

Water Supply Outlook

April 2, 2020

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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:

The probability of releases from the Washington metropolitan area's back-up water supply reservoirs for the 2020 summer and fall seasons is close to 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. Average precipitation in the Potomac Basin in March was 1.1 inches below normal and the 12-month cumulative precipitation is now 1 inch below normal. Streamflow is currently near normal, and groundwater levels are normal with some local exceptions. The Middle Atlantic River Forecast Center's (MARFC) outlook for water resources and supplies is fair, pointing to worsening of conditions over the past couple of weeks, low winter precipitation and groundwater recharge. Though precipitation outlooks remain above average, persistence of a dry, warm weather into spring, could lead to the development of drought conditions. 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 owing to carefully designed drought-contingency plans.

ICPRB's Low Flow Outlook:

There is a 6 to 12 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.

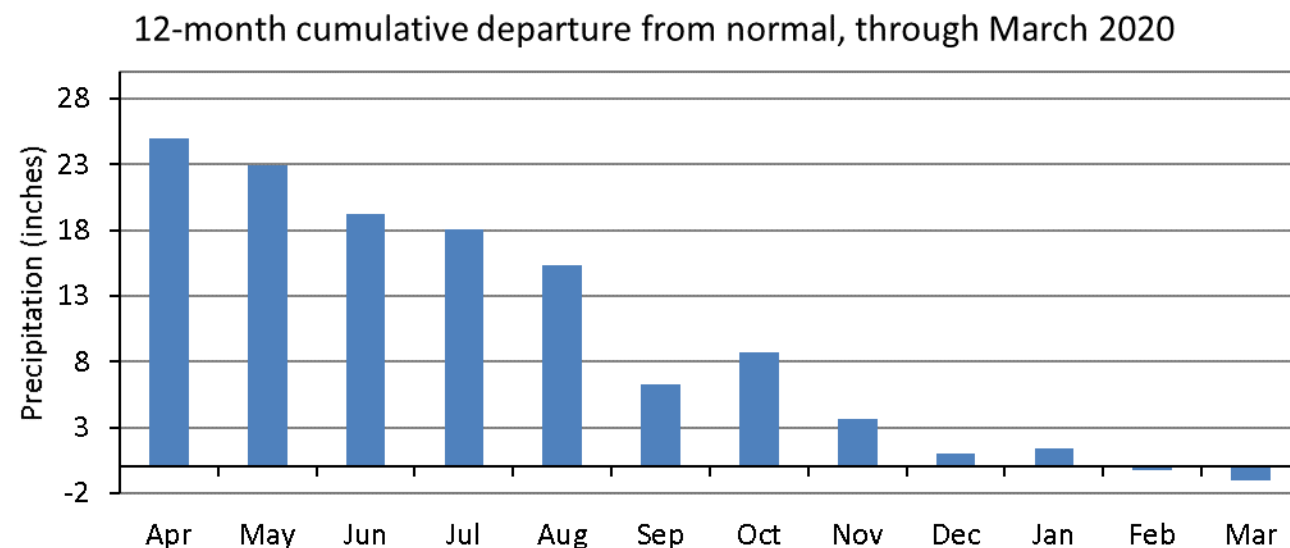
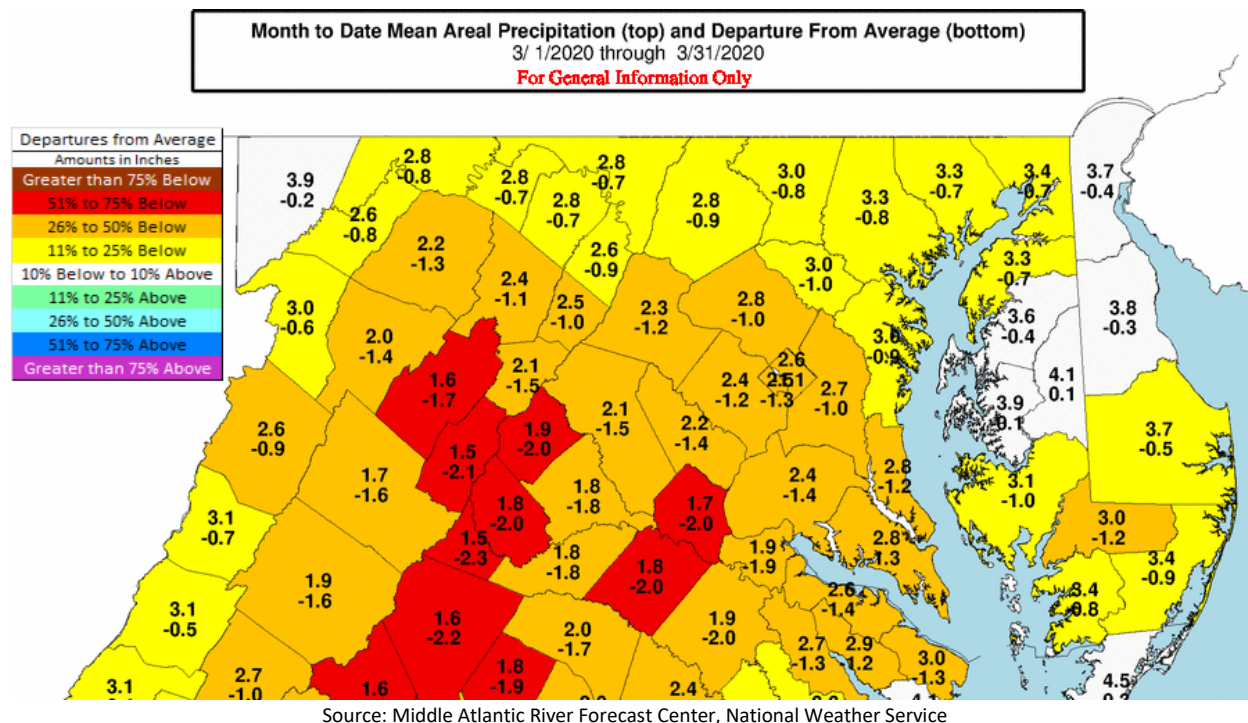
The conditional probability is estimated by analyzing the historical stream flow records and giving consideration to recent stream flow values, precipitation totals for the prior 12 months, current groundwater levels, and the current Palmer Drought Index. Past years in which watershed conditions most 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 6 to 12 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, 2020

| 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% | 69% |
| 1000 | 1548 | 49% | 51% |
| 800 | 1238 | 25% | 24% |
| 700 | 1084 | 15% | 12% |
| 600 | 929 | 8% | 6% |

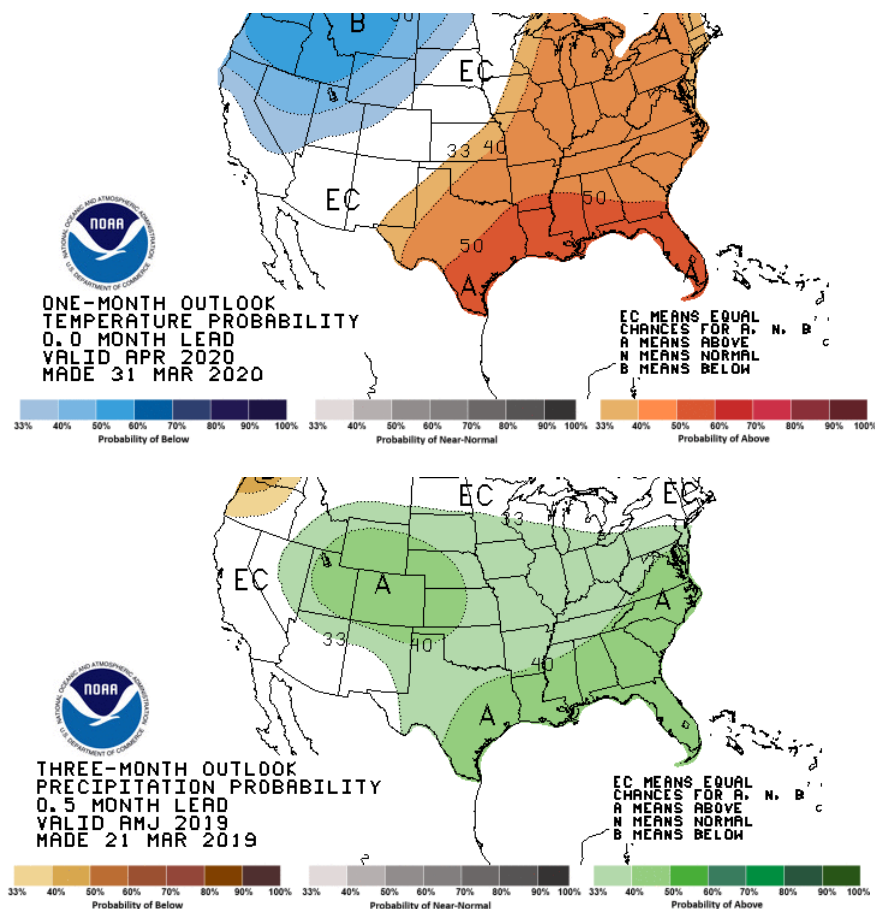
Past Precipitation:

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 2.4 inches for the month of March, which is 1.1 inches below normal. The map below shows that March precipitation ranged between 1.5 to about 3 inches throughout the region. The 12-month cumulative basin precipitation is 1 inch below normal as of March (see graph).



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 2020:

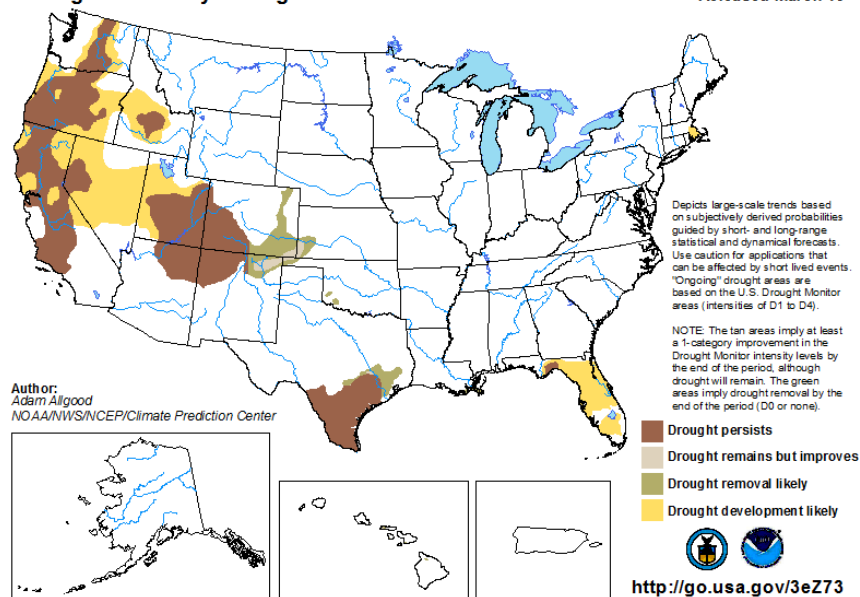


The Middle Atlantic River Forecast Center's (MARFC) outlook for water resources and supplies is fair. MARFC points out that most indicators for water resources and supplies are showing indications that a dry spell has begun in the Mid-Atlantic. Precipitation is below normal for the past 1 to 3 months for most areas. Temperatures has been slightly above average and low winter precipitation has provided no substantial recharge for groundwater or streams from this point forward into spring.

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

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

Valid for March 19 - June 30, 2020
Released March 19

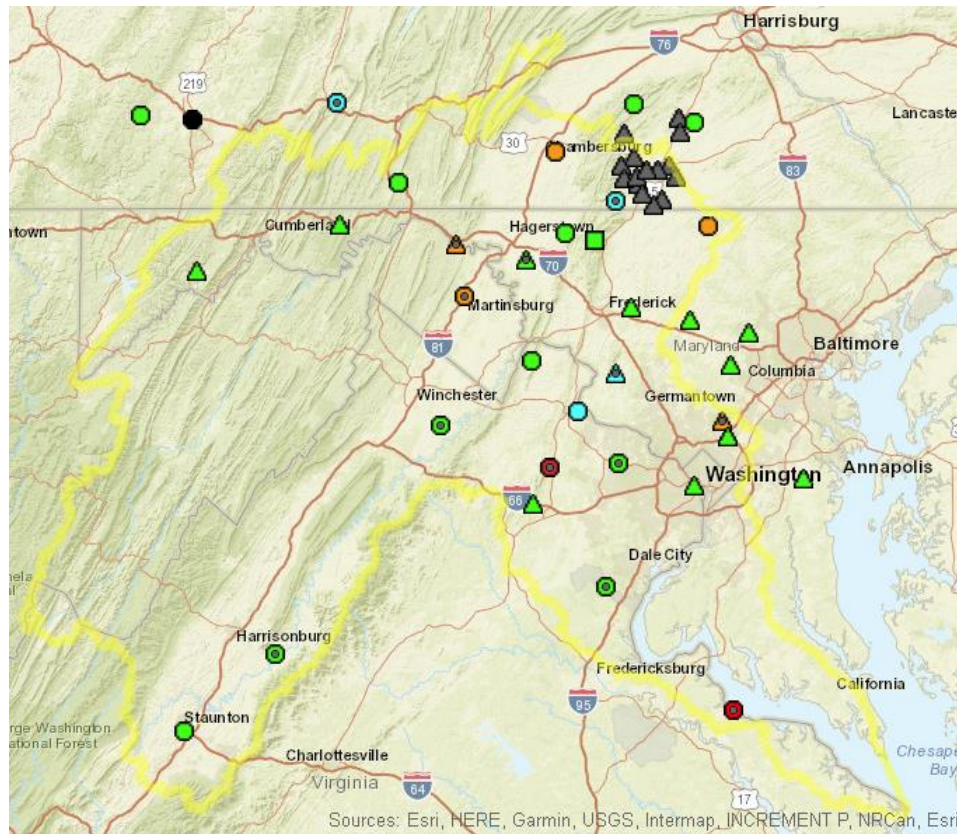


As of March 19, 2020, the Climate Prediction Center's U.S. Seasonal Drought Outlook reports no drought development in the Potomac basin.

Groundwater – Current Conditions:

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

The groundwater map below, developed by the U.S. Geological Survey (USGS), Pennsylvania Water Science Center, shows that current water levels in most monitoring wells in the Potomac basin are in the “Normal” range although a couple of wells are in the “Much Below Normal” range. 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. “Much Below Normal” is defined as below the 10th 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 | Not Ranked |

| Wells | | |
|-------|---|----------------------|
| ○ | ■ | Real Time |
| □ | ■ | Continuous |
| △ | ■ | Periodic Measurement |

Reservoir Storage – Current Conditions:

No water supply releases from the CO-OP shared system have been made this year. There is relatively low usable storage in the Triadelphia Reservoir, one of the two Patuxent reservoirs, due to the recent dam rehabilitation work. The project is now complete and storage level should increase through the year depending on precipitation. Previously scheduled whitewater releases from [Jennings Randolph](#) Reservoir for the beginning of April are cancelled in light of the current situation with COVID-19 and in line of recommendations at Federal and State levels regarding restrictions. Whitewater releases scheduled for the weekends of April 18-19th will be evaluated as the date becomes near. 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, 2020

| Facility | Percent Full | Current usable storage, BG | Total usable capacity, BG |
|--|--------------|----------------------------|---------------------------|
| WSSC's Patuxent reservoirs ^{4,5} | 69 | 7.3 | 10.5 |
| Fairfax Water's Occoquan Reservoir | 100 | 8.1 | 8.1 |
| Little Seneca Reservoir ¹ | 99 | 3.8 | 3.9 |
| Jennings Randolph water supply ² | 100 | 13.1 | 13.1 |
| Jennings Randolph water quality ² | 97 | 15.8 | 16.3 |
| Savage Reservoir ³ | 76 | 4.7 | 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.

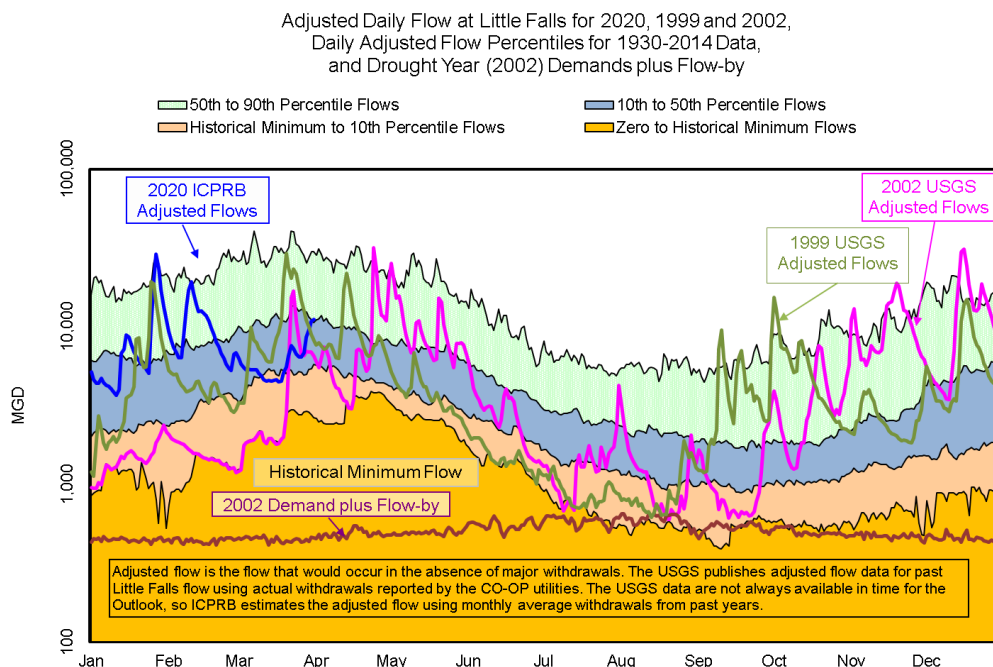
⁵ Patuxent total usable storage currently reduced to approximately 5.5 BG due to the Brighton dam rehabilitation project.

Potomac River Flow:

The estimated adjusted Potomac flow at Little Falls on March 31st was 10.8 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 7.9 BGD for the first three months of the year and 6.1 BGD in March.

Environmental Flow-by:

Average observed Potomac flow at Little Falls in March 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.

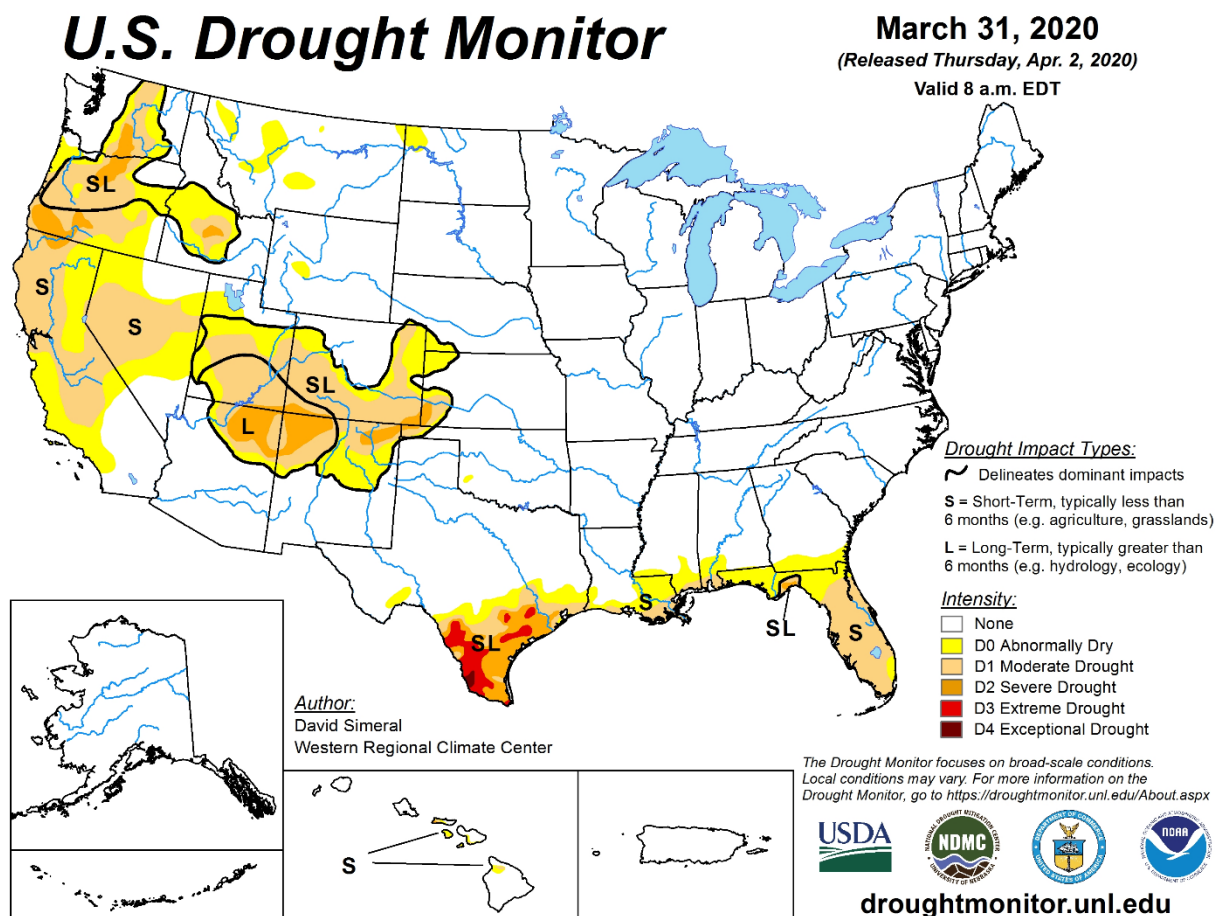
Information provided by the USGS, the Middle Atlantic River Forecast Center, and the National Weather Service.

Drought Status:

Drought status in [Maryland](#), [Pennsylvania](#), and [Virginia](#) is “Normal”.

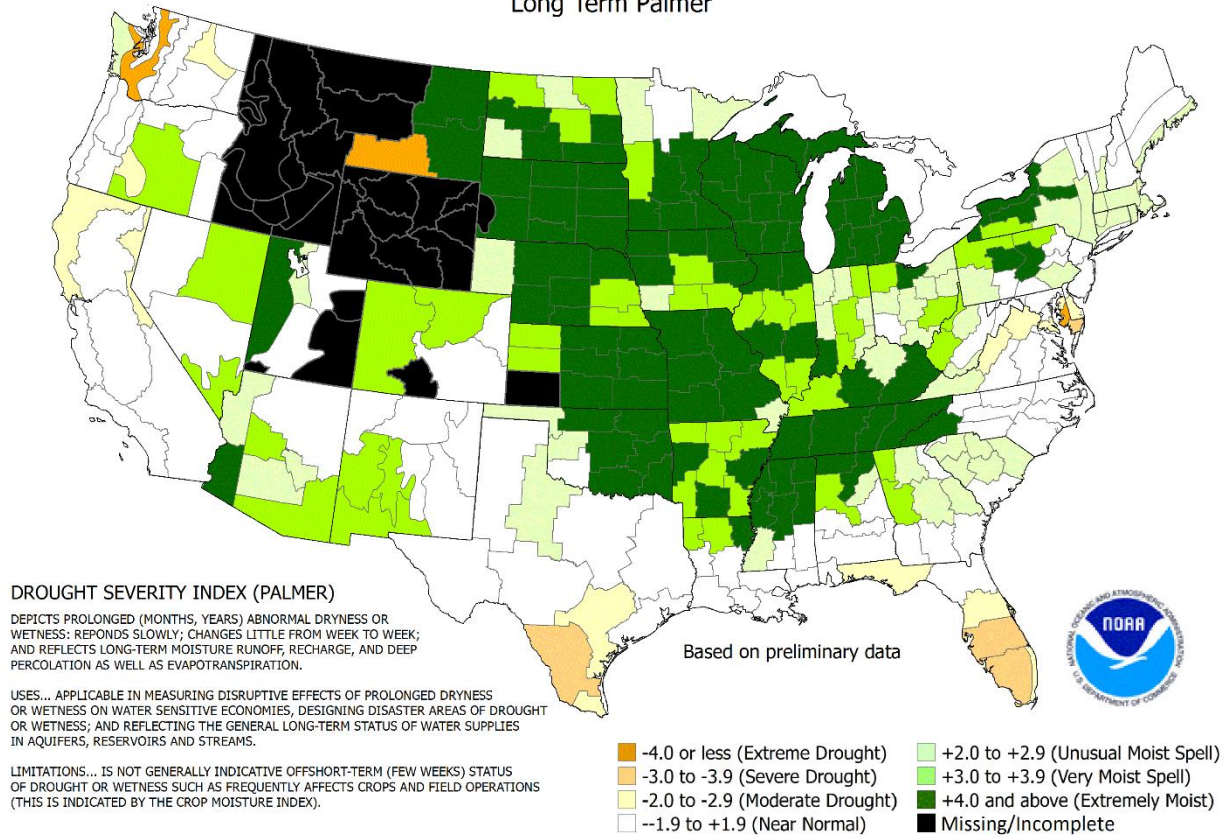
Drought Monitor and Soil Moisture:

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 normal to moderate drought conditions in the Potomac basin.



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

Drought Severity Index by Division
Weekly Value for Period Ending Mar 28, 2020
Long Term Palmer



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