

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 near to above normal probability of releases from the Washington metropolitan area's back-up water supply reservoirs for the 2017 summer and fall seasons. The ICPRB Low Flow Outlook reports higher than historical conditional probabilities for the 700 to 1200 million gallons per day (MGD) low flow thresholds, indicating that low flow monitoring may begin in the near future. 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. The current Water Resource Outlook for the southern MARFC Area reports that current (July 1) stream flow data from the U.S. Geological Survey shows that stream flows are near or below normal. Some flows in central Maryland are much below normal. Groundwater levels are mostly near or below normal. At present, there is sufficient flow in the Potomac River to meet the Washington metropolitan area's water demands without augmentation from upstream reservoirs. However, Maryland and adjoining parts of nearby states have been lacking in precipitation. If this lack of precipitation continues, then degradation in the ICPRB Low Flow Outlook is likely. 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 5 to 16 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.

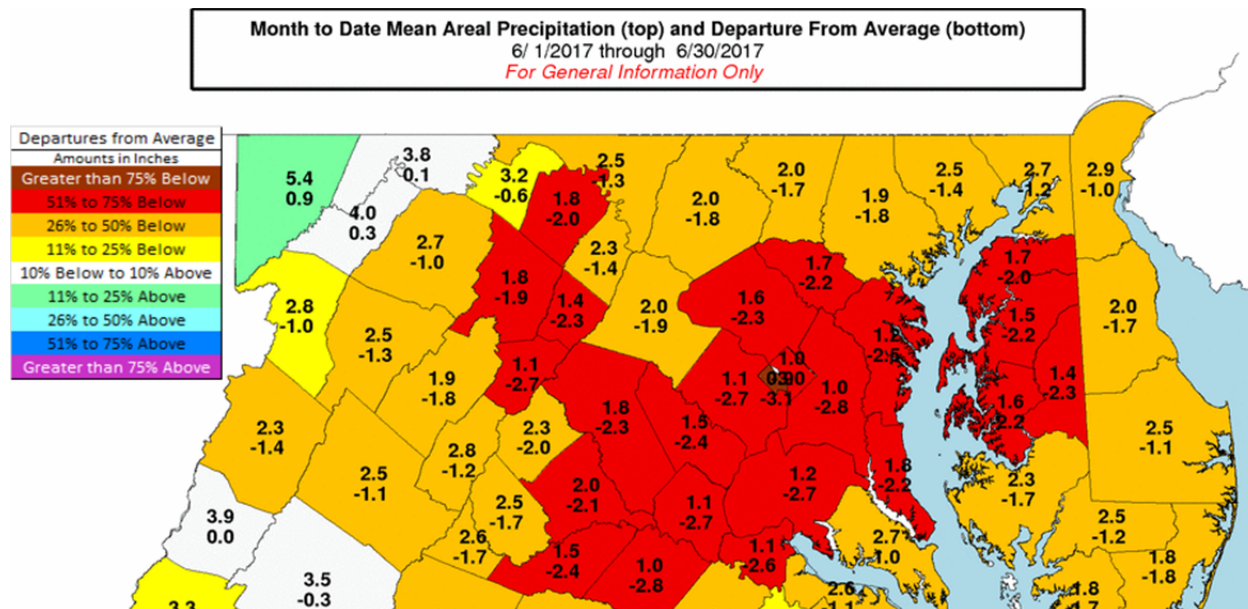
The conditional probability is estimated by analyzing the historical stream flow records and giving consideration to recent stream flow values, precipitation totals for the prior 12 months, current groundwater levels, and the current Palmer Drought Index. Past years in which watershed conditions most 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 conditional probability of 5 to 16 percent compares to a historical probability of 8 to 15 percent and is considered the more reliable indicator.

Outlook for natural Potomac River flow at Little Falls – Watershed conditions as of July 5, 2017

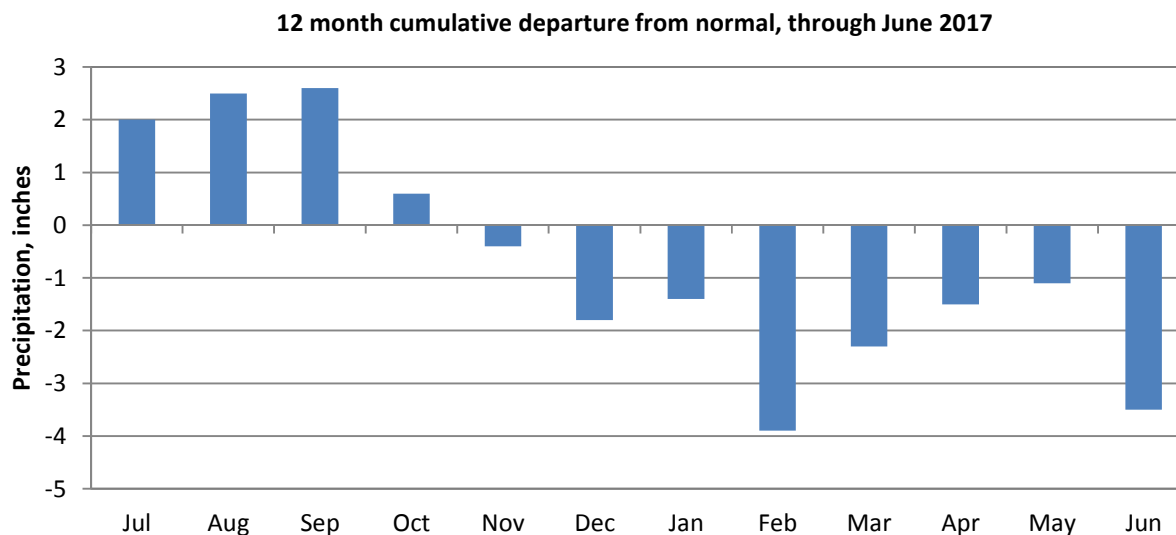
Low flow threshold (MGD)	Low flow threshold (cfs)	Historical probability of lower flow July 1 through December 31	Conditional probability of lower flow July 1 through December 31
1200	1858	68%	75%
1000	1548	49%	57%
800	1238	25%	29%
700	1084	15%	16%
600	929	8%	5%

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 2.6 inches for the month of June, which is 1.1 inches below normal. The map below shows that June precipitation ranged between below 1.5 to more than 2.5 inches below normal in Delaware, much of Maryland, the eastern panhandle of West Virginia, and northern Virginia. The rest of Virginia and far western Maryland were closer to normal. The 12-month cumulative basin precipitation shows deterioration from 1.1 inches below normal in May to 3.5 inches below normal in June (see graph).

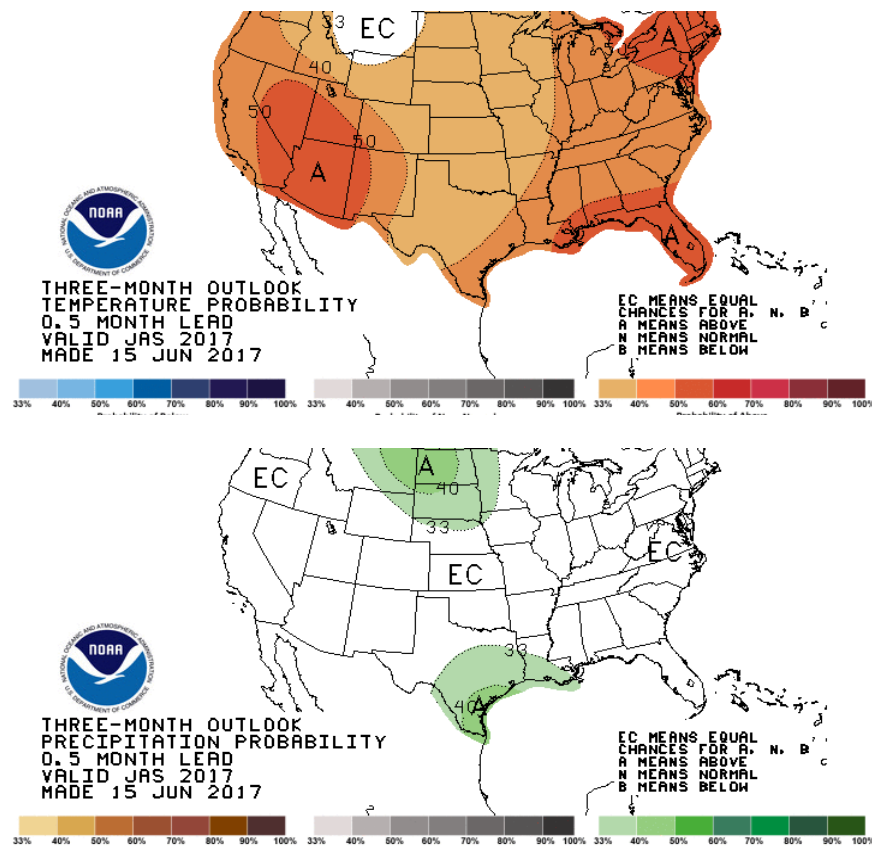


Source: Middle Atlantic River Forecast Center, National Weather Service



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

Precipitation and Drought Outlook for July, August, and September 2017:

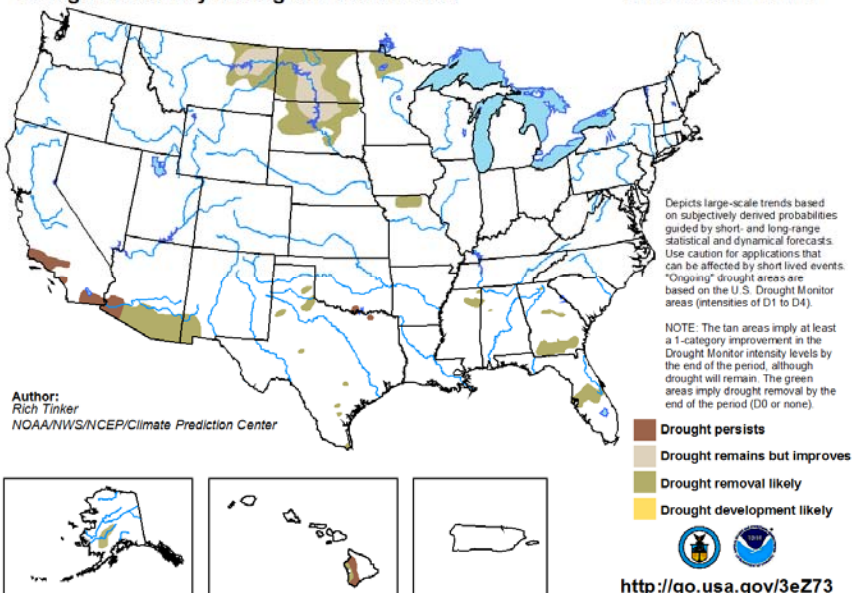


MARFC's Water Resource Outlook for the southern portion of the Middle Atlantic calls for near or above average precipitation and above average temperatures through the middle of July.

The National Weather Service Climate Prediction Center's 30 day outlook for July as well as the 90 day outlook for July through September calls for near average precipitation and above average temperatures.

U.S. Seasonal Drought Outlook Drought Tendency During the Valid Period

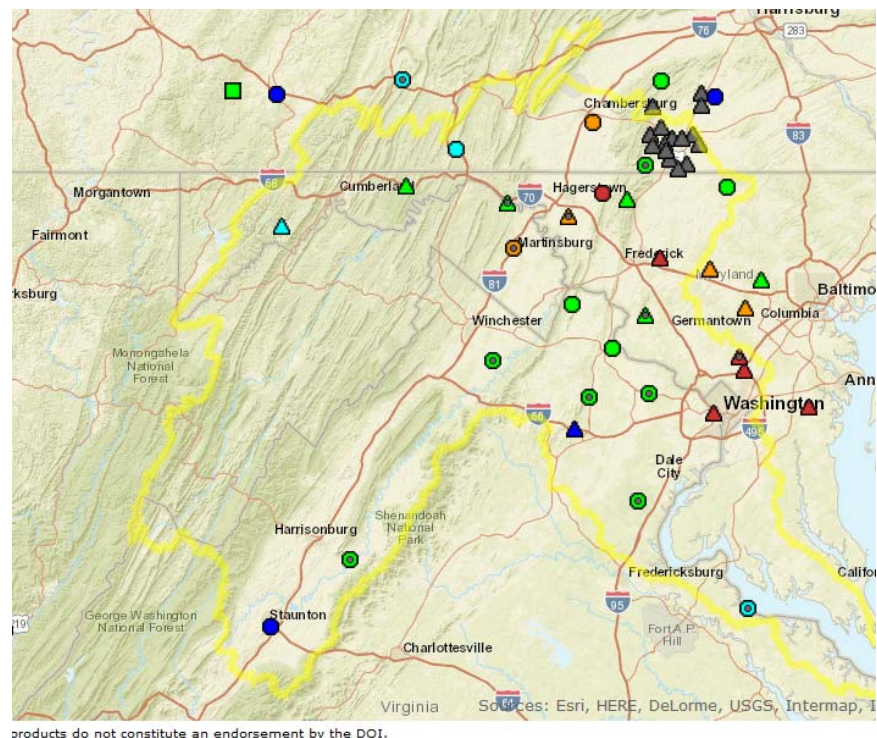
Valid for June 15 - September 30, 2017
Released June 15, 2017



As of June 15, 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 (July 1, 2017) reports that groundwater levels are near or below normal. The groundwater map below, created 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 "Much Below Normal" to "Above Normal". Wells with a gray dot inside the symbol identify Water Supply Outlook wells, the majority of which fall in the "Normal" category. In this map, the USGS defines "Normal" as between the 25th and 75th percentiles, and "Below Normal" as between the 10th and 24th percentile.



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	High	Not Ranked

Wells

- ■ Real Time
- ■ Continuous
- △ ■ Periodic Measurement

Reservoir Storage – Current Conditions:

No water supply releases from the COOP shared system have been made this year. Triadelphia Reservoir is low and will remain so for the next two years because of rehabilitation work being done at the dam.

The second whitewater recreational release from Savage Reservoir occurred on July 2nd. Releases from Jennings Randolph and Savage Reservoirs are made for a variety of purposes. The flow values reported for whitewater and artificially varied flow (AVF) come entirely from water quality storage and may be increased or decreased without prior notice, depending on changing climatic and hydrologic conditions.

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

Reservoir storage as of July 3, 2017

Facility	Percent Full	Current usable storage, BG	Total usable capacity, BG
WSSC's Patuxent reservoirs ⁴	51	6.0	11.9
Fairfax Water's Occoquan Reservoir	100	8.1	8.1
Little Seneca Reservoir ¹	97	3.8	3.9
Jennings Randolph water supply ²	100	13.1	13.1
Jennings Randolph water quality ²	99	16.1	16.3
Savage Reservoir ³	94	5.9	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.

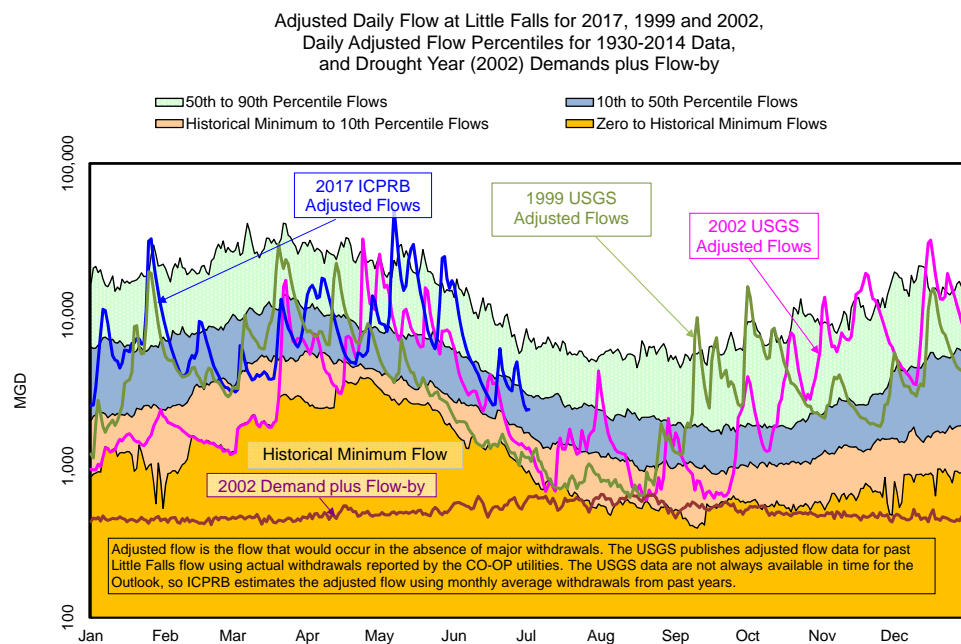
⁴ Bathymetric study conducted December 2015 with revisions in December 2016, and unusable storage corrected June 2017.

Potomac River Flow:

The estimated adjusted Potomac flow at Little Falls on June 30 was 2.5 billion gallons per day (BGD). For this day of the year, this value was above the 10th percentile flow value of 1.6 BGD and below the 50th percentile flow value of 3.1 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 8.7 BGD for the first six months of the year and 4.9 BGD in June.

Environmental Flow-by:

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



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.

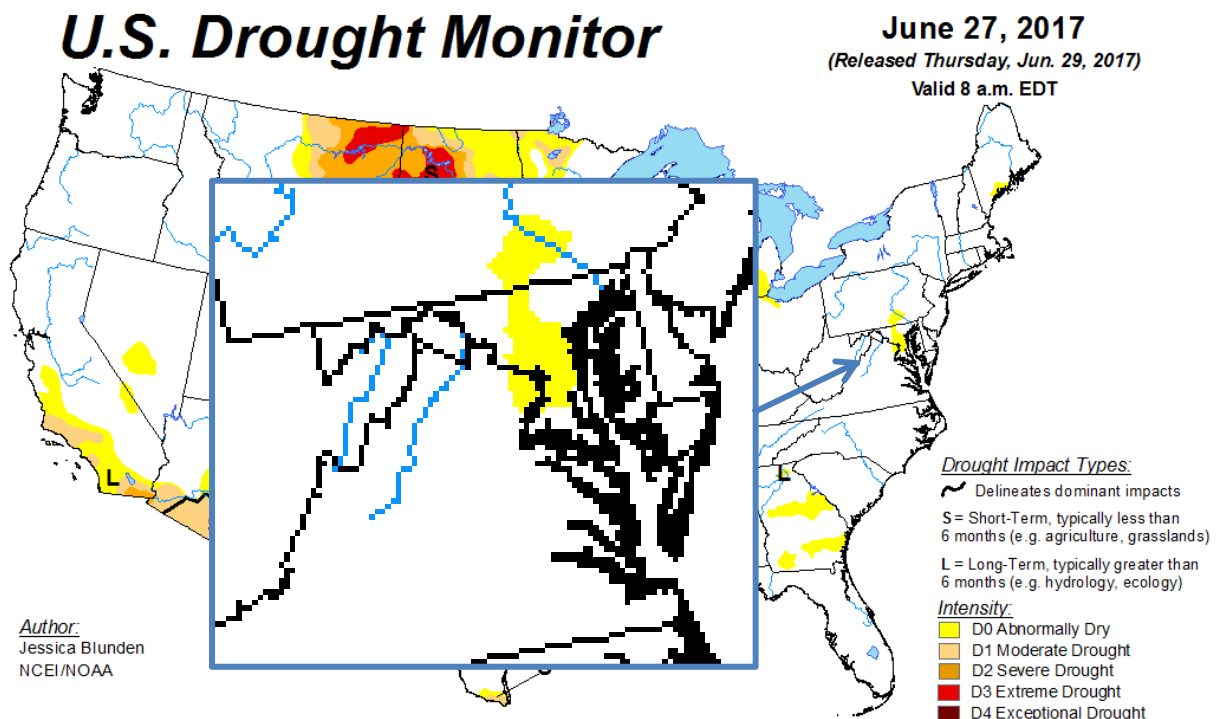
Information provided by the USGS, the Middle Atlantic River Forecast Center, and the National Weather Service.

Drought Status:

The Metropolitan Washington Council of Government's Drought Awareness Response Plan status is "Normal". The state of [Maryland](#) has a "Drought Watch" in effect for central parts of the state. The state of [Virginia](#) has a "Drought Watch" in effect for the Northern Piedmont region of the state due to low groundwater level indicators. The state of [Pennsylvania](#) remains "Normal" for the entire state.

Drought Monitor and Soil Moisture:

The NOAA Climate Prediction Center's U.S. Drought Monitor map (see first figure below) indicates abnormal dry (D0) conditions in parts of the Potomac basin. The D0 conditions shrank southward in southeast Pennsylvania. However, in northern Maryland D0 conditions were extended south and a bit southeastward to include Howard, southern Baltimore, most of Anne Arundel and Prince Georges Counties, and much of Montgomery County. This also includes northwestern Calvert and northern Charles Counties. Precipitation in southern Baltimore County, for example, was less than 25 percent of normal over the past month. Abnormal dryness also extended south through Washington D.C. into Arlington and part of Fairfax Counties in Virginia. The Palmer Drought Severity Index by Division map (see second figure on next page) indicates moderate to severe drought conditions in the Potomac basin, with the severe drought conditions occurring in parts of West Virginia, the Washington, D.C. area and surrounding suburbs.



Drought Severity Index by Division
Weekly Value for Period Ending Jul 01, 2017
Long Term Palmer

