Water Supply Outlook

August 5, 2019
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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 below normal probability of releases from the Washington metropolitan area’s back-up water supply reservoirs for the 2019 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. Potomac basin streamflows are mostly near or above normal, influenced by near or above normal precipitation and groundwater levels. According to the Middle Atlantic River Forecast Center, the outlook for water resources and water supplies is good. 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 minimal (<1 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 minimal (<1 percent) conditional probability compares to the 7 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 August 1, 2019

<table>
<thead>
<tr>
<th>Low flow threshold (MGD)</th>
<th>Low flow threshold (cfs)</th>
<th>Historical probability of lower flow August 1 through December 31</th>
<th>Conditional probability of lower flow August 1 through December 31</th>
</tr>
</thead>
<tbody>
<tr>
<td>1200</td>
<td>1858</td>
<td>67%</td>
<td>29%</td>
</tr>
<tr>
<td>1000</td>
<td>1548</td>
<td>47%</td>
<td>4%</td>
</tr>
<tr>
<td>800</td>
<td>1238</td>
<td>24%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>700</td>
<td>1084</td>
<td>15%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>600</td>
<td>929</td>
<td>7%</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>
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 5.2 inches in the month of July, which is 1.3 inches above normal. The map below shows that July rainfall has been normal plus or minus an inch or two for most areas. Central Maryland, the extreme eastern parts of the eastern West Virginia panhandle and extreme northeastern Virginia are running 1 to over 3 inches above. The graph below shows that the basin cumulative precipitation over the past 12 months (August 2018 through July 2019) has been 17.9 inches above normal.

Source: Middle Atlantic River Forecast Center, National Weather Service
Precipitation and Drought Outlook for August, September, October 2019

MARFC’s Water Resource Outlook for the southern portion of the Middle Atlantic calls for near average rainfall and near or below normal temperatures through the next couple of weeks.

The NWS Climate Prediction Center’s 30 day outlook for August as well as the 90 day outlook for August through October calls for near average rainfall and above average temperatures.

As of July 18, 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 or above 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 is one well that is “Below Normal” in Prince William County, Virginia. Wells with a gray dot inside the symbol identify Water Supply Outlook wells, the majority of which fall in the “Normal” category. In this map, the USGS defines “Normal” as between the 25th and 75th percentiles.

![Map of groundwater conditions](image)

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 next year because of rehabilitation work being done at the dam. Triadelphia Reservoir is one of the two Patuxent reservoirs.

An artificially varied flow (AVF) releases from Jennings Randolph Reservoir is scheduled for Saturday and Sunday, August 24-25, 2019. 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 August 1, 2019

<table>
<thead>
<tr>
<th>Facility</th>
<th>Percent Full</th>
<th>Current usable storage, BG</th>
<th>Total usable capacity, BG</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSSC’s Patuxent reservoirs</td>
<td>57</td>
<td>6.0</td>
<td>10.5</td>
</tr>
<tr>
<td>Fairfax Water’s Occoquan Reservoir</td>
<td>99</td>
<td>8.0</td>
<td>8.1</td>
</tr>
<tr>
<td>Little Seneca Reservoir</td>
<td>99</td>
<td>3.8</td>
<td>3.9</td>
</tr>
<tr>
<td>Jennings Randolph water supply</td>
<td>100</td>
<td>13.1</td>
<td>13.1</td>
</tr>
<tr>
<td>Jennings Randolph water quality</td>
<td>95</td>
<td>15.4</td>
<td>16.3</td>
</tr>
<tr>
<td>Savage Reservoir</td>
<td>89</td>
<td>5.6</td>
<td>6.3</td>
</tr>
</tbody>
</table>

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 July 31 was 3.1 billion gallons per day (BGD). For this day of the year, this value was above the 50th percentile flow value of 2.4 BGD and below the 90th percentile flow value of 5.3 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 9.7 BGD for the last three months and 6.3 BGD in July.

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 July was well above the minimum recommendation of 100 MGD.

Drought Status:

The states of Maryland, Pennsylvania, and Virginia have “Normal drought status.”
**Drought Monitor and Soil Moisture:**

The NOAA Climate Prediction Center’s U.S. Drought Monitor map (see first figure) indicates no drought conditions for the Potomac basin. The Palmer Drought Severity Index by Division map (see second figure) indicates near normal to extremely moist conditions in the Potomac Basin.

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