

EFFICIENT USE OF WATER SUPPLIES THROUGH COOPERATIVE RIVER MANAGEMENT: THE ATLANTA EXPERIENCE

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BACKGROUND

The Atlanta, Georgia, metropolitan area is a rapidly growing urban area of 2.2 million people which withdraws over 70 percent of its water supply from the Chattahoochee River. Four major water supply intakes are located on a 48-mile stretch of the river downstream of Buford Dam, a major Corps of Engineers impoundment. This Corps project serves navigation, hydropower, flood control, water supply, water quality and recreation. The release patterns from the project were not optimally suited to meeting the growing water supply needs of the Atlanta Region. The minimum releases provided for Atlanta in the original authorization were no longer adequate as the project was being operated. This problem was the subject of a Corps of Engineers Urban Study which recommended that additional offpeak releases be made from the project on a short-term basis to meet downstream water supply and low-flow requirements until a permanent, long-term arrangement could be put in place.

SHORT-TERM PLAN IMPLEMENTATION

Implementation of the Short-Term Plan required modification of operations at Buford Dam and at the Georgia Power Company Morgan Falls Dam to more closely match water needs. In 1983, the Atlanta Regional Commission (ARC) proposed a concept of payment for water supply releases from Buford Dam only when demands required special releases and suggested a coordinated water management system to forecast such needs. Thus, during periods of normal or high local inflows, or when demands are low, special offpeak releases are not needed to meet water supply requirements in the River and no charges need to be made to the water utilities.

The Short-Term Plan was implemented in June, 1986, through contracts negotiated among ARC, the Corps of Engineers, the Georgia Power Company, the Gwinnett County Water and Sewerage Authority, Fulton County, DeKalb County, the Cobb County-Marietta Water Authority and the City of Atlanta. The contracts include provisions for water management procedures and charges for raw water. ARC coordinates the weekly water management and procedures which match water demands to water supplies on a regional basis in the Chattahoochee River.

WATER MANAGEMENT SYSTEM

The water management system includes simple procedures to coordinate water demands with water

supplies. The goal of the system is to minimize special water supply releases into the Chattahoochee River from Lake Lanier. The procedures involve daily monitoring of streamflows and weekly communication between the water utilities, ARC, the Corps and the Georgia Power Company.

Water demand estimates for the following week are phoned in to ARC by four utilities each Wednesday. These estimates are based on current and forecasted weather conditions and the operator's knowledge of water use patterns.

Water quality requirements are set by the State. Under normal (i.e. non-drought) conditions, the water quality requirement is for a continuous flow of 750 cfs immediately downstream of the last intake.

ARC estimates local inflows between Buford Dam and the last intake. The inflow is considered a reduction to the amount of water needed from Lake Lanier for water supply and water quality. An average reliable inflow is estimated for three major tributary creeks for the following week using daily stream gauge readings and observation of the creek's trend.

ARC then calculates the minimum weekend and weekday releases required from Buford Dam and Morgan Falls Dam for water supply and water quality. The peak weekend and weekday water supply forecasts are added to the water quality flow requirement, and the local inflows are subtracted off. Adjustments are made to account for some flow reregulation at Morgan Falls. This information is reported each Thursday to the Corps of Engineers. The Corps uses the information as one of many factors in scheduling releases from Buford Dam. The data is also reported to the Georgia Power Company for use in scheduling releases from the Morgan Falls Dam for the following week.

In addition, the Corps of Engineers monitors stream gauges during the week and makes further reductions to Buford releases when appropriate, and notifies Morgan Falls Dam.

DROUGHT CONDITIONS

During the past several years, north Georgia has experienced severe drought conditions. Rainfall has been significantly below normal for the past four years. In June, 1988, Atlanta received the lowest recorded June monthly rainfall since 1878. Rainfall often followed hot dry periods and improved conditions only slightly or temporarily because of absorption by dry soil and vegetation. Record or near record low stream flows were recorded in the upper Chattahoochee watershed in both 1986 and 1988.

Under average conditions, weekday releases at Buford Dam are dominated by hydropower and navigation needs.

Weekend releases primarily are for the Atlanta Region's water supply and water quality needs and are significantly less. During the past three years, the Corps of Engineers have implemented drought contingency plans at Buford Dam which have eliminated navigation releases and provided only minimum contract hydropower releases for extended periods.

DROUGHT BENEFITS OF WATER MANAGEMENT

As the Corps reduced or eliminated releases for other purposes, releases for the Atlanta Region's water supply and water quality became the single most important factor influencing releases from Buford Dam and Morgan Falls Dam during much of 1986, 1987 and all of 1988. The cooperative water management system became an important drought management tool. It provided the Corps of Engineers with information on Atlanta's daily demands so that releases could be matched to those needs. By monitoring downstream inflows for the remainder of each week, the Corps could often make even further reductions in releases.

When water use restrictions were put in place in both 1986 and 1988 by the State of Georgia and local water utilities, the system provided the Corps the ability to immediately account for reductions in water demand.

The coordination and monitoring put in place by the procedures also provided the Corps with the opportunity to test and reduce minimum releases to levels lower than previously thought possible without jeopardizing Atlanta's water supply. Because of confidence in the system, the State also temporarily reduced the water quality flow-by requirement during winter months.

The cooperative management system contributed to maintaining pool level in Lake Lanier in 1986. It was able to speed a temporary recovery in 1987, and significantly contributed to conservation of the pool level in 1988. Our calculations show that Lake Lanier would have been nine feet lower than the lowest elevation it reached at the end of 1988, which was already eight feet below average and 13 feet below rule curve.

Finally, a major importance of the cooperative management system was its contribution to public confidence in drought management efforts. The active involvement of the water utilities, Georgia Power Company, ARC, and the Corps of Engineers in this management system coupled with the water use restrictions put in place for metro Atlanta in 1986 and 1988 illustrated to other users of the Lake Lanier/Chattahoochee River System that metro Atlanta was doing its part to conserve the water resource and use it efficiently.