

2015 Washington Metropolitan Area Drought Exercise

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2015 Washington Metropolitan Area Drought Exercise, ICPRB

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The report is available online at www.PotomacRiver.org as ICP16-2_Schultz.pdf.

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, 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. This includes joint funding of water supply storage in reservoirs located upstream of the 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 specifies a formula 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 requires that long-term water demand and availability forecasts be conducted every five years.

During periods of drought, the Interstate Commission on the Potomac River Basin (ICPRB) Section for Cooperative Water Supply Operations on the Potomac (CO-OP) 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 the 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 and also provide ICPRB's CO-OP staff with an opportunity to practice using operational tools and making management decisions. 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 lessons learned from the 2015 drought exercise, which took place from September 23 through September 29. Participants in this year's exercise included staff from:

- ICPRB CO-OP Section
- 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
- 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

¹ A complete discussion of CO-OP drought operations can be found in the report, 2015 Washington Metropolitan Area Water Supply Study: Demand and Resource Availability Forecast for the Year 2040, by S.N. Ahmed, K.R. Bencala, and C.L. Schultz, ICPRB Report No. 15-4a, August 2015, available at www.potomacriver.org under "Publications."

- Loudoun County Water Authority (Loudoun Water), a wholesale customer of Fairfax Water which is currently constructing a Potomac River intake and the Trap Rock Water Treatment Facility, expected to begin service in 2017, to provide a portion of its future supply needs
- U.S. Army Corps of Engineers (USACE), Baltimore District Office
- U.S. Geological Survey Water Science Center for Maryland, Delaware, and the District of Columbia (USGS)
- Metropolitan Washington Council of Governments (MWCOG)

2 Overview of CO-OP Drought Operations

The Potomac River is the primary source of raw water for the WMA's three major suppliers, which each have an intake on the river upstream of Little Falls dam near Washington, D.C. Fairfax Water also relies on stored water from the Occoquan Reservoir and WSSC relies on water from a pair of reservoirs in the Patuxent River watershed: T. Howard Duckett (Rocky Gorge) and Tridelphia (see map in Figure 1). The Aqueduct has intakes at two locations on the Potomac River at 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 Reservoir (JRR), located on the North Branch of the Potomac River adjacent to Garrett County, Md., and Mineral County, WVa., and Little Seneca Reservoir, located in Montgomery County, Md. Jennings Randolph Reservoir is operated by the U.S. Army Corps of Engineers and the dam at Little Seneca is operated by WSSC. The water suppliers pay a portion of the operations and maintenance costs of a third upstream reservoir, Savage, also located on the North Branch of the Potomac. These three reservoirs are available to augment Potomac River flow during low-flow periods.

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

- Maintaining Potomac River flow at Little Falls dam, as measured by the USGS gage at that location (Station ID 01646500), at or above the environmental flow-by of 100 MGD, or equivalently, 155 cubic feet per second (cfs).
- Maintaining estimated flow below 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 volumes are 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.

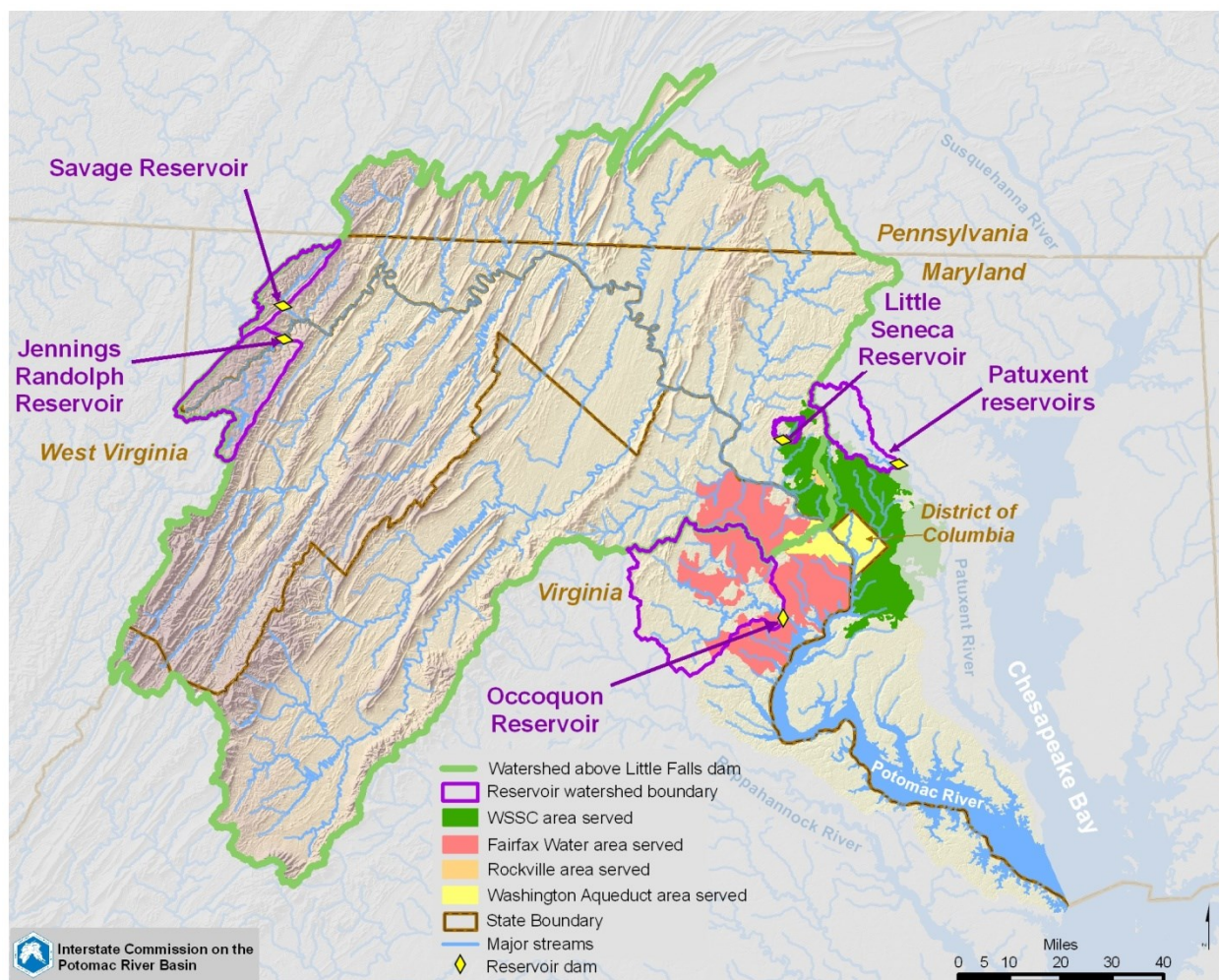


Figure 2-1 – WMA water sources

To estimate future Potomac withdrawals 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.

Withdrawal scenarios may require “load shifts” by the water suppliers between Potomac River intakes and off-Potomac reservoir intakes. Load shifting, that is, the shifting of some portion of a supplier’s withdrawal from one intake to another, may be requested by CO-OP during droughts to help meet operational goals. Each of the WMA suppliers has two intakes. Fairfax Water and WSSC both have one or more intakes 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 Summary of Exercise Activities

The 2015 drought exercise was conducted during the seven-day period from September 23 through September 29. A pre-exercise meeting took place on September 21 at ICPRB’s office in Rockville, Md.

(see Appendix A for agenda). Pre-exercise meetings give the WMA drought operations team an opportunity to get acquainted or reacquainted. This meeting also gives CO-OP staff a chance to review and update information on system constraints and to obtain information on the expected status of reservoirs and other system components during the following year's low-flow season. Updated information on the WMA system appears in Tables 1 through 4.

3.1 Scenario

The hypothetical scenario for the exercise was a "late-onset" drought occurring in 2017. 2017 was selected for the scenario year in order to simulate potential operational considerations that might arise during WSSC's actual planned rehabilitation of Tridelphia Reservoir's Brighton Dam. This project is now anticipated to begin in the spring of 2017 and continue for two or more years.

The exercise scenario was as follows:

Today is September 23, 2017. The region has had a hot, dry summer and state water supply agencies have declared Drought Warnings for portions of Maryland, Pennsylvania, and Virginia; moderate drought has been declared in the western portion of West Virginia. On August 21st, observed flow in the Potomac River at Little Falls dam near Washington, D.C., fell to 550 MGD, which was less than current Potomac demand plus the 100 MGD flow-by at Little Falls – CO-OP's trigger for drought operations. Since that time, there have been several water supply releases from both Jennings Randolph and Little Seneca reservoirs. Storage in these reservoirs is currently at 83 percent and 87 percent of usable capacity, respectively. WSSC's Patuxent reservoirs have a significantly reduced storage capacity (6.0 BG versus a usual capacity of 10.1 BG) due to the Brighton Dam rehabilitation project.

Table 3-1 – 2015 Fairfax Water System Information and Operational Constraints

Facility	MGD	Notes
Griffith plant max. production	120	The maximum production from the Griffith plant (Occoquan Reservoir) will be increased to 160 MGD at some time in the future.
Griffith plant min. production	45	The minimum current production at Griffith is approximately 45 MGD (25 to Prince William County East + 20 to Main Service area). More accurately, the minimum production rate is a function of the maximum possible transfer rate from the Potomac plant (Corbalis) and total demand in the Occoquan service area. The maximum transfer rate from the Potomac plant to the Occoquan service area is 65 MGD. Minimal advance notice is required to implement this change. In addition to this constraint, there is also a hydraulic limitation requiring a minimum Occoquan withdrawal of 45 MGD. The minimum Occoquan demand is the greater of these two constraints. The fraction of total demand that comes from the Potomac service area is currently about 0.6, or 60 percent.
Corbalis plant max. production	225	Capacity of the Corbalis plant (Potomac River) will be expanded to 300 MGD at some point in the future.
Corbalis plant min. production	50 to 60	Lower in the winter and higher in the summer. The minimum current production at Corbalis is a function of demand in the Potomac service area as well as pump capacities and the need to furnish part of Loudoun Water demand directly from the Corbalis plant. Roughly, the minimum Potomac demand is the fraction of the total demand serviced by the Potomac minus 35 MGD. (30-35 MGD is the maximum that can be transferred from the Occoquan service area, but note that approximately a 24-hour notice is required to configure yard piping at Pohick Pump Station.)
Maximum WEST to EAST (Potomac TO Occoquan) transfer rate of finished water*	65	Potomac withdrawals can be increased to conserve Occoquan storage by transferring up to 65 MGD of treated water from Corbalis to the Occoquan service area. Minimal advance notice required.
Maximum EAST to WEST (Occoquan TO Potomac) transfer rate*	35	Potomac withdrawals can be decreased to conserve Little Seneca storage by transferring up to 35 MGD of treated water from the Griffith plant to the Potomac service area. 24-hour advance notice required to configure yard piping at Pohick Pump Station.
*These transfer amounts also depend on demands in the two service areas - in other words, check with Fairfax Water to confirm the feasibility of all load shift requests.		

Table 3-2 – 2015 Washington Aqueduct System Information and Operational Constraints

Facility	MGD	Notes
Dalecarlia max. production	200	
Dalecarlia min. production	60	
McMillan max. production	65-70	Flat rate constrained by turbidity, although in the short term an increase to 120 max. is possible.
McMillan min. production	63	
Great Falls min. withdrawal	(32)	The gates can go as low as needed (Woody Peterson, 9/16/14). Under normal circumstances, changes in gate height are made at 0.5 foot increments. One gate can be closed, and the other one be open. According to our current algorithm, both gates are at the lowest setting, 0.5 foot, the withdrawal is 32 MGD.
Woody Peterson says that Little Falls pump #6 is closest to the USGS gage and may locally depress the water level in the vicinity of the gage (see Figure 3-1).		

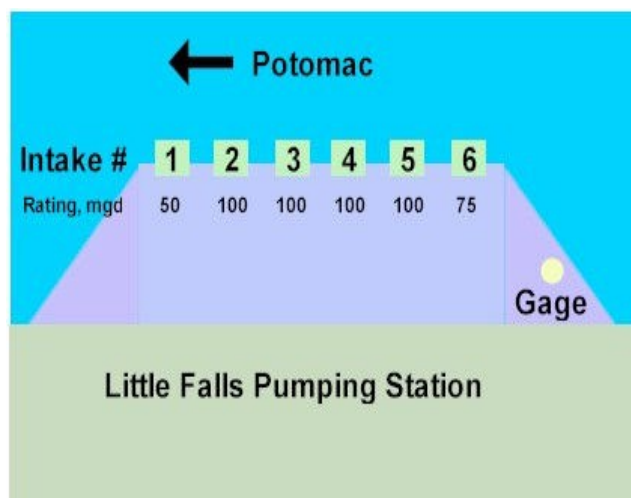


Figure 3-1 – Washington Aqueduct's Little Falls pump rates

Table 3-3 – 2015 WSSC System Information and Operational Constraints

Facility	MGD	Notes
Patuxent plant max. production	62 to 65	A max. of 70 MGD might be possible for a couple of days (Karen Wright, WSSC). The Patuxent plant max. depends on reservoir levels. When the new plant is completed, it will be rated at 72 MGD with an emergency maximum of 120 MGD.
Patuxent plant min. production	30	
Potomac plant max. production	283	
Potomac plant min. production	100	
Brighton Dam will be undergoing repairs beginning in 2017 that are expected to take two years to complete. This will reduce available storage in the Patuxent reservoirs by approximately 4 BG. The work will include gate and dam repair and sediment removal.		

Table 3-4 – Additional System Information

Organization - Facility	MGD	Notes
Loudoun Water – BRWRF discharge	4.5	Loudoun Water's Broad Run Water Reclamation Facility (BRWRF) discharges treated wastewater into the Potomac River upstream of WMA system intakes.
USGS – Point of Rocks stream gage		During low flow conditions, the growth and/or die-off of aquatic grasses at the Point of Rocks gage may require more frequent updates of the rating curve. If grass effects are suspected, call Matt Baker of the USGS's Frostburg office.

3.2 Exercise of Communications and Operations Procedures

During annual drought exercises, participants practice communication procedures that would be used in an actual drought and also practice working with flow forecast spreadsheets and other operational tools. The Potomac basin was experiencing actual dry conditions during the fall of 2015. Daily drought monitoring and reporting of demands and flow conditions began on August 31, 2015, and continued throughout the exercise. During the exercise, CO-OP sent out separate daily emails on actual conditions and twice daily emails related to the exercise. These emails included information to clarify whether the report was part of the exercise or actual monitoring. Also, to reduce confusion and keep staff cognizant of potential worsening of conditions, training on use of flow forecast tools that occurred during the exercise was based on actual flow data. However, in order to simulate drought conditions, a “flow reduction factor” was applied to actual flows before input into the flow forecast spreadsheets used in the exercise.

Most drought operations communications take place via email, but operational changes are discussed and/or confirmed via telephone. The following types of communications were practiced during the 2015 exercise:

- Fairfax Water, Aqueduct, and WSSC sent twice daily reports to ICPRB on “yesterday’s” actual hourly demands, “today’s” and “tomorrow’s” forecasted daily demands, and reservoir storage volumes.
- Loudoun Water sent reports on actual daily demands and on “yesterday’s” daily discharge from the Broad Run Water Reclamation Facility.
- CO-OP sent twice daily email reports to water suppliers, USACE, USGS, and other stakeholders on recent and forecasted demands, recent flows, and current system storage.
- CO-OP made telephone calls to the water suppliers to confirm the feasibility of requested (simulated) load shifts between intakes and (simulated) releases from Little Seneca Reservoir.
- CO-OP made telephone calls to the USACE’s Baltimore District Office to request (simulated) changes in Jennings Randolph Reservoir water supply release rates.
- CO-OP supplier general managers were not contacted to request concurrence on simulated releases because the exercise scenario assumed that releases had been occurring periodically over the past several weeks and that concurrence was given when the initial releases were made. Staff would, however, be in contact with general managers anytime there was a significant new development in drought conditions or operations.

During the drought exercise, staff practiced using CO-OP spreadsheet tools to make Potomac River flow forecasts. They also reviewed on a daily basis the Middle Atlantic River Forecast Center (MARFC) 72-hour flow predictions for Little Falls and other basin streams.² Staff also practiced devising load-shifting and reservoir release scenarios that would maintain flow at Little Falls above the 100 MGD environmental flow-by.

3.2.1 Simulation of Load-Shifting

One of the operational strategies used in the CO-OP system to optimize use of resources during droughts is “load-shifting,” that is, the shifting of a portion of a supplier’s withdrawal from one intake to another. Load shifts that reduce Potomac withdrawals when flows are falling can help preserve storage in a key system reservoir, Little Seneca. Load shifts that increase Potomac withdrawals when flows are more than adequate to meet downstream needs can help preserve storage in the Occoquan and Patuxent reservoirs. Load shifts to the Potomac also allow for more efficient use of water released from the North Branch reservoirs. Finally, load shifts by Washington Aqueduct from its Great Falls intake to its Little Falls intake help maintain flow above the recommended minimum of 300 MGD in the stretch of the river between Great Falls and Little Falls.

During the course of the 2015 drought exercise, requests for load shifts were made of all three CO-OP suppliers. Load shift requests are noted under the operations portion of CO-OP’s twice daily emails to

² Available at <http://water.weather.gov/ahps/region.php?rfc=marfc>.

the water suppliers and stakeholders. The ability of a supplier to implement a load shift request is also verified by phone.

During several phone conversations with operational staff at Fairfax Water, CO-OP learned of a load-shifting constraint that it had not been aware of. Though the maximum production capacity of Fairfax Water's Griffith treatment plant on the Occoquan is 120 MGD, operational staff said that they would not be able to increase Griffith production beyond 100 MGD without authorization from their management due to a potential impact on energy costs. Fairfax Water's contract with Dominion Virginia Power specifies that during the period June 1 – September 30 and between the hours of 10 AM – 10 PM, if their use of power exceeds the previous maximum for 30 minutes, their rate over the next 12 months increases (Joel Thompson, private communication, Dec 29, 2015). CO-OP's planning model assumes that the production capacity of the Griffith plant is 120 MGD, so this issue needs to be explored through future conversations with Fairfax Water and via future drought exercises.

3.2.2 Simulation of Operations during Brighton Dam Rehabilitation

WSSC is about to undertake a major project that will temporarily reduce the storage capacity of its Tridelphia Reservoir. The rehabilitation of Brighton Dam, which forms Tridelphia Reservoir, is planned to begin in the winter of 2016-17 and continue for approximately two years. Though the dam is currently structurally sound, the rehabilitation project will extend its lifetime. It is estimated that the combined usable storage capacity of WSSC's pair of off-Potomac reservoirs, Tridelphia and T. Howard Duckett, will be reduced from 10.1 BG to approximately 6 BG throughout the course of this project. At the request of the Maryland Department of Environment (MDE), CO-OP used its planning model, the Potomac Reservoir and River Simulation Model (PRRISM), to evaluate the impact of this reduction in storage on the reliability of the CO-OP system. PRRISM simulations indicated that the impact is not significant given estimated 2017 water demands.

The scenario year for the exercise was 2017, allowing for operational considerations related to the dam rehabilitation project to be considered. It was assumed that WSSC production from its Patuxent water treatment plant would typically be maintained at its minimum rate, 33 MGD, during a dry summer in order to conserve available storage in the reservoirs. However, it was also assumed that during drought operations there would be times when CO-OP would request that WSSC temporarily increase production at the Patuxent plant and decrease its Potomac withdrawal to help meet the 100 MGD environmental flow-by at Little Falls.

3.2.3 Simulation of Remote Operations

During certain periods of actual droughts it may be necessary for CO-OP staff to work evening and weekend hours. Additionally, power outages and other emergency situations may require that operations be conducted remotely. CO-OP staff are capable of conducting operations from their homes and from other remote locations. CO-OP is currently using log-in and screen-sharing software available from Logmein, Inc. for remote operations.

Days 1 and 2 of the 2015 drought exercise coincided with a visit to Washington, D.C., by Pope Francis, and road closures and serious traffic disruptions related to this event were predicted. Workers were

strongly encouraged by regional transportation officials and by the Federal Office of Personnel Management to telework during the Pope's visit. To avoid the possibility that bad traffic would delay commencement of the drought exercise, CO-OP staff teleworked on Day 1 of the exercise, using screen-sharing software and a telephone conference line to view graphs, confer about operational strategies, and conduct training on use of CO-OP's operational spreadsheets.

3.3 Simulation of Drought Communications Technical Committee Meeting

A meeting via teleconference of the regional Drought Coordination Technical Committee (DCTC), organized by MWCOG, took place on September 25 (see Appendix B for the agenda). The purpose of the meeting was to discuss potential responses to the simulated drought conditions, including the possible issuance of a regional Drought Warning statement. The DCTC is an advisory arm of MWCOG's Drought Coordination Committee (DCC), which is made up of representatives of 17 local jurisdictions, the general managers of the region's water utilities, the director of CO-OP, and representatives of Maryland and Virginia state government. Actions recommended by the DCTC are forwarded to the DCC for consideration. The DCC was established by the Regional Water Supply and Drought Awareness Plan, which was adopted by the MWCOG Board of Directors on June 7, 2000.

Subsequent to the drought of 2002, Virginia developed the Virginia Drought Assessment and Response Plan (2003), which makes decisions independent of the DCC. Under the Virginia plan, the Commonwealth of Virginia Drought Coordinator evaluates conditions and impacts across the Commonwealth and determines what actions are necessary. The Commonwealth is divided under the plan into 13 drought evaluation regions, with the Northern Virginia Drought Evaluation Region consisting of Fairfax, Loudoun, Prince William, Arlington, and Fauquier counties. In the drought of 2002, the Deputy Secretary of Natural Resources was appointed as the Commonwealth Drought Coordinator by issuance of an Executive Order by the Governor.

CO-OP staff sought participation in the DCTC call by the Commonwealth Drought Coordinator in an effort to enhance coordination between the MWCOG and the Virginia drought response plans. ICPRB also intended to add the email address of the Commonwealth Drought Coordinator to the distribution list for CO-OP's twice daily drought operations reports. However, ICPRB was informed by staff at Virginia Department of Environmental Quality's (VA DEQ) Water Supply Planning Program that the Commonwealth Coordinator is a position that is only filled in the case of actual drought, so it was not possible to include such an individual in the activities of CO-OP's exercise. Prior to the appointment of a person to this position, the appropriate contact for drought-related issues is VA DEQ's Water Supply Program. The Director and other staff members of DEQ's Water Supply Program are included in CO-OP's drought reporting email distribution list.

3.4 CO-OP's Test Website for Data Entry

A website for data entry was developed using Drupal, a leading platform for web content management among global enterprises, governments, higher education institutions, and NGOs. The data entry website was designed to allow supplier staff to enter daily water demand and withdrawal data. An entry page and a report page was set up for each one of the four utilities. The entry page consists of a web form where suppliers submitted data each morning and afternoon. By 8 am on each day, suppliers were

to enter average daily Potomac withdrawals of the previous day, and, as applicable, for the Occoquan and Patuxent reservoirs: the previous day's withdrawals, estimated total demand for the current and next day, and usable storage volumes. By 1 pm, suppliers were to enter updated estimates of total demand for the current and next day. The report pages consist of a table of submitted data and a graph showing demands and withdrawals for the last 10 days.

The website is password secured allowing data to be accessible only to those who submitted it and to website administrators. One account was created for each of the four water suppliers. All utilities were able to register accounts and use their accounts as needed despite minor issues with initial registration owing to network firewalls. All suppliers successfully provided the requested data during the course of the drought exercise.

Improvements to be made to the website in the future include the capability of adding multiple users per supplier and the capability of submitting hourly data. In addition, a mechanism for automated download and processing of the online data for use in the drought operation spreadsheets needs to be designed.

3.5 Actual Little Seneca Reservoir Test Release

An actual release from Little Seneca Reservoir was conducted as part of the drought exercise. The purpose of this release was to test coordination between ICPRB, WSSC staff operating the dam at Little Seneca, and staff at Black Hill Regional Park, where the reservoir is located. Test releases also may provide valuable operational data on the flow-dependent time of travel from the reservoir to Little Falls dam. Little Seneca Reservoir was constructed with funds provided by the Washington area water suppliers in the early 1980s. This local reservoir is a key component of the cooperative system. Drought-related releases were made as part of drought operations in 1999, 2002, and 2010. Test releases have also been conducted during previous drought exercises, in 2003, 2004, 2005, and 2013.

A letter was sent to the Montgomery County Executive and County Council members on September 18 informing them that a test release was planned (Appendix C). The Maryland-National Capital Park and Planning Commission (M-NCPPC) was also informed of the planned release. Additional notification was provided to M-NCPPC and Black Hill Regional Park staff prior to the actual release by both ICPRB and WSSC staff. In addition, the MWCOG issued a press release on the day of the test release (Appendix C).

The WSSC initiated the test release at 8:10 AM on September 28, increasing flow seven times until reaching approximately 200 MGD (309 cfs) at 9:00 AM. This release rate continued until 6:00 AM on September 29, when reductions in the release rate began in increments of 20 MGD made every hour until the release rate returned to the pre-release rate.

Elevated flows in Seneca Creek were visible in observed flow values at a downstream gage several hours after initiation of the release. Prior to the release on the morning of September 28, flow downstream of the dam, measured at the USGS gage on Seneca Creek at Dawsonville, ranged from 14 to 28 MGD (22 to 44 cfs). As the release passed by this gage, between 12:45 PM on September 28 and 7:00 AM on September 29, observed flow at Dawsonville ranged from 235 to 247 MGD (364 to 382 cfs).

An increase in flow in the Potomac River at Little Falls dam, likely attributable to the release, occurred the morning of September 29. Flow at Little Falls was fairly constant at approximately 743 MGD (1150 cfs) at 12:00 AM on the 29. At 4:00 AM flow began to rise, as can be seen on the graph in Figure 3-2, and by 10:45 AM it had risen by approximately 200 MGD, to 937 MGD (1450 cfs). By 4:00 PM flow began rising significantly due to a rain event.

Travel time is a function of both stream flow and release quantity. From the data provided by this test release, the time of travel of a 200 MGD Little Seneca Reservoir release associated with a flow of 743 MGD in the river is between 20 and 27 hours.

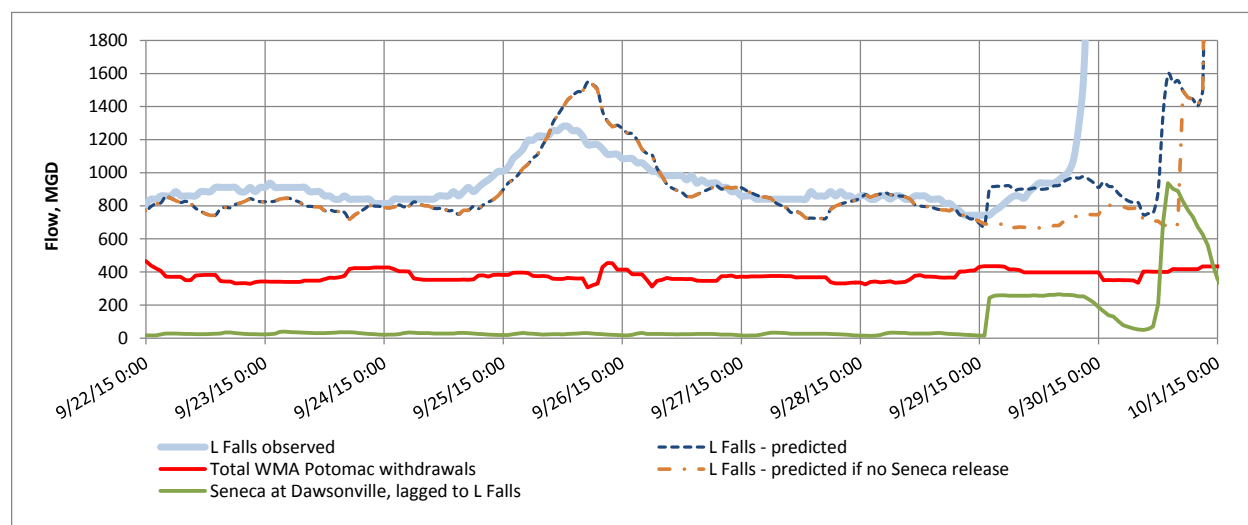


Figure 3-2 – Observed and predicted flow at Little Falls during the 200 MGD Little Seneca Reservoir test release.

3.6 Overlap of Drought and Spill Response Responsibilities

On Day 2 of the drought exercise, September 24, ICPRB staff received notification from MDE of the release on September 23 of approximately 10,000 gallons of a latex paper coating material into the North Branch of the Potomac River. This spill event generated considerable concern for CO-OP suppliers and for the smaller suppliers upstream of the Washington metropolitan area that have intakes on the North Branch and on the Potomac. The contaminant plume was visible in the river for a number of days following the release. A regulated drinking water contaminant, styrene, was reported to be a component of the spilled material, albeit likely in trace quantities. In addition, suppliers were concerned that the latex material might clog or otherwise damage filters in their water treatment systems.

There is an overlap of ICPRB staff persons with spill response and drought operations responsibilities. For this reason, and because a number of members of the spill response team were on leave, the attention of CO-OP's drought team was divided during the days subsequent to the spill. Had an actual drought been underway, available staff might have been hard-pressed to carry out all necessary drought and spill activities.

4 Lessons Learned and Action Items

The lessons learned during the course of the exercise and corresponding action items are listed below.

1. **Test Drupal website:** Water suppliers used test webpages on CO-OP's Drupal website to enter daily demand and reservoir storage data during the exercise. The data entry forms are a promising means for collection of daily data during droughts, but during the design of the data input forms, no convenient system was identified for the input of hourly withdrawal data (i.e. no code was found to allow pasting a column of data from Excel into a web form).

ACTION ITEMS:

- a. CO-OP and the suppliers need to work together to identify a means of automating the acquisition of hourly withdrawal data from the suppliers' SCADA (supervisory control and data acquisition) systems.
 - b. CO-OP staff needs to design a means to automate the extraction of daily data from the website's data base for use in CO-OP's operational spreadsheets.
2. **Fairfax Water's energy-related load shift constraints:** The CO-OP system relies on load shifts to increase system efficiency during droughts. At a point during the exercise in which simulated river flows were falling to a level that would require a release from Little Seneca Reservoir, Fairfax Water operational staff were reluctant to simulate increases in Occoquan Reservoir withdrawals because of concerns about energy costs.

ACTION ITEM: Discuss with Fairfax Water staff how and when to put into place procedures to allow the over-riding of energy considerations during droughts, and if appropriate, exercise agreed upon procedures in next year's drought exercise. If it is determined that some energy cost-related constraints remain, update CO-OP's planning model, PRRISM.

3. **Virginia's Drought Coordinator:** During the exercise, a simulated meeting of the Drought Coordination Technical Committee was held. CO-OP staff sought participation in the DCTC call by the Commonwealth Drought Coordinator in an effort to enhance coordination between the MWCOG and the Virginia drought response plans. However, ICPRB was informed by staff at VA DEQ's Water Supply Planning Program that the Commonwealth Coordinator is a position that is only filled in the case of actual drought.

ACTION ITEM: Add an item to the CO-OP drought procedures task list to track the status of the Commonwealth Drought Coordinator and to add the Coordinator's email address to CO-OP's drought operations distribution list when this position is filled.

4. **Overlap of CO-OP's drought and spill responsibilities:** On Day 2 of the drought exercise, September 24, ICPRB staff received notification from MDE of the release on September 23 of a latex paper coating material into the North Branch of the Potomac River. This spill event generated considerable concern for Potomac basin water suppliers. Because of the overlap of ICPRB staff persons with spill response and drought operations responsibilities, and because a number of members of the spill response team were on leave, the attention of CO-OP's drought team was divided during the days subsequent to the spill. Had an actual drought been underway, available staff might have been hard-pressed to carry out all necessary drought and spill activities.

ACTION ITEM: Provide spill response training to additional ICPRB staff.

5. **Webpage to provide withdrawal data to MARFC:** In recent exercises, information on North Branch reservoir releases and WMA withdrawals was provided each day to MARFC for use in its flow forecasts.³ The current day's North Branch reservoir water supply release request, 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, was sent to MARFC via email at approximately 9 AM in the morning. Recent and forecasted Potomac River withdrawals were provided via a text file, with an agreed upon format, which was uploaded every morning to a page on CO-OP's website:
http://potomacriver.org/datahub/potomacwithdrawals/ICPRB_potomac_withdrawals.txt. Because of the recent redesign of ICPRB's website, the mechanisms to generate this page were outdated and information exchange with MARFC did not occur.
ACTION ITEM: Rebuild tools and mechanisms to provide data to MARFC via a webpage.
6. **More training material:** It was suggested in a post-exercise meeting that in future exercises, training material be provided that would allow staff members to practice individual operational tasks in their own offices and free from the distraction of the simulation.

³ 2013 Drought Exercise Report, by S.A. Ahmed, K.R. Bencala, H. Moltz, and C.L. Schultz, ICPRB Report No. 14-5, September 2014, available at www.potomacriver.org under "Publications."

Appendix A – Agenda for the pre-exercise meeting

2015 Annual CO-OP Drought Exercise

Pre-Exercise Meeting

10 AM to 12:30 PM, Monday, September 21, 2015
Interstate Commission on the Potomac River Basin
30 West Gude Drive, Suite 450, Rockville, Maryland

2015 Drought Exercise Goals

1. Exercise CO-OP communications and operational procedures
 - a. Communications with suppliers regarding “load-shifting”
 - b. Communications with the Corps regarding North Branch releases
 - c. Communications with WSSC and others regarding Little Seneca releases
 - d. Communications with MARFC on metropolitan area withdrawals
 - e. Use of CO-OP flow prediction tools and MARFC flow prediction resources
2. Test “beta” version of website for online data submission
3. Simulate WSSC’s upcoming 2-year Brighton dam rehabilitation project
4. Conduct Little Seneca Reservoir test release (assuming that low flow conditions continue)

1. Welcome & introductions
2. Current drought status
3. Overview of 2015 exercise
4. Reports on system updates and current operational considerations; contact information (see Tables, 1 to 5)
 - Fairfax Water
 - Loudoun Water
 - Washington Aqueduct
 - WSSC
 - MWCOG
 - USACE
 - USGS
 - MARFC
5. Discussion of operational strategies related to Brighton dam rehabilitation
6. “Beta” website for online data submission
7. Lunch (bag lunch provided)

Appendix B – Agenda for meeting of the Drought Coordination Technical Committee

EXERCISE EXERCISE EXERCISE – September 25, 2012

PROPOSED AGENDA FOR THE 2015 CO-OP Drought Exercise Conference Call

Date: Friday, September 25, 2015

Time: 2:00 – 3:00 p.m.

Conference Call Number: (605) 562-3000, Participant Access Code: 451421#

- **Call to Order/Roll Call – COG staff**
- **Purpose of Call – Chuck Murray, General Manager, Fairfax Water**
- **Regional Water Supply and Drought Conditions/Outlook Reports**
 - Overview – COG staff
 - Weather Conditions and Outlook – NOAA (Rich Tinker)
 - COOP System Report – ICPRB/COOP Staff
 - Regional Surface Water/Groundwater - USGS
 - Water Utility Status – Utilities
 - WSSC
 - Washington Aqueduct
 - Fairfax Water
 - Loudoun Water
 - State Reports – MDE/VADEQ
- **Discuss Potential Actions**
 - Possible Issuance of Regional “Drought WARNING” Statement – COG staff
 - Agreement on list of voluntary water restrictions
 - Possible DCC conference call – COG staff
 - Other Potential Actions – DCTC Members
 - Discussion/Concurrence on Recommended Actions – DCTC Members
- **Next Steps – COG staff**
 - COG staff will prepare a written summary of DCTC recommendations for consideration by DCC;
 - DCC will have until Monday (September 28, 2015) to review;
 - Unless there is major objection or need for further discussion, DCC would not convene and DCTC recommendation would be implemented.
- **Adjourn Call**

EXERCISE EXERCISE EXERCISE – September 25, 2015

Appendix C – Communications related to Little Seneca release

INTERSTATE COMMISSION ON THE POTOMAC RIVER BASIN

30 W. Gude Drive, Suite 450
Rockville, MD 20850
(301) 984-1908
www.potomacriver.org



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Robert Sussman

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Randy C. Huffman
Del. Harold K. Michael
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United States
Darryl Madden
BG Kent D. Savre
Robert Sussman (*)

Executive Director
H. Carlton Haywood

General Counsel
Robert L. Bolle

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

September 18, 2015

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 (Washington Suburban Sanitary Commission (WSSC), Fairfax Water, and the Washington Aqueduct Division of the Army Corps of Engineers). **I am writing to notify you of planned water supply test release(s) from Little Seneca Reservoir as part of our annual drought exercise.**

These exercises are conducted each year when an actual drought does not occur. The main goal is 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 staff at Black Hill Regional Park, where the reservoir is located. Test releases also provide valuable operational data. Such a release is planned for this year's exercise sometime between September 23 and 29. The release will occur over one or more days.

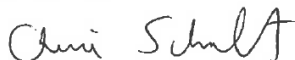
Little Seneca Reservoir was constructed with funds provided by the Washington area water suppliers in 1981. The reservoir is used to augment Potomac River flow during droughts to ensure a safe and reliable water supply for the over 4.6 million customers in the Washington metropolitan area, including the citizens of Montgomery County. It is an integral component of the cooperative system devised for the region. Releases are 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, 2005, and 2013.

The ICPRB is an interstate compact commission established by Congress in 1940. Its mission is to protect and enhance the waters and related resources of the Potomac River basin through science, regional cooperation, and education. 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.

If you have any questions contact me at cschultz@icprb.org or 301-274-8120.

Sincerely,

A handwritten signature in cursive script that reads "Cherie Schultz".

Cherie Schultz, Ph.D., Director of Cooperative Water Supply Operations on the Potomac Interstate Commission on the Potomac River Basin

CC:

Council Member Roger Berliner
Council Member Marc Elrich
Council Member Nancy Floreen
Council Member Tom Hucker
Council Member Sidney Katz
Council Member George Leventhal
Council Member Nancy Navarro
Council Member Craig Rice
Council Member Hans Riemer

METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS

777 North Capitol Street, N.E., Suite 300 Washington, D.C. 20002-4239

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For Immediate Release

September 28, 2015

CONTACT: Steven Kania (202) 962-3249 / skania@mwkog.org

Water to be Released from Little Seneca Reservoir

Release is Part of Annual Drought Exercise; Region's Water Supply at Normal Levels

A modest amount of water will be released today into the Potomac River from the Little Seneca Reservoir in Montgomery County, Maryland. The release of water will be made during an annual regional drought operations exercise to test the region's back-up water supply by measuring the time it takes water to travel from the reservoir to the regional drinking water intakes. The exercise also provides an opportunity to practice stakeholder communications.

The Interstate Commission on the Potomac River Basin (ICPRB) calculated the amount for the planned water release and will monitor the travel time. 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.

According to the Metropolitan Washington Council of Governments (COG), the region's water supply and drought stage are at normal levels despite the lack of rainfall in recent weeks and months. Officials will continue to monitor the Potomac River's water supply and drought conditions on a daily basis.

COG's regional water supply and [drought report](#) for September noted that a small portion of Maryland and Northern Virginia are experiencing abnormally dry conditions according to the U.S. Drought Monitor and the ICPRB Water Supply Outlook. In the Potomac River, the region's primary drinking source, the flow is low. Ground water levels remain at normal levels. Officials note that the drought exercise is not connected with the low rainfall of late; however, the fact that the river flow levels are low provides an opportunity to measure flow times during realistic conditions.

To learn more about the regional drought plan as well as additional water conservation tips, visit <http://www.mwcog.org/environment/water/watersupply.asp>.

The Council of Governments is an independent, nonprofit association where area leaders address regional issues affecting the District of Columbia, suburban Maryland and Northern Virginia.

One Region Moving Forward