

Water Supply Outlook

August 5, 2015

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Interstate Commission on the Potomac River Basin (ICPRB)

30 W. Gude Drive, Suite 450

Rockville, MD 20850

Tel: (301) 274-8120

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 the major 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 2015 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 MARFC's Water Resource Outlook for the southern portion of the Middle Atlantic reports that precipitation in the month of July has been scattered and variable, with a basin averaged precipitation 0.5 inches below normal. Precipitation is expected to be near or above normal in the next month. Dry weather conditions are still possible later this summer. 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 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.

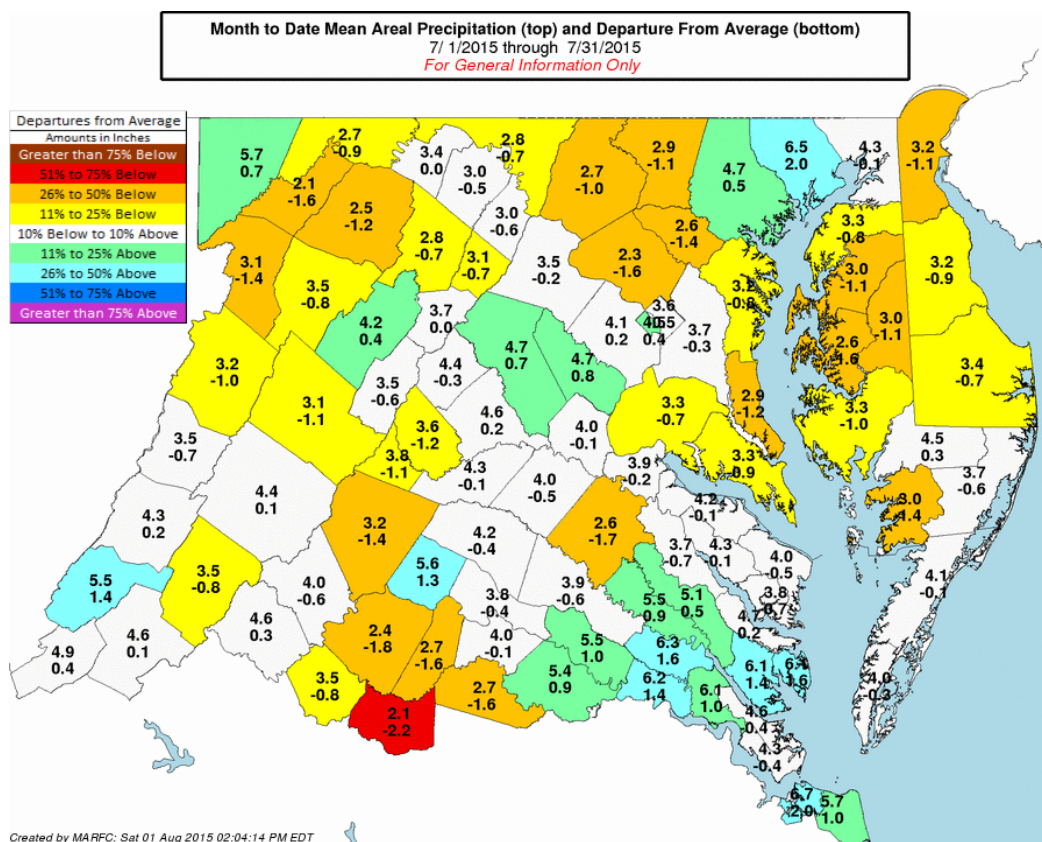
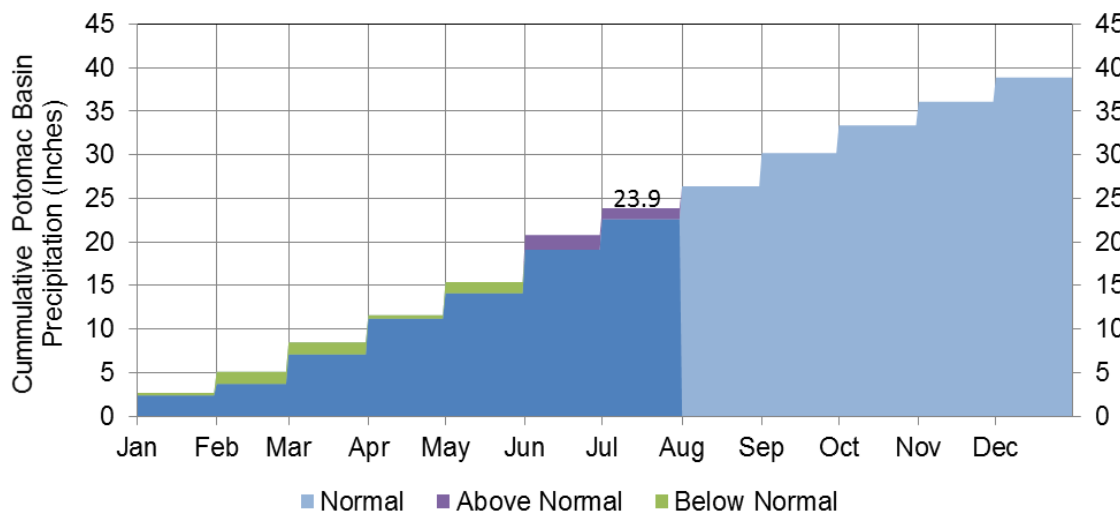
The conditional probability is estimated by analyzing the historical stream flow records and giving consideration to recent stream flow values, precipitation totals for the prior 12 months, current groundwater levels, and the current Palmer Drought Index. Past years in which watershed conditions most 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 weighting for current conditions. The conditional probability of 1 to 4 percent compares to a historical probability of 7 to 15 percent and is considered the more reliable indicator.

Outlook for Potomac River at Little Falls – Watershed conditions as of August 3, 2015

<i>Low flow threshold (MGD)</i>	<i>Low flow threshold (cfs)</i>	<i>Historical probability of lower flow July 1 through December 31</i>	<i>Conditional probability of lower flow July 1 through December 31</i>
1200	1858	67%	63%
1000	1548	47%	36%
800	1238	24%	9%
700	1084	15%	4%
600	929	7%	1%

Past Precipitation:

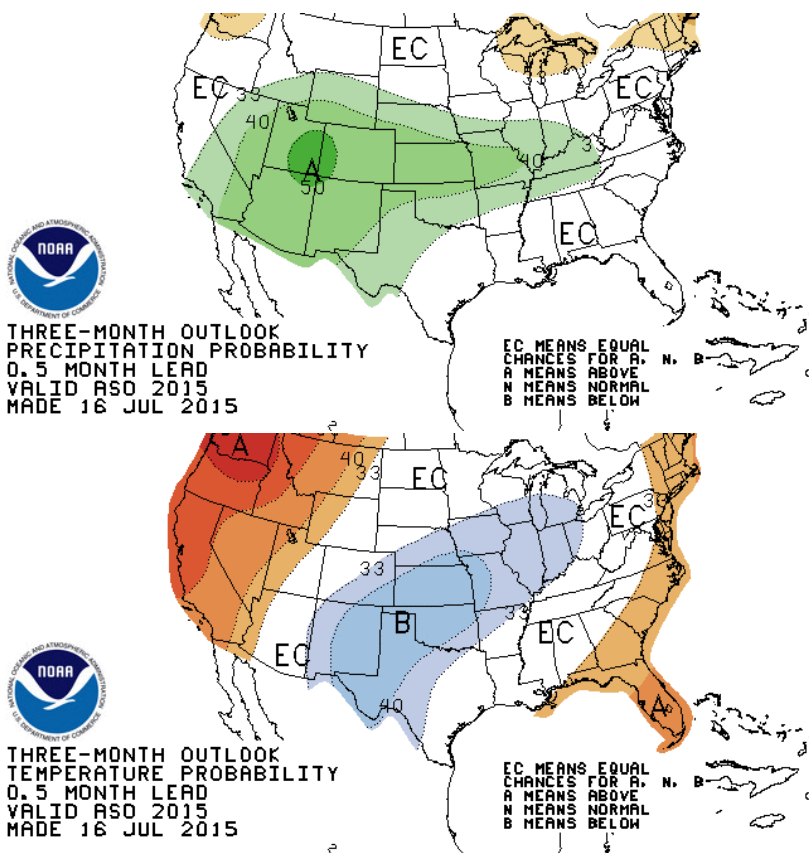
Data from the National Weather Service's Middle Atlantic River Forecast Center (MARFC) shows that the Potomac basin upstream of Washington, D.C. has received a precipitation total of 3.1 inches for the month of July, which is 0.5 inches below normal. The cumulative basin precipitation is 23.9 inches for the year to date (January 1 to July 31), which is 1.3 inches above normal (see graph). The map on the bottom of the page shows that July precipitation has been scattered and variable in the Potomac basin, ranging from below to above normal.



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 2015:

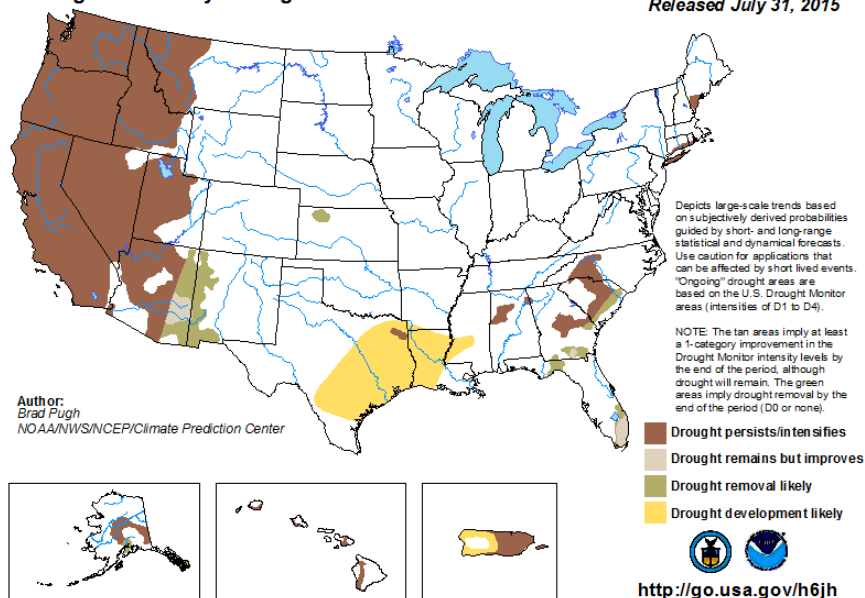


MARFC's Water Resource Outlook for the southern portion of the Middle Atlantic calls for near or above normal rainfall for the next couple of weeks. Temperatures are expected to start the period near or above normal but end the period below average.

The NWS Climate Prediction Center's 30 day outlook for August calls for normal rainfall along with normal temperatures. The 90 day outlook for August through October calls for normal precipitation and near or above normal temperatures.

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

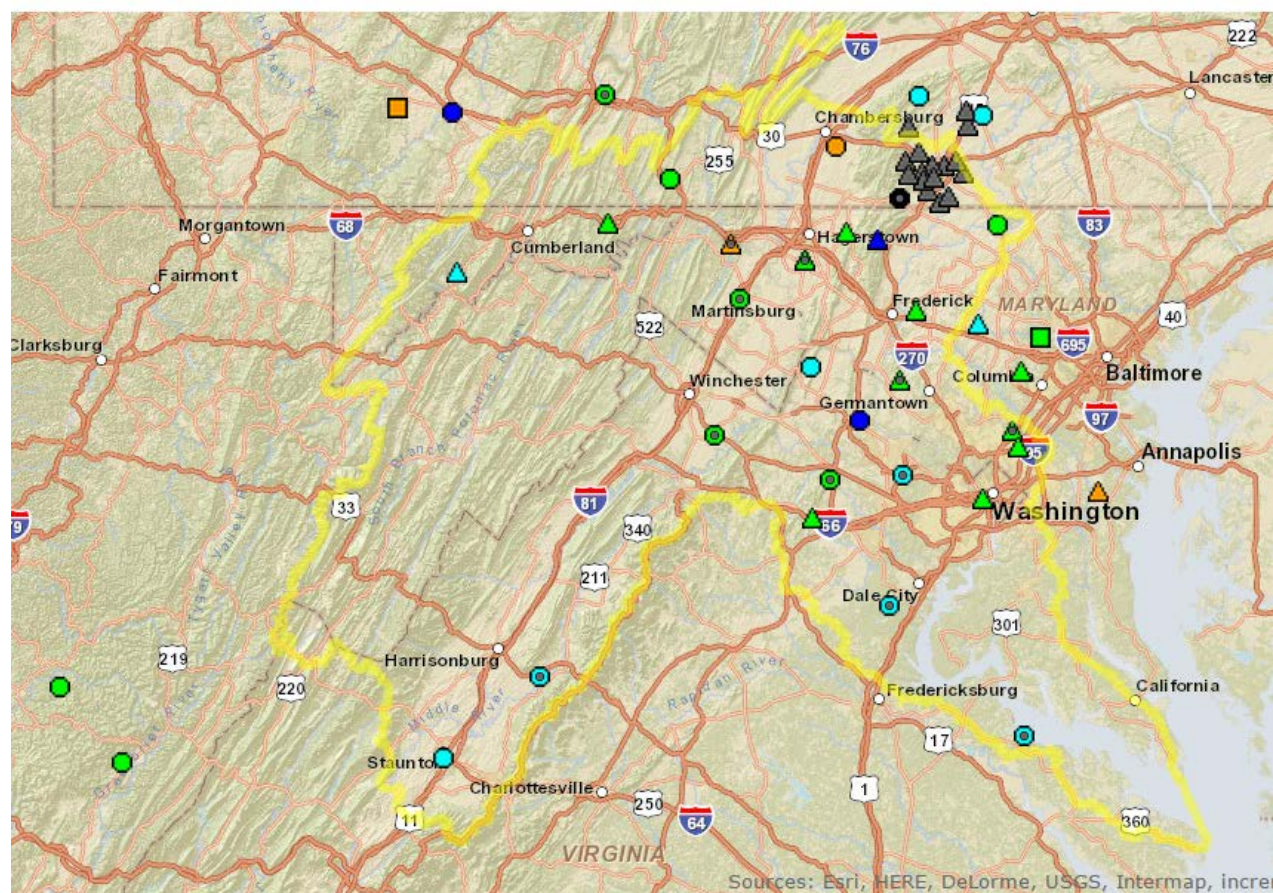
Valid for August 2015
Released July 31, 2015



As of July 31 the Climate Prediction Center's U.S. Seasonal Drought Outlook indicates that drought development is not likely for the Potomac basin.

Groundwater – Current Conditions:

MARFC's Water Resource Outlook for the southern portion of the Middle Atlantic reports that groundwater levels are generally near normal. The groundwater map below, created by the U.S. Geological Survey (USGS), Pennsylvania Water Science Center on August 4, shows that water levels in monitoring wells in the Potomac basin range from "Below Normal" to "High", with most falling in the "Normal" or "Above Normal" categories. In this map, the USGS defines "Above Normal" as between the 76th and 90th percentile, "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	Much Below Normal	Below Normal	Normal	Above Normal	Much Above Normal	High	Not Ranked

Wells		(on/off)
	Real Time	<input checked="" type="checkbox"/>
	Continuous	<input checked="" type="checkbox"/>
	Periodic Measurement	<input checked="" type="checkbox"/>

Reservoir Storage – Current Conditions:

No water supply releases has been made this year. There will be an artificially varied flow release from Jennings Randolph Reservoir on Saturday-Sunday, 22-23 of August.

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

Reservoir storage as of August 4, 2015

Facility	Percent Full	Current usable storage, BG	Total usable capacity, BG
WSSC's Patuxent reservoirs	92	9.4	10.2
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	89	14.5	16.3
Savage Reservoir ³	87	5.5	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.

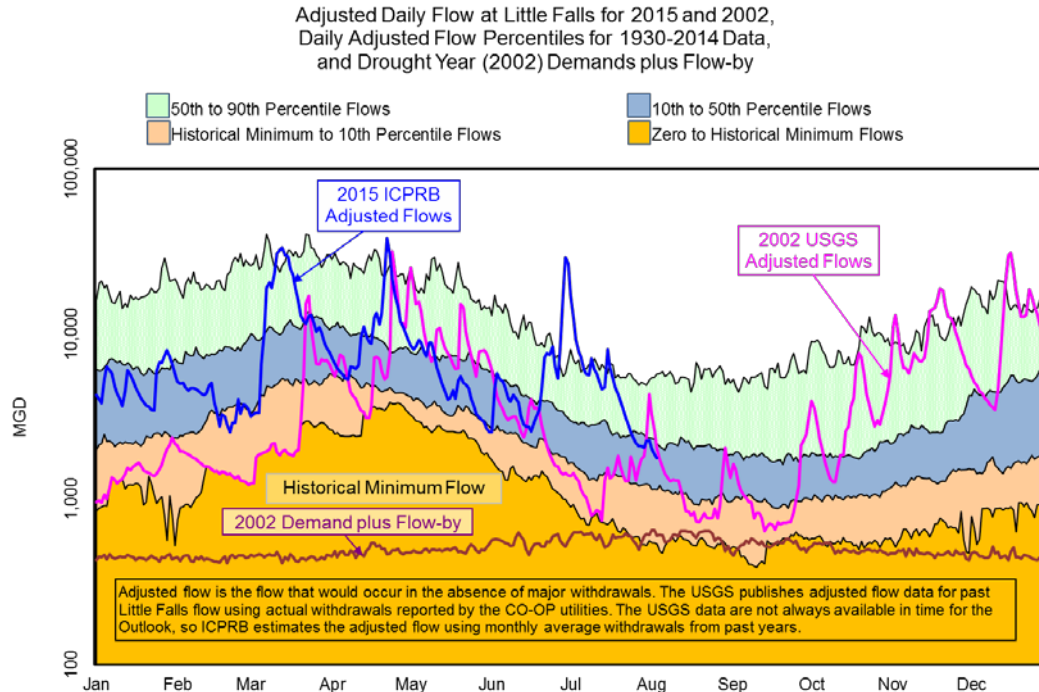
³ 1998 revised stage-storage curve provided by Bill Haines, US Army Corps of Engineers, Baltimore District.

Potomac River Flow:

The estimated adjusted Potomac flow at Little Falls on August 3 was 1.78 billion gallons per day (BGD). For this day of the year, this value was above the historical 10th percentile value of 1.15 BGD and below the 50th percentile value of 2.16 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 7.7 BGD for the first six months of the year and 5.3 BGD in July.

Environmental Flow-by:

Average observed Potomac flow at Little Falls in July 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.

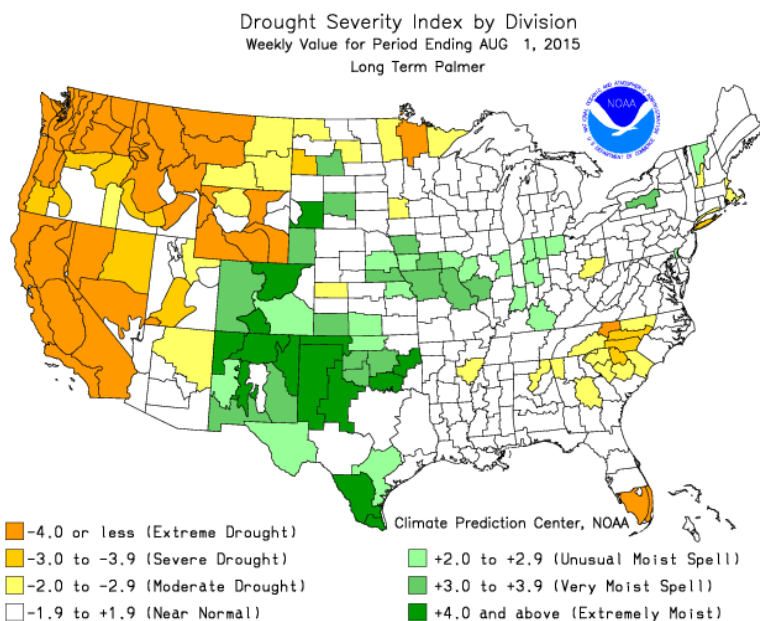
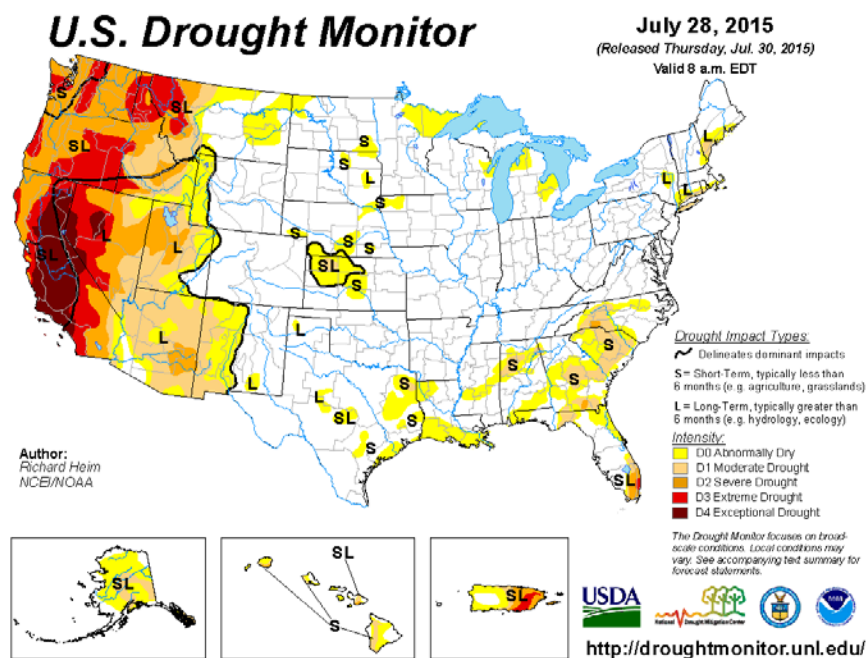
Information provided by the USGS, the Middle Atlantic River Forecast Center, and the National Weather Service.

Drought Status:

The Metropolitan Washington Council of Government's Drought Awareness Response Plan status is "Normal."

Drought Monitor and Soil Moisture:

The NOAA Climate Prediction Center's U.S. Drought Monitor map (see first figure below) indicates that the Potomac basin is currently free of dry conditions. The Palmer Drought Severity Index by Division map (see second figure below) indicates near normal in the Potomac basin.



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