwater – Current Conditions

According to U.S. Geological Survey (USGS) data, groundwater levels at ten wells monitored for the ICPRB water supply outlook are mostly below normal. The graph below shows current groundwater depths compared to estimated normal values for March.



	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	33.33	14.78	33.88	53.94	68.45	45.13	9.44	8.82	14.38	55.17
normal	28.29	11.09	26.4	43.45	67.87	35.1	8.63	4.03	10.42	39.84

Reservoir Storage – Current Conditions

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

Whitewater releases from Jennings Randolph Reservoir are scheduled for April 12–13 and April 26–27, 2025. However, persistent dry conditions have slowed the reservoir's spring refill, and the first release will likely be canceled. A final decision will be made on Monday, April 7, following an assessment of rainfall. Updates can be found at https://www.nab-wc.usace.army.mil/nab/northBranch.html.

Reservoir storage as of April 6, 2025

Facility	Percent Full	Current usable storage, BG	Total usable capacity, BG
WSSC Water's Patuxent reservoirs[1]	71	7.5	10.5
Fairfax Water's Occoquan Reservoir[2]	96	7.9	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]	77	12.5	16.3
Savage Reservoir[5]	62	3.9	6.3

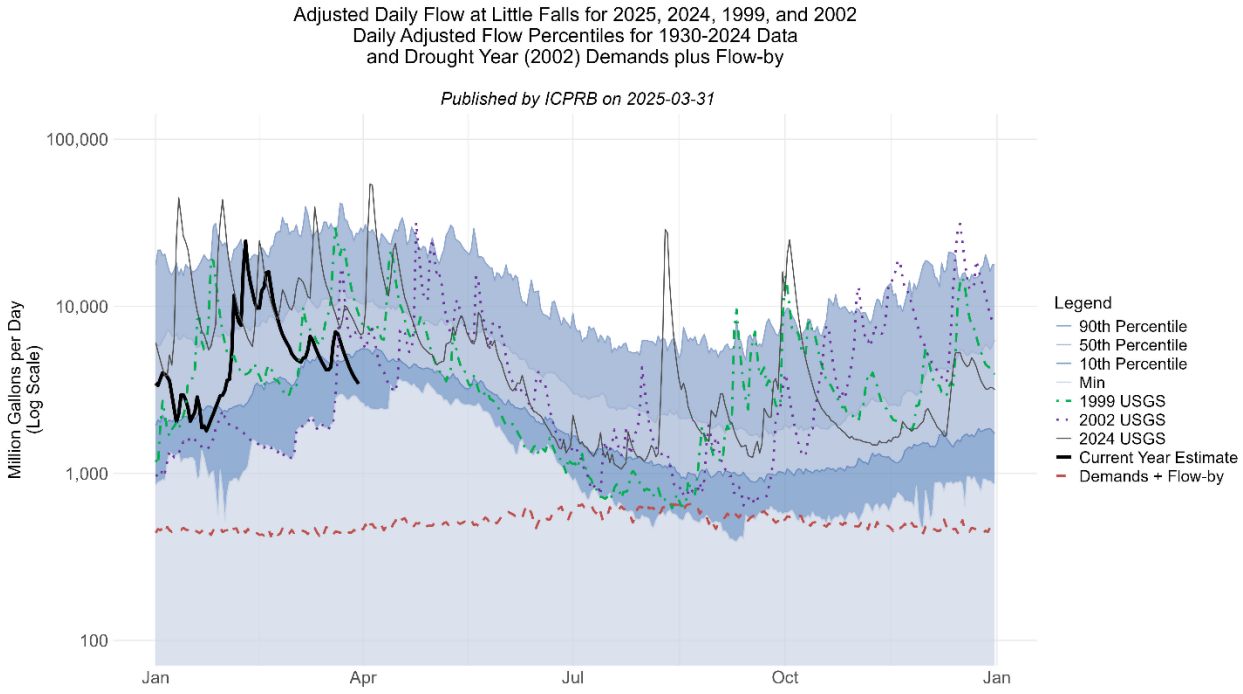
[1] Bathymetric study conducted December 2015 with revisions in December 2016, and unusable storage corrected June 2017.
[2] Bathymetric study conducted in 2019.
[3] Usable capacity consistent with Ortt, *el al.* (2011).
[4] 2013 revised stage-storage curve provided by Bill Haines, US Army Corps of Engineers, 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 March 31 was 3.4 billion gallons per day (BGD). For this day of the year, this value was below the 10th percentile flow value of 5.4 BGD and above the minimum flow value of 2.8 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 6.0 BGD for the past three months and 5.0 BGD in March.

Environmental Flow-by

Average observed Potomac flow at Little Falls in March was well above the minimum recommended flow-by 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

In Maryland, drought warnings are in effect statewide except for the WSSC Service Area, which is in drought watch status as declared by Metropolitan Washington Council of Governments (MWCOG). In Virginia, four regions are currently under a drought watch, while the rest of the state remains in normal conditions. In Pennsylvania, many counties within the Potomac basin are under a drought watch, while two counties outside the basin are under a drought warning and many others remain normal. The drought watch declared by MWCOG on July 29 also remains in effect, urging residents and businesses across the region to conserve water where possible.

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 abnormally dry to severe drought conditions in the Potomac Basin. The Palmer Drought Severity Index map (refer to the second figure on the next page) indicates moderate to severe drought conditions in the upper and middle portions of the basin.