Multi-level Co-operative Water Resource Management for the Washington, DC Metropolitan Area

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Interstate Commission on the Potomac River Basin
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Motivation for Co-operation

Perhaps the catalyst in a reaction ready to happen was the comprehensive report of study by the Corps of Engineers (1963), identifying 16 new water supply reservoirs in the Potomac River basin to meet foreseeable demand. This study was initiated as a result of much concern and the completion of many other smaller studies which projected growth in demand for water exceeding available supply. The proposed reservoirs met unexpected difficulty with public acceptance, and authorization and appropriation of construction funds.

The 1966 drought in which Potomac River flow at Washington, DC dropped to 388 mgd. Demands were projected soon to exceed this flow. Area growth projections were beginning to reflect the changing nature of the Washington, DC area as a place to live and work.

Bloomington Reservoir construction received federal appropriation, and only two others of the proposed 16 were authorized by 1974 (11 years after the completion of the 1963 study) (1976, a). Area growth projections continued to reflect the changing nature of the Washington, DC area as a place to live and work.

The 1975 Washington Metropolitan Area Water Supply Study Report of the Northeastern United States Water Supply (NEWS) Study (1975) by the Corps of Engineers projected water supply deficits beginning no later than 1980. These deficits were calculated with the assumption of a repeat of the 1930 drought (but including the availability of Bloomington Reservoir, then under construction). Area growth projections continued to reflect the changing nature of the Washington, DC area as a place to live and work.

The legal rights to water in the Potomac River basin were becoming an increasing concern. Those who wanted and needed the waters of the basin were, in the past, generally able to use those waters to meet requirements without adverse impact on other users. However, it was now clear that unrestricted demand would outstrip available supply. The Interstate Commission on the Potomac River Basin held a conference (1976, b) in order to address the issue of legal rights in Potomac waters. Area growth projections continued to reflect the changing nature of the Washington, DC area as a place to live and work.

As an indication of how desperate the situation was getting, a pumping station and pilot treatment plant were even constructed to take water from the estuary.

Multi-level Co-operation

Interagency co-operation was being called for as early as 1972 in a report by a National Capital Area Committee of the National Society of Professional Engineers (1972). In their report, a liaison committee among the three major water supply utilities was recommended in order to expedite joint actions and communications. The suburban areas are served by the Washington Suburban Sanitary Commission (Maryland), and the Fairfax County Water Authority (Virginia). These utilities are semi-autonomous county agencies governed by boards of county commissioners or their appointees; the Washington Aqueduct Division of the US Army Corps of Engineers is a federal agency supplying the city of Washington, DC. The multi-level co-operation in this case would have been obvious.

The first significant actual example of multi-level co-operation for water resource management in the Washington area was the Potomac River Low Flow Allocation Agreement (LFAA) signed in 1978. This agreement, celebrating its tenth anniversary this year, is among the US Army Corps of Engineers, State of Maryland, Commonwealth of Virginia, District of Columbia, Washington Suburban Sanitary Commission, and Fairfax County Water Authority. It clearly involves federal, state, and local co-operation in the management of flow in the river. The major provisions of the LFAA bind the utilities to an allocation of available flow which is in proportion to the previous five-year rolling average of their winter demands; direct the Washington Aqueduct Division to declare Alert, Restriction, and Emergency stages of flow; and establish the position of unbiased Moderator to resolve disputes and enforce the agreement. And so, with considerable effort but without litigation, the major withdrawers of water in the Potomac River basin came to a fair and workable agreement on how to divide the limited flow.

With advances in improved reservoir operation being applied to the water resources of the Potomac River basin, the Water Supply Coordination Agreement was entered into in 1982 by the Corps of Engineers, Fairfax County Water Authority, Washington Suburban Sanitary Commission, District of Columbia, and Interstate Commission on the Potomac River Basin (ICPRB). The major provisions of this agreement designate the ICPRB Section for Co-operative Water Supply Operations on the Potomac (CO-OP) as the coordinator of water resources during times of low flow.

In its Final Report of the Washington Metropolitan Area Water Supply Study (1983), the Corps of Engineers referred to use of the PRISM water resource operations model developed at the Department of Geography and Environmental Engineering of the Johns Hopkins University in co-operation with ICPRB. The use of this model demonstrated that, with efficient operation, the Washington metropolitan area supply system (including only two new reservoirs) could satisfy demands to the year 2030 with a repetition of the longest historical drought (1930-31) or the lowest flow of record (1966).

Thus, at a time twenty years after the 1963 study report recommending sixteen new reservoirs; one was built, another smaller one (not on the list) was under construction, and innovative operating agreements were in place so as to avoid the necessity for any more reservoir construction until well into the 21st century.

ICPRB/CO-OP Water Resource Management Functions

Prior to the development of allocation and operational agreements on the Potomac, the region was prime for a case of the "Tragedy of the Commons" (1971). That is, the use of the river as a common resource was about to exceed its capacity; and it was not in the interest of any one of the users to individually curtail its use for the benefit of either the other users or the resource itself.

Much hard work at coordination and co-operation by all parties resulted in the Water Supply Coordination Agreement between the utilities and ICPRB. This agreement designates the CO-OP Section of ICPRB to be responsible for coordination water resources during times of low flow. As an independent inter-jurisdictional organization, ICPRB is particularly well suited to engage in coordinated co-operative functions.

In times of adequate flow in the river, the utilities operate quite independently of each other. They each have Potomac River intakes, and the suburban utilities each have storage in local reservoirs which are not on the Potomac.

In times of drought (low river flow relative to demands) the water resources available to the utilities, including local non-Potomac reservoirs, will be operated according to procedures developed and administered by the CO-OP Section. These procedures are set out in the Drought-Related Operations Manual for the Washington Metropolitan Area Water Suppliers, which is part of the Water Supply Coordination Agreement. A major provision of the operating rules involves maintaining the probability of not refilling any reservoir used for Washington metropolitan area supply to 90 percent of usable capacity by the following June 1 at less than 5 percent during a repetition of the historical streamflow record. This rule helps ensure a balanced risk, and minimizes the maximum deficit any one of the utilities is likely to experience.

In order to keep operations crisp, CO-OP conducts a drought exercise every year. The exercises simulate low river flow and reservoir operations to meet real demands in the summer period. This has the effect of exercising all the communications links which would be required if a drought should occur. These annual exercises have the effect of not letting CO-OP and the utilities be more than one year out of practice for a drought.

Emergency Management

In the event of short- or long-term emergencies (defined by insufficient resources to meet unrestricted demand) the Washington metropolitan area has useful operating procedures in place. The availability of critical resources will be governed by the Potomac River Low Flow Allocation Agreement. Whereas, the management of demand will be governed by individual water utility emergency plans, for which the Metropolitan Washington Water Supply Emergency Agreement provides a coordinating function at the local level.

The Past, Present, and Future

The enormous amount of coordination and co-operation which put the water management agreements in place, before any major supply crisis occurred, bodes well for their maintenance and successful implementation in the eventuality of their necessity.

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