

Final Report

A Review of the Potomac River Low Flow Allocation Agreement

**Prepared for:
The Interstate Commission on the Potomac River Basin**

**Prepared by:
The Cruden Team**

February 23, 2018



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Final Report

A Review of the Potomac River Low Flow Allocation Agreement

Executive Summary

This report fulfills the request by the Interstate Commission on the Potomac River Basin (ICPRB) to conduct a review of the 1978 Potomac River Low Flow Agreement and related documents (LFAA) to determine whether the LFAA should be revised or updated, and to document applicable laws, regulations, and practices that might relate to any such changes.

In preparing for this task, three subject matter experts – the Cruden Team – met with ICPRB staff, received their technical advice, reviewed a comprehensive array of relevant documents, and prepared an interview template. From October 17 to November 9, 2017, the team interviewed each of the six parties that signed the original LFAA, including key officials from the governing parties – the Commonwealth of Virginia, the State of Maryland, the District of Columbia, and the United States (represented by the Army Corps of Engineers, including the Washington Aqueduct Division) – and the member parties – Fairfax Water and the Washington Suburban Sanitary Commission. The interviews collectively involved 24 individuals and took more than 19 hours. The individuals participating in the interviews were uniformly knowledgeable, prepared, professional, and committed to the study.

A draft report was shared with the LFAA parties on December 18, 2017. On January 8, 2018, the Cruden Team provided an oral briefing on the draft report at ICPRB headquarters and responded to questions. The parties subsequently provided written comments on the draft report. This final report incorporates our responses to those written comments and to comments made at the oral briefing. The Cruden Team will brief the ICPRB on the final report at its quarterly business meeting on March 6, 2018.

The Cruden Team has prepared this comprehensive report based on the background briefings and technical advice provided by ICPRB staff, the relevant documents and applicable law, the extensive interviews, and comments by the parties. The Introduction (Section 1.0) describes the study purpose and report organization. The Background section (Section 2.0) discusses the historic context and the key components of the LFAA, including the 1978 Memorandum of Intent authored by the Acting Director of Civil Works, Department of the Army, which clarifies certain aspects of the implementation of the LFAA. The Study Approach (Section 3.0) summarizes the methodology that the Cruden Team used to prepare for and then complete this report.

The Issues and Options section (Section 4.0) is the heart of this report. It outlines ten key topics that arose from our review of the LFAA and its implementation. Those ten topics relate to the continuing vitality of the LFAA, technical revisions that would make the LFAA more accurate

by reflecting changes that have occurred since 1978, the relationship of the LFAA to other relevant agreements, the roles of the current parties, whether other upstream users should be added as parties to the LFAA, the upstream boundary of the pertinent portion of the Potomac River, the selection and responsibilities of the Moderator and Standby Moderator, the stages of flow, the allocation formula, and the environmental flow-by.

With respect to the first topic – the continuing vitality of the LFAA – the interviewed parties were consistent in their belief that the LFAA serves a useful purpose and should remain in effect. One party called the LFAA the “cornerstone” of the drought management process for the entire Washington metropolitan area. With respect to technical revisions, the report provides several suggestions to make the LFAA more accurate, such as recognizing that the Commonwealth of Virginia now also exercises permitting authority – along with the State of Maryland – for water withdrawals from the Potomac River. The remainder of the Issues and Options section raises specific issues and provides options to address each issue. In each instance, one viable option is simply to maintain the status quo. However, other options that may improve the process are also offered. Some of the options would require formal revisions to the LFAA; others could be implemented through separate action, such as a memorandum of agreement, a manual, or an interpretive legal opinion.

The Conclusion (Section 5.0) summarizes the topics, issues, and options discussed in Section 4.0 (see Table 5). It also describes five ways in which the current process could be improved without making substantial revisions to the LFAA:

- Make available a consolidated LFAA document that includes the updated LFAA (with all modifications), the ancillary agreements, and the Memorandum of Intent.
- Make technical revisions to the LFAA to improve accuracy and consistency and reflect new circumstances since 1978.
- Provide opportunities – such as tabletop exercises – for the LFAA parties to practice their responses during a hypothetical severe drought and test the viability of individual sections of the LFAA.
- Create a readily accessible LFAA resource, such as an LFAA manual, guidebook, or series of memoranda of understanding, that explains in detail key elements of the LFAA and how they are intended to be implemented.
- Set forth in writing the selection processes, term lengths, and eligibility requirements for the Moderator and Standby Moderator.

Our goal in preparing this report was two-fold. First, we wanted to fulfill the request of the ICPRB to fully evaluate the existing LFAA and to identify issues that should be considered, with appropriate options. Second, we wanted to create a resource that assembles in one place the

history, relevant documents, and views of the parties in order to facilitate future implementation and decision-making with respect to the LFAA. We believe this report fulfills both goals.

We would like to thank ICPRB staff and the 24 individuals who met with us during the interview process. Their input was invaluable. This final report, however, reflects our independent analysis.

1.0 Introduction

The Potomac River Low Flow Allocation Agreement was signed four decades ago, on January 11, 1978, to assure an adequate and equitable supply of drinking water to end-users in the metropolitan Washington area during times of low flow. [Document 4.] The LFAA also serves as an important backstop to subsequent water management planning and decision-making actions. Although the 1978 Agreement has been formally modified just two times – in 1982 and 1985 – many changes affecting water supply and demand have occurred since then. These include population growth, changes in water demand and use, new regional water supply agreements, climate change, and competing demands on the resources of the Potomac River, as well as a seminal Supreme Court decision in *Commonwealth of Virginia v. State of Maryland*, 540 U.S. 56 (2003).

The document numbers shown in brackets refer to the resources listed in Attachment B.

In the electronic version of this report, these references often contain a hyperlink to an online version of the referenced document.

In recognition of these and other factors, on March 7, 2017, the [ICPRB](#) approved a resolution recommending that a review of the LFAA be conducted. [Document 20.] Subsequently, in July 2017, ICPRB issued a Request for Proposal to:

...conduct a review of [the 1978] Agreement, its subsequent Modifications, and a related Memorandum of Intent (collectively referred to as the LFAA), resulting in a report that identifies aspects that the governing parties to the LFAA might, in a subsequent process, consider for amendment. The report will document the applicable laws, regulations, and practices that apply to the LFAA, the perspectives of the LFAA's governing and member parties on possible amendments, and other factors that might relate to changes to the LFAA.

[Document 21.]

This report presents the results of the Cruden Team's review and analysis of the LFAA. It is organized as follows:

- Section 2.0 provides background information relevant to the LFAA.
- Section 3.0 describes our approach in conducting this review.
- Section 4.0 details ten key topics that we identified during our study, including a discussion of the input received from the LFAA parties, issues related to each topic, and viable options for addressing each issue.

- Section 5.0 summarizes our conclusions.

The report also includes five attachments:

- Attachment A: Timeline of the LFAA from 1853 to the present
- Attachment B: The resources reviewed during this project
- Attachment C: Topic guide used for interviews with the LFAA parties
- Attachment D: Interview schedule
- Attachment E: 1978 LFAA and related documents, including LFAA Modification 1 and Modification 2; a consolidated version of the LFAA, which incorporates Modifications 1 and 2 into the original 1978 Agreement; an annotated version of the LFAA, which identifies the revisions to the original Agreement; the Memorandum of Intent; and two Ancillary Agreements.

2.0 Background

This section provides background information helpful to understanding the issues identified in this report.

- Section 2.1 discusses the historical context of the LFAA.
- Section 2.2 summarizes the key components of the LFAA.
- Section 2.3 describes the separate Memorandum of Intent that clarified how implementation of the LFAA would address environmental concerns arising from low flow events.

2.1 Historical Context of the LFAA

This section expands on key events that led to the LFAA and describes subsequent drought management actions.

The Potomac River is the primary drinking water source for the Washington metropolitan area, currently providing approximately 75 percent of the average daily demand of 500 million gallons to a population of more than 4.6 million people. [\[Document 17.\]](#) Three major entities supply water from the Potomac: the Washington Aqueduct Division of the United States Corps of Engineers (Washington Aqueduct), the Washington Suburban Sanitary Commission (WSSC), and the Fairfax County Water Authority (dba Fairfax Water). Washington Aqueduct relies exclusively on the Potomac River and serves as the sole supply of water for residents of the District of Columbia and Arlington County, and as the primary supply for parts of Fairfax County. The Patuxent Reservoir serves as an additional source of water for residents of Montgomery County and Prince George's County, which is supplied by WSSC. The Occoquan River is an additional source of water in Fairfax County, supplied by Fairfax Water. [\[Document 11, p. 12.\]](#)

A timeline prepared by the ICPRB of relevant events from 1853 to the present is provided in Attachment A.

In 1967, WSSC applied to the Army Corps of Engineers for a federal permit under the Rivers and Harbors Act of 1899 to construct a water diversion structure in the Potomac River in order to improve its capacity to withdraw water during periods of drought. The Corps indicated that it would not grant the permit until a legally enforceable regional agreement was in place to equitably apportion Potomac River water during low flow periods. The Corps stated that such an agreement was necessary to prevent non-federal interests from taking so much water from the Potomac that Washington Aqueduct could not meet its statutory requirements to provide drinking water to the residents of the District of Columbia, Arlington County, and Falls Church. [\[Document 11, pp. 13-38.\]](#)

Congress thereupon enacted Section 181 of the Water Resources Development Act of 1976, which authorized WSSC to construct its water diversion structure, provided that Maryland, Virginia, WSSC, and other “desirable signatories” enter into a written agreement “providing an enforceable schedule for allocation among the parties to such agreement for the withdrawal of the waters of that portion of the Potomac River located between Little Falls Dam and the farthest upstream limit of the pool of water behind the Chesapeake and Ohio Canal rubble dam at Seneca, Maryland, during periods of low flow of such portion of such river” [\[Document 3.\]](#)

Section 181 led to the LFAA. While the LFAA was being negotiated, Fairfax County Water Authority also applied to the Corps for a permit to construct an intake to the Potomac River, which resulted in it joining the negotiations. [\[Document 8, p. 11.\]](#) The LFAA was signed on January 11, 1978, by the United States of America (acting by the Secretary of the Army through the Chief of Engineers), the State of Maryland (acting by the Governor and the Secretary of the Department of Natural Resources), the Commonwealth of Virginia (acting by the Governor and the Chairman of the State Water Control Board), the District of Columbia (acting by its Mayor), the Washington Suburban Sanitary Commission (acting by its Chairman), and the Fairfax County Water Authority (acting by its Chairman). [\[Document 4.\]](#) The LFAA establishes a framework by which the right to withdraw water from the Potomac River is allocated among the three major water purveyors – WSSC, Fairfax Water, and Washington Aqueduct – during drought periods, while preserving sufficient flow to maintain environmental conditions.

Subsequent to the execution of the LFAA, a Section of the ICPRB known as the Cooperative Water Supply Operations on the Potomac (CO-OP) coordinated with Washington Aqueduct, WSSC, and Fairfax Water to develop a regional approach to address water supply issues. The goals of this approach were to operate existing water supplies in a coordinated manner to maximize non-Potomac sources of water during dry conditions and to share equitably the costs of constructing, operating, and maintaining additional reservoirs. This led to the Water Supply Coordination Agreement (WSCA), dated July 22, 1982, among the United States (acting through the Corps and Washington Aqueduct), CO-OP, the District of Columbia, WSSC, and Fairfax Water. [\[Document 7.\]](#)

A stated objective of the WSCA is to minimize the possibility that the LFAA’s allocation restrictions will ever go into effect. [\[Document 7, p. 107a.\]](#) This is accomplished in part by WSSC maximizing use of its Patuxent River reservoir and Fairfax Water maximizing use of its Occoquan River Reservoir during low flow conditions, as monitored by CO-OP. [\[Document 7, Article 1.\]](#)

The WSCA is also intended to coordinate the development of future water supplies. Specifically, every five years Washington Aqueduct, the District of Columbia, WSSC, and Fairfax Water “shall review and evaluate the adequacy of the then available water supplies to meet the water demands in the Washington Metropolitan Area which may then be expected to occur during the succeeding twenty-year period.” Any additional structures necessary to meet

increased demand are to be funded through a formula that is based on each party's relative increase in water demand. [Document 7, Article 10.]

The WSCA incorporates a Drought-Related Operations Manual (Operations Manual), which the suppliers agreed would govern management and operation of water supply facilities related to drought. [Document 7, Article 4.] The Operations Manual describes its objective as: making the most efficient use of all water supply facilities to meet all water supply needs for the Washington Metropolitan Area; maintaining the probability of invoking the Restriction Stage of the LFAA at less than five percent during a repeat of the historical streamflow record; maintaining the probability of entering the Emergency Stage of the LFAA at less than two percent with full reservoirs on June 1 of any year; maintaining the probability of not refilling any reservoir to ninety percent of usable capacity by the following June 1 at less than five percent during a repeat of the historical streamflow record; maintaining flows in the Potomac River below Seneca Pool as agreed in the LFAA; minimizing conflict between normal utility operations and drought operations; and providing consistency with the requirements of the LFAA. [Document 7, pp. 188a-119a.]

Section IV of the Operations Manual provides that whenever gauged flows at Point of Rocks are below 2,000 cubic feet per second (1,292 million gallons per day (mgd)), CO-OP will compute flows and withdrawals above Little Falls Dam on a daily basis. CO-OP is also to issue long-range supply outlooks on a monthly basis from May through October and as needed. These outlooks are to contain estimates of the probability of meeting long-range unrestricted demands from current storage, and then refilling every reservoir to at least 90 percent of usable capacity by the following June 1. If the probability of meeting all unrestricted demands and refilling all reservoirs to 90 percent of usable capacity by the following June 1 is less than 98 percent, *or* if the flow in the Potomac minus the environmental flow-by is projected to be less than twice the projected withdrawals for any of the next five days, then certain operating rules take effect. These include: each supplier shall report its 24-hour demand to CO-OP on a daily basis; CO-OP shall direct appropriate releases from water supply storage in Jennings Randolph (formerly Bloomington) Reservoir and Little Seneca Lake; and CO-OP shall set daily withdrawal rates from the Potomac River for WSSC and Fairfax Water. However, if Washington Aqueduct declares a Restriction or Emergency Stage to be in effect under the LFAA, withdrawals from the Potomac River are to be determined under the LFAA. If at any time the probability of meeting unrestricted demand with existing storage falls below 95 percent, each supplier agrees to advise the governing bodies in its respective jurisdiction to recommend restrictions on water use. [Document 7, pp. 120a-122a.]

The WSCA was accompanied by seven other agreements executed on the same day, including a contract for future water supply storage in Jennings Randolph Reservoir, a cost-sharing agreement regarding the construction of the Seneca Reservoir, and a cost-sharing agreement for maintenance and operation of Savage Reservoir. Pursuant to one of the related agreements, the LFAA was amended by deleting a provision in the allocation formula that would have allowed

the District of Columbia to freeze WSSC's and Fairfax Water's low-flow allocations at 1988 levels. [[Document 8](#), Table 4.]

A representative of the ICPRB opined at the time that the coordinated regional operation of water supply facilities represented by the eight interlocking agreements ended three decades of uncertainty and would guarantee adequate water supply in the Washington Metropolitan Area well into the 21st century. [Document 8, p. 1.]

Another development affecting the LFAA is the Metropolitan Water Supply and Drought Awareness Response Plan: Potomac River System (Response Plan) prepared in June 2000 by the Metropolitan Washington Council of Governments (MWCOC), Regional Task Force on Water Supply Issues (Task Force). [Document 9.] As the regional planning organization for the Washington D.C. area's major local governments, MWCOC works toward solutions to regional problems, including water supply. The Task Force was established in the summer of 1999, the first drought severe enough to require water supply releases from Jennings Randolph (although only a "moderate" drought in the historical record). The MWCOC Board was concerned that the region was not speaking with a common voice, resulting in public confusion. The Board directed the Task Force "to provide special emphasis on communication and coordination among local and state governments, water supply utilities, and the media and general public in the event of another serious drought in the future." [[Document 9B](#).]

The Response Plan that grew out of the Task Force's efforts provided "a plan of action that would be implemented during drought conditions for the purpose of coordinated regional response." It established four levels of drought awareness: normal, watch, warning, and emergency. The warning stage is triggered when either the combined water supply storage at Jennings Randolph and Little Seneca reservoirs drops to 60% of capacity for five consecutive days or when there is a 5% probability of not meeting unrestricted water supply demands over the next one to two months. The warning stage leads to a period of voluntary water restrictions accompanied by a coordinated message sent out to customers, local governments, and media. The emergency stage is triggered when there is a 50% probability of not being able to meet water supply demands over the next month. It results in mandatory water restrictions accompanied by a coordinated message to consumers, governments, and the media. One of the specific actions described in the emergency stage is for Washington Aqueduct to assign allocations to Potomac River utilities pursuant to the LFAA. [[Document 9C](#).]

The Response Plan calls for meetings of the Drought Coordination Committee (comprised of MWCOC's administrative officers and supported by utilities, the states, and CO-OP) during the watch, warning, and emergency stages. [Document 9C.]

Also of note, in 2003 the U.S. Supreme Court decided a dispute between the Commonwealth of Virginia and the State of Maryland concerning whether water withdrawals from the Potomac River by entities in Virginia are subject to Maryland's consumptive use permitting program. The Court's determination that Maryland lacks such regulatory authority fundamentally changed the

two states' relationship to each other under the LFAA, as well as Maryland's relationship to the State of West Virginia with respect to upstream withdrawals of water from the Potomac River.

2.2 Summary of the LFAA as Amended

The 1978 LFAA, as modified in 1982 and 1985, consists of seven Articles, relevant parts of which are summarized below.

Article 1. Enforcement

Article 1.A.1. defines "Pertinent Portion of the River" as the portion of the Potomac River "located between Little Falls Dam and the farthest upstream limit of the pool of water behind the Chesapeake and Ohio Canal Company rubble dam at Seneca, Maryland." This stretch of river is also referred to as "the defined portion" or "the subject portion" of the Potomac River.

Article 1.A.2. designates the four sovereign parties (the United States, Maryland, Virginia, and the District of Columbia) as "governing parties" and the two utilities (WSSC and Fairfax Water) as "member parties."

Article 1.B. establishes the position of Moderator, who is vested with the authority to "take all actions necessary to enforce the provisions" of the LFAA and to "decide all disputes between or among the parties arising under this Agreement not disposed of by consent." Decisions of the Moderator "shall be final and conclusive unless determined by a court of competent jurisdiction to have been fraudulent, capricious, arbitrary, or not supported by substantial evidence." (Article 1.C.) The Moderator may hire counsel to commence or defend any action, which shall be funded by the governing parties. (Article 1.E.)

The Moderator is selected – and may be removed – only by unanimous action of the governing parties. (Article 1.G.) During any period in which the office of Moderator is vacant, the functions of the Moderator shall be exercised by a Standby Moderator. The duty to designate the Standby Moderator rotates annually among the governing parties, on January 1 of each year. (Article 1.G.)

Article 2. Administration

Article 2.A. provides that the Washington Aqueduct Division of the Baltimore District of the Corps of Engineers (USACE-Baltimore District) will collect and make available daily records regarding both the flow of the Potomac River and water withdrawn from the pertinent portion.

Attachment E contains the LFAA and related documents, including:

- The 1978 LFAA
- Modifications 1 and 2
- A consolidated LFAA, which incorporates the 1982 and 1985 modifications
- An annotated LFAA, which identifies the revisions made in 1982 and 1985
- The Memorandum of Intent
- The two ancillary agreements (1981 and 1984).

Based upon this information, Washington Aqueduct will determine whether a stage of low flow exists. (Article 2.B.) Specifically, Washington Aqueduct may, after consultation with WSSC and Fairfax Water, declare an “Alert Stage” to be in effect when the total daily withdrawal is equal to or exceeds 50 percent of the total daily flow (Article 2.B.1.); a Restriction Stage when the total daily withdrawal is equal to or exceeds 80 percent of the total daily flow (Article 2.B.2.); and an Emergency Stage when the estimated total daily withdrawal for any day within the following five days is expected to exceed the anticipated daily flow (Article 2.B.3.). Total daily flow at Little Falls and total daily withdrawal are based upon the previous 24 hour period. (Article 2.A.)

When a Restriction or Emergency Stage is in effect, the LFAA provides that Washington Aqueduct will on a daily basis calculate and advise each user of its allocated fair share. This allocation is calculated by Washington Aqueduct by first determining – in consultation with the parties – any amount needed for flow below the Little Falls Dam “for the purpose of maintaining environmental conditions” (called “environmental flow-by”) and balancing such need “against essential human, industrial and domestic requirements for water.” Washington Aqueduct is to give “substantial weight” to conclusions for environmental flow-by submitted by Maryland. (Article 2.C.) The actual allocation for each user is based upon its relative “average daily winter use” over the previous five years, after taking into account the daily amount of water available to all users (after deduction of the environmental flow-by) and other sources of water practically available to that user. (Article 2.C.2.)

This allocation formula may be modified by unanimous consent of the governing parties, pursuant to the procedures set forth in Article 2.C.3.a. The LFAA requires review by the parties of the fairness and reasonableness of the allocation formula every five years, taking into consideration “experience gained in the operation of the Agreement during the preceding five-year period; then current estimates of future water demands in the Washington Metropolitan Area; the adequacy of then available and prospective future supplies to satisfy future demands for water; experience gained in the regional management of available water supply facilities to optimize their use; factors listed in subparagraph 2.C.3.b.; and such other factors as may be pertinent.” In the interim, any party desiring a revision to the formula may give written notice of that desire to the other parties, and, if the formula has not been changed after one year, that party may seek relief in the United States District Court for the District of Columbia, unless the action is between two states, in which case action may be commenced in the U.S. Supreme Court. (Article 2.C.3.a.&c.)

Any new allocation formula negotiated by the governing parties shall take into consideration “(a) steps taken by the parties which can do so to minimize dependence upon the Potomac River during periods of low flow, (b) the nature and effectiveness of water conservation methods put into effect, (c) steps taken to increase the water supply available for the Washington Metropolitan Area, (d) then current population growth and planning for future growth, (e) feasibility and availability of new sources of water, and (f) technological advances in water treatment and water quality measurement.” (Article 2.C.3.b.)

The water subject to allocation consists of the maximum capacity practicable from the Patuxent River and the Occoquan River; the natural flow of the pertinent portion of the Potomac River; and augmented flow of the pertinent portion of the Potomac River resulting from releases from existing upstream reservoirs, including Jennings Randolph, Savage, and Little Seneca. (Article 2.C.5.)

Every five years, Washington Aqueduct, the District of Columbia, Fairfax Water, and the WSSC are to evaluate the adequacy of the then available water supplies to meet expected demands in the Washington Metropolitan Area over the succeeding 20-year period. If it is determined that additional water supplies will be required to meet expected demands, those parties are to undertake negotiations to provide the required additional water supplies, which will then be included as water subject to allocation under the LFAA. (Article 2.C.8.)

Article 3. Obligations of the Parties

Article 3.A. provides that Washington Aqueduct will carry out the functions and requirements of the United States under the LFAA, under the supervision of the District Engineer for USACE-Baltimore District. The parties agree to provide Washington Aqueduct with all information needed to administer the allocation system. (Article 3.B.) Maryland agrees that all permits that it grants for water appropriations from the pertinent portion of the Potomac River will include a provision subjecting the permittee to the LFAA. (Article 3.C.) All parties agree to comply with Washington Aqueduct's determinations under the LFAA, unless overturned pursuant to Article 1. (Article 3.D.) Any community or entity that seeks to appropriate water from the pertinent portion of the Potomac River shall either become a member party to the LFAA or shall be governed by a permit that incorporates the low flow allocation formula. (Article 3.E.)

Article 4. Review

Article 4 provides that the parties shall convene in April of each year to review the LFAA and to make modifications agreed to by the governing parties. The governing parties can review and make modifications at any other time as well. New member parties may be allowed to join the LFAA upon unanimous consent of the governing parties.

Article 5. Revocation

The LFAA may be revoked only by unanimous consent of the governing parties.

Article 6. Effective Date

The LFAA became binding when it was executed by the parties, a Moderator was selected, the United States issued a permit for the construction of a water diversion structure or water intake in the pertinent portion of the Potomac River to a party to the LFAA or a political subdivision or

authority thereof, and each party took all action necessary to make the LFAA binding and enforceable on itself.

Article 7. Severability

The parties agree that if any part of the LFAA is found to be invalid or unconstitutional, the remainder of the LFAA will remain in effect.

2.3 Memorandum of Intent

Separate from the 1978 Agreement, but an essential component of the LFAA, on July 20, 1978, Brigadier General Drake Wilson, Acting Director of Civil Works for the United States Army, sent a letter entitled Memorandum of Intent to the Honorable James A. Joseph, Under Secretary of the Interior, in response to concerns expressed by the United States Fish and Wildlife Service and the Department of the Interior. According to the memorandum, “[t]he problem at issue is to assure that there will be enough water remaining in the Potomac River after withdrawals by the proposed intake structures to avert severe and irreparable damage and disruption to the Potomac River ecosystem, and to recognize the need to avoid damage to properties of the National Park Service.” [\[Document 5.\]](#)

The Memorandum of Intent stated that in calculating the total daily withdrawal to determine whether the Restriction or Emergency Stage goes into effect, Washington Aqueduct will include the amount designated as the environmental flow-by. During the Restriction and Emergency Stages, Washington Aqueduct will reduce withdrawal from the Great Falls intake and increase withdrawal from the Little Falls intake “consistent with maintaining favorable environmental conditions between Great Falls and Little Falls.”

The Memorandum of Intent stated that a joint study by the State of Maryland in cooperation with the Department of the Interior, the Army Corps of Engineers, the Environmental Protection Agency, and the Commonwealth of Virginia was underway for the purpose of determining an environmental flow-by amount, which would then be used as the basis for applicable provisions of the LFAA. If the study was not completed, the Secretary of the Army would set the environmental flow-by in consultation with the Secretary of the Interior, after soliciting the views of the parties to the LFAA.

The Memorandum stated that in administering the LFAA Washington Aqueduct will not “invade” the environmental flow-by “absent essential need.” In assessing such need, Washington Aqueduct will assure itself that the affected localities and jurisdictions “have made maximum use of other sources of water and imposed maximum conservation measures.”

In recognition of the need of the C & O National Historic Park for minimal amounts of water to maintain the integrity of the structure, the Memorandum stated that the National Park Service

“will not be obligated to consider a complete cutoff of its intakes until such time as the Washington Aqueduct determines it necessary to invade the environmental flow-by amount.”

According to the Memorandum, the parties to the LFAA were consulted with respect to Brigadier General Wilson’s interpretations, and they concurred.

3.0 Study Approach

The Cruden Team's approach to reviewing the LFAA consisted of the following key elements:

- **Resource Review.** The team met with ICPRB and CO-OP team members to discuss the LFAA objectives, learn about the LFAA and its history, discuss potential issues, and identify key resources. We then reviewed numerous documents related to the LFAA and its history, as well as applicable local, state, and federal laws and regulations. A list of the resources used in preparing this report is provided in Attachment B.
- **Interview Guide.** Based on our findings from the resource review and coordination with the ICPRB team, the Cruden Team developed a flexible topic guide for use in interviews with the LFAA parties. The interview guide provided a list of questions related to each section of the LFAA. A copy is provided in Attachment C.
- **Interviews with LFAA Parties.** The primary means of collecting the parties' views and concerns about the LFAA was through in-person interviews with the four governing parties and the two member parties. Attachment D shows the dates and locations of the interviews and the individuals who participated for each party. Each meeting lasted approximately three hours, with one meeting lasting more than four hours. All three members of the Cruden Team attended each meeting, and the number of party representatives at each meeting ranged from one to six. Altogether, 24 party representatives participated in the interviews. In advance of the in-person interviews, the Cruden Team provided each party a list of potential topics to be covered. Two parties provided written responses prior to or during their interviews. The in-person interviews were recorded to ensure accuracy. Written interview summaries were subsequently prepared, and each party was given an opportunity to review the summary of its interview.
- **Draft Report.** A draft report was provided to all parties on December 18, 2017. On January 8, 2018, the Cruden Team provided an oral briefing on the draft report at ICPRB headquarters, and the parties subsequently provided written comments on the report. The Cruden Team carefully considered all of the parties' oral and written comments in preparing the final report.

4.0 Issues and Options by Topic

The parties reported that they generally work together well and understand each other's goals, objectives, and needs. They noted that this is due in part to the fact that many of the same individuals have been involved with the regional water supply and the LFAA for many years. This is positive and should be recognized. However, this mutual understanding could be affected if there were a major change in players, if the organizations' managements shift their perspectives, or if applicable laws, regulations, or policies change. Accordingly, it is important to document standard practices and create operating manuals to assure that the current knowledge passes on to future managers and staff.

Although there was little disagreement among the parties about the underlying purposes of the LFAA, the parties did emphasize different aspects of the LFAA. For example, the District of Columbia and Washington Aqueduct stated that the key objective of the LFAA is to guarantee that consumers in the District of Columbia have secure and equitable access to safe drinking water in times of low flow resulting from drought. They stressed that the District of Columbia continues to have unique requirements for drinking water because, as the District of Columbia pointed out, it "is wholly dependent on the Potomac River for its water supply and as the party located furthest downstream, the District of Columbia relies on the effective implementation of the LFAA during drought conditions more than any other party." In addition, the District of Columbia houses the federal government and so has national security needs. As a totally urban environment, where household irrigation is not a prevalent practice, the District of Columbia has fewer opportunities to restrict water use during a severe drought than do suburban communities, where single family homes and large yards are more common.

Other parties took a broader regional view, emphasizing the importance of a safe and adequate supply of water during times of drought for all the parties, distributed in a fair and equitable way. Fairfax Water joined the LFAA in order to ensure its access to the Potomac River and an equitable apportionment. Protection of wildlife and fisheries was cited by Maryland as an additional objective, while Virginia noted the importance of maintaining environmental conditions.

Over the course of the six interviews, it became apparent that because the LFAA has never been formally implemented, some individuals were not completely certain about the precise meaning of some of its provisions, how the LFAA would actually be implemented, and how it relates to other regional drought management agreements.

Based upon our comprehensive interviews with the parties and our own research on and assessment of the LFAA, the Cruden Team has identified numerous issues and related options that the parties might wish to consider in determining whether and how to revise the LFAA.

For discussion purposes, the issues and options are set out in ten overall topics, as follows:

- 4.1 Continuing Vitality of the LFAA
- 4.2 Technical Changes to the LFAA
- 4.3 Relationship of LFAA to Other Regional Agreements
- 4.4 Responsibilities of the LFAA Parties
- 4.5 Upstream Users
- 4.6 Pertinent Portion
- 4.7 Moderator
- 4.8 Stages of Flow
- 4.9 Allocation Formula
- 4.10 Environmental Flow-by

Organization of Section 4.0

Topic 4.X

Technical and Legal Background

Views Expressed by the Parties

Issues and Options

- Issue
 - Option
 - Option
 - Option
- Issue
 - Option
 - Option
 - Option

4.1 Continuing Vitality of the LFAA

Technical and Legal Background

As described in Section 2.1, implementation of water allocations under the LFAA has been significantly affected by subsequent regional agreements that make it less likely that the water allocation process set forth in the Agreement will be triggered in the near future.

First, in 1982 the three water supplier members of the LFAA joined CO-OP and the District of Columbia in the WSCA, which led to a regional coordination process that is intended to optimize utilization of all available supplies and maximize non-Potomac sources of water during low flow conditions, as well as provide additional reservoir capacity in the future. [\[Document 7.\]](#) The WSCA was accompanied by seven other agreements that resulted in the water suppliers purchasing existing and constructing new water supply storage facilities. Second, the WSCA includes a Drought-Related Operations Manual that governs the management and operation of water supply facilities well before the Restriction or Emergency Stage is triggered under the LFAA. [\[Document 7.\]](#) Third, in 2000 the MWCOC issued the Metropolitan Water Supply and Drought Awareness Response Plan to ensure that local governments coordinate their water supply efforts and speak with a common voice when a shortage of water supplies is threatened. [\[Document 9A.\]](#)

These efforts have paid off. Indeed, in the forty-year history of the LFAA, allocations under Article 2 have never been triggered, nor was any interviewee aware of any dispute that has ever gone to the Moderator. At the same time, forecasts of large increases in demand for Potomac River water have not borne out. Thanks to more efficient appliances, repairs to infrastructure, increased water-use consciousness by consumers, and more multi-family housing, the per capita use of water in the Washington metropolitan has declined over the past 25 years and total water consumption has remained stagnant. [[Document 17](#), p. xii.]

Views Expressed by the Parties

Notwithstanding the subsequent regional agreements, no party advocated that the LFAA be terminated. Indeed, most parties emphatically supported its continuing existence. For example, Fairfax Water called the LFAA the “cornerstone” of the entire system, and said it must exist for the WSCA to be effective. WSSC referred to the LFAA as a “safety valve,” and the District of Columbia compared the LFAA to wearing seat belts: they might never have saved our lives in an accident, but we certainly don’t want to get rid of them. The District of Columbia added that the LFAA is “an indispensable and vital agreement for the wellbeing of District residents and for the continued operation of the federal government institutions and agencies that are headquartered here.”

That said, the parties varied on whether and how much the LFAA should be revised. The parties’ views ranged from the belief that there is no need to make any revisions to the LFAA to a concern that the LFAA might not fully meet today’s potential drought situations and that thorough study of some components is needed to determine if revisions are appropriate. Virginia suggested that it is important to agree on the current purpose of the LFAA and why it should be retained, and wondered if consideration should be given to merging or coordinating the LFAA with the WSCA. The District of Columbia wants to ensure that the pillars of the LFAA are sound and believes that it makes sense to consider partial changes that clarify or enhance the LFAA. In its comments to the draft report, the District of Columbia stated that at this point it “does not see a need for a complete revision or renegotiation of the LFAA,” recommending instead that “serious issues or concerns about the LFAA process could be addressed by supplementary memoranda of agreement or memoranda of understanding that are negotiated among the parties.”

One person expressed concern that some parties have discouraged revisions to the LFAA. On the other hand, several parties pointed out that it is essential to identify the impacts of any potential changes, especially since the LFAA may never have to be implemented. Comments included that the parties do not want to open a “can of worms” and that it is important to not “make the perfect the enemy of the good.” All parties understood that some technical revisions might be desirable.

Issues and Options

Given the findings described above, it was clear that all parties believe in the continuing vitality of the LFAA. Accordingly, there are no issues or related options relevant to this topic. The remainder of this report focuses primarily on specific revisions and measures that the parties might wish to consider that would maintain and improve on the LFAA's ongoing vitality.

4.2 Technical Changes to the LFAA

Technical and Legal Background

When the LFAA went into effect, the State of Maryland was the sole permitting authority for the appropriation of water from the Potomac River, even for intake structures physically located in Virginia or West Virginia. The fourth "Whereas" clause in the LFAA thus noted that Maryland "has enacted an appropriation permit statute which requires that all non-exempt jurisdictions obtain a permit from the Water Resources Administration of the State's Department of Natural Resources . . . to appropriate or use the water of the Potomac River." Further, Article 3.C. provided that Maryland "agrees that all appropriation permits granted by the Administration for any appropriation of water from the subject portion of the Potomac River shall include a provision subjecting the permittee to the provisions of this Agreement."

In 1996 Maryland denied an appropriation permit sought by the Fairfax County Water Authority. The Commonwealth of Virginia thereupon challenged Maryland's authority, and the United States Supreme Court held in 2003 that the Compact of 1785 and the 1877 Black-Jenkins Award had given Virginia sovereign authority, free from regulation by Maryland, to build improvements appurtenant to her shore and to withdraw water from the Potomac River, thus rendering Maryland's restrictions on the Fairfax Water's withdrawals null and void. *Commonwealth of Virginia v. State of Maryland*, 540 U.S. 56 (2003). [[Document 13.](#)]

In 2010, Maryland and Virginia entered into a Memorandum of Understanding that formally recognized each sovereign's authority to regulate surface water withdrawals from the Potomac River in their respective jurisdictions. [[Document 14.](#)] However, the LFAA has not been amended to expressly acknowledge Virginia's exercise of permitting authority.

In addition, as described above, the LFAA has over time been modified and related documents have been added. The LFAA currently comprises the original 1978 Agreement, the 1978 Memorandum of Intent, Modification 1 (dated July 22, 1982), Modification 2 (dated 1985), and two Ancillary Agreements that relate to compensation of the Moderator (dated 1981 and 1984).

Views Expressed by the Parties

Several parties stated that in the interest of accuracy the LFAA should be revised to reflect technical changes that have occurred since 1978. On the other hand, in their written comments

on the draft report, the District of Columbia, Fairfax Water, and Washington Aqueduct opined that there is no need to formally modify the LFAA to provide technical or administrative fixes; instead, these should be addressed in a separate document or memorandum.

In written comments, Virginia suggested that the LFAA be modified to reflect its permit authority that had not been exercised in 1978:

To create equivalent “users” for the two states now that Virginia has a regulatory program for water withdrawals, Art. 2.C.1. should be revised to be “...the Commonwealth and the Board for...”. “Board” would be defined as the State Water Control Board which has the statutory authority to grant water withdrawal permits in accordance with the State Water Control Law (Virginia Water Protection Permit). This would make the Commonwealth’s “users” the same as Maryland.

[Article 3.C. (Permits)] needs to reflect the development of permit based water allocation programs in Virginia. At the time Maryland issued all water allocation permits for entities using the Potomac River. This changed with the USSC decision. Therefore, this provision may no longer be valid. Our reading of this provision is that the terms of the LFAA, including any flow-by are expected to be implemented through state water allocation permits, including “any authority that the Commonwealth may have.” At the time of the original agreement, the Commonwealth exercised its Sec. 401 authority to manage withdrawals including the US Army Corps of Engineers and Maryland permits issued to Fairfax Water.

Another possible technical change would involve the ninth Whereas clause, which identifies Fairfax Water as a proposed water user:

Whereas, the Fairfax County Water Authority is an authority in the Commonwealth of Virginia proposing to withdraw water from that portion of the Potomac River which is covered by this Agreement and has applied for a permit to construct a water intake structure for such purpose...

This Whereas clause could be revised to reflect that Fairfax Water is a current water provider.

Maryland pointed out that references in the LFAA to the “state’s Department of Natural Resources” should instead be “Maryland’s Department of the Environment.”

Finally, some parties suggested that they should have access to a single LFAA with all amendments and related documents. Because different forms of the LFAA are being used (some with and some without modifications), during the interviews not everyone was always literally on the same page.

Issues and Options

- Should there be one LFAA that is accurate and up-to-date, reflecting changes that have occurred since 1978, including amendments?
 - Maintain status quo.
 - Revise the LFAA to reflect the following historical changes and any other changes required for consistency and accuracy (to reflect new circumstances since 1978):
 - Virginia now regulates surface water withdrawals from the Potomac River:
 - Revise the fourth Whereas clause in the LFAA to add a reference to the development of permit-based water allocation programs in Virginia under the authority of the Commonwealth of Virginia and the State Water Control Board. This reference should parallel the existing reference to Maryland’s authority.
 - Revise Articles 2.C.1. and 3.C. to add parallel language for the Commonwealth of Virginia and State Water Control Board.
 - Fairfax Water is now a water withdrawer (revise the ninth Whereas clause).
 - References to the “state’s Department of Natural Resources” should now be to “Maryland’s Department of the Environment.”
 - Create a consolidated document that includes the original 1978 LFAA as modified in 1982 and 1985, the Memorandum of Intent, the ancillary agreements, and any revisions that are made as a result of this report or otherwise. This also could include a list of changes that have occurred since 1978 that should be noted but do not require formal revision of the LFAA (e.g., references to “future reservoirs” that have now been constructed and the Jennings Randolph reservoir name change).

4.3 Relationship of LFAA to Other Regional Agreements

Technical and Legal Background

As discussed above, the LFAA does not exist in a vacuum. Yet, the LFAA does not acknowledge the existence of the WSCA, its Drought-Related Operations Manual, MWCOC’s

Metropolitan Water Supply and Drought Awareness Response Plan, or how the various agreements relate to one another.

Views Expressed by the Parties

The parties recognized that the LFAA, the states, WSCA, and MWCOG may have different approaches to drought management in some instances, and understood and accepted that there are reasons for these differences. For example, Fairfax Water mentioned that the MWCOG Response Plan plays an important role because it brings cities and counties in Maryland and Virginia into the drought management process. Fairfax Water also believes that coordination under the LFAA and WSCA is working well. Washington Aqueduct stated that the ICPRB is working to align the LFAA and WSCA, but observed that the MWCOG's plan involves a different set of parties. WSSC pointed out that the triggers in the LFAA are not set to prompt an action by the water utilities in the same way that a drought plan does. The LFAA is intended as the initiation of last resort to manage a temporarily reduced resource. The triggers in the LFAA are rules that establish definitive points at which the firm allocation of water from the river will start. Triggers in a drought plan, on the other hand, are intended to initiate (sufficiently early in a drought) a predefined strategy that will guide policymakers and utilities to manage and influence customer demands and coordinate the release of water from reservoirs.

Overall, the parties did not suggest making changes to the LFAA concerning this topic, and several stated that it would not be appropriate to ask the states or MWCOG to make wholesale changes to their drought management plans. However, several parties would welcome information about the interrelationship among the different drought management approaches. They also suggested the need for increased coordination and communication among the various drought management organizations and increased coordination when communicating drought requirements to water consumers. At least one party suggested that there is room to harmonize the different drought management plans and approaches.

Issues and Options

- Should the LFAA, CO-OP/WSCA, and/or MWCOG drought management plans be better aligned?
 - Maintain status quo.
 - Educate the parties about the interrelationship of the LFAA, WSCA, and MWCOG approaches, their potential differences, and how they can be aligned during a severe drought. This information could be presented in a separate LFAA manual or guidance.
 - Conduct tabletop exercises specifically related to LFAA issues and the coordination of the different drought management approaches. LFAA parties

could also be included in tabletop exercises conducted by CO-OP, if this is not already occurring.

4.4 Responsibilities of the LFAA Parties

Technical and Legal Background

The parties to the LFAA are the United States, the State of Maryland, the Commonwealth of Virginia, the District of Columbia, WSSC, and Fairfax Water. As outlined in the enabling statute and further explained by the parties during the interviews, Maryland is a party partly because, when the LFAA came into effect, the State had enacted a statute that required all non-exempt jurisdictions to obtain permits from Maryland on order to appropriate water from the Potomac. Virginia is a party because it has certain riparian rights to use water from the River. The District of Columbia is a party because the Potomac River runs through it and the Potomac is the sole source of drinking water for D.C. residents. WSSC and Fairfax Water are parties as a result of their applications for permits to construct or expand intakes in order to withdraw water from the Potomac River. The United States is a party both because it reviews permit applications under the Rivers and Harbors Act for the construction of intakes and because it maintains and operates Washington Aqueduct, which supplies water from the Potomac River to end users in the District of Columbia, Arlington County, and parts of Fairfax County.

The four sovereign parties – the United States, Maryland, Virginia, and the District of Columbia – are “governing parties.” WSSC and Fairfax Water are “member parties.” (Article 1.A.2.) The distinction is an important one. Only the governing parties (1) may select or remove the Moderator (Article 1.G.); (2) share in the costs of paying the Moderator’s legal expenses (Article 1.E.); (3) pay the Moderator’s reasonable expenses (Article 1.H.); (4) may request a change in the allocation formula or revise the allocation formula (Article 2.C.3.a.); (5) may go to court to seek a change in the allocation formula (Article 2.C.3.a.); (6) may agree to modifications of the LFAA (Article 4.); (7) may agree to admit new members to the LFAA (Article 4.); or (8) may revoke the LFAA (Article 5.). While member parties may participate in negotiations for replacement of the allocation formula, they do not get to vote on its approval. (Article 2.C.3.a.)

The LFAA provides Washington Aqueduct with the authority to carry out many important functions, including determining whether an Alert, Restriction, or Emergency Stage should be declared; calculating allocated shares during the Restriction and Emergency Stages; determining the environmental flow-by; and reassigning any excess allocations.

Views Expressed by the Parties

During the interviews, there was consensus that there is no need to modify the designated roles of the governing and member parties.

There was substantial discussion about the scope of Washington Aqueduct's authority and the sometimes different roles of Washington Aqueduct and USACE-Baltimore District. Virginia suggested that the LFAA should clarify the roles of Washington Aqueduct vis-a-vis USACE-Baltimore District, because Washington Aqueduct, as a water supplier, is more like a member party and USACE-Baltimore District, as a regulator, is more like a governing party. Virginia suggested, for example, that USACE-Baltimore District or another governing party – not Washington Aqueduct – could be responsible for calculating total daily flow and making any decision that could impact the environmental flow-by. WSSC suggested asking CO-OP to calculate daily flows and report allocation percentages, since it currently performs similar duties under the WSCA. (It should be noted that none of the parties expressed concern about Washington Aqueduct's actual calculation of total daily flow.) Maryland mentioned oversight of Washington Aqueduct's decisions and its important authority to declare when the Alert, Restriction, and Emergency Stages have been triggered. Other parties stressed that Washington Aqueduct plays a key role precisely because its job is to protect D.C.'s (including the federal government's) water supply, and that the current approach works well. Overall, the parties spoke positively about Washington Aqueduct's implementation of the LFAA.

Some parties expressed uncertainty as to how Washington Aqueduct would actually exercise some of its discretion under the LFAA, such as when exactly to declare a Restriction or Emergency Stage, how to determine each user's allocation, and how to account for environmental flow-by. These questions related primarily to uncertainty about specific LFAA requirements, not to how Washington Aqueduct actually exercises its authorities.

Several parties expressed concern about what would happen if Washington Aqueduct (identified in the LFAA as a federal entity) were to change ownership or management structure. The parties did not offer concrete suggestions about how to address this possibility other than to be aware that it could become significant at some point in the future, and that further study of this issue and its impacts is warranted.

Issues and Options

- Should the roles of the governing and member parties be modified? *No options listed because parties are satisfied with the status quo. A change in ownership or management at Washington Aqueduct (e.g., privatization or new ownership by a local utility) would automatically trigger the need to review the LFAA because the Agreement clearly identifies Washington Aqueduct as a federal entity and describes its role.*
- Should the dual role of the Corps of Engineers in the LFAA be clarified?
 - Maintain status quo.

- Clarify in the LFAA that the Corps of Engineers has both oversight responsibilities as a governing party and water supply responsibilities as the operator of Aqueduct.
- Clarify in a related document, such as an LFAA manual, guidebook, or memorandum of understanding, that the Corps of Engineers has both oversight responsibilities as a governing party and water supply responsibilities as the operator of the Aqueduct.

4.5 Upstream Users

Technical and Legal Background

The term “users” in the LFAA is defined in Article 2.C.1. (for purposes of Article 2.C. Allocation of Flow) as “entities which are or may be appropriating water for public water supply purposes from the subject portion of the Potomac River,” specifically including the United States (including its water customers), the Commonwealth of Virginia for and on behalf of itself and its political subdivisions and authorities (including Fairfax Water), the State of Maryland for and on behalf of its permittees whether or not parties to the LFAA, the District of Columbia, the WSSC, and such entities that may formally be added or made subject to the LFAA subsequent to its initial execution.

Views Expressed by the Parties

Several parties expressed concern about upstream users that withdraw water from the Potomac River but do not contribute toward overall supply through the sharing of stored water. This concern is alleviated to the extent that an upstream user has a state water consumption permit that subjects it to the restrictions of the LFAA, but some parties noted that such permits are limited in their duration and subject to policy changes.

The two upstream users that drew the most comment were Loudoun Water and the State of West Virginia. West Virginia, of course, is outside the pertinent portion, and it does not have a consumptive use permitting program. Its impact on downstream water flow could become increasingly significant as a result of population growth, climate change, fracking, and industrial development.

Loudoun Water presents a more immediate issue. Loudoun Water historically has met most of its demand by purchasing treated water from Fairfax Water. After the completion of its new Potomac River intake and Trap Rock water treatment facility, scheduled for 2018, Loudoun Water will continue to obtain a portion of demand from Fairfax Water. Loudoun Water’s Potomac River intake is upstream of the pertinent portion and is therefore not directly covered by the LFAA. Nevertheless, its pending Potomac River withdrawals of up to 40 mgd will be significant, and population growth in Loudoun County could dramatically increase water

demand. Whereas Loudoun County's water consumption was not a threat to D.C. users when the LFAA was created in 1978, it is far more significant today. Through its Virginia state permit, Loudoun Water is already subject to reductions in withdrawals determined by the Virginia Department of Environmental Quality (DEQ) during LFAA Restriction and Emergency Stages. [\[Document 16.\]](#) The state permit also requires Loudoun Water to use its reservoirs during low flow periods specified by DEQ. However, state permits are limited in duration, whereas the LFAA is binding until all governing parties agree to its revocation. Moreover, because Loudoun Water is not a party to the WSCA, it is not subject to the Drought-Related Operations Manual, which provides for a coordinated regional response to water supply issues. Discussions are underway to bring Loudoun Water into the WSCA.

Most of the parties expressed a strong desire that Loudoun Water play a role in regional water supply management, through some combination of the LFAA, the state permitting process, the WSCA, and the MWCOG. A major benefit of coordinating with Loudoun Water is that its new reservoir could provide an important additional water source to the region. Several parties questioned whether Loudoun Water has any incentive to join the LFAA. Fairfax Water suggested that one incentive might be that the LFAA would offer Loudoun Water more flexibility than the Virginia permitting system in terms of when it would be required to switch from the Potomac River to its reservoir.

Discussion about bringing Loudoun County into the LFAA led to further discussion about the upstream boundary of the pertinent portion. One issue discussed was whether the LFAA could be extended to accommodate Loudoun Water's intake (which is currently outside the pertinent portion as defined in the LFAA). Another issue was whether Congressional approval would be required to expand the pertinent portion. (The Cruden Team believes that expanding the upstream boundary beyond the pool of water behind Seneca Dam would require Congressional action.)

Aside from Loudoun Water, several parties emphasized the need to continue to evaluate the collective consumptive use of all upstream users and to take them into account in future regional and inter-state agreements. One party suggested extending the pertinent portion to help ensure that upstream users would be subject to the LFAA if their consumptive use expands. Another party stressed that any decision about expanding the LFAA to upstream users would require an assessment of how federal, state, and other local interests would be affected.

Issues and Options

- Should Loudoun Water formally be brought into the LFAA?
 - Maintain status quo. (Continue with Loudoun Water being permitted through the existing Virginia permit process.)
 - Make Loudoun Water a party to the LFAA.

- Coordinate with Loudoun Water through the WSCA and MWCOG processes and include an agreement that, during drought, Loudoun Water's reservoirs would be operated as part of the CO-OP system.
- Should other upstream users such as West Virginia be subject to the LFAA?
 - Maintain status quo. (Keep an eye on consumptive use in West Virginia and other upstream locations but do not make changes at this time.)
 - Coordinate with all upstream users to ensure adequate water supply in times of drought.
 - Seek to include West Virginia and/or other upstream users in the LFAA.

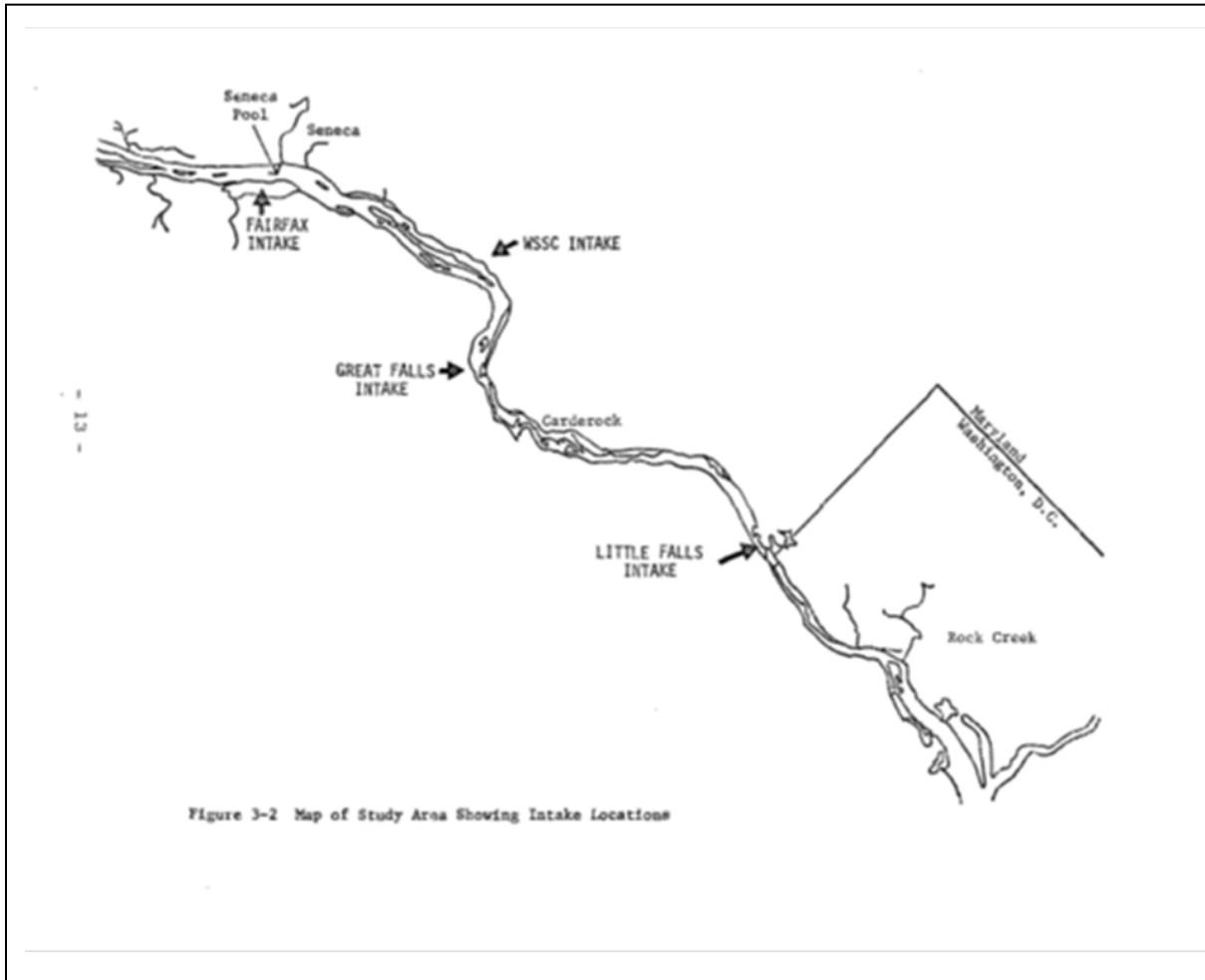
4.6 Pertinent Portion

Technical and Legal Background

The LFAA defines the portion of the Potomac River subject to the Agreement as the stretch “between Little Falls Dam and the farthest upstream limit of the pool of water behind the Chesapeake and Ohio Canal Company rubble dam at Seneca, Maryland.” (Article 1.1.) This description of the “pertinent portion of the River” is taken verbatim from the Water Resources Development Act of 1976, which directly led to the LFAA. [[Document 3.](#)]

Figure 1 shows the pertinent portion, as depicted in the Maryland DNR Potomac River Environmental Flow-by Study. [[Document 6.](#)]

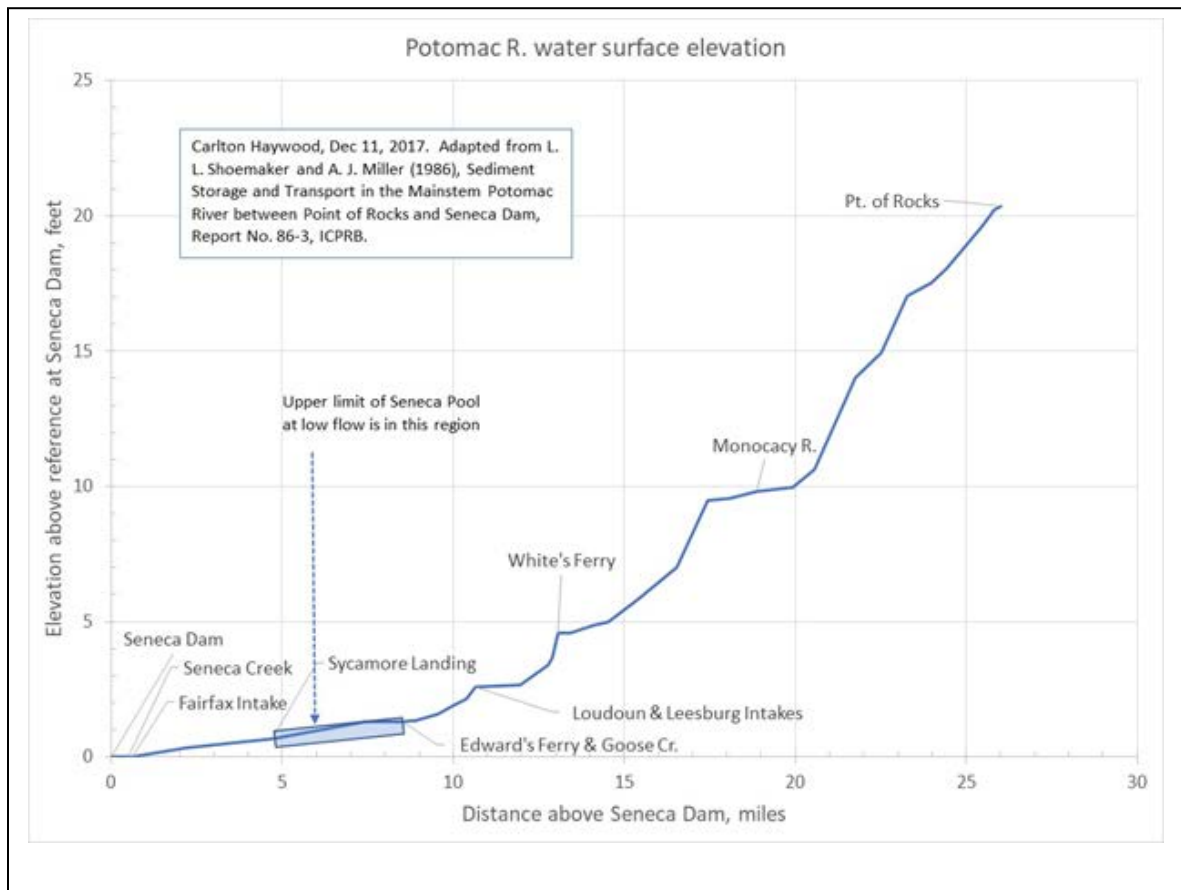
Figure 1. LFAA Pertinent Portion
(From the Maryland DNR Potomac River Environmental Flow-by Study [Document 6])



The location of Little Falls Dam is readily understood and has not changed since the LFAA came into effect. The same cannot be said for the upstream boundary of the pertinent portion. The “rubble dam at Seneca, Maryland” does still exist; however, “the farthest upstream limit of the pool of water behind” the dam is not subject to easy definition. The precise boundary of the pertinent portion is important because it bears upon the calculation of daily withdrawals (Article 2.A.), stages of flow (Article 2.B.), allocations during the Restriction and Emergency Stages (Article 2.C.), “users” (Article 2.C.1.), water subject to the allocation formula (Article 2.C.5.), what state permittees are subject to the LFAA (Article 3.C.), what communities or entities must either become a party to the LFAA or be bound by the requirements of the LFAA in order to appropriate water from the River (Article 2.E.), and even when the LFAA became binding (Article 6.).

According to the ICPRB, the Seneca Dam is 19.2 miles upstream of Little Falls Dam. Fairfax Water's Corbalis plant intake is another 0.7 mile upstream. There seems to be general consensus that this intake is physically located within the “pool of water” behind Seneca Dam. As illustrated in Figure 2, a 1986 ICPRB study suggested that Seneca Pool extends at least to Sycamore Landing, which is almost five miles upstream of Seneca Dam, and perhaps as far as Edwards Ferry, which is approximately 8.5 miles upstream of Seneca Dam. Loudoun Water's new intake and the Town of Leesburg's intake are 1.8 miles upstream of Edwards Ferry, outside the pertinent portion for purposes of the LFAA.

Figure 2. Potomac River Water Surface Elevation



Views Expressed by the Parties

Several parties expressed uncertainty about the precise boundaries of the pertinent portion and whether the Loudoun Water intake is within the pertinent portion. These parties welcomed further clarification of the pertinent portion's upstream boundary. There was also discussion about whether it would be appropriate to expand the pertinent portion to include more upstream users (see Section 4.5, Upstream Users).

Issues and Options

- Should the LFAA clarify the precise location of “the farthest upstream limit of the pool of water behind the Chesapeake and Ohio Canal Company rubble dam at Seneca, Maryland”?
 - Maintain status quo.
 - Amend the LFAA to clarify the precise upstream limit of its scope.
 - Clarify the precise definition of the upstream limit in a related document such as an LFAA manual, guidebook, or memorandum of understanding.

4.7 Moderator

Technical and Legal Background

Article 1.B. of the LFAA establishes the position of Moderator, who has the duty and authority “1. [t]o take all actions necessary to enforce the provisions of this Agreement and his decisions hereunder, and for this purpose he may sue in his own name . . . 2. [t]o decide all disputes between or among the parties under this Agreement not disposed of by consent.”

When the Moderator makes a decision, it “shall be final and conclusive unless determined by a court of competent jurisdiction to have been fraudulent, capricious, arbitrary, or not supported by substantial evidence.” Moreover, “[a]ll parties agree to accept and implement every decision of the Moderator unless and until said decision is overturned by a court of competent jurisdiction.” (Article 1.C.)

If the Moderator “commence[s] or defend[s] any action or otherwise ha[s] need of legal services relating to this Agreement, he shall have the right to contract with counsel for such purpose, and the cost of such services shall be repaid in equal shares by the governing parties.” (Article 1.E.)

The Moderator may be selected or relieved of duties “for any reason, by unanimous action of the governing parties expressed in a signed memorandum.” (Article 1.G.) The only apparent qualification set forth in the LFAA is that the Moderator be “unbiased.” (Article 1.B.)

Whenever the position of Moderator is vacant, the full functions of the office are to be exercised by a Standby Moderator. The “duty to designate” the Standby Moderator rotates annually among the four governing members, beginning on the first day of each calendar year. (Article 1.G.)

The Moderator’s compensation is to be determined annually by majority vote of the governing members. (Article 1.H.) By Ancillary Agreement No. 1, dated May 8, 1981, the Moderator’s

compensation was set at \$2,500 annually, plus \$300 for each day that the Moderator's "services are necessary" in excess of seven days in a calendar year. In 1984, it was agreed that the annual compensation would be discontinued and the Moderator would be paid \$500 for each day that services are necessary. (Ancillary Agreement No. 2 [reference by meeting minutes].) A Standby Moderator who is employed by the designating party shall serve without compensation. (Article 1.H.)

The Moderator is authorized to bring a lawsuit against any party to the LFAA in the United States District Court for the District of Columbia. (Article 1.I.)

The LFAA does not set forth specific responsibilities of the Moderator. Other than Article 1, which describes the Moderator's duties in the very general language discussed above, the Moderator is mentioned only four times in the LFAA. Article 2.A. provides that "[s]ubject to the parties rights of appeal to the Moderator," the parties grant certain rights to Washington Aqueduct and to each other, and that beginning with the Alert State Washington Aqueduct "will keep the Moderator informed as to the stage of flow in the Potomac River." Then, Article 2.C. states that during the Restriction Stage or the Emergency Stage, Washington Aqueduct will daily calculate and advise each user "and the Moderator" of each user's allocated fair share. There is no indication as to what the Moderator should do with this information. Finally, Article 6 requires that a Moderator have been selected in order for the LFAA to become binding.

Views Expressed by the Parties

The parties reported that they are not aware of any dispute ever being raised to a Moderator or Standby Moderator. However, some parties expressed concerns that the selection of a Moderator is a burdensome and time-consuming process, that there are no eligibility requirements, that the unlimited term for Moderator is too long, and that there might be situations where the Moderator has too much authority in resolving disputes. Some parties also said that uncertainty about the Moderator's compensation and other uncertainties about the job make it hard to find someone to agree to serve as Moderator. One party suggested a fixed term of three years, which would make it easier to select a new Moderator if there is dissatisfaction with the existing Moderator. Some parties described the process they developed to screen and select the most recent Moderator and suggested formalizing this approach and memorializing it in the LFAA.

The parties also described their concerns about the Standby Moderator. They commented that the possible calendar-year-end termination for a Standby Moderator is too early, especially since it can take most of a year even to select a Standby Moderator. Several parties recommended extending the term length and/or adding a requirement that the existing Standby Moderator remain in office until the next Standby Moderator has been selected. Some parties also expressed concern that a Standby Moderator selected by one of the governing parties might not be completely unbiased, especially in resolving disputes between parties.

In addition, some parties expressed concern about having a Moderator who is quite powerful but is not necessarily familiar with LFAA requirements or involved in ongoing LFAA activities. There were also discussions about what would happen if the Moderator were to make a decision during a severe drought that one of the parties disputes and takes to court. Some parties pointed out that there would be no time to wait for a court's decision, and so the Moderator's challenged decision would end up being implemented during the drought emergency. Suggestions for addressing these concerns included allowing the Moderator to play a mediator role, and encouraging the Moderator to become more familiar with the LFAA by, for example, attending LFAA meetings. Some parties noted that in an emergency drought situation there would be little time for a mediator to resolve a dispute. (The Cruden Team believes that the Moderator or Standby Moderator should not serve as a mediator, as doing so might affect his or her neutrality in later resolving a dispute.) Some suggested that the ICPRB could possibly take on the Moderator's role, even saying that in many ways the ICPRB already behaves like a moderator. (We note, however, that such a change in ICPRB's role could create a conflict of interest in light of the ICPRB's responsibilities under the WSCA.) Others suggested clarifying the ICPRB's role in relationship to the Moderator, CO-OP, the utilities, and the governing parties. Two parties suggested that revisions to the Moderator and Standby Moderator selection process and term lengths should be accomplished without formally modifying the LFAA.

Issues and Options

- Should the selection process for the Moderator and Standby Moderator be revised, including setting out minimum qualifications for office?
 - Maintain status quo.
 - Establish a transparent selection process, selection criteria, and minimum qualifications for the Moderator, based on the process recently developed for selecting the current Moderator. Memorialize these changes in the LFAA and/or incorporate into an LFAA manual, guidebook, or memorandum of understanding.
 - Establish a transparent selection process, selection criteria, and minimum qualifications for the Standby Moderator. Memorialize these changes in the LFAA and/or incorporate into a related document such as an LFAA manual, guidebook, or memorandum of understanding.
- Should term lengths for the Moderator and Standby Moderator be established?
 - Maintain status quo.

- Establish a term of office for the Moderator (e.g., three years). Memorialize in the LFAA and/or in a related document such as an LFAA manual, guidebook, or memorandum of understanding.
 - Establish a term of office for the Standby Moderator (e.g., two years), and/or extend the Standby Moderator's term until the next Standby Moderator is selected. Memorialize in the LFAA and/or in a related document such as an LFAA manual, guidebook, or memorandum of understanding.
- Should there be a mediation process prior to the Moderator's or Standby Moderator's final decision?
 - Maintain status quo.
 - Provide a process for an outside mediator to help resolve disagreements prior to a final decision by the Moderator or Standby Moderator.
 - Work with a neutral organization, such as the ICPRB, to mediate disagreements prior to a final decision by the Moderator or Standby Moderator.
- Should there be an alternative dispute resolution process after a final decision by the Moderator or Standby Moderator and before the matter is taken to court?
 - Maintain status quo.
 - Provide an opportunity for outside alternative dispute resolution of a final decision by the Moderator or Standby Moderator before a dispute is taken to court.
 - Work with a neutral organization, such as the ICPRB, to help resolve disputes after a final decision by the Moderator or Standby Moderator and before the dispute is litigated.

4.8 Stages of Flow

Technical and Legal Background

The LFAA provides that Washington Aqueduct will determine when any of three stages of flow exists in the pertinent portion of the Potomac River. Specifically, Washington Aqueduct may declare an Alert Stage when total daily withdrawal is equal to or greater than 50 percent of the total daily flow but less than 80 percent; a Restriction Stage when the total daily withdrawal is equal to or greater than 80 percent; and an Emergency Stage when the estimated total daily

withdrawal for any day within the next five days is expected to exceed the anticipated daily river flow. (Article 2.B.1-3.) Allocations commence during the Restriction Stage and continue through the Emergency Stage. (Article 2.C.) The reference point for determining river flow is the Little Falls gage. Because this gage is downstream from all water supply withdrawal points except Washington Aqueduct's Little Falls intake, the "daily river flow" referenced in the LFAA is a calculated value equal to observed flow at the Little Falls gage plus the sum of upstream withdrawals in the subject portion of the river. This calculated flow value is sometimes referred to as Little Falls adjusted flow.

Article 2.C. qualitatively modifies the criteria for Restriction and Emergency Stages by specifying that Washington Aqueduct will take into account, when calculating the amount of water available for allocation, an amount of flow needed for environmental flow purposes below Little Falls dam. This provision states that Washington Aqueduct's determination of environmental flow-by "shall be based upon the data and shall give substantial weight to conclusions for environmental flow-by submitted by the State [Maryland]." The Memorandum of Intent [\[Document 5\]](#), p. 2, par. 3.] clarifies how environmental flow-by is factored into the determination of Restriction and Emergency Stages by providing that Washington Aqueduct "will include along with the amount of water withdrawn from the subject portion of the river that amount designated as the environmental flow-by."

Thus, the Restriction Stage defined in LFAA Article 2.B.2 as:

$$\text{Withdrawals} \geq 0.8 * \text{daily river flow}$$

becomes, through the Memorandum of Intent:

$$\text{Withdrawals} + \text{Env. Flow-by} \geq 0.8 * \text{daily river flow.}$$

Similarly, the Emergency Stage defined in LFAA Article 2.B.3 as:

$$\text{Withdrawals}_{5\text{-day max}} \geq \text{daily river flow}$$

becomes, through the Memorandum of Intent:

$$\text{Withdrawals}_{5\text{-day max}} + \text{Env. Flow-by} \geq \text{daily river flow}$$

Where:

"Withdrawals" is the sum of water supply withdrawals in the subject portion of the river;

“5-day max” is the highest single day withdrawal predicted for the next five days;

“daily river flow” is the Little Falls mean daily observed flow, reported by USGS in cfs and converted to mgd, plus Withdrawals.

The approach set forth in the Memorandum of Intent therefore results in earlier declarations of the Restriction and Emergency Stages; but that approach has never been formally incorporated into the LFAA document.

It should be noted that the low-flow stages defined in the LFAA are not synonymous with triggers in the WSCA Drought Operations-Related Manual, which relate to gauged flows at Point of Rocks and estimates of the probability of meeting long-range unrestricted demands based upon current storage levels. Nevertheless, the goal of WSCA operations is to minimize the likelihood that the LFAA Emergency Stage is triggered. [[Document 7](#), pp. 120a-122a.]

Views Expressed by the Parties

Our conversations with the parties focused on whether the three stages of flow in the LFAA should be reconsidered, especially in terms of whether they are still appropriate for drought management purposes. Fairfax Water, WSSC, and Washington Aqueduct expressed a clear desire to retain the existing stages as defined in the LFAA. Washington Aqueduct also stressed the importance of retaining the LFAA provision that WSSC and Fairfax Water may be directed to shift their withdrawal percentages to increase their withdrawals from the Patuxent River and Occoquan Reservoir, respectively. The District of Columbia did not recommend changes to the stages of flow but stated that if there are any questions then a hydrologist should study the issues and make recommendations. Maryland wondered what the basis was for establishing the three flow stages.

Virginia suggested that more scientifically viable approaches may exist for determining appropriate triggers for drought management. Specifically, it stated that the method used in the LFAA to identify stages based on withdrawal as a percentage of flow is an unusual way to evaluate drought given current approaches. According to Virginia, most assessment methodologies used today “take meteorological, hydrologic and water supply criteria into consideration,” while the LFAA “uses only a water supply metric.” Virginia also expressed concern that the LFAA stages represent extremely low flows that are not consistent with the Virginia Drought Assessment and Response Plan criteria. Thus, users in Virginia that are not subject to the LFAA are required to restrict their water use before users that are subject to the LFAA. WSSC opined that the percentage-based criteria are appropriate because this type of trigger automatically accounts for any future water supply that does not draw water from the Potomac basin during the critical low flow period. Also, as mentioned in Section 4.3., the stages of flow triggers are applied as a last resort after other drought management plan options have been implemented.

Issues and Options

- Should the three stages of flow in the LFAA be reconsidered?
 - Maintain status quo.
 - Conduct a study of the three low-flow stages.
 - Conduct tabletop exercises that help assess whether the three stages of low-flow will be effective and can be readily implemented during a severe drought.
- Should the LFAA be revised to expressly reflect the Memorandum of Intent's methodology for calculating low-flow stages?
 - Maintain status quo.
 - Revise the LFAA to incorporate or refer to the Memorandum of Intent's methodology for calculating low-flow stages.
 - Provide information about the Memorandum of Intent's methodology for calculating low-flow stages in a related document, such as an LFAA manual, guidebook, or memorandum of understanding.

4.9 Allocation Formula

Technical and Legal Background

Allocations are required under the LFAA during the Restriction and Emergency Stages. (Article 2.C.) Each user is allocated a share of available water based upon the average amount of water that it pumped from all sources during the past five winter periods (the months of December, January, and February). As provided in the LFAA:

The ratio which the average daily winter use of each user bears to the average daily winter use of all users will be applied to the daily amount of water available at the time of allocation from the subject portion of the Potomac River (after deduction for environmental flow-by) and all other sources as specified in Paragraph 5 below (calculated at maximum capacity practicable). The resulting amount, less the amount then available to said user by use of the maximum capacity practicable from all other sources, will be such user's allocated fair share of the flow of the Potomac River.

(Article 2.C.2.)

A hypothetical example, developed by ICPRB staff, helps demonstrate how the allocation formula would work in practice. The most recent 5-year average daily winter use is shown in Table 1 and a hypothetical daily water demand (in this case the actual demands for July 15, 2010) is shown in Table 2. The “Use (%)” column in Table 1 shows each withdrawer’s percentage of total water used. This percentage would be used to allocate Potomac water if allocations under the LFAA were imposed. Note that the City of Rockville is included in the allocation of Potomac River water. Although Rockville is not a signatory to the LFAA, its withdrawal is located in the subject portion of the river and Rockville is subject to LFAA flow allocations under Article 2.C.1. For a total Potomac demand of 478.1 mgd, as shown in Table 2, a Restriction Stage would go into effect when daily river flow drops below 722.5 mgd $[(478.1 \text{ mgd demand plus } 100 \text{ mgd Little Falls flow-by}) / 0.8]$. At this river flow there is enough water to meet all demand plus the flow-by and to allow some operational flexibility for shifting withdrawals between Potomac and off-river resources. Shifting withdrawals would be guided by the WSCA Operations Manual and constraints on utility operations. While the Restriction Stage is in effect, the utilities and governments may implement various steps to reduce consumer demand, such as the Metropolitan Washington Water Supply and Drought Awareness Response Plan, but there is enough Potomac river water to meet each utility’s demand.

Table 1. Average Daily Winter Use, 2012-2017

Water Supplier	Use (mgd)	Use (%)	Potomac (mgd)	Occoquan (mgd)	Patuxent (mgd)
Washington Aqueduct	123	29.4	123		
Fairfax Water	133	31.8	76	57	
WSSC	157.5	37.7	109.5		48
Rockville	4.3	1.0	4.3		
Total	417.8	100	312.8	57	48

Table 2. Hypothetical Water Demand

(based on actual use on 7/15/10,
except for Rockville, which is estimated)

Water Supplier	Total Demand (mgd)	Potomac (mgd)	Occoquan (mgd)	Patuxent (mgd)
Washington Aqueduct	194.6	194.6		
Fairfax Water	216.5	138.6	77.9	
WSSC	206	138.9		67.1
Rockville	6.0	6.0		
Total	623.1	478.1	77.9	67.1

Consider what happens when the Potomac daily flow falls to 525 mgd, which is less than withdrawals plus flow-by, triggering the Emergency Stage. Table 3 shows a Potomac River water allocation for this situation based on the percentage use shown in Table 1 and Table 2 and on the allocation method defined in Article 2.C.2. The Patuxent and Occoquan allocations are based upon maximum capacity as reported by WSSC and Fairfax Water, respectively, in 2017. Upstream releases from Jennings Randolph, Savage, and Little Seneca reservoirs are incorporated into the calculation of Potomac River daily flow pursuant to Article 2.C.5. of the LFAA.

Table 3. Hypothetical Initial Water Allocation During Emergency Stage

Potomac River daily flow (i.e., Little Falls Adjusted) = 525 mgd

Potomac River flow available for allocation is Little Falls Adj. (525 mgd) - Env Flow-by (100 mgd) = 425 mgd

Water Supplier	Total Allocation (mgd)	Winter Use (%)	Initial Potomac Allocation (mgd) (Article 2.C.2)	Occoquan Allocation (mgd)	Patuxent Allocation (mgd)
Washington Aqueduct	176.9	29.4%	176.9		
Fairfax Water	191.3	31.8%	71.3	120	
WSSC	226.6	37.7%	170.6		56
Rockville	6.2	1.0%	6.2		
Total	601	100%	425	120	56

Table 4 shows how the initial allocations assigned in Table 3 compare to demands shown in Table 2. Two utilities have allocations that exceed their needs and two have allocations that are less than needed. This initial allocation would be modified by Article 2.C.4., which specifies that an “allocation exceeding the proposed withdrawal of any user” shall be reallocated by Washington Aqueduct “in a reasonable manner.”

The last two columns of Table 4 show a possible reallocation of surpluses that might satisfy the criteria of reasonableness required by Article 2.C.4. In this example, the combined surpluses of WSSC and Rockville, which total 20.8 mgd, are reallocated by adding 7.2 mgd to Washington Aqueduct and 13.6 mgd to Fairfax Water, so that each receives 94.5% of its demand. Of course, many other “reasonable” reallocation methods can be imagined. After this reallocation, the combined deficit still totals 22.1 mgd, but no supplier has been allocated an amount in excess of its demand. Other provisions in Article 2.C. provide Washington Aqueduct with flexibility to take into account special circumstances, and the Memorandum of Intent, part 6, provides that Washington Aqueduct may invade the flow-by amount for reasons of “essential need.” Any disputes about allocation can be raised to the Moderator.

Table 4. Example of Final Allocation after Reallocation of Surplus

Water Supplier	Demand (mgd)	Initial Allocation (Article 2.C.2)		Example Final Allocation (Article 2.C.4)	
		Allocation (mgd)	Surplus (deficit) (mgd)	Allocation (mgd)	Surplus (deficit) (mgd)
Aqueduct	194.6	176.9	(17.7)	184.1	(10.5)
Fairfax Water	216.5	191.3	(25.2)	204.9	(11.6)
WSSC	206	226.6	20.6	206.0	0
Rockville	6.0	6.2	0.2	6.0	0
Total	623.1	601.0	(22.1)	601.0	(22.1)

This example illustrates the mechanics of flow allocation under the conditions of an LFAA defined Restriction or Emergency Stage. It should be pointed out, however, that the goal of operations per the WSCA [Document 7] is that the likelihood of flow deficits in any year (i.e. LFAA Emergency Stage) be less than 2%. The ICPRB notes that modeling of current regional resources and coordinated operations under the WSCA suggests that in the year 2040, under the median climate change scenario, the likelihood in any given year of Potomac flow deficits is 0.01% and the likelihood of combined water supply storage in Jennings Randolph and Little Seneca reservoirs falling below 5%, indicative of impending emergency restrictions under the LFAA, is 0.08%. [Document 22, pages 2-6 and C-2.] As a result, very little attention has been given, so far, to exploring how the various provisions of the LFAA would work in an extreme low-flow event.

The allocation formula may be changed by unanimous consent of the governing parties. Moreover, any governing party may give written notice to all other parties that it desires a change in the formula. If the governing parties do not agree to the request for a replacement formula within one year, the party requesting the revision may seek relief from the United States District Court for the District of Columbia. (Article 2.C.3.a.&c.)

Views Expressed by the Parties

Most of the parties do not believe it is necessary to revise the allocation formula at this time, especially since there is no clear understanding of what an improved formula would look like. The three water suppliers all expressed clear opposition to revising the allocation formula, saying there is nothing wrong with the current approach. Virginia expressed concern that the allocation formula (which it says optimizes only for water supply) is “somewhat of an artifact” and is not consistent with the methodology that Virginia uses in its permit program (which optimizes for a balance of beneficial uses). Although the District of Columbia did not see any problems with the allocation formula, it agreed that it might be helpful to conduct a study to determine how and

why the formula was developed, verify that it makes sense, and identify consequences of applying it during a severe drought. Maryland questioned why the LFAA requires that excess water from a user's allocation be reallocated to the others rather than being put back into the Potomac.

In addition, one water supplier expressed concerns about potentially ambiguous terms in the Allocation of Flow section of the LFAA, such as “essential human, industrial and domestic requirements for water” in Article 2.C., “available” and “maximum capacity practicable from all other sources” in Article 2.C.2, “the maximum capacity then practicable from the Patuxent River and the Occoquan River” in Article 2.C.5., and “suitable adjustments” in Article 2.C.6.

Except perhaps for Virginia and Maryland, the parties are not particularly concerned about whether the formula fairly accounts for variations in the parties' efforts to conserve water use (e.g., by tracking down leaks, developing alternative water sources, conducting water audits, and otherwise promoting water conservation). They point out that water conservation efforts by all the regional water utilities have increased considerably since 1978 and there is only a limited opportunity for further conservation. Fairfax Water pointed out that because water conservation is already being practiced, it would probably only be able to reduce consumption by an additional ten percent. Fairfax Water sees water conservation as a nation-wide trend, saying it is not really an issue of equity.

The parties' level of concern about how well the formula (or any formula) would work during a severe drought varies. Virginia suggested that it might not be possible to provide the calculated allocations if the LFAA were triggered. Several parties agreed that further assessment could be useful – especially by conducting tabletop exercises that test the use of the allocation formula during a hypothetical drought situation. It was also suggested that the fairness and equity of the allocation formula should be substantively reviewed (rather than treated as a pro forma discussion) every five years at the annual LFAA meeting.

Issues and Options

- Should the allocation formula be revised?
 - Maintain status quo.
 - Conduct a study of whether the allocation formula is still fair and equitable and will provide sufficient water during a severe drought.
 - Conduct tabletop exercises that help assess whether the allocation formula will be effective, can provide sufficient water, and can be readily implemented during a severe drought.

- Based on findings from tabletop exercises and other resources, substantively review the allocation formula every five years at the annual LFAA meeting pursuant to Article 2.C.3.a. of the LFAA.

4.10 Environmental Flow-by

Technical and Legal Background

Although protection of “environmental conditions” is a key element of the LFAA, the manner in which that concept is actually implemented is not evident on the face of the 1978 Agreement.

The only mentions of environmental flow-by in the LFAA are in Articles 2.C. and 2.C.2. Article 2.C. provides:

Allocation of Flow. Whenever the Restriction Stage or the Emergency Stage is in effect, the Aqueduct shall daily calculate and advise each user (as defined herein), and the Moderator, of each user’s allocated fair share of the water available from the subject portion of the Potomac River in accordance with this Section C. In calculating the amount of water available for allocation, the Aqueduct will determine, in consultation with the parties and based upon then current conditions and information, any amount needed for flow in the Potomac River downstream from the Little Falls dam for the purpose of maintaining environmental conditions (“environmental flow-by”), and shall balance such need against essential human, industrial and domestic requirements for water. The Aqueduct’s determination shall be based upon the data and shall give substantial weight to conclusions for environmental flow-by submitted by the State. (Emphasis added.)

Article 2.C.1. provides:

On or before March 15 of each year, each user shall report to the Aqueduct (and to each other) the number of gallons of processed water pumped daily to all its customers from all sources during each winter period (the months of December through February), commencing with the winter period 1977-78. The amounts pumped during the 5 most recent winter periods which have elapsed as of the time of allocation, or less than 5 if fewer have so elapsed, shall be combined for the purpose of computing each user’s average daily winter use; except that, in the case of a user first withdrawing water subsequent to the initial execution of the Agreement, the average daily winter use of such user shall be the average of the amounts of water pumped during all of the winter periods, commencing December 1 of the year immediately prior to its first withdrawal from the subject portion of the river, which have elapsed as of the time of allocation, but not exceeding the 5 most recent winter periods. The ratio which the average daily winter use of each user bears to the average daily winter use of all users will be applied to the daily amount of water available at the time of allocation from the

subject portion of the Potomac River (after deduction for environmental flow-by) and all other sources as specified in Paragraph 5 below (calculated at maximum capacity practicable). The resulting amount, less the amount then available to said user by use of the maximum capacity practicable from all other sources, will be such user's allocated fair share of the flow of the Potomac River. (Emphasis added.)

Thus, each party's allocation during a Restriction or Emergency Stage is reduced by a proportionate amount that, collectively, is intended to ensure that sufficient flow remains in the river, after all withdrawals, to satisfy environmental conditions.

The term "environmental conditions" is not defined in the 1978 Agreement, nor does it designate a quantity of flow that will ensure that such conditions are satisfied. Prior to the Memorandum of Intent, these matters appear to have been left largely to Washington Aqueduct's discretion. For example, Washington Aqueduct was to determine the "amount needed for flow in the Potomac River downstream from the Little Falls dam for the purpose of maintaining environmental conditions." Once that determination was made, Washington Aqueduct was to "balance such need against essential human, industrial and domestic requirements for water." Washington Aqueduct's discretion appears to have been limited only by its obligations to consult with the parties before determining the flow-by amount and to "give substantial weight to conclusions for environmental flow-by" to be prepared by the State of Maryland.

The LFAA's treatment of environmental flow-by, however, was clarified six months after the 1978 Agreement was signed, but before it actually became binding, through the Memorandum of Intent that was executed in the form of a three-page letter from the then Acting Director of Civil Works to the then Under Secretary of the Interior. The Memorandum, dated July 20, 1978, states that it was prompted by concerns expressed by the United States Fish and Wildlife Service and the Department of the Interior with respect to permit applications to the Corps of Engineers by WSSC and Fairfax Water to construct intake structures in the Potomac River.

The Memorandum of Intent addressed environmental flow-by in several respects. First, it provided that in determining whether a Restriction or Emergency Stage is to be declared under Article 2.B. of the LFAA, Washington Aqueduct "will include along with the amount of water withdrawn from the subject portion of the river that amount designated as the environmental flow-by." Thus, whereas under the terms of the LFAA a Restriction Stage would be declared and allocation would commence when total daily withdrawals reach 80 percent of total daily flow, under the Memorandum of Intent the Restriction Stage would be triggered when total daily withdrawals plus the environmental flow-by reach 80 percent of total daily flow. A similar adjustment was made with respect to the Emergency Stage. This meant that these stages would go into effect earlier than under the literal terms of the LFAA. [\[Document 5, p.2, par. 3.\]](#)

Second, the Memorandum of Intent addressed a joint study that was then underway by the State of Maryland, the Department of the Interior, the Army Corps of Engineers, the Environmental

Protection Agency and the Commonwealth of Virginia to determine an environmental flow-by amount. The Memorandum stated that when the study was completed, its results would constitute “the data and conclusions” referenced in Article 2.C. of the LFAA and will “automatically . . . become the basis for execution of that provision of the Agreement.” [Document 5, p. 2, par. 4.] Washington Aqueduct “will not invade such an amount absent essential need.” “In determining such need, the Washington Aqueduct shall assure itself that the localities and jurisdictions affected have made maximum use of other sources of water and imposed maximum conservation measures.” According to the Memorandum, Washington Aqueduct’s decisions in this respect “will be appealable to the Moderator under Article 1.” If the Department of the Interior or another federal agency objects to a decision by Washington Aqueduct, the appeal will be raised by the Department of the Army. [Document 5, p.2, par.6.]

Third, the Memorandum of Intent addressed the role of the National Park Service in providing minimum amounts of water to maintain the integrity of structures in the C & O Canal National Historic Park. Specifically, the Memorandum stated that the NPS “will not be obligated to consider a complete cutoff of its intakes until such time as the Washington Aqueduct determines it necessary to invade the environmental flow-by amount.” [Document 5, p. 3, par. 7.] But see Article 2.B.2. of the LFAA, which provides that when a Restriction Stage is declared “the Aqueduct will request the U.S. Park Service to discontinue putting Potomac River water into the C&O Canal.”

Although the Memorandum of Intent was signed only by the Acting Director of Civil Works, it stated that the parties to the LFAA “have been consulted with respect to this interpretation and application of the Agreement, and they concur in it.” Further, reference to the Memorandum is to be placed “in any future permits for withdrawal structures from the affected portion of the Potomac River.” [Document 5, p. 3.] However, the Memorandum of Intent was never formally incorporated into the LFAA.

The 1981 study referenced in the LFAA and the Memorandum of Intent was completed in 1981. Entitled Potomac River Environmental Flow-By Study, it made two recommendations:

RECOMMENDATION #1: Establish a minimum daily environmental flow-by of 100 million gallons a day (mgd) below Little Falls dam.” Recommendation #1 will form the basis for implementing the Potomac River Low Flow Allocation Agreement formula.

RECOMMENDATION #2: At a calculated flow of 500 mgd just above the Great Falls intake, begin shifting Aqueduct withdrawals to the Little Falls dam intake to maintain at least 100 mgd plus the Washington Aqueduct’s allocation up to 200 mgd between Great Falls and Little Falls dam.

[[Document 6](#), p. 2, emphasis in original.]

The study used primary data collected in the summers of 1978 and 1980 during periods of low flow. However, the authors reported that application of the model used for analyzing relative changes in habitat availability at various flows was limited by four factors: (1) the model would not provide results below flows of 300 mgd with any acceptable degree of confidence; (2) the model had never been applied to a stream as large or complex as the Potomac River; (3) necessary data were not available for eastern streams to determine the full significance of square feet of available ideal habitat per 1,000 feet; and (4) the model did not provide a direct indication of changes in sub-ideal or marginal habitat availability or establish a direct relationship to change in water quality. [Document 6, p. 9] The study noted that other factors could also affect the recommended flow-by, including the Jennings Randolph and Little Seneca reservoirs becoming operational, improved waste water management on a regional scale, restoration of habitat and natural recovery of biota, and restoration of Little Falls fishway. [Document 6, pp. 115-117]

In 2000-2001, the Maryland Department of Natural Resources initiated a “re-evaluation of the low-flow requirements for protecting the lower Potomac River aquatic ecosystem” established in the 1981 Potomac River Environmental Flow-By Study. The re-evaluation was undertaken because “severe drought conditions that occurred in the Potomac River watershed in 1999 raised concerns about the adequacy of [the] minimum low-flow requirement for protecting the river ecosystem and its resources, particularly given the increasing demand for water within the river basin.” A Status Report dated March 2002 pointed out a number of shortcomings in the 1981 study. For example, because the 1981 study “was not able to evaluate habitat at flows lower than about 900 mgd,” it “did not explicitly indicate any linkage between the recommended 100/300 mgd minimum flow and the modeling results or other biological and environmental results presented.” [Document 12, pp. ii, 2.] The Status Report concluded:

The 2001 results confirm that the 1981 study findings are likely to have overestimated the reduction in physical habitat that occurs as flows approach the 300 mgd (450 cfs) flow-by value. However, the hydraulic response of the river in the study reach will vary over the length of the reach because of the high variability in river profiles. Thus, to quantify the habitat changes in the entire reach during low flows, it would be necessary to conduct a complete study of the area.

[Document 12, p. iv]

To our knowledge, no such “complete study” was undertaken. Nevertheless, the preliminary conclusions of the re-evaluation suggest that the flow-by requirements established in the 1981 study were, if anything, more protective than estimated.

A more comprehensive analysis of environmental flow needs along the entire Potomac River was undertaken in 2010-11. Support for that project was provided by the National Park Service and The Nature Conservancy. Its purpose was “to identify the hydrologic needs of flow-dependent species and communities in four segments of the mainstem Potomac and two selected

tributaries,” [Document 15, p. vii.], including the mainstem from Great Falls to Chain Bridge. This area was considered of special concern “because of its relatively unique and rare biological communities.” One charge to the research team was to re-examine the 100 mgd minimum flow-by requirement established in the 1981 study and implemented through the LFAA. [Document 15, p. viii.]

Two findings from the 2011 final report are particularly relevant. First, the analysis found no documented evidence of species impairment along the Potomac River due to current levels of flow management. Second, the study concluded that low flows in the reach of the Potomac River from Great Falls to Little Falls “are lower than they would otherwise be due to drinking water withdrawals at, and above, Great Falls,” and that in 2002, when flows were approaching the flow-by levels established under the LFAA, “field observations in areas that were surveyed did not identify any stressed communities, and there did not seem to be a significant loss of habitat in these areas.” [Document 15, p. ix.]

The 2011 report concluded that the 1981 recommendation for a 300 mgd minimum flow from Great Falls to Little Falls “should be continued” and that the 100 mgd minimum flow-by at Little Falls should be “maintain[ed].” Further, with respect to both objectives, “an ecological monitoring program” should be implemented “to better understand if there are impacts and need to adapt” management, and, “as a precautionary measure until this study is completed,” “reservoir operating procedures which give consideration to maintaining variability at extreme low flows” should be developed. [Document 15, p. x-xi.]

A workshop held as part of the 2010-11 study recommended that a small technical workgroup be convened to re-evaluate the historic 300/100 flow recommendation and requirement “with a research and monitoring plan to provide the scientific basis for either maintaining or revising the low-flow recommendations for Great Falls-Chain Bridge reach, and that includes consideration of impacts on water supply withdrawals as well as ecological impacts.” This proposal was specifically identified as a “next step” in the 2011 final report. [Document 15, p. xii.]

Views Expressed by the Parties

The environmental flow-by issue generated considerable discussion by the parties. Overall, no one advocated making the environmental flow-by number less protective. Cognizant of the critical balance between providing drinking water and protecting the living resources in the Potomac River, most of the parties expressed concern about increasing the flow-by number unless there is a very good scientific reason to do so.

The parties articulated many reasons both in favor of and against taking any action that might result in adjusting the flow-by number. Among the reasons supporting reconsideration of the flow-by are:

- The 100 mgd flow-by number might be too low;

- The flow-by number was a somewhat arbitrary determination based on old science; instream flow science has advanced significantly since the 1981 study;
- Virginia and Maryland use a different approach for managing flow-by under their state consumptive use regulations. Those approaches do not look simply at the issue of balancing water supply against aquatic life, but entail a broader assessment of management objectives, with the balancing of interests as one goal;
- It could prove difficult to coordinate the LFAA flow-by number with Virginia's and Maryland's approaches in the event of a major drought;
- The 1981 study anticipated that the flow-by would be reviewed on a periodic basis;
- It might not make sense to continue using a single number for flow-by since the appropriate amount of flow varies by month, season, temperature, and other factors;
- Climate change could affect flow-by;
- A flow-by study might be easier to conduct now (with advanced scientific techniques) than in the past;
- Environmental priorities might have changed since 1981. For example, there is now a movement to bring sturgeon back to the Potomac, which might warrant a higher flow-by.

At the same time, numerous reasons were given for not reconsidering the flow-by:

- Additional flow-by studies have in fact been completed since the original study (not all interviewees knew this) and these studies did not find fault with the 100 mgd flow-by;
- There is no evidence of species diminution or other ecological impacts from lower flow levels;
- So far, the 100 flow-by level has never been reached;
- The potential costs of changing the flow-by number – especially without compelling biological evidence – are high. Parties pointed out that changing the flow-by number could affect the whole LFAA approach. The utilities expressed concerns that they have made costly infrastructure decisions based on the existing flow-by number. They also pointed out that if the flow-by number were increased, utilities would be

stretched because their withdrawals would have to be reduced. One party even stated that changing the flow-by would be “suicidal”;

- The construction of Jennings Randolph and other reservoirs was intended to augment the Potomac River to keep the flow-by above 100 mgd;
- Long-term planning for increasing the region’s water supply might continue to reduce any future need to adjust the flow-by;
- The current flow-by number might provide an incentive for water suppliers to find alternative sources.

Two parties – Virginia and the District of Columbia – suggested additional study of the flow-by based on the latest scientific methods to determine whether it should be increased. Other parties do not recommend any further study.

The parties also discussed whether the environmental flow-by number should be made more explicit in the LFAA – either by including the 100 mgd and 300 mgd numbers or referencing the Memorandum of Intent and/or Maryland DNR study. Although some parties thought that this would help clarify the flow-by, others preferred to retain the flexibility afforded by the existing LFAA text. Article 2.C., for example, gives Washington Aqueduct some discretion over the flow-by when it states that Washington Aqueduct “will not invade such an amount absent essential need.” Several parties pointed out that this enables Washington Aqueduct to make reasonable and equitable allocation decisions during a severe drought. As one party said, “would you let D.C. burn in order to keep the flow-by?”

Issues and Options

- Should the environmental flow-by be reconsidered?
 - Maintain status quo.
 - Conduct a new study of environmental flow-by consistent with current state standards and definitions of “environmental conditions.” If a severe drought occurs and there is a 100 mgd flow-by, conduct a study to assess effects on natural resources or species.
 - Conduct tabletop exercises that help assess whether the flow-by amount can be readily implemented and sustained during a severe drought.
- Should the environmental flow-by number and/or other aspects of the environmental flow-by be made more explicit?

- Maintain status quo.
- Formally incorporate some or all of the Memorandum of Intent into the LFAA:
 - The flow-by amount
 - Consideration of flow-by in assessing Restriction and Emergency Stages
 - Treatment of water for C & O Canal.
- Formally reference the Memorandum of Intent and/or the Maryland DNR study on environmental flow-by in the LFAA or in a related document such as an LFAA manual, guidebook, or memorandum of understanding.

5.0 Conclusions

This report has set out a number of issues and options that the LFAA parties may wish to consider to make the LFAA more compatible with its objectives. Although some of these issues are complex, some are straightforward. We have identified viable options for each issue that would require efforts ranging from maintaining the status quo to taking moderate steps (e.g., providing clarification about a topic of uncertainty) to conducting more extensive responses (e.g., conducting major studies or making major revisions to the LFAA). Table 5 summarizes these issues and options by topic.

Table 5 is followed by a discussion of five areas where the current LFAA process could be improved without making extensive revisions to the LFAA and could be done fairly expeditiously, providing more time to consider the other options. Guidance is also provided regarding what additional actions would not require formal modifications to the LFAA, what modifications would expressly require unanimous agreement, and one action that would require Congressional approval. Finally, we describe several additional studies suggested by the parties that might provide useful information pertinent to the current and future implementation of the LFAA.

Table 5. Summary of LFAA Issues and Options by Topic

Issue	Options	Notes
Topic 4.2 Technical Changes to the LFAA		
Should there be one LFAA that is accurate and up-to-date, reflecting changes that have occurred since 1978?	Maintain status quo.	
	Revise the LFAA to reflect historical changes and any other changes required for consistency and accuracy (to reflect new circumstances since 1978).	<p>Potential provisions for modification include:</p> <ul style="list-style-type: none"> • Fourth Whereas clause: Add reference to Virginia's permitting authority to parallel reference to Maryland's authority; • Ninth Whereas clause: Revise to refer to Fairfax Water as a water withdrawer; • Art. 2.C.1.: Add reference to Virginia's State Water Control Board; • Art. 3.C.: Add reference to Virginia's permitting authority to parallel reference to Maryland's authority; Change "state's Department of Natural Resources" to "Maryland's Department of the Environment" as appropriate. <p>Several parties commented that it is not worth going through the effort to formally modify the LFAA merely to make these types of technical revisions.</p>

Issue	Options	Notes
	Create a consolidated LFAA document that includes the original 1978 LFAA as modified in 1982 and 1985, the Memorandum of Intent, the ancillary agreements, and any revisions made as a result of this report or otherwise. This could include a list of changes that have occurred since 1978 that should be noted but do not require formal revision of the LFAA.	Some parties may already maintain a consolidated LFAA document. However, these are not necessarily current and complete.
Topic 4.3 Relationship of LFAA to Other Regional Agreements		
Should the LFAA, CO-OP/WSCA, and/or MWCOG drought management plans be better aligned?	Maintain status quo.	
	Educate the parties about the interrelationship of the LFAA, WSCA, and MWCOG approaches, their potential inconsistencies, and how they can be aligned during a severe drought.	
	Conduct tabletop exercises specifically related to LFAA issues and the coordination of the different drought management approaches.	Tabletop exercises could include parties to other regional agreements in addition to LFAA parties. Tabletop exercises could be integrated into CO-OP's existing drought exercises.
Topic 4.4 Responsibilities of the LFAA Parties		
Should the dual role of the Corps of Engineers in the LFAA be clarified?	Maintain status quo.	
	Clarify in the LFAA that the Corps of Engineers has both oversight responsibilities as a governing party and water supply authorities as the operator of the Aqueduct.	
	Clarify in a related document such as an LFAA manual, guidebook, or memorandum of understanding, that the Corps of Engineers has both oversight responsibilities as a governing party and water supply responsibilities as the operator of the Aqueduct.	

Issue	Options	Notes
Topic 4.5 Upstream Users		
Should Loudoun Water formally be brought into the LFAA?	Maintain status quo.	Loudoun Water's Virginia state permit currently imposes restrictions applicable during droughts.
	Make Loudoun Water a party to the LFAA.	Making any upstream user a party to the LFAA would likely require revising the definition of "pertinent portion," which, in turn, would likely require Congressional action.
	Coordinate with Loudoun Water through the WSCA and MWCOG processes and include an agreement that, during drought, Loudoun Water's reservoirs would be operated as part of the CO-OP system.	
Should other upstream users such as West Virginia be subject to the LFAA?	Maintain status quo.	Upstream users in Virginia and Maryland are currently subject to those states' consumptive use regulations. West Virginia currently has no consumptive use program.
	Coordinate with all upstream users to ensure adequate water supply in times of drought.	
	Seek to include West Virginia and/or other upstream users in the LFAA.	Making any upstream user a party to the LFAA would likely require revising the definition of "pertinent portion," which, in turn, would likely require Congressional action.

Issue	Options	Notes
Topic 4.6 Pertinent Portion		
Should the LFAA clarify the precise location of “the farthest upstream limit of the pool of water behind the Chesapeake and Ohio Canal Company rubble dam at Seneca, Maryland”?	Maintain status quo.	Simply clarifying the meaning of the phrase “the farthest upstream limit of the pool of water behind the Chesapeake and Ohio Canal Company rubble dam at Seneca, Maryland” would not require Congressional action.
	Amend the LFAA to clarify the precise upstream limit of its scope.	
	Clarify the precise upstream limit in a related document such as an LFAA manual, guidebook, or memorandum of understanding.	
Topic 4.7 Moderator		
Should the selection process for the Moderator and Standby Moderator be revised, including setting out minimum qualifications for office?	Maintain status quo.	
	Establish a transparent selection process, selection criteria, and minimum qualifications for the Moderator, based on the process recently developed for selecting the current Moderator. Memorialize in the LFAA and/or in an LFAA manual, guidebook, or memorandum of understanding.	
	Establish a transparent selection process, selection criteria, and minimum qualifications for the Standby Moderator. Memorialize in the LFAA and/or in a related document such as an LFAA manual, guidebook, or memorandum of understanding.	
Should term lengths for the Moderator and Standby Moderator be established?	Maintain status quo.	
	Establish a term of office for the Moderator (e.g., three years). Memorialize in the LFAA and/or in a related document such as an LFAA manual, guidebook, or memorandum of understanding.	
	Establish a term of office for the Standby Moderator (e.g., two years), and/or extend the Standby Moderator’s term until the next Standby Moderator is selected. Memorialize in the LFAA and/or in a related document such as an LFAA	

Issue	Options	Notes
	manual, guidebook, or memorandum of understanding.	
Should there be a mediation process prior to the Moderator's or Standby Moderator's final decision?	Maintain status quo.	
	Provide a process for an outside mediator to help resolve disagreements prior to a final decision by the Moderator or Standby Moderator.	The Moderator or Standby Moderator should not serve as a mediator, as doing so might affect his or her neutrality in later resolving a dispute. A Standby Moderator might have a conflict in any event if he or she is employed by one of the disputing parties or a party affected by resolution of a dispute.
	Work with a neutral organization, such as the ICPRB, to mediate disagreements prior to a final decision by the Moderator or Standby Moderator.	
Should there be an alternative dispute resolution process after a final decision by the Moderator or Standby Moderator and before the matter is taken to court?	Maintain status quo.	
	Provide an opportunity for external alternative dispute resolution of a final decision by the Moderator or Standby Moderator before a dispute is taken to court.	Because Moderator decisions would likely occur in emergency situations, adding alternative dispute resolution at that time could prove cumbersome, ineffective, and too time-consuming.
	Work with a neutral organization, such as the ICPRB, to help resolve disputes after a final decision by the Moderator or Standby Moderator and before the dispute is litigated.	
Topic 4.8 Stages of Flow		
Should the three stages of flow in the LFAA be reconsidered?	Maintain status quo.	
	Conduct a study of the three low-flow stages.	Study could consider whether stages should be based upon meteorological and hydrological criteria and/or criteria used by Virginia and Maryland.
	Conduct tabletop exercises that help assess whether the three stages of low-flow will be effective and can be readily implemented during a severe drought.	Tabletop exercises could inform the need for further study.

Issue	Options	Notes
		Tabletop exercises could be integrated into CO-OP's existing drought exercises.
Should the LFAA be revised to expressly reflect the Memorandum of Intent's methodology for calculating low-flow stages?	Maintain status quo.	
	Revise the LFAA to incorporate or refer to the Memorandum of Intent's methodology for calculating low-flow stages.	The Memorandum of Intent clarifies that the flow-by amount shall be combined with withdrawals in determining whether the Restriction or Emergency Stage is to be put into effect.
	Provide information about the Memorandum of Intent's methodology for calculating low-flow stages in a related document such as an LFAA manual, guidebook, or memorandum of understanding.	
Topic 4.9 Allocation Formula		
Should the allocation formula be revised?	Maintain status quo.	
	Conduct a study of whether the allocation formula is still fair and equitable and will provide sufficient water during a severe drought.	
	Conduct tabletop exercises that help assess whether the allocation formula will be effective, can provide sufficient water, and can be readily implemented during a severe drought.	Tabletop exercises could inform the need for further study. ICPRB could oversee tabletop exercises, including triggers from the WSCA and the MWCOC Drought Emergency Plan.
	Based on findings from tabletop exercises and other resources, substantively review the allocation formula every five years at the annual LFAA meeting.	
Topic 4.10 Environmental Flow-by		
Should the environmental flow-by be reconsidered?	Maintain status quo.	
	Conduct a new study of environmental flow-by consistent with current state standards and definitions of "environmental conditions." If a severe drought occurs and there is a 100 mgd	Although no comprehensive minimum flow study has been conducted since 1982, surveys after the droughts of 1999 and 2002 did not identify any lasting negative impacts on aquatic

Issue	Options	Notes
	flow-by, conduct a study to assess effects on natural resources or species.	species in the subject portion of the river. No party to the LFAA suggested lowering the 100 mgd flow-by number.
	Conduct tabletop exercises that help assess whether the flow-by amount can be readily implemented and sustained during a severe drought.	Tabletop exercises could inform the need for further study. ICPRB could oversee tabletop exercises, including triggers from the WSCA and the MWCOG Drought Emergency Plan, as well as from the LFAA.
Should the environmental flow-by number and/or other aspects of the environmental flow-by be made more explicit?	Maintain status quo.	
	Formally incorporate some or all of the Memorandum of Intent into the LFAA.	Provisions possibly to include in the LFAA: (1) the flow-by amount, (2) consideration of flow-by in assessing Restriction and Emergency Stages, (3) treatment of water for C & O Canal.
	Formally reference the Memorandum of Intent and/or the Maryland DNR study on environmental flow-by in the LFAA or in a related document such as an LFAA manual, guidebook, or memorandum of understanding.	

Based on our extensive interviews with the parties, we have identified the following five areas where the current LFAA process could be improved without making extensive revisions to the LFAA or investing in major studies:

- Make available a consolidated LFAA document.** We found that some parties do not have ready access to a single source that includes the LFAA, its modifications, the ancillary agreements, and the Memorandum of Intent. A consolidated LFAA document would serve as an easy reference tool for new staff and others who are not familiar with the LFAA. Attachment E provides an initial LFAA consolidation. Parties that have already compiled their own consolidated LFAA should share their versions with CO-OP staff. In addition, all parties would benefit from the creation of an annotation to the LFAA that would explain name changes and other technical revisions or explanatory information that would assist the reader.

- **Make technical revisions to the LFAA.** The LFAA does not reflect historical and other technical changes that reflect new circumstances since 1978. The parties described several LFAA provisions that are no longer consistent or accurate, such as Virginia's exercise of authority to regulate water withdrawals from the Potomac River. Changing these and other provisions that are identified through additional review could provide a relatively easy way to improve the LFAA. In some or all cases these updates would not necessarily require revisions to the LFAA, but could be identified in a separate document or addendum (see "Create a one-source LFAA interpretive resource," below).
- **Provide opportunities – such as tabletop exercises – for the LFAA parties to practice their responses during a hypothetical severe drought.** In many instances, the parties' concerns about the LFAA were rooted in the fact that since the LFAA has never been formally triggered, they are not sure how it would work during a severe drought. They welcomed the idea of participating in tabletop exercises related to specific LFAA issues and, as relevant, coordination with the WSCA and other state and local drought management programs. More specifically, some parties suggested that tabletop exercises could be incorporated into the existing schedule for drought-related exercises conducted by CO-OP. Tabletop exercises could also provide valuable information about the effectiveness of complex issues such as the stages of flow, allocation formula, and environmental flow-by, and help the parties identify the need for any future revisions to these LFAA provisions.
- **Create a one-source LFAA interpretive resource.** The parties described numerous LFAA terms and provisions that are not clear to them, as well as uncertainties about issues such as how the LFAA relates to the WSCA and MWCOG drought management plans, the precise location of the upstream boundary of the pertinent portion of the river, and the LFAA allocation process. The creation of an LFAA manual, guidebook, or series of memoranda of understanding could provide a valuable resource that could educate the parties and help reduce some of their concerns about the LFAA.
- **Set forth in writing the selection process and term lengths of the Moderator and Standby Moderator.** The parties agreed that even though the Moderator or Standby Moderator has never been called upon to enforce the LFAA or to resolve any disputes, they do have concerns about whether a Moderator or Standby Moderator would be in place and prepared to take action during a severe drought. The parties recommended making changes to selection processes, term lengths, and eligibility requirements; in fact, they have already developed and used some of these new approaches during their recent selection of a new Moderator. Finalizing, implementing, and memorializing these approaches in the LFAA or in a memorandum of understanding (as preferred by at least three of the parties) would be a relatively straightforward way to help ensure that the LFAA will be effective in the

event of a severe drought. We note in this respect that the LFAA does not designate when the term of a Standby Moderator ends; just that the authority to appoint a new Standby Moderator passes on to the next governing party in line on January 1 of each year. The parties could agree that a Standby Moderator remains in office until the next Standby Moderator has assumed office.

Several other options identified in Table 5 also would not require formal modifications to the LFAA. These include:

- Conducting studies regarding stages of flow, allocation formula, and environmental flow-by.
- Monitoring of and coordination with upstream users through the WSCA and MWCOG processes.
- Retention of an outside mediator to help resolve disputes.

Several parties requested guidance as to what actions under the LFAA require unanimous agreement and what actions can be implemented through a majority vote. The LFAA expressly requires “unanimous agreement” or “unanimous consent” of the governing parties for the following actions:

- Selection and termination of the Moderator (Article 1.B.).
- Adoption of a new allocation formula (Article 2.C.3.A.). Note, however, that a governing party may seek judicial relief with respect to the allocation formula after exhausting administrative procedures (Article 2.C.3.A.).
- Admission of new member parties (Article 4.).
- Revocation of the LFAA (Article 5.).

The LFAA requires agreement of at least three governing parties for the following action:

- Deeming an expense to be reasonable (Article 1.H.).

The LFAA requires agreement among the parties for the following action, without specifying whether such agreement must be unanimous:

- Selection of a different 24-hour measuring period for calculations of daily withdrawals or daily flows (Article 2.A.).

The LFAA requires agreement of the governing parties for the following actions, without specifying whether such agreement must be unanimous:

- Modifications to the LFAA (Article 4.).

Because many of the options set forth in Table 5 would be implemented through formal modification of the LFAA, the governing parties would first have to determine, after consulting with counsel, whether such modifications require unanimity or can be accomplished by majority vote. The Cruden Team offers no opinion on that legal question, but does note that the two prior modifications to the LFAA were in fact agreed to unanimously by the governing parties.

The parties also requested guidance with respect to what actions would require Congressional action in order to be implemented. Because the definition of “pertinent portion” in the LFAA is based upon precise statutory language, the Cruden Team believes that any modification to this definition would require Congressional approval. However, we believe that the parties have discretion to reasonably interpret the statutory phrase “the farthest upstream limit of the pool of water behind the Chesapeake and Ohio Canal Company rubble dam at Seneca, Maryland.” This could be done by means of a legal opinion or other relevant document such as a manual, guidebook, or memorandum of understanding and would not require a change to the LFAA.

Finally, several parties suggested additional studies that might provide information pertinent to the current and future implementation of the LFAA. While these are outside the scope of this report, ICPRB might consider them for future investigation:

- Review this report with a view toward any implications for future implementation of the recommended options in the ICPRB CO-OP’s August 2017 *Washington Metropolitan Area Water Supply Alternatives* study [[Document 22](#)].
- Explore the interactions between water quantity and water quality during times of drought, including whether and how these interactions might require a new focus on water pollution and water quality within the context of the LFAA in the future.
- Consider whether there are any statutory limitations on the role the ICPRB might take in the administration of the LFAA.
- Determine whether a major change in players, organizational philosophies, or federal laws, regulations, or policies would trigger a legal requirement to revise the LFAA or whether these changes can be accommodated through the existing LFAA. This review could include an assessment of whether any of these potential changes could jeopardize long-term water supply planning within the metropolitan Washington area.

ATTACHMENT A

A Timeline of Significant Events Before and After the Signing of the Potomac River Low Flow Allocation Agreement

Carlton Haywood and Cherie Schultz

ICPRB

November 21, 2017

Date	Action	Description
1853	Construction begins for Great Falls aqueduct and Dalecarlia and Georgetown reservoirs	Operations began in 1859.
1908	Federal appropriation for investigation for increasing water supply for DC	USACE reports to Congress in 1909. Mean annual water demand for Washington Aqueduct service area is 64.9 MGD. Forecasts demand in 1940 as 70 MGD mean annual. Forecasts for 1960 is 84 MGD mean annual.
1940	Compact creating ICPRB authorized by Congress	... "for the abatement of existing pollution and control of future pollution." Signatories are DC, MD, PA, VA, WV. The U.S. is not a signatory but is a member party to the Compact with all the rights and responsibilities of the signatories.
1941-42	Federal appropriations "for the development of a plan to insure an adequate future water supply for the District of Columbia ..."	USACE reports to Congress in 1946. Washington Aqueduct service area demand in 1940 was 110 MGD mean annual. Forecast to 1980 is 217 MGD, and for year 2000, 225 MGD.
1962	WSSC initiates withdrawals from the Potomac River	... upon completion of its Potomac intake and Potomac Water Filtration Plant.
1963	USACE Potomac River Basin Report	... proposes to build 16 dams in Potomac basin. Proposal met with widespread public opposition. Ultimately, only two reservoirs were built.
1966	Mid 60's drought	Mean daily flow at Little Falls, <u>before water supply withdrawals</u> , was 601 cfs (388 MGD) on Sep. 10. The lowest ever recorded daily flow at Little Falls, after water supply withdrawals, was 121 cfs on Sep. 9.
1967	WSSC requests permit to construct a weir and increase withdrawal	USACE studies request (no decision).
1970	Potomac River Basin Compact amended.	Adding a new purpose: "... integration and coordination of the planning for the development and use of the water and associated land resources ...", i.e. water supply. Also adding an authority to create special purpose sections whose membership may include less than the full complement of ICPRB members.
1971	USACE begins construction of Bloomington Lake, later renamed Jennings Randolph Lake	Authorized purposes: flood control, water supply, water quality control, and recreation (in-lake and below). Completed and filled in 1982.

Date	Action	Description
1974	USACE and WSSC agree on a draft Low Flow Allocation Agreement	... but the Corps decides that Congressional authorization is needed and Virginia and FCWA demand to be included as parties
1974	WRDA Section 85	The Corps is directed to “make a full and complete investigation and study of the future water resources needs of the Washington metropolitan area,” before Congress will authorize additional reservoirs.
1975	USACE NEWS Report, "Washington Metropolitan Area Water Supply Study"	... in response to WRDA 1974 Section 85. Reports that MWA demand in 1972 was 309 MGD mean annual and forecasts WMA demand in 2000 will be 665 MGD.
1976	WRDA Section 181	Congress consents to the construction of a water diversion structure by WSSC <u>conditional</u> on the Corps, MD, VA, WSSC, and other parties deemed desirable, reaching agreement on an allocation of water during periods of low flow.
1976	USACE initiates Metropolitan Washington D.C. Area Water Supply Study	
1970-77	Water supply withdrawals sometime exceed record low river flow	From 1970 to 1977, MWA water supply withdrawals exceed the 1966 minimum flow amount on 36 different occasions.
1978	Potomac River Low Flow Allocation Agreement (LFAA)	As required by 1976 WRDA and signed by DC, MD, VA, USACE, FCWA, WSSC. Subsequently, the Corps granted WSSC a permit to construct a 400 MGD intake adjacent to its existing intake structure on the Potomac and granted Fairfax Water a permit to construct a 200 MGD intake on the Potomac River at Lowes Island in Loudoun County.
1979	ICPRB Section for Cooperative Water Supply Operations on the Potomac (CO-OP) created	Established to provide a central cooperative technical center to assure maximum reliability of water supply and quality. Includes all ICPRB members except PA. Geographic extent includes DC and all counties in MD, VA, and WV that border nontidal Potomac River and North Branch.
1979	District of Columbia Water Supply Hearing, Committee on Governmental Affairs, US Senate	LFAA is celebrated but testimony by MD and VA speakers provides different perspectives on access to Potomac River.
1981	Potomac River Environmental Flow-by Study	Completed by MD DNR, and "Submitted to The United States Army Corps of Engineers in Fulfillment of the Requirements of Article 2.C of The Potomac River Low Flow Allocation Agreement."
1981	New WSSC 400 MGD Potomac River intake completed	

Date	Action	Description
1982	Additional upstream water supply storage secured	FCWA, WSSC, and Washington Aqueduct, together purchase storage in Bloomington (now Jennings Randolph) lake and agree to share O&M costs at Savage and capital and O&M costs for Little Seneca.
1982	Water Supply Coordination Agreement	Signed by FCWA, WSSC, USACE, DC, ICPRB. Water suppliers agree to coordinate operation of all facilities to minimize the chances that the allocation provision of the LFAA will ever need to be implemented. The ICPRB CO-OP Section is designated to provide administrative, technical, supervisory, and managerial services.
1982	Fairfax Water initiates withdrawals from the Potomac River	... at the Corbalis Water Treatment Facility, with a 50 MGD capacity.
1983	Final Report USACE's Washington Metropolitan Area Water Supply Study	Among the findings: Regional cooperation is essential to meeting WMA water needs.
1985	Maryland regulates consumptive use of surface waters in the Potomac basin upstream of Little Falls	See Consumptive Use of Surface Water in the Potomac River Basin, COMAR 26.17.07 , where reference is made to restrictions under the LFAA.
1990	CO-OP Section completes first twenty-year demand forecast	Demand forecast is repeated every five years to make sure that system resources remain adequate to meet needs.
1999	First water supply release from JRL	As a result of low flow in the Potomac River, CO-OP Section directs USACE-Baltimore District to make the release per the WSCA
2000	MWCOG adopts the "Metropolitan Washington Water Supply and Drought Awareness Response Plan"	Plan calls for uniform water use restrictions throughout the WMA during droughts.
2003	Supreme Court decision, Virginia v Maryland,	... holds that "Virginia [has] sovereign authority, free from regulation by Maryland, to build improvements appurtenant to her shore and to withdraw water from the River, subject to the constraints of federal common law and the [Black-Jenkins] Award."
2007	Virginia regulates consumptive use of surface waters in the Potomac basin between the West Virginia border and Little Falls	See Code of Virginia § 62.1-44.15:5.02. Low-flow protections in Potomac River . Also see Virginia Administrative Code, 25-210-370 , which references the restriction and emergency stages of the LFAA.
2010	MOU between MDE and the DEQ Concerning Permits for Water Withdrawals from the Potomac River	MDE and DEQ agree to work amicably together on water withdrawal permits
2015	ICPRB CO-OP Section publishes "2015 Washington Metropolitan Area Water Supply Study"	"Water use in the WMA has held remarkably steady during the past two decades, averaging 466 ... MGD in recent years (2009-2013)." "Average annual demand ... is projected to increase to 545 MGD ... by 2040."

Date	Action	Description
2016	West Virginia objects to Maryland permitting WV withdrawals and MD concedes.	Referencing Virginia v. Maryland, WV Attorney General asserts that Maryland does not have the authority to issue water use permits to West Virginia users. Maryland Attorney General responds that Maryland will no longer review or issue permits for WV water use.

ATTACHMENT B

Resource Materials

No.	Title	Date
1	Compact Creating the Interstate Commission on the Potomac River Basin, Public Law 91-407, 91st Congress, S. J. Res. 67	September 25, 1970
2	Water Resources Development Act of 1974, Public Law 93-251	March 7, 1974
3	Water Resources Development Act of 1976, Public Law 94-587	October 22, 1976
4	Potomac River Low Flow Allocation Agreement, Annotated	January 11, 1978
5	Memorandum of Intent	July 20, 1978
6	Potomac River Environmental Flow-by Study, Prepared by Maryland Department of Resources, Water Resources Administration, Water Supply Division, Water Supply Planning Section	1981
7	Water Supply Coordination Agreement of 1982	July 22, 1982
8	Assured Water Supply for the Washington Metropolitan Area, Daniel P. Sheer, Interstate Commission on the Potomac River Basin	January 1983
9	Metropolitan Washington Water Supply and Drought Awareness Response Plan: Potomac River System A. Abstract B. Introduction C. Water Supply and Drought Awareness Response Plan	June 7, 2000
10	Water Resources Planning and Development for the Washington Metropolitan Region, Perry Costas, Chief, Washington Aqueduct (Retired), ICPRB 60 th Anniversary	September 25, 2000
11	Excerpts from Virginia's Brief on the Merits of Maryland's Remaining Claims, <i>Commonwealth of Virginia v. State of Maryland</i> , No. 129, Supreme Court of the United States, pages 11-45	January 17, 2002
12	Draft Potomac Flow-By Study 2000-2001, Status Report	March 2002
13	Commonwealth of Virginia v. State of Maryland, No. 129, Supreme Court of the United States, 540 U.S. 56 (2003)	December 9, 2003
14	Memorandum of Understanding between the Maryland Department of the Environment and the Virginia Department of Environmental Quality Concerning Permits for Water Withdrawals from the Potomac River	March 11, 2010
15	Potomac Basin Large River Environmental Flow Needs, prepared by the Interstate Commission on the Potomac River Basin, George Mason University, and U.S. Geological Survey	May 12, 2011
16	Virginia Water Protection Permit Number 10-2020, Potomac River Water Supply Project, Loudon County Sanitation Authority	November 27, 2012

No.	Title	Date
17	S.N. Ahmed, K.R. Bencala, and C.L. Schultz, 2015 Washington Metropolitan Area Water Supply Study: Demand and Resources Availability Forecast for the Year 2040, ICPRB Report No. 15-4, The Section for Cooperative Water Supply Operations on the Potomac, Interstate Commission on the Potomac River Basin	August 2015
18	Letter from Patrick Morrissey, Attorney General, State of West Virginia, to The Honorable Brian E. Frosh, Attorney General, State of Maryland, and The Honorable Benjamin H. Grumbles, Secretary of the Environment, State of Maryland Department of the Environment	November 2, 2016
19	Letter from Ben Grumbles, Secretary, Maryland Department of the Environment, and Brian E. Frosh, Attorney General, State of Maryland, to The Honorable Patrick Morrissey, Attorney General, State of West Virginia	November 22, 2016
20	Resolution approved at ICPRB's March 7, 2017, business meeting	March 7, 2017
21	Request for Proposal, A Review of the Potomac River Low Flow Allocation Agreement, Interstate Commission on the Potomac River Basin	July 14, 2017
22	Washington Metropolitan Area Water Supply Alternatives, ICPRB Publication # 17-3	August 2017
23	A Timeline of Significant Events Before and After the Signing of the Potomac River Low Flow Allocation Agreement	November 21, 2017
24	Maryland Consumptive Use Regulations, Title 26 Department of the Environment, Subtitle 17 Water Management	
25	Virginia Consumptive Use Regulations, Code of Virginia § 62.1-44.15:5.02	

ATTACHMENT C

Topics for Interviews with LFAA Parties

1. How would you describe the objectives of the Potomac River Low Flow Allocation Agreement?
 - a. In what ways has implementation of the LFAA met these objectives?
 - b. In what ways have these objectives not been met?
2. Is the LFAA's definition of pertinent portion of the Potomac River as being between Little Falls Dam and the furthest upstream limit of the pool behind the rubble dam at Seneca still appropriate or should be it changed and, if changed, how? [Art. 1.A.1.]
3. Would you recommend any changes to the definitions of "governing parties," "member parties," or "users"? [Art. 1.A.2; Art. 2.C.1.]
4. How have the moderator's and standby moderator's roles and responsibilities worked in practice? Do you have any suggested modifications regarding the selection of the moderator/standby moderator or their defined roles? [Art. 1.B.; Ancillary Agreement No. 1; Ancillary Agreement No. 2]
5. Is the method of calculating total daily flow, with responsibility assigned to the Washington Aqueduct, reasonable and appropriate? Would you suggest any changes? [Art. 2.A.]
6. Are the stages of low flow as defined in the Agreement (i.e., alert, restriction, and emergency stages) still appropriate for drought management? Would you recommend any changes? [Art. 2.B.]
7. Do you recommend reevaluating the environmental flow-by amount and, if so, for what reasons? [Art. 2.C.; Memorandum of Intent; MD DNR Env. Flow-by Study]
8. Do you recommend any revisions to the method for allocating a fair share of Potomac River flow? [Art. 2.C.2.]
9. With respect to other provisions of the LFAA, do you recommend any revisions to
 - a. Article 3.C. (Permits)
 - b. Article 4 (Review)
 - c. Article 5 (Revocation)
 - d. Modification No. 1
 - e. Modification No. 2

- f. Ancillary Agreements No. 1 and No. 2
 - g. Memorandum of Intent?
10. Overall, what lessons have you learned from implementation of the Agreement or from other sources that might be applied to a revised LFAA?
11. What other revisions to the LFAA, not previously discussed, would you recommend?

ATTACHMENT D

Interview Schedule

Party	Interviewee	Date/Location
District of Columbia Governing Party	Hamid Karimi, Ph.D. Deputy Director Natural Resources Administration District Department of Energy and the Environment Collin Burrell Associate Director Inspection and Enforcement Division (IED) District Department of Energy and the Environment Willem H. Brakel, Ph.D.	October 17, 2017 Washington, D.C.
Commonwealth of Virginia Governing Party	Scott W. Kudlas Alternate Commissioner ICPRB Director, Office of Water Supply Dept. of Environmental Quality (DEQ)	October 23, 2017 Richmond, Virginia
Maryland Governing Party	Virginia (Ginny) Kearney Deputy Director Water Management Administration Maryland Department of the Environment Saeid Kasraei Program Manager Water Supply Program Water Management Administration Maryland Department of the Environment Bruce Michael Director Resource Assessment Service Maryland Department of Natural Resources Tony Prochaska Manager Freshwater Fisheries Program Maryland Department of Natural Resources	October 30, 2017 Baltimore, Maryland

Party	Interviewees	Date/Location
Fairfax Water Member Party	Charles M. Murray General Manager Fairfax Water Steve Edgemon Deputy General Manager Fairfax Water Jamie Hedges Director Planning & Engineering Fairfax Water Gregory Prelewicz Manager Planning Fairfax Water Stuart Raphael Attorney Hunton & Williams	October 31, 2017 Fairfax, Virginia
Washington Suburban Sanitation Commission Member Party	Joel Caudill Regional Water & Wastewater Manager Planning Division WSSC James (J.C.) Langley, Jr. Director of Production Production Department WSSC Gary Grey Deputy Director of Production Production Support Division WSSC Thomas Hilton Group Leader Planning Group WSSC Gary Gumm Chief Engineer Engineering and Construction Department WSSC	November 2, 2017 Laurel, Maryland

Party	Interviewee	Date/Location
United States of America Governing Party	Thomas P. Jacobus General Manager Washington Aqueduct James Bemis Assistant District Counsel USACE-Baltimore District Alex Gorzalski Environmental Engineer Washington Aqueduct Julia Fritz Chief Water Control Section USACE-Baltimore District Heather Cisar Federal Advisor Washington Aqueduct Carlton Haywood Executive Director Interstate Commission on the Potomac River Basin	November 9, 2017 Washington, D.C.

ATTACHMENT E

1978 LFAA and Related Documents

Contents:

1. Potomac River Low Flow Allocation Agreement (January 11, 1978)
2. LFAA Modification No. 1 (1982)
3. LFAA Modification No. 2 (1985)
4. Consolidated LFAA (Modifications 1 and 2 incorporated)
5. Annotated LFAA (Modifications 1 and 2 shown in blue text)
6. Memorandum of Intent (July 20, 1978)
7. Ancillary Agreement #1 (1981)
8. Ancillary Agreement #2 (1984)

11 January 1978

POTOMAC RIVER LOW FLOW ALLOCATION AGREEMENT

THIS AGREEMENT, made and entered into this 11th day of January 1978, by and among the UNITED STATES OF AMERICA (hereinafter called "the Government") acting by the Secretary of the Army through the Chief of Engineers, the STATE OF MARYLAND (hereinafter called "the State") acting by the Governor and the Secretary of the Department of Natural Resources, the COMMONWEALTH OF VIRGINIA (hereinafter called "the Commonwealth") acting by the Governor and the Chairman of the State Water Control Board; the DISTRICT OF COLUMBIA (hereinafter called "the District") acting by its Mayor, the WASHINGTON SUBURBAN SANITARY COMMISSION (hereinafter called "the Commission") acting by its Chairman; and the FAIRFAX COUNTY WATER AUTHORITY (hereinafter called "the Authority") acting by its Chairman;

PREFACE

WHEREAS, the Chief of Engineers is charged with the operation and maintenance of the Washington Aqueduct for the primary purpose of providing an adequate supply of potable water for distribution to and consumption by the agencies and instrumentalities of the Government situate in the District of Columbia and its environs, and thereafter of

providing a public water supply for the inhabitants of the District of Columbia; and

WHEREAS, the Secretary of the Army is authorized, subject to certain conditions, to supply treated water from the Washington Aqueduct to any competent state or local authority in the Washington Metropolitan Area in Virginia, and to that end has entered into agreements with the County of Arlington and the City of Falls Church, Virginia; and

WHEREAS, the sole source of raw water treated by the Washington Aqueduct and dispensed therefrom is the Potomac River, and the Washington Aqueduct is now maintaining intake facilities for this purpose at Little Falls and Great Falls, Maryland; and

WHEREAS, the State of Maryland has enacted an appropriation permit statute which requires that all non-exempt jurisdictions obtain a permit from the Water Resources Administration of the State's Department of Natural Resources (hereinafter called "the Administration") to appropriate or use the water of the Potomac River; and

WHEREAS, the parties to this Agreement recognize that other riparian interests, such as communities located in Virginia, may in the future desire to withdraw and use water from the segment of the Potomac River which is the subject of the within Agreement, and provision is made

herein requiring that access by any of them to such water be made subject to the provisions of this Agreement; and

WHEREAS, the Commission is charged with the responsibility of providing a safe and adequate public water supply within the Counties of Montgomery and Prince George's, Maryland and is also authorized to enter into agreements to provide water, and for that purpose is operating and maintaining water treatment facilities and a water distribution system; and

WHEREAS, the Commission maintains a water treatment plant and an intake therefrom on the Potomac River, which intake is upstream from the Washington Aqueduct intakes and within the limits of the River covered by this Agreement, and in addition the Commission maintains a water treatment plant with intake on the Patuxent River, and requires water from both sources in order to fulfill its above-mentioned responsibilities for providing a public water supply; and

WHEREAS, the City of Rockville, Maryland, is operating and maintaining water treatment facilities and a water distribution system and maintains an intake facility about one mile upstream from Great Falls on the Potomac River, which intake is upstream from the Washington Aqueduct

intakes and within the limits of the River covered by this Agreement; and

WHEREAS, the Fairfax County Water Authority is an authority in the Commonwealth of Virginia proposing to withdraw water from that portion of the Potomac River which is covered by this Agreement and has applied for a permit to construct a water intake structure for such purpose; and

WHEREAS, in the absence of adequate upstream impoundments and associated flow regulation, the quantity of water which may flow in the Potomac River between Little Falls Dam and the farthest upstream limit of the pool of water behind the Chesapeake and Ohio Canal Company rubble dam at Seneca, Maryland, during periods of low flow in that portion of the River, may be less than the quantity needed to meet the demand for all customary public water supply purposes during such periods; and

WHEREAS, in light of the Federal legislative enactments providing for the Corps of Engineers to supply water to the District of Columbia, enactment of legislation was deemed by the Government to be a prerequisite to its participation in a Potomac River Low Flow Allocation Agreement; and

WHEREAS, the consent of Congress to a Potomac River Low Flow Allocation Agreement is expressly stated in Section 181 of the Water Resources Development Act of 1976, Public Law 94-587; and

WHEREAS, the consent of Congress, pursuant to Section 9 of the Rivers and Harbors Act of 1899, to the construction of a water diversion structure by the Commission from the north shore of the Potomac River at the Commission's water filtration plant to the north shore of Watkins Island is conditioned in Section 181 of the aforesaid Water Resources Development Act of 1976 upon an enforceable Low Flow Allocation Agreement; and

WHEREAS, it is the judgment of the Chief of Engineers and the Secretary of the Army, acting pursuant to Section 10 of the Rivers and Harbors Act of 1899, that the public interest requires that such a Low Flow Allocation Agreement be a requirement for issuance of the permits for the construction of water intake structures in the subject portion of the Potomac River by the Commission and the Fairfax County Water Authority;

NOW, THEREFORE, in consideration of the premises and of the public and governmental interests deemed to be served hereby, the parties hereto do mutually agree as follows:

ARTICLE 1. Enforcement.

A. Certain Definitions:

1. Pertinent Portion of the River. The portion of the Potomac River subject to this Agreement is that located

between Little Falls Dam and the farthest upstream limit of the pool of water behind the Chesapeake and Ohio Canal Company rubble dam at Seneca, Maryland. This portion is referred to herein as "the defined portion" or, alternately "the subject portion" of the Potomac River.

2. Parties. The Government, the State, the Commonwealth, and the District shall be termed "the governing parties." All other parties hereto shall be termed "member parties." The term "parties" shall mean all parties, both governing and member, except when the context otherwise requires.

B. Moderator. Authority to enforce the provisions of this Agreement shall be vested in an unbiased Moderator. It shall be the duty of the Moderator and he shall have the authority:

1. To take all actions necessary to enforce the provisions of this Agreement and his decisions hereunder, and for this purpose he may sue in his own name.

2. To decide all disputes between or among the parties arising under this Agreement not disposed of by consent.

The authority of the Moderator shall not restrict those powers reserved to the parties, including those specified in Article 3, Section C.

C. The decision of the Moderator shall be final and conclusive unless determined by a court of competent jurisdiction to have been fraudulent, capricious, arbitrary, or not supported by substantial evidence. All parties agree to accept and implement every decision of the Moderator unless and until said decision is overturned by a court of competent jurisdiction.

D. The parties specifically grant to the Moderator the authority to inspect documents, records, meters, facilities, and other items necessary to decide any question or verify reports made by any party as a consequence of this Agreement. Upon the request of any party, the Moderator shall provide said party any or all of the information held by him relevant to this Agreement.

E. Should the Moderator decide to commence or defend any action or otherwise have need of legal services relating to this Agreement, he shall have the right to contract with counsel for such purpose, and the cost of such services shall be repaid in equal shares by the governing parties. In the interest of prompt action, the Moderator may accept legal services, or an advance of funds, for such purpose from any party. Nothing herein shall require a party being sued by the Moderator to advance funds for such purpose.

F. The Moderator shall not be liable for injury or damage resulting from any decision or action taken in good faith without malice under apparent authority of this agreement, even though such decision or action is later judicially declared to be unauthorized or invalid.

G. The Moderator shall be selected, and may be relieved of his duties for any reason, by unanimous action of the governing parties expressed in a signed memorandum. Should the office of Moderator become vacant through death, resignation, or otherwise, a new Moderator shall be selected as soon as practicable by such unanimous action. During any period in which the office of Moderator remains vacant through a failure of unanimous action or otherwise, the full functions of the office of Moderator shall be exercised by a Standby Moderator who shall, except as expressly otherwise provided, be treated as the Moderator for all purposes under the provisions hereof. The duty to designate the Standby Moderator shall rotate annually among the Government, the State, the Commonwealth, and the District in the order stated, beginning on the date this agreement becomes effective and rotating thereafter on the first day of each calendar year. Written notice of such annual designation shall be sent to all other parties by January 15 of each year. The first Moderator for this Agreement is designated in Annex A hereto.

H. Subject to the availability of funds, the reasonable expenses, including legal fees, and compensation of the Moderator shall be paid in equal shares by the governing parties. Any expense shall be deemed reasonable if at least three of the governing parties so agree or if so determined by a court. If any such party accepts as reasonable a particular expense not accepted as reasonable by the other such parties, that party may pay that expense, in addition to that party's proportionate share of all other expenses. At the time of each annual review as provided in Article 4 of this agreement, the governing parties shall set, by majority vote, the per diem fee to be paid a Moderator in the event his services shall be necessary. A Standby Moderator, who is an employee of the designating party or one of its political subdivisions or agencies, shall serve without fee in exercising the functions of the Moderator.

I. The Moderator or any party may bring an action against any one or more other parties to enforce this Agreement or a decision of the Moderator made hereunder. Such action shall be brought in the United States District Court for the District of Columbia, and each party consents to venue in said court and to service of process upon it from said court, provided that if the action is between two states of the United States, such action may be commenced in the Supreme Court of the United States. In any such action the joinder of all

parties hereto shall not be deemed necessary or indispensable merely because they are parties to this Agreement. Application for or receipt of a determination by the Moderator shall not be a prerequisite to the maintenance of an action by a party, but any decision made by the Moderator on a matter involved in said action, whether before or after commencement thereof, shall be given the effect set forth in Article I, Section C. Nothing herein shall be deemed to be a waiver of any immunity any party may have from a claim for monetary damages or a claim which has substantial fiscal impact, except for the fees and expenses which are provided to be paid pursuant to the agreement. It is the intention of the parties that any matters involving the technical aspects of maintenance of litigation be resolved in a manner which ensures rapid and certain enforcement of this Agreement.

ARTICLE 2. Administration.

A. Washington Aqueduct. The Government will provide a communication control center at the Washington Aqueduct for the administration of the allocation plan as provided herein. The Washington Aqueduct Division, U. S. Army Engineer District, Baltimore ("the Aqueduct"), will collect, receive, record and accumulate daily reports regarding the flow of the Potomac River and the quantities of water being withdrawn from the defined portion of the Potomac River, and the quantities of water withdrawn and available from all other

sources for use within the Washington Metropolitan Area, by the parties and the political subdivisions, authorities, and permittees of any of them, and by any other water withdrawing entity which may formally be added or made subject to this Agreement subsequent to its initial execution. Subject to the parties rights of appeal to the Moderator, the parties grant to the Aqueduct, and to each other, the right to inspect documents, records, meters, facilities and other items necessary to decide any question or verify reports made by any party as a consequence of this agreement. Beginning with the Alert Stage, the Aqueduct will keep the Moderator informed as to the stage of flow in the Potomac River, and, during the Restriction and Emergency Stages the fair share allocated to each user, and all information utilized for determining the allocation. The Aqueduct will provide all parties with the same information relating to allocation, the quantities of water being withdrawn by all users from any and all sources, and the flow of the Potomac River. To permit uniformity of reports and to implement the administrative measures specified herein, reports and calculations, by or to the Aqueduct, of daily withdrawals or daily flows, will be based on the twenty-four hour period from one midnight to the following midnight, unless the parties subsequently agree to a different twenty-four hour measuring period. The Aqueduct will calculate the total daily flow by adding the withdrawals during the previous 24 hours at all withdrawal points and the

remaining daily flow over the Washington Aqueduct Dam at Little Falls, as determined by the readings recorded on the USGS gage at Little Falls during the preceding twenty-four (24) hours. The average reading will determine the flow over the dam for the previous day.

B. Stages of Flow in the Potomac River. The Aqueduct will determine from the information accumulated when the following stages exist in the defined portion of the Potomac River.

1. Alert Stage. When the total daily withdrawal from the subject portion of the Potomac River is equal to or greater than fifty percent (50%) of the total daily flow, but less than 80%, the Aqueduct will declare an "Alert Stage" to be in effect.

2. Restriction Stage. When the total daily withdrawal from the subject portion of the Potomac River is equal to or greater than eighty percent (80%) of the total daily flow, the Aqueduct will declare a "Restriction Stage" to be in effect and the Aqueduct will request the U. S. Park Service to discontinue putting Potomac River water into the C&O Canal.

3. Emergency Stage. When the estimated total daily withdrawal for any day within the ensuing five (5) days

from the subject portion of the Potomac River is expected to exceed the daily river flow anticipated, the Aqueduct will declare an "Emergency Stage" to be in effect.

C. Allocation of Flow. Whenever the Restriction Stage or the Emergency Stage is in effect, the Aqueduct shall daily calculate and advise each user (as defined herein), and the Moderator, of each user's allocated fair share of the water available from the subject portion of the Potomac River in accordance with this Section C. In calculating the amount of water available for allocation, the Aqueduct will determine, in consultation with the parties, and based upon then current conditions and information, any amount needed for flow in the Potomac River downstream from the Little Falls dam for the purpose of maintaining environmental conditions ("environmental flow-by"), and shall balance such need against essential human, industrial and domestic requirements for water. The Aqueduct's determination shall be based upon the data and shall give substantial weight to conclusions for environmental flowby submitted by the State.

1. For the purposes of this Section C, the term "users" refers to the following entities which are or may be appropriating water for public water supply purposes from the subject portion of the Potomac River; namely, the Government (including its water customers), the Commonwealth for and on behalf of herself and each of her political subdivisions and

authorities (including the Authority), the State and the Administration (for and on behalf of its permittees whether or not parties to this Agreement), the District of Columbia, the Commission, and such entities which may formally be added or made subject to this Agreement subsequent to its initial execution.

2. Each user shall report to the Aqueduct (and to each other) the number of gallons of processed water pumped daily to all its customers from all sources during each winter period (the months of December through February), commencing with the winter period 1977-78. The amounts pumped during the 5 most recent winter periods which have elapsed as of the time of allocation, or less than 5 if fewer have so elapsed, shall be combined for the purpose of computing each user's average daily winter use; except that, in the case of a user first withdrawing water subsequent to the initial execution of the Agreement, the average daily winter use of such user shall be the average of the amounts of water pumped during all of the winter periods, commencing December 1 of the year immediately prior to its first withdrawal from the subject portion of the river, which have elapsed as of the time of allocation, but not exceeding the 5 most recent winter periods. The ratio which the average daily winter use of each user bears to the average daily winter use of all users will be applied to the daily amount of water available at the

time of allocation from the subject portion of the Potomac River (after deduction for environmental flow-by) and all other sources as specified in Paragraph 5 below (calculated at maximum capacity practicable). The resulting amount, less the amount then available to said user by use of the maximum capacity practicable from all such other sources, will be such user's allocated fair share of the flow of the Potomac River.

3. a. The formula set forth in Article 2.C.2. shall continue in effect unless changed by unanimous consent of the governing parties or as set forth below. After January 1, 1988, any of the governing parties which desires to change the allocation formula shall give written notice to all other parties. Within 60 days thereafter, both the governing and member parties shall meet for the purpose of negotiating a replacement formula. In the event that no such replacement formula is agreed on by the governing parties within one year after receipt of the aforesaid notice, the allocation ratio which would have been in effect for the summer of the year in which the notice was given shall be used as an interim allocation ratio for the withdrawal of water during subsequent periods of low flow until such time as the governing parties agree upon a replacement formula. Any governing party, at any time after the expiration of one year from the receipt of such notice and after the exhaustion of such administrative procedures as may be applicable if it is a permittee for

water appropriation or withdrawal, may apply to a court of competent jurisdiction for an adjudication of such rights, if any, as it or users associated with it may have to a greater share of water than set by the interim allocation ratio, provided that all parties shall adhere to the interim allocation ratio until and unless altered by a decision of such court. Applications for intakes or other modifications to water works shall continue to be received and processed during periods in which the interim allocation ratio is in effect, but such ratio shall be recalculated only in the event of the grant of an application to a new user as set forth in Section E of Article 3.

b. Any formula negotiated pursuant to subparagraph a hereof shall allocate water on a fair and equitable basis and shall take into consideration, among other things, (a) steps taken by parties which can do so to minimize dependence upon the Potomac River during periods of low flow, (b) the nature and effectiveness of water conservation methods put into effect, (c) steps taken to increase the water supply available for the Washington Metropolitan Area, (d) then current population growth and planning for future growth, (e) feasibility and availability of new sources of water, and (f) technological advances in water treatment and water quality measurement.

c. In any court proceeding instituted pursuant to subparagraph a, neither the signing of this agreement nor the

passage of time thereafter shall be asserted as a waiver or diminution of any party's rights to, or right to seek, a greater share of water from the subject portion of the river. Such action shall be brought in the United States District Court for the District of Columbia, and each party consents to venue in such court and to service of process upon it from such court, provided that if the action is between two states of the United States, such action may be commenced in the Supreme Court of the United States.

4. In the event the applicable allocation formula results in an allocation exceeding the proposed withdrawal of any user, the excess amount shall be reported by said user to the Aqueduct for reallocation.

5. The water subject to the allocation formula under the terms of this Agreement includes the maximum capacity practicable from Patuxent and Occoquan as it exists in each case on December 31, 1977, and both the natural flow and the augmented flow from existing upstream reservoirs, in addition to Bloomington Lake, of the subject portion of the Potomac River. Any other augmentation to flow, reservoir storage, or treating capacity developed by a user after December 31, 1977, shall not be made subject to the allocation formula, but those users who incur, or participate in the payment of, the expenditures for such augmentation may agree as to how it is to be divided and shall file a copy of said agreement with

the other parties. In recognition that the sole source of water supply for the District of Columbia is the Potomac River, each other party will offer the District an opportunity to participate in a portion of any additional augmentation for use during the Restriction and Emergency stages on reasonable terms, unless such party shows that it is infeasible to do so.

6. In the event a disaster, such as a major fire or water main break, results in an abnormal loss of a significant portion of any user's water supply, the Aqueduct shall determine suitable adjustments in low flow allocation during the emergency period created by the disaster only, taking into consideration all sources available to the users.

7. Water from the emergency pumping station having its intake at the estuary of the Potomac shall not be considered as water available from other sources for the purposes of Section 2.C.2. or otherwise included in computations made under this agreement.

ARTICLE 3. Obligations of the Parties.

A. The Government agrees to cause the Aqueduct as the operating agency to perform the functions and requirements which are required of the Government and the Aqueduct in this Agreement, including the furnishing of information to the other parties relating to the Aqueduct's water withdrawal and use, the same as required by other parties to be furnished

to the Aqueduct under Subparagraphs B and D, of this Article. These functions and responsibilities of the Aqueduct shall be carried out under the supervision of the District Engineer, U.S. Army Engineer District, Baltimore, or his designee, who shall be responsible for making the determinations required in the discharge of these responsibilities.

B. The parties agree to provide the Aqueduct with all the information relating to the withdrawal and use by them, their permittees, entities reporting through them and their political subdivisions, as applicable, of the waters of the subject portion of the Potomac River and availability from other sources which is needed for the administration of the allocation system.

C. The State agrees that all appropriation permits granted by the Administration for any appropriation of water from the subject portion of the Potomac River shall include a provision subjecting the permittee to the provisions of this Agreement. Nothing herein shall restrict or limit such authority as the Administration may properly have to issue permits or impose low flow allocation requirements upon any other water appropriating permittee withdrawing water from other segments of the Potomac River, or to enforce provisions of its permits in the subject portion of the Potomac River; nor any such authority as the Commonwealth may have; nor the authority of the Government with respect to navigable waters,

including the regulation of commerce among the states and with foreign nations.

D. The parties will comply with the determinations made by the Aqueduct pursuant to this Agreement, unless and until overturned pursuant to the terms of Article 1.

E. Any community or entity which seeks to appropriate water from the subject portion of the Potomac River shall either become a member party to this Agreement or shall be governed by a permit which includes the low flow allocation formula and such other provisions as are necessary to effect the purposes of this Agreement. Any such community or entity may apply for permits necessary to build water intake structures or to appropriate water, and such permits shall be processed in accordance with the rules and regulations of the permit-issuing agency, notwithstanding the pendency of negotiations or the imposition of an interim allocation ratio pursuant to Section 2.C.3. If the necessary permits are granted to a community or entity not previously withdrawing water from the subject portion of the river, the existing interim allocation ratio shall be recalculated based on winter period use for the year immediately prior to the first withdrawal from the subject portion of the river by such new user. The average daily winter use of the new user for such winter period and those of the other users employed in determining the interim allocation ratio shall be employed

to compute a revised interim allocation ratio which shall remain in effect until a replacement formula is determined pursuant to Section 2:C.3.

F. This Agreement does not affect such rights as parties or others subject to this agreement may have to grant or obtain permits to appropriate additional amounts of water during periods other than the Restriction or Emergency stages, but except as specifically provided in Article 2, Section C and Article 3, Section E, any additional water use resulting therefrom shall not affect any user's allocated fair share during such stages.

ARTICLE 4. Review

In the month of April in each year during the term of this Agreement the parties shall convene for the purpose of reviewing the provisions of this Agreement and considering any modifications thereof, and make such modifications as the governing parties agree upon. Upon agreement among the governing parties, review and modifications as might be agreed upon can occur at any time and not be necessarily limited to the annual, April consideration. Entities shall be admitted as new member parties upon unanimous agreement of the governing parties.

ARTICLE 5. Revocation.

This Agreement shall not be revoked without the unanimous consent of the governing parties.

ARTICLE 6. Effective Date.

This Agreement shall become binding when: (1) it is executed by the parties, and (2) a Moderator has been selected as provided in Article 1.G, and (3) the Government issues one or more permits for the construction of any water diversion structure or water intake in the subject portion of the Potomac River to any party hereto or political subdivision or authority thereof, and (4) all acts have been taken by each of the parties hereto necessary to make this agreement binding and enforceable with respect to each of them, including, if necessary, ratification by the legislatures of the signatory states. Notice that all such necessary acts have been taken by each of the parties shall be delivered to the other parties along with the opinion of its respective counsel or attorney general that the acts taken are sufficient to cause this agreement to become effective, binding and enforceable under the laws or charter of such parties. The parties will, however, commence to record and maintain the consumption figures and other base data called for under the foregoing provisions of this Agreement, at the time they execute this Agreement. This Agreement may be executed in one or more counterparts.

ARTICLE 7. Severability.

The provisions of this agreement shall be severable and if any phrase, clause, sentence or provision of the agreement is declared to be unconstitutional or the applicability thereof to any party is held invalid, the remainder of such agreement shall not be affected thereby.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written, except as a different date of execution may be noted following any party's signature.

ATTEST:

Charles J. McCann

Garburt M. Sachs

Albert K. Schaller

EXECUTIVE SECRETARY, D. C.

THE UNITED STATES OF AMERICA

BY Cassius M. Alexander
Secretary of the Army
W. H. Harris
Chief of Engineers

THE STATE OF MARYLAND

BY Blair H. R.
Governor

James B. Louth
Secretary of Natural
Resources

THE COMMONWEALTH OF VIRGINIA

BY Walter W. R.
Governor

J. Leo Brown
Vice Chairman, State Water
Control Board

THE DISTRICT OF COLUMBIA

BY Walter Washington
Mayor

Herbert F. Beach
Director of Environmental
Services

THE WASHINGTON SUBURBAN SANITARY
COMMISSION

Robert B. Gentry

BY

Clara Berkman
Chairman

FAIRFAX COUNTY WATER AUTHORITY

W. H. H. H. H.

BY

Frank C. Martin
Chairman

Modification No. 1

MODIFICATION NO. 1
POTOMAC RIVER LOW FLOW ALLOCATION AGREEMENT
DATED AS OF JANUARY 11, 1978

ARTICLE 2.C.2. is modified by adding the phrase "On or before March 15 of each year," at the beginning of the first sentence.

ARTICLE 2.C.3.a. is modified by adding the following paragraphs at the end thereof:

"During such time as there is in effect a legally enforceable agreement by and among the Aqueduct, the District, the Authority and the Commission providing for the regional management of all their water supply facilities for the benefit of the Washington Metropolitan Area and the proposed Little Seneca Lake has been constructed and is operational, the foregoing paragraph shall be inoperative and the following paragraph shall become operative.

The allocation formula set forth in Article 2.C.2., or any subsequently revised or replacement formula, may be revised or replaced by unanimous agreement of the governing parties as herein provided. At the April 1995 meeting of the parties and at each fifth annual April meeting thereafter, the parties shall review and evaluate the fairness and reasonableness of the formula then in effect in the light of: experience gained in the operation of the agreement during the preceding five year period; then current estimates of future water demands in the Washington Metropolitan Area; adequacy of then available and prospective future supplies of water to satisfy future demands; experience gained in the regional management of available water supply facilities to optimize their use; factors listed in subparagraph 2.C.3.b.; and such other factors as may be pertinent. If as a result of any such review and evaluation the governing parties shall determine that the formula

then in effect is not fair and reasonable, they shall revise or replace the formula in such manner as they shall deem appropriate. Notwithstanding the foregoing, if at any other time any party desires to secure a revision or replacement of the formula, it shall give written notice thereof to all other parties and, within 60 days after such notification, the parties shall meet for the purpose of negotiating a revision or replacement of the formula. Unless and until a revised or replacement formula is agreed upon by unanimous agreement of the governing parties, the formula then in effect shall continue in effect. However, any party, at any time after the expiration of one year from the filing of such notice and after the exhaustion of such administrative procedures as may be applicable if it is a permittee for water appropriation or withdrawal, may apply to a court of competent jurisdiction for an adjudication of such rights, if any, as it or users associated with it may have to a greater share of water than set by the formula then in effect. All parties shall adhere to the formula then in effect until and unless altered by a decision of such court. Applications for intakes or other modifications to water works shall continue to be received and processed during periods in which negotiations of a revised or replacement formula are in effect and during the pendency of any litigation relating thereto."

ARTICLE 2.C.4. is modified to read as follows:

"4. In the event the applicable allocation formula results in an allocation exceeding the proposed withdrawal of any user, the excess amount shall be reported by said user to the Aqueduct and the Aqueduct shall reallocate said excess amount among the other users in a reasonable manner."

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ARTICLE 2.C.5. is modified to read as follows:

"5. The water subject to the allocation formula under the terms of this Agreement includes (i) the maximum capacity then practicable from the Patuxent River and the Occoquan River; (ii) the natural flow of the subject portion of the Potomac River; and (iii) augmented flow of the subject portion of the Potomac River resulting from releases (for whatever purpose) from existing upstream reservoirs, including Bloomington Lake and Savage Lake and from the proposed Little Seneca Lake when completed and operational."

ARTICLE 2.C. is modified by adding the following new paragraph:

"8. In April 1990 and in April of each fifth year thereafter during such time as there is in effect a legally enforceable agreement by and among the Aqueduct, the District, the Authority, and the Commission providing for the regional management of all of their water supply facilities for the benefit of the Washington Metropolitan Area and the proposed Little Seneca Lake has been constructed and is operational, the Aqueduct, the District, the Authority, and the Commission shall review and evaluate the adequacy of the then available water supplies to meet the water demands in the Washington Metropolitan Area which may then be expected to occur during the succeeding twenty year period. If as a result of any such review and evaluation it is determined that additional water supplies will be required to meet the expected demands, the Aqueduct, the District, the Authority, and the Commission shall undertake negotiations to provide the required additional water supplies and, when provided, water from such additional water supplies shall be included as water subject to the allocation formula under the terms of this Agreement."

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ARTICLE 3.E. is modified by adding the following paragraphs at the end thereof:

"During such time as there is in effect a legally enforceable agreement by and among the Aqueduct, the District, the Authority, and the Commission providing for the regional management of all of their water supply facilities for the benefit of the Washington Metropolitan Area and the proposed Little Seneca Lake has been constructed and is operational, the foregoing paragraph shall be inoperative and the following paragraph shall become operative.

Any community or entity which seeks to appropriate water from the subject portion of the Potomac River shall either become a member party to this Agreement or shall be governed by a permit which includes the low flow allocation formula and such other provisions as are necessary to effect the purposes of this Agreement. Any such community or entity may apply for permits necessary to build water intake structures or to appropriate water, and such permits shall be processed in accordance with the rules and regulations of the permit-issuing agency, notwithstanding the pendency of negotiations or litigation pursuant to Section 2.C.3."

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ADOPTION BY GOVERNING PARTIES

At a meeting held on the 15th day of April 1982, and by subsequent correspondence and telephone polling, representatives of the governing parties unanimously recommend adoption of the foregoing Modification No. 1 of the Potomac River Low Flow Allocation Agreement, dated as of January 11, 1978, and the same is hereby agreed to and adopted by the governing parties as of the dates indicated opposite their signatures.

Witness the following signatures:

ATTEST:

22 JUL 1982

(Date)

22 JUL 1982

(Date)

22 JUL 1982

(Date)

22 JUL 1982

(Date)

THE UNITED STATES OF AMERICA

By

Secretary of the Army

Chief of Engineers

THE STATE OF MARYLAND

By

Governor

Secretary of Natural Resources

THE COMMONWEALTH OF VIRGINIA

By

Governor

Chairman, State Water Control Board

THE DISTRICT OF COLUMBIA

By

Mayor

Director, Department of Environmental Services

C-E-R-T-I-F-I-C-A-T-E

We, the undersigned representatives of the governing parties to the Potomac River Low Flow Allocation Agreement, dated January 11, 1978, do hereby certify that, at a meeting held on this 15th day of April, 1982, we unanimously approved the hereunto attached Modification No. 1 to the said Agreement and agreed to recommend the adoption thereof by our respective governing parties.

Witness the following signatures:

REPRESENTATIVE OF THE
UNITED STATES OF AMERICA

James W. Seck
COL DISTRICT ENGINEER
(Title)

REPRESENTATIVE OF THE
COMMONWEALTH OF VIRGINIA

David W. Miller
POTOMAC RIVER BOARD
(Title)

REPRESENTATIVE OF THE
STATE OF MARYLAND

James B. Foulter
Sect. Md. Dept. of Natural Res.
(Title)

REPRESENTATIVE OF THE
DISTRICT OF COLUMBIA

William B. John
DIRECTOR, DC-DES
(Title)

Modification No. 2 [unsigned]

MODIFICATION NO. 2

POTOMAC RIVER LOW FLOW ALLOCATION AGREEMENT

DATED AS OF JANUARY 11, 1978

ARTICLE 2.B.1. is modified to read as follows:

"1. Alert Stage. When the total daily withdrawal from the subject portion of the Potomac River is equal to or greater than fifty percent (50%) of the total daily flow, but less than eighty percent (80%), the Aqueduct may, after consultation with the General Manager of the Commission and the Engineer-Director of the Authority, declare an "Alert Stage" to be in effect."

ARTICLE 2.B.2. is modified to read as follows:

"2. Restriction Stage. When the total daily withdrawal from the subject portion of the Potomac River is equal to or greater than eighty percent (80%) of the total daily flow, the Aqueduct may, after consultation with the General Manager of the Commission and the Engineer-Director of the Authority, declare a "Restriction Stage" to be in effect and, upon such declaration, the Aqueduct will request the U.S. Park Service to discontinue putting Potomac River water into the C&O Canal."

ARTICLE 2.B.3. is modified to read as follows:

"3. Emergency Stage. When the estimated total daily withdrawal for any day within the ensuing five (5) days from the subject portion of the Potomac River is expected to exceed the daily river flow anticipated, the Aqueduct may, after consultation with the General Manager of the Commission and the Engineer-Director of the Authority, declare an "Emergency Stage" to be in effect."

ADOPTION BY GOVERNING PARTIES

At a meeting held on the 19th day of April 1985, and by subsequent correspondence and telephone polling, representatives of the governing parties unanimously recommended

adoption of the foregoing Modification No. 2 of the Potomac River Low Flow Allocation Agreement, dated as of January 11, 1978, and the same is hereby agreed to and adopted by the governing parties as of the dates indicated opposite their signatures.

WITNESS the following signatures:

ATTEST:

THE UNITED STATES OF AMERICA

By _____
Secretary of the Army

(Date)

Chief of Engineers

THE STATE OF MARYLAND

By _____
Governor

(Date)

Secretary of Natural Resources

THE COMMONWEALTH OF VIRGINIA

By _____
Governor

(Date)

Chairman,
State Water Control Board

THE DISTRICT OF COLUMBIA

By _____
Mayor

(Date)

Director, Department of
Environmental Services

This document is an electronic version of the Low Flow Allocation Agreement with Modifications 1 and 2 incorporated. If there is any discrepancy, the language in the original documents controls.

11 January 1978

POTOMAC RIVER LOW FLOW ALLOCATION AGREEMENT

THIS AGREEMENT, made and entered into this 11th day of January 1978, by and among the UNITED STATES OF AMERICA (hereinafter called “the Government”) acting by the Secretary of the Army through the Chief of Engineers, the STATE OF MARYLAND (hereinafter called “the State”) acting by the Governor and the Secretary of the Department of Natural Resources, the COMMONWEALTH OF VIRGINIA (hereinafter called “the Commonwealth”) acting by the Governor and the Chairman of the State Water Control Board; the DISTRICT OF COLUMBIA (hereinafter called “the District”) acting by its Mayor, the WASHINGTON SUBURBAN SANITARY COMMISSION (hereinafter called “the Commission”) acting by its Chairman; and the FAIRFAX COUNTY WATER AUTHORITY (hereinafter called “the Authority”) acting by its Chairman;

PREFACE

WHEREAS, the Chief of Engineers is charged with the operation and maintenance of the Washington Aqueduct for the primary purpose of providing an adequate supply of potable water for distribution to and consumption by the agencies and instrumentalities of the Government situate in the District of Columbia and its environs, and thereafter of providing a public water supply for the inhabitants of the District of Columbia; and

WHEREAS, the Secretary of the Army is authorized, subject to certain conditions, to supply treated water from the Washington Aqueduct to any competent state or local authority in

the Washington Metropolitan Area in Virginia, and to that end has entered into agreements with the County of Arlington and the City of Falls Church, Virginia; and

WHEREAS, the sole source of raw water treated by the Washington Aqueduct and dispensed therefrom is the Potomac River, and the Washington Aqueduct is now maintaining intake facilities for this purpose at Little Falls and Great Falls, Maryland; and

WHEREAS, the State of Maryland has enacted an appropriation permit statute which requires that all non-exempt jurisdictions obtain a permit from the Water Resources Administration of the State's Department of Natural Resources (hereinafter called "the Administration") to appropriate or use the water of the Potomac River; and

WHEREAS, the parties to this Agreement recognize that other riparian interests, such as communities located in Virginia, may in the future desire to withdraw and use water from the segment of the Potomac River which is the subject of the within Agreement, and provision is made herein requiring that access by any of them to such water be made subject to the provisions of this Agreement; and

WHEREAS, the Commission is charged with the responsibility of providing a safe and adequate public water supply within the Counties of Montgomery and Prince George's, Maryland, and is also authorized to enter into agreements to provide water, and for that purpose is operating and maintaining water treatment facilities and a water distribution system; and

WHEREAS, the Commission maintains a water treatment plant and an intake therefrom on the Potomac River, which intake is upstream from the Washington Aqueduct intakes and within the limits of the River covered by this Agreement, and in addition the Commission maintains a water treatment plant with intake on the Patuxent River, and requires water from

both sources in order to fulfill its above-mentioned responsibilities for providing a public water supply; and

WHEREAS, the City of Rockville, Maryland, is operating and maintaining water treatment facilities and a water distribution system and maintains an intake facility about one mile upstream from Great Falls on the Potomac River, which intake is upstream from the Washington Aqueduct intakes and within the limits of the River covered by this Agreement; and

WHEREAS, the Fairfax County Water Authority is an authority in the Commonwealth of Virginia proposing to withdraw water from that portion of the Potomac River which is covered by this Agreement and has applied for a permit to construct a water intake structure for such purpose; and

WHEREAS, in the absence of adequate upstream impoundments and associated flow regulation, the quantity of water which may flow in the Potomac River between Little Falls Dam and the farthest upstream limit of the pool of water behind the Chesapeake and Ohio Canal Company rubble dam at Seneca, Maryland, during periods of low flow in that portion of the River, may be less than the quantity needed to meet the demand for all customary public water supply purposes during such periods; and

WHEREAS, in light of the Federal legislative enactments providing for the Corps of Engineers to supply water to the District of Columbia, enactment of legislation was deemed by the Government to be a prerequisite to its participation in a Potomac River Low Flow Allocation Agreement; and

WHEREAS, the consent of Congress to a Potomac River Low Flow Allocation Agreement is expressly stated in Section 181 of the Water Resources Development Act of 1976, Public Law 94-587; and

WHEREAS, the consent of Congress, pursuant to Section 9 of the Rivers and Harbors Act of 1899, to the construction of a water diversion structure by the Commission from the north shore of the Potomac River at the Commission's water filtration plant to the north shore of Watkins Island is conditioned in Section 181 of the aforesaid Water Resources Development Act of 1976 upon an enforceable Low Flow Allocation Agreement; and

WHEREAS, it is the judgment of the Chief of Engineers and the Secretary of the Army, acting pursuant to Section 10 of the Rivers and Harbors Act of 1899, that the public interest requires that such a Low Flow Allocation Agreement be a requirement for issuance of the permits for the construction of water intake structures in the subject portion of the Potomac River by the Commission and the Fairfax County Water Authority;

NOW, THEREFORE, in consideration of the premises and of the public and governmental interests deemed to be served hereby, the parties hereto do mutually agree as follows:

ARTICLE 1. Enforcement.

A. Certain Definitions:

1. Pertinent Portion of the River. The portion of the Potomac River subject to this Agreement is that located between Little Falls Dam and the farthest upstream limit of the pool of water behind the Chesapeake and Ohio Canal Company rubble dam at Seneca, Maryland. This

portion is referred to herein as “the defined portion” or, alternately “the subject portion” of the Potomac River.

2. Parties. The Government, the State, the Commonwealth, and the District shall be termed “the governing parties.” All other parties hereto shall be termed “member parties.” The term “parties” shall mean all parties, both governing and member, except when the context otherwise requires.

B. Moderator. Authority to enforce the provisions of this Agreement shall be vested in an unbiased Moderator. It shall be the duty of the Moderator and he shall have the authority:

1. To take all actions necessary to enforce the provisions of this Agreement and his decisions hereunder, and for this purpose he may sue in his own name.

2. To decide all disputes between or among the parties arising under this Agreement not disposed of by consent.

The authority of the Moderator shall not restrict those powers reserved to the parties, including those specified in Article 3, Section C.

C. The decision of the Moderator shall be final and conclusive unless determined by a court of competent jurisdiction to have been fraudulent, capricious, arbitrary, or not supported by substantial evidence. All parties agree to accept and implement every decision of the Moderator unless and until said decision is overturned by a court of competent jurisdiction.

D. The parties specifically grant to the Moderator the authority to inspect documents, records, meters, facilities, and other items necessary to decide any question or verify reports made by any party as a consequence of this Agreement. Upon the request of any party, the

Moderator shall provide said party any or all of the information held by him relevant to this Agreement.

E. Should the Moderator decide to commence or defend any action or otherwise have need of legal services relating to this Agreement, he shall have the right to contract with counsel for such purpose, and the cost of such services shall be repaid in equal shares by the governing parties. In the interest of prompt action, the Moderator may accept legal services, or an advance of funds, for such purpose from any party. Nothing herein shall require a party being sued by the Moderator to advance funds for such purpose.

F. The Moderator shall not be liable for injury or damage resulting from any decision or action taken in good faith without malice under apparent authority of this agreement, even though such decision or action is later judicially declared to be unauthorized or invalid.

G. The Moderator shall be selected, and may be relieved of his duties for any reason, by unanimous action of the governing parties expressed in a signed memorandum. Should the office of Moderator become vacant through death, resignation, or otherwise, a new Moderator shall be selected as soon as practicable by such unanimous action. During any period in which the office of Moderator remains vacant through a failure of unanimous action or otherwise, the full functions of the office of Moderator shall be exercised by a Standby Moderator who shall, except as expressly otherwise provided, be treated as the Moderator for all purposes under the provisions hereof. The duty to designate the Standby Moderator shall rotate annually among the Government, the State, the Commonwealth, and the District in the order stated, beginning on the date this agreement becomes effective and rotating thereafter on the first day of each calendar

year. Written notice of such annual designation shall be sent to all other parties by January 15 of each year. The first Moderator for this Agreement is designated in Annex A hereto.

H. Subject to the availability of funds, the reasonable expenses, including legal fees, and compensation of the Moderator shall be paid in equal shares by the governing parties. Any expense shall be deemed reasonable if at least three of the governing parties so agree or if so determined by a court. If any such party accepts as reasonable a particular expense not accepted as reasonable by the other such parties, that party may pay that expense, in addition to that party's proportionate share of all other expenses. At the time of each annual review as provided in Article 4 of this Agreement, the governing parties shall set, by majority vote, the per diem fee to be paid a Moderator in the event his services shall be necessary. A Standby Moderator, who is an employee of the designating party or one of its political subdivisions or agencies, shall serve without fee in exercising the functions of the Moderator.

I. The Moderator or any party may bring an action against any one or more other parties to enforce this Agreement or a decision of the Moderator made hereunder. Such action shall be brought in the United States District Court for the District of Columbia, and each party consents to venue in said court and to service of process upon it from said court, provided that if the action is between two states of the United States, such action may be commenced in the Supreme Court of the United States. In any such action the joinder of all parties hereto shall not be deemed necessary or indispensable merely because they are parties to this Agreement. Application for or receipt of a determination by the Moderator shall not be a prerequisite to the maintenance of an action by a party, but any decision made by the Moderator on a matter involved in said action, whether before or after commencement thereof, shall be given the effect set forth in Article I, Section C. Nothing herein shall be deemed to be a waiver of any immunity any party may have

from a claim for monetary damages or a claim which has substantial fiscal impact, except for the fees and expenses which are provided to be paid pursuant to the agreement. It is the intention of the parties that any matters involving the technical aspects of maintenance of litigation be resolved in a manner which ensures rapid and certain enforcement of this Agreement.

ARTICLE 2. Administration

A. Washington Aqueduct. The Government will provide a communication control center at the Washington Aqueduct for the administration of the allocation plan as provided herein. The Washington Aqueduct Division, U.S. Army Engineer District, Baltimore ("the Aqueduct"), will collect, receive, record and accumulate daily reports regarding the flow of the Potomac River and the quantities of water being withdrawn from the defined portion of the Potomac River, and the quantities of water withdrawn and available from all other sources for use within the Washington Metropolitan Area, by the parties and the political subdivisions, authorities, and permittees of any of them, and by any other water withdrawing entity which may formally be added or made subject to this Agreement subsequent to its initial execution. Subject to the parties' rights of appeal to the Moderator, the parties grant to the Aqueduct, and to each other, the right to inspect documents, records, meters, facilities and other items necessary to decide any question or verify reports made by any party as a consequence of this agreement. Beginning with the Alert Stage, the Aqueduct will keep the Moderator informed as to the stage of flow in the Potomac River, and, during the Restriction and Emergency Stages the fair share allocated to each user, and all information utilized for determining the allocation. The Aqueduct will provide all parties with the same information relating to allocation, the quantities of water being withdrawn by all users from any and all sources, and the flow of the Potomac River. To permit uniformity of reports and to implement the administrative measures specified herein, reports and calculations, by or to the

Aqueduct, of daily withdrawals or daily flows, will be based on the twenty-four hour period from one midnight to the following midnight, unless the parties subsequently agree to a different twenty-four hour measuring period. The Aqueduct will calculate the total daily flow by adding the withdrawals during the previous 24 hours at all withdrawal points and the remaining daily flow over the Washington Aqueduct Dam at Little Falls, as determined by the readings recorded on the USGS gage at Little Falls during the preceding twenty- four (24) hours. The average reading will determine the flow over the dam for the previous day.

B. Stages of Flow in the Potomac River. The Aqueduct will determine from the information accumulated when the following stages exist in the defined portion of the Potomac River.

1. Alert Stage. When the total daily withdrawal from the subject portion of the Potomac River is equal to or greater than fifty percent (50%) of the total daily flow, but less than eighty percent (80%), the Aqueduct may, after consultation with the General Manager of the Commission and the Engineer-Director of the Authority, declare an “Alert Stage” to be in effect.

2. Restriction Stage. When the total daily withdrawal from the subject portion of the Potomac River is equal to or greater than eighty percent (80%) of the total daily flow, the Aqueduct may, after consultation with the General Manager of the Commission and the Engineer-Director of the Authority, declare a “Restriction Stage” to be in effect and the Aqueduct will request the U.S. Park Service to discontinue putting Potomac River water into the C&O Canal.

3. Emergency Stage. When the estimated total daily withdrawal for any day within the ensuing five (5) days from the subject portion of the Potomac River is expected to exceed the

daily river flow anticipated, the Aqueduct may, after consultation with the General Manager of the Commission and the Engineer-Director of the Authority, declare an “Emergency Stage” to be in effect.

C. Allocation of Flow. Whenever the Restriction Stage or the Emergency Stage is in effect, the Aqueduct shall daily calculate and advise each user (as defined herein), and the Moderator, of each user’s allocated fair share of the water available from the subject portion of the Potomac River in accordance with this Section C. In calculating the amount of water available for allocation, the Aqueduct will determine, in consultation with the parties and based upon then current conditions and information, any amount needed for flow in the Potomac River downstream from the Little Falls dam for the purpose of maintaining environmental conditions (“environmental flow-by”), and shall balance such need against essential human, industrial and domestic requirements for water. The Aqueduct’s determination shall be based upon the data and shall give substantial weight to conclusions for environmental flow-by submitted by the State.

1. For the purpose of this Section C, the term “users” refers to the following entities which are or may be appropriating water for public water supply purposes from the subject portion of the Potomac River; namely, the Government (including its water customers), the Commonwealth for and on behalf of herself and each of her political subdivisions and authorities (including the Authority), the State and the Administration (for and on behalf of its permittees whether or not parties to this Agreement), the District of Columbia, the Commission, and such entities which may formally be added or made subject to this Agreement subsequent to its initial execution.

2. On or before March 15 of each year, each user shall report to the Aqueduct (and to each other) the number of gallons of processed water pumped daily to all its customers from all sources during each winter period (the months of December through February), commencing with the winter period 1977-78. The amounts pumped during the 5 most recent winter periods which have elapsed as of the time of allocation, or less than 5 if fewer have so elapsed, shall be combined for the purpose of computing each user's average daily winter use; except that, in the case of a user first withdrawing water subsequent of the year immediately prior to its first withdrawal from the subject portion of the river, which have elapsed as of the time of allocation, but not exceeding the 5 most recent winter periods. The ratio which the average to the initial execution of the Agreement, the average daily winter use of such user shall be the average of the amounts of water pumped during all of the winter periods, commencing December 1 daily winter use of each user bears to the average daily winter use of all users will be applied to the daily amount of water available at the time of allocation from the subject portion of the Potomac River (after deduction for environmental flow-by) and all other sources as specified in Paragraph 5 below (calculated at maximum capacity practicable). The resulting amount, less the amount then available to said user by use of the maximum capacity practicable from all such other sources, will be such user's allocated fair share of the flow of the Potomac River.

3. a. The formula set forth in Article 2.C.2. shall continue in effect unless changed by unanimous consent of the governing parties or as set forth below. After January 1, 1988, any of the governing parties which desires to change the allocation formula shall give written notice to all other parties. Within 60 days thereafter, both the governing and member parties shall meet for the purpose of negotiating a replacement formula. In the event that no such replacement formula is agreed on by the governing parties within one year after receipt of the aforesaid notice, the

allocation ratio which would have been in effect for the summer of the year in which the notice was given shall be used as an interim allocation ratio for the withdrawal of water during subsequent periods of low flow until such time as the governing parties agree upon a replacement formula. Any governing party, at any time after the expiration of one year from the receipt of such notice and after the exhaustion of such administrative procedures as may be applicable if it is a permittee for water appropriation or withdrawal, may apply to a court of competent jurisdiction for an adjudication of such rights, if any, as it or users associated with it may have to a greater share of water than set by the interim allocation ratio, provided that all parties shall adhere to the interim allocation ratio until and unless altered by a decision of such court. Applications for intakes or other modifications to water works shall continue to be received and processed during periods in which the interim allocation ratio is in effect, but such ratio shall be recalculated only in the event of the grant of an application to a new user as set forth in Section E of Article 3.

During such time as there is in effect a legally enforceable agreement by and among the Aqueduct, the District, the Authority and the Commission providing for the regional management of all their water supply facilities for the benefit of the Washington Metropolitan Area and the proposed Little Seneca Lake has been constructed and is operational, the foregoing paragraph shall be inoperative and the following paragraph shall become operative.

The allocation formula set forth in Article 2.C.2., or any subsequently revised or replacement formula, may be revised or replaced by unanimous agreement of the governing parties as herein provided. At the April 1985 meeting of the parties and at each fifth annual April meeting thereafter, the parties shall review and evaluate the fairness and reasonableness of the formula then in effect in the light of: experience gained in the operation of the Agreement during

the preceding five-year period; then current estimates of future water demands in the Washington Metropolitan Area; adequacy of then available and prospective future supplies of water to satisfy future demands; experience gained in the regional management of available water supply facilities to optimize their use; factors listed in subparagraph 2.C.3.b.; and such other factors as may be pertinent. If as a result of any such review and evaluation the governing parties shall determine that the formula then in effect is not fair and reasonable, they shall revise or replace the formula in such manner as they shall deem appropriate. Notwithstanding the foregoing, if at any other time any party desires to secure a revision or replacement of the formula, it shall give written notice thereof to all other parties and, within 60 days after such notification, the parties shall meet for the purpose of negotiating a revision or replacement of the formula. Unless and until a revised or replacement formula is agreed upon by unanimous agreement of the governing parties, the formula then in effect shall continue in effect. However, any party, at any time after the expiration of one year from the filing of such notice and after the exhaustion of such administrative procedures as may be applicable if it is a permittee for water appropriation or withdrawal, may apply to a court of competent jurisdiction for an adjudication of such rights, if any, as it or users associated with it may have to a greater share of water than set by the formula then in effect. All parties shall adhere to the formula then in effect until and unless altered by a decision of such court. Applications for intakes or other modifications to water works shall continue to be received and processed during periods in which negotiations of a revised or replacement formula are in effect and during the pendency of any litigation relating thereto.

b. Any formula negotiated pursuant to subparagraph a hereof shall allocate water on a fair and equitable basis and shall take into consideration, among other things, (a) steps taken by parties which can do so to minimize dependence upon the Potomac River during periods of low

flow, (b) the nature and effectiveness of water conservation methods put into effect, (c) steps taken to increase the water supply available for the Washington Metropolitan Area, (d) then current population growth and planning for future growth, (e) feasibility and availability of new sources of water, and (f) technological advances in water treatment and water quality measurement.

c. In any court proceeding instituted pursuant to subparagraph a, neither the signing of this agreement nor the passage of time thereafter shall be asserted as a waiver or diminution of any party's rights to, or right to seek, a greater share of water from the subject portion of the river. Such action shall be brought in the United States District Court for the District of Columbia, and each party consents to venue in such court and to service of process upon it from such court, provided that if the action is between two states of the United States, such action may be commenced in the Supreme Court of the United States.

4. In the event the applicable allocation formula results in an allocation exceeding the proposed withdrawal of any user, the excess amount shall be reported by said user to the Aqueduct and the Aqueduct shall reallocate said excess amount among the other users in a reasonable manner.

5. The water subject to the allocation formula under the terms of this Agreement includes (i) the maximum capacity then practicable from the Patuxent River and the Occoquan River; (ii) the natural flow of the subject portion of the Potomac River; and (iii) augmented flow of the subject portion of the Potomac River resulting from releases (for whatever purpose) from existing upstream reservoirs, including Bloomington Lake and Savage Lake and from the proposed Little Seneca Lake when completed and operational.

6. In the event a disaster, such as a major fire or water main break, results in an abnormal loss of a significant portion of any user's water supply, the Aqueduct shall determine suitable adjustments in low flow allocation during the emergency period created by the disaster only, taking into consideration all sources available to the users.

7. Water from the emergency pumping station having its intake at the estuary of the Potomac shall not be considered as water available from other sources for the purposes of Section 2.C.2. or otherwise included in computations made under this agreement.

8. In April 1990 and in April of each fifth year thereafter during such time as there is in effect a legally enforceable agreement by and among the Aqueduct, the District, the Authority, and the Commission providing for the regional management of all of their water supply facilities for the benefit of the Washington Metropolitan Area and the proposed Little Seneca Lake has been constructed and is operational, the Aqueduct, the District, the Authority, and the Commission shall review and evaluate the adequacy of the then available water supplies to meet the water demands in the Washington Metropolitan Area which may then be expected to occur during the succeeding twenty- year period. If as a result of any such review and evaluation it is determined that additional water supplies will be required to meet the expected demands, the Aqueduct, the District, the Authority, and the Commission shall undertake negotiations to provide the required additional water supplies and, when provided, water from such additional water supplies shall be included as water subject to the allocation formula under the terms of this Agreement.

ARTICLE 3. Obligations of the Parties.

A. The Government agrees to cause the Aqueduct as the operating agency to perform the functions and requirements which are required of the Government and the Aqueduct in this Agreement, including the furnishing of information to the other parties relating to the Aqueduct's water withdrawal and use, the same as required by other parties to be furnished to the Aqueduct under Subparagraphs B and D, of this Article. These functions and responsibilities of the Aqueduct shall be carried out under the supervision of the District Engineer, U.S. Army Engineer District, Baltimore, or his designee, who shall be responsible for making the determinations required in the discharge of these responsibilities.

B. The parties agree to provide the Aqueduct with all the information relating to the withdrawal and use by them, their permittees, entities reporting through them and their political subdivisions, as applicable, of the waters of the subject portion of the Potomac River and availability from other sources which is needed for the administration of the allocation system.

C. The State agrees that all appropriation permits granted by the Administration for any appropriation of water from the subject portion of the Potomac River shall include a provision subjecting the permittee to the provisions of this Agreement. Nothing herein shall restrict or limit such authority as the Administration may properly have to issue permits or impose low flow allocation requirements upon any other water appropriating permittee withdrawing water from other segments of the Potomac River, or to enforce provisions of its permits in the subject portion of the Potomac River; nor any such authority as the Commonwealth may have; nor the authority of the Government with respect to navigable waters, including the regulation of commerce among the states and with foreign nations.

D. The parties will comply with the determinations made by the Aqueduct pursuant to this Agreement, unless and until overturned pursuant to the terms of Article 1.

E. Any community or entity which seeks to appropriate water from the subject portion of the Potomac River shall either become a member party to this Agreement or shall be governed by a permit which includes the low flow allocation formula and such other provisions as are necessary to effect the purposes of this Agreement. Any such community or entity may apply for permits necessary to build water intake structures or to appropriate water, and such permits shall be processed in accordance with the rules and regulations of the permit-issuing agency, notwithstanding the pendency of negotiations or the imposition of an interim allocation ratio pursuant to Section 2.C.3. If the necessary permits are granted to a community or entity not previously withdrawing water from the subject portion of the river, the existing interim allocation ratio shall be recalculated based on winter period use for the year immediately prior to the first withdrawal from the subject portion of the river by such new user. The average daily winter use of the new user for such winter period and those of the other users employed in determining the interim allocation ratio shall be employed to compute a revised interim allocation ratio which shall remain in effect until a replacement formula is determined pursuant to Section 2.C.3.

During such time as there is in effect a legally enforceable agreement by and among the Aqueduct, the District, the Authority, and the Commission providing for the regional management of all of their water supply facilities for the benefit of the Washington Metropolitan Area and the proposed Little Seneca Lake has been constructed and is operational, the foregoing paragraph shall be inoperative and the following paragraph shall become operative.

Any community or entity which seeks to appropriate water from the subject portion of the Potomac River shall either become a member party to this Agreement or shall be governed by a permit which includes the low flow allocation formula and such other provisions as are necessary to effect the purposes of this Agreement. Any such community or entity may apply for permits necessary to build water intake structures or to appropriate water, and such permits shall be processed in accordance with the rules and regulations of the permit-issuing agency, notwithstanding the pendency of negotiations or litigation pursuant to Section 2.C.3.

F. This Agreement does not affect such rights as parties or others subject to this Agreement may have to grant or obtain permits to appropriate additional amounts of water during periods other than the Restriction or Emergency stages, but except as specifically provided in Article 2, Section C and Article 3, Section E, any additional water use resulting therefrom shall not affect any user's allocated fair share during such stages.

ARTICLE 4. Review

In the month of April in each year during the term of this Agreement, the parties shall convene for the purpose of reviewing the provisions of this Agreement and considering any modifications thereof, and make such modifications as the governing parties agree upon. Upon agreement among the governing parties, review and modifications as might be agreed upon can occur at any time and not be necessarily limited to the annual, April consideration. Entities shall be admitted as new member parties upon unanimous agreement of the governing parties.

ARTICLE 5. Revocation

This Agreement shall not be revoked without the unanimous consent of the governing parties.

ARTICLE 6. Effective Date

This Agreement shall become binding when: (1) it is executed by the parties, and (2) a Moderator has been selected as provided in Article 1.G, and (3) the Government issues one or more permits for the construction of any water diversion structure or water intake in the subject portion of the Potomac River to any party hereto or political subdivision or authority thereof, and (4) all acts have been taken by each of the parties hereto necessary to make this agreement binding and enforceable with respect to each of them, including, if necessary, ratification by the legislatures of the signatory states. Notice that all such necessary acts have been taken by each of the parties shall be delivered to the other parties along with the opinion of its respective counsel or attorney general that the acts taken are sufficient to cause this Agreement to become effective, binding and enforceable under the laws or charter of such parties. The parties will, however, commence to record and maintain the consumption figures and other base data called for under the foregoing provisions of this Agreement, at the time they execute this Agreement. This Agreement may be executed in one or more counterparts.

ARTICLE 7. Severability

The provisions of this Agreement shall be severable and if any phrase, clause, sentence or provision of the Agreement is declared to be unconstitutional or the applicability thereof to any party is held invalid, the remainder of such Agreement shall not be affected thereby.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written, except as a different date of execution may be noted following any party's signature.

Dec. 23, 1998, Revised Dec. 15, 2017

This document is an electronic version of the Low Flow Allocation Agreement with Modifications 1 and 2 shown in highlights. If there is any discrepancy, the language in the original documents will control.

11 January 1978

POTOMAC RIVER LOW FLOW ALLOCATION AGREEMENT

THIS AGREEMENT, made and entered into this 11th day of January 1978, by and among the UNITED STATES OF AMERICA (hereinafter called “the Government”) acting by the Secretary of the Army through the Chief of Engineers, the STATE OF MARYLAND (hereinafter called “the State”) acting by the Governor and the Secretary of the Department of Natural Resources, the COMMONWEALTH OF VIRGINIA (hereinafter called “the Commonwealth”) acting by the Governor and the Chairman of the State Water Control Board; the DISTRICT OF COLUMBIA (hereinafter called “the District”) acting by its Mayor, the WASHINGTON SUBURBAN SANITARY COMMISSION (hereinafter called “the Commission”) acting by its Chairman; and the FAIRFAX COUNTY WATER AUTHORITY (hereinafter called “the Authority”) acting by its Chairman;

PREFACE

WHEREAS, the Chief of Engineers is charged with the operation and maintenance of the Washington Aqueduct for the primary purpose of providing an adequate supply of potable water for distribution to and consumption by the agencies and instrumentalities of the Government situate in the District of Columbia and its environs, and thereafter of providing a public water supply for the inhabitants of the District of Columbia; and

WHEREAS, the Secretary of the Army is authorized, subject to certain conditions, to supply treated water from the Washington Aqueduct to any competent state or local authority in the Washington Metropolitan Area in Virginia, and to that end has

entered into agreements with the County of Arlington and the City of Falls Church, Virginia; and

WHEREAS, the sole source of raw water treated by the Washington Aqueduct and dispensed therefrom is the Potomac River, and the Washington Aqueduct is now maintaining intake facilities for this purpose at Little Falls and Great Falls, Maryland; and

WHEREAS, the State of Maryland has enacted an appropriation permit statute which requires that all non-exempt jurisdictions obtain a permit from the Water Resources Administration of the State's Department of Natural Resources (hereinafter called "the Administration") to appropriate or use the water of the Potomac River; and

WHEREAS, the parties to this Agreement recognize that other riparian interests, such as communities located in Virginia, may in the future desire to withdraw and use water from the segment of the Potomac River which is the subject of the within Agreement, and provision is made herein requiring that access by any of them to such water be made subject to the provisions of this Agreement; and

WHEREAS, the Commission is charged with the responsibility of providing a safe and adequate public water supply within the Counties of Montgomery and Prince George's, Maryland, and is also authorized to enter into agreements to provide water, and for that purpose is operating and maintaining water treatment facilities and a water distribution system; and

WHEREAS, the Commission maintains a water treatment plant and an intake therefrom on the Potomac River, which intake is upstream from the Washington Aqueduct intakes and within the limits of the River covered by this Agreement, and in addition the Commission maintains a water treatment plant with intake on the Patuxent

River, and requires water from both sources in order to fulfill its above-mentioned responsibilities for providing a public water supply; and

WHEREAS, the City of Rockville, Maryland, is operating and maintaining water treatment facilities and a water distribution system and maintains an intake facility about one mile upstream from Great Falls on the Potomac River, which intake is upstream from the Washington Aqueduct intakes and within the limits of the River covered by this Agreement; and

WHEREAS, the Fairfax County Water Authority is an authority in the Commonwealth of Virginia proposing to withdraw water from that portion of the Potomac River which is covered by this Agreement and has applied for a permit to construct a water intake structure for such purpose; and

WHEREAS, in the absence of adequate upstream impoundments and associated flow regulation, the quantity of water which may flow in the Potomac River between Little Falls Dam and the farthest upstream limit of the pool of water behind the Chesapeake and Ohio Canal Company rubble dam at Seneca, Maryland, during periods of low flow in that portion of the River, may be less than the quantity needed to meet the demand for all customary public water supply purposes during such periods; and

WHEREAS, in light of the Federal legislative enactments providing for the Corps of Engineers to supply water to the District of Columbia, enactment of legislation was deemed by the Government to be a prerequisite to its participation in a Potomac River Low Flow Allocation Agreement; and

WHEREAS, the consent of Congress to a Potomac River Low Flow Allocation Agreement is expressly stated in Section 181 of the Water Resources Development Act of 1976, Public Law 94-587; and

WHEREAS, the consent of Congress, pursuant to Section 9 of the Rivers and Harbors Act of 1899, to the construction of a water diversion structure by the Commission from the north shore of the Potomac River at the Commission's water filtration plant to the north shore of Watkins Island is conditioned in Section 181 of the aforesaid Water Resources Development Act of 1976 upon an enforceable Low Flow Allocation Agreement; and

WHEREAS, it is the judgment of the Chief of Engineers and the Secretary of the Army, acting pursuant to Section 10 of the Rivers and Harbors Act of 1899, that the public interest requires that such a Low Flow Allocation Agreement be a requirement for issuance of the permits for the construction of water intake structures in the subject portion of the Potomac River by the Commission and the Fairfax County Water Authority;

NOW, THEREFORE, in consideration of the premises and of the public and governmental interests deemed to be served hereby, the parties hereto do mutually agree as follows:

ARTICLE 1. Enforcement.

A. Certain Definitions:

1. Pertinent Portion of the River. The portion of the Potomac River subject to this Agreement is that located between Little Falls Dam and the farthest upstream limit of the pool of water behind the Chesapeake and Ohio Canal Company rubble dam at

Seneca, Maryland. This portion is referred to herein as “the defined portion” or, alternately “the subject portion” of the Potomac River.

2, Parties. The Government, the State, the Commonwealth, and the District shall be termed “the governing parties.” All other parties hereto shall be termed “member parties.” The term “parties” shall mean all parties, both governing and member, except when the context otherwise requires.

B. Moderator. Authority to enforce the provisions of this Agreement shall be vested in an unbiased Moderator. It shall be the duty of the Moderator and he shall have the authority:

1. To take all actions necessary to enforce the provisions of this Agreement and his decisions hereunder, and for this purpose he may sue in his own name.

2. To decide all disputes between or among the parties arising under this Agreement not disposed of by consent.

The authority of the Moderator shall not restrict those powers reserved to the parties, including those specified in Article 3, Section C.

C. The decision of the Moderator shall be final and conclusive unless determined by a court of competent jurisdiction to have been fraudulent, capricious, arbitrary, or not supported by substantial evidence. All parties agree to accept and implement every decision of the Moderator unless and until said decision is overturned by a court of competent jurisdiction.

D. The parties specifically grant to the Moderator the authority to inspect documents, records, meters, facilities, and other items necessary to decide any question or verify reports made by any party as a consequence of this Agreement. Upon the request

of any party, the Moderator shall provide said party any or all of the information held by him relevant to this Agreement.

E. Should the Moderator decide to commence or defend any action or otherwise have need of legal services relating to this Agreement, he shall have the right to contract with counsel for such purpose, and the cost of such services shall be repaid in equal shares by the governing parties. In the interest of prompt action, the Moderator may accept legal services, or an advance of funds, for such purpose from any party. Nothing herein shall require a party being sued by the Moderator to advance funds for such purpose.

F. The Moderator shall not be liable for injury or damage resulting from any decision or action taken in good faith without malice under apparent authority of this agreement, even though such decision or action is later judicially declared to be unauthorized or invalid.

G. The Moderator shall be selected, and may be relieved of his duties for any reason, by unanimous action of the governing parties expressed in a signed memorandum. Should the office of Moderator become vacant through death, resignation, or otherwise, a new Moderator shall be selected as soon as practicable by such unanimous action. During any period in which the office of Moderator remains vacant through a failure of unanimous action or otherwise, the full functions of the office of Moderator shall be exercised by a Standby Moderator who shall, except as expressly otherwise provided, be treated as the Moderator for all purposes under the provisions hereof. The duty to designate the Standby Moderator shall rotate annually among the Government, the State, the Commonwealth, and the District in the order stated, beginning

on the date this agreement becomes effective and rotating thereafter on the first day of each calendar year. Written notice of such annual designation shall be sent to all other parties by January 15 of each year. The first Moderator for this Agreement is designated in Annex A hereto.

H. Subject to the availability of funds, the reasonable expenses, including legal fees, and compensation of the Moderator shall be paid in equal shares by the governing parties. Any expense shall be deemed reasonable if at least three of the governing parties so agree or if so determined by a court. If any such party accepts as reasonable a particular expense not accepted as reasonable by the other such parties, that party may pay that expense, in addition to that party's proportionate share of all other expenses. At the time of each annual review as provided in Article 4 of this Agreement, the governing parties shall set, by majority vote, the per diem fee to be paid a Moderator in the event his services shall be necessary. A Standby Moderator, who is an employee of the designating party or one of its political subdivisions or agencies, shall serve without fee in exercising the functions of the Moderator.

I. The Moderator or any party may bring an action against any one or more other parties to enforce this Agreement or a decision of the Moderator made hereunder. Such action shall be brought in the United States District Court for the District of Columbia, and each party consents to venue in said court and to service of process upon it from said court, provided that if the action is between two states of the United States, such action may be commenced in the Supreme Court of the United States. In any such action the joinder of all parties hereto shall not be deemed necessary or indispensable merely because they are parties to this Agreement.

Application for or receipt of a

determination by the Moderator shall not be a prerequisite to the maintenance of an action by a party, but any decision made by the Moderator on a matter involved in said action, whether before or after commencement thereof, shall be given the effect set forth in Article I, Section C. Nothing herein shall be deemed to be a waiver of any immunity any party may have from a claim for monetary damages or a claim which has substantial fiscal impact, except for the fees and expenses which are provided to be paid pursuant to the agreement. It is the intention of the parties that any matters involving the technical aspects of maintenance of litigation be resolved in a manner which ensures rapid and certain enforcement of this Agreement.

ARTICLE 2. Administration

A. Washington Aqueduct. The Government will provide a communication control center at the Washington Aqueduct for the administration of the allocation plan as provided herein. The Washington Aqueduct Division, U.S. Army Engineer District, Baltimore ("the Aqueduct"), will collect, receive, record and accumulate daily reports regarding the flow of the Potomac River and the quantities of water being withdrawn from the defined portion of the Potomac River, and the quantities of water withdrawn and available from all other sources for use within the Washington Metropolitan Area, by the parties and the political subdivisions, authorities, and permittees of any of them, and by any other water withdrawing entity which may formally be added or made subject to this Agreement subsequent to its initial execution. Subject to the parties' rights of appeal to the Moderator, the parties grant to the Aqueduct, and to each other, the right to inspect documents, records, meters, facilities and other items necessary to decide any question or verify reports made by any party as a consequence of this agreement. Beginning with

the Alert Stage, the Aqueduct will keep the Moderator informed as to the stage of flow in the Potomac River, and, during the Restriction and Emergency Stages the fair share allocated to each user, and all information utilized for determining the allocation. The Aqueduct will provide all parties with the same information relating to allocation, the quantities of water being withdrawn by all users from any and all sources, and the flow of the Potomac River. To permit uniformity of reports and to implement the administrative measures specified herein, reports and calculations, by or to the Aqueduct, of daily withdrawals or daily flows, will be based on the twenty-four hour period from one midnight to the following midnight, unless the parties subsequently agree to a different twenty-four hour measuring period. The Aqueduct will calculate the total daily flow by adding the withdrawals during the previous 24 hours at all withdrawal points and the remaining daily flow over the Washington Aqueduct Dam at Little Falls, as determined by the readings recorded on the USGS gage at Little Falls during the preceding twenty- four (24) hours. The average reading will determine the flow over the dam for the previous day.

B. Stages of Flow in the Potomac River. The Aqueduct will determine from the information accumulated when the following stages exist in the defined portion of the Potomac River.

1. Alert Stage. When the total daily withdrawal from the subject portion of the Potomac River is equal to or greater than fifty percent (50%) of the total daily flow, but less than eighty percent (80%), the Aqueduct may, after consultation with the General

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Manager of the Commission and the Engineer-Director of the Authority,¹ declare an “Alert Stage” to be in effect.

2. Restriction Stage. When the total daily withdrawal from the subject portion of the Potomac River is equal to or greater than eighty percent (80%) of the total

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daily flow, the Aqueduct may, after consultation with the General Manager of the Commission and the Engineer-Director of the Authority,² declare a “Restriction Stage” to

be in effect and the Aqueduct will request the U.S. Park Service to discontinue putting Potomac River water into the C&O Canal.

3. Emergency Stage. When the estimated total daily withdrawal for any day within the ensuing five (5) days from the subject portion of the Potomac River is expected to exceed the daily river flow anticipated, the Aqueduct may, after consultation with the General Manager of the Commission and the Engineer-Director of the Authority,³ declare an “Emergency Stage” to be in effect.

C. Allocation of Flow. Whenever the Restriction Stage or the Emergency Stage is in effect, the Aqueduct shall daily calculate and advise each user (as defined herein), and the Moderator, of each user’s allocated fair share of the water available from the subject portion of the Potomac River in accordance with this Section C. In calculating the amount of water available for allocation, the Aqueduct will determine, in consultation with the parties and based upon then current conditions and information, any amount needed for flow in the Potomac River downstream from the Little Falls dam for the purpose of maintaining environmental conditions (“environmental flow-by”), and shall balance such need against essential human, industrial and domestic requirements for

¹ Modification No. 2 adopted by the governing parties on April 19, 1985.

² Ibid.

³ Ibid

water. The Aqueduct's determination shall be based upon the data and shall give substantial weight to conclusions for environmental flow-by submitted by the State.

1. For the purpose of this Section C, the term "users" refers to the following entities which are or may be appropriating water for public water supply purposes from the subject portion of the Potomac River; namely, the Government (including its water customers), the Commonwealth for and on behalf of herself and each of her political subdivisions and authorities (including the Authority), the State and the Administration (for and on behalf of its permittees whether or not parties to this Agreement), the District of Columbia, the Commission, and such entities which may formally be added or made subject to this Agreement subsequent to its initial execution.

2. On or before March 15 of each year,⁴ each user shall report to the Aqueduct (and to each other) the number of gallons of processed water pumped daily to all its customers from all sources during each winter period (the months of December through February), commencing with the winter period 1977-78. The amounts pumped during the 5 most recent winter periods which have elapsed as of the time of allocation, or less than 5 if fewer have so elapsed, shall be combined for the purpose of computing each user's average daily winter use; except that, in the case of a user first withdrawing water subsequent to the initial execution of the Agreement, the average daily winter use of such user shall be the average of the amounts of water pumped during all of the winter periods, commencing December 1 of the year immediately prior to its first withdrawal from the subject portion of the river, which have elapsed as of the time of allocation, but not exceeding the 5 most recent winter periods. The ratio which the average daily winter use of each user bears to the average daily winter use of all users will be applied to the

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Modification No. 1 adopted at a meeting of the governing parties, April 15, 1982

daily amount of water available at the time of allocation from the subject portion of the Potomac River (after deduction for environmental flow-by) and all other sources as specified in Paragraph 5 below (calculated at maximum capacity practicable). The resulting amount, less the amount then available to said user by use of the maximum capacity practicable from all such other sources, will be such user's allocated fair share of the flow of the Potomac River.

3. a. The formula set forth in Article 2.C.2. shall continue in effect unless changed by unanimous consent of the governing parties or as set forth below. After January 1, 1988, any of the governing parties which desires to change the allocation formula shall give written notice to all other parties. Within 60 days thereafter, both the governing and member parties shall meet for the purpose of negotiating a replacement formula. In the event that no such replacement formula is agreed on by the governing parties within one year after receipt of the aforesaid notice, the allocation ratio which would have been in effect for the summer of the year in which the notice was given shall be used as an interim allocation ratio for the withdrawal of water during subsequent periods of low flow until such time as the governing parties agree upon a replacement formula. Any governing party, at any time after the expiration of one year from the receipt of such notice and after the exhaustion of such administrative procedures as may be applicable if it is a permittee for water appropriation or withdrawal, may apply to a court of competent jurisdiction for an adjudication of such rights, if any, as it or users associated with it may have to a greater share of water than set by the interim allocation ratio, provided that all parties shall adhere to the interim allocation ratio until and unless altered by a decision of such court. Applications for intakes or other modifications to

water works shall continue to be received and processed during periods in which the interim allocation ratio is in effect, but such ratio shall be recalculated only in the event of the grant of an application to a new user as set forth in Section E of Article 3.

During such time as there is in effect a legally enforceable agreement by and among the Aqueduct, the District, the Authority and the Commission providing for the regional management of all their water supply facilities for the benefit of the Washington Metropolitan Area and the proposed Little Seneca Lake has been constructed and is operational, the foregoing paragraph shall be inoperative and the following paragraph shall become operative.

The allocation formula set forth in Article 2.C.2., or any subsequently revised or replacement formula, may be revised or replaced by unanimous agreement of the governing parties as herein provided. At the April 1985 meeting of the parties and at each fifth annual April meeting thereafter, the parties shall review and evaluate the fairness and reasonableness of the formula then in effect in the light of: experience gained in the operation of the Agreement during the preceding five-year period; then current estimates of future water demands in the Washington Metropolitan Area; adequacy of then available and prospective future supplies of water to satisfy future demands; experience gained in the regional management of available water supply facilities to optimize their use; factors listed in subparagraph 2.C.3.b.; and such other factors as may be pertinent. If as a result of any such review and evaluation the governing parties shall determine that the formula then in effect is not fair and reasonable, they shall revise or replace the formula in such manner as they shall deem appropriate. Notwithstanding the foregoing, if at any other time any party desires to

secure a revision or replacement of the formula, it shall give written notice thereof to all other parties and, within 60 days after such notification, the parties shall meet for the purpose of negotiating a revision or replacement of the formula. Unless and until a revised or replacement formula is agreed upon by unanimous agreement of the governing parties, the formula then in effect shall continue in effect. However, any party, at any time after the expiration of one year from the filing of such notice and after the exhaustion of such administrative procedures as may be applicable if it is a permittee for water appropriation or withdrawal, may apply to a court of competent jurisdiction for an adjudication of such rights, if any, as it or users associated with it may have to a greater share of water than set by the formula then in effect. All parties shall adhere to the formula then in effect until and unless altered by a decision of such court. Applications for intakes or other modifications to water works shall continue to be received and processed during periods in which negotiations of a revised or replacement formula are in effect and during the pendency of any litigation relating thereto.⁴

b. Any formula negotiated pursuant to subparagraph a hereof shall allocate water on a fair and equitable basis and shall take into consideration, among other things,

(a) steps taken by parties which can do so to minimize dependence upon the Potomac River during periods of low flow, (b) the nature and effectiveness of water conservation methods put into effect, (c) steps taken to increase the water supply available for the Washington Metropolitan Area, (d) then current population growth and planning for

⁵ Ibid..

Dec. 23, 1998, Revised Dec. 15, 2017

future growth, (e) feasibility and availability of new sources of water, and (f) technological advances in water treatment and water quality measurement.

c. In any court proceeding instituted pursuant to subparagraph a, neither the signing of this agreement nor the passage of time thereafter shall be asserted as a waiver or diminution of any party's rights to, or right to seek, a greater share of water from the subject portion of the river. Such action shall be brought in the United States District Court for the District of Columbia, and each party consents to venue in such court and to service of process upon it from such court, provided that if the action is between two states of the United States, such action may be commenced in the Supreme Court of the United States.

4. In the event the applicable allocation formula results in an allocation exceeding the proposed withdrawal of any user, the excess amount shall be reported by said user to the Aqueduct and the Aqueduct shall reallocate said excess amount among the other users in a reasonable manner.⁶

5. The water subject to the allocation formula under the terms of this Agreement includes

- (i) the maximum capacity then practicable from the Patuxent River and the Occoquan River;
- (ii) the natural flow of the subject portion of the Potomac River; and
- (iii) augmented flow of the subject portion of the Potomac River resulting from releases (for whatever purpose) from existing upstream reservoirs, including Bloomington Lake and Savage Lake and from the proposed Little Seneca Lake when completed and operational.⁷

⁶ Ibid.

⁷ Ibid.

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Deleted: of the subject portion of the Potomac River. Any other augmentation to flow, reservoir storage, or treating capacity developed by a user after December 31, 1977, shall not be made subject to the allocation formula, but those users who incur, or participate in the payment of, the expenditures for such augmentation may agree to as to how it is divided and shall file a copy of said agreement with the other parties. In recognition that the sole source of water supply for the District of Columbia is the Potomac River, each other party will offer the District an opportunity to participate in a portion of any additional augmentation for use during the Restriction and Emergency stages on reasonable terms, unless such party shows that it is feasible to do so.

6. In the event a disaster, such as a major fire or water main break, results in an abnormal loss of a significant portion of any user's water supply, the Aqueduct shall determine suitable adjustments in low flow allocation during the emergency period created by the disaster only, taking into consideration all sources available to the users.

7. Water from the emergency pumping station having its intake at the estuary of the Potomac shall not be considered as water available from other sources for the purposes of Section 2.C.2. or otherwise included in computations made under this agreement.

8. In April 1990 and in April of each fifth year thereafter during such time as there is in effect a legally enforceable agreement by and among the Aqueduct, the District, the Authority, and the Commission providing for the regional management of all of their water supply facilities for the benefit of the Washington Metropolitan Area and the proposed Little Seneca Lake has been constructed and is operational, the Aqueduct, the District, the Authority, and the Commission shall review and evaluate the adequacy of the then available water supplies to meet the water demands in the Washington Metropolitan Area which may then be expected to occur during the succeeding twenty- year period. If as a result of any such review and evaluation it is determined that additional water supplies will be required to meet the expected demands, the Aqueduct, the District, the Authority, and the Commission shall undertake negotiations to provide the required additional water supplies and, when provided, water from such additional water supplies shall be included as water subject to the allocation formula under the terms of this Agreement.⁸

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_____ARTICLE 3. Obligations of the Parties.

A. The Government agrees to cause the Aqueduct as the operating agency to perform the functions and requirements which are required of the Government and the Aqueduct in this Agreement, including the furnishing of information to the other parties relating to the Aqueduct's water withdrawal and use, the same as required by other parties to be furnished to the Aqueduct under Subparagraphs B and D, of this Article. These functions and responsibilities of the Aqueduct shall be carried out under the supervision of the District Engineer, U.S. Army Engineer District, Baltimore, or his designee, who shall be responsible for making the determinations required in the discharge of these responsibilities.

B. The parties agree to provide the Aqueduct with all the information relating to the withdrawal and use by them, their permittees, entities reporting through them and their political subdivisions, as applicable, of the waters of the subject portion of the Potomac River and availability from other sources which is needed for the administration of the allocation system.

C. The State agrees that all appropriation permits granted by the Administration for any appropriation of water from the subject portion of the Potomac River shall include a provision subjecting the permittee to the provisions of this Agreement. Nothing herein shall restrict or limit such authority as the Administration may properly have to issue permits or impose low flow allocation requirements upon any other water appropriating permittee withdrawing water from other segments of the Potomac River, or to enforce provisions of its permits in the subject portion of the Potomac River; nor any such authority as the Commonwealth may have; nor the authority

⁸ Ibid.

of the Government with respect to navigable waters, including the regulation of commerce among the states and with foreign nations.

D. The parties will comply with the determinations made by the Aqueduct pursuant to this Agreement, unless and until overturned pursuant to the terms of Article 1.

E. Any community or entity which seeks to appropriate water from the subject portion of the Potomac River shall either become a member party to this Agreement or shall be governed by a permit which includes the low flow allocation formula and such other provisions as are necessary to effect the purposes of this Agreement. Any such community or entity may apply for permits necessary to build water intake structures or to appropriate water, and such permits shall be processed in accordance with the rules and regulations of the permit-issuing agency, notwithstanding the pendency of negotiations or the imposition of an interim allocation ratio pursuant to Section 2.C.3. If the necessary permits are granted to a community or entity not previously withdrawing water from the subject portion of the river, the existing interim allocation ratio shall be recalculated based on winter period use for the year immediately prior to the first withdrawal from the subject portion of the river by such new user. The average daily winter use of the new user for such winter period and those of the other users employed in determining the interim allocation ratio shall be employed to compute a revised interim allocation ratio which shall remain in effect until a replacement formula is determined pursuant to Section 2.C.3.

During such time as there is in effect a legally enforceable agreement by and among the Aqueduct, the District, the Authority, and the Commission providing for the regional management of all of their water supply facilities for the benefit of the

Washington Metropolitan Area and the proposed Little Seneca Lake has been constructed and is operational, the foregoing paragraph shall be inoperative and the following paragraph shall become operative.

Any community or entity which seeks to appropriate water from the subject portion of the Potomac River shall either become a member party to this Agreement or shall be governed by a permit which includes the low flow allocation formula and such other provisions as are necessary to effect the purposes of this Agreement. Any such community or entity may apply for permits necessary to build water intake structures or to appropriate water, and such permits shall be processed in accordance with the rules and regulations of the permit-issuing agency, notwithstanding the pendency of negotiations or litigation pursuant to Section 2.C.3.⁹

F. This Agreement does not affect such rights as parties or others subject to this Agreement may have to grant or obtain permits to appropriate additional amounts of water during periods other than the Restriction or Emergency stages, but except as specifically provided in Article 2, Section C and Article 3, Section E, any additional water use resulting therefrom shall not affect any user's allocated fair share during such stages.

ARTICLE 4. Review

In the month of April in each year during the term of this Agreement, the parties shall convene for the purpose of reviewing the provisions of this Agreement and considering any modifications thereof, and make such modifications as the governing parties agree upon. Upon agreement among the governing parties, review and modifications as might be agreed upon can occur at any time and not be necessarily

limited to the annual, April consideration. Entities shall be admitted as new member parties upon unanimous agreement of the governing parties.

ARTICLE 5. Revocation

This Agreement shall not be revoked without the unanimous consent of the governing parties.

ARTICLE 6. Effective Date

This Agreement shall become binding when: (1) it is executed by the parties, and (2) a Moderator has been selected as provided in Article 1.G, and (3) the Government issues one or more permits for the construction of any water diversion structure or water intake in the subject portion of the Potomac River to any party hereto or political subdivision or authority thereof, and (4) all acts have been taken by each of the parties hereto necessary to make this agreement binding and enforceable with respect to each of them, including, if necessary, ratification by the legislatures of the signatory states. Notice that all such necessary acts have been taken by each of the parties shall be delivered to the other parties along with the opinion of its respective counsel or attorney general that the acts taken are sufficient to cause this Agreement to become effective, binding and enforceable under the laws or charter of such parties. The parties will, however, commence to record and maintain the consumption figures and other base data called for under the foregoing provisions of this Agreement, at the time they execute this Agreement. This Agreement may be executed in one or more counterparts.

⁹ Ibid.

ARTICLE 7. Severability

The provisions of this Agreement shall be severable and if any phrase, clause, sentence or provision of the Agreement is declared to be unconstitutional or the applicability thereof to any party is held invalid, the remainder of such Agreement shall not be affected thereby.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written, except as a different date of execution may be noted following any party's signature.

ATTEST:

THE UNITED STATES OF AMERICA

BY Secretary of the Army

Chief of Engineers

THE STATE OF MARYLAND

BY Governor

Secretary of Natural Resources

THE COMMONWEALTH OF VIRGINIA

BY

Governor

Vice Chairman

State Water Control Board

THE DISTRICT OF COLUMBIA

BY

Mayor

Director of Environmental Services

Executive Secretary, D.C.

THE WASHINGTON SUBURBAN SANITARY
COMMISSION

BY

Chairman

FAIRFAX COUNTY WATER AUTHORITY

BY

Chairman

NABOP-F/4 (Washington Suburban Sanitary Commission) 76-328
NABOP-F/4 (Washington Suburban Sanitary Commission) 76-804
NABOP-F/4 (Fairfax County Water Authority) 76-1126

Honorable James A. Joseph
Under Secretary of the Interior
Washington, D. C. 20240

Memorandum of Intent

Dear Mr. Joseph:

This memorandum clarifies the intent of the parties with respect to implementation of the Low Flow Allocation Agreement in response to the concerns expressed by the United States Fish and Wildlife Service and the Department of the Interior with respect to the captioned permit applications. The problem at issue is to assure that there will be enough water remaining in the Potomac River after withdrawals by the proposed intake structures to avert severe and irreparable damage and disruption to the Potomac River ecosystem, and to recognize the need to avoid damage to properties of the National Park Service.

This will be addressed as follows:

1. Until any of the proposed intakes has begun to withdraw water, there will be no change in the current water withdrawal situation. Thus, there is no need for an "environmental flow-by" amount until at least one such intake has become operational, there being no such amount in effect now.
2. The Low Flow Allocation Agreement of January 11, 1978, provides that in calculating the amount of water available for allocation, an amount shall be set aside for the maintenance for environmental conditions. Specifically, Article 2.C. states in part:

"In calculating the amount of water available for allocation, the Aqueduct will determine, in consultation with the parties and based upon then current conditions and information, any amount needed for flow in the Potomac River downstream from the Little Falls dam for the purpose of maintaining environmental conditions ("environmental flow-by"), and shall balance such need against essential human, industrial and domestic requirements for water. The Aqueduct's determination shall be based upon the data and shall give substantial weight to conclusions for environmental flow-by submitted by the State."

3. In calculating the total daily withdrawal to determine whether the Restriction and Emergency Stages are to be put into effect pursuant to Article 2.B. of the LFAA, the Washington Aqueduct will include along with the amount of water withdrawn from the subject portion of the river that amount designated as the environmental flow-by. Thus, when the Washington Aqueduct determines that the amount withdrawn, combined with the environmental flow-by amount, is equal to or greater than eighty (80) percent of the total daily flow, the Restriction Stage will be put into effect and allocation will begin. During the Restriction or Emergency Stages, the Washington Aqueduct will (subject to the availability of funds) reduce withdrawal from the Great Falls intake and increase withdrawal from the Little Falls intake consistent with maintaining favorable environmental conditions between Great Falls and Little Falls.

4. A joint study proposed by the State of Maryland and conducted in cooperation with the Department of the Interior, the Army Corps of Engineers, the Environmental Protection Agency, and the Commonwealth of Virginia ("the joint study") is currently underway for the purpose of determining an environmental flow-by amount for the aforesaid provision of the Low Flow Allocation Agreement. When the results of that study are complete, it will constitute the data and conclusions to which reference is made in the aforesaid provision of the Agreement. The study will automatically, therefore, become the basis for execution of that provision of the Agreement.

5. Should the joint study, for any reason, not be completed by the time any intake becomes operational, the Washington Aqueduct, as initial administrative authority under the Low Flow Allocation Agreement, will utilize such environmental flow-by amount as shall be set by the Secretary of the Army in consultation with the Secretary of the Interior. The Secretary of the Army shall also solicit the views of the signatories to the Agreement.

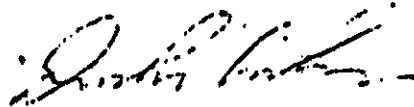
6. It is expected that the joint study will determine, among other things, (a) an environmental flow-by amount, and (b) a schedule of the ecological consequences of each level of flow below the environmental flow-by amount. In administering the above-quoted provision of the Low Flow Allocation Agreement, the Washington Aqueduct will not invade such an amount absent essential need. In determining such need, the Washington Aqueduct shall assure itself that the localities and jurisdictions affected have made maximum use of other sources of water and imposed maximum conservation measures. The decisions of the Washington Aqueduct will be appealable to the Moderator under Article 1 of the Agreement. Any objection of the Department of the Interior or other Federal agency to any such decision of the Washington Aqueduct will be raised by appeal to the Moderator by the Department of the Army.

7. In recognition of the need of the C & O Canal National Historic Park for minimal amounts of water to maintain the integrity of structures, the National Park Service will not be obligated to consider a complete cutoff of its intakes until such time as the Washington Aqueduct determines it necessary to invade the environmental flow-by amount. Whenever the Restriction Stage is in effect and following a request by the Washington Aqueduct, the National Park Service will consider means of reducing the demand for water withdrawal by the C & O Canal National Historic Park from the subject portion of the river consistent with the preservation of the Park's resources.

8. Nothing in this memorandum shall be construed as purporting (a) to diminish the rights of the Secretary of the Interior to meet his statutory responsibilities to protect the National Park along the river, or (b) to alter Article 3.C of the Low Flow Allocation Agreement.

The signatories to the Low Flow Allocation Agreement have been consulted with respect to this interpretation and application of the Agreement, and they concur in it. Reference to this memorandum shall be placed in any of the captioned permits granted and in any future permits for withdrawal structures from the affected portion of the Potomac River.

Sincerely,



DRAKE WILSON
Brigadier General, USA
Acting Director of Civil Works

*This document is an electronic version of the Low Flow Allocation Agreement's Ancillary Agreement #1.
If there is any discrepancy, the language in the original document will control. 2-20-2018*

ANCILLARY AGREEMENT #1
TO THE POTOMAC RIVER LOW FLOW ALLOCATION AGREEMENT
(MODERATOR'S COMPENSATION AND REASONABLE EXPENSES)

1. Compensation: Pursuant to Article I, Section H, of the Potomac River Low Flow Allocation Agreement (LFAA), the governing parties hereby agree that the Moderator shall be compensated as follows:

a. The Moderator will be paid an annual fee of \$2,500.00 (or a ratable portion if the Moderator's service is less than a full year).

b. The Moderator will be paid an additional fee of \$300.00 per day for each day over seven days in any calendar year that the Moderator's services are necessary.

2. Payment of Compensation and Other Reasonable Expenses:

a. The governing parties hereby agree that the State of Maryland annually shall pay the Moderator the full amount of compensation and reimbursement for his reasonable expenses in a manner agreeable to the State and the Moderator, and that each governing party shall, subject to the availability of funds, reimburse the State for its equal share. On or before March 1 of each year, the State will submit to each of the other governing parties a bill for its share for the preceding calendar year. Subject to the availability of funds, such bill shall be paid within 30 days of receipt.

b. In any instance where the expenses of the Moderator may reasonably be regarded as extraordinary or subject to question, the State shall consult with the other governing parties in advance of the incurrence or reimbursement of such expense in order to effectuate the provisions

of Article 1, Section H, of the LFAA. Each governing party shall notify the State in writing of the title, address, and phone number of its agent who is authorized to determine the reasonableness of the Moderator's expenses. For purposes of this paragraph, the agent of the State is the Director, Water Resources Administration, Tawes State Office Building, Annapolis, Maryland 21401, (301) 269-3846.

3. Effective Date: The first Moderator will be compensated under the terms of this Ancillary Agreement #1 for services he provides in the capacity of Moderator on and after April 19, 1979.

IN WITNESS THEREOF, the governing parties hereto have executed this ancillary agreement to the Potomac River Low Flow Allocation Agreement, this day of 8 May 1981

ATTEST:

William R. Sherry

THE UNITED STATES OF AMERICA

By J. K. Bratton
J. K. BRATTON, LTJ. USA
Chief of Engineers

Thomas A. Deming

THE STATE OF MARYLAND

By James S. Loefer

R. V. Davis

THE COMMONWEALTH OF VIRGINIA

By Carl L. To Beaman

J. B. King

THE DISTRICT OF COLUMBIA

By M. S. King

*This document is an electronic version of the Low Flow Allocation Agreement's Ancillary Agreement #2.
If there is any discrepancy, the language in the original document will control. 2-20-2018*

ANCILLARY AGREEMENT #2
TO THE POTOMAC RIVER LOW FLOW ALLOCATION AGREEMENT
(MODERATOR'S COMPENSATION AND REASONABLE EXPENSES)

1. Compensation: Pursuant to Article 1, Section H, of the Potomac River Low Flow Allocation Agreement (LFAA), at the annual April meeting the governing parties shall set, by majority vote, the per diem fee to be paid the Moderator in the event his services shall be necessary. Effective May 1, 1983, and until further modified by the governing parties, the per diem fee shall be \$500.00.

2. Payment of Compensation and Other Reasonable Expenses:

a. The governing parties hereby agree that the State of Maryland annually shall pay the Moderator the full amount of compensation and reimbursement for his reasonable expenses in a manner agreeable to the State and the Moderator, and that each governing party shall, subject to the availability of funds, reimburse the State for its equal share. On or before March 1 of each year, the State will submit to each of the other governing parties a bill for its share for the preceding calendar year. Subject to the availability of funds, such bill shall be paid within 30 days of receipt.

b. In any instance where the expenses of the Moderator may reasonably be regarded as extraordinary or subject to question, the State shall consult with the other governing parties in advance of the incurrence or reimbursement of such expenses in order to effectuate the provisions of Article 1, Section H, of the LFAA. Each governing party shall notify the State in writing

of the title, address, and phone number of its agent who is authorized to determine the reasonableness of the Moderator's expenses. For purposes of this paragraph, the agent of the State is the Director, Water Resources Administration, Tawes State Office Building, Annapolis, Maryland 21401, (301) 269-3846.

3. Effective Date: This agreement shall become binding when executed by all parties hereto. When this Ancillary Agreement #2 becomes binding, Ancillary Agreement #1 shall have no further force and effect.

IN WITNESS WHEREOF, the governing parties have executed this Ancillary Agreement #2 to the Potomac River Low Flow Allocation Agreement.

ATTEST:

THE UNITED STATES OF AMERICA

David W. Taylor Col, CE
12 October 84
(Date)

[Signature]
Chief of Engineers

THE STATE OF MARYLAND

Thomas A. Deming
February 7, 1984
(Date)

By [Signature]
Governor

[Signature]
Secretary of Natural Resources

THE COMMONWEALTH OF VIRGINIA

[Signature]
5/30/84

By Charles S. Robb
Governor

June 11, 1984
(Date)

8-10-84

8/6/84
(Date)

[Signature]
Chairman, State Water Control Board

THE DISTRICT OF COLUMBIA

By [Signature]
Mayor

[Signature]
Director, Department of
~~Environmental Services~~
Public Works