

Water Supply Outlook



Interstate Commission on the Potomac River Basin (ICPRB)

30 W. Gude Drive, Suite 450
Rockville, MD 20850
Tel: (301) 274-8120

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To subscribe: please email sahmed@icprb.org

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 a below normal probability of releases from the Washington metropolitan area's back-up water supply reservoirs for the 2019 summer and fall seasons. 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 Middle Atlantic River Forecast Center's (MARFC) Water Resource Outlook for the southern portion of the Middle Atlantic reports that water resources and water supplies are very good with little change expected in the next couple of weeks. Within the Potomac basin average precipitation in the month of March is below normal, with an above normal area in central Virginia reaching northeastward into Maryland as well as the Delmarva Peninsula. Streamflow is near or above normal, and groundwater levels are above or much above 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. 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 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. 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.

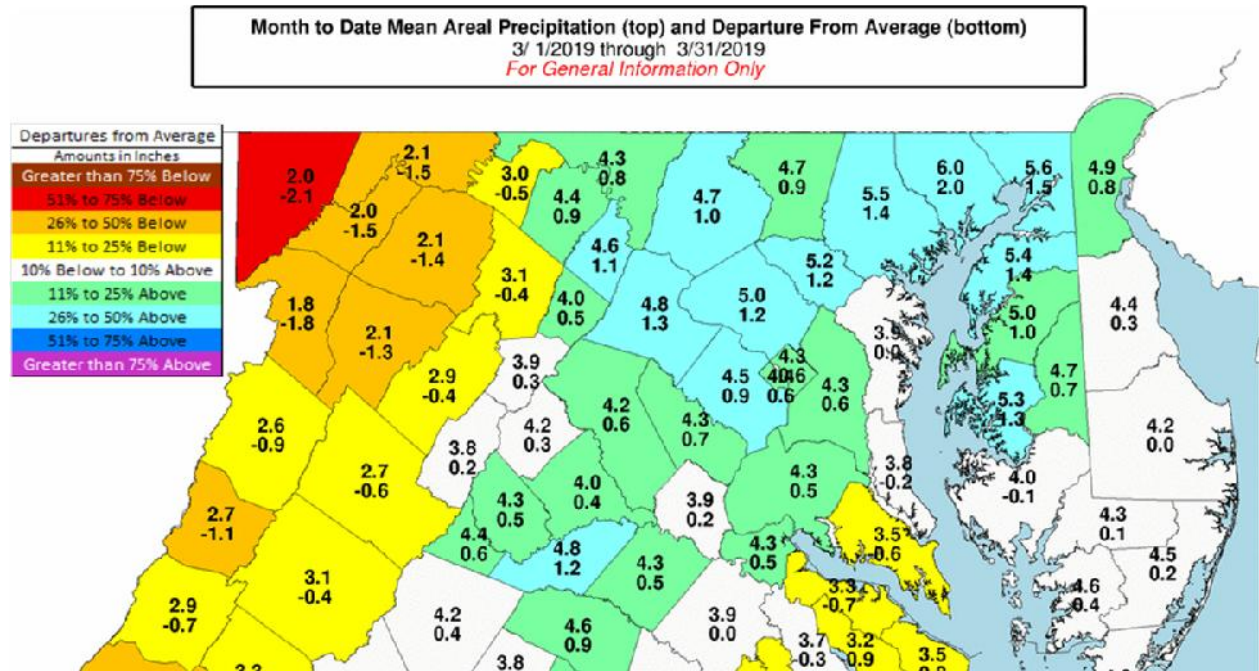
The conditional probability is estimated by analyzing the historical stream flow records and giving consideration to recent stream flow values, precipitation totals for the prior 12 months, current groundwater levels, and the current Palmer Drought Index. Past years in which watershed conditions most 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 1 to 4 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, 2019

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	68%	58%
1000	1548	49%	18%
800	1238	25%	9%
700	1084	15%	4%
600	929	8%	1%

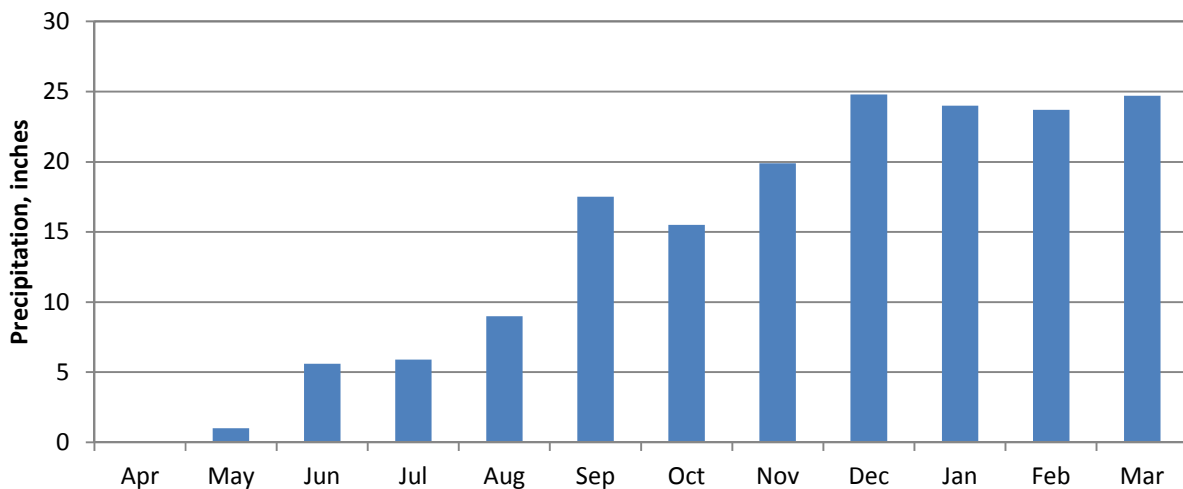
Past Precipitation:

Data from the National Weather Service’s Middle Atlantic River Forecast Center (MARFC) shows that the Potomac basin upstream of Washington, D.C. has received a precipitation total of 3.1 inches for the month of March, which is 0.4 inches below normal. The map below shows that March precipitation ranged between 1 to 2 inches above average from central Virginia northeastward into Maryland as well as the Delmarva Peninsula. Elsewhere, amounts have been average plus or minus an inch or so. The 12-month cumulative basin precipitation shows 24.7 inches above normal as of March (see graph).



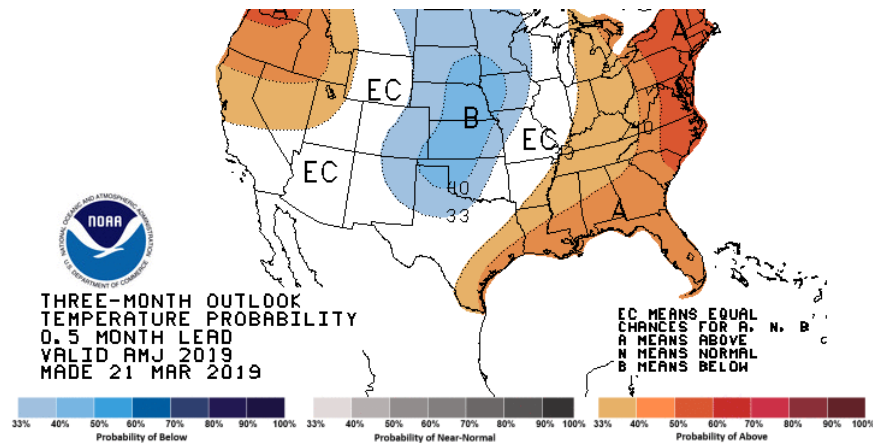
Source: Middle Atlantic River Forecast Center, National Weather Service

12 month cumulative departure from normal, through March 2019



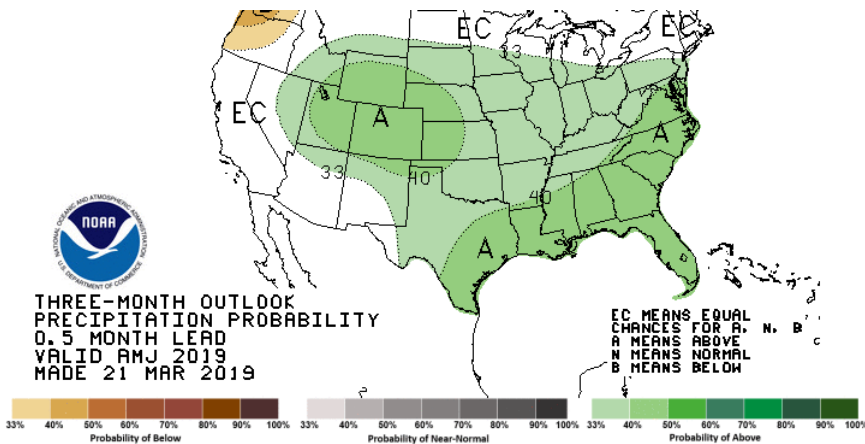
Information provided by the USGS, the Middle Atlantic River Forecast Center, and the National Weather Service.

Precipitation and Drought Outlook for April, May, and June 2019:



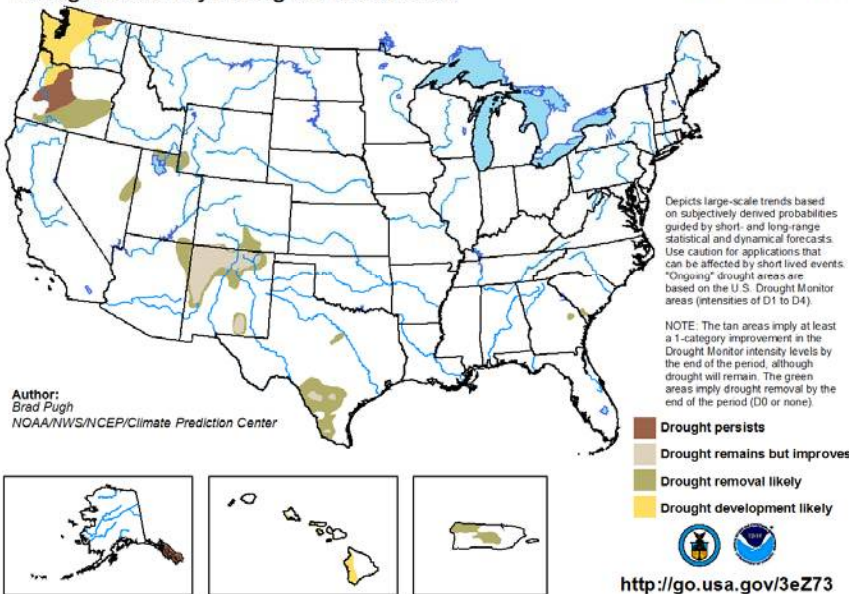
MARFC's Water Resource Outlook for the southern portion of the Middle Atlantic calls for calls for near or below average precipitation and about normal temperatures through the next couple of weeks.

The National Weather Service Climate Prediction Center's 30-day outlook for April calls for near average precipitation and above normal temperatures. The 90-day outlook for April through June calls for above average precipitation and above average temperatures.



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

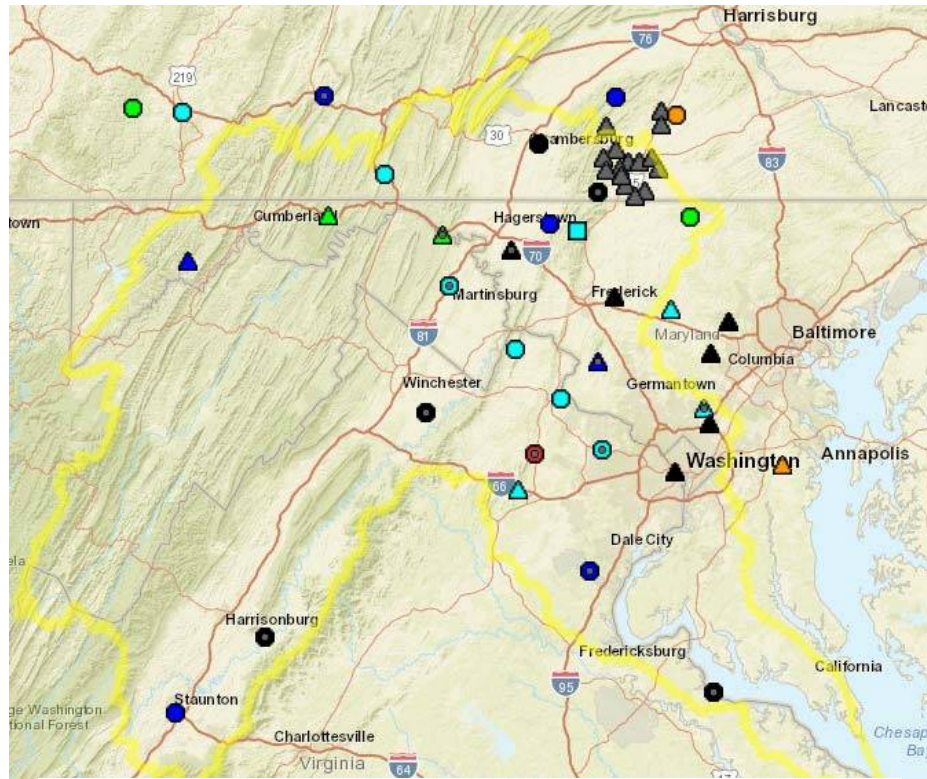
Valid for March 21 - June 30, 2019
Released March 21



As of March 21, 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, created by the U.S. Geological Survey (USGS), Pennsylvania Water Science Center, shows that current water levels in monitoring wells in the Potomac basin mostly range from “Normal” to “Much Above Normal” or “High.” One well in Prince William County, Virginia is reported as “Much Below Normal” for unknown reasons. It may be that the well is responding to below normal precipitation over the past 7 days, despite the overall normal precipitation over the past 30 days. Wells with a gray dot inside the symbol identify Water Supply Outlook wells. 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)							Wells		
●	●	●	●	●	●	●	●	○	■
Low	<10	10-24	25-75	76-90	>90	High	Not Ranked	□	▣
	Much Below Normal	Below Normal	Normal	Above Normal	Much Above Normal			△	▴

Reservoir Storage – Current Conditions:

No water supply releases from the CO-OP shared system have been made this year. Triadelphia Reservoir is low and will remain so for the next year or so because of rehabilitation work being done at the dam. Triadelphia Reservoir is one of the two Patuxent reservoirs.

Whitewater releases from Jennings Randolph Reservoir are scheduled for the weekends of April 13-14th and April 27-28th. 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 April 1, 2019

Facility	Percent Full	Current usable storage, BG	Total usable capacity, BG
WSSC's Patuxent reservoirs ^{4,5}	67	7.0	10.5
Fairfax Water's Occoquan Reservoir	100	8.1	8.1
Little Seneca Reservoir ¹	98	3.8	3.9
Jennings Randolph water supply ²	100	13.1	13.1
Jennings Randolph water quality ²	85	13.9	16.3
Savage Reservoir ³	76	4.8	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.

⁵ Patuxent total usable storage currently reduced to approximately 5.5 BG due to the Brighton dam rehabilitation project.

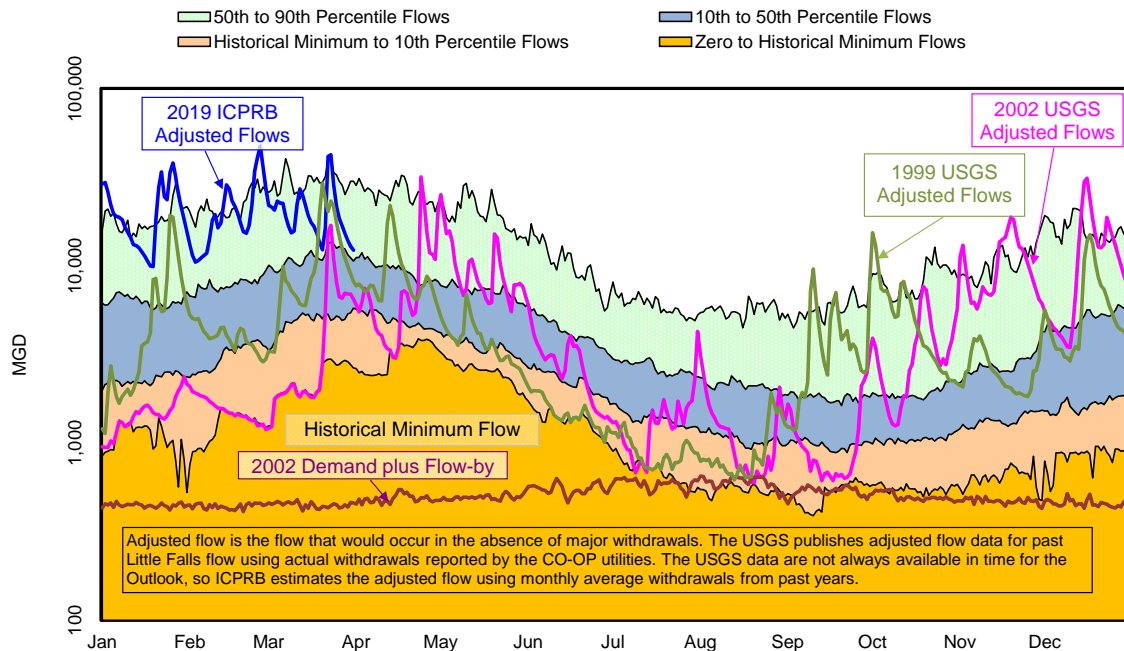
Potomac River Flow:

The estimated adjusted Potomac flow at Little Falls on March 31st was 12.2 billion gallons per day (BGD). For this day of the year, this value was above the 50th percentile flow value of 10.6 BGD and below the 90th percentile flow value of 30.0 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 20.5 BGD for the first three months of the year and 20.3 BGD in March.

Environmental Flow-by:

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

Adjusted Daily Flow at Little Falls for 2019, 1999 and 2002,
Daily Adjusted Flow Percentiles for 1930-2014 Data,
and Drought Year (2002) Demands plus Flow-by



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.

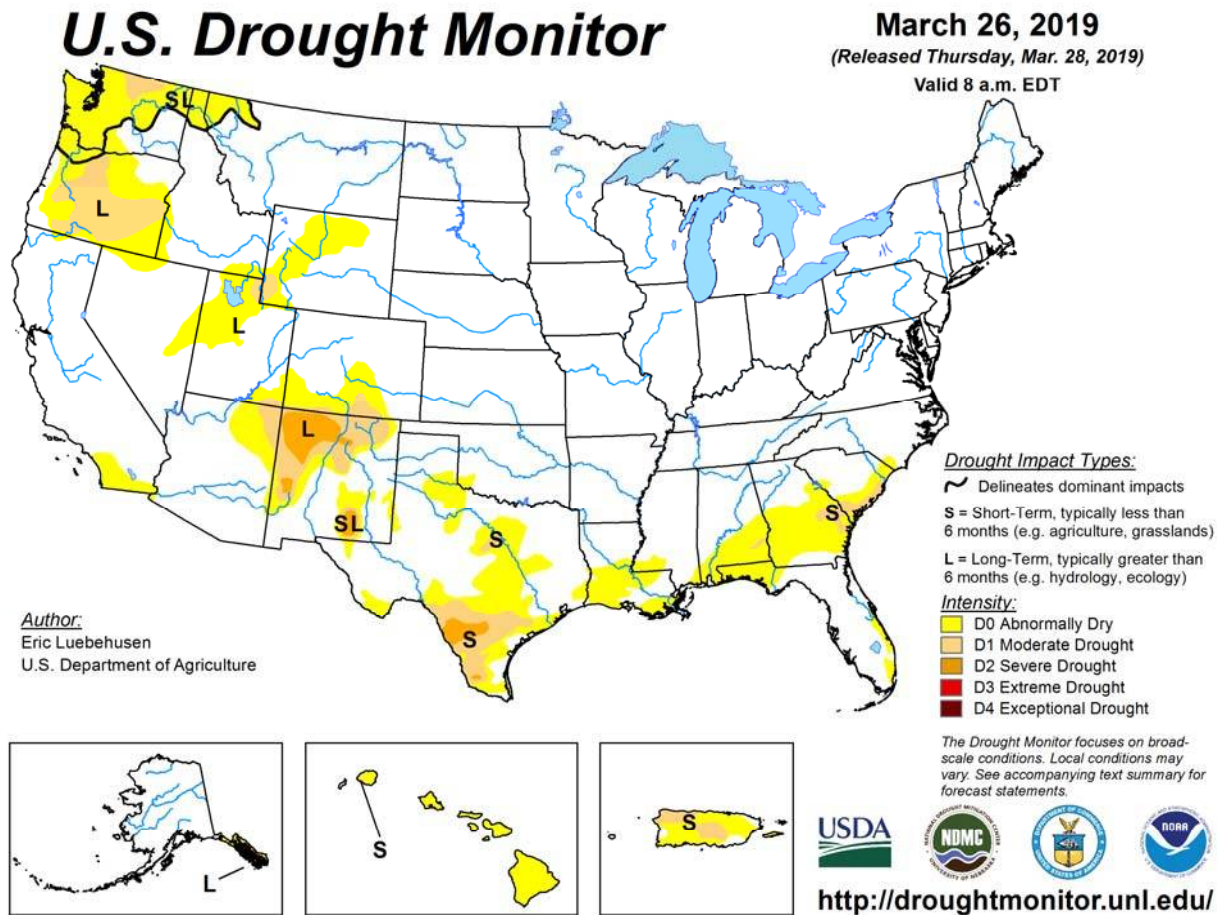
Information provided by the USGS, the Middle Atlantic River Forecast Center, and the National Weather Service.

Drought Status:

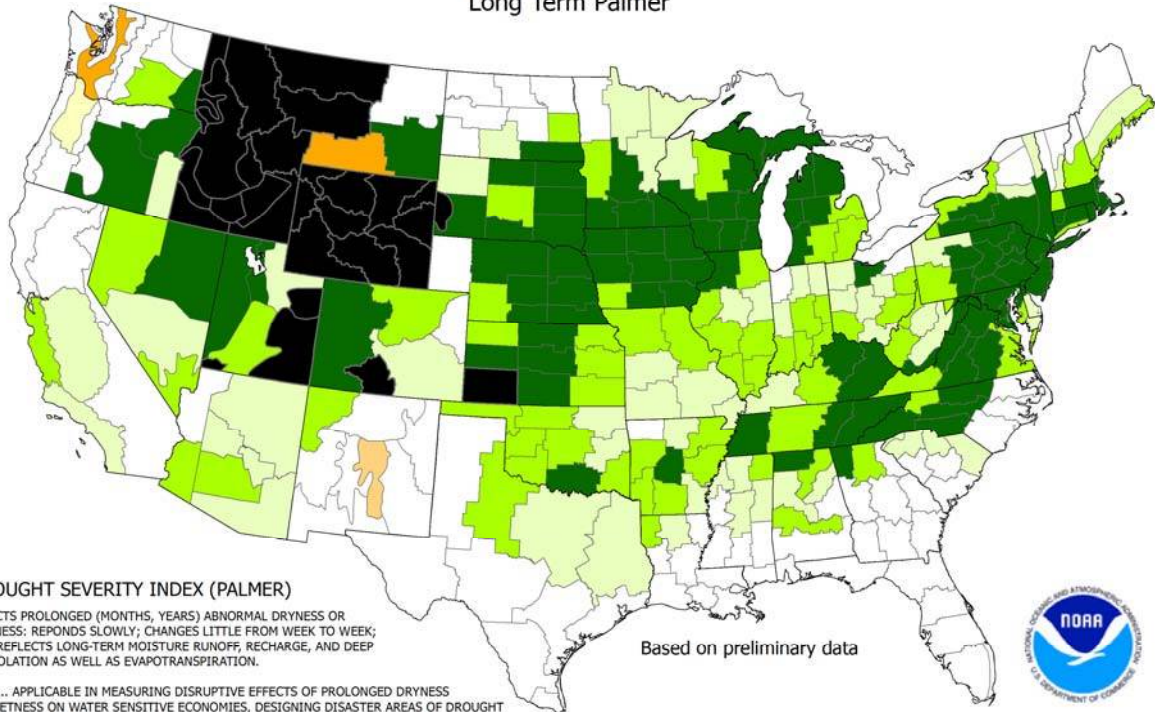
The Metropolitan Washington Council of Government’s Drought Awareness Response Plan status is “Normal”. The states of [Maryland](#), [Pennsylvania](#), and [Virginia](#) are “Normal.”

Drought Monitor and Soil Moisture:

The NOAA Climate Prediction Center’s U.S. Drought Monitor map (see first figure below) indicates no drought conditions for the Potomac basin. The Palmer Drought Severity Index by Division map (see second figure on next page) indicates unusually to extremely moist conditions throughout the Potomac basin.



Drought Severity Index by Division
 Weekly Value for Period Ending Mar 23, 2019
 Long Term Palmer



DROUGHT SEVERITY INDEX (PALMER)

DEPICTS PROLONGED (MONTHS, YEARS) ABNORMAL DRYNESS OR WETNESS; REponds 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 OFFSHORT-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) | ■ +2.0 to +2.9 (Unusual Moist Spell) |
| ■ -3.0 to -3.9 (Severe Drought) | ■ +3.0 to +3.9 (Very Moist Spell) |
| ■ -2.0 to -2.9 (Moderate Drought) | ■ +4.0 and above (Extremely Moist) |
| ■ --1.9 to +1.9 (Near Normal) | ■ Missing/Incomplete |