Water Supply Outlook

Interstate Commission on the Potomac River Basin (ICPRB)
30 W. Gude Drive, Suite 450
Rockville, MD 20850
Tel: (301) 274-8120

October 1, 2019
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 fall season. It is typical that the probability of releases decreases around this time of year, when evaporative loss and drinking water demands begin to decline due to lower temperatures. 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. Potomac basin streamflows are near or below normal, influenced by much below normal precipitation and near normal groundwater levels. Almost no precipitation (0.9 inch basin average) occurred in the Potomac basin for the month of September. The majority of areas in the Potomac basin have been designated as abnormally dry (D0), which means that the basin is showing dryness but not yet in drought. However, areas in Southern Maryland and Northern Virginia have been designated as being in moderate drought (D1). If below average rainfall continues (as currently expected in the short term) then further degradation in conditions is expected to occur. Precipitation from a tropical system is not expected in the near term. Daily monitoring of Point of Rocks and Little Falls flows began on September 23 and will continue to prepare for the possibility that more serious drought conditions develop in the upcoming weeks. 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 one to four 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-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.

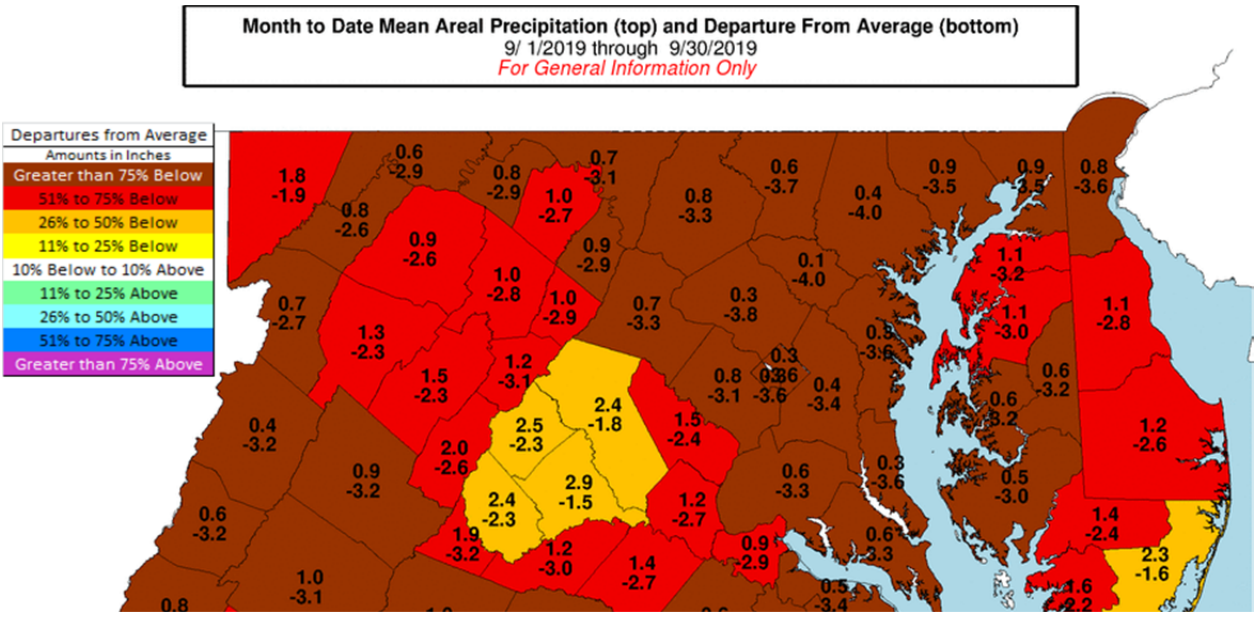
The conditional probability is estimated by analyzing the historical stream flow records and giving consideration to recent stream flow values, precipitation totals for the prior 12 months, current groundwater levels, and the current Palmer Drought Index. Past years in which watershed conditions most 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 weighing for current conditions. The one to four percent conditional probability compares to the three to five percent historical probability and is considered the more reliable indicator.

Outlook for natural Potomac River flow at Little Falls – Watershed conditions as of October 1, 2019

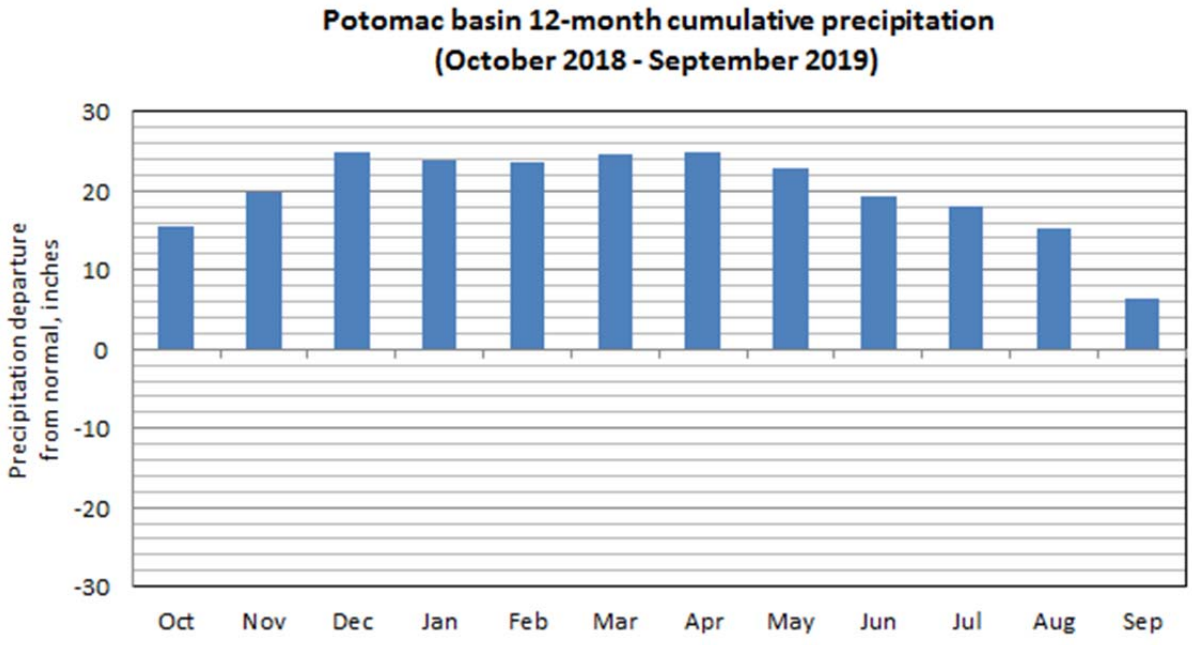
Low flow threshold (MGD)	*Low flow threshold (cfs)*	*Historical probability of lower flow October 1 through December 31*	*Conditional probability of lower flow October 1 through December 31*
1200	1858	49%	49%
1000	1548	28%	22%
800	1238	9%	6%
700	1084	5%	4%
600	929	3%	1%

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 0.9 inches in the month of September, which is 2.9 inch below normal. The map below shows that September rainfall has been 26 percent to greater than 75 percent below normal. The graph below shows that the basin cumulative precipitation over the past 12 months (October 2018 through September 2019) has been 6.3 inches above normal. This is a huge drop since the April basin cumulative precipitation over the past 12 months (May 2018 through April 2019) was reported, which started out at 25.0 inches above normal.

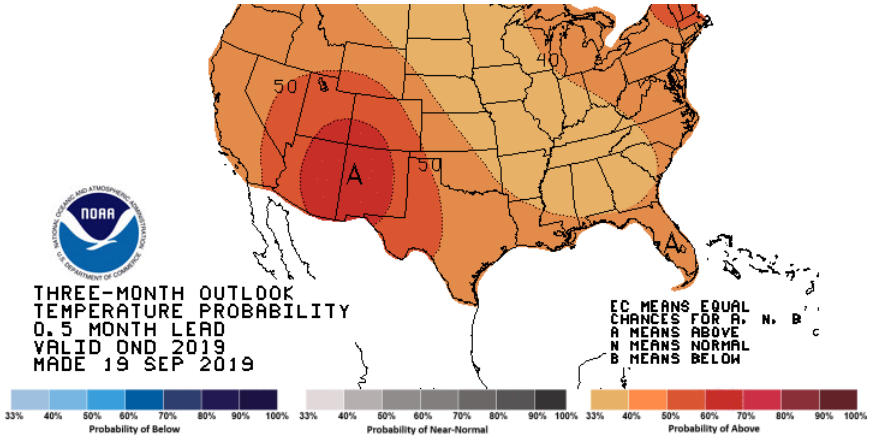


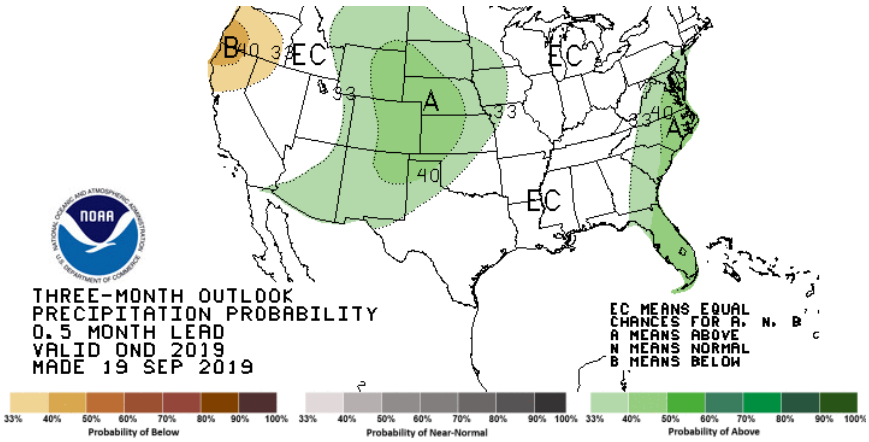
Source: Middle Atlantic River Forecast Center, National Weather Service



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

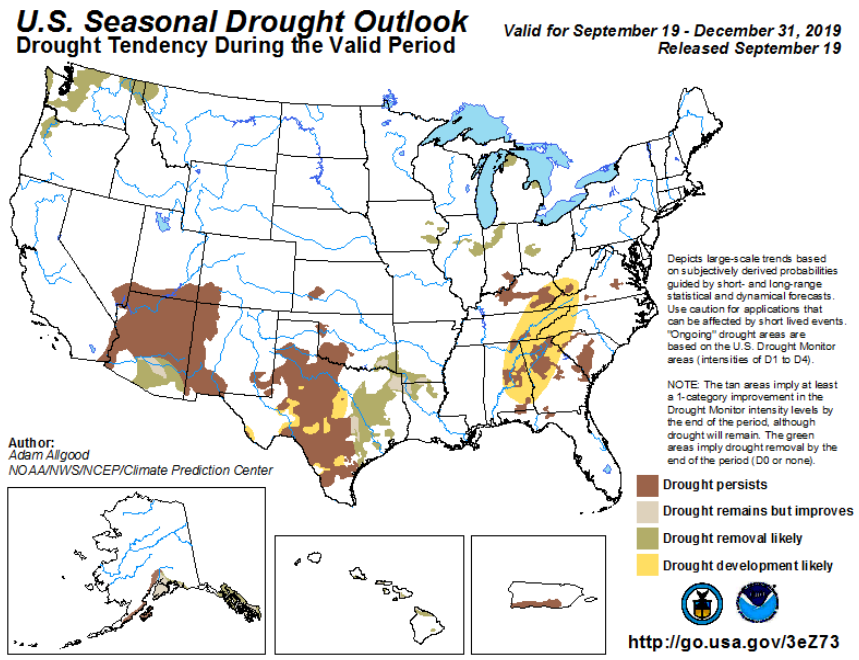
Precipitation and Drought Outlook for October, November, and December 2019





MARFC's Water Resource Outlook for the southern portion of the Middle Atlantic calls for below or much below average rainfall and above or much above normal temperatures through the first week of October.

The NWS Climate Prediction Center's 30 day outlook for October as well as the 90 day outlook for October through December calls for above average precipitation and above average temperatures.

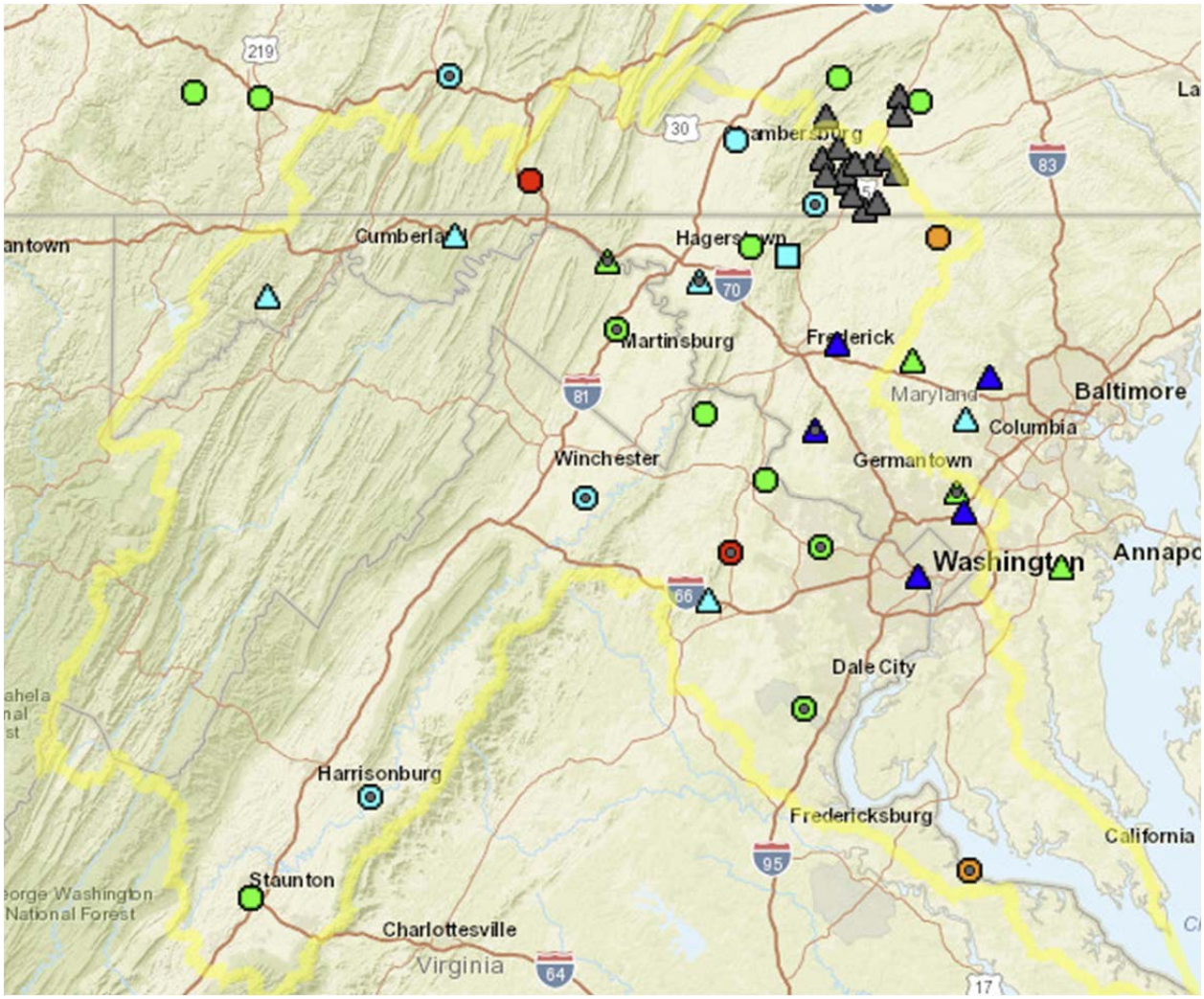


As of September 19, the Climate Prediction Center's U.S. Seasonal Drought Outlook reports no drought development in the Potomac basin.

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 reports that groundwater levels are 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 mostly range from "Normal" to "Much Above Normal." There are two wells that are "Below Normal" in Carroll County, Maryland, and Westmoreland County, Virginia. Additionally, there two wells that are "Much Below Normal" in Prince William County, Virginia, and Fulton County, Pennsylvania. 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.



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

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

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 rehabilitation work being done on Brighton Dam. Work on the dam may be completed by this December, after which the Reservoir will begin refilling. Triadelphia Reservoir is one of the two Patuxent reservoirs.

A whitewater release from Savage Reservoir was made on Saturday, September 28, 2019. No other recreational releases are scheduled for the month of October. Releases from Jennings Randolph and Savage reservoirs are made for a variety of purposes. The flow values reported for whitewater and AVF releases come entirely from water quality storage and may be increased or decreased without prior notice, depending on changing climatic and hydrologic conditions.

Reservoir storage as of October 1, 2019

Facility	Percent Full	Current usable storage, BG	Total usable capacity, BG
WSSC's Patuxent reservoirs[4,5]	39	4.1	10.5
Fairfax Water's Occoquan Reservoir	92	7.4	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]	51	8.2	16.3
Savage Reservoir[3]	60	3.8	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, 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.

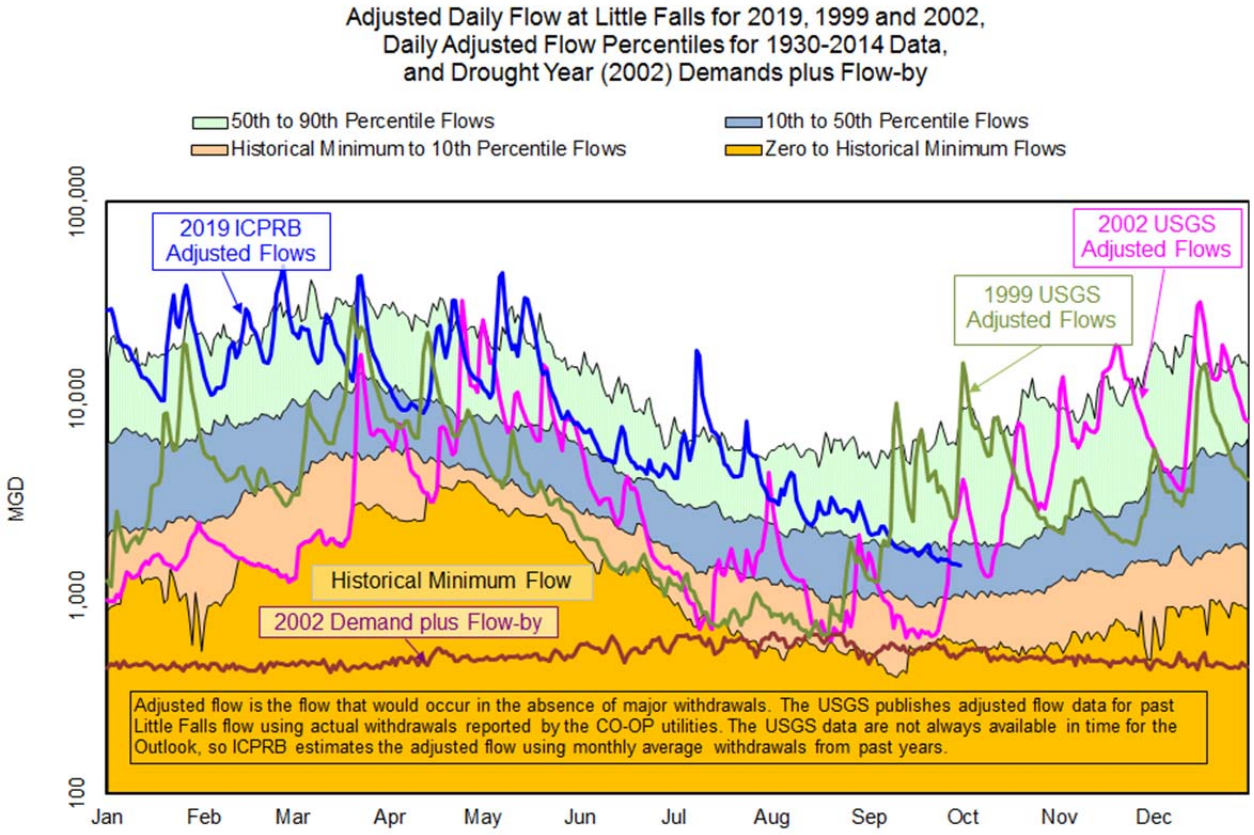
Potomac River Flow:

The estimated adjusted Potomac flow at Little Falls on September 30 was 1.4 billion gallons per day (BGD). For this day of the year, this value was above the 10th percentile flow value of 1.0 BGD and below the 50th percentile flow value of 1.8 BGD. Adjusted flow, shown in the figure on the next page, is the flow that would occur in the absence of major Washington metropolitan area withdrawals, but includes releases from upstream reservoirs. Adjusted flow averaged 3.64 BGD for the last three months and 1.8 BGD in September.

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

Environmental Flow-by:

Average observed Potomac flow at Little Falls in September 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.

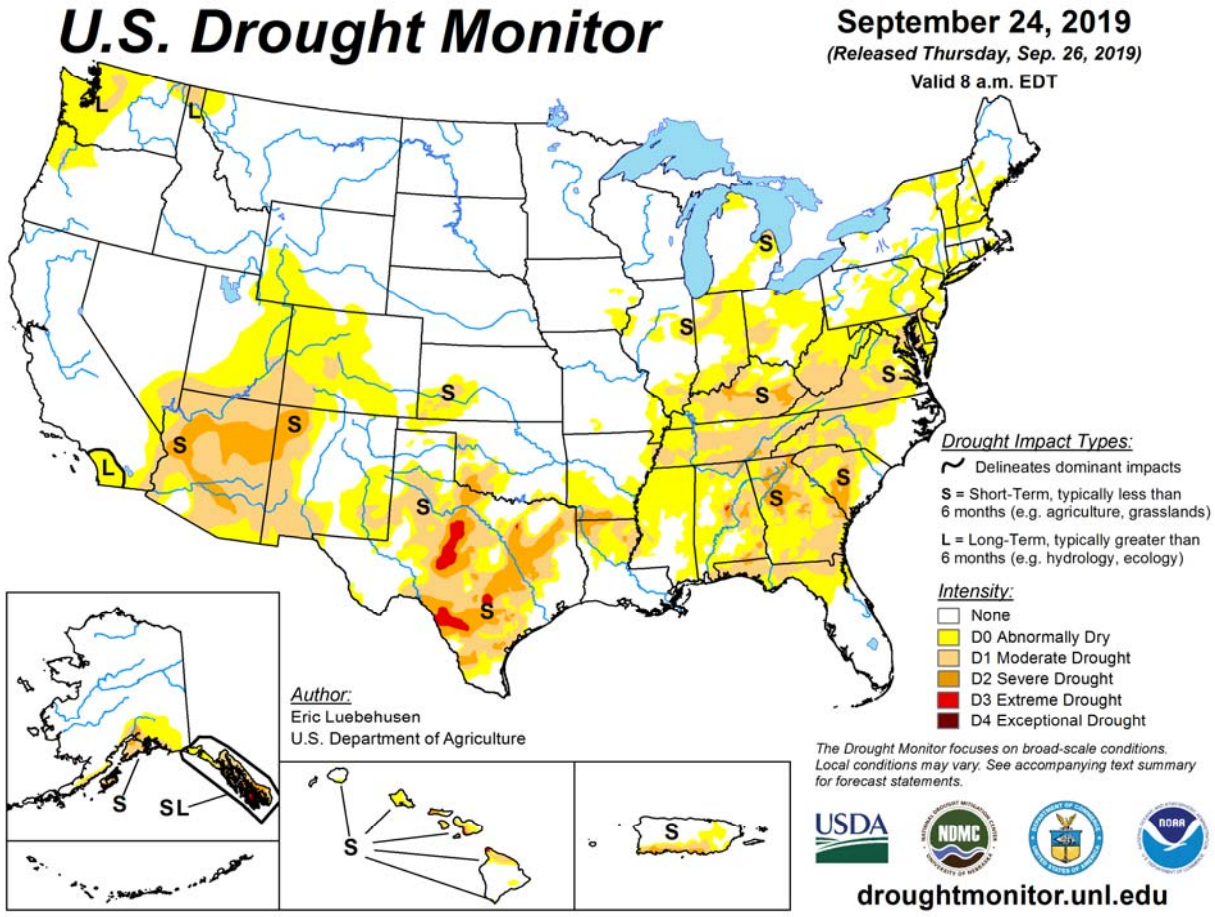
Drought Status:

The states of Maryland, Pennsylvania, and Virginia have "Normal drought status." A number Virginia's thirteen Drought Evaluation Regions are reporting drought warning and watch for their groundwater and flow indicators.

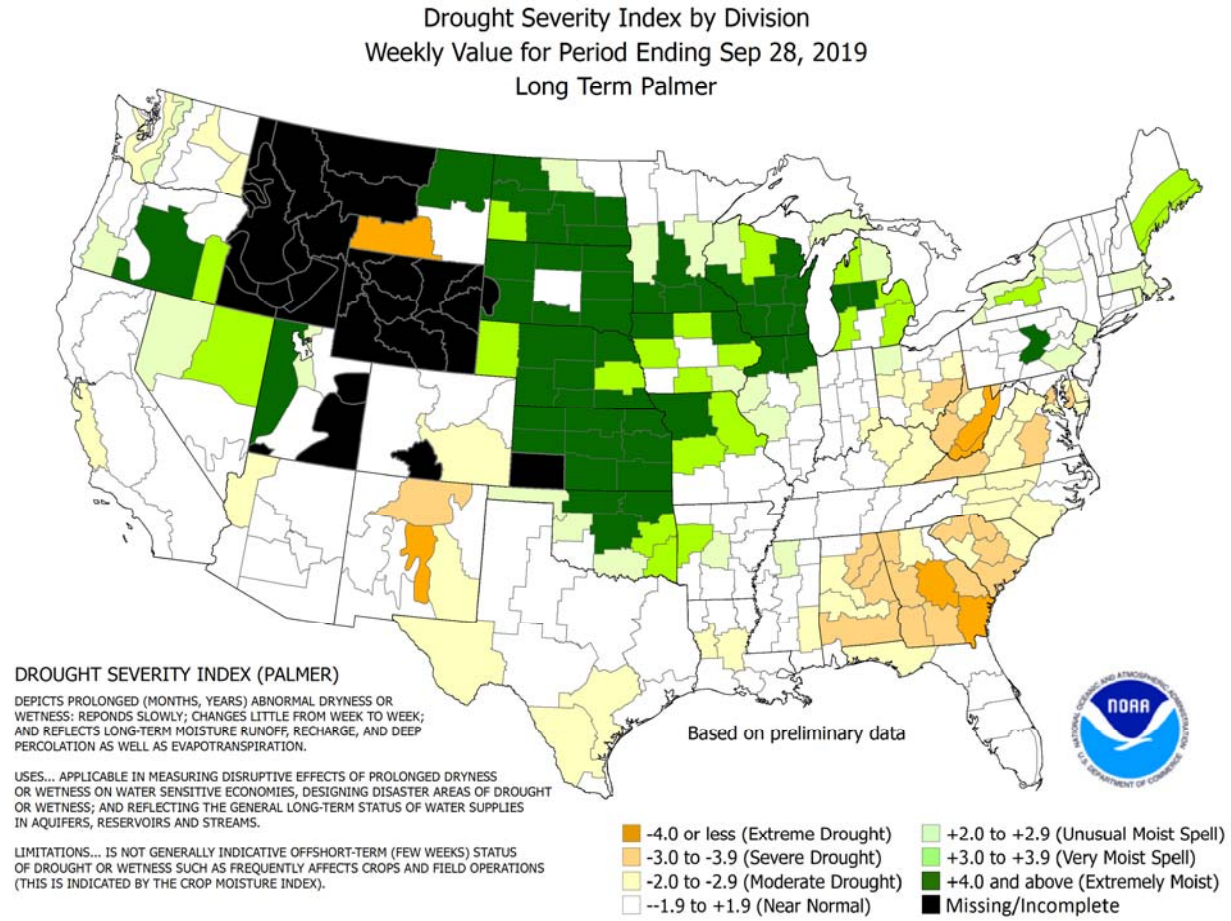
Information provided by the USGS, the Middle Atlantic River Forecast Center, and the National Weather Service.

Drought Monitor and Soil Moisture:

The NOAA Climate Prediction Center's U.S. Drought Monitor map (see first figure) indicates an increase in abnormally dry conditions (D0) in the Potomac basin, with some development of moderate drought conditions (D1) in Southern Maryland, Virginia, and West Virginia. Maryland has 98 percent area in D0 and 33 percent area in D1. Virginia has 96 percent area in D0 and 54 percent area in D1. West Virginia has 100 percent area in D0 and 41 percent area in D1. Both Virginia and West Virginia D0 coverage includes area outside the Potomac basin. The Palmer Drought Severity Index by Division map (see second figure) indicates moderate drought to near normal conditions in the majority of the Potomac Basin. Some areas in Southern Maryland, western Maryland, Virginia, and West Virginia show severe to extreme drought conditions.



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



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