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 a slightly elevated probability of releases from the Washington metropolitan area's back-up water supply reservoirs for the 2017 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 current National Drought Summary for the Northeast region reports that widespread showers made small improvements in the long-term drought conditions shown in the April 25th U.S. Drought Monitor. Although short-term dryness is currently not a concern, slower-to-recover drought impacts remain. In particular, groundwater levels remain unfavorably low with 10 to 25th percentile and below 10th percentile wells in the areas with lingering Abnormal Dryness and Moderate Drought (D0 and D1) 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 because of carefully designed drought-contingency plans.

ICPRB's Low Flow Outlook:

There is an 8 to 17 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.

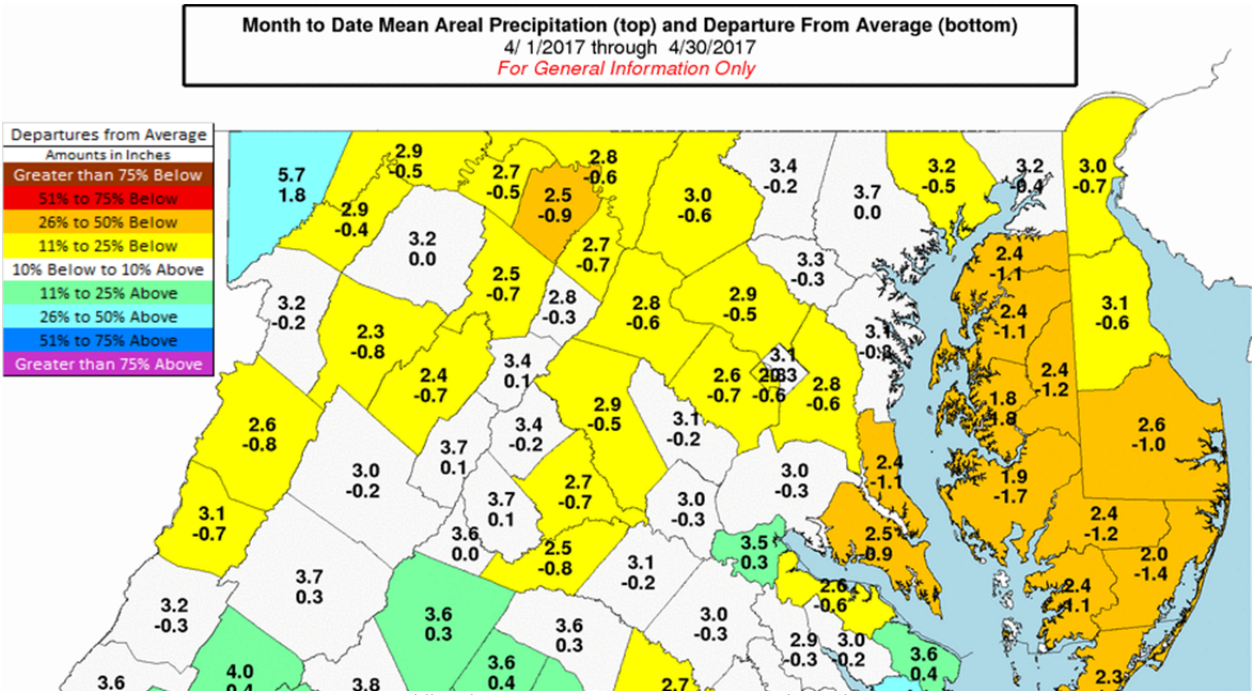
The conditional probability is estimated by analyzing the historical stream flow records and giving consideration to recent stream flow values, precipitation totals for the prior 12 months, current groundwater levels, and the current Palmer Drought Index. Past years in which watershed conditions most 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 8 to 17 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 May 1, 2017

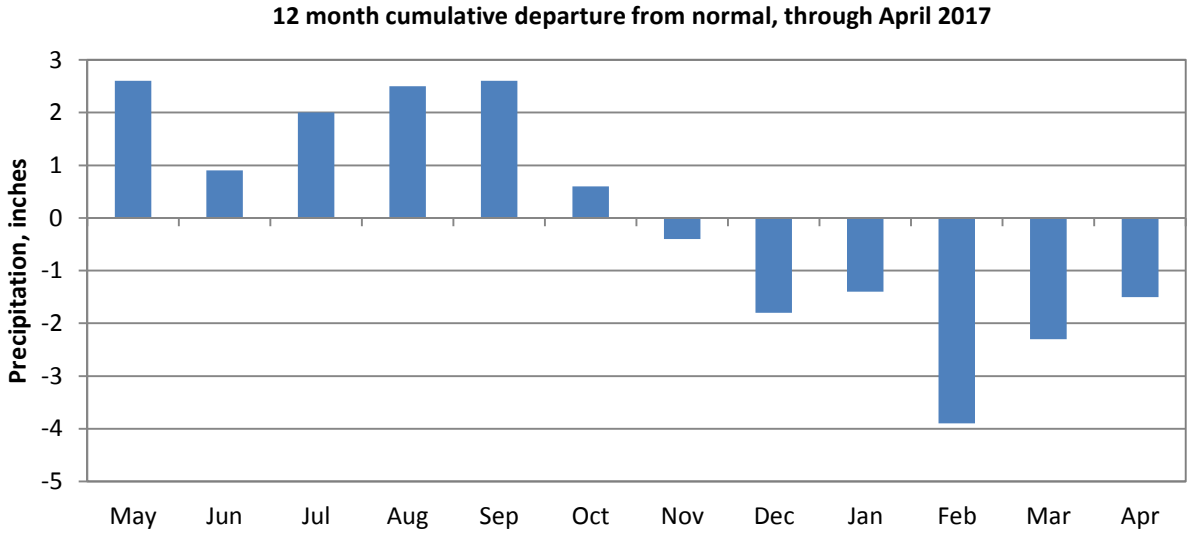
Low flow threshold (MGD)	*Low flow threshold (cfs)*	*Historical probability of lower flow May 1 through December 31*	*Conditional probability of lower flow May 1 through December 31*
1200	1858	68%	72%
1000	1548	49%	56%
800	1238	25%	29%
700	1084	15%	17%
600	929	8%	8%

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 2.9 inches for the month of April, which is 0.4 inches below normal. The map below shows that April precipitation ranged between 10 percent above normal to 25 percent below normal for most of the Potomac basin. A few areas report up to 50% above and below normal precipitation. The 12-month cumulative basin precipitation improved from 2.3 below normal in March to 1.5 below normal in April (see graph).

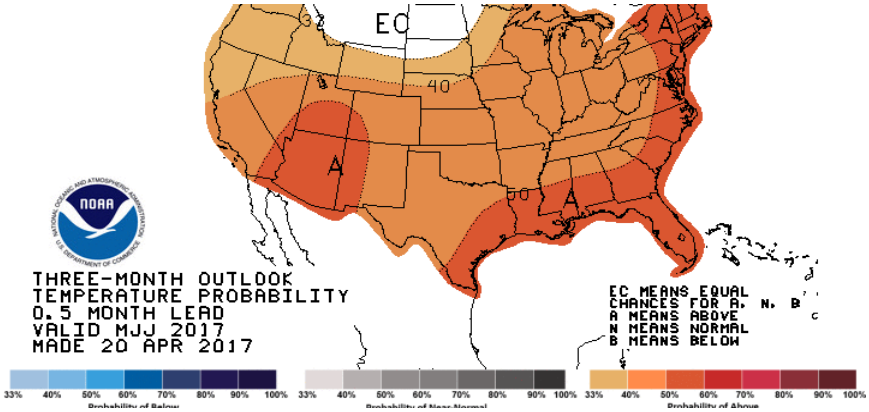


Source: Middle Atlantic River Forecast Center, National Weather Service

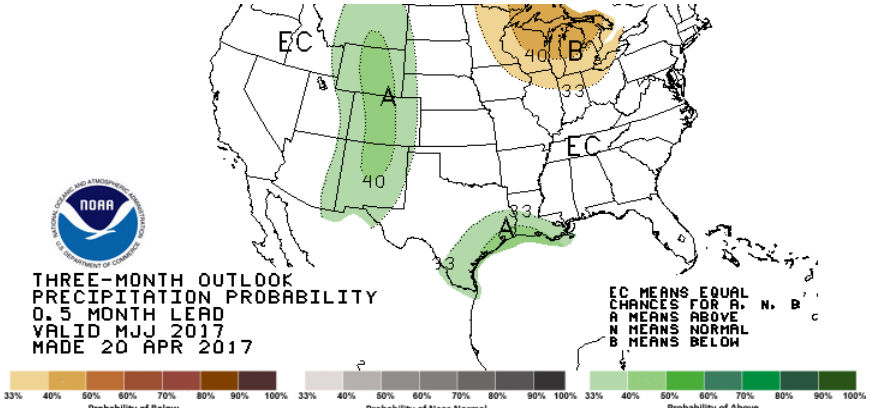


Information provided by the USGS, the Middle Atlantic River Forecast Center, and the National Weather Service.

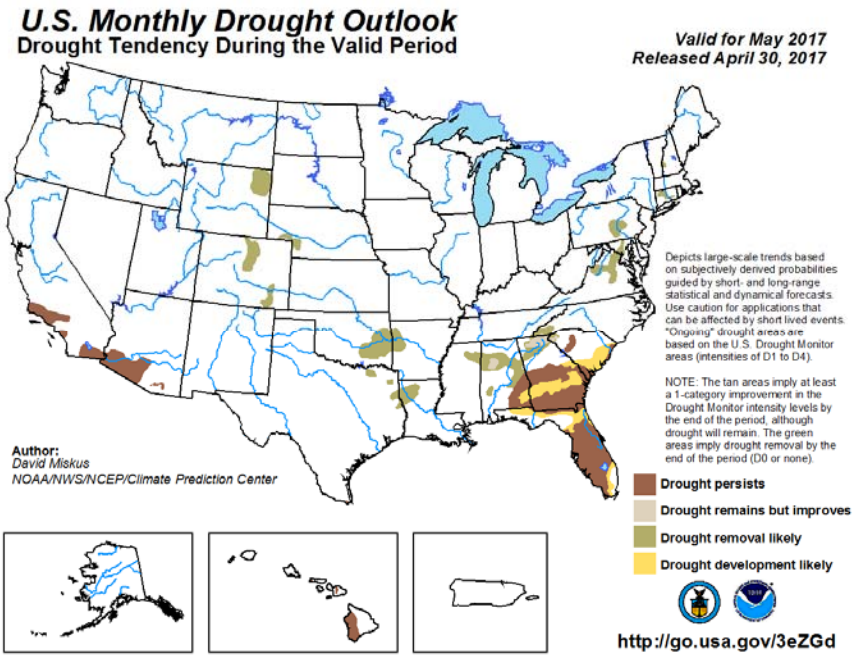
Precipitation and Drought Outlook for May, June and July 2017:



MARFC's Water Resource Outlook for the southern portion of the Middle Atlantic calls for above average rainfall over the next couple of weeks. Temperatures are expected to be above normal for much of the period but cool to around normal by the end of the outlook.



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

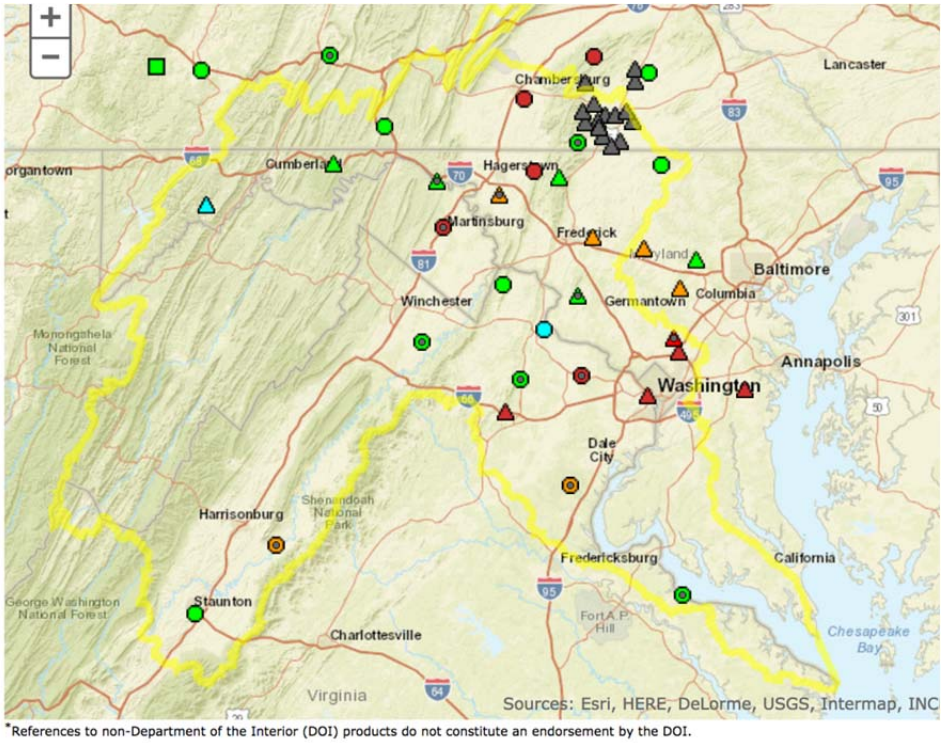


As of April 30, the Climate Prediction Center's U.S. Seasonal Drought Outlook indicates that drought removal is likely for the Potomac basin, meaning that by the end of the period conditions should be D0 or none.

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

Groundwater – Current Conditions:

MARFC's Water Resource Outlook for the southern portion of the Middle Atlantic (April 27, 2017) reports that groundwater levels are averaging 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", with slightly more locations falling 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.



*References to non-Department of the Interior (DOI) products do not constitute an endorsement by the DOI.

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 Much Below Normal	10-24 Below Normal	25-75 Normal	76-90 Above Normal	>90 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. Whitewater releases from Jennings Randolph are scheduled for the 13-14 and 27-28 of May.

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

Reservoir storage as of May 1, 2017

Facility	Percent Full	Current usable storage, BG	Total usable capacity, BG
WSSC's Patuxent reservoirs[4]	54	5.5	10.2
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]	100	16.3	16.3
Savage Reservoir[3]	87	5.5	6.3

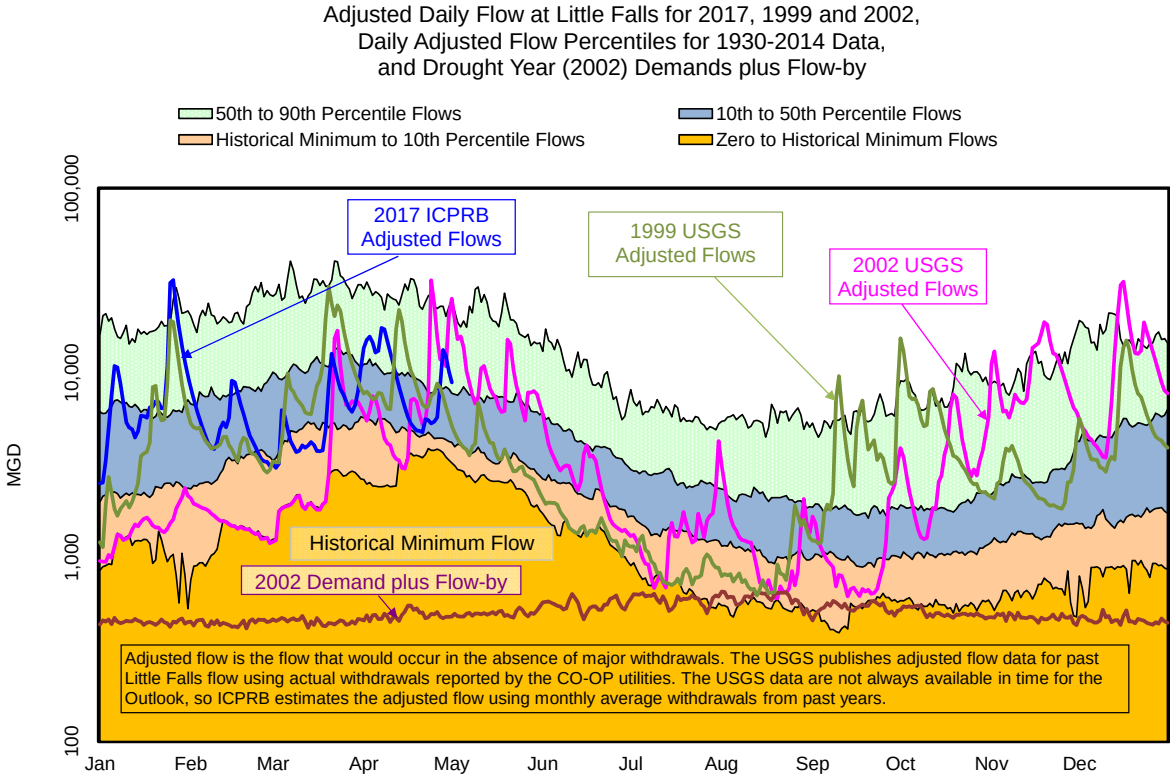
[1] Usable capacity consistent with Ortt, *el al.* (2011).
[2] 2013 revised stage-storage curve provided by Bill Haines, US Army Corps of Engineers, Baltimore District.
[3] 1998 revised stage-storage curve provided by Bill Haines, US Army Corps of Engineers, Baltimore District.
[4] Bathymetric study conducted December 2015 with revisions in December 2016

Potomac River Flow:

The estimated adjusted Potomac flow at Little Falls on May 1 was 8.9 billion gallons per day (BGD). For this day of the year, this value was above the historical 50th percentile value of 7.7 BGD and below the 90th percentile value of 25.0 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 7.6 BGD for the first four months of the year and 9.8 BGD in April.

Environmental Flow-by:

Average observed Potomac flow at Little Falls in April was well above the minimum flow 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.

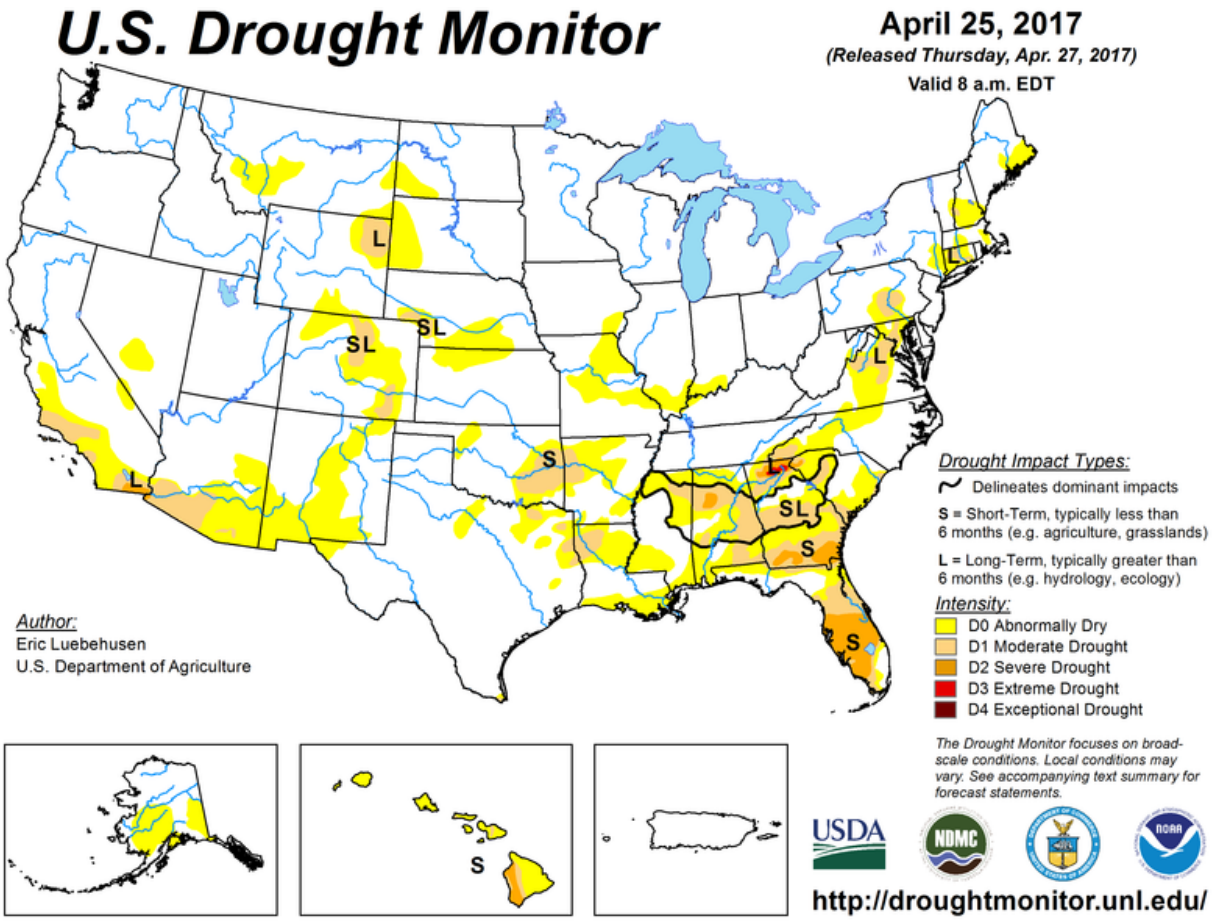
Information provided by the USGS, the Middle Atlantic River Forecast Center, and the National Weather Service.

Drought Status:

The Metropolitan Washington Council of Government's Drought Awareness Response Plan status is "Normal". The state of Maryland has a "Drought Warning" in effect for central parts of the state. The state of Virginia has a "Drought Watch" in effect for northern parts of the state. The state of Pennsylvania has issued a "Drought Watch" for southeast portions of the state.

Drought Monitor and Soil Moisture:

The NOAA Climate Prediction Center's U.S. Drought Monitor map (see first figure below) indicates Abnormally Dry (D0) to Moderate Drought (D1) conditions for most of the Potomac basin. The Palmer Drought Severity Index by Division map (see second figure on next page) indicates mostly Moderate Drought conditions in the basin with a section of Severe Drought around Washington, D.C.



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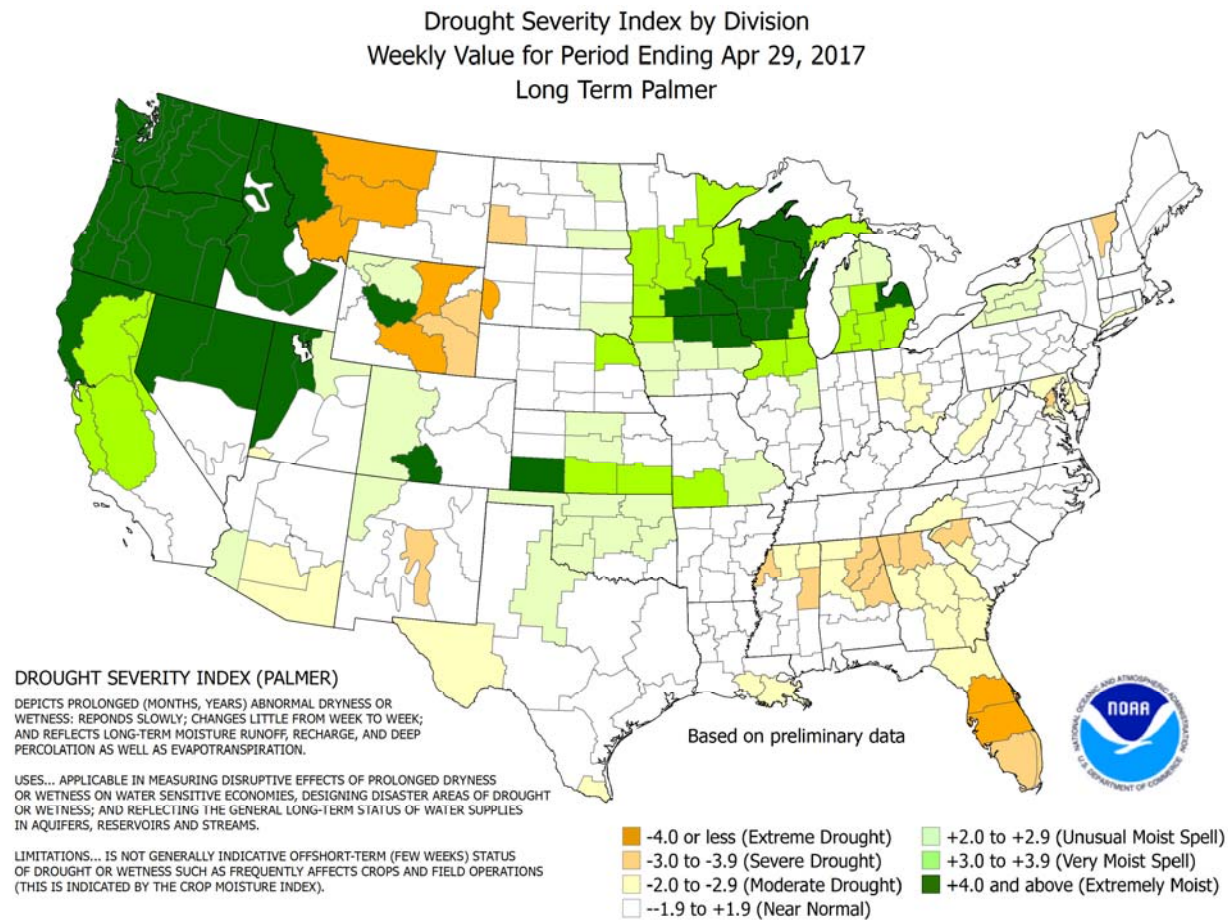

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