

Water Supply Outlook



Interstate Commission on the Potomac River Basin (ICPRB)

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

June 2, 2017

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 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 Water Resource Outlook for the southern MARFC Area reports that precipitation was abundant for the month of May, averaging mostly 2 to 5 inches above normal. Temperatures have been normal plus or minus a degree. Current streamflow data from the U.S. Geological Survey show that flows are near or above normal in Delaware and Maryland. Flows are much above normal in the eastern panhandle of West Virginia and in Virginia. Groundwater levels are averaging near normal. The outlook for water resources and water supplies has improved and is now good for all parts of the southern portion of the MARFC service area. Recent rainfall has led to improvement and additional slow improvement is possible as a result of recent and forecast rainfall. 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 3 to 7 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.

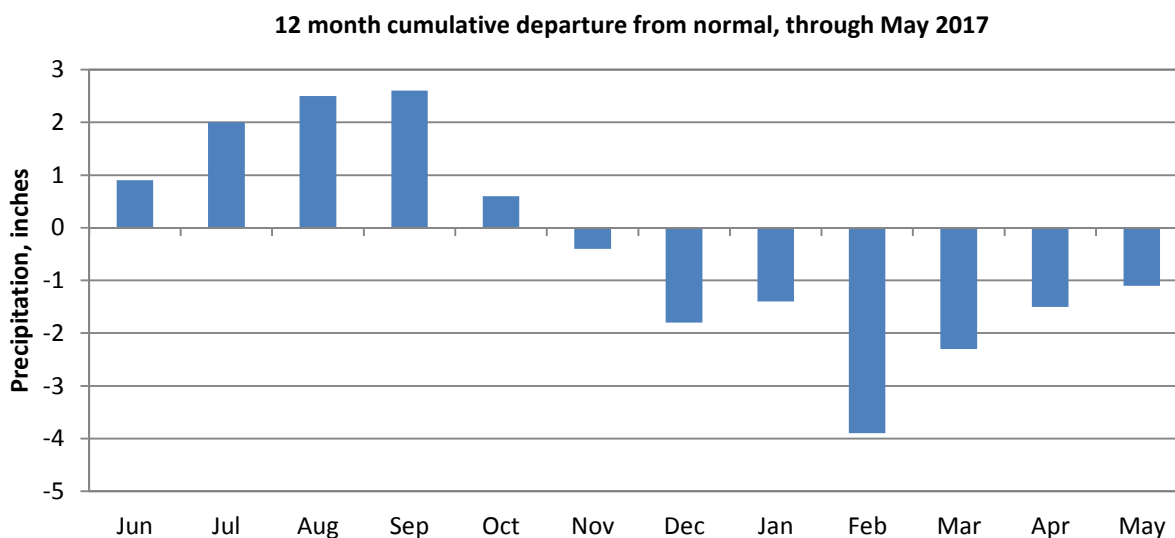
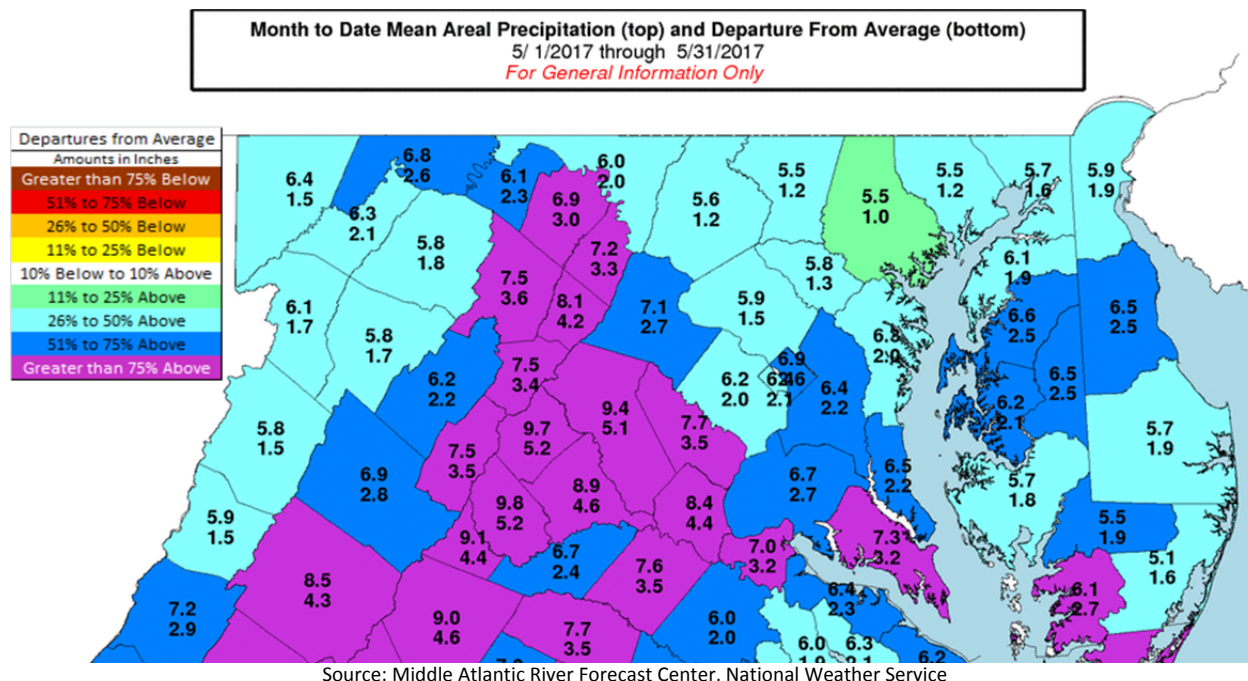
The conditional probability is estimated by analyzing the historical stream flow records and giving consideration to recent stream flow values, precipitation totals for the prior 12 months, current groundwater levels, and the current Palmer Drought Index. Past years in which watershed conditions most 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 3 to 7 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 June 1, 2017

Low flow threshold (MGD)	Low flow threshold (cfs)	Historical probability of lower flow June 1 through December 31	Conditional probability of lower flow June 1 through December 31
1200	1858	68%	64%
1000	1548	49%	42%
800	1238	25%	16%
700	1084	15%	7%
600	929	8%	3%

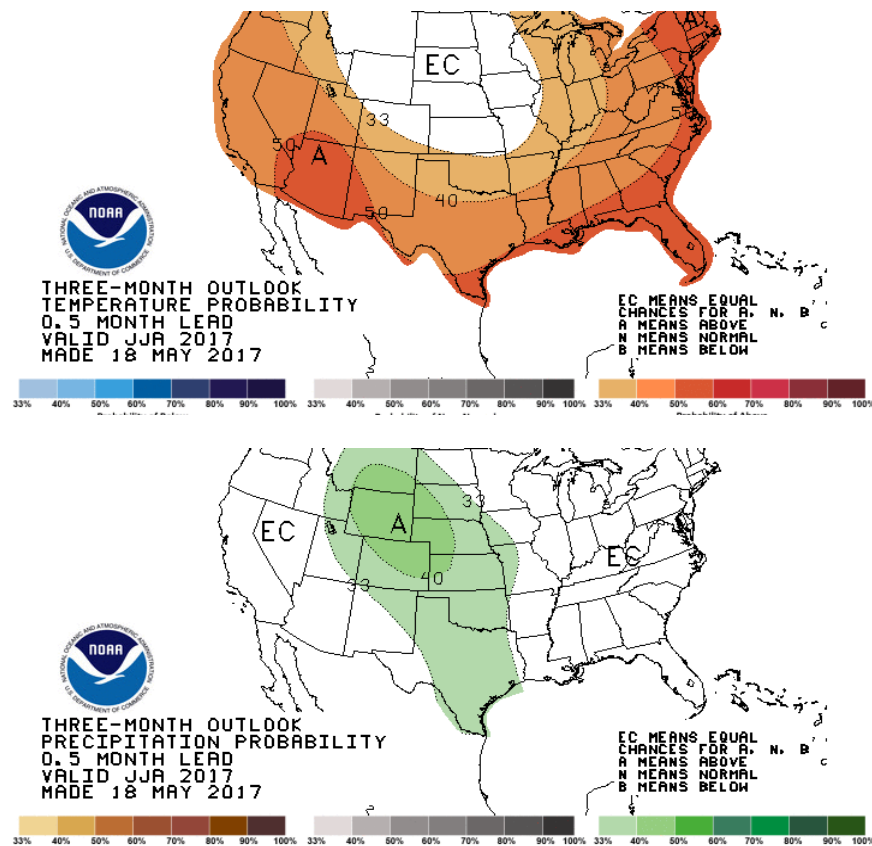
Past Precipitation:

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 6.6 inches for the month of May, which is 2.4 inches above normal. The map below shows that May precipitation ranged between 26 to 75 percent above normal for the Potomac basin. The 12-month cumulative basin precipitation improved from 1.5 inches below normal in April to 1.1 inch below normal in May (see graph).



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

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

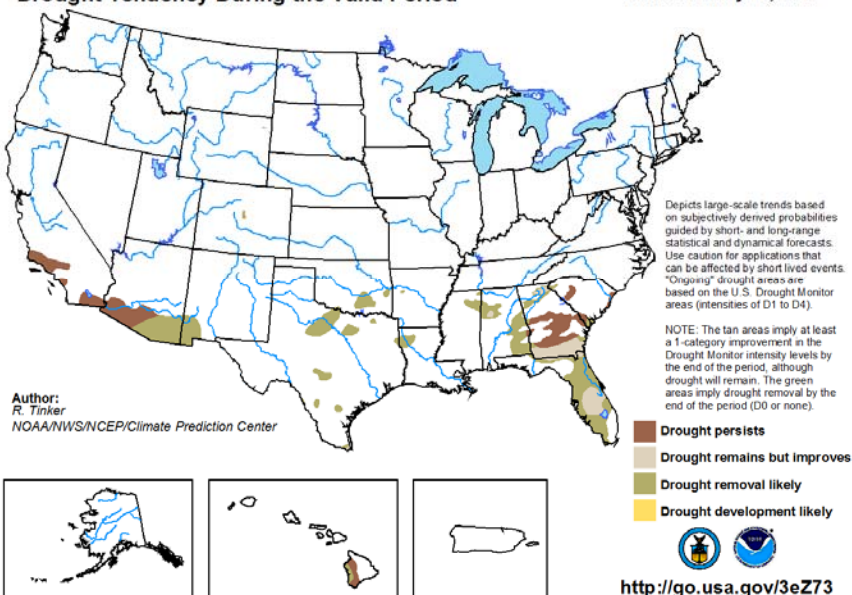


MARFC's Water Resource Outlook for the southern portion of the Middle Atlantic calls for near or above average precipitation and near normal temperatures for the next couple of weeks.

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

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

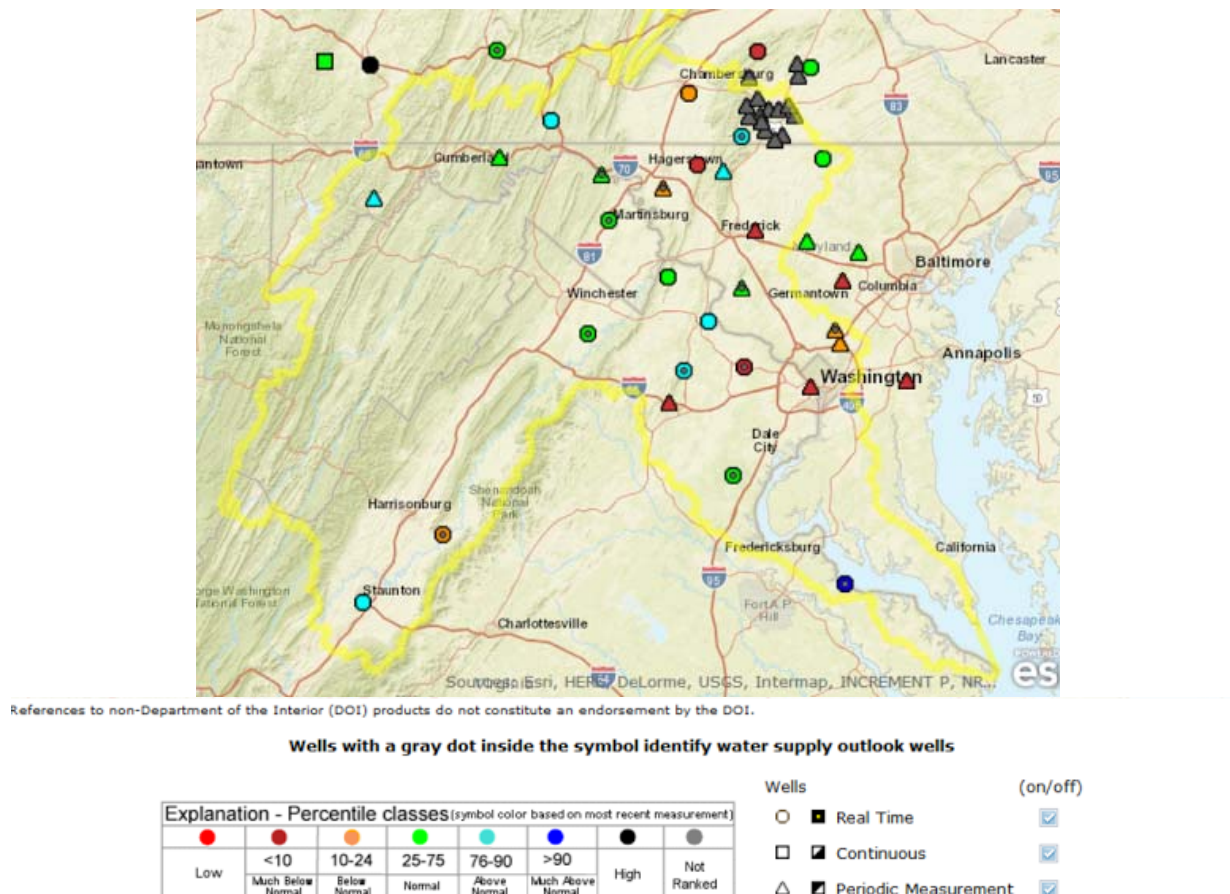
Valid for May 18 - August 31, 2017
Released May 18, 2017



As of May 18, the Climate Prediction Center's U.S. Seasonal Drought Outlook indicates that near- to above-normal precipitation in May has kept any drought development at bay with no drought reported for the Potomac basin. More improvement than deterioration is expected in June. However, latent long-term moisture shortages remain across the Northeast, and drought could re-develop quickly should any substantial period of abnormal heat and dryness occur.

Groundwater – Current Conditions:

MARFC's Water Resource Outlook for the Southern portion of the Middle Atlantic (May 27, 2017) reports that groundwater levels are averaging near 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 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.



Reservoir Storage – Current Conditions:

No water supply releases from the COOP shared system have been made this year. In preparation for the two-year dam rehabilitation project at the Patuxent reservoirs, which began June 1st, Triadelphia Reservoir was lowered to 25 percent usable capacity. All water released from the Triadelphia Reservoir was contained by Duckett Reservoir, which is currently at 95 percent usable capacity.

The first whitewater recreational release from Savage Reservoir is scheduled for June 3rd. The recreational release will be 1,000 cubic feet per second (cfs) from 10:00AM to 4:00PM with increased flow starting at about 7:30AM. The post-event flow will be around 110 cfs. 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 June 1, 2017

Facility	Percent Full	Current usable storage, BG	Total usable capacity, BG
WSSC's Patuxent reservoirs ⁴	57	6.8	11.9
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	93	5.8	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.

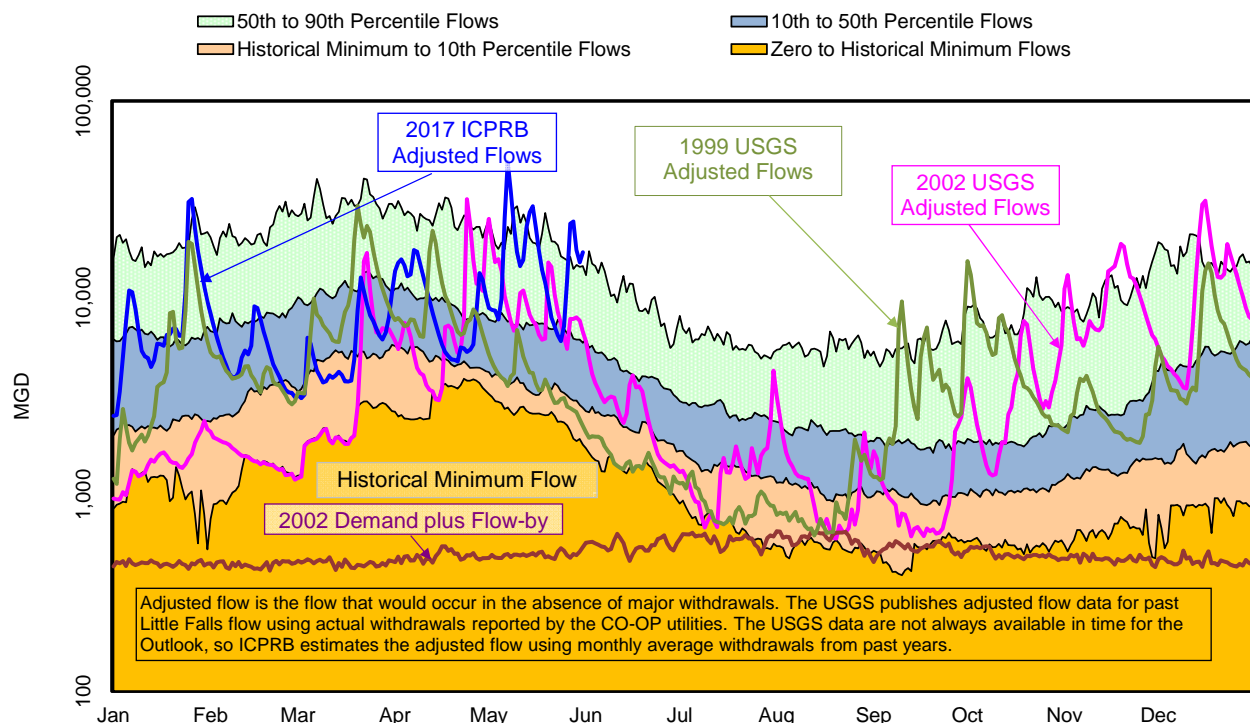
Potomac River Flow:

The estimated adjusted Potomac flow at Little Falls on May 31 was 17.0 billion gallons per day (BGD). For this day of the year, this value was above the historical 90th percentile value of 14.3 BGD and below the maximum flow value of 49.0 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 9.5 BGD for the first five months of the year and 16.8 BGD in May.

Environmental Flow-by:

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

Adjusted Daily Flow at Little Falls for 2017, 1999 and 2002,
Daily Adjusted Flow Percentiles for 1930-2014 Data,
and Drought Year (2002) Demands plus Flow-by



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

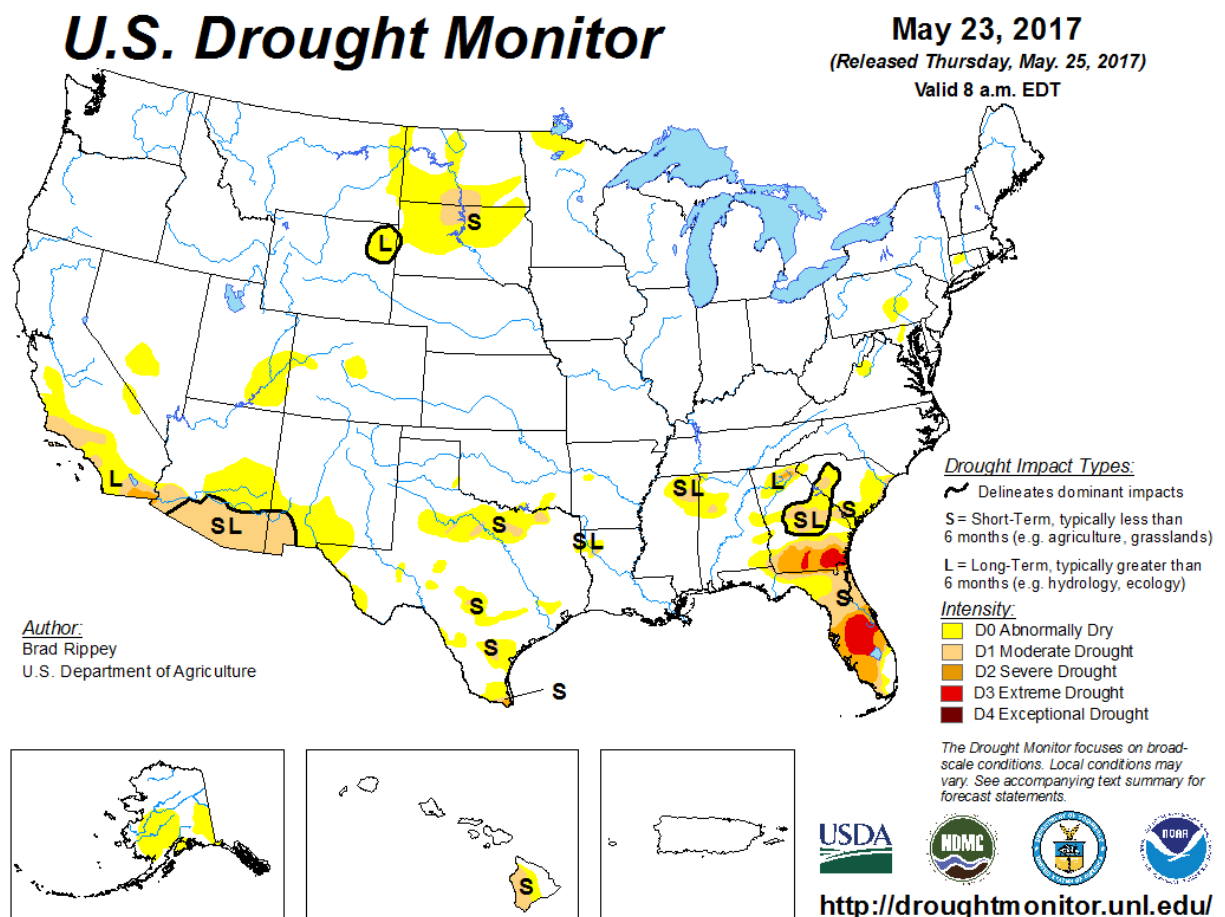
Little Falls flow statistics are based on 1930 through 2014 USGS published gage flow, "USGS 01646502 POTOMAC RIVER (ADJUSTED) NEAR WASH, DC". To create this flow record, the USGS has added historical water supply withdrawals from the Potomac as reported by FW, WSSC, the Aqueduct, and Rockville to the Little Falls gage flow record.

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 and a "Drought Watch" in effect for eastern 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 returned to "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 that recent heavy precipitation has eradicated most dry conditions within the Potomac basin with the exception of a few areas of Abnormally Dry (D0) conditions in Maryland and Virginia. The Palmer Drought Severity Index by Division map (see second figure on next page) indicates Moderate Drought conditions in and below Washington, D.C.



Drought Severity Index by Division
Weekly Value for Period Ending May 27, 2017
Long Term Palmer

