

2013 Drought Exercise Report

September 2014

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The report is available online at www.PotomacRiver.org as ICP14-4_Ahmed.

1. Introduction

The Washington, D.C., metropolitan area (WMA) relies on the Potomac River to supply approximately three quarters of the water it uses. The area's three major water suppliers, Fairfax Water (FW), the Washington Suburban Sanitary Commission (WSSC), and the Washington Aqueduct Division of the U.S. Army Corps of Engineers (Aqueduct) participate in a cooperative system of water supply planning and management which includes joint funding of water supply storage in reservoirs located upstream of the CO-OP suppliers' Potomac River intakes and coordinated operations when flows in the river fall below specified thresholds. This cooperative system is based on a set of agreements entered into more than 30 years ago. The Low Flow Allocation Agreement (LFAA) of 1978 provides for the allocation of water during shortages. The Water Supply Coordination Agreement (WSCA) of 1982 commits the three suppliers to operate "in a coordinated manner" to optimize the use of available resources and specifies that water demand and availability forecasts be conducted every five years.

During periods of drought, the Section for Cooperative Water Supply Operations on the Potomac (CO-OP) of the Interstate Commission on the Potomac River Basin (ICPRB) helps manage this system by coordinating WMA water withdrawals from the Potomac River and off-river reservoirs. CO-OP also recommends releases from upstream reservoirs when forecasted flow in the river is not sufficient to meet expected needs. These needs include WMA demands and an environmental flow-by of 100 million gallons per day (MGD) on the Potomac River at Little Falls dam near Washington, D.C.¹

Each year when flows are at or above normal, CO-OP conducts a drought exercise. These exercises allow participants to practice and improve communication procedures among organizations. They also provide ICPRB's CO-OP staff with an opportunity to practice using operational tools and making management decisions, and to explore the effects of different management strategies. This ensures that during an actual drought all stakeholders are properly trained and key operational strategies have been discussed and tested beforehand.

This report describes activities and results of the 2013 drought exercise, which took place from August 21 through August 27. It is not intended to fully describe CO-OP drought operations or the cooperative system in place. For those familiar with CO-OP drought operations, this report will cover the aspects practiced during the exercise and document information learned about the individual systems and how they influence joint operations.

Participants in this year's exercise included staff from:

- ICPRB CO-OP Section
- The Washington Aqueduct – a Division of the U.S. Army Corps of Engineers, which supplies water to the District of Columbia via DC Water, and to parts of Virginia

¹ A complete discussion of CO-OP drought operations can be found in the report, [2010 Washington Metropolitan Area Water Supply Reliability Study; Part 1: Demand and Resource Availability Forecast for the Year 2040](#), by S.N. Ahmed, K.R. Bencala, and C.L. Schultz, ICPRB Report No. 10-01, May 2010, available at www.potomacriver.org under "Publications."

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- The Washington Suburban Sanitary Commission (WSSC), which supplies water to Montgomery and Prince George’s counties in Maryland, and on a limited basis to other parts of Maryland
- Fairfax County Water Authority (Fairfax Water), which supplies water to Fairfax County, Virginia, and provides wholesale water to other suppliers in northern Virginia
- Loudoun County Water Authority (Loudoun Water), a wholesale customer of Fairfax Water with plans to construct a Potomac River intake and water treatment plant to provide a portion of its future supply
- U.S. Army Corps of Engineers (USACE), Baltimore District
- Metropolitan Washington Council of Governments (MWCOG)
- National Weather Service Middle Atlantic River Forecast Center (MARFC)

This year’s exercise included the following elements:

- Communications
 - Reporting by utilities of recent and forecasted demands, and on reservoir storage
 - Communication and coordination with Loudoun Water on actual demands and discharges in order to familiarize Loudoun Water with the communication exchange between the utilities and CO-OP staff during drought conditions.
 - Reporting by CO-OP via email on recent and current demands, flows, and storage
 - Communication between CO-OP and utilities on operational changes in withdrawals and on reservoir releases
 - Exchange of information between CO-OP and MARFC on withdrawals
- Technical
 - Use by CO-OP of three separate flow prediction tools to determine the need for releases from Jennings Randolph and Little Seneca reservoirs:
 - CO-OP’s hourly flow prediction tool – based on actual flow conditions
 - MARFC’s 72-hour flow prediction – based on actual flow conditions
 - Chesapeake Bay Program watershed model flow predictions
 - Actual release from Little Seneca Reservoir to provide data for time of travel estimates
 - Better understand operations at each utility, focusing on load shifting capabilities and constraints

2. Overview of CO-OP Drought Operations

The Potomac River is the primary source of raw water for the CO-OP suppliers, who each have an intake on the river upstream of Little Falls dam. Fairfax Water also relies on stored water in the Occoquan Reservoir. Likewise, WSSC relies on water from a pair of reservoirs in the Patuxent River watershed: Rocky Gorge and Triadelphia (see map in Figure 1). Aqueduct has intakes at two locations on the Potomac River: Little Falls and, several miles upstream, at Great Falls. In addition, these three suppliers jointly own storage in two reservoirs located upstream of their Potomac River intakes: Jennings

Randolph (JRR), which is operated by the U.S. Army Corps of Engineers, and Little Seneca, operated by WSSC. They pay a portion of the operations and maintenance costs of a third upstream reservoir, Savage. This storage is available to augment Potomac River flow during low-flow periods.

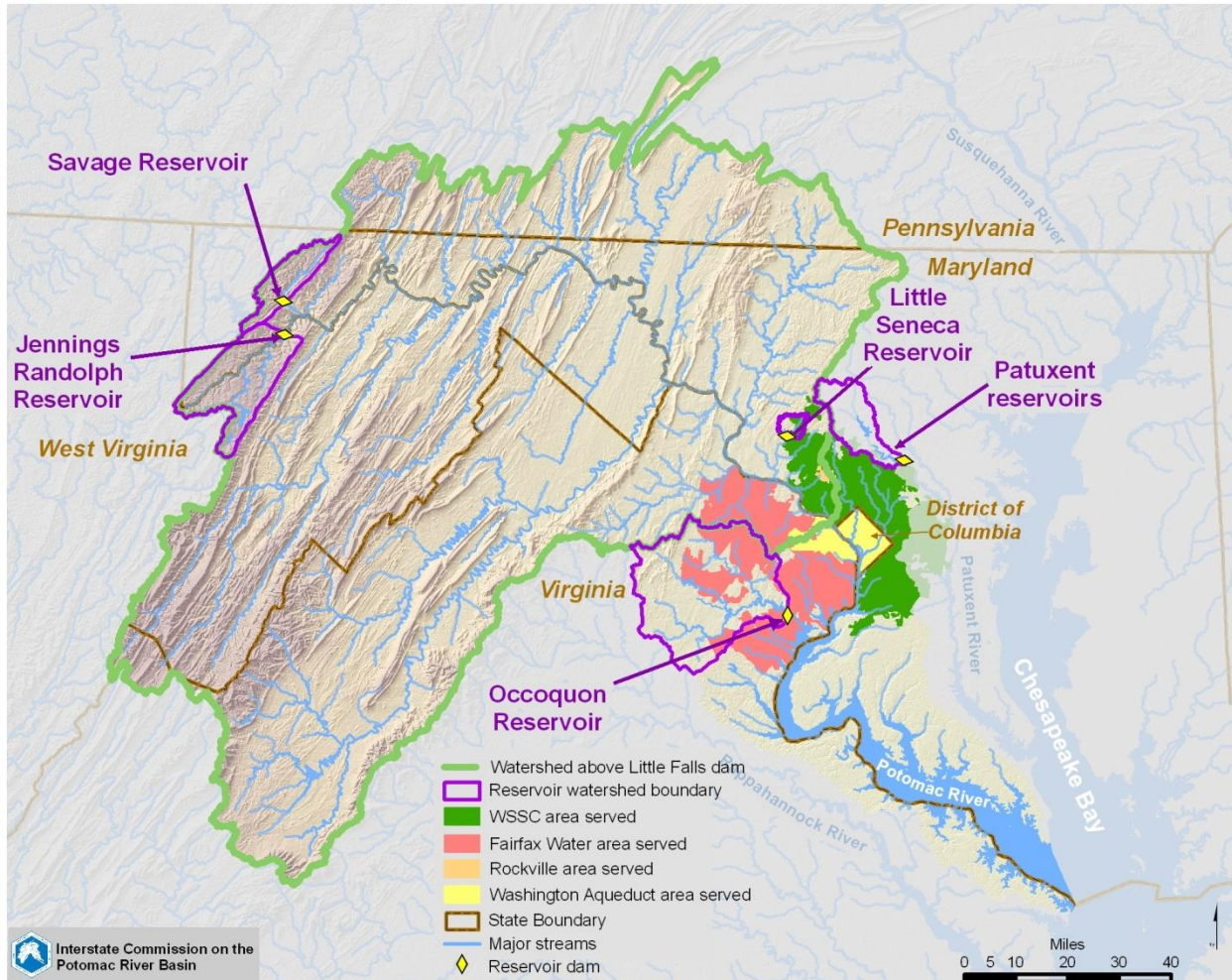


Figure 1 – Water supply resources for CO-OP suppliers

Key operational goals for CO-OP staff during droughts are:

- Maintaining Potomac River flow at Little Falls dam, as measured by the U.S. Geological Survey (USGS) gage (Station ID 01646500), at or above the 100 MGD (155 cubic feet per second (cfs)) environmental flow-by.
- Maintaining estimated flow at Great Falls, located approximately 9.3 river miles upstream of Little Falls, at or above the recommended minimum flow of 300 MGD (464 cfs). Estimated travel time between Great Falls and Little Falls during extremely low flow conditions is nine hours.
- Balancing use of storage in system reservoirs to ensure that adequate storage is maintained in each reservoir to sustain expected withdrawals throughout the remainder of a severe drought, and to ensure a 95 percent probability of refill to 90 percent capacity by June 1 of the following year.

To estimate Potomac withdrawals one to nine days into the future for input into flow prediction tools, CO-OP staff develops withdrawal scenarios for both the Potomac River and off-Potomac reservoirs. Scenarios are based on estimates of near-term demands, estimates provided by the water suppliers, and historic data. These scenarios may require load shifts by the water suppliers to and from Potomac River and reservoir intakes. Load shifting, that is, the shifting of some portion of a supplier's withdrawal from one intake to another, is sometimes requested by CO-OP staff during droughts to help meet operational goals. Each of the WMA suppliers has two intakes. Fairfax Water and WSSC both have one intake on the Potomac River and one off-Potomac intake (at the Occoquan and the Patuxent reservoirs, respectively). Aqueduct has two intakes on the Potomac River: one at Great Falls and one at Little Falls. Load shifting requires close communication between ICPRB CO-OP and water supplier staff.

3. Exercise Scenario

The year is 2013. The summer has been moderately dry, and conditions are worsening. According to NOAA's Potomac basin drought monitor more than half of the basin is now in D1 (moderate) drought status, with some portions entering D2 (severe) drought status, and a drought Watch was announced earlier in the month by MWCOG following a meeting of the region's Drought Coordination Committee. Water supply releases from the North Branch reservoirs were initiated by CO-OP on August 16th. Because of the nine-day travel time, the first release water is expected to arrive at Little Falls this coming Sunday. In the meantime, flows in the Potomac River continue to fall.

Timeline:

1. August 5: *The Drought Coordination Committee declared a drought Watch, following a recommendation made at a meeting of the Drought Coordination Technical Committee organized by MWCOG.*
2. August 10: *CO-OP began drought operations, including twice daily reporting of recent withdrawals and forecasted demands, when adjusted flow at Little Falls (observed flow plus Washington metropolitan area Potomac withdrawals) minus the 100 MGD Little Falls flow-by fell below twice Potomac withdrawals.*
3. August 16: *Water supply releases were initiated from Jennings Randolph and Savage reservoirs.*
4. August 18: *The Montgomery County Executive and County Council, the Maryland-National Capital Region Park and Planning Commission, and staff at Black Hill Regional Park were informed that releases from Little Seneca Reservoir may occur in the coming weeks.*

4. Simulated Drought Operations

Simulated drought operations were conducted over a seven-day period, including weekends, from Wednesday, August 21, through Tuesday, August 27, 2013. Simulated operations included twice daily reports from CO-OP utilities and from Loudoun Water on recent withdrawal rates, forecasted demands, and reservoir storage levels. CO-OP distributed morning and afternoon e-mail updates on flow conditions, actual and estimated withdrawal rates, current storage volumes, and operational

recommendations for each utility and reservoir. During the exercise details often emerge on how each utility operates; this information is documented in this section

Load shifting by Fairfax Water

Fairfax Water has two water supply sources, the Potomac River and Occoquan Reservoir. Fairfax Water's Potomac and Occoquan supplies are treated separately and fed into a single interconnected transmission and distribution system. The Potomac source primarily feeds northern and western areas (Potomac service area) while the Occoquan supplies the south and east (Occoquan service area). Available transmission capacity defines the amount of water that may be transferred between the different areas. Raw water withdrawn from the Potomac River is treated by Fairfax Water's Corbalis water treatment plant (WTP) which has a maximum capacity of 225 MGD. Raw water withdrawn from Occoquan Reservoir is treated by their Griffith treatment plant, which has a maximum capacity of 120 MGD. The Corbalis plant supplies treated water primarily to the Potomac service area, but up to 65 MGD of this water can be fed into the distribution system of the Occoquan service area. Conversely, the Griffith plant supplies treated water primarily to the Occoquan service area, but up to 35 MGD can be pumped to the Potomac service area. In 2012, the Corbalis plant provided 58 percent of Fairfax Water's total production and the Griffith plant provided 42 percent. This split is also reflective of the last five year period (private communication, Greg Prelewicz, Aug 19, 2013).

At the start of the exercise, the simulated production at Fairfax Water's Griffith plant was assumed to be 70 MGD. In the afternoon of Day 1 of the exercise, on August 21, CO-OP staff requested that Fairfax Water shift demand from its Griffith WTP to its Corbalis WTP in order to conserve reservoir storage. CO-OP phoned FW operations to inquire how low Griffith production could be reduced, given current conditions. FW operations staff replied that a sustainable minimum production rate for Griffith was 63 MGD, and that this rate was necessary to supply Prince William County.

On Day 3 of the exercise, August 23, simulated flow in the Potomac River had fallen below forecasted levels. The simulated Griffith production rate was 63 MGD. CO-OP requested a load shift to increase Griffith production in order to reduce FW's Potomac River withdrawals. CO-OP staff spoke with FW operations staff to find out how much production at the Griffith plant could be increased, and how quickly this could be done. FW staff said that a shift of 10-15 MGD could be accomplished fairly quickly (increasing Griffith production to 73-78 MGD). They estimated that it would take three hours to accomplish the maximum possible shift of 30 MGD (increasing Griffith production to 93 MGD) because there are valves in the distribution system that would have to be turned manually.

Load shifting by WSSC

WSSC's distribution system has considerable flexibility and can implement load shifts between its Potomac and Patuxent WTPs quickly, though the load shifts are subject to the constraints of the Patuxent plant's minimum and maximum production rates of 30 and 65 MGD. At the start of the exercise, CO-OP staff recommended that Patuxent withdrawals be maintained at the minimum rate of 30 MGD to conserve reservoir storage. During several days of the exercise, due to falling flows in the Potomac River, WSSC was asked to temporarily shift up to an additional 35 MGD of demand to the Patuxent in order to help maintain the Little Falls flow-by.

Load shifting by Washington Aqueduct

One of CO-OP's operational targets is a recommended flow minimum of 300 MGD (464 cfs) between Great Falls and Little Falls. This stretch of the river, approximately 9.3 miles in length, contains relatively unique and rare biological communities.² During droughts, CO-OP staff may request that Washington Aqueduct shift part or all of its withdrawal from its Great Falls intake downstream to its Little Falls intake in order to maintain flow at or above this minimum level. Because there is no stream gage at Great Falls, flow between Great Falls and Little Falls is estimated to be the sum of observed flow at Little Falls and Washington Aqueduct's withdrawal at Little Falls, with an adjustment made to account for the travel time between Great Falls and Little Falls (which has been estimated to be nine hours during very low flow conditions). CO-OP drought operation spreadsheets include computations and graphs of estimated flow at Great Falls.

Simulated flow at Little Falls during the drought exercise ranged from 107 MGD (165 cfs) to 250 MGD (387 cfs). Therefore, throughout most of the exercise Washington Aqueduct was requested to withdraw all of its water from Little Falls to help maintain flow between Great Falls and Little Falls above the recommended minimum. On Day 6 of the exercise, when simulated flows were rising, it was recommended that Aqueduct reduce the withdrawal at Little Falls to 50 MGD, and on the final day to cease pumping at Little Falls. Because there are significant pumping costs associated with water withdrawals from Little Falls, Washington Aqueduct prefers under normal conditions to withdraw water from Great Falls.

Reporting by Loudoun Water

This year's exercise included reporting of demand and discharges by Loudoun Water. Loudoun Water's Broad Run Water Reclamation Facility (BRWRF) discharges treated wastewater into Broad Run, a Potomac River tributary. Because Broad Run flows into the Potomac at a point downstream of the USGS's flow gage at Point of Rocks and upstream of the WMA supplier intakes, data on recent and current BRWRF discharge rates is useful input for CO-OP Little Falls flow forecasts. Also, while Loudoun Water does not presently withdraw water from the Potomac River (it is currently a wholesale customer of Fairfax Water), it has received a Virginia water appropriations permit and plans to construct a water treatment plant and Potomac River intake. In addition, it plans to re-purpose a quarry for water supply storage ("Quarry A"). Depending on the extent of future participation by Loudoun Water in CO-OP operations, the proposed quarry could significantly increase the reliability and flexibility of the region's water supply system.

In this year's exercise, Loudoun Water did not simulate future Potomac withdrawals and use of its quarry, but instead practiced standard drought operations communication procedures. Loudoun Water

² Cummins, J.D., Claire Buchanan, Carlton Haywood, Heidi Moltz, Adam Griggs, R. Christian Jones, Richard Kraus, Nathaniel Hitt, Rita Villella Bumgardner. 2011. "Potomac Basin Large River Environmental Flow Needs" prepared for The Nature Conservancy of Maryland and the District of Columbia and the National Park Service. ICPRB Report 10-3.

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staff sent twice daily reports to CO-OP of “yesterday’s” actual and “today’s” projected values of demand and of discharge from the BRWRF. This data was included in CO-OP’s email reports of recent and current demands, flows, and storage volumes.

Information Exchange with MARFC

Drought exercises are an opportunity for CO-OP and MARFC to investigate ways to increase exchanges of information. The MARFC makes flow forecasts for streams throughout the Middle Atlantic region. The primary purpose of these forecasts is to provide flood warning information, but the forecasts are also useful during low flow periods. A table of three-day forecasts of stream flow values are available on the MARFC website (<http://www.weather.gov/marfc/>), including forecasts for the Potomac River at Little Falls.

During the 2013 exercise: 1) CO-OP incorporated the MARFC forecasted stream flow values into its hourly forecast spreadsheet tool, and 2) the two organizations discussed a mechanism by which CO-OP could provide MARFC with reservoir release and WMA withdrawal data for use in MARFC’s forecast model. CO-OP staff entered values of MARFC’s forecasted flows, which are given at six-hour intervals, into a table in its hourly spreadsheet forecast tool, and included a plot of the MARFC predictions in the tool’s graph of predicted and observed flows at Little Falls. CO-OP maintains a set of forecasting tools to assist in determining reservoir release rates.³ CO-OP currently has two spreadsheet tools that forecast Potomac River flow at Little Falls, a “daily” tool based on daily flow and withdrawal data and an “hourly” tool based on real-time flow data and hourly withdrawal data. Forecasts are made using a flow accumulation model which sums appropriately lagged upstream flows and assumes that future flows will attenuate according to simple recession algorithms. **Error! Reference source not found.** Figure 2 and Figure 3 show plots of forecasts from CO-OP’s hourly tool that were made during the drought exercise, on August 23. The forecasts shown were computed from various sets of upstream gage data. For example, the Little Falls forecast from Point of Rocks was computed using Potomac River flow data from the USGS streamflow gage at Point of Rocks and from flow data for tributaries which discharge into the river below Point of Rocks. Also shown is the MARFC three-day forecast.

During the 2013 exercise, CO-OP and MARFC staff discussed the types of CO-OP data that might be provided to MARFC during low flow periods for use in its forecast model. The method used by MARFC to estimate WMA Potomac River withdrawals is based on monthly means of historical data. Since during low flow periods, WMA withdrawals are significant relative to the river’s flow, it was agreed that it would be desirable for MARFC to have actual observed and forecasted withdrawal values for input into its model. Also, during dry weather periods, the MARFC model assumes that releases from North Branch

³ A description of CO-OP’s flow forecasting tools can be found in “2010 Washington Metropolitan Area Drought Operations - Summary and Lessons Learned”, by S.N. Ahmed, K.R. Bencala, and C.L. Schultz, ICPRB Report No. 11-04, December 2011, available at www.potomacriver.org under “Publications.”

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Potomac reservoirs in coming days will remain constant. But these release rates change on days when CO-OP requests that USACE staff make a water supply release from Jennings Randolph Reservoir.

During the exercise, CO-OP sent MARFC information on the current day's North Branch reservoir water supply release. This release request is made by CO-OP staff to the USACE Baltimore District Office's Water Control Group by 9 AM every morning, in the form of a "Luke target" flow at the USGS's stream flow gage on the North Branch of the Potomac River at Luke, Maryland. The information was sent to MARFC via email at approximately 9 AM in the morning, after the Luke target was determined based on flow and demand forecasts. After the exercise, during a brief period of daily drought reporting and monitoring which occurred in September 2013, CO-OP implemented a method to provide MARFC with recent and forecasted WMA supplier Potomac River withdrawals (see Section 6 of this report).

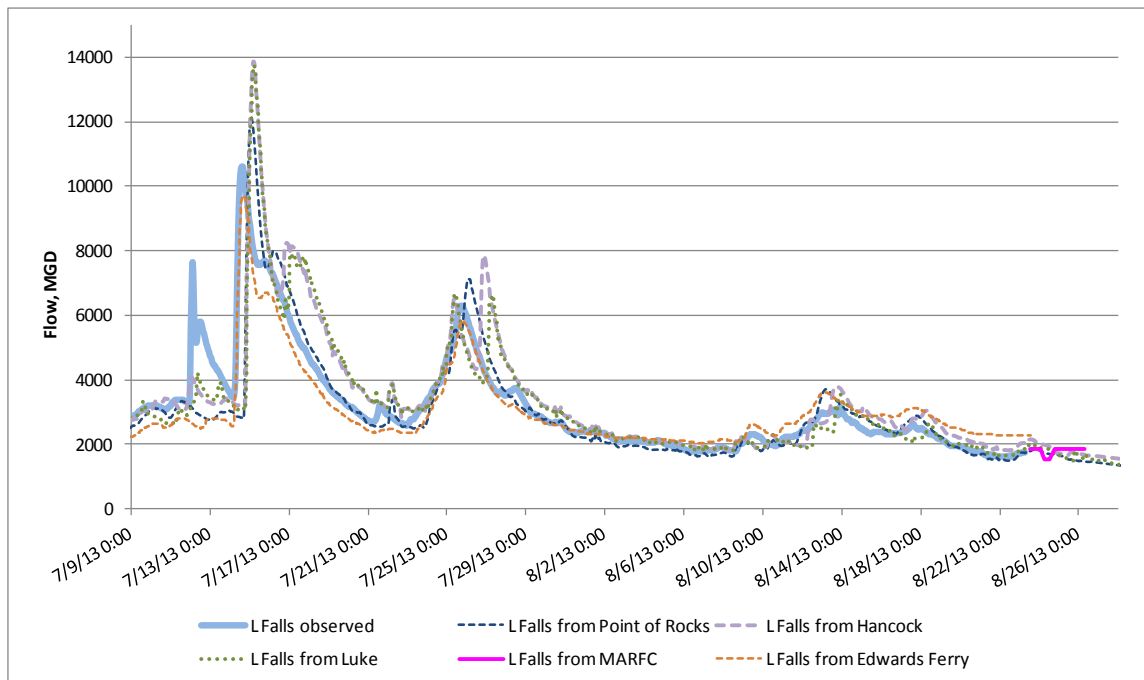


Figure 2 – Observed flow at Little Falls (L Falls observed) compared with forecasts made on August 23 from CO-OP's hourly forecast tool (L Falls from...) and from the MARFC (L Falls from MARFC)

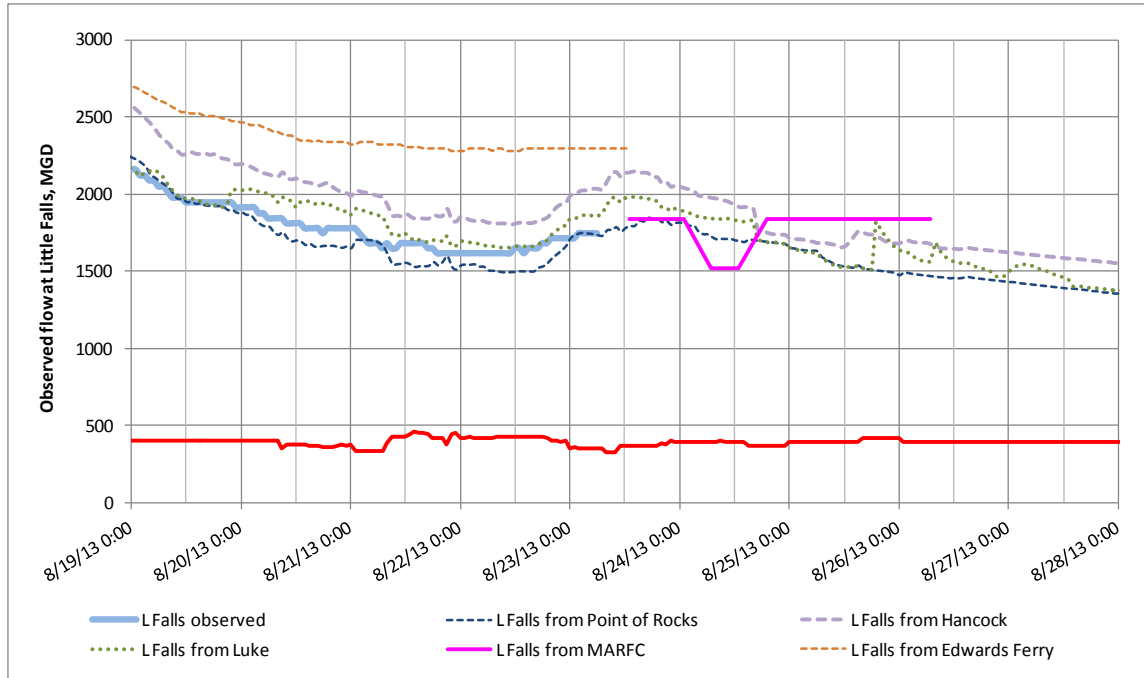


Figure 3 – Close-up of observed and forecasted flows at Little Falls, displayed by CO-OP’s hourly forecast tool

5. Little Seneca Reservoir Release

An actual release from Little Seneca Reservoir was initiated on the Day 3 of the exercise, August 23, 2013. The purpose of the release was to exercise communications procedures and also to attempt to generate new data on the amount of time it takes for a release to travel from Little Seneca dam to Little Falls. A number of steps were taken to notify interested stakeholders prior to the release. CO-OP sent letters to the Montgomery County Executive and Council and to Maryland-National Capital Parks and Planning Commission on August 15 to inform them that a test release would occur in the coming days (see Appendix A). Contact via telephone was made with Black Hill Regional Park staff on August 22 to remind them of the release and to verify contact information. Also, a press release concerning the release was issued on August 22 (see Appendix B). Drafting of the press release was coordinated by the MWCOG, with input from communications experts from the water suppliers and ICPRB.

The release from Little Seneca Reservoir was initiated at 11 AM and the release rate was 125 MGD. The duration of the release was 19 hours. Measured flow downstream at the USGS’s gage on Seneca Creek at Dawsonville, Maryland, was between 50 and 70 cfs (32 to 45 MGD) on the morning of the 23rd, and rose to approximately 280 cfs (180 MGD) after the release’s arrival at approximately 2:00 PM. The graph in Figure 4 shows observed and forecasted flows at Little Falls during the Little Seneca Reservoir release. **Error! Reference source not found.** All flows in this graph are lagged to indicate estimated arrival time at Little Falls. In this graph the assumed lag times to Little Falls from the upstream gages were: 0.5 day from Seneca Creek at Dawsonville and 1.7 days from Potomac River at Point of Rocks. Note that lag times vary depending on flow conditions. This test release was not considered successful in providing an estimate of travel time from Little Seneca Reservoir to Little Falls because the increase in Potomac River

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flow due to the release appeared to more or less coincide with and be obscured by a temporary increase in upstream flow evident at the Point of Rocks gage.

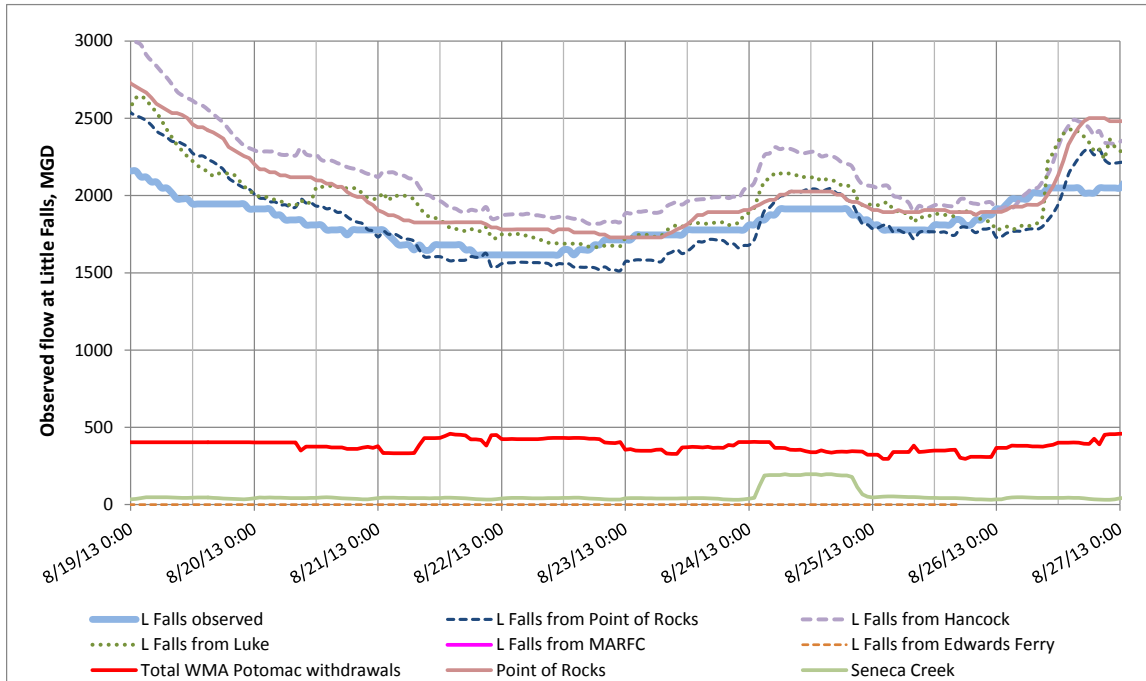


Figure 4 – Observed and forecasted flows at Little Falls during Little Seneca Reservoir release. Also shown are WMA withdrawals and observed flow at Little Seneca Creek at Dawsonville, Maryland

6. Action Items

The 2013 drought exercise concluded on August 27. During the exercise, CO-OP staff noted unanswered questions and information that required further action on a list of action items. These appear below, along with notes on the resolution of each item.

- The information on the minimum Griffith plant production rate and on load shifting provided by Fairfax Water operations staff during the exercise should be discussed and confirmed with Fairfax Water planning staff.

In a discussion that occurred after the exercise, Fairfax Water planning staff said that CO-OP should continue using the value for the minimum Griffith plant production rate currently in CO-OP operations and planning tools, 45 MGD. Also, it said that CO-OP should assume that a load-shift of 30 MGD from the Potomac to the Occoquan intake would take approximately one day to implement.

- CO-OP should make recent and forecasted WMA withdrawal data available to the MARFC during low flow periods, for use in their flow forecasting model.

After the exercise, during a brief period of daily drought reporting and monitoring which occurred in September 2013, CO-OP implemented a method to provide MARFC with recent and forecasted WMA supplier Potomac River withdrawals. A text file with an agreed upon format was uploaded every morning to a page on CO-OP's website:

http://potomacriver.org/datahub/potomacwithdrawals/ICPRB_potomac_withdrawals.txt.

- In the days preceding the Little Seneca Reservoir release, CO-OP was asked by staff at Black Hill Regional Park, where the reservoir is located, what drop in the reservoir level was expected to occur due to the release. CO-OP estimated that the drop would be less than a half foot based on a graph that appears in a report on a 2010 hydrographic survey of the reservoir by the Maryland Geological Survey⁴. However, it would be desirable to have a table relating Little Seneca Reservoir volume to stage, so that this sort of estimate could be made for various release quantities under a variety of conditions.

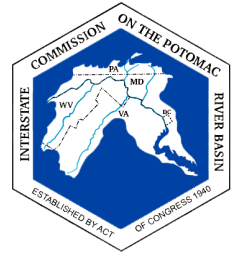
After the exercise, CO-OP requested a volume/area/stage table from WSSC to allow it to more definitely answer questions about expected reservoir level changes due to releases. However, a table has not yet been developed from the recent hydrographic survey data.

⁴ Bathymetry and Sediment Accumulation of Little Seneca Lake, R.A. Ortt, D.V. Wells, and S. VanRyswick, Maryland Department of Natural Resources Coastal and Estuarine Geology File Report No. 11-03, May 2011.

Appendix A – Letter to Montgomery County Executive on Little Seneca Reservoir Release

INTERSTATE COMMISSION ON THE POTOMAC RIVER BASIN

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George W. Reiger (*)
Jane G. Witheridge
Robert Pace (a)
John H. Quigley (a)

Executive Director
H. Carlton Haywood

General Counsel
Robert L. Bolle

(*)--Executive Committee
(a)--Alternate

August 15, 2013

The Honorable Isiah Leggett
Montgomery County Executive
Executive Office Building
101 Monroe Street, 2nd Floor
Rockville, MD 20850

Dear Mr. Leggett:

The Interstate Commission on the Potomac River Basin (ICPRB) coordinates drought-related water supply operations on behalf of the Washington, D.C., metropolitan area water suppliers including the Washington Suburban Sanitary Commission (WSSC), Fairfax Water serving Northern Virginia, and Washington Aqueduct serving suppliers in the District of Columbia and Arlington County and Falls Church, Virginia. I am writing to notify you of a planned water supply release test from Little Seneca Reservoir as part of our annual drought exercise.

These exercises are conducted each year when an actual drought does not occur to practice decision making and communications within and between organizations. Periodically, a release from Little Seneca is included in the exercise to test coordination between ICPRB, WSSC staff operating the dam at Little Seneca, and the staff at Black Hill Regional Park. Such a release is planned for this year's exercise sometime between August 22 and 28.

Little Seneca Reservoir was constructed with funds provided by the Washington area water suppliers. Completed in 1981, the reservoir is used to augment Potomac River flow during droughts to ensure a safe and reliable supply of water for the over 4.3 million customers the Washington metropolitan area, including the citizens of Montgomery County. Releases are an important part of normal drought operations; drought-related releases were made in 1999, 2002, and 2010. Releases were also made during the annual drought exercises of 2003, 2004, and 2005.

The ICPRB is an interstate compact commission established by Congress in 1940. Its mission is the enhancement, protection, and conservation of the water resources of the Potomac River and its tributaries through regional and interstate cooperation. Represented by appointed commissioners, the ICPRB includes the District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia, and the federal government.

The Maryland-National Capital Park and Planning Commission (M-NCPPC) has also been contacted about the plan for a test release and notification will be provided to M-NCPPC and Black Hill Regional Park staff prior to the actual release.

Please do not hesitate to contact me by email at chaywood@icprb.org, or by phone at 301-274-8105 if you have any questions.

Sincerely,

H. Carlton Haywood, Executive Director
Interstate Commission on the Potomac River Basin

CC:

Council Member Phil Andrews
Council Member Roger Berliner
Council Member Marc Elrich
Council Member Valerie Ervin
Council Member Nancy Floreen
Council Member George Leventhal
Council Member Nancy Navarro
Council Member Craig Rice
Council Member Hans Riemer

Appendix B – Press Release on Little Seneca Reservoir Release

For Immediate Release

Contact: Jeanne Saddler

August 22, 2013

[\(202\) 962-3250](tel:2029623250)

WATER RELEASE PLANNED FROM LITTLE SENECA RESERVOIR

Washington, D.C. – Water will be released from a local reservoir into the Potomac River on Friday morning as part of a drought response exercise in the region, the Metropolitan Washington Council of Governments (COG) announced today. The planned release will test the use of the metropolitan region’s back-up water supply reservoirs.

This year, a relatively modest amount of water –about 63 million gallons (which represents about 10 – 15% of daily water use in the Metropolitan region) -- will be released from the Little Seneca Reservoir in Montgomery County, MD, which holds four billion gallons. People using the reservoir might notice a slight drop in water levels over the next few days but the release will not affect any planned recreational activities.

For more than twenty years, the Interstate Commission on the Potomac River Basin (ICPRB) has conducted an annual drought exercise for the Metropolitan Washington region, working with COG and the area’s three largest water utilities: Fairfax Water, Washington Aqueduct, and Washington Suburban Sanitary Commission. Loudoun Water, which recently received a permit to construct a water withdrawal intake on the Potomac River, is also participating in this year’s exercise. The exercises are conducted in non-drought years to practice regional communications and simulate operations of the water supply system as they would occur during an actual drought.

Area water utilities and local governments have worked together for decades to protect the water supply in the Washington region. When droughts occur, ICPRB assists the area’s independent utilities, which rely on the Potomac River for about three quarters of their supply, to coordinate water withdrawals and reservoir releases. If needed, stored water purchased by the utilities is released from upstream reservoirs. The releases provide water both for water supply and to meet environmental flow targets. The upstream reservoirs include Jennings Randolph Reservoir in the North Branch Potomac and Little Seneca Reservoir in Montgomery County. Data on river flow, current and future utility demands, and weather are used in models that guide reservoir release decisions. Release rates are made to meet drinking water and ecological needs while optimizing the amount of stored water remaining in the reservoirs for later use.

For additional information about this year’s drought exercise, please contact:

Curtis Dalpra, ICPRB Communications Manager at [301-274-8107](tel:3012748107), email cdalpra@icprb.org; or

Jeanne Saddler, COG Director of Public Affairs, at [202-962-3250](tel:2029623250), email jsaddler@mwkog.org

COG is the association of 22 local governments working for a better metropolitan area.

Appendix C – Daily Monitoring Updates

2013 Drought Exercise Monitoring Updates

Current Drought Monitoring Status: EXERCISE

Scenario:

The scenario year is the current year, 2013. The summer has been moderately dry, and conditions are worsening. According to NOAA's Potomac basin drought monitor more than half of the basin is now in D1 (moderate drought) drought status, with some portions entering D2 (severe) status, and a drought Watch was announced earlier in the month by MWCOG following a meeting of the region's Drought Coordination Committee. Water supply releases from the North Branch reservoirs were initiated by CO-OP on August 16th. Because of the 9-day travel time, the first release water is expected to arrive at Little Falls this coming Sunday. In the meantime, flows in the Potomac River continue to fall.

Timeline:

August 5: The Drought Coordination Committee declared a drought Watch, following a recommendation made at a meeting of the Drought Coordination Technical Committee organized by MWCOG.

August 10: CO-OP began drought operations, including twice daily reporting of recent withdrawals and forecasted demands, when adjusted flow at Little Falls (observed flow plus Washington metropolitan area Potomac withdrawals) minus the 100 MGD Little Falls flow-by fell below twice Potomac withdrawals.

August 16: Water supply releases were initiated from Jennings Randolph and Savage reservoirs.

August 18: The Montgomery County Executive and County Council, the Maryland-National Capital Region Park and Planning Commission, and staff at Black Hill Regional Park were informed that releases from Little Seneca Reservoir may occur in the coming weeks.

Objectives:

- Communications
 - Reporting by utilities on yesterday's actual and today and tomorrow's forecasted demands, and on reservoir storage
 - Reporting by CO-OP on recent and current demands, flows, and storage
 - Communications between CO-OP and utilities on withdrawals
 - Communications between CO-OP and USACE and WSSC on reservoir releases
 - Exchange of information between CO-OP and MARFC on withdrawals and reservoir releases
- Technical
 - Use by CO-OP of three separate flow prediction tools:
 - CO-OP's hourly flow prediction tool – based on actual flow conditions
 - MARFC's 72-hour flow predictions– based on actual flow conditions
 - Chesapeake Bay Program watershed model flow predictions
 - Actual release from Little Seneca Reservoir

DROUGHT EXERCISE - Afternoon simulated Potomac flow and demand update (Tuesday 08/27/2013)

This afternoon's report concludes the 2013 CO-OP drought exercise. Our thanks and appreciation goes out to everyone who participated in the exercise!

SIMULATED CONDITIONS: Yesterday evening's thunderstorms resulted in significant accumulations of precipitation in the western portion of the basin, and flow predictions indicate that flow at Little Falls will continue to rise over the next several days. The only operational change for this afternoon is the discontinuation of the request that a portion of Washington Aqueduct's withdrawal be made at Little Falls. (Great Falls and Little Falls withdrawals now per operational preference.)

THE FLOWS, DEMANDS, AND DISCHARGES REPORTED BELOW REFLECT ACTUAL CONDITIONS:

Daily Flows:

Little Falls gage flow 08/26: 2020 MGD (3120 cfs)

Little Falls gage flow 08/27: 2620 MGD (est., based on most recently available real time data) (4050 cfs)

Note: Gage flow at Little Falls is measured after water supply withdrawals.

Point of Rocks flow 08/26: 3520 MGD (5440 cfs)

Point of Rocks flow 08/27: 4520 MGD (est., based on recently available real time data) (6990 cfs)

Today's estimated demand (08/27/13) P.M.:

WSSC P.M. estimated demand: 185 MGD

FW P.M. estimated demand: 175 MGD

Aqueduct P.M. estimated demand: 155 MGD

LW estimated demand (included in total through FW): 29 MGD

Total P.M. estimated demand: 515 MGD

Tomorrow's estimated demand (08/28/13):

WSSC estimated demand: 180 MGD

FW estimated demand: 180 MGD

Aqueduct estimated demand: 150 MGD

LW estimated demand (included in total through FW): 30 MGD

Total estimated demand: 510 MGD

SIMULATED - Recommended operations for this afternoon (08/27/13):

Fairfax Water:

Maintain Occoquan production at 63 MGD to conserve reservoir storage. Potomac withdrawals per operational preference.

WSSC:

Maintain Patuxent production at 30 MGD to conserve reservoir storage. Potomac withdrawals per operational preference.

Seneca (release date, time, amount in MGD):

No releases from Little Seneca at this time.

Aqueduct:

Great Falls and Little Falls withdrawals per operational preference.

North Branch Reservoirs:

No releases from Jennings Randolph Reservoir at this time.

DROUGHT EXERCISE - Morning simulated Potomac flow and demand update (Tuesday 08/27/2013)

ACTUAL: Over the past 24 hours, the National Weather Service reports small, scattered areas of precipitation in the basin with 0.25 to 0.5 inches of rain recorded in those areas. The majority of the basin received no precipitation. The quantitative precipitation forecast over the next 72 hour period calls for precipitation throughout the basin, increasing from 0.5 inches in the east to 1.25 inches in the western portions of the basin.

SIMULATED: Yesterday evening's thunderstorms resulted in significant accumulations of precipitation in the western portion of the basin, and flow predictions indicate that flow at Little Falls will continue to rise over the next several days. Current flow at Little Falls is 387 cfs (250 MGD). Due to the improving conditions, the Jennings Randolph release can now be discontinued.

Today is the final day of the drought exercise. This afternoon's email will be the final update as part of the exercise. Thank you for your participation.

THE FLOWS, DEMANDS, AND DISCHARGES REPORTED BELOW REFLECT ACTUAL CONDITIONS:

Daily Flows:

Little Falls gage flow 08/26: 2020 MGD (3120 cfs)

Little Falls gage flow 08/27: 2120 MGD (est., based on most recently available real time data) (328 cfs)

Note: Gage flow at Little Falls is measured after water supply withdrawals.

Point of Rocks flow 08/26: 3520 MGD (5440 cfs)

Point of Rocks flow 08/27: 4680 MGD (est., based on recently available real time data) (7240 cfs)

Net Potomac Production (08/26/13):

FW Corbalis raw water withdrawal (Potomac): 111 MGD

WSSC Potomac Production: 137 MGD

Aqueduct withdrawal: 149 MGD

LW total demand (included in total demand through FW): 28 MGD

Total Potomac demand: 398 MGD

Patuxent, Occoquan, and Net Total System Production (08/26/13):

WSSC Patuxent withdrawal: 50 MGD

FW Occoquan raw water withdrawal: 69 MGD

Total System demand: 517 MGD

Loudoun Water Broad Run Discharge:

Yesterday's (08/26/13): 4.3 MGD

Today's (08/27/13 A.M.): 4.4 MGD

Tomorrow's (08/28/13) : 4.3 MGD

Today's estimated demand (08/27/13) A.M.:

WSSC estimated demand: 185 MGD

FW estimated demand: 175 MGD

Aqueduct estimated demand: 150 MGD

LW estimated total demand (included in total through FW): 29 MGD

Total A.M. estimated demand: 510 MGD

Tomorrow's estimated demand (08/28/13):

WSSC estimated demand: 180 MGD

FW estimated demand: 180 MGD

Aqueduct estimated demand: 150 MGD

LW estimated demand (included in total through FW): 30 MGD

Total estimated demand: 510 MGD

SIMULATED - Recommended operations for today (08/27/13):

Fairfax Water:

Reduce Occoquan production to 63 MGD to conserve reservoir storage. Potomac withdrawals per operational preference.

WSSC:

Reduce Patuxent production to 30 MGD to conserve reservoir storage. Potomac withdrawals per operational preference.

Seneca (release date, time, amount in MGD):

No releases from Little Seneca at this time.

Aqueduct:

Reduce withdrawals from Little Falls to 50 MGD. Great Falls withdrawal per operational preference.

North Branch Reservoirs:

Discontinue releases from Jennings Randolph.

Reservoirs - Usable storage as of this morning (BG)

Facility	%Full	Current	Reported Capacity*
WSSC's Patuxent reservoirs:	92%	9.39	10.2
Fairfax Water's Occoquan reservoir:	100%	8.05	8.05
Little Seneca Reservoir:	95%	3.7	3.9
Jennings Randolph Total Reservoir:	92%	26.48	28.7
Jennings Randolph water supply**:	100%	13.4	13.4
Jennings Randolph water quality**:	85%	13.1	15.3
Savage Reservoir:	98%	6.2	6.3

*Storage and capacities for Occoquan, Patuxent and Little Seneca reservoirs are provided by Washington metropolitan area water utilities, and based on best available information. Storage and capacities for Jennings Randolph and Savage reservoirs are based on observed water levels and available US ACE water level/storage tables from 1998. ICPRB estimates that sedimentation has resulted in a loss of total available storage in Jennings Randolph Reservoir of 1.6 BG in recent years, and this loss is not reflected in the numbers above.

** ICPRB's initial estimate. Final accounting of Jennings Randolph water supply versus water quality

storage will be provided at a later date by the US ACE.

DROUGHT EXERCISE - Afternoon simulated Potomac flow and demand update (Monday 08/26/2013)

SIMULATED: Flow is currently holding steady. There are no changes to recommended utility operations th afternoon.

THE FLOWS, DEMANDS, AND DISCHARGES REPORTED BELOW REFLECT ACTUAL CONDITIONS:

Daily Flows:

Little Falls gage flow 08/25: 1810 MGD (2800 cfs)

Little Falls gage flow 08/26: 2050 MGD (est., based on most recently available real time data) (317 cfs)

Note: Gage flow at Little Falls is measured after water supply withdrawals.

Point of Rocks flow 08/25: 2500 MGD (3860 cfs)

Point of Rocks flow 08/26: 2880 MGD (est., based on recently available real time data) (4460 cfs)

Today's estimated demand (08/26/13) P.M.:

WSSC P.M. estimated demand: 190 MGD

FW P.M. estimated demand: 180 MGD

Aqueduct P.M. estimated demand: 150 MGD

LW estimated demand (included in total through FW): 29 MGD

Total P.M. estimated demand: 520 MGD

Tomorrow's estimated demand (08/27/13):

WSSC estimated demand: 185 MGD

FW estimated demand: 180 MGD

Aqueduct estimated demand: 150 MGD

LW estimated demand (included in total through FW): 30 MGD

Total estimated demand: 515 MGD

SIMULATED - Recommended operations for today (08/26/13):

Fairfax Water:

Maintain Occoquan production at 80 MGD.

WSSC:

Maintain production at the Patuxent Reservoirs at 40 MGD.

Seneca (release date, time, amount in MGD):

No release at this time.

Aqueduct:

Meet all demands from Little Falls in order to maintain Great Falls flow-by.

North Branch Reservoirs:

Today's Luke target is 280 cfs (180 MGD).

DROUGHT EXERCISE - Morning simulated Potomac flow and demand update (Monday 08/26/2013)

ACTUAL: Over the past 24 hours, the National Weather Service reports no precipitation in the basin. The quantitative precipitation forecast over the next 72 hour period calls for 0.1 to 1 inch of precipitation

throughout much of the basin, with increasing amounts going from the southern to northern portions of the basin.

SIMULATED: Flow in the river rose slightly since yesterday morning due to the arrival of the North Branch reservoir release. Current flow at Little Falls equals 255 cfs (165 MGD). Flow predictions show that Little Seneca release can be discontinued and that WSSC can shift a bit more load back to the Potomac.

THE FLOWS, DEMANDS, AND DISCHARGES REPORTED BELOW REFLECT ACTUAL CONDITIONS:

Daily Flows:

Little Falls gage flow 08/25: 1810 MGD (2800 cfs)

Little Falls gage flow 08/26: 1980 MGD (est., based on most recently available real time data) (306 cfs)

Note: Gage flow at Little Falls is measured after water supply withdrawals.

Point of Rocks flow 08/25: 2500 MGD (3860 cfs)

Point of Rocks flow 08/26: 2530 MGD (est., based on recently available real time data) (3910 cfs)

Net Potomac Production (08/25/13):

FW Corbalis raw water withdrawal (Potomac): 98 MGD

WSSC Potomac Production: 124 MGD

Aqueduct withdrawal: 139 MGD

LW total demand (included in total demand through FW): 26 MGD

Total Potomac demand: 361 MGD

Patuxent, Occoquan, and Net Total System Production (08/25/13):

WSSC Patuxent withdrawal: 53 MGD

FW Occoquan raw water withdrawal: 64 MGD

Total System demand: 477 MGD

Loudoun Water Broad Run Discharge:

Yesterday's (08/25/13): 4.3 MGD

Today's (08/26/13 A.M.): 4.2 MGD

Tomorrow's (08/27/13) : 4.3 MGD

Today's estimated demand (08/26/13) A.M.:

WSSC estimated demand: 187 MGD

FW estimated demand: 180 MGD

Aqueduct estimated demand: 153 MGD

LW estimated total demand (included in total through FW): 29 MGD

Total A.M. estimated demand: 520 MGD

Tomorrow's estimated demand (08/27/13):

WSSC estimated demand: 185 MGD

FW estimated demand: 180 MGD

Aqueduct estimated demand: 150 MGD

LW estimated demand (included in total through FW): 30 MGD

Total estimated demand: 515 MGD

SIMULATED - Recommended operations for today (08/26/13):

Fairfax Water:

Continue Occoquan production at 80 MGD.

WSSC:

Reduce Patuxent production to 40 MGD.

Seneca (release date, time, amount in MGD):
Discontinue the Little Seneca release.

Aqueduct:
Maintain the withdrawal from Little Falls at 125 MGD and take the remainder from Great Falls.

North Branch Reservoirs:
Today's Luke target is 280 cfs (180 MGD).

Reservoirs - Usable storage as of this morning (BG)

Facility	%Full	Current	Reported Capacity*
WSSC's Patuxent reservoirs:	92%	9.41	10.2
Fairfax Water's Occoquan reservoir:	100%	8.05	8.05
Little Seneca Reservoir:	95%	3.7	3.9
Jennings Randolph Total Reservoir:	92%	26.5	28.7
Jennings Randolph water supply**:	100%	13.4	13.4
Jennings Randolph water quality**:	86%	13.1	15.3
Savage Reservoir:	100%	6.2	6.3

*Storage and capacities for Occoquan, Patuxent and Little Seneca reservoirs are provided by Washington metropolitan area water utilities, and based on best available information. Storage and capacities for Jennings Randolph and Savage reservoirs are based on observed water levels and available US ACE water level/storage tables from 1998. ICPRB estimates that sedimentation has resulted in a loss of total available storage in Jennings Randolph Reservoir of 1.6 BG in recent years, and this loss is not reflected in the numbers above.

** ICPRB's initial estimate. Final accounting of Jennings Randolph water supply versus water quality storage will be provided at a later date by the US ACE.

DROUGHT EXERCISE - Afternoon simulated Potomac flow and demand update (Sunday 08/25/2013)

(SIMULATED CONDITIONS AND OPERATIONS:) Natural flow in the river has continued to rise, due to the arrival today of the North Branch reservoir release, and flow at Little Falls is currently at 263 cfs (170 MGD). Because of the improvement in flow conditions, Washington Aqueduct will be shifting a portion of its withdrawal back to its Great Falls intake this afternoon.

NOTE: An ACTUAL 1,000 cfs artificially varied flow release began yesterday from Jennings Randolph and will continue until approximately 3pm today. The ACTUAL release from Little Seneca made it to Little Falls, but observation of the release at the Little Falls gage was potentially confounded by a number of factors including recent rainfall. Additional analyses will be required to fully understand the time of travel under current flow conditions.

THE FLOWS, DEMANDS, AND DISCHARGES REPORTED BELOW REFLECT ACTUAL CONDITIONS:

Daily Flows:

Little Falls gage flow 08/24: 1890 MGD (2920 cfs)

Little Falls gage flow 08/25: 1780 MGD (est., based on most recently available real time data) (2750 cfs)

Note: Gage flow at Little Falls is measured after water supply withdrawals.

Point of Rocks flow 08/24: 1980 MGD (3070 cfs)

Point of Rocks flow 08/25: 2480 MGD (est., based on recently available real time data) (3830 cfs)

Today's estimated demand (08/25/13) P.M.:

WSSC P.M. estimated demand: 173 MGD

FW P.M. estimated demand: 170 MGD

Aqueduct P.M. estimated demand: 140 MGD

LW estimated demand (included in total through FW): 0 MGD

Total P.M. estimated demand: 483 MGD

Tomorrow's estimated demand (08/26/13):

WSSC estimated demand: 180 MGD

FW estimated demand: 175 MGD

Aqueduct estimated demand: 155 MGD

LW estimated demand (included in total through FW): 27 MGD

Total estimated demand: 510 MGD

SIMULATED - Recommended operations for this afternoon (08/25/13):

Fairfax Water:

Continue Occoquan production at 80 MGD.

WSSC:

Continue Patuxent production at 50 MGD.

Seneca (release date, time, amount in MGD):

Continue the simulated Seneca release rate of 40 MGD. The ACTUAL release from Little Seneca Reservoir of 125 MGD has ended.

Aqueduct:

Reduce the withdrawal from Little Falls to 125 MGD and shift the remainder to Great Falls.

North Branch Reservoirs:

Today's Luke target is 280 cfs (180 MGD).

DROUGHT EXERCISE - Morning simulated Potomac flow and demand update (Sunday 08/25/2013)

(ACTUAL) Over the past 24 hours, the National Weather Service reports no precipitation for the majority of the basin; however, small areas of northern Virginia received up to 0.25 inches of rain. The quantitative precipitation forecast over the next 72 hour period calls for precipitation throughout much of the basin, predominantly 0.25 inches with areas of up to 0.5 inches in the north and northwestern portions of the basin.

Flow (simulated) at Little Falls has increased to 230 cfs (149 MGD). Simulated releases from Little Seneca have arrived at Little Falls and have made it possible for the utilities to move off of their reservoirs and shift some of the withdrawals back to their Potomac intakes. Simulated Little Seneca releases continue today, but have been decreased to 40 MGD. The simulated release from Jennings Randolph has been reduced to 280 cfs (180 MGD). NOTE: An ACTUAL 1,000 cfs artificially varied flow release began yesterday from Jennings

Randolph and will continue until approximately 3pm today.

THE FLOWS, DEMANDS, AND DISCHARGES REPORTED BELOW REFLECT ACTUAL CONDITIONS:

Daily Flows:

Little Falls gage flow 08/24: 1890 MGD (2920 cfs)

Little Falls gage flow 08/25: 1780 MGD (est., based on most recently available real time data) (2750 cfs)

Note: Gage flow at Little Falls is measured after water supply withdrawals.

Point of Rocks flow 08/24: 1980 MGD (3070 cfs)

Point of Rocks flow 08/25: 2440 MGD (est., based on recently available real time data) (3770 cfs)

Net Potomac Production (08/24/13):

FW Corbalis raw water withdrawal (Potomac): 81 MGD

WSSC Potomac Production: 109 MGD

Aqueduct withdrawal: 143 MGD

LW total demand (included in total demand through FW): 23 MGD

Total Potomac demand: 334 MGD

Patuxent, Occoquan, and Net Total System Production (08/24/13):

WSSC Patuxent withdrawal: 63 MGD

FW Occoquan raw water withdrawal: 63 MGD

Total System demand: 460 MGD

Loudoun Water Broad Run Discharge:

Yesterday's (08/24/13): 4 MGD

Today's (08/25/13 A.M.): 4.2 MGD

Tomorrow's (08/26/13) : 4.2 MGD

Today's estimated demand (08/25/13) A.M.:

WSSC estimated demand: 175 MGD

FW estimated demand: 170 MGD

Aqueduct estimated demand: 140 MGD

LW estimated total demand (included in total through FW): 24 MGD

Total A.M. estimated demand: 485 MGD

Tomorrow's estimated demand (08/26/13):

WSSC estimated demand: 180 MGD

FW estimated demand: 175 MGD

Aqueduct estimated demand: 155 MGD

LW estimated demand (included in total through FW): 27 MGD

Total estimated demand: 510 MGD

SIMULATED - Recommended operations for today (08/25/13):

Fairfax Water:

Shift some demand back to the Potomac by reducing the Occoquan production to 80 MGD.

WSSC:

Shift some demand back to the Potomac by reducing production from the Patuxent Reservoirs to 50 MGD.

Seneca (release date, time, amount in MGD):

The simulated Seneca release of 50 MGD has been reduced to 40 MGD. The ACTUAL release from Little Seneca Reservoir of 125 MGD has ended.

Aqueduct:

Meet all demands from Little Falls in order to maintain Great Falls flow-by.

North Branch Reservoirs:

Today's Luke target is 280 cfs (180 MGD).

Reservoirs - Usable storage as of this morning (BG)

Facility	%Full	Current	Reported Capacity*	
WSSC's Patuxent reservoirs:		93%	9.46	10.2
Fairfax Water's Occoquan reservoir:	101%	8.1	8.05	
Little Seneca Reservoir:	95%		3.7	3.9
Jennings Randolph Total Reservoir:	93%		26.65	28.7
Jennings Randolph water supply**:	100%		13.4	13.4
Jennings Randolph water quality**:	87%		13.3	15.3
Savage Reservoir:	101%	6.34	6.3	

*Storage and capacities for Occoquan, Patuxent and Little Seneca reservoirs are provided by Washington metropolitan area water utilities, and based on best available information. Storage and capacities for Jennings Randolph and Savage reservoirs are based on observed water levels and available US ACE water level/storage tables from 1998. ICPRB estimates that sedimentation has resulted in a loss of total available storage in Jennings Randolph Reservoir of 1.6 BG in recent years, and this loss is not reflected in the numbers above.

** ICPRB's initial estimate. Final accounting of Jennings Randolph water supply versus water quality storage will be provided at a later date by the US ACE.

DROUGHT EXERCISE - Afternoon simulated Potomac flow and demand update (Saturday 08/24/2013)

The National Weather Service estimates that 0.25 to 2.0 inches of rain fell in some areas in the western portion of the basin this morning. Operational recommendations have changed from this morning's email.

THE FLOWS, DEMANDS, AND DISCHARGES REPORTED BELOW REFLECT ACTUAL CONDITIONS:

Daily Flows:

Little Falls gage flow 08/23: 1760 MGD (2720 cfs)

Little Falls gage flow 08/24: 1910 MGD (est., based on most recently available real time data) (2960 cfs)

Note: Gage flow at Little Falls is measured after water supply withdrawals.

Point of Rocks flow 08/23: 1890 MGD (2920 cfs)

Point of Rocks flow 08/24: 1890 MGD (est., based on recently available real time data) (2930 cfs)

Today's estimated demand (08/24/13) P.M.:

WSSC P.M. estimated demand: 180 MGD

FW P.M. estimated demand: 165 MGD

Aqueduct P.M. estimated demand: 145 MGD

LW estimated demand (included in total through FW): 26 MGD

Total P.M. estimated demand: 490 MGD

Tomorrow's estimated demand (08/25/13):

WSSC estimated demand: 185 MGD

FW estimated demand: 170 MGD

Aqueduct estimated demand: 145 MGD

LW estimated demand (included in total through FW): 27 MGD

Total estimated demand: 500 MGD

SIMULATED - Recommended operations for today (08/24/13):

Fairfax Water:

Load shift 30 MGD to the Potomac, for a total of 63 MGD at Occoquan.

WSSC:

Load shift 30 MGD to the Potomac, for a total of 35 MGD from the Patuxent Reservoirs.

Seneca (release date, time, amount in MGD):

The ACTUAL release from Little Seneca Reservoir of 125 MGD has ended.

Aqueduct:

Meet all demands from Little Falls in order to maintain Great Falls flow-by.

North Branch Reservoirs:

Today's Luke target is 310 cfs (200 MGD)

DROUGHT EXERCISE - Morning simulated Potomac flow and demand update (Saturday 08/24/2013)

All areas of the basin received some rain in the last 24-hour period according to the National Weather Service. Heavier rains were seen across the western portion where there were isolated pockets that received between 2 and 3 inches. To the east, up to half an inch was seen. No precipitation is anticipated over the next 72 hours.

Flow (simulated) at Little Falls has increased slightly to 180 cfs (116 MGD). The release from Little Seneca is making its way downstream and is expected to arrive at Little Falls this afternoon. This should allow utilities to move off of their reservoirs and back to their Potomac intakes. The release from Jennings Randolph continues at 310 cfs (200 MGD). NOTE: The ACTUAL release from Little Seneca Reservoir is indeed on its way to Little Falls. Due to a miscommunication between operators at the Little Seneca dam, the release ran for about 19 hours instead of the requested 12. Therefore, the total released was closer to 99 MGD. The leading edge arrived at the Dawsonville gage around 10 am yesterday, and became most visible by 2 pm. Before the release the gage height was about 2 feet and is now reading just above 2.6 feet. The release is expected to arrive at

Little Falls sometime this afternoon.

THE FLOWS, DEMANDS, AND DISCHARGES REPORTED BELOW REFLECT ACTUAL CONDITIONS:

Daily Flows:

Little Falls gage flow 08/23: 1760 MGD (2720 cfs)

Little Falls gage flow 08/24: 1870 MGD (est., based on most recently available real time data) (2900 cfs)

Note: Gage flow at Little Falls is measured after water supply withdrawals.

Point of Rocks flow 08/23: 1890 MGD (2920 cfs)

Point of Rocks flow 08/24: 1860 MGD (est., based on recently available real time data) (2880 cfs)

Net Potomac Production (08/23/13):

FW Corbalis raw water withdrawal (Potomac): 107 MGD

WSSC Potomac Production: 125 MGD

Aqueduct withdrawal: 151 MGD

LW total demand (included in total demand through FW): 29 MGD

Total Potomac demand: 383 MGD

Patuxent, Occoquan, and Net Total System Production (08/23/13):

WSSC Patuxent withdrawal: 65 MGD

FW Occoquan raw water withdrawal: 64 MGD

Total System demand: 512 MGD

Loudoun Water Broad Run Discharge:

Yesterday's (08/23/13): 4.4 MGD

Today's (08/24/13 A.M.): 4.2 MGD

Tomorrow's (08/25/13) : 4.2 MGD

Today's estimated demand (08/24/13) A.M.:

WSSC estimated demand: 180 MGD

FW estimated demand: 175 MGD

Aqueduct estimated demand: 150 MGD

LW estimated total demand (included in total through FW): 26 MGD

Total A.M. estimated demand: 505 MGD

Tomorrow's estimated demand (08/25/13):

WSSC estimated demand: 185 MGD

FW estimated demand: 170 MGD

Aqueduct estimated demand: 145 MGD

LW estimated demand (included in total through FW): 27 MGD

Total estimated demand: 500 MGD

SIMULATED - Recommended operations for today (08/24/13):

Fairfax Water:

Continue producing 93 MGD at Occoquan. Prepare to load shift 30 MGD back to the Potomac in the afternoon.

WSSC:

Maintain a total of 65 MGD from the Patuxent Reservoirs. Prepare to load shift 30 MGD to the Potomac this afternoon.

Seneca (release date, time, amount in MGD):

The ACTUAL release from Little Seneca Reservoir of 125 MGD has ended.

Aqueduct:

Meet all demands from Little Falls in order to maintain Great Falls flow-by.

North Branch Reservoirs:

Today's Luke target is 310 cfs (200 MGD).

Reservoirs - Usable storage as of this morning (BG)

Facility	%Full	Current	Reported Capacity*
WSSC's Patuxent reservoirs:	93%	9.5	10.2
Fairfax Water's Occoquan reservoir:	100%	8.05	8.05
Little Seneca Reservoir:	95%	3.71	3.9
Jennings Randolph Total Reservoir:	94%	26.98	28.7
Jennings Randolph water supply**:	100%	13.4	13.4
Jennings Randolph water quality**:	89%	13.6	15.3
Savage Reservoir:	100%	6.3	6.3

*Storage and capacities for Occoquan, Patuxent and Little Seneca reservoirs are provided by Washington metropolitan area water utilities, and based on best available information. Storage and capacities for Jennings Randolph and Savage reservoirs are based on observed water levels and available US ACE water level/storage tables from 1998. ICPRB estimates that sedimentation has resulted in a loss of total available storage in Jennings Randolph Reservoir of 1.6 BG in recent years, and this loss is not reflected in the numbers above.

** ICPRB's initial estimate. Final accounting of Jennings Randolph water supply versus water quality storage will be provided at a later date by the US ACE.

DROUGHT EXERCISE - Afternoon simulated Potomac flow and demand update (Friday 08/23/2013)

The National Weather Service estimates that 1 to 2 inches of rain fell in some areas in the western portion of the basin this morning, and it predicts that the western portion of the basin will receive up to 1/2 inch of additional rain over the coming 24 hours.

An ACTUAL release from Little Seneca Reservoir of 125 MGD was initiated today at approximately 11 AM. The duration of the release will be 12 hours.

THE FLOWS, DEMANDS, AND DISCHARGES REPORTED BELOW REFLECT ACTUAL CONDITIONS:

Daily Flows:

Little Falls gage flow 08/22: 1640 MGD (2540 cfs)

Little Falls gage flow 08/23: 1780 MGD (est., based on most recently available real time data) (2750 cfs)

Note: Gage flow at Little Falls is measured after water supply withdrawals.

Point of Rocks flow 08/22: 1930 MGD (2990 cfs)

Point of Rocks flow 08/23: 1870 MGD (est., based on recently available real time data) (2900 cfs)

Today's estimated demand (08/23/13) P.M.:

WSSC P.M. estimated demand: 185 MGD

FW P.M. estimated demand: 170 MGD

Aqueduct P.M. estimated demand: 148 MGD

LW estimated demand (included in total through FW): 26 MGD

Total P.M. estimated demand: 503 MGD

Tomorrow's estimated demand (08/24/13):

WSSC estimated demand: 180 MGD

FW estimated demand: 170 MGD

Aqueduct estimated demand: 145 MGD

LW estimated demand (included in total through FW): 27 MGD

Total estimated demand: 495 MGD

SIMULATED - Recommended operations for today (08/23/13):

Fairfax Water:

Shift load from the Potomac to the Occoquan reservoir by increasing production at Occoquan by 30 MGD, to a total of 93 MGD.

WSSC:

Shift load from the Potomac to the Patuxent reservoirs by increasing production at Patuxent reservoirs by 35 MGD, to a total of 65 MGD.

Seneca (release date, time, amount in MGD):

An ACTUAL release from Little Seneca Reservoir of 125 MGD was initiated today at approximately 11 AM. The duration of the release will be 12 hours.

Aqueduct:

Meet all demands from Little Falls in order to maintain Great Falls flow-by.

North Branch Reservoirs:

Today's Luke target is 310 cfs (200 MGD)

DROUGHT EXERCISE - Morning simulated Potomac flow and demand update (Friday 08/23/2013)

Over the past 24 hours, the National Weather Service reports no precipitation for the majority of the central portion of the basin. Most of the Pennsylvania portion of the basin and isolated areas of northwestern Virginia received 0.25 to 0.5 inches of rain. The quantitative precipitation forecast over the next 72 hour period calls for

precipitation throughout the basin. Predicted amounts increase from less than 0.25 inches in the northeastern portion of the basin to up to 0.75 inches in the southwestern portions of the basin.

Flow (simulated) at Little Falls dropped more than expected over the night, and is currently at 165 cfs (107 MGD). To ensure that we meet the minimum flow target of 100 MGD at Little Falls today, we have requested load shifts (simulated) by WSSC and Fairfax Water to their off-Potomac reservoirs, and are requesting a release from Little Seneca Reservoir of 50 MGD (simulated). NOTE: We are requesting an ACTUAL release from Little Seneca Reservoir of 125 MGD today (with an expected total of 240 cfs at the Seneca Creek at Dawsonville, MD USGS gage), for a duration of 12 hours (upon concurrence by WSSC, Fairfax Water, and Washington Aqueduct management). At current flows, we have some chance of detecting this larger release at the Little Falls gage and adding to our data on travel times of Little Seneca releases.



The photo above shows a 75 MGD release of water from Little Seneca Reservoir in 2005.

Daily Flows:

Little Falls gage flow 08/22: 1640 MGD (2540 cfs)

Little Falls gage flow 08/23: 1750 MGD (est., based on most recently available real time data) (2700 cfs)

Note: Gage flow at Little Falls is measured after water supply withdrawals.

Point of Rocks flow 08/22: 1930 MGD (2990 cfs)

Point of Rocks flow 08/23: 1910 MGD (est., based on recently available real time data) (2950 cfs)

Net Potomac Production (08/22/13):

FW Corbalis raw water withdrawal (Potomac): 100 MGD

WSSC Potomac Production: 122 MGD

Aqueduct withdrawal: 153 MGD

LW total demand (included in total demand through FW): 27 MGD

Total Potomac demand: 376 MGD

Patuxent, Occoquan, and Net Total System Production (08/22/13):

WSSC Patuxent withdrawal: 54 MGD

FW Occoquan raw water withdrawal: 68 MGD

Total System demand: 498 MGD

Loudoun Water Broad Run Discharge:

Yesterday's (08/22/13): 4.3 MGD

Today's (08/23/13 A.M.): 4.4 MGD

Tomorrow's (08/24/13) : 4.3 MGD

Today's estimated demand (08/23/13) A.M.:

WSSC estimated demand: 185 MGD

FW estimated demand: 170 MGD

Aqueduct estimated demand: 153 MGD

LW estimated total demand (included in total through FW): 26 MGD

Total A.M. estimated demand: 508 MGD

Tomorrow's estimated demand (08/24/13):

WSSC estimated demand: 180 MGD

FW estimated demand: 170 MGD

Aqueduct estimated demand: 145 MGD

LW estimated demand (included in total through FW): 27 MGD

Total estimated demand: 495 MGD

SIMULATED - Recommended operations for today (08/23/13):

Fairfax Water:

Shift load from the Potomac to the Occoquan reservoir by increasing production at Occoquan by 30 MGD, to a total of 93 MGD.

WSSC:

Shift load from the Potomac to the Patuxent reservoirs by increasing production at Patuxent reservoirs by 35 MGD, to a total of 65 MGD.

Seneca (release date, time, amount in MGD):

An ACTUAL release from Little Seneca Reservoir of 125 MGD is being requested today, for a duration of 12 hours (upon concurrence by WSSC, Fairfax Water, and Washington Aqueduct management).

Aqueduct:

Meet all demands from Little Falls in order to maintain Great Falls flow-by.

North Branch Reservoirs:

Today's Luke target is 310 cfs (200 MGD).

Reservoirs - Usable storage as of this morning (BG)

Facility	%Full	Current	Reported Capacity*
WSSC's Patuxent reservoirs:	94%	9.55	10.2
Fairfax Water's Occoquan reservoir:	101%	8.1	8.05
Little Seneca Reservoir:	97%	3.79	3.9
Jennings Randolph Total Reservoir:	93%	26.81	28.7
Jennings Randolph water supply**:	100%	13.4	13.4
Jennings Randolph water quality**:	88%	13.4	15.3
Savage Reservoir:	101%	6.34	6.3

*Storage and capacities for Occoquan, Patuxent and Little Seneca reservoirs are provided by Washington metropolitan area water utilities, and based on best available information. Storage and capacities for Jennings Randolph and Savage reservoirs are based on observed water levels and available US ACE water level/storage tables from 1998. ICPRB estimates that sedimentation has resulted in a loss of total available storage in Jennings Randolph Reservoir of 1.6 BG in recent years, and this loss is not reflected in the numbers above.

** ICPRB's initial estimate. Final accounting of Jennings Randolph water supply versus water quality storage will be provided at a later date by the US ACE.

DROUGHT EXERCISE - Afternoon simulated Potomac flow and demand update (Thursday 08/22/2013)

There are no significant changes in this afternoon's weather and flow forecasts, and operational recommendations remain the same as reported in this morning's email.

Daily Flows:

Little Falls gage flow 08/21: 1670 MGD (2580 cfs)

Little Falls gage flow 08/22: 1620 MGD (est., based on most recently available real time data) (2500 cfs)

Note: Gage flow at Little Falls is measured after water supply withdrawals.

Point of Rocks flow 08/21: 1740 MGD (2690 cfs)

Point of Rocks flow 08/22: 1860 MGD (est., based on recently available real time data) (2880 cfs)

Today's estimated demand (08/22/13) P.M.:

WSSC P.M. estimated demand: 190 MGD

FW P.M. estimated demand: 170 MGD

Aqueduct P.M. estimated demand: 143 MGD

LW estimated demand (included in total through FW): 27 MGD

Total P.M. estimated demand: 503 MGD

Tomorrow's estimated demand (08/23/13):

WSSC estimated demand: 185 MGD

FW estimated demand: 180 MGD

Aqueduct estimated demand: 150 MGD

LW estimated demand (included in total through FW): 28 MGD

Total estimated demand: 515 MGD

DROUGHT EXERCISE - Morning simulated Potomac flow and demand update (Thursday 08/22/2013)

Over the past 24 hours, the National Weather Service reports no precipitation for the majority of the northern portion of the Basin. The remaining areas, mostly in Virginia, received 0.1 to 0.25 inches of rain and an isolated part of western Maryland received between 1 and 2 inches of rain. The quantitative precipitation forecast over the next 72 hour period calls for approximately a quarter inch of rain over most of the basin with heavier rain possible in the western portion of the basin. Simulated flow at Little Falls this morning was 250 cfs (162 MGD). Our flow predictions show that Potomac River flows (simulated) will continue to fall over the next several days.

THE FLOWS, DEMANDS, AND DISCHARGES REPORTED BELOW REFLECT ACTUAL CONDITIONS:**Daily Flows:**

Little Falls gage flow 08/21: 1670 MGD (2580 cfs)

Little Falls gage flow 08/22: 1620 MGD (est., based on most recently available real time data) (2500 cfs)

Note: Gage flow at Little Falls is measured after water supply withdrawals.

Point of Rocks flow 08/21: 1740 MGD (2690 cfs)

Point of Rocks flow 08/22: 1860 MGD (est., based on recently available real time data) (2880 cfs)

Net Potomac Production (08/21/13):

FW Corbalis raw water withdrawal (Potomac): 109 MGD

WSSC Potomac Production: 140 MGD

Aqueduct withdrawal: 152 MGD

LW total demand (included in total demand through FW): 27 MGD

Total Potomac demand: 400 MGD

Patuxent, Occoquan, and Net Total System Production (08/21/13):

WSSC Patuxent withdrawal: 54 MGD

FW Occoquan raw water withdrawal: 68 MGD

Total System demand: 523 MGD

Loudoun Water Broad Run Discharge:

Yesterday's (08/21/13): 4 MGD

Today's (08/22/13 A.M.): 4.4 MGD

Tomorrow's (08/23/13) : 4.3 MGD

Today's estimated demand (08/22/13) A.M.:

WSSC estimated demand: 190 MGD

FW estimated demand: 180 MGD

Aqueduct estimated demand: 150 MGD

LW estimated total demand (included in total through FW): 27 MGD

Total A.M. estimated demand: 520 MGD

Tomorrow's estimated demand (08/23/13):

WSSC estimated demand: 185 MGD

FW estimated demand: 180 MGD

Aqueduct estimated demand: 150 MGD

LW estimated demand (included in total through FW): 28 MGD

Total estimated demand: 515 MGD

SIMULATED - Recommended operations for today (08/22/13):

Fairfax Water:

Maintain the withdrawal at Occoquan at 63 MGD to conserve storage.

WSSC:

Maintain the Patuxent withdrawal at the minimum of 30 MGD to conserve storage.

Seneca (release date, time, amount in MGD):

There is currently no release from Little Seneca Reservoir.

Aqueduct:

Meet all demands from Little Falls in order to maintain Great Falls flow-by.

North Branch Reservoirs:

Today's Luke target is 310 cfs (200 MGD).

Reservoirs - Usable storage as of this morning (BG)

Facility	%Full	Current	Reported Capacity*
WSSC's Patuxent reservoirs:	94%	9.6	10.2
Fairfax Water's Occoquan reservoir:	101%	8.1	8.05
Little Seneca Reservoir:	97%	3.8	3.9
Jennings Randolph Total Reservoir:	94%	26.86	28.7
Jennings Randolph water supply**:	100%	13.4	13.4
Jennings Randolph water quality**:	88%	13.5	15.3
Savage Reservoir:	100%	6.32	6.3

*Storage and capacities for Occoquan, Patuxent and Little Seneca reservoirs are provided by Washington metropolitan area water utilities, and based on best available information. Storage and capacities for Jennings Randolph and Savage reservoirs are based on observed water levels and available US ACE water level/storage tables from 1998. ICPRB estimates that sedimentation has resulted in a loss of total available storage in Jennings Randolph Reservoir of 1.6 BG in recent years, and this loss is not reflected in the numbers above.

** ICPRB's initial estimate. Final accounting of Jennings Randolph water supply versus water quality storage will be provided at a later date by the US ACE.

DROUGHT EXERCISE - Afternoon simulated Potomac flow and demand update (Wednesday 08/21/2013)

The weather and flow forecasts and operational recommendations remain the same as reported in this morning's email.

Daily Flows:

Little Falls gage flow 08/20: 1820 MGD (2820 cfs)

Little Falls gage flow 08/21: 1680 MGD (est., based on most recently available real time data) (2600 cfs)

Note: Gage flow at Little Falls is measured after water supply withdrawals.

Point of Rocks flow 08/20: 2080 MGD (3220 cfs)

Point of Rocks flow 08/21: 2040 MGD (est., based on recently available real time data) (3160 cfs)

Today's estimated demand (08/21/13) P.M.:

WSSC P.M. estimated demand: 185 MGD

FW P.M. estimated demand: 180 MGD

Aqueduct P.M. estimated demand: 153 MGD

LW estimated demand (included in total through FW): 28 MGD

Total P.M. estimated demand: 518 MGD

Tomorrow's estimated demand (08/22/13):

WSSC estimated demand: 185 MGD

FW estimated demand: 190 MGD

Aqueduct estimated demand: 150 MGD

LW estimated demand (included in total through FW): 29 MGD

Total estimated demand: 525 MGD

SIMULATED - Recommended operations for today (08/21/13):

Fairfax Water:

Maintain the withdrawal at Occoquan at 63 MGD to conserve storage.

Potomac withdrawals per operational preference

WSSC:

Maintain the Patuxent withdrawal at the minimum of 30 MGD to conserve storage.

Potomac withdrawals per operational preference

Seneca (release date, time, amount in MGD):

There is currently no release from Little Seneca Reservoir.

Aqueduct:

Meet all demands from Little Falls in order to maintain Great Falls flow-by.

North Branch Reservoirs:

Today's Luke target is 230 cfs.

DROUGHT EXERCISE - Morning simulated Potomac flow and demand update (Wednesday 08/21/2013)

This is the first day of the 2013 Annual CO-OP Drought Exercise. The scenario year is the current year, 2013. The summer has been moderately dry, and conditions are worsening. According to NOAA's Potomac basin drought monitor more than half of the basin is now in D1 (moderate drought) drought status, with some portions entering D2 (severe) status, and a drought Watch was announced earlier in the month by MWCOC following a meeting of the region's Drought Coordination Committee. Simulated water supply releases from the North Branch reservoirs were initiated by CO-OP on August 16th. Because of the 9-day travel time, the first release water is expected to arrive at Little Falls this coming Sunday. In the meantime, simulated flows in the Potomac River continue to fall. For this exercise, we are reporting actual flows, production/demand, and reservoir levels. Operational changes are simulated based on the drought scenario.

The National Weather Service reports no precipitation in the basin over the past 24 hour period. The quantitative precipitation forecast over the next 72 hour period calls for approximately half an inch of rain over most of the basin with heavier rain possible in the western portion of the basin. Simulated flow at Little Falls this morning was 305 cfs (197 MGD). Our flow predictions show that Potomac River flows (simulated) will continue to fall over the next several days.

Daily Flows:

Little Falls gage flow 08/20: 1820 MGD (2820 cfs)

Little Falls gage flow 08/21: 1680 MGD (est., based on most recently available real time data) (2600 cfs)

Note: Gage flow at Little Falls is measured after water supply withdrawals.

Point of Rocks flow 08/20: 2080 MGD (3220 cfs)

Point of Rocks flow 08/21: 2040 MGD (est., based on recently available real time data) (3160 cfs)

Net Potomac Production (08/20/13):

FW Corbalis raw water withdrawal (Potomac): 97 MGD
WSSC Potomac Production: 125 MGD
Aqueduct withdrawal: 141 MGD
LW total demand (included in total demand through FW): 17 MGD
Total Potomac demand: 363 MGD

Loudoun Water Broad Run Discharge:

Yesterday: 4.3 MGD
Today: 4.4 MGD
Tomorrow, estimated: -- MGD

Patuxent, Occoquan, and Net Total System Production (08/20/13):

WSSC Patuxent withdrawal: 54 MGD
FW Occoquan raw water withdrawal: 63 MGD
Total System demand: 480 MGD

Today's estimated demand (08/21/13) A.M.:

WSSC estimated demand: 185 MGD
FW estimated demand: 180 MGD
Aqueduct estimated demand: 150 MGD
LW estimated total demand (included in total through FW): 0 MGD
Total A.M. estimated demand: 515 MGD

Tomorrow's estimated demand (08/22/13):

WSSC estimated demand: 185 MGD
FW estimated demand: 190 MGD
Aqueduct estimated demand: 150 MGD
LW estimated demand (included in total through FW): 0 MGD
Total estimated demand: 525 MGD

SIMULATED - Recommended operations for today (08/21/13):

Fairfax Water:

Maintain the withdrawal at Occoquan at 63 MGD to conserve storage.
Potomac withdrawals per operational preference.

WSSC:

Maintain the Patuxent withdrawal at the minimum of 30 MGD to conserve storage.
Potomac withdrawals per operational preference.

Seneca (release date, time, amount in MGD):

There is currently no release from Little Seneca Reservoir.

Aqueduct:

Meet all demands from Little Falls in order to maintain Great Falls flow-by.

North Branch Reservoirs:

Today's Luke target is 230 cfs.

Reservoirs - Usable storage as of this morning (BG)

Facility	%Full	Current	Reported Capacity
WSSC's Patuxent reservoirs	94%	9.61	10.2
Fairfax Water's Occoquan reservoir	100%	8.05	8.05
Little Seneca Reservoir	97%	3.79	3.9
Jennings Randolph Total Reservoir	94%	26.94	28.7
Jennings Randolph water supply*	100%	13	13.4
Jennings Randolph water quality*	88%	14	15.3
Savage Reservoir	99%	6.24	6.3

* ICPRB's initial estimate. Final accounting of Jennings Randolph water supply versus water quality storage will be provided at a later date by the US ACE.