US Army Corps
of Engineers ®
Mobile District

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN WATER CONTROL MANUAL

Final
APPENDIX A

ALLATOONA DAM AND LAKE

ETOWAH RIVER, GEORGIA

U.S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
MOBILE, ALABAMA

MARCH 1952
REVISED AUGUST 1962
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REVISED MAY 2015

Allatoona Dam and Lake

NOTICE TO USERS OF THIS MANUAL

Regulations specify that this Water Control Manual be published in a hard copy binder with loose-leaf form, and only those sections, or parts thereof; requiring changes will be revised and printed. Therefore, this copy should be preserved in good condition so that inserts can be made to keep the manual current. Changes to individual pages must carry the date of revision, which is the South Atlantic Division's approval date.

REGULATION ASSISTANCE PROCEDURES

If unusual conditions arise, contact can be made with the Water Management Section, Mobile District Office by phoning (251) 690-2737 during regular duty hours and (251) 509-5368 during non-duty hours. The Allatoona Powerhouse personnel can be reached at (678) 721-6700 during regular duty hours.

METRIC CONVERSION

Although values presented in the text are shown in English units only, a conversion table is listed in Exhibit B for your convenience.

VERTICAL DATUM

All vertical data presented in this manual are referenced to the project's historical vertical datum, National Geodetic Vertical Datum of 1929 (NGVD29). It is the U.S. Army Corps of Engineers (herein referred to as USACE or Corps) policy that the designed, constructed, and maintained elevation grades of projects be reliably and accurately referenced to a consistent nationwide framework, or vertical datum - i.e., the National Spatial Reference System (NSRS) or the National Water Level Observation Network (NWLON) maintained by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration. The current orthometric vertical reference datum within the NSRS in the continental United States is the North American Vertical Datum of 1988 (NAVD88). The current NWLON National Tidal Datum Epoch is 1983 - 2001. The relationships among existing, constructed, or maintained project grades that are referenced to local or superseded datums (e.g., NGVD29, MSL), the current NSRS, and/or hydraulic/tidal datums, have been established per the requirements of Engineering Regulation 1110-2-8160 and in accordance with the standards and procedures as outlined in Engineering Manual 1110-2-6056. A Primary Project Control Point has been established at this project and linked to the NSRS. Information on the Primary Project Control Point, designated BM1, and the relationship between current and legacy datums are in Exhibit B.

ALLATOONA DAM AND LAKE

WATER CONTROL MANUAL
ETOWAH RIVER, GEORGIA
U.S. Army Corps of Engineers, Mobile District, South Atlantic Division

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PERTINENT DATA

(see Exhibit A, page E-A-1 for Supplementary Pertinent Data)

GENERAL

Location – Bartow County, Georgia, Etowah River, river mile 47.86	
Drainage area above damsite – square miles	1,122
Drainage area btwn damsite & mouth of Etowah River at Rome, GA – sq mi	728

RESERVOIR

Length – river miles	28.0
Full summer pool elevation – feet NGVD29	840.0
Peak pool for standard project flood – feet NGVD29	864.7
Peak pool for spillway design flood – feet NGVD29	872.1
Area at full summer pool (elev. 840) – acres	11,862
Total volume at full summer pool (elev. 840)– acre feet	367,471
Total volume (between elev. 823-840) – acre feet	164,702
Total volume at elev. 823 – acre feet	202,769
Total Inactive volume (below elev. 800) – acre feet	82,891
Shore line length at static full pool – miles	270

TAILWATER ELEVATIONS

Normal, (minimum outflow 240 cfs) – feet NGVD29	690.0
Normal, one turbine operating (outflow 3,250 cfs) – feet NGVD29	692.6
Normal, full powerhouse flow (outflow 6,500 cfs) – feet NGVD29	694.7
Bankfull (9,500 cfs)	696.5

DAM/EARTH DIKES

Total length, concrete dam – feet	1,250
Total length, earth dikes - feet	4,200
Top elevation, dam – feet NGVD29	880.0
Top elevation, earth dike – feet NGVD29	875.0

SPILLWAY SECTION

Total length – feet (net length 400 ft)	500
Number of piers, including end piers	12
Elevation of crest – feet NGVD29	835.0
Type of gates	Tainter
Size of gates – feet	9@40 x 26 2 @ 20 x 26
Elevation top of gates – feet NGVD29	860.0
Number of gates	11

POWER PLANT AND DATA

Number of units	3
Generator rating, two units @ 40,000 each; 1 small unit @ 2,200 – kW (declared values)	82,200
Plant output at rated net head	
Installed capacity at rated power factor – kW	86,800
Installed capacity at unity power factor – kW	96,400

I - INTRODUCTION

1-01. Authorization. Section 7 of the Flood Control Act of 1944 instructed the Secretary of the Army to prescribe regulations for the use of storage allocated for flood control (now termed flood risk management) or navigation at all Corps reservoirs. Therefore, this water control manual has been prepared as directed in the Corps' Water Management Regulations, specifically Engineering Regulation (ER) 1110-2-240, *Water Control Management* (date enacted 8 October 1982). That regulation prescribes the policies and procedures to be followed in carrying out water management activities, including establishment and updating of water control plans for Corps and non-Corps projects, as required by Federal laws and directives. This manual is also prepared in accordance with pertinent sections of the Corps' Engineering Manual (EM) 1110-2-3600, *Management of Water Control Systems* (date enacted 30 November 1987); under the format and recommendations described in ER 1110-2-8156, *Preparation of Water Control Manuals* (date enacted 31 August 1995); and ER 1110-2-1941, *Drought Contingency Plans* (date enacted 15 September 1981). Revisions to this manual are to be processed in accordance with ER 1110-2-240.

1-02. Purpose and Scope. This individual project manual describes the water control plan for the Allatoona Dam and Lake Project (Allatoona Project). The description of the project's physical components, history of development, water control activities, and coordination with others are provided as supplemental information to enhance the knowledge and understanding of the water control plan. The Allatoona Project water control plan must be coordinated with the multiple projects in the Alabama-Coosa-Tallapoosa (ACT) Basin to ensure consistency with the purposes for which the projects were authorized. In conjunction with the ACT Basin master water control manual, this manual provides a general reference source for Allatoona water control regulation. It is intended for use in day-to-day, real-time water management decision making and for training new personnel.

1-03. Related Manuals and Reports.

Other manuals related to the Allatoona Project water control regulation activities include the *Operation and Maintenance* manual for the project, and the ACT Master Water Control Manual for the entire basin.

One master water control manual and nine individual project manuals, which are incorporated as appendices, compose the complete set of water control manuals for the ACT Basin:

Appendix A - Allatoona Dam and Lake

Appendix B - Weiss Dam and Lake (Alabama Power Company)

Appendix C - Logan Martin Dam and Lake (Alabama Power Company)

Appendix D - H. Neely Henry Dam and Lake (Alabama Power Company)

Appendix E - Millers Ferry Lock and Dam and William "Bill" Dannelly Lake

Appendix F - Claiborne Lock and Dam and Lake

Appendix G - Robert F. Henry Lock and Dam and R. E. "Bob" Woodruff Lake

Appendix H - Carters Dam and Lake and Carters Reregulation Dam

Appendix I - Harris Dam and Lake (Alabama Power Company)

Other pertinent information regarding the ACT River Basin development is in operation and maintenance manuals and emergency action plans for each project. Historical, definite project reports and design memoranda also have useful information.

1-04. Project Owner. The Allatoona Project is a federally owned project entrusted to the Corps, South Atlantic Division (SAD), Mobile District.

1-05. Operating Agency. Operation and maintenance of the Allatoona Project is the responsibility of the Mobile District Operations Division. Supervision and direction for this effort is provided by the project's Operations Project Manager.

1-06. Regulating Agencies. Authority for the water control regulation of the Allatoona Project has been delegated to the SAD Commander. Water control regulation activities are the responsibility of the Mobile District, Engineering Division, Water Management Section. Water control actions for the Allatoona Project are regulated in a system-wide, balanced approach to meet the federally authorized purposes. It is the responsibility of the Water Management Section to develop water control regulation procedures for the ACT Basin Federal projects. The regulating instructions presented in the basin water control plan are issued by the Water Management Section with approval of SAD. The Water Management Section monitors the project for compliance with the approved water control plan and makes water control regulation decisions on the basis of that plan. When necessary, the Water Management Section instructs the project personnel regarding normal procedures and emergencies for unusual circumstances.

II - DESCRIPTION OF PROJECT

2-01. Location. Allatoona Dam and Lake is located in Georgia on the Etowah River in Bartow, Cobb and Cherokee Counties, about 32 miles northwest of Atlanta and 26 miles east-southeast of Rome, Georgia. An aerial view of the Allatoona Project is shown in Figure 2-1. The location of the project, 47.86 river miles above the mouth of the Etowah River, is indicated on Plate 2-1. Detailed hydrology of the area and the river stage gages and rainfall gages are shown on Plate 2-2. The 1,122 square miles drainage area lies on the southern slopes of the Blue Ridge Mountains and consists of steep sloping mountain terrain.

Figure 2-1. Allatoona Dam and Lake

2-02. Purpose. Allatoona Dam and Lake is a multiple purpose project, originally authorized for hydropower, flood risk management and navigation. The original congressional authorization has been modified and expanded by later legislation to include the additional project purposes of public recreation, water quality, fish and wildlife conservation, conservation of federally listed threatened and endangered species and their critical habitat, and water supply.

2-03. Physical Components. The project consists of a lake extending 28 miles up the Etowah River at full summer conservation pool of 840 feet NGVD29, a concrete gravity-type dam with gated spillway, earth dikes, an 82,200 kilowatt (kW) (declared value) power plant and appurtenances. Declared power capacity is defined as the plant's operational capacity declared on a weekly basis to the power marketing agency. The value may vary slightly from week to week depending on factors such as head and cooling capabilities. The dam under construction is shown in Figure 2-2 and the completed structure in Figure 2-3.

a. Dam. The dam is a concrete gravity-type structure with curved axis convex upstream, having a top elevation of 880 feet NGVD29 and an overall length of approximately 1,250 feet. The maximum height above the existing river bed is 190 feet. An 18-foot wide, non-public use roadway is provided across the entire length of the dam. Sections and plans of the dam and appurtenant works are shown on Plate 2-3. The dam is located east of Interstate 75 approximately 30 miles northwest of downtown Atlanta, Georgia.

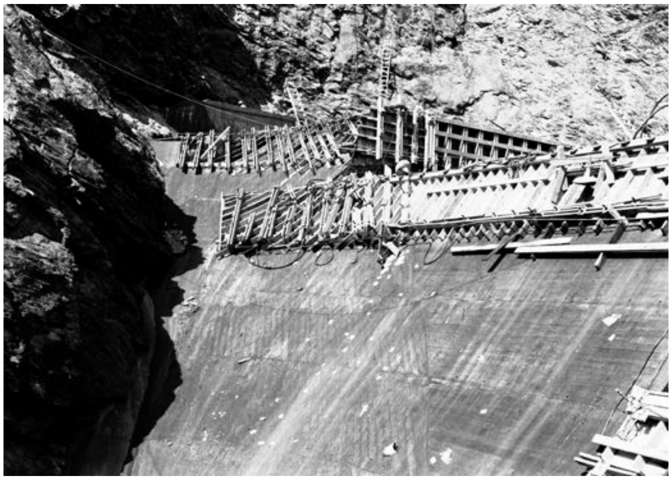


Figure 2-2. Dam under Construction

Figure 2-3. Completed Project

b. Earth Dikes. The left bank (south) basin divide at the dam site between Allatoona and Pumpkinvine Creeks has three low saddle dikes. In order to prevent overflow into the Pumpkinvine Creek drainage basin, it was necessary to construct earth dikes at these locations. These dikes are designated on Plate 2-4 as plug dam (3.25 miles south of dam), saddle dike No. 1 (one mile east-southeast of plug dam), and saddle dike No. 2 (1.5 miles southwest of No. 1). Built along the abandoned line of the Western and Atlantic Railroad near the divide, the dikes have been constructed to elevation 875 feet with a top width of 12 feet and side slopes of 1:3 on the water side and 1:2.5 on the land side. The side facing the reservoir is completely covered with two feet of riprap on a one-foot gravel blanket. The total length of the two dikes is about 4,200 feet. The plug dam is built similarly.

c. Reservoir. The drainage area into the Allatoona Project is 1,122 square miles. The reservoir has a total storage capacity of 670,047 acre-feet at full flood-control pool (elevation 860 feet NGVD29). At elevation 860, the reservoir covers a surface area of 19,201 acres (30.0 square miles) or 2.7 percent of the dam site drainage area.

At full summer-level conservation pool (elevation 840 feet NGVD29), the reservoir covers 11,862 acres and has a total storage capacity of 367,471 acre-feet. At minimum conservation pool (elevation 800 feet NGVD29), the reservoir covers 3,251 acres and has a total storage capacity of 82,891 acre-feet. Area-capacity curves and tables are shown on Plate 2-5.

Allatoona Creek, a major arm of the lake, extends southward into Cobb County near Acworth, Georgia, is used as a source of water by the Cobb County-Marietta Water Authority (CCMWA) for its Wyckoff Water Treatment Plant. The Howell-Bunger sluice, located in Allatoona Dam, is presently used by the city of Cartersville, Georgia, for its water intake. Water is returned from sewage treatment plants located on Allatoona Lake tributaries including; Cobb Noonday Creek Water Reclamation Facility, Cobb Fitzgerald Creek Water Pollution Control Plant Little River, and the Cobb Rose Creek Water Pollution Control Plant that discharges to the Etowah River arm of Allatoona Lake.

d. Spillway. The spillway section of the dam, with a crest elevation of 835 feet NGVD29, has a total flow length of 500 feet, a net length of 400 feet, and a discharge capacity of 184,000 cubic feet per second (cfs) at elevation 860 feet, full flood-control pool. It is equipped with 11 tainter gates, nine of which are 40 feet wide by 26 feet high and two gates are 20 feet wide by 26 feet high. In closed position, the top of the gates are at elevation 860 feet NGVD29 and the bottom of the gates are at elevation 834 feet NGVD29, one foot below the crest. Protection against erosion below the spillway is provided by a concrete apron which will produce the depth required for a hydraulic jump at a discharge of about 65,000 cfs. The spillway rating curves are shown on Plates 2-7 and 2-8. Figure 2-4 shows the gate platforms under construction.

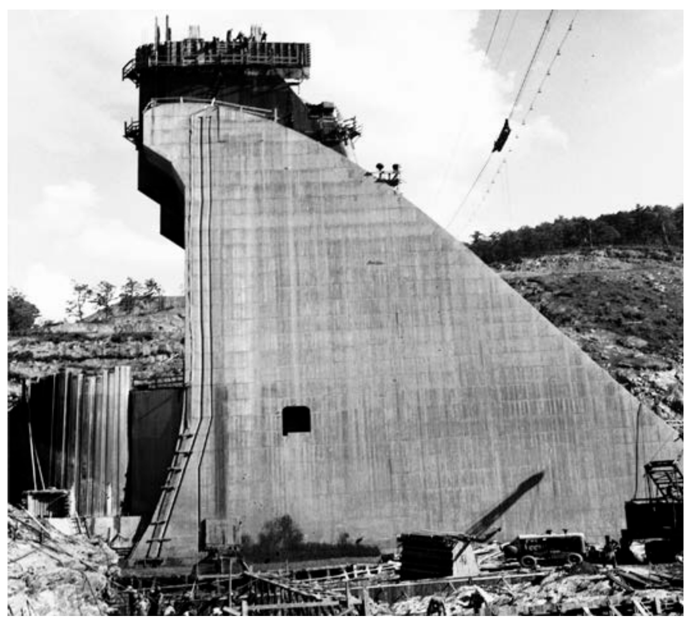


Figure 2-4. Gate Platform under Construction

e. Sluices. There are four sluices, 5.67 feet wide by 10 feet high, and one sluice, the 48-inch diameter Howell-Bunger valve. The sluices were designed to be used to release water when the lake level is below the spillway crest elevation of 835 feet NGVD29. However, the Howell-Bunger valve was replaced with the raw-water intake for the City of Cartersville in early 1969. The capacity of each sluice with a one foot gate opening is 4,050 cfs (total 16,200 cfs) at elevation 840 feet NGVD29, as shown on Plate 2-9.

Figure 2-5. City of Cartersville Raw-Water Intake

f. <u>Powerhouse and Penstocks</u>. The powerhouse and penstock intakes are located on the left (south) bank of the river and consists of two 40,000 kW main units and one 2,200 kW small unit, for a total power installation of 82,200 kW (declared value). The penstocks are steel-lined and are controlled by a hoist operated tractor-type head gates. The penstock to the small unit has a diameter of 5.5 feet and the penstocks to the main units are 20 feet in diameter at the intake and reduce to 18 feet at an elbow under the switchyard. Space has been allotted for a future unit of 36,000 kW capacity. However, the channel capacity would have to be increased to

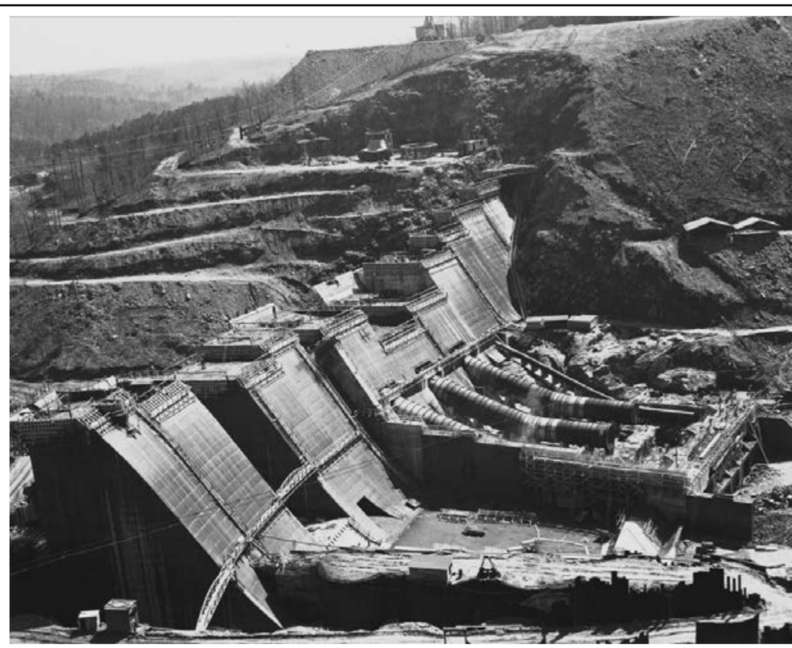


Figure 2-6. Dam and Penstocks under Construction

allow the operation of a third large unit. Discharge rating curves for the main units are shown on Plate 2-10 and for small unit on Plate 2-11. Plates 2-12 and 2-13 show historical hydropower production for the power plant. The location of the penstocks is shown in Figure 2-6.

g. Switchyard and Transformer Substation. The switchyard and transformer substation are located in the area between the dam and powerhouse. The main transformer gallery with deck at elevation 744 feet NGVD29 is immediately adjacent to the switchyard deck. The switchyard deck is at elevation 744 feet NGVD29 and adjoins the downstream face of the dam. There are two 50,000kVA, 13.8/115kV three phase transformers. Full provision has been made for the installation of an additional transformer. A ring bus has been installed complete with switching equipment, protective devices, relays, and accessories which could ultimately extend to include the additional transformer and a second line. At present, the busses extend over only two transformer bays and one line bay.

h. Acworth Sub-impoundment. The Acworth development is situated on the Proctor Creek arm of Allatoona Lake, as shown on Plate 2-6, and enhances the Allatoona Project purposes for recreation and conservation of fish and wildlife. All structures associated with Acworth Dam are owned and maintained by the Corps. The sub-impoundment dam, shown in Figure 2-7, provides a generally non-fluctuating level for the 325 acre lake and provides a road across Allatoona Lake, connecting the City of Acworth, Georgia, with U.S. Highway 41. The earth filled dam is 1,500 feet long with a 60-foot concrete spillway flanked on each side by concrete non-overflow sections 61 feet long. The maximum height of the earth fill is 45 feet and the slopes are covered with one foot of riprap on a six-inch gravel filter blanket. The ungated spillway, shown in Figure 2-8, has its crest at elevation 848 feet NGVD29 and is bridged in a single span by the road crossing the dam. Stilling action at the toe is accomplished by means of a bucket which deflects the water upward. Two 24-inch sluices, one at each end of the spillway, are provided to allow fluctuation of the upper pool during low flow for mosquito control and to drain the reservoir. The Area/Volume of the Acworth sub-impoundment is included in the Area/Capacity of Allatoona Lake.

Figure 2-7. Acworth Sub-impoundment

Figure 2-8. Acworth Sub-Impoundment, Ungated Spillway

2-04. Related Control Facilities. Operation of the Allatoona Powerhouse (as well as Buford) is remotely controlled from the Carters pumped storage facility in nearby Carters, Georgia. This is accomplished through a microwave network between Carters and Allatoona. The spillway gates at Allatoona can only be operated locally. The Allatoona Powerhouse can also be locally operated if conditions require.

2-05. Real Estate Acquisition. Beginning in the 1940's, the Federal Government acquired lands for Allatoona Lake and flowage easements for flood-prone areas. The criteria for establishing the basic taking line required all the land within the pool at the top of the flood risk management storage of elevation 860 feet NGVD29, plus three feet of freeboard. This elevation of 863 feet NGVD29 provides for wave run up on the dam and adds to the safety of preventing overtopping. The main dam, the plug dam, and the two saddle dikes along the divide with Pumpkinvine Creek, were designed to incorporate this additional three feet in elevation. These land purchases are referred to as fee simple and have a building restriction of elevation 863 feet NGVD29 for any structures used for human habitation. The total fee acquisition for the project was 37,742 acres.

The Government leases 6,291 acres for park and campground uses and 11,663 acres to the State of Georgia as a wildlife area. Flowage easements are used in flooding areas where the government does not own the land but wants to prevent structures from being built in flood-prone areas. The Government pays the owner a fee (flow easements) which allows the owner to use the land without holding the government liable for flood damages. There are 208 acres of flowage easements consisting of small parcels in the Canton area, the recreational cottage areas, and downstream of the dam. Plate 2-6 shows project property lines and recreation sites.

2-06. Public Facilities. The Acworth sub-impoundment forms one of the developed areas for a variety of recreational activities. The Acworth sub impoundment, with a constant pool level, is leased to the Acworth Lake Authority and Cobb County Parks Department which operates the area as a public park. Other areas, designated for second, third, and fourth priority use, have been leased to organized nonprofit groups, semi-public organized groups and to private clubs.

Additional development has been provided by the Corps at 30 public access areas to meet demands for picnicking, camping, sight-seeing, boating, and fishing. Tracts on the north bank and on Little River have been licensed to the Georgia Department of Natural Resources (GADNR) for game management. The recreation development plan on Plate 2-6 shows the distribution of recreational areas around the reservoir.

III - HISTORY OF PROJECT

3-01. Authorization. The first official recognition that the present dam site on the Etowah River near Cartersville, Georgia, was a prime location for a hydropower project was in a document entitled, "Reports on Examination and Survey of Etowah, Coosa, Tallapoosa and Alabama Rivers", prepared in 1910 by the U. S. Army Corps of Engineers. The site was considered suitable for a dam of any height up to 200 feet. It is interesting to note that Allatoona Dam rises 190 feet above the river bed.

In the late 1920s, the Georgia Power Company expressed interest in the Allatoona site and conducted extensive surveys and studies. In 1934, the Corps, under the provisions of House Document No. 306, 69th Congress, 1st Session, developed a general plan for overall development of the Alabama-Coosa River System. That report, published in House Document No. 66, 74th Congress, 1st Session, included the Allatoona Project but the economic aspect of the project appeared unfavorable at that time.

Further studies were directed by Congress in resolutions adopted by the Committee on Rivers and Harbors, House of Representatives, on 1 April 1936 and 26 April 1936, and by the Committee on Commerce, United States Senate, on 18 January 1939. In response to those resolutions, an interim report on Allatoona Dam was submitted to Congress in 1940. That report, published in House Document No. 674, 76th Congress, 3rd Session, recommended the construction of Allatoona Dam and Reservoir as a dual purpose flood control and power project with an estimated total storage capacity of 630,000 acre-feet to be utilized as follows: flood control storage, 422,500 acre-feet between elevations 821 and 855 feet NGVD29; conservation storage, 182,500 acre-feet between elevations 771 and 821 feet NGVD29; and inactive storage of 25,000 acre-feet below elevation 771 feet NGVD29. The Allatoona Project was authorized by the Flood Control Act of 1941 (Public Law (P.L.) 77-228) as a multipurpose project for flood risk management, hydropower, and navigation. An early concept of the plan for Allatoona Dam is shown in Figure 3-1.

Figure 3-1. Early Depiction of Proposed Project

Other statutory authorities generally applicable to Corps projects, including Allatoona, include P.L. 78-534, P.L. 85-500, P.L. 85-624, P.L. 92-500, and P.L. 93-205. Pursuant to the above-referenced authorities, purposes of the Allatoona Project include hydropower, flood risk management, navigation, recreation, water quality, fish and wildlife conservation, and water supply.

3-02. Planning and Design. In December 1941, the District Engineer submitted to the Chief of Engineers a report entitled "Definite Project Report, Allatoona Dam and Reservoir, Etowah River, in the Alabama-Coosa River Basin, Georgia", and work was initiated on plans and specifications. The proposals presented in the definite project report were substantially in agreement with those described in the interim report except that the estimated total storage was increased to 722,000 acre-feet by raising the full flood control pool from elevation 855 to 860 feet NGVD29 and making a number of changes in the design of the structure.

3-03. Construction. Construction was authorized in the Flood Control Act of 18 August 1941, now known as Public Law No. 228, 77th Congress, 1st Session, H. R. 4911. Project construction was delayed during World War II and was restarted on 8 February 1946, using hired labor. The contract for the construction of the main dam was awarded on 29 April 1946 to National Constructors, Inc. The main dam was essentially complete in late 1949, and filling the reservoir commenced 27 December 1949. The reservoir pool reached elevation 835 feet NGVD29 in June 1950 and normal reservoir operation began at that time. Hydropower generation began in January 1950. Figure 3-2 pictures the project during early construction.

Figure 3-2. Early Construction, circa 1947-1948

3-04. Related Projects. Allatoona Dam and Lake is one of five Corps reservoir projects in the ACT Basin. Carters Dam and Lake (with Reregulation Dam) is on the Coosawattee River and Robert F. Henry, Millers Ferry and Claiborne Lock and Dam Projects are located on the Alabama River downstream. The Corps reservoirs are operated as a system to accomplish the authorized purposes of the projects. Outflows from Allatoona Dam are defined by the water control plan and requirements at the downstream Corps reservoirs. In addition, 11 privately owned dams are located in Alabama on the Coosa and Tallapoosa Rivers and operate mainly for the production of hydropower. The Corps has flood control authority over 4 of these 11 privately owned dams; Weiss, H. Neely Henry, and Logan Martin Dams on the Coosa River, and Harris Dam on the Tallapoosa River.

3-05. Modifications to Regulations. Shortly after construction began, the storage allocation was reconsidered and the top of the conservation pool was changed to elevation 835 feet NGVD29, with estimated storages of 389,000 acre-feet between elevation 835 and 860 feet NGVD29 allocated for flood risk management, and 253,000 acre-feet between elevations 800 and 835 feet NGVD29 reserved for power generation and conservation. The inactive storage below minimum conservation pool, elevation 800 feet NGVD29, was estimated at 80,000 acre-feet.

The storage curve previously used was revised in 1950 as a result of more detailed data. According to this revised curve, the total storage in the reservoir at elevation 860 feet NGVD29 is 670,047 acre-feet. Of this total, 587,156 acre-feet between elevations 860 and 800 feet NGVD29 is usable storage and 82,891 acre acre-feet below elevation 800 feet NGVD29 is inactive storage.

Studies conducted in 1952 revealed that overall benefits from the project could be increased appreciably by varying the storage allocations in Allatoona Lake on a seasonal basis. Raising the top of conservation pool during the summer months with a drawdown prior to the flood season would result in a considerable increase in power revenue with no reduction in flood risk management benefits. An operating plan based on seasonal variation of storage allocations was approved by the Chief of Engineers in November 1956. Under this plan, 840 feet NGVD29 is the top of conservation pool during the months May through August, transitions down from 840 to 820 feet NGVD29 during September through December, and then transitions back up from 820 to 840 feet NGVD29 during January through April. The flood risk management storage at elevation 840 feet NGVD29 is 302,580 acre-feet, and at elevation 820 feet NGVD29 is 489,060 acre-feet. The conservation storage is 284,580 acre-feet at elevation 840 feet NGVD29 and 98,100 acre-feet at elevation 820 feet NGVD29.

In 1967, another study of the top of conservation pool was made to determine the desirability of allowing the pool level to remain at elevation 840 feet NGVD29 until the end of September whenever flow conditions are favorable. Such an operation would be particularly desirable from the standpoint of recreation and would provide additional benefits to hydropower, low-flow control, and navigation. Another change considered was the elimination of the steep drawdown and immediate refilling in late December and early January. The study showed that the changes could be made without depreciating flood risk management benefits. On 28 March 1968, the Chief of Engineers approved a revised top of conservation curve which has a top level at elevation 840 feet NGVD29 during the months May through September, varies uniformly from elevation 840 to 823 feet NGVD29 during 1 October through 15 December, remains at elevation 823 feet NGVD29 from 15 December through January, then varies uniformly from 823 feet NGVD29 on 15 January to 840 feet NGVD29 at the end of April. The flood risk management storage at elevation 823 feet NGVD29 is 467,278 acre-feet and the conservation storage is 119,878 acre-feet. The curve delineating the current top of conservation pool is shown on Plate 3-1 adopted in the 2014 manual revision. The curve remains steady at 840 feet NGVD29 between 1 May to Labor Day; then the pool is drawn down uniformly from 840 feet NGVD29 to 835 feet NGVD29 beginning the day after Labor Day to 1 October; the curve is held steady at 835 feet NGVD29 from 1 October to 15 November, then transitions uniformly down to 823 feet NGVD29 by 31 December; then held steady at 823 feet NGVD29 between 31 December to 15 January; and then transitions uniformly between 16 January to 1 May back to 840 feet NGVD29. Table 3-1 summarizes the historical changes in Allatoona storage allocation.

The 2014 update to the water control manual also establishes four action zones within the conservation storage pool. These zones are shown on Plate 3-1. The action zones are used to manage the lake at the highest level possible within the conservation storage pool while balancing the needs of all authorized purposes with water conservation as a national priority used as a guideline. These provide water control regulation guidance to meet this water conservation plan while balancing the use of available conservation storage to meet the project purposes.

When the project went into operation in 1949, the top of conservation pool was at elevation 835 feet NGVD29 and the regulation plan called for evacuation of flood waters stored above that level as soon as practicable by releasing at rates not to exceed the downstream bankfull capacity estimated at 12,000 cfs. Through actual operating experience, the channel capacity below Allatoona Dam has been determined to be about 9,500 cfs. A survey and real estate appraisal was made to determine the acreage involved and the cost of acquiring easements to permit emptying releases up to 12,000 cfs. This higher release rate, which would expedite the evacuation of flood storage, would be necessary to permit operation of the power plant at full capacity if the third generating unit was installed. Until such easements are acquired, flood storage will be emptied at a maximum rate of 9,500 cfs, except in induced surcharge operations.

The induced surcharge operation during floods which exceed the available flood storage is a departure from the operating plan outlined in the Definite Project Report. In that report, the pool level would be maintained at elevation 860.0 feet NGVD29 by regulating the gates to make outflow equal to inflow until all spillway gates were opened, after which the outflow becomes uncontrolled until the pool level dropped back to elevation 860 feet. A study of induced surcharge operation was conducted in February 1947 to determine the most desirable plan for Allatoona Dam. Since Allatoona Dam was under construction at the time, induced surcharge operation was limited by the pool elevation-gate opening curve, shown on Plate 2-8, so that the maximum pool for the spillway design flood could be held to a level that would not necessitate major changes in the structure. The gate operating machinery is provided with limit switches which will open gates in 0.5-foot increments up to a 12-foot opening. In following the induced surcharge schedule, the gates will be opened as uniformly as practicable with no gate opening more than 0.5-foot larger than any other gate opening.

Table 3-1. Revisions to Available Storage at Allatoona

Allatoona Available Storage in Acre-Feet					
Approval by	Year Authorized	Available Storage** (acre-feet)	Purpose	Elevation Range (Ft-NGVD29)	Period
HD674,76th,3rd +	1940	422,500	Flood risk management	821-855	Jan-Dec
		182,500	Conservation	771-821	Jan-Dec
		25,000	Inactive	Below 771	Jan-Dec
Flood Control Act +	1941	212,000	Flood risk management	848-860	Jan-Dec
		456,000	Conservation	788-848	Jan-Dec
		54,000	Inactive	Below 788	Jan-Dec
OCE	1946	389,000	Flood risk management	835-860	Jan-Dec
		253,000	Conservation	800-835	Jan-Dec
		80,000	Inactive	Below 800	Jan-Dec
OCE	1956	489,060	Flood risk management	820-860	Sep-Apr
		302,580	Flood risk management	840-860	May-Aug
		98,100	Conservation	800-820	Sep-Apr
		284,580	Conservation	800-840	May-Aug
		82,900	Inactive	Below 800	Jan-Dec
OCE	1968	467,280	Flood risk management	823-860	Oct-Apr#
		302,600	Flood risk management	840-860	May-Sep#
		119,900	Conservation	800-823	Oct-Apr#
		284,600	Conservation	800-840	May-Sep
		82,900	Inactive	Below 800	Jan-Dec
OCE	2012	467,278	Flood risk management	823-860	16 Nov-30 Apr
		358,582	Flood risk management	835-860	6 Sep-15 Nov
		302,576	Flood risk management	840-860	1 May-5 Sep
		119,878	Conservation	800-823	16 Nov-30 Apr
		228,574	Conservation	800-835	6 Sep-15 Nov
		284,580	Conservation	800-840	1 May-5 Sep
		82,890	Inactive	Below 800	Jan-Dec
(OCE) Office of Chief of Engineers, COE					
# Conservation is set at 823 feet-NGVD29 from 15 Dec-15 Jan.					
** Total storage is 630,000 acre-feet (1940), 722,000 (1941&46) and 670,100. (1956&1968)					

3-06. Principal Regulation Problems. The initial regulation plan called for evacuation of flood waters stored above the conservation pool as soon as practicable by releasing at rates not to exceed the downstream bankfull capacity estimated at 12,000 cfs. However, through actual operating experience, particularly the April 1964 flood, the channel capacity below Allatoona Dam was reevaluated and reduced from 12,000 cfs to 9,500 cfs. A survey and real estate appraisal was made to determine the acreage involved and the cost of acquiring easements to permit emptying releases up to 12,000 cfs. This higher release rate, which would expedite the evacuation of flood storage, would be necessary to permit operation of the power plant at full capacity if the third generating unit was installed. Until such easements are acquired, flood storage will continue to be emptied at a maximum rate of 9,500 cfs.

IV - WATERSHED CHARACTERISTICS

4-01. General Characteristics. Etowah River and its upstream tributaries originate in the Blue Ridge Mountains of northern Georgia, near the western tip of South Carolina. The northern boundary of the Allatoona drainage area is along a high ridge varying from elevation 1,300 to 3,800 feet NGVD29. Creeks along the upper Etowah River have steep mountainous slopes which produce rapid runoff. Amicalola Creek is a major tributary and begins at the divide with the Carters Project drainage area. The main stem of the Etowah River above the reservoir is more than 70 miles long. Rain storms produce large flood inflows that can persist for several days.

The Etowah River Basin below Allatoona Dam is about 30 miles wide and has 700 square miles of uncontrolled runoff. The Etowah River drops from elevation 687 feet NGVD29 at the toe of the dam to 562 feet NGVD29 at Rome, Georgia. This lower portion of the basin has a wider floodplain and flatter stream slope than the upper basin. The drainage area and river miles (from Mobile Bay) for important locations of interest within the basin are shown in Table 4-1. The entire ACT Basin is shown on Plate 2-1.

Table 4-1. River Mile and Drainage Area for Selected Sites in ACT Basin

River Mile and Drainage Area for Important Sites in the ACT Basin				
River Mile	**River**	**Location**	**Drainage Area (Square Miles)**	**Owner**
693	Etowah	Allatoona Dam	1,122	COE
683.4	Etowah	Cartersville, GA (Hwy 61)	1,345	
666.6	Etowah	Kingston, GA	1,634	
645.2	Etowah	Mouth	1,861	
672	Coosawattee	Carters Dam	374	COE
670.2	Coosawattee	Carters Reregulation	520	COE
645.2	Oostanaula	Mouth	2,150	
645.5	Oostanaula	Rome, GA (Hwy 27)	2,149	
638.1	Coosa	Mayo's Bar	4,040	
585.1	Coosa	Weiss Dam	5,270	APC
506.2	Coosa	H Neely Henry Dam	6,596	APC
457.4	Coosa	Logan Martin Dam	7,743	APC
410.2	Coosa	Lay Dam	9,053	APC
396.2	Coosa	Mitchell Dam	9,778	APC
378.3	Coosa	Jordan Dam	10,102	APC
497.4	Tallapoosa	R. L. Harris	1,454	APO
420	Tallapoosa	Martin Dam	2,984	APC
412.1	Tallapoosa	Yates Dam	3,293	APC
409.1	Tallapoosa	Thurlow Dam	3,308	APC
281.2	Alabama	Robert F Henry Dam*	16,233	COE
178	Alabama	Millers Ferry Dam*	20,637	COE
117.5	Alabama	Claiborne Dam*	21,473	COE
* Navigation Lock at Project				
COE - Corps of Engineers; APC - Alabama Power Company				

4-02. Topography. The Blue Ridge Province comprises much of the drainage basin above Allatoona Dam. This province is characterized by irregular divides formed by isolated and poorly connected masses of highly metamorphosed and igneous rocks. The western boundary of this province is determined largely by the extent of over thrust of resistant crystalline rocks on the weaker sedimentary formations of the Valley and Ridge Province. The drainage area above Allatoona is composed of mountainous streams with steep slopes.

4-03. Geology and Soils. Many of the rocks of the Blue Ridge appear to be the metamorphosed equivalents of Proterozoic or Paleozoic (or both) sedimentary rocks. Others are metamorphosed igneous rocks, such as the Corbin Metagranite, the Fort Mountain Gneiss, various mafic and ultramafic rocks, and the metavolcanic rocks of the Gold Belt. Geologic resources of the Blue Ridge include marble, much of which is mined. Talc has been mined in the western Blue Ridge just east of Chatsworth, Georgia. Gold was mined at Dahlonega, Georgia, in the early 1800s, and the U.S. mint produced gold coins there from 1830 to 1861.

Piedmont soils consist of kaolinite and halloysite (aluminosilicate clay minerals) and iron oxides. They result from the intense weathering of feldspar-rich igneous and metamorphic rocks. Such intense weathering dissolves or alters nearly all minerals and leaves behind a residue of aluminum-bearing clays and iron-bearing iron oxides because of the low solubilities of aluminum and iron at earth-surface conditions. Those iron oxides give the red color to the clay-rich soil that has come to be synonymous with north and central Georgia.

4-04. Sediment. The streams in the northern part of the Etowah River Basin have been severely impacted by past and present urban development. Urban development generally increases the peak and volume of rainfall events, which increases the velocity and erosion potential of rainfall runoff. Results are generally a down-cutting and widening of the stream, which creates bank caving and further erosion. Other significant sources of sediment within the basin are agricultural land erosion, unpaved roads, and sliviculture, and variation in land uses that result in conversion of forests to lawns or pastures.

In general, the quantity and size of sediment transported by rivers is influenced by the presence of dams. Impoundments behind dams serve as sediment traps where particles settle in the lake headwaters because of slower flows. Large impoundments typically trap coarser particles plus some of the silt and clay. Often releases from dams scour or erode the streambed downstream.

In 1960, the Corps established sedimentation and retrogression ranges to monitor changes in reservoir volume and channel degradations. Reservoirs tend to slow river flow and accelerate deposition. The locations of the ranges for the Allatoona Project are shown on Plate 2-4. Descriptive analyses are performed after periodic re-surveys of the ranges to determine the level of sedimentation occurring in the main body of the reservoir and to examine shoreline erosion. Detailed reports are written after each re-survey to determine changes in reservoir geometry. Those reports include engineering analysis of the range cross-sections to estimate reservoir storage loss by comparing to the earlier surveys of the existing ranges. The data provide the ability to compute new area/capacity curves for the reservoirs. Area/capacity curves have not been updated since construction of the project. Maintenance of the sedimentation and retrogression ranges, which could include reestablishing or relocating ranges, typically occurs when they are resurveyed.

4-05. Climate. Chief factors that control the climate of the ACT Basin are its geographical position in the southern end of the temperate zone and its proximity to the Gulf of Mexico and South Atlantic Ocean. Another factor is the range in altitude from almost sea level at the southern end to higher than 3,000 feet in the Blue Ridge Mountains to the north. Frontal systems influence conditions throughout the year. During the warmer months, thunderstorms are a major producer of rainfall. Tropical disturbances and hurricanes also affect the region.

a. Temperature. The Blue Ridge Mountains protect the Etowah River Basin in the vicinity of Allatoona Dam from the more rigorous winters prevailing across the divide in the Tennessee Valley and tend to assure a milder climate. The average annual temperature in the vicinity of the Allatoona Project is 59.7 degrees Fahrenheit (^{o}F), based on records at six stations averaged for the 30-year period of 1981 - 2010, inclusive. The stations are Gainesville, Dahlonega, Jasper, Cedartown, Cartersville and Rome, Georgia. The maximum temperature recorded during this time period was 109 ^{o}F at Rome, Georgia. The minimum temperature recorded was -14 ^{o}F at Jasper, Georgia. The average summer temperature is about 76 ^{o}F and the average winter temperature is about 42 °F. The frost-free period usually lasts from April through October and extended periods of below freezing temperature are unusual. Tables 4-2 presents the maximum, minimum, and mean monthly normal temperature data for selected stations in the basin. Climatologists define a climatic normal as the arithmetic average of a climate element, such as temperature, over a prescribed 30-year time interval. The National Climatic Data Center (NCDC) uses a homogenous and complete dataset with no changes to the collection site or missing values to determine the 30-year normal values. When developing this 30-year normal dataset, the NCDC has standard methods available to them to make adjustments to the dataset for any inhomogeneities or missing data before computing normal values.

Table 4-2. Normal 30-Year Air Temperature for Selected Sites in/near Allatoona Basin

Normal Temperature Based on 30-Year Period – 1981 Through 2010 (degrees Fahrenheit)														
Station		**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUNE**	**JULY**	**AUG**	**SEPT**	**OCT**	**NOV**	**DEC**	**ANNUAL**
Gainesville	Max	49.8	54.2	62.5	70.6	77.3	84.1	87.2	86.0	79.9	70.8	61.8	51.9	69.7
	Mean	40.8	44.2	51.5	59.2	66.8	77.4	77.9	76.9	70.5	60.6	51.7	43.1	60.1
	Min	31.7	34.2	40.5	47.8	56.4	64.7	68.6	67.9	61.2	50.5	41.6	34.4	50.0
Dahlonega	Max	50.3	54.9	61.8	70.3	77.4	83.1	86.3	85.2	79.4	71.2	62.3	52.2	64.9
	Mean	38.4	41.9	48.3	55.8	63.2	70.6	74.5	74.0	67.3	57.9	48.7	40.4	56.8
	Min	26.4	28.9	34.7	41.3	49.1	58.1	62.7	62.8	55.2	44.5	35.2	28.6	37.1
Jasper	Max	47.8	52.0	60.6	69.0	76.1	82.7	85.6	84.9	79.2	69.5	60.0	50.3	68.1
	Mean	39.0	42.7	50.3	57.8	65.5	73.0	76.1	75.6	69.6	59.3	50.4	42.0	58.4
	Min	30.2	33.4	40.1	46.1	54.9	63.2	66.7	66.2	59.9	49.0	40.9	33.7	48.7
Cedartown	Max	51.7	55.8	64.6	72.8	79.6	86.6	89.4	88.9	83.0	73.5	63.6	53.6	65.7
	Mean	40.0	43.6	51.1	59.3	67.1	75.0	78.3	77.7	71.0	60.2	50.5	42.3	59.7
	Min	28.3	31.3	37.6	45.8	54.6	63.4	67.3	66.5	59.0	46.9	37.5	31.0	44.0
Cartersville	Max	53.2	58.6	67.3	74.9	81.7	88.6	91.5	91.1	85.2	75.5	65.9	55.5	74.1
	Mean	41.4	45.9	53.1	60.7	68.7	76.4	79.7	79.3	73.3	62.1	52.7	43.9	61.4
	Min	29.6	33.2	38.8	46.5	55.7	64.2	67.8	67.5	61.5	48.8	39.6	32.3	48.8
Rome	Max	52.1	56.8	65.7	73.6	80.5	86.9	89.7	89.1	83.3	73.6	64.1	54.2	72.5
	Mean	41.6	45.6	53.2	61.0	68.9	76.6	80.1	79.4	72.9	61.9	52.4	44.1	61.5
	Min	31.1	34.3	40.8	48.3	57.3	66.3	70.5	69.6	62.4	50.1	40.7	34.0	50.5
Basin	Max	50.8	55.4	63.8	71.9	78.8	85.3	88.3	87.5	81.7	72.4	63.0	53.0	69.2
	Mean	40.2	44.0	51.3	59.0	66.7	74.8	77.8	77.2	70.8	60.3	51.1	42.6	59.7
	Min	29.6	32.6	38.9	46.0	54.7	63.3	67.3	66.8	59.9	48.3	39.3	32.3	46.5

b. Precipitation. Due to the topographic lift of the Blue Ridge Mountains, the upland slopes are subject to intense local storms and to general storms of heavy rainfall lasting days. Heavy rains may occur at any time during the year, but are most frequent between late fall and mid-spring, when the majority of the large floods in the basin have been recorded. The large flood of March 1990 occurred when a storm front extended from Mobile, Alabama, to Montgomery, Alabama, to Rome, Georgia, and subtropical moisture was continuously drawn along the line producing an extended period of heavy rain. The normal monthly precipitation above Allatoona Dam is based on the 1981 - 2010 normal rainfall at six National Weather Service (NWS) stations; Cumming, Dahlonega, Cartersville, Jasper, Canton and Woodstock, Georgia. Table 4-3 lists the normal precipitation at these 6 stations. Extreme rainfall events of record are shown in Table 4-4. About 40 percent of the normal annual precipitation occurs from January through April, while only about 30 percent occurs during the dry period August through November. The average annual snowfall is three to four inches, usually in January and February, but is of minor importance in producing runoff.

Table 4-3. Normal Rainfall Based on 30-Year Period – 1981 Through 2010

Normal Rainfall Based on 30-Year Period – 1981 Through 2010 (inches)														
Station		**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUNE**	**JULY**	**AUG**	**SEPT**	**OCT**	**NOV**	**DEC**	**ANNUAL**
Gainesville		5.17	5.10	5.23	3.69	3.80	4.13	4.22	4.39	4.55	3.88	4.34	4.66	53.16
Dahlonega		6.00	5.84	5.55	4.36	4.46	5.06	4.63	4.77	4.93	4.59	5.09	6.15	61.43
Jasper		5.45	5.18	5.31	4.56	4.07	4.81	5.48	4.41	4.07	3.88	4.87	4.89	52.58
Cedartown		4.60	4.89	5.01	3.92	4.29	3.96	4.83	3.91	3.63	3.44	4.51	4.39	51.38
Cartersville		3.24	4.35	4.12	3.43	2.88	3.25	3.92	3.84	2.81	2.62	3.29	4.30	42.05
Rome		4.76	4.84	5.35	4.28	4.11	4.76	4.98	4.49	3.56	3.25	4.58	4.61	54.07
Basin		4.87	5.03	5.10	4.04	3.94	4.33	4.68	4.30	3.93	3.61	4.45	4.83	52.45

Flood-producing storms can occur over the basin at any time, but they are much more frequent in the winter and early spring. Major storms in the winter are usually of the frontal type. Summer storms consist mainly of convective thundershowers with occasional tropical storms affecting southern sections of the basin.

4-06. Storms and Floods. Frontal systems influence conditions throughout the year. During the warmer months, thunderstorms are a major producer of rainfall. Tropical disturbances and hurricanes also impact the region. The autumn months are usually dryer but flood producing storms can occur any time of the year.

Allatoona Project began filling on 27 December 1949, and the pool reached elevation 835 feet NGVD29 in June 1950. Because Allatoona has a seasonally varied conservation level, and other operational reasons, the maximum pool elevation does not always correspond with the maximum inflow. A long series of floods could cause the pool to rise steadily above elevation 840 feet NGVD29 because releases are limited by the downstream flood conditions. Then, an average flood inflow towards the end of the flood series could produce the maximum pool for that event. As a rule, the extended, larger volume floods normally impact the reservoir elevation more than short, high inflow flood events. The maximum pool elevation of record (elevation 861.19 feet NGVD29) occurred during the April 1964 flood while the maximum daily inflow (prior to the September 2009 flood) of 45,845 cfs over a 24-hour period (day-second-feet (dsf)) occurred during February 1982 with a resulting peak pool of elevation 848.01 feet NGVD29. The September 2009 flood exceeded previous inflow records producing a daily inflow of 53,534 cfs and a peak pool elevation of 853.04 feet NGVD29.

The April 1964 event was a series of storms which occurred during early 1964, and caused the local runoff below the dam to stay near bankfull through most of the period. The flood waters into the dam could not be evacuated without causing flood damages downstream. Thus, the pool elevations were high for several weeks. The April 1964 peak inflow occurred during the period of maximum elevation and produced a higher elevation than would have been expected.

Table 4-4. Extreme Rainfall Within and Near the Basin (in Inches)

Station: (093621) GAINESEVILLE From 1891 To 2010						
MONTH	HIGH	YEAR	LOW	YEAR	1-DAY MAX	DATE
JAN	11.70	1936	0.74	1907	4.15	25/1964
FEB	11.85	1961	0.21	1906	4.45	21/1961
MAR	15.47	1980	1.02	1910	5.33	26/1964
APR	14.03	1964	0.25	1915	4.15	30/1963
MAY	12.23	1923	0.20	1914	4.00	12/1942
JUN	13.48	1963	0.50	1988	4.62	24/1980
JUL	13.47	1916	0.12	1952	3.92	15/1949
AUG	16.40	1969	0.26	1925	5.62	16/1969
SEP	16.80	2004	0.13	1978	6.04	02/2004
OCT	10.74	1977	0.00	1963	4.40	09/1977
NOV	13.75	1948	0.15	1901	4.15	11/2009
DEC	15.37	1932	0.69	1980	4.27	06/1983
ANN	80.39	2009	20.96	1904	6.04	20040902

Station: (092475) DAHLONEGA From 1874 To 2010						
MONTH	HIGH	YEAR	LOW	YEAR	1-DAY MAX	DATE
JAN	14.33	1946	0.93	1981	5.72	27/1996
FEB	14.11	1903	0.60	1906	5.17	03/1982
MAR	19.70	1980	1.38	1910	6.28	30/1977
APR	13.62	1979	0.55	1915	4.9	17/1998
MAY	14.65	1976	0.68	1914	5.49	15/1976
JUN	13.01	1900	0.97	1925	4.12	03/1995
JUL	16.67	1916	0.62	1952	4.18	12/1948
AUG	18.16	1978	0.34	1925	7.34	16/1895
SEP	14.49	1929	0.11	1954	5.44	27/1942
OCT	11.29	1918	0.00	1904	5.41	26/1997
NOV	13.97	1948	0.51	1924	3.63	11/2009
DEC	20.63	1932	0.97	1896	5.89	12/1961
ANN	62.02	1929	38.82	1904	7.34	18950816

Station: (094648) JASPER From 1937 To 2010						
MONTH	HIGH	YEAR	LOW	YEAR	1-DAY MAX	DATE
JAN	11.35	1947	1.19	1981	4.43	27/1996
FEB	11.18	1944	0.72	1978	5.78	17/1942
MAR	16.67	1980	1.94	1985	5.1	04/1979
APR	13.57	1979	1.05	1942	5.32	08/1938
MAY	10.15	1976	0.00	2009	4.35	15/1976
JUN	12.83	1989	0.55	1986	3.82	27/1994
JUL	11.62	2003	0.52	1957	3.98	02/1992
AUG	11.30	1969	0.15	1953	5.55	09/0977
SEP	10.57	2004	0.44	2005	7.41	17/2004
OCT	9.12	1997	0.00	1938	5.38/	26/1997
NOV	12.60	1948	0.53	1939	4.22	11/2009
DEC	15.45	1961	1.07	1980	5.75	12/1961
ANN	80.95	1989	36.08	2007	7.41	20040917

Station: (091732) CEDARTOWN From 1896 To 2010						
MONTH	HIGH	YEAR	LOW	YEAR	1-DAY MAX	DATE
JAN	9.91	1947	0.99	1981	4.35	26/1996
FEB	11.14	1944	0.52	1898	4.10	03/1982
MAR	15.68	1980	1.35	1985	6.45	04/1979
APR	14.61	1979	0.43	2007	5.05	13/1979
MAY	9.01	2003	0.80	2007	3.17	14/1972
JUN	11.77	1989	0.58	2009	3.65	21/1961
JUL	14.83	2003	0.41	1993	5.04	07/1962
AUG	10.72	1992	0.71	1955	3.43	24/1967
SEP	10.04	1957	0.09	1998	3.77	17/2004
OCT	10.80	1995	0.00	1938	5.08	04/1995
NOV	15.29	1948	0.57	1949	4.90	09/2000
DEC	13.01	1961	0.09	2010	4.61	12/1961
ANN	71.21	1989	28.41	2007	6.45	19790304

Station: (091665) CARTERSVILLE From 1891 To 2010						
MONTH	HIGH	YEAR	LOW	YEAR	1-DAY MAX	DATE
JAN	8.69	1947	0.44	1981	3.38	26/1976
FEB	10.05	1944	0.00	1996	3.58	22/1974
MAR	13.66	1976	1.19	1983	6.00	18/1990
APR	13.34	1964	0.81	1986	4.56	03/1979
MAY	8.76	1946	0.00	1899	3.29	20/1973
JUN	7.08	1963	0.15	1984	3.64	19/1976
JUL	11.94	2001	0.95	1983	4.21	16/1897
AUG	9.77	1942	0.32	1997	4.50	16/1955
SEP	9.34	1898	0.00	2008	4.20	01/1898
OCT	8.66	1975	0.00	1963	4.11	01/1958
NOV	12.50	1948	0.23	1939	3.62	19/2003
DEC	13.19	1961	0.17	1980	4.85	12/1961
ANN	68.45	1964	19.84	1998	6.00	19900318

Station: (097600) ROME From 1893 To 2010						
MONTH	HIGH	YEAR	LOW	YEAR	1-DAY MAX	DATE
JAN	12.42	1947	0.85	1981	4.65	16/1954
FEB	13.45	1903	0.74	1906	5.30	09/1921
MAR	17.98	1980	1.07	1918	6.22	26/1901
APR	13.60	1979	0.30	1915	4.30	05/1957
MAY	11.33	2003	0.22	2007	2.99	03/1964
JUN	10.85	1989	0.23	1988	3.31	06/1930
JUL	14.76	1916	0.87	1960	4.05	12/1999
AUG	14.54	1992	0.49	1987	4.92	22/1992
SEP	11.33	1957	0.00	1897	4.95	25/1997
OCT	10.37	1995	0.00	1938	6.67	26/1997
NOV	16.26	1948	0.36	1924	5.58	19/1906
DEC	16.47	1932	0.58	1980	5.96	12/1961
ANN	77.65	1932	28.71	2007	6.67	19971026

based on single storm inflow alone. The bankfull capacity below the dam was reevaluated due to the flooding at Cartersville, Georgia, and farther downstream. At that time, the defined stream capacity was reduced from 12,000 cfs to 9,500 cfs due to flood damages of the April 1964 flood. With this change in channel capacity, a repeat of the events of the April 1964 flood would produce a higher pool level than occurred in 1964. The April 1964 operation is shown on Plates 4-1 and 4-2.

The April 1979 and March 1990 flood events were large areal storms which caused the pool to be in the top five of maximum annual pools. The April 1979 and March 1990 floods are typical flood events that occurred with current rule curves, storage allocation and basin conditions. Plates 4-3 and 4-5 present the pool inflow and outflow and Plates 4-4 and 4-6 presents the downstream stages.

The storm of September 2009 occurred at the end of a severe drought and Allatoona Lake was lower than normal for that time of year (837 feet NGVD29). The storms resembled a tropical event, but in reality were caused by steady rain for eight days. Between 15 – 18 September 2009, there was constant rainfall, but not in unusual amounts. Most areas only had about an inch or less of accumulated rainfall during this time. On 19 September, the rainfall increased, with three to five inches falling that day. Some of the heaviest rainfall occurred above Allatoona Lake. The storing of runoff in Allatoona Lake significantly reduced downstream flows and stages. Plates 4-7 and 4-8 show the pool inflow and outflow and graphs of the downstream flows.

4-07. Runoff Characteristics. Runoff characteristics of the Etowah River and its major tributaries above the dam site are those of mountain streams with rapid rise and recession of the flood hydrographs. Peak flood discharges at Rome, Georgia are usually caused by local inflow from tributary streams downstream of Allatoona Dam.

The retention of floodwaters in Allatoona Lake essentially reduces flood stages in the latter portion of a flood and prevents the Oostanaula River from causing a secondary flood peak. Carters Dam and Lake Project, located in the Oostanaula River Basin, has some flood risk management capacity for the upper Oostanaula and is operated to reduce flood peaks at Resaca, Calhoun, and Rome, Georgia.

In the ACT Basin, rainfall occurs throughout the year but is less abundant from August through November. Only a portion of rainfall actually runs into local streams to form the major rivers. Factors that determine the percent of rainfall that runs into the streams include the intensity of the rain, antecedent conditions, ground cover and time of year (plants growing or dormant). Intense storms will have high runoff potential regardless of other conditions while a slow rain can produce little measurable runoff. Table 4-5 and Figure 4-1 present the average monthly runoff for the ACT Basin above Rome, Georgia. This information was computed by comparing unregulated flows with rainfall over the basin. The percent of rainfall appearing as streamflow is presented for each month.

Table 4-5
Average Monthly Runoff in ACT Basin Measured at Rome Georgia

	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
AVG MONTHLY FLOW AT ROME	6525	9602	11652	12828	10565	7038	4636	4234	3188	2778	2867	4162
AVG RUNOFF IN INCHES AT ROME	1.86	2.47	3.33	3.54	3.01	1.94	1.32	1.21	0.88	0.79	0.79	1.19
AVG RAINFALL IN INCHES	5.15	4.97	5.96	4.79	4.22	3.92	4.89	3.77	3.82	3.05	3.90	4.87
PERCENT OF RAINFALL AS RUNOFF	36	50	56	74	71	50	27	32	23	26	20	24

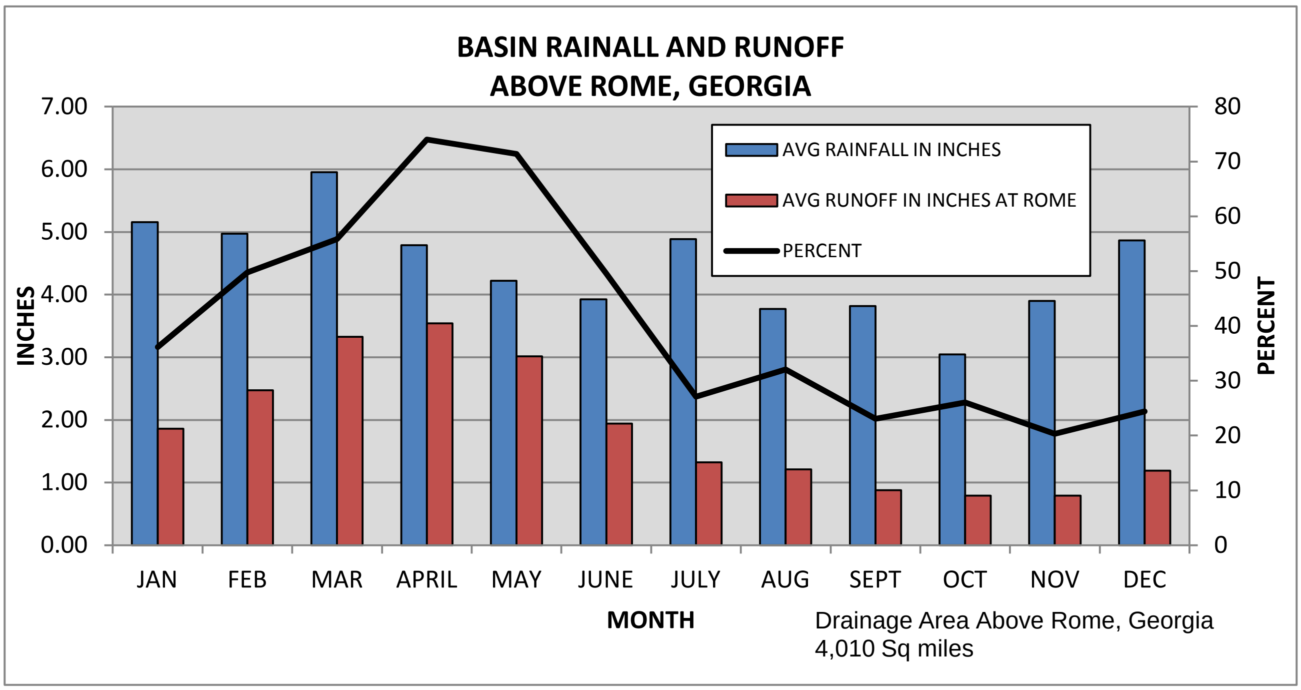


Figure 4-1. Basin Rainfall and Runoff above Rome, Georgia

Streamflow has been measured at the Allatoona gage site since September 1938. The station was operated by the Mobile District until the late 1970's when the U. S. Geological Survey (USGS) took over operation and maintenance of the gage. Other gages in the region have been in existence since the late 1800's and can be used to estimate flows at Allatoona. Since 1950, the inflow and outflow have been measured at Allatoona Dam by the COE. The inflows at the dam are computed by combining the change in storage with the measured outflow that accounts for evaporation and withdrawals. Travel time for water released from Allatoona Dam to reach Rome, Georgia, is approximately 12 hours. Monthly flows for 1896 through 1949 are shown on Plates 4-9 and 4-10. The monthly inflows at the dam are shown on Plates 4-11 and 4-12. A set of unimpaired inflows that have been corrected for evaporation, increase runoff from rain directly on the reservoir, and other factors are shown on Plates 4-13 through 4-31.

4-08. Water Quality. The mid-lake and dam forebay portions of Allatoona Lake meet all designated water use criteria established by the State of Georgia. Both the Etowah River and Little River embayment sections of Allatoona Lake are listed on the 2012 draft Integrated 305(b) and 303(d) list because of chlorophyll *a* impairment. A draft Total Maximum Daily Load (TMDL) for chlorophyll *a* was completed in 2009, and a fecal coliform TMDL was completed in 2004. The lake is transitioning from mesotrophic to eutrophic due to the influx of phosphorus nutrients. Phosphorus levels have increased in the lake and its tributaries because of increases in urban lands and broiler and beef cattle production. Dissolved oxygen levels in the tailwaters below Allatoona Dam drops below four mg/L during the summer and through early fall, and can reach as low as one mg/L.

a. Water Quality Needs. Georgia Department of Natural Resources has classified various portions of the Etowah River above Allatoona Dam as drinking water, recreation, and fishing. Etowah River below the dam has been classified as suitable for fishing, in accordance with Georgia Water Quality Control laws. Georgia has promulgated water quality criteria for various water use classifications. The principal specific criteria related to the use classifications are as follows:

Drinking Water:

- Bacteria: Fecal coliform not to exceed a geometric mean of 200 colonies per 100 milliliters (ml) during May – October; 4,000 per 100 ml November – April (instantaneous maximum).
- Dissolved oxygen: A daily average greater or equal to 5.0 milligrams per liter (mg/l) and no less than 4.0 mg/l at all times.
- pH: Within the range of 6.0 - 8.5.
- Temperature: Less than 90 degrees Fahrenheit.

Recreation:

- Bacteria: Fecal coliform not to exceed a geometric mean of 200 colonies per 100 ml.
- Dissolved oxygen: A daily average greater or equal to 5.0 mg/l and no less than 4.0 mg/l at all times.
- pH: Within the range of 6.0 - 8.5.
- Temperature: Less than 90 degrees Fahrenheit.

Fishing:

- Bacteria: Fecal coliform not to exceed a geometric mean of 500 colonies per 100 ml during May – October; 4,000 per 100 ml November – April (instantaneous maximum).
- Dissolved oxygen: A daily average greater or equal to 5.0 mg/l and no less than 4.0 mg/l at all times.
- pH: Within the range of 6.0 - 8.5.
- Temperature: Less than 90 degrees Fahrenheit.

The following criteria apply to all use classifications:

- All waters shall be free from materials associated with municipal or domestic sewage, industrial waste or any other waste which will settle to form sludge deposits that become putrescent, unsightly or otherwise objectionable.

- All waters shall be free from oil, scum and floating debris associated with municipal or domestic sewage, industrial waste or other discharges in amounts sufficient to be unsightly or to interfere with legitimate water uses.
- All waters shall be free from material related to municipal, industrial or other discharges which produce turbidity, color, odor or other objectionable conditions which interfere with legitimate water uses.
- No material in concentration that after treatment would exceed Georgia Environmental Protection Division (GAEPD) and Federal drinking water standards.

The above listing is not intended to be all-inclusive, and Georgia Water Quality Control regulations and standards should be consulted as necessary. Note that Allatoona Dam was constructed in the late 1940s, before specific water quality standards were established. Achievement of standards in release water is viewed as a goal rather than a strict legal requirement.

b. Lake Water Quality Conditions. Georgia's 2012 draft integrated 305(b)/303(d) list of impaired waters designates the dam pool and the mid-lake reaches in Allatoona Lake as supporting designated uses. Two reaches, the Etowah River arm and the Little River embayment, were identified as impaired. The Allatoona Creek arm was identified as pending because growing season average chlorophyll *a* exceeded the criteria. Chlorophyll *a* standards for Allatoona Lake, set according to the growing season (April through October) average less than 10 micrograms per liter (μg/l) upstream from the dam, mid-lake downstream from Kellogg Creek, and at Allatoona Creek upstream from I-75; less than 15 μg/l in Little River upstream from Highway 205; and less than 12 μg/l in Etowah River upstream from Sweetwater Creek. In April 2009, GAEPD developed a draft nutrient TMDL for Allatoona Lake which was the first TMDL in the ACT Basin that identified the need for reductions in total nitrogen and phosphorus to achieve in-lake chlorophyll *a* standards. Reductions of 16 percent and 20 percent nitrogen and 20 percent and 40 percent phosphorus in the Etowah River and Allatoona Creek arms, respectively, have been proposed. Measured data at compliance points for dissolved oxygen, total nitrogen, and pH are in compliance with Georgia's standards. The state collects profile data at compliance points in the reservoir for dissolved oxygen, pH, conductivity, and water temperature during the growing season. It also collects grab samples of nitrogen, phosphorus, chlorophyll *a*, and bacteria.

Georgia has begun efforts to identify sources contributing to high chlorophyll *a* by developing a total maximum daily load. As part of the state's water planning effort, it is also modeling the Coosa River Basin, including the Etowah River portion downstream of Allatoona Dam.

c. Lake Stratification. During the colder winter months, the water in Allatoona Lake is generally cold, relatively clear, and the same temperature from the top to the bottom. Water on the top and bottom of the reservoir has similar densities. Wind action keeps the lake well mixed, resulting in adequate dissolved oxygen levels throughout the water column. During winter-time, water temperature and oxygen concentrations do not limit fish movement in the lake. Lake water, which is released through the hydropower units from near the bottom of the lake into the Etowah River below the dam, is cold, oxygenated, and relatively clear.

During spring and early summer, the lake warms and stratifies into three distinct layers: a surface layer called the epilimnion, a bottom layer called the hypolimnion, and a layer between the two called the metalimnion, or the thermocline. Figure 4-2 shows the summer stratification layers.

The warm, upper layer is fairly uniform in temperature and varies from 15 to 30 feet thick throughout the summer. It is well oxygenated from wind action and photosynthesis.

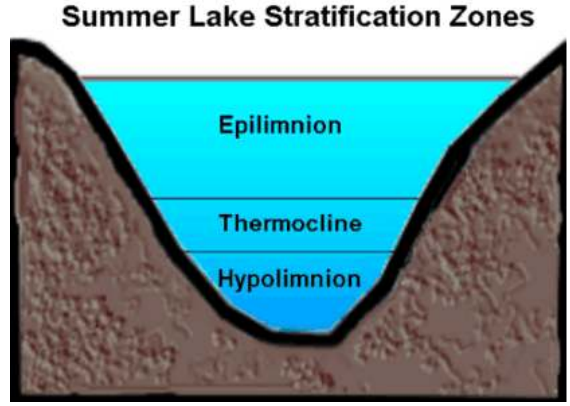


Figure 4-2. Lake Stratification

The hypolimnion, the cold (45 to 55 °F) dense bottom layer, becomes isolated and no longer mixes with the warm, oxygenated epilimnion. Oxygen is not produced in the hypolimnion because the cold, deep layer does not receive sunlight and is devoid of phytoplankton production. Early in the lake stratification process, the hypolimnion still contains some oxygen but declines through the summer as biological and chemical processes consume oxygen. By summer's end, the lake is strongly stratified. The epilimnion is warm and well oxygenated. Water temperature and oxygen concentrations in the thermocline are both lower but still often provide acceptable habitat for cool-water fish species. In the hypolimnion, the water is cold and low in oxygen (less than 1 mg/l). As oxygen levels fall to anoxic conditions, some metals and sulfides in the lake sediments become soluble. They dissolve in the water and can be released downstream, entering the river. The river water becomes re-aerated rapidly as it flows downstream, thus releasing the metals and sulfides that have become soluble.

In the fall, the lake begins to lose heat, and the process of destratification begins. The warm water of the epilimnion cools and becomes deeper and denser. As the epilimnion's density approaches the density of the hypolimnion, mixing of the layers occurs and the stratification is broken. This event is called *lake turnover*, and generally occurs around November - December each year. After mixing, no layers exist, and the entire lake has a relatively uniform temperature and oxygen levels, until the next summer season.

During the 1960's an extensive field test was made of an air diffuser system for destratifying the reservoir. The method included a system of pipes and mechanical pumping of air to the lower levels of the lake. Partial success was achieved; dissolved oxygen levels in downstream releases increased on the order of 2-3 mg/l in late summer. Maintenance issues relating to design of the equipment resulted in frequent equipment breakdowns, associated financial costs and eventual discontinuance.

d. Downstream Water Quality Conditions. Water quality conditions in the releases from Allatoona Dam are typical for hydropower projects in the southeast; i.e., cold water year-round with low dissolved oxygen levels during summer-time lake stratification periods and high dissolved oxygen levels during winter-time lake destratification periods. Turbidity is relatively low year-round. The potential for suspended metals occurs during lake stratification periods when the hypolimnion reaches anoxic conditions. The water use classification established by the State of Georgia for the Etowah River below Allatoona Dam is *fishing*, with corresponding water quality standards as described in section 4-08.a. above. TMDLs for dissolved oxygen, fecal coliforms, and polychlorinated biphenyls (PCBs) have been established for the Etowah River below Allatoona Dam. Due to PCB levels in fish tissue, the fishery advisories of one meal per week for spotted bass and one meal per month for smallmouth buffalo have been established by the State of Georgia.

4-09. Channel and Floodway Characteristics.

a. General. Allatoona Dam is a headwater project with only one reservoir located upstream (Hickory Log Creek Project) and a sub-impoundment (Lake Acworth) within Allatoona Lake. The channel capacity of the Etowah River below Allatoona Dam is 9,500 cfs.

b. Damage Centers and Key Control Points. There are major flood damage reaches both above Allatoona Lake and downstream on the Etowah River. Urban flood damages occur above the lake at Dawsonville, and Canton, Georgia. This flooding is due to flood flows exceeding the channel capacity. However, Allatoona Lake can affect flood heights at Canton, Georgia, due to backwater effects, so the Corps has acquired the property which may be affected. Since the drainage area has a long travel reach, the flood hydrograph peaks at Canton, Georgia, occur one or two days after the maximum rainfall, and the high flows tend to continue for many days.

The City of Cartersville, Georgia, located below Allatoona Dam, experiences flooding if the local runoff plus the outflow from the dam becomes too large. Rome, Georgia, is the major flood damage area protected by the Allatoona Project. The Carters Project also provides some flood risk management benefits at Rome, Georgia. Of the 4,011 square miles of drainage area at Rome, Georgia (2,150 square miles Oostanaula River plus 1,861 square miles Etowah River), 374 square miles are controlled by the Carters Dam, 146 square miles are controlled by the Carters Reregulation Dam, and 1,122 square miles are controlled by Allatoona Dam. This leaves 59 percent of the drainage area at Rome, Georgia, unregulated. A levee system was completed in 1939 that, along with flood risk management operations at the Allatoona and Carters Projects, has protected the city of Rome. A locality map of the Rome, Georgia levee system is shown on Figure 4-3 and a portion of the levee along the Oostanaula River is shown on Figure 4-4.

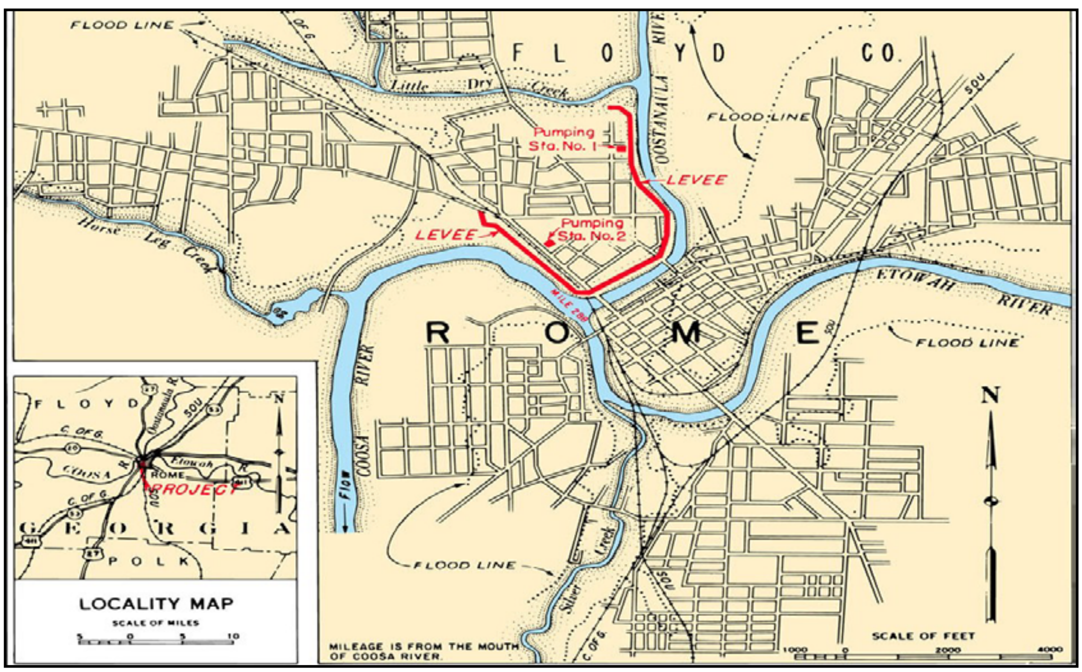


Figure 4-3. Levee Locality Map for Rome, Georgia

Figure 4-4. Portion of Levee along Oostanaula River at Rome, Georgia

The USGS gages for the Etowah River at GA 1 Loop (USGS # 02395980) and Coosa River at Mayo's Bar (USGS # 02397000) are used to guide operations of Allatoona Dam to insure maximum flood reductions. The location of USGS gages are shown in Figure 4-5.

Travel time for water released from Allatoona Dam to reach Rome, Georgia, is approximately 12 hours.

The Carters Dam and Reregulation Dam Project is located northeast of Rome, Georgia, on the Coosawattee River and its operation also provides some flood risk management benefits for Rome, Georgia. However, Carters Dam controls runoff from less than 10 percent of the drainage area above Rome, Georgia, so flood reductions at Rome due to the Carters Project are relatively small.

Tables 4-6 through 4-10 provide details for river stages and flood damages at Dawsonville, Canton, Cartersville, and Rome, Georgia. Tables 4-11 through 4-15 give the dates and heights of historical floods for these locations.

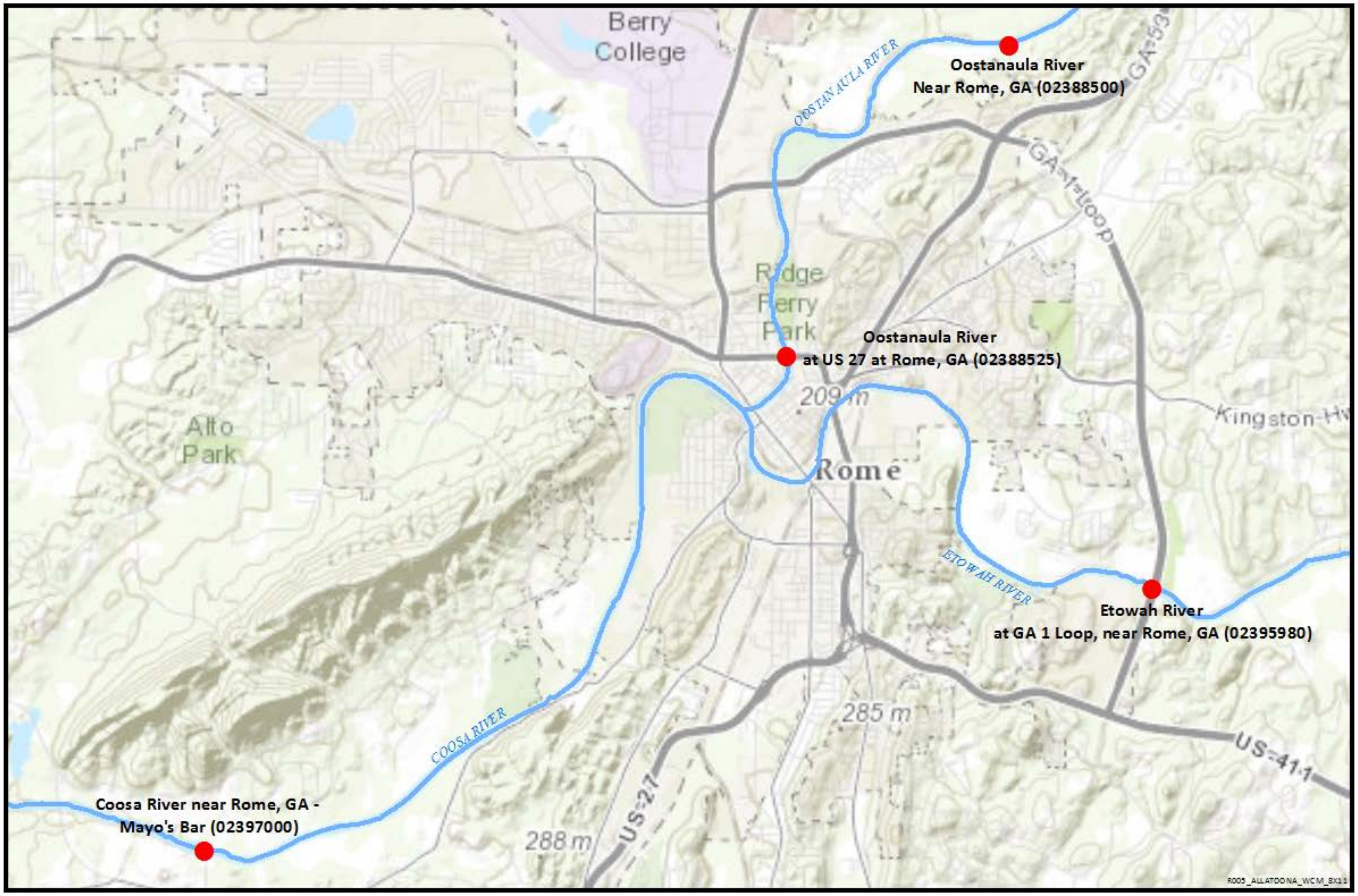


Figure 4-5. USGS Gages in the vicinity of Rome, Georgia

Table 4-6. Flood Impacts at Dawsonville, Georgia (Upstream of Any Project, USGS# 02389150)	
Stages (feet)	**Impacts**
11	Bankfull is reached on the river in south Dawson County. Some minor flooding begins in pasture lands of northwest Forsyth County and water approaches low areas of Nicholson Road.
12	Minor flooding of Nicholson Road in northwest Forsyth County begins.
13	Flood Stage is reached and minor flooding begins in south Dawson County. Minor flood continues on Nicholson Road in northwest Forsyth County.
14	Moderate flooding begins in northwest Forsyth County. Old Federal Road begins to flood and Nicholson Road is closed off to residents. Minor flooding continues in south Dawson County.
16	Moderate flood begins in south Dawson County and continues in northwest Forsyth County. Widespread flooding of pasture land and horse stables occur. Old Federal and Nicholson Roads are closed in northwest Forsyth County.
21	Major flooding occurs. Highway 9 goes underwater in low areas in south Dawson County and Nicholson and Old Federal Roads are closed in northwest Forsyth County to residents.

Table 4-7. Flood Impacts at Canton, Georgia (Upstream End of Allatoona, USGS# 0239200)	
Stages (feet)	**Impacts**
15	Bankfull is reached. Water begins to spill out of the Etowah River banks in Canton.
16	Flood Stage is reached. Minor flooding begins in Boiling Park in Canton. Soccer fields and Lady Warriors' ball fields begin to flood. This is located behind the Canton High School which is on higher ground. Canton Greenway begins to flood.
17	Minor flooding continues to expand. Parking lot and road to Boiling Park begins to flood. Flooding of lowlands begins to increase.
18	Minor flooding expands. Mill Industrial Way Road floods.
19	Flood waters reach base of water treatment plant near Highway 140 and Boiling Park.
22	Moderate flooding begins. Old Canton Textile Plant Number 1 begins to flood.
23	Moderate flooding expands. Several buildings near the Canton Textile Plant flood...secondary roads and access roads to the river flood...as well as farm lands.
25	Moderate flooding expands. Buildings along Railroad Street flood.
26	Major flooding begins. Electrical power station floods near Waleska Street. River Place Shopping Center begins to flood. Flooding affects several businesses. Economic losses begin to mount.
28	Railroad tracks of L&N are inundated. Some warehouses and small industrial buildings are also affected...but without serious damage. The gage house elevation is at 27.8 feet above datum. Instrument shelf is at 31.3 feet.
30	Major flooding continues in Canton. The lowest part of Highway 140 is inundated and many businesses near the river and a few houses flood.

Table 4-8. Flood Impacts at Cartersville, Georgia (Immediately Downstream of Allatoona Dam, UGS# 02394670)	
Stages (feet)	**Impacts**
16	Bankfull Stage is reached. Impacts are minimal to none. Some water enters far backyard edges of homes along Riverside Court Southeast.
18	Flood Stage is reached. Minor flooding develops as flood waters reach through backyards of homes right up to homes on Riverside Court Southeast. Farmland and farm building floods downstream of Old River Road.
19	Moderate flooding begins. Old River Road Southeast floods near Highway 41.
20	Major flooding begins. Flood waters enter Seaboard Coastline Railroads buildings.
22	Major flooding expands. CIMBAR company floods along Old River Road. Allatoona Dam Road Southeast has a building that floods. Two (2) homes flood near Highway 293 and Old River Road.
34	Widespread flooding occurs. Highway 41 bridge has water to under-supports. Many homes and businesses are underwater.

Table 4-9. Flood Impacts at Rome – Etowah River (Downstream of Allatoona Dam, USGS# 02395980)	
Stage (feet)	**Impacts**
28	Bankfull and Action Stage is reached on the river.
32	Flood Stage is reached and minor flooding begins of open fields on the right bank.
34	Minor flooding continues. Grizzard Park athletic fields begin to flood on the right bank.
36	Moderate flooding begins. The concession stand and other maintenance buildings at the Grizzard Park athletic fields begin to flood.
40	Major flooding begins. Grizzard Park athletic fields & buildings completely inundated.

Table 4-10. Flood Impacts at Rome – Oostanaula River (Downstream of Allatoona Dam, USGS# 02388525)	
Stage (feet)	**Impacts**
19	Action Stage is reached. Heritage Park Rome Greenway floods within floodplain.
22	Drainage valve must be closed at 2nd Avenue and Avenue A Pump station outfalls.
24	Drainage valves must be closed at American Legion Outfall and Police Station Outfall.
25	Flood Stage is reached. Mainly minor flooding will develop.
28	Moderate flooding begins. Water will enter basements of lower two city blocks near the gage site. Flood gates on 2nd Avenue and Avenue A must be closed.
30	Moderate flooding expands. Water enters Georgia Power Maintenance Yard at Etowah River.
32	Major flooding begins. Flooding of Rome Sewage Treatment Plant begins. 5th Avenue Bridge closed. Water overflows onto 2nd Avenue between railroad & bridge.
34.5	Major flooding continues. Six city blocks of basements in Rome near the Oostanaula River will flood. Water will cover the 200 block of East Second Avenue.
36	Major flooding continues. Water overflows at the lowest point of Summerville Road.
38	Major flooding expands. Water will reach Broad Street. This is the 100-year flood.
40.29	The record crest was 40.30 feet on April 1, 1886.
42	The levee of the Oostanaula will reach the top of the city levee. This is a very serious situation. Floyd Medical Center, Law Enforcement Center, and numerous businesses flood.
46	Highway 27 / 5th Avenue bridge floods. Many businesses and homes flooded.

Table 4-11
Historical Crests for Etowah River Near Dawsonville (USGS #02389150) Gage Datum 1,022 ft NAVD88
(1) 16.20 ft on 01/07/1946 (2) 16.03 ft on 01/16/1954 (3) 15.78 ft on 09/17/2004 (4) 15.72 ft on 03/11/1952 (5) 15.19 ft on 03/06/2003 (6) 15.02 ft on 09/06/1949 (7) 14.56 ft on 09/21/2009 (8) 14.31 ft on 03/13/1950 (9) 14.20 ft on 04/05/1957 (10) 14.05 ft on 11/11/2009 (11) 14.00 ft on 11/16/2006 (12) 13.73 ft on 03/29/1951 (13) 13.31 ft on 01/06/2009 (14) 13.13 ft on 12/09/2009
Low Water Records
(1) 2.92 ft on 09/13/2002 (2) 3.01 ft on 10/01/2007

Table 4-12	
Historical Crests for Etowah River at Canton, Georgia (USGS #02392000) Gage Datum 845 ft NGVD29	
(1) 26.70 ft on 01/07/1946	(41) 20.17 ft on 03/09/1980
(2) 26.30 ft on 12/10/1919	(42) 20.10 ft on 02/07/1955
(3) 25.90 ft on 07/10/1916	(43) 19.82 ft on 02/05/1998
(4) 25.33 ft on 03/17/1990	(44) 19.81 ft on 02/04/1998
(5) 25.20 ft on 12/12/1932	(45) 19.60 ft on 03/24/1917
(6) 25.20 ft on 12/22/1918	(46) 19.50 ft on 03/14/1909
(7) 25.00 ft on 01/01/1892	(47) 19.50 ft on 03/05/1929
(8) 24.70 ft on 03/26/1964	(48) 19.20 ft on 04/05/1974
(9) 24.45 ft on 02/03/1982	(49) 19.04 ft on 03/14/1975
(10) 24.38 ft on 04/30/1963	(50) 19.00 ft on 12/18/1922
(11) 24.20 ft on 10/02/1989	(51) 19.00 ft on 03/20/1944
(12) 23.80 ft on 12/13/1961	(52) 18.91 ft on 08/23/1969
(13) 23.57 ft on 04/14/1979	(53) 18.56 ft on 12/16/1972
(14) 23.56 ft on 03/31/1977	(54) 18.47 ft on 01/07/2009
(15) 23.30 ft on 03/23/1952	(55) 18.43 ft on 03/06/2003
(16) 23.20 ft on 02/05/1936	(56) 18.43 ft on 03/01/1987
(17) 23.20 ft on 02/26/1961	(57) 18.40 ft on 12/30/1942
(18) 23.20 ft on 02/09/1921	(58) 18.30 ft on 12/03/1905
(19) 22.76 ft on 03/31/1976	(59) 18.24 ft on 01/11/1968
(20) 22.72 ft on 01/28/1996	(60) 18.05 ft on 12/07/1983
(21) 22.67 ft on 03/04/1966	(61) 18.05 ft on 10/27/1997
(22) 22.40 ft on 04/08/1938	(62) 17.67 ft on 03/09/1998
(23) 22.40 ft on 11/29/1948	(63) 17.60 ft on 05/24/1928
(24) 22.39 ft on 09/17/2004	(64) 17.60 ft on 01/22/1922
(25) 22.20 ft on 12/29/1901	(65) 17.50 ft on 01/10/1895
(26) 22.20 ft on 03/16/1899	(66) 17.30 ft on 03/31/1932
(27) 22.00 ft on 02/17/1903	(67) 17.28 ft on 12/17/1992
(28) 21.96 ft on 11/06/1977	(68) 17.20 ft on 04/05/1911
(29) 21.70 ft on 01/17/1954	(69) 17.11 ft on 11/11/2009
(30) 21.70 ft on 04/05/1957	(70) 17.00 ft on 10/06/1995
(31) 21.60 ft on 05/21/1901	(71) 16.60 ft on 04/25/1908
(32) 21.32 ft on 08/25/1967	(72) 16.50 ft on 02/14/1927
(33) 21.20 ft on 03/15/1912	(73) 16.20 ft on 02/12/1900
(34) 21.20 ft on 02/17/1942	(74) 16.11 ft on 03/01/1997
(35) 21.20 ft on 01/21/1947	(75) 16.10 ft on 01/19/1925
(36) 21.00 ft on 03/07/1996	(76) 16.10 ft on 03/14/1950
(37) 20.73 ft on 09/22/2009	(77) 16.10 ft on 08/05/1948
(38) 20.50 ft on 01/03/1937	(78) 16.04 ft on 03/25/1965
(39) 20.41 ft on 01/11/1972	(79) 16.00 ft on 08/13/1940
(40) 20.20 ft on 03/07/1930	
Low Water Records for Etowah River at Canton	
(1) 0.20 ft on 10/02/1927	(5) 0.80 ft on 09/13/2002
(2) 0.70 ft on 09/14/1924	(6) 0.86 ft on 09/09/2007
(3) 0.70 ft on 10/02/1931	(7) 0.90 ft on 10/09/1935
(4) 0.78 ft on 10/01/2007	(8) 1.00 ft on 09/24/1941

Table 4-13
Historical Crests for Etowah River at GA 61, Near Cartersville, Georgia (USGS #02394670) Gage Datum 651 ft NGVD29
(1) 37.00 ft on 04/01/1886 (2) 31.00 ft on 12/19/1919 (3) 30.40 ft on 01/08/1946 (4) 30.00 ft on 11/29/1948 (5) 29.90 ft on 04/08/1938 (6) 25.80 ft on 01/27/1947 (7) 24.80 ft on 12/30/1942 (8) 24.50 ft on 03/22/1942 (9) 22.60 ft on 03/30/1944 (10) 21.98 ft on 07/11/2005 (11) 20.76 ft on 02/03/1982 (12) 20.70 ft on 03/04/1979 (13) 20.10 ft on 04/10/1964 (14) 19.80 ft on 08/14/1940 (15) 19.70 ft on 05/28/1981 (16) 19.50 ft on 12/06/1983 (17) 19.35 ft on 03/22/1952 (18) 19.20 ft on 03/01/1939 (19) 19.00 ft on 08/03/1948 (20) 18.85 ft on 04/14/1980 (21) 18.40 ft on 03/29/1977 (22) 18.00 ft on 02/21/1961 (23) 18.00 ft on 07/02/1941 (24) 18.00 ft on 03/06/2003
Low Water Records
(1) 3.80 ft on 10/01/1949 (2) 4.60 ft on 10/01/2007 (3) 4.66 ft on 09/26/2007

Table 4-14
Historical Crests for Etowah River at Rome, Georgia (USGS #02395980) Gage Datum 562 ft NGVD29
(1) 37.50 ft on 04/09/1938 (2) 37.40 ft on 11/30/1948 (3) 36.77 ft on 03/17/1990 (4) 36.70 ft on 01/21/1947 (5) 36.20 ft on 01/09/1946 (6) 36.05 ft on 02/04/1998 (7) 33.44 ft on 03/06/2003 (8) 33.25 ft on 02/26/1964 (9) 32.81 ft on 02/04/1982 (10) 32.10 ft on 12/30/1942 (11) 31.17 ft on 01/27/1996 (12) 30.70 ft on 03/30/1994 (13) 30.10 ft on 02/22/1961 (14) 29.81 ft on 07/12/2005 (15) 28.97 ft on 05/03/1997 (16) 28.20 ft on 03/20/2001
Low Water Records
(1) 12.43 ft on 10/01/2007

Table 4-15	
Historical Crests for Oostanaula River at US 27, Rome, (USGS Gage #02388525) Gage Datum 562 ft NGVD29	
1) 40.30 ft on 04/01/1886	(19) 30.50 ft on 03/30/1951
(2) 37.20 ft on 01/15/1892	(20) 30.50 ft on 04/05/1920
(3) 34.50 ft on 01/22/1947	(21) 29.90 ft on 01/28/1996
(4) 34.30 ft on 07/12/1916	(22) 29.60 ft on 03/22/1980
(5) 34.26 ft on 03/18/1990	(23) 29.00 ft on 01/04/1982
(6) 34.10 ft on 02/12/1946	(24) 28.90 ft on 03/08/1996
(7) 33.90 ft on 11/30/1948	(25) 28.82 ft on 02/05/1998
(8) 33.80 ft on 01/09/1946	(26) 28.00 ft on 01/20/1925
(9) 33.80 ft on 12/30/1932	(27) 27.70 ft on 05/07/2003
(10) 33.70 ft on 04/08/1936	(28) 27.00 ft on 11/29/1929
(11) 33.30 ft on 02/06/1936	(29) 26.90 ft on 03/10/1998
(12) 33.00 ft on 04/14/1979	(30) 26.50 ft on 04/14/1980
(13) 32.80 ft on 12/11/1919	(31) 26.20 ft on 10/04/1989
(14) 32.64 ft on 02/27/1990	(32) 25.98 ft on 05/04/1997
(15) 32.00 ft on 12/14/1932	(33) 25.65 ft on 01/07/2009
(16) 31.80 ft on 04/05/1977	(34) 25.60 ft on 03/07/2003
(17) 31.80 ft on 12/18/1932	(35) 25.10 ft on 03/01/1987
(18) 30.50 ft on 03/27/1964	(36) 25.04 ft on 01/13/1993
Low Water Records	
(1) 1.75 ft on 10/08/2007 (2) 1.82 ft on 09/27/2007	

4-10. Upstream Structures. Allatoona Dam is a headwater project with only one reservoir located upstream. The Hickory Log Creek Project was constructed in 2007 and is located approximately 16 miles east northeast of Allatoona Dam. Hickory Log Creek Reservoir is a pump back reservoir for water supply that, when full covers 411 acres and has a capacity of 17,702 acre-feet. The drainage area for Hickory Log Creek Reservoir is 8.3 square miles.

There is also a sub-impoundment within Allatoona Lake at Acworth, Georgia. The Acworth development is situated on the Proctor Creek arm of Allatoona Lake as shown on Plate 2-6, and enhances Allatoona Lake's purposes for recreation and conservation of fish and wildlife. The sub-impoundment dam provides a generally unfluctuating level for the 325 acre lake and provides a road across Allatoona Lake, connecting Acworth with U.S. Highway 41. The dam is 1,500 feet long and consists of earth fill with a 60-foot concrete spillway flanked on each side by concrete non-overflow sections 61 feet long, which form a transition and connection between the earth fill and spillway. The maximum height of the earth fill is 45 feet and the slopes are covered with one foot of riprap on a six-inch gravel filter blanket. The ungated spillway has a crest elevation of 848 feet NGVD29 and is bridged in a single span by the road crossing the dam. Stilling action at the toe is accomplished by means of a bucket which deflects the water upward. Two, 24-inch sluices, one at each end of the spillway, are provided to allow fluctuation of the upper pool during low flow for mosquito control and to drain the reservoir.

4-11. Downstream Structures. Allatoona Lake is one of a number of reservoirs in the ACT Basin which include Corps projects at Allatoona, Carters, Robert F. Henry, Millers Ferry, and Claiborne. These projects provide flood risk management, water supply, water quality, hydropower, recreation, navigation, and fish and wildlife conservation. Also, Alabama Power Company (APC) has hydropower plants at Weiss, H. Neely Henry, Logan Martin, Lay, Mitchell, Bouldin and Jordan on the Coosa River and R. L. Harris, Martin, Yates, and Thurlow Dams on the Tallapoosa River. The Corps has flood control authority over Weiss, H. Neely Henry, Logan Martin, and R.L. Harris. The Alabama River is navigable to Montgomery, Alabama, near river mile 342.0. Locations of these projects are shown on Plate 2-1. The Thompson-Weinman Dam which is no longer in operation is a low head structure located about three miles downstream of Allatoona Dam. The Purdy Dam and Lake Project is located on the Cahaba River (a tributary of the Alabama River) and provides water supply for the Birmingham Water Works.

4-12. Economic Data. The general economics of the region are represented by the nine counties in Table 4-16. Eight of the counties are located within Georgia and one county in Alabama. The watershed includes both developed urban and residential land uses and more rural land uses within the watershed.

a. Population. The 2010 population estimates for the nine counties composing the Allatoona Project watershed and basin below was 641,529 persons. Table 4-16 shows the 2010 population and the 2006 per capita income for each county. The most recent data available is provided.

Table 4-16. Population and Per Capita Income

	2010 Population	2006 Per Capita Income
Bartow	96,082	$ 27,649
Cherokee	217,186	$ 33,700
Dawson	22,358	$ 30,710
Floyd	96,531	$ 29,730
Haralson	29,019	$ 25,445
Paulding	138,097	$ 26,851
Polk	42,256	$ 22,617
Carroll	110,527	$ 24,244
Cleburne	14,972	$ 23,997

*US Census Bureau, 2010
*US Census Bureau, County and City Data Book, 2007

b. Agriculture. The watershed and basin consists of approximately 4,403 farms averaging 107 acres per farm. In 2005 the area produced $379 million in farm products sold and total farm earnings of more than $125 million. Agriculture in the Allatoona Project watershed and basin consists primarily of livestock, which accounts for a little less than 92 percent of the value of farm products sold. Livestock production consists primarily of poultry operations in the counties in the immediate vicinity of the project. Livestock operations consist predominately of beef cattle in the basin. The principal crops consist of nursery and greenhouse ornamentals, floriculture, and sod, along with vegetable farms and orchards. Agricultural production information and farm earnings for each of the counties in the Allatoona Project watershed and basin are shown in Table 4-17.

Table 4-17. Farm Earnings and Agricultural Production

County	2005 Farm Earnings ($1,000)	Number of Farms	Total Farm Acres (1,000)	Acres Per Farm	Value of Farm Products Sold ($1,000)	Percent Crops	From Livestock
Georgia							
Bartow	9,983	586	82	139	49,000	15.1	84.9
Carroll	35,700	975	94	97	106,000	4.6	95.4
Cherokee	20,321	606	36	60	51,000	10.7	89.3
Dawson	11,500	222	20	91	40,000	2.5	97.5
Floyd	8,416	663	91	138	29,000	7.9	92.1
Haralson	5,391	332	40	120	19,000	3.4	96.6
Paulding	25	265	17	63	14,000	20.5	79.5
Polk	6,296	428	52	122	19,000	5.6	94.4
Alabama							
Cleburne	27,633	326	44	136	52,000	2.6	97.4

*US Census Bureau, City and County Data Books, 2007

c. Industry. The leading industrial sectors that provide non-farm employment are wholesale and retail trade, services, and manufacturing. The remaining non-farm employment is provided by construction, finance, insurance, real estate, transportation, and public utilities. In 2005 the Allatoona Lake project area counties contained 679 manufacturing establishments that provided 38,400 jobs with total earnings of more than $2.1 billion. Additionally, the value added by the area manufactures was more than $3.7 billion. Table 4-18 contains information on the manufacturing activity for each of the counties in the Allatoona Project watershed and basin.

d. Flood Damages. Allatoona Lake provides flood risk management for existing development in and along the Etowah and Coosa River Floodplain. The floodplain below Allatoona Lake consists of 1,132 residential structures, nine public structures, and 189 commercial structures totaling over $280 million in value. The tax assessor appraised values of residential structures and contents total about $65.8 million, public structures more than $847 thousand, and commercial structures over $213 million. The values for each category of structures in the upper area of the ACT River Floodplain below Allatoona Lake are shown in Table 4-19.

Table 4-18. Manufacturing Activity

County	No. of Manufacturing Establishments	Total Manufacturing Employees	Total Earnings ($1,000)	Value Added by Manufactures ($1,000)
Georgia				
Bartow	119	8,435	490,437	1,421,853
Carroll	123	7,616	518,749	738,564
Cherokee	167	4,846	199,411	267,277
Dawson	21	687	39,212	55,509
Floyd	119	9,484	585,524	735,657
Haralson	33	1,939	88,086	145,833
Paulding	48	1,186	50,778	93,799
Polk	37	3,292	144,540	258,971
Alabama				
Cleburne	12	915	37,185	60,310

*US Census Bureau, City and County Data Books, 2007

Table 4-19. Allatoona Lake Floodplain Value Data

	Structure ($)	Content ($)	Inventory ($)	Equipment ($)
Residential	65,804,000	29,149,000	-	-
Public	847,000	-	169,000	741,000
Commercial	213,691,000	-	25,066,000	54,389,000
Total	**280,342,000**	**29,149,000**	**25,235,000**	**55,130,000**

The Corps' Water Management Office has developed an Annual Damage Reduction Summary that estimates the flood damages prevented by the Allatoona Lake flood reduction project in the ACT Basin. Table 4-20 shows the Allatoona Project flood damages prevented by year from 1986 through 2013.

Table 4-20. Flood Damages Prevented Allatoona Lake

Year	Allatoona Dam	Year	Allatoona Dam
1986	$0	2000	$0
1987	$2,626,000	2001	$0
1988	$0	2002	$0
1989	$0	2003	$21,706,008
1990	$14,620,100	2004	$11,002,375
1991	$0	2005	$20,033,559
1992	$142,580	2006	$0
1993	$0	2007	$0
1994	$0	2008	$0
1995	$433,046	2009	$32,666,192
1996	$33,200	2010	$20,330,262
1997	$0	2011	$18,354,891
1998	$628,127	2012	$0
1999	$0	2013	$26,795,190

**Dollar values are indexed to each FY using CP

V - DATA COLLECTION AND COMMUNICATION NETWORKS

5-01. Hydrometeorological Stations.

a. Facilities. Management of water resources requires continuous, real-time knowledge of hydrologic conditions. The Mobile District contracts out the majority of basin data collection and maintenance to the USGS and National Weather Service (NWS) through cooperative stream gaging and precipitation network programs. The USGS, in cooperation with other federal and state agencies, maintains a network of real-time gaging stations throughout the ACT Basin. The stations continuously collect various types of data including stage, flow, and precipitation. The data are stored at the gage location and are transmitted to orbiting satellites. Figure 5-1 shows a typical encoder with wheel tape housed in a stilling well used for measuring river stage or lake elevation. Figure 5-2 shows a typical precipitation station, with rain gage, solar panel, and Geostationary Operational Environmental Satellite (GOES) antenna for transmission of data. The gage locations are discussed in Chapter VI related to hydrologic forecasting.

Reservoir project data are obtained through each project's Supervisory Control and Data Acquisition (SCADA) system and provided to the Water Management Section both daily and in real-time.

Figure 5-1. Encoder with Wheel Tape for Measuring the River Stage or Lake Elevation in the Stilling Well

Figure 5-2. Typical Field Installation of a Precipitation Gage

The Water Management Section employs a staff of hydrologic field technicians and contract work to USGS to operate and maintain Corps' gages throughout the ACT Basin. Corps personnel also maintain precipitation gages at project locations over the ACT Basin.

All rainfall gages equipped as Data Collection Platforms are capable of being part of the reporting network. Data are available from many stations in and adjacent to the ACT Basin. The 30 stations listed in Table 5-1 and shown on Plate 2-2 are considered the rainfall reporting network for the Allatoona Dam project. Because Allatoona Dam regulates flood flows to downstream locations, the reporting network extends to Rome, Georgia. Allatoona Dam regulation of peak flows does not affect areas below Weiss Dam on the Coosa River but does reduce flood inflows to that project.

Table 5-1. Rainfall Reporting Network (Above Rome, Georgia)

Location	Operating Agency	Agency ID	Latitude	Longitude
Etowah River Basin				
Cleveland,GA	NWS	92006	34.6	83.766667
Dahlonega, GA	NWS	92475	34.533333	83.983333
Amicacola, GA	USACE	AMIG1	34.55	84.25
Wahsega, GA	USACE	WAHG1	34.633333	84.083333
Mountaintown, GA	USACE	MTNG1	34.766667	84.533333
Dawsonville, GA	NWS	92578	34.416667	84.116667
Jasper 1 NNW	NWS	94648	34.483333	84.45
Ball Ground, GA	NWS	90603	34.35	84.383333
Waleska, GA	NWS	99077	34.316667	84.55
Canton, GA	USACE	CTNG1	34.233333	84.5
Woodstock, GA	NWS	99524	34.116667	84.516667
Allatoona Dam, GA	USACE	CVLG1	34.15	84.716667
Allatoona Dam 2, GA	NWS	90181	34.166667	84.733333
Carters Dam, GA	USACE	CTRG1	34.6	84.666667
Cartersville #2, GA	NWS	91670	34.166667	84.783333
Dallas 7NE, GA	NWS	92485	33.983333	84.75
Taylorsville, GA	NWS	98600	34.083333	84.983333
Kingston, GA	NWS	94854	34.233333	84.933333
Oostanaula River Basin				
Dalton, GA	NWS	92493	34.766667	84.95
Chatsworth 2, GA	NWS	91863	34.766667	84.783333
Ellijay, GA	NWS	93115	34.7	84.483333
Fairmont, GA	NWS	93295	34.433333	84.7
Resaca, GA	NWS	97430	34.566667	84.95
Adairsville 5 SE, GA	NWS	90044	34.35	84.933333
Curryville 3W, GA	NWS	92429	34.45	85.1
Rome WSO Arpt, GA	NWS	93801	34.35	85.166667
Rome, GA	NWS	97600	34.25	85.166667
Coosa River Basin				
Summerville, GA	NWS	98436	34.483333	85.366667
Lafayette 4SSSW, GA	NWS	94941	34.633333	85.3
Cedartown, GA	NWS	91732	34.016667	85.25

All river stage gages equipped as Data Collection Platforms are capable of being part of the reporting network. Data are available from many stations in and adjacent to the ACT Basin. The stations listed in Table 5-2 are in the ACT Basin and provide information for operations for both Allatoona and Carters Dams. The locations of river stage stations are shown on Plate 2-2.

Table 5-2. River Stage Reporting Network (above Rome, Georgia)

River Stage Reporting Network above Rome, Georgia								
USGS Gage	**Location**	**Latitude**	**Longitude**	**Drainage Area**	**River Mile above Rome**	**Datum Elev NGVD29**	**Flood Stage**	**Rain Gage**
Etowah River								
02333500	Chestatee River Near Dahlonega, GA	34.5281	-83.93972	153	30.69	1,129	19	Y
02388975	Etowah River at GA 136, Near Landdrum, GA	34.4089	-84.01972	97.3	133.22	1,080	14	Y
02389150	Etowah River At GA 9, Near Dawsonville, GA	34.3581	-84.11333	131	129.17	1,022 (NAVD88)	13	Y
02390000	Amicaclola Creek Near Dawsonville, GA	34.4256	-84.21194	89	128.64	1,204 (NAVD88)	10	Y
02390050	Etowah River at Kelly Bridge Road, Near Matt, GA	34.3522	-84.20639	277	118.31	980	19	Y
02392000	Etowah River At Canton, GA	34.4167	-84.11667	613	77.8	845	16	N
02394000	Etowah River At Allatoona Dam, Abv Cartersville,GA	34.1631	-84.74111	1122	47.8	687	23	N
02393501	Etowah River Allatoona Dam Tw, Abv Cartersville,GA	34.1639	-84.72806	1122	47.73	0	9	N
02393500	Allatoona Lake Near Cartersville, GA	34.1628	-84.72778	1122	47.8	0	0	Y
02394670	Etowah River At GA 61, Near Cartersville, GA	34.1428	-84.83889	1345	38.22	651	18	Y
02394820	Euharlee Creek At Us 278, At Rockmart, GA	33.9986	-85.0525	42.1	30.54	733	9	Y
02395000	Etowah River Near Kingston,GA	34.2089	-84.97873	1634	21.4	610	20	N
02395120	Two Run Creek Near Kingston, GA	34.2428	-84.88972	33.1	NA	723.2 (NAVD88)	8	N
02395980	Etowah River At GA 1 Loop, Near Rome, GA	34.2322	-85.11694	1801	1.8	562	32	N
02395996	Etowah River At Coosa Valley F.G., At Rome, GA	34.2564	-85.15056	1819	0.9	562	32	N
Oostanaula River								
02380500	Coosawattee River Near Ellijay, GA	34.675	-84.50861	236	93.3	1,216.0 (NAVD88	8	Y
02381400	Carters Lake Near Carters, GA	34.6139	-84.67111	374	73.75	0.05 (NAVD88)	20	Y
02381401	Carters Lake Tailrace Near Carters, GA	34.6142	-84.67472	374	73.55	0	0	N
02382200	Talking Rock Creek Near Hinton, GA	34.5228	-84.61111	119	NA	894	10	Y
02382400	Carters Re-Regulation Lake Near Carters, GA	34.6042	-84.69139	520	72.25	651	N/A	N
02382500	Coosawattee River At Carters, GA	34.6036	-84.69556	521	71.86	650.67 (NAVD88)	20	Y
02383500	Coosawattee River Near Pine Chapel, GA	34.5642	-84.83306	831	53.55	616	22	Y
02384500	Conasauga River At GA 286, Near Eton, GA	34.8278	-84.85083	252	89.62	673	12	Y
02385800	Holly Creek Near Chatsworth, GA	34.7167	-84.77	64	NA	689	18	Y
02387000	Conasauga River At Tilton, GA	34.6667	-84.92833	687	59.09	622	10	N
02387500	Oostanaula River At Resaca, GA	34.5771	-84.94185	1602	43.16	604	22	Y
02388500	Oostanaula River Near Rome, GA	34.2983	-85.13806	2115	0.5	561.7 (NAVD88)	30	N
02388525	Oostanaula River At Us 27, At Rome, GA	34.2606	-85.17083	2150	0.35	561.7 (NAVD88)	25	Y

b. Reporting. The Water Management Section operates and maintains a Water Control Data System (WCDS) for the Mobile District that integrates large volumes of hydrometeorological and project data so the basin can be regulated to meet the operational objectives of the system. The WCDS, in combination with the new Corps Water Management System (CWMS), together automate and integrate data acquisition and retrieval to best meet all Corps water management activities.

Data are collected at Corps sites and throughout the ACT Basin through a variety of sources and integrated into one verified and validated central database. The basis for automated data collection at a gage location is the Data Collection Platform. The Data Collection Platform is a computer microprocessor at the gage site. A Data Collection Platform has the capability to interrogate sensors at regular intervals to obtain real-time information (e.g., river stage, reservoir elevation, water and air temperature, precipitation). The Data Collection Platform then saves the information, performs simple analysis of it, and then transmits the information to a fixed geostationary satellite. Data Collection Platforms transmit real-time data at regular intervals to the GOES System operated by the National Oceanic and Atmospheric Administration (NOAA). The GOES Satellite's Data Collection System sends the data directly down to the NOAA Satellite and Information Service in Wallops Island, Virginia. The data are then rebroadcast over a domestic communications satellite (DOMSAT). The Mobile District Water Management Section operates and maintains a Local Readout Ground System (LRGS) that collects the Data Collection Platform-transmitted, real-time data from the DOMSAT. Figure 5-3 depicts a typical schematic of how the system operates.

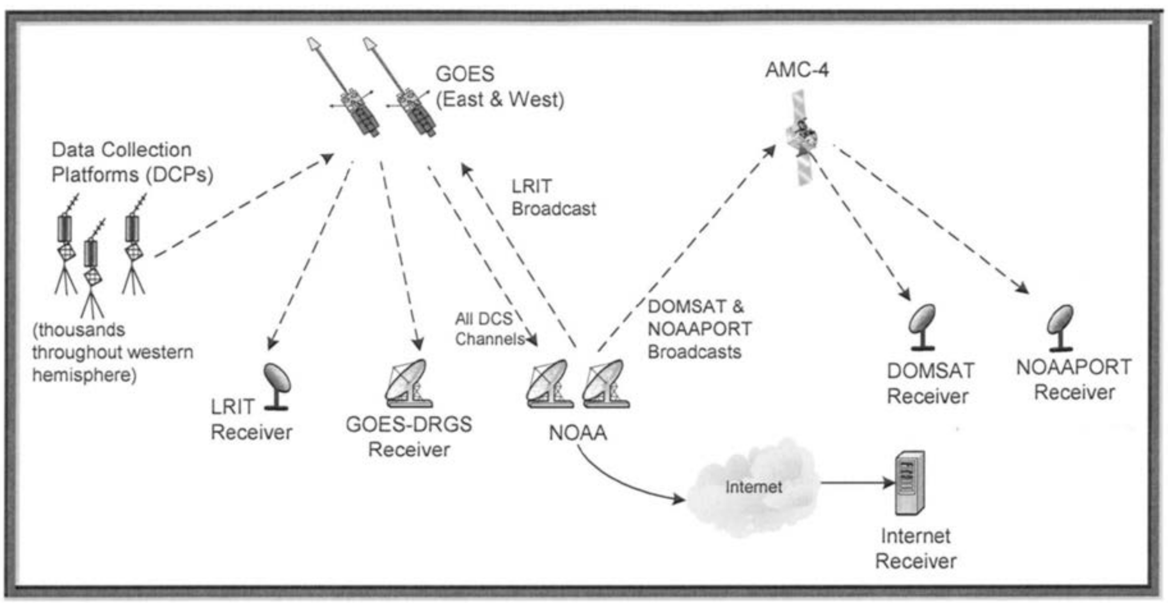


Figure 5-3. Typical Configuration of the GOES System

Typically, reporting stations log 15-minute data that are transmitted every hour. A few remaining gages report every four hours, but they are being transitioned to the hourly increment. All river stage and precipitation gages equipped with a Data Collection Platform and GOES antenna are capable of being part of the reporting network.

The power plant at Allatoona Dam is operated remotely from the control room at the Carters Dam powerhouse via a microwave link between the two projects. The remote system also produces visual observations of the project. Data from Allatoona Dam are automatically collected at the project and transmitted through the project's SCADA system and the Internet to

Carters Dam and the Mobile District. Telephone is an option for other communications. Data for the project and the Data Collection Platforms are downloaded both daily and hourly through the Corps' server network to the Water Management Section.

c. Maintenance. Maintenance of data reporting equipment is a cooperative effort among the Corps, USGS, and NWS. The USGS, in cooperation with other federal and state agencies, maintains a network of real-time Data Collection Platform stream gaging stations throughout the ACT Basin. The USGS is responsible for the supervision and maintenance of the real-time Data Collection Platform gaging stations and the collection and distribution of streamflow data. In addition, the USGS maintains a systematic measurement program at the stations so the stage-discharge relationship for each station is current. Through cooperative arrangements with the USGS, discharge measurements at key ACT Basin locations are made to maintain the most current stage-discharge relationships at the stations. The NWS also maintains precipitation data for the flood control precipitation (FC-1) network.

If gages appear to be out of service, the following agencies can be contacted for repair:

U.S. Army Corps of Engineers, Mobile District, 109 Saint Joseph Street, Mobile, AL 36602-3630
Phone: (251) 690-2737 Web: http://water.sam.usace.army.mil

USGS South Atlantic Water Science Center - Georgia, 1770 Corporate Dr., Suite 500, Norcross, Georgia 30093 Phone: (678) 924-6700 Web: http://ga.water.usgs.gov

USGS Lower Mississippi-Gulf Water Science Center - Alabama, 75 TechnaCenter Drive, Montgomery, Alabama 36117 Phone: (334) 395-4120 Web: http://al.water.usgs.gov

NWS Southern Region, 819 Taylor Street, Room 10E09, Fort Worth, TX 76102
Phone: (817) 978-1100 Web: http://www.srh.noaa.gov/

5-02. Water Quality Stations. The Corps' local ranger staff maintains a water quality monitoring station at Riverside Park. The water quality parameters monitored are dissolved oxygen, temperature, pH, and conductivity. The data are not reported in real-time; the project staff collects the data and periodically reports the data to the Mobile District Environmental Resources Section. The data is not stored in an automated system available to water management.

There is also some real-time water quality parameters collected at several of the stream gages maintained by the USGS for general water quality monitoring purposes.

5-03. Sediment Stations. In order to provide an adequate surveillance of sedimentation, a network of sediment ranges were established for Allatoona Lake. Quantitative computations can be made from these ranges to compute storage depletion rates. The network also serves as an index of any bank sloughing that may occur. General conditions and changes have been measured and recorded using this network. The network of sediment stations is shown on Plate 2-4. In order to monitor degradation and gradation of the Etowah River below Allatoona Dam, a network of tailwater ranges were established before operations began. Sedimentation and retrogression surveys were conducted in 1956, with resurveys conducted on a periodic basis. The first resurvey (using the same cross-section locations) was made in 1960 and showed no large deposits in the principal reservoir. Although the June 1960 study of the tailwater ranges concluded the channel below the dam to be fairly stable, some isolated areas of bank caving were noted.

Sediment surveys were conducted in 2010. Tetra Tech, Inc., was retained to conduct an analysis of the data and determine the extent and degree of sedimentation and erosion that has occurred in the lake and its tributaries over the years, and where appropriate, to speculate on the causes of those changes. This analysis and results are presented in a report entitled; "Sedimentation and Erosion Analysis for Allatoona Dam and Lake". Sedimentation and erosion classifications were developed for each range. Based on the percentage change for the entire cross section, range cross sections were classified for sedimentation as "Heavy" (greater than 15 percent change), "Medium" (5 to 15 percent change), "Light" (0 to 5 percent), and "None" (0 or negative change). Erosion classifications were also developed from bank retreat and advance rates. A bank retreat or advance rate is the average change in location, measured in feet, of the shoreline. It is the area bounded between two cross section profiles at the shore erosion zone (sq-ft) divided by the height of shore erosion zone (ft). The shorelines were separated into two groups, erosional and depositional. The erosional group was further divided into three classes by percentile. The 25 percent of shorelines showing the greatest bank retreat were classed as "Acute," the middle 50 percent in bank retreat were classed as "Moderate," and the 25 percent with the least bank retreat were classed as "Slight." Shorelines in the depositional group were classed as "Deposition."

Analysis revealed that sedimentation within the channel is classified as heavy in the head and mid-upper sections of tributaries, specifically those with urban areas upstream. Tributaries with forested contributing areas, such as Clear Creek, had little or no sedimentation within the channel. Sedimentation occurred with the channel at the head and mid-upper sections because the river velocity slows upon entering the pool, and the sediment is removed from suspension. Sediment deposition also tended to be heavier in sections where the lake channel widens, slowing the velocity and allowing additional sediment to be removed from suspension. Most sediment is removed from suspension in the tributaries; therefore little to no sedimentation occurs in the downstream ranges in the main pool, as seen in the downstream ranges on the Etowah River and Allatoona Creek. Overall, sediment deposition was heaviest in the Little River and upper Etowah River due to the large sediment loads both rivers carry.

Erosion along the summer pool shoreline was pervasive in Allatoona Lake and typically occurred in the downstream sections of tributaries and the main rivers. Acute erosion was typically seen in the main body of Allatoona Lake and at the mouth of tributaries to the lake. This was potentially caused by increased boat traffic in the main body. Erosion also appeared to be more severe when the shoreline slope was greater. At these steep slopes, mass wasting of the bank appeared to be the main cause of shoreline erosion. The site visit indicated that some shorelines, specifically those with slight to moderate erosion, were fairly stable. These shorelines often exhibited lower slopes or exposed bedrock. Shorelines with lower slope allowed for greater wave dissipation, preventing wave erosion, and were also less prone to mass wasting. At shorelines with exposed bedrock, the unconsolidated material had been eroded, likely immediately after Allatoona Lake was constructed, but the shorelines appeared to have stabilized due to the presence of the hard rock or saprolitic material.

Shoreline deposition typically occurred in the heads of tributaries at the summer pool level, and at the heads of mid section of tributaries at the winter pool level. Deposition appeared to be more severe in tributaries with upstream urban areas.

The amount of sediment deposition that has occurred has not affected the operation of the project. The resurvey data remains under review and no revisions to the area/capacity curves have been included in this manual update.

5-04. Recording Hydrologic Data. The Water Control Data Support System (WCDSS) is an integrated system of computer hardware and software packages readily usable by water managers and operators as an aid for making and implementing decisions. An effective decision support system requires efficient data input, storage, retrieval, and capable information processing. Corps-wide standard software and database structure are used for real-time water control. Time series hydrometeorological data are stored and retrieved using the CWMS Oracle database. In the event this database is unavailable, data can alternately be stored in the Hydrologic Engineering Center Data Storage System (HEC-DSS).

To provide stream gage and precipitation data needed to support proper analysis, a DOMSAT Receive Station (DRS) is used to retrieve DCP data from gages throughout the ACF Basin. The DRS equipment and software then receives the DOMSAT data stream, decodes the DCPs of interest and reformats the data for direct ingest into a HEC-DSS database. Reservoir data is received through a link with the Supervisory Control and Data Acquisition (SCADA) system which monitors and records reservoir conditions and operations in real time.

Most reservoir data are transmitted in hourly increments for inclusion in daily log sheets that are retained indefinitely. Gage data are transmitted in increments of 15 minutes, 1-hour, or other intervals. Reservoir data are examined and recorded in water control models every morning (or other times when needed). The data are automatically transferred to forecast models.

Automated timed processes also provide provisional real-time data needed for support of real-time operational decisions. Interagency data exchange has been implemented with the USGS and NWS Southeast River Forecast Center (SERFC). A direct link to SERFC is maintained to provide real-time products generated by NWS offices. Information includes weather and flood forecasts and warnings, tropical storm information, NEXRAD radar rainfall, graphical weather maps and more. Likewise, a direct link to USGS gages in the field allows for direct downloading of USGS data to Corps databases.

5-05. Communication Network. The global network of the Corps consists of private, dedicated, leased lines between every Division and District office worldwide. Those lines are procured through a minimum of two General Services Administration-approved telephone vendors, and each office has a minimum of two connections, one for each vendor. The primary protocol of the entire Corps network is Ethernet. The reliability of the Corps' network is considered a command priority and, as such, supports a dedicated 24 hours per day Network Operations Center. The use of multiple telephone companies supplying the network connections minimizes the risk of a one cable cut causing an outage for any office. Such dual redundancy, plus the use of satellite data acquisition, makes for a very reliable water control network infrastructure.

The Water Management Section has a critical requirement to be available during emergency situations for operation of the ACT Basin and to ensure data acquisition and storage remain functional. The Water Management Section must be able to function in cases of flooding or other disasters, which typically are followed by the loss of commercial electricity. The WCDS servers and the LRGS each have individual UPS (uninterruptable power supply) and a large UPS unit specifically for the portion of Mobile District Office in which the Water Management Section resides to maintain power for operational needs.

In the event of a catastrophic incident that causes loss of communication or complete loss of access to the Mobile District Office and the WCDS and CWMS servers located on site, a Continuity of Operations Program (COOP) site is being set up as a backup to these systems.

This site will have servers that mirror the WCDS and CWMS servers located at the Mobile District Office allowing Water Managers to continue operating with no interruption or loss of data. It is currently planned that the COOP site will be located at the South Atlantic Division Office in Atlanta, Georgia.

The primary communication network of the Allatoona Project is a SCADA system network. The SCADA network includes a microwave link between Allatoona and Carters Dam. The SCADA network also monitors powerhouse conditions and digitally records real-time project data hourly. Computer servers at Allatoona and Carters are connected to the Mobile District through the Corps Network, permitting data transfer at any time. The data include physical conditions at the reservoir such as pool elevations, outflow, river stages, generation, and rainfall. Special instructions or deviations are usually transmitted by e-mail, telephone, or fax.

Emergency communication is available at the following numbers:

Water Management Section	251-690-2737
Chief of Water Management	251-690-2730 or 251-509-5368 (cell)
Carters Powerhouse*	706-334-2906
Allatoona Resource Office	678-721-6700

* Allatoona Dam is operated remotely from Carters Dam

5-06. Communication with Project Office.

a. Regulating Office With Project Office. The Water Management Section is the regulating office for the Corps' projects in the ACT Basin. Daily routine communication between the Water Management Section and project offices occur thru electronic mail, telephone, and facsimile. Daily hydropower generation schedules are issued by the Southeastern Power Administration (SEPA). During normal conditions on weekends, hydropower generation schedules can be sent out on Friday to cover the weekend period of project regulation, but it can change if deemed appropriate. If loss of network communications occurs, orders can be given via telephone.

During critical reservoir regulation periods and to assure timely response, significant coordination is often conducted by telephone between the project office and the Water Management Section. That direct contact ensures that issues are completely coordinated, and concerns by both offices are presented and considered before final release decisions are made. The Chief of the Water Management Section is available by cell phone during critical reservoir operation periods.

b. Between Project Office and Others. Each reservoir project office is generally responsible for local notification and for maintaining lists of those individuals who require notification under various project regulation changes. In addition, the project office is responsible for notifying the public including project recreation areas, campsites, and other facilities that could be affected by various project conditions.

In order to warn the public at the start of a hydropower release downstream, when an operator initiates a generator start, a warning horn sounds. An audio detector verifies the horn has sounded and allows the unit start-up sequence to continue. The horn will continue to sound for three minutes. The spillway at Allatoona Dam has a manually operated warning horn switch, located at gate No.1. The horn switch is activated by the operator opening the spillway gates. The horn will sound for three minutes. There is no audio detector for the spillway gates.

5-07. Project Reporting Instructions. In addition to automated data, project operators maintain record logs of gate position, water elevation, and other relevant hydrological information including inflow and discharge. That information is stored and available to the Water Management Section through the Corps' network. The Water Management Section maintains constant contact with project operators. Operators notify the Water Management Section if changes in conditions occur. Unforeseen or emergency conditions at the project that require unscheduled manipulations of the reservoir should be reported to the Water Management Section as soon as possible.

If the automatic data collection and transfer are not working, projects are required to fax or email daily or hourly project data to the Water Management Section. Water Management staff will manually input the information into the database. In addition, Mobile District Power Projects must verify pool level gauge readings each week, in accordance with *Standard Operating Procedure, Weekly Verification of Gauge Readings, Mobile District Power Projects* dated 19 February 2008, and CESAD SOP 1130-2-6 dated 21 July 2006. Those procedures require that powerhouse operators check the accuracy of pool monitoring equipment by verifying readings of the equipment against gage readings at each plant. That information is logged into the Official Log upon completion and furnished to the master plant. A Trouble Report to management communicates any discrepancies with the readings. Operations Division, Hydropower Section will be notified by electronic mail when verification is complete. The e-mail notification will include findings of the verification.

Project personnel or the Hydropower Section within Operations Division, or both, are responsible for requesting any scheduled system hydropower unit outages in excess of two hours. The out-of-service times for the hydropower units are reported back to Water Management upon completion of outages. Forced outages are also reported with an estimated return time, if possible. Any forced or scheduled outages causing the project to miss scheduled water release targets must be immediately reported to the Water Management Section and to SEPA. In such cases, minimum flow requirements can be met through spilling.

5-08. Warnings. During floods, dangerous flow conditions, or other emergencies, the proper authorities and the public must be informed. In general, flood warnings are coupled with river forecasting. The NWS has the legal responsibility for issuing flood forecast to the public, and that agency will have the lead role for disseminating the information. For emergencies involving the Allatoona Project, the operator on duty should notify the Water Management Section, Operations Division and the Operations Project Manager at the project. A coordinated effort among those offices and the District's Emergency Management Office will develop notifications to make available to local law enforcement, government officials and emergency management agencies.

5-09. Role of Regulating Office. The Water Management Section of the Mobile District Office is responsible for developing operating procedures for both flood and non-flood conditions. Plans are developed to most fully use the water resources potential of each project within the constraints of authorized functions. Those plans are presented in water control manuals such as this one. Water control manual preparation and updating is a routine operation of the Water Management Section. In addition, the Water Management Section maintains information on current and anticipated conditions, precipitation, and river-stage data to provide the background necessary for best overall operation. The Water Management Section arranges communication channels to the Power Project Manager and other necessary personnel. Instructions pertaining to reservoir regulation are issued to the Power Project Manager; however, routine instructions are normally issued directly to the powerhouse operator on duty.

5-10. Role of Power Project Manager. The Power Project Manager should be completely familiar with the approved operating plans for the Allatoona and Carters Projects. The Power Project Manager is responsible for implementing actions under the approved water control plans and carrying out special instructions from the Water Management Section. The Power Project Manager is expected to maintain and furnish records requested from him by the Water Management Section. Training sessions should be held as needed to ensure that an adequate number of personnel are informed of proper operating procedures for reservoir regulation. Unforeseen or emergency conditions at the project that require unscheduled manipulation of the reservoir should be reported to the Water Management Section as soon as practicable.

VI - HYDROLOGIC FORECASTS

6-01. General. Reservoir operations for Allatoona Dam are scheduled by the Water Management Section in accordance with forecasts of reservoir inflow and river stages. Operations at Carters Dam are coordinated with Allatoona Dam to reduce the flood damage at Rome, Georgia.

The Corps has developed techniques to conduct forecasting in support of the regulation of the ACT Basin. In addition, the Corps has a strong reliance on other Federal agencies such as the NWS and the USGS to help maintain accurate data and forecast products to aid in making the most prudent water management decisions. The regulation of multipurpose projects requires scheduling releases and storage on the basis of both observed and forecasted hydrologic events throughout the basin. During both normal and below-normal runoff conditions, releases through the power plants are scheduled on the basis of water availability, to the extent reasonably possible, during peak periods to generate electricity during periods of greatest demand. The release level and schedules are dependent on current and anticipated hydrologic events. The most efficient use of water is always a goal, especially during the course of a hydrologic cycle when below-normal streamflow is occurring. Reliable forecasts of reservoir inflow and other hydrologic events that influence streamflow are critical to the efficient regulation of the ACT System.

a. Role of the Corps. The Water Management Section maintains real-time observation of river and weather conditions in the Mobile District. The Water Management Section has capabilities to make forecasts for several areas in the ACT Basin. Those areas include all the Federal projects and other locations. Observation of real-time stream conditions provides guidance of the accuracy of the forecasts. The Corps maintains contact with the River Forecast Center to receive forecast and other data as needed. Daily operation of the ACT River Basin during normal, flood risk management, and drought conservation regulation requires accurate, continual short-range and long-range elevation, streamflow, and river-stage forecasting. These short-range inflow forecasts are used as input in computer model simulations so that project release determinations can be optimized to achieve the regulation objectives stated in this manual. The Water Management Section continuously monitors the weather conditions occurring throughout the basin and the weather and hydrologic forecasts issued by the NWS. The Water Management Section then develops forecasts that are to meet the regulation objectives of regulating the ACT projects. The Water Management Section prepares five-week inflow and lake elevation forecasts weekly based on estimates of rainfall and historical observed data in the basin. These projections assist in maintaining system balance and providing project staff and the public lake level trends based on the current hydrology and operational goals of the period. In addition, the Water Management Section provides weekly hydropower generation forecasts based on current power plant capacity, latest hydrological conditions, and system water availability.

b. Role of Other Agencies. The NWS is responsible for preparing and publicly disseminating forecasts relating to precipitation, temperatures, and other meteorological elements related to weather and weather-related forecasting in the ACT Basin. The Water Management Section uses the NWS as a key source of information for weather forecasts. The meteorological forecasting provided by the Birmingham, Alabama and Peachtree City, Georgia offices of the NWS is considered critical to the Corps' water resources management mission. The 24- and 48-hour Quantitative Precipitation Forecasts (QPFs) are invaluable in providing guidance for proactive management of basin release determinations. Using precipitation forecasts and subsequent runoff directly relates to project release decisions.

1) The NWS is the Federal agency responsible for preparing and issuing streamflow and river-stage forecasts for public dissemination. That role is the responsibility of the Southeast River Forecast Center (SERFC) co-located in Peachtree City, Georgia with the Peachtree City Weather Forecast Office. SERFC is responsible for the supervision and coordination of streamflow and river-stage forecasting services provided by the NWS Weather Service Forecast Office in Peachtree City, Georgia. SERFC routinely prepares and distributes five-day streamflow and river-stage forecasts at key gaging stations along the Alabama, Coosa, and Tallapoosa Rivers. Streamflow forecasts are available at additional forecast points during periods of above normal rainfall. In addition, SERFC provides a revised regional QPF on the basis of local expertise beyond the NWS Hydrologic Prediction Center QPF. SERFC also provides the Water Management Section with flow forecasts for selected locations on request.

2) The Corps and SERFC have a cyclical procedure for providing forecast data between Federal agencies. As soon as reservoir release decisions have been planned and scheduled for the proceeding days, the release decision data are sent to SERFC. Taking release decision data, coupled with local inflow forecasts at forecast points along the ACT, SERFC can provide inflow forecasts into Corps projects. Having revised inflow forecasts from SERFC, the Corps has up-to-date forecast data to make the following days' release decisions.

6-02. Flood Condition Forecasts. During flood conditions, forecasts are made for two conditions; rainfall that has already fallen, and for potential rainfall (or expected rainfall). Proactive decisions can be made on the basis of known events and *what if* scenarios. The Water Management Section prepares forecasts and receives the official forecasts from SERFC.

a. <u>Requirements</u>. Accurate flood forecasting requires a knowledge of antecedent conditions, rainfall and runoff that has occurred, and tables or unit hydrographs to apply the runoff to existing flow conditions. Predictive QPF data are needed for what if scenario.

b. <u>Methods</u>. In determining the expected inflow into the Allatoona Lake, it is necessary to forecast the flows of the Etowah River above Allatoona Dam. Runoff or rainfall excess for the area is estimated using the seasonal correlation values shown in Table 6-1, depending on antecedent conditions. For very dry conditions, initial runoff can be near zero and then increase as rainfall continues. During wet conditions, most of the rainfall appears as runoff into the lake. The rainfall excess is distributed over the area by using the unit hydrograph shown in Table 6-2. During the next several hours and days, the observed inflow is compared to the forecasts and adjustments are applied. Additional rainfall/runoff is accumulated with the continuing forecasts.

The Corps provides a link to the NWS website so that the Water Management Section, the affected county emergency management officials, and the public can obtain this vital information in a timely fashion. When hydrologic conditions exist so that all or portions of the ACT Basin are considered to be flooding, existing Corps streamflow and short and long-range forecasting runoff models are run on a more frequent, as-needed basis. Experience demonstrates that the sooner a significant flood event can be recognized and the appropriate release of flows scheduled, an improvement in overall flood risk management can be achieved. Stored storm water that has accumulated from significant rainfall events must be evacuated following the event and as downstream conditions permit to provide effective flood risk management. Flood risk management carries the highest priority during significant runoff events that pose a threat to human health and safety. The accumulation and evacuation of storage for the authorized purpose of flood risk management is accomplished in a manner that will prevent, insofar as possible, flows exceeding those which will cause flood damage downstream. During periods of significant basin flooding, the frequency of contacts between the Water Management Section and SERFC staff are increased to allow a complete interchange of available data upon which the most reliable forecasts and subsequent project regulation can be based.

Allatoona is located 48 river miles above the primary damage point at Rome, Georgia. The forecasting procedure requires routing Allatoona releases and adding the local runoff at Rome, Georgia. Forecasting stage at Rome, Georgia, is further complicated by being located at the junction of the Etowah and Oostanaula Rivers. Flood events lasting several days produce double flood peaks, and at times, the two rivers are at different water surface elevations. The first peak at Rome, Georgia, is a result of runoff in the Etowah River Basin. Allatoona Lake controls runoff from 1,122 square miles or about 60 percent of the Etowah River Basin. Releases from the project take approximately 12 hours to reach Rome, Georgia. The area above Carters Lake is 374 square miles or about 17 percent of the Oostanaula River Basin. Releases from Carters take about 32 hours to reach Rome, Georgia.

Table 6-1. Rainfall - Runoff Relationship for Basin above Rome, Georgia

		Runoff - Etowah Basin							**Runoff - Oostanaula Basin**				
	Rainfall	0	0.20	0.4	0.6	0.8		**Rainfall**	0	0.2	0.4	0.6	0.8
Wet condition	0	0.00	0.10	0.30	0.05	0.08		0	0.00	0.04	0.90	0.15	0.21
	1	0.12	0.16	0.20	0.24	0.30		1	0.28	0.36	0.44	0.54	0.64
	2	0.37	0.44	0.51	0.58	0.66		2	0.74	0.84	0.96	1.08	1.22
	3	0.75	0.84	0.53	1.02	1.14		3	1.37	1.52	1.67	1.81	1.97
	4	1.27	1.44	1.62	1.80	1.98		4	2.12	2.27	2.41	2.56	2.71
	5	2.16	2.34	2.52	2.70	2.88		5	2.85	3.00	3.15	3.30	3.45
	6	3.06	3.26	3.46	3.66	3.86		6	3.60	3.75	3.89	4.04	4.19
Normal condition	0	0.00	0.01	0.02	0.04	0.06		0	0.00	0.03	0.06	0.08	0.11
	1	0.08	0.10	0.13	0.16	0.20		1	0.14	0.18	0.22	0.26	0.30
	2	0.24	0.30	0.36	0.42	0.47		2	0.36	0.40	0.44	0.50	0.58
	3	0.53	0.59	0.67	0.72	0.77		3	0.65	0.73	0.81	0.90	0.98
	4	0.83	0.90	0.97	1.05	1.14		4	1.07	1.14	1.21	1.29	1.38
	5	1.22	1.32	1.43	1.56	1.68		5	1.46	1.56	1.67	1.80	1.92
	6	1.80	1.94	2.08	2.22	2.36		6	2.04	2.18	2.32	2.48	2.60
Dry condition	0	0.00	0.00	0.01	0.02	0.04		0	0.00	0.02	0.04	0.05	0.06
	1	0.05	0.07	0.08	0.09	0.11		1	0.08	0.10	0.12	0.14	0.16
	2	0.13	0.15	0.18	0.20	0.23		2	0.18	0.20	0.23	0.27	0.32
	3	0.25	0.28	0.31	0.34	0.37		3	0.36	0.44	0.50	0.57	0.64
	4	0.40	0.43	0.46	0.49	0.52		4	0.72	0.80	0.88	0.96	1.04
	5	0.56	0.60	0.64	0.69	0.75		5	1.12	1.20	1.29	1.37	1.45
	6	0.82	0.90	0.98	1.06	1.14		6	1.54	1.60	1.70	1.76	1.86

Table 6-2. Unit Hydrographs in Etowah River Basin

6-hour unit hydrographs in Etowah River basin				
	Allatoona (02394000)	Cartersville (02394670)	Kingston (02395000)	Rome (02395980)
Area between gages (square miles)	1,122	223	289	167
Time in hours	Flow in cfs			
6	15600	2600	1660	2860
12	20000	4370	5110	5550
18	17000	3640	6340	4320
24	14000	3400	4980	2610
30	11400	2920	3620	1580
36	9100	2300	2620	960
42	7100	1760	1900	570
48	5550	1320	1380	350
54	4300	920	1000	210
60	3400	600	730	130
66	2600	360	530	80
72	2100	240	380	40
78	1700	160	280	
84	1350	100	200	
90	1000	40	150	
96	800	10	110	
102	600		80	
108	500		60	
114	400			
120	300			
126	200			
132	150			
138	100			
144	70			
150	50			
156	20			

c. Downstream Forecasts. Table 6-3 gives estimates of the time for releases from Allatoona Dam to reach downstream locations, and the increased flow over time. This table can be used to maximize use of the power plant during flood event without causing additional damages.

In addition to locations below Allatoona Dam, it is important to know conditions in the Oostanaula River Basin. Table 6-4 presents unit hydrographs for Carters Dam, Carters Reregulation Dam, Redbud, Tilton, Resaca, and flows from the Oostanaula at Rome. Outflow from the Carters Project is determined at the reregulation dam. A combination of local flows, generation, and pump-back determines the outflow from the reregulation dam. Flood waters stored at Carters are not released until after the stage at Rome has receded to below flood stage, unless induced surcharge operations are required at Carters.

Table 6-3. Effect of Allatoona Power Releases at Downstream Locations

Effect of Allatoona power releases at downstream locations Cartersville, and Rome, Georgia								
Release rate at dam in cfs		2000	4000	6000	7000	8000	8500	8900
Number of hours units are running	Hours since releases began to reach peak	Increase in flow						
At Cartersville, river begins to rise two hours after releases start								
1	4	800	1440	2040	2380	2720	2810	2940
2	4.5	1400	2560	3540	4200	4960	5360	5610
3	5	1680	3200	4620	5530	6480	6800	7120
4	6	1960	3680	5340	6230	7120	7570	7920
5	7	2000	3880	5700	6650	7600	8080	8280
6	8		4000	5880	6830	7760	8250	8630
7	9			6000	6930	7920	8420	8810
8	10				7000	8000	8500	8900
At Kingston, river begins to rise seven hours after releases start								
1	9	520	960	1320	1540	1760	1870	1960
2	10	940	1760	2460	2870	3360	3570	3740
3	11	1240	2320	3300	3850	4480	4760	4980
4	12	1420	2720	3900	4550	5200	5530	5790
5	13	1580	3040	4380	5110	5840	6210	6500
6	14	1700	3280	4740	5460	6160	6550	6850
7	15	1960	3680	4980	5770	6560	6970	7300
8	16	2000	3880	5160	6020	6880	7310	7650
9	17		4000	5640	6720	7840	8330	8720
10	18			6000	6970	7920	8420	8810
11	19				7000	8000	8500	9000
At Rome, river begins to rise 12 hours after releases start								
1	14	300	460	670	770	880	940	980
2	15	550	900	1320	1510	1720	1830	1900
3	16	780	1300	1920	2230	2540	2700	2830
4	17	980	1720	2520	2910	3320	3530	3690
5	18	1160	2080	3050	3500	4010	4250	4450
6	19	1320	2400	3510	4050	4630	4920	5150
7	20	1460	2680	3900	4590	5240	5570	5830
8	21	1580	2940	4280	5030	5740	6100	6390
9	22	1760	3350	4880	5670	6490	6890	7210
10	23	1880	3630	5300	6150	7020	7460	7810
11	24	1950	3820	5620	6510	7460	7910	8280
12	25	1980	3940	5840	6780	7740	8230	8620
13	26	2000	3980	5960	6920	7900	8400	8790
14	27		4000	6000	7000	7980	8480	8880
15	28					8000	8500	8900

Table 6-4. 6-Hour Unit Hydrographs in Etowah River Basin

6-hour unit hydrographs in Etowah River Basin						
	Coosawattee River			Conasauga - Oostanaula Rivers		
	Carters Main Dam (02381400)	Carters Reregulation Dam (02382400)	Redbud 02383500)	Tilton (02387000)	Resaca (02387500)	Rome (02388525)
Area between gages (square miles)	374	146	311	687	84	547
Time in hours	Flow in cfs					
6	1740	960	2470	190	1810	820
12	5900	3100	7740	690	2800	2170
18	9050	4190	9830	1360	1500	4200
24	8260	3290	7090	2120	780	6400
30	5530	1990	3940	2910	400	8040
36	3550	1200	2190	3710	210	8160
42	2280	720	1220	44'60	110	6990
48	1470	440	680	5050	60	5390
54	940	260	380	5420	30	3880
60	610	160	210	5590		2720
66	390	100	120	5560		1920
72	250	60		5300		1370
78	160	40		4730		990
84	100			4020		720
90				3410		520
96				2880		370
102				2440		270
108				2070		200
114				1750		150
120				1480		120
126				1250		90
132				1060		60
138				900		30
144				760		
150				640		
156				550		
162				460		
168				390		
174				330		
180				280		
186				240		
192				210		
198				180		
204				150		
210				120		
216				100		
222				80		
228				60		

6-03. Conservation Purpose Forecasts. Forecasts for conservation operations are accomplished similarly to flood condition forecasts.

a. Requirements. The ACT projects are typically regulated for normal or below normal runoff conditions. Therefore, the majority of the forecasting and runoff modeling simulation is for conservation regulation decisions. Conservation requirements are the same as for flood conditions with the additional emphasis to ensure the minimum flow requirement of 240 cfs is maintained from the project.

b. Methods. The Water Management Section prepares five-week inflow and lake elevation forecasts weekly based on estimates of rainfall and historical observed data in the basin. These projections assist in maintaining system balance and providing project staff and the public lake level trends based on the current hydrology and operational goals of the period. In addition, the

Water Management Section provides weekly hydropower generation forecasts based on current power plant capacity, latest hydrological conditions, and system water availability.

6-04. Long-Range Forecasts.

a. Requirements. The Corps utilizes available information from the NWS to develop long-range forecasts to aid in the operation of the system and for planning studies. These long-range forecasts vary from the five-week forecast to six-month forecasts.

b. Methods. During normal conditions, the current long-range outlook produced by the Corps is a five-week forecast. For normal operating conditions, a forecast longer than this incorporates a greater level of uncertainty and reliability. In extreme conditions, three-month and six-month forecasts can be produced based on observed hydrology and comparative percentage hydrology inflows into the ACT Basin. One-month and three-month outlooks for temperature and precipitation produced by the NWS Climate Prediction Center are used in long-range planning for prudent water management of the ACT reservoir projects.

6-05. Drought Forecast.

a. Requirements. ER 1110-2-1941, Drought Contingency Plans, dated 15 September 1981, called for developing drought contingency plans for all Corps' reservoirs. Drought recognition and drought forecast information can be used in conjunction with the drought contingency plan.

b. Methods. Various products are used to detect the extent and severity of basin drought conditions. One key indicator is the U.S. Drought Monitor. The Palmer Drought Severity Index is also used as a regional drought indicator. The index is a soil moisture algorithm calibrated for relatively homogeneous regions and may lag emerging droughts by several months. The Alabama Office of State Climatologist also produces a Lawn and Garden Index which gives a basin-wide ability to determine the extent and severity of drought. The runoff forecasts developed for both short and long-range time periods reflect drought conditions when appropriate. There is also a heavy reliance on latest ENSO (El Niño/La Niña-Southern Oscillation) forecast modeling to represent the potential impacts of La Nina on drought conditions and spring inflows. Long-range models are used with greater frequency during drought conditions to forecast potential impacts to reservoir elevations, ability to meet minimum flows, and water supply availability. A long-term, numerical model, Extended Streamflow Prediction developed by the NWS, provides probabilistic forecasts of streamflow on the basis of climatic conditions, streamflow, and soil moisture. Extended Streamflow Prediction results are used in projecting possible future drought conditions. Other parameters and models can indicate a lack of rainfall and runoff and the degree of severity and continuance of a drought. Models using data of previous droughts or a percent of current to mean monthly flows with several operational schemes have proven helpful in planning. Other parameters are the ability of Allatoona Lake to meet the demands placed on its storage, the probability that Allatoona Lake pool elevation will return to normal seasonal levels, the conditions at other basin impoundments, basin streamflows, basin groundwater table levels, and the total available storage to meet hydropower marketing system demands.

c. Reference Documents. The drought contingency plan for the Allatoona Project is summarized in Section 7-12 below. The complete ACT Drought Contingency Plan is provided in Exhibit D.

VII - WATER CONTROL PLAN

7-01. General Objectives. The Congressionally authorized purposes for the Allatoona Project as specified in the original project authorizing documents are flood risk management, hydropower, and navigation. Several other project purposes have been authorized at Allatoona through generally applicable legislation. Those purposes include water quality, recreation, fish and wildlife conservation, and water supply. The regulation plan seeks to balance the needs of all project purposes at the Allatoona Project and at other projects in the ACT Basin and is intended for use in day-to-day, real-time water management decision making and for training new personnel.

The Allatoona Project authorizing legislation (Flood Control Act of 1941) did not specify allocations or priorities within conservation storage, and left it to the discretion of the Corps how to operate conservation storage to fulfill the authorized purposes of the Allatoona Project. Conservation purposes are not fundamentally in competition; Mobile District seeks to attain balanced operations to achieve all authorized purposes and take into account other considerations to the extent possible.

7-02. Constraints. Physical constraints of the project are generally limited to available powerhouse capacity, sluice capacity, and downstream channel capacity. As the project approaches the bottom of conservation pool, the powerhouse turbines can no longer effectively run and discharge will be limited to sluice operation. Allatoona Dam has a minimum flow requirement of 240 cfs immediately downstream of the dam for water quality purposes. That flow is met with the small hydropower unit that is operated 24 hours a day. If the small unit is out of service, a spillway gate or sluice gate will be opened or one of the main hydropower units will be operated to meet minimum flow requirements.

7-03. Overall Plan for Water Control.

a. General Regulation. The water control operations of Allatoona Dam are in accordance with the regulation schedule as outlined in the following paragraphs. The Corps operates the Allatoona Dam and Lake to provide for the authorized project purposes of the project. All authorized project purposes are considered when making water control regulation decisions, and those decisions affect how water is stored and released from the project. Deviations from the prescribed instructions, which can occur due to planned or unplanned events as described in section 7-15, will be at the direction of the Water Management Section. Additionally, if communication between the District Office and the dam is interrupted, the operator will follow an emergency operation schedule, Exhibit C - Instructions to the Damtenders for Water Control.

b. Conservation Pool. Allatoona Lake's conservation storage pool was designed to provide the necessary capacity to store water for subsequent use to meet the multiple conservation purposes for which the project was constructed. The top of conservation pool elevation is the reservoir's normal maximum operating level for conservation storage purposes. If the elevation is higher than the conservation limit, the reservoir level is in the flood pool. The conservation pool is regulated between a minimum elevation of 800 feet NGVD29 and a seasonal variable top-of-conservation pool ranging between elevations 823 to 840 feet NGVD29. The top-of-conservation pool guide curve and minimum conservation pool are shown on Plate 7-1 along with other operating action zones. The flood risk management plan drawdown to elevation 823 feet NGVD29 in advance of flood season provides 467,278 acre-feet (elevation 823 to 860 feet NGVD29) of flood risk management storage.

c. Guide Curves and Action Zones. Multiple project purposes and water demands in the basin require that the Corps regulate the use of conservation storage in a balanced manner in an attempt to meet all authorized purposes, while continuously monitoring the climatological conditions to ensure that project purposes can at least be minimally satisfied during critical drought periods. The balanced water management strategy for Allatoona does not prioritize any project function but seeks to balance all project authorized purposes. However, during a flood event, flood risk management does clearly govern the operation of Allatoona. A seasonal conservation pool regulation guide curve and conservation storage action zones have been developed to guide the water control management decisions in meeting the balanced strategy. Table 7-1 provides key elevations of the top of conservation pool and action zones. Area Capacity Curves for Allatoona Lake, which indicate the amount of storage and the surface area of the lake for the complete range of possible pool elevations, are shown on Plate 2-5.

1) A regulation guide curve for Allatoona Lake has been prescribed to facilitate the water control regulation of the project. The guide curve defines the seasonal top of conservation storage water surface elevation. Water management operational decisions strive to maintain the pool elevation at the top of conservation elevation or at the highest elevation possible while meeting project purposes. Normally, the pool elevation will be lower than the guide curve as available conservation storage is utilized to meet project purposes except when storing flood waters or during conservative lake level regulation when drought conditions exist within the project watershed during the spring refill period. The top of conservation elevation from 1 May to 5 Sep is 840-feet NGVD29; transitions to elevation 835 feet NGVD29 by 1 Oct; is elevation 835 feet NGVD29 through 15 November; drawn down to elevation 823 feet NGVD29 by 31 Dec for additional flood storage; and begins the refill period 16 Jan.

2) The water control plan also establishes action zones within the conservation storage pool. The action zones are used to manage the lake at the highest level possible within the conservation storage pool while balancing the needs of all authorized purposes with water conservation as a national priority used as a guideline. The action zones at Allatoona provide water control regulation guidance to meet this water conservation plan while balancing the use of available conservation storage to meet the project purposes. Additionally Zone A, above the top of conservation pool, can also be used to meet these purposes. Zone A is described in Section 7-05. These zones are used as a general guide to the hydropower peaking generation available from the Allatoona Project to help meet system hydropower commitments. Table 7-2 shows the typical peak generation hours available for each zone. The term “peak generation” is defined as using the full plant capacity for generating hydroelectric power. The following provides a general description of each zone.

Zone 1: While Allatoona is in Zone 1, the project conditions are likely to be normal to wetter than normal during the late summer and fall months. Most likely, other projects in the basin and within the Federal hydropower system will be in similar condition. Full consideration will be given to meeting hydropower demand by typically providing up to four hours of peak generation. However, the duration of peak generation could be zero or exceed four hours based on various factors or activities, such as, maintenance and repair of turbines; emergency situations such as a drowning or chemical spill; draw-downs because of shoreline maintenance; drought operations; increased or decreased hydropower demand; and other circumstances.

Zone 2: While in Zone 2, a reduced amount of peaking generation will be provided to meet system hydropower demand. The typical peak generation schedule will provide up to three hours of peak generation. However, the duration of peak generation could be zero or exceed three hours based on various factors or activities, such as, maintenance and repair of turbines; emergency situations such as a drowning or chemical spill; draw-downs because of shoreline maintenance; drought operations; increased or decreased hydropower demand; and other circumstances.

Zone 3: Zone 3 will typically indicate drier than normal conditions or impending drought conditions. Careful, long range analyses and projections of inflows, pool levels, and upstream and downstream water needs will be made when pool levels are in Zone 3. While in Zone 3 during the months of Jan-Apr, a reduced amount of peaking generation will be provided to meet system hydropower demand while making water control regulation decisions to ensure refilling the reservoir to elevation 840 feet NGVD29 by 1 May. Should drier than normal hydrologic conditions exist or persist, the reduced peak generation will continue until the reservoir level rises to a higher action zone. The typical peak generation schedule will provide up to two hours of peak generation. However, the duration of peak generation could be zero or exceed two hours based on various factors or activities, such as, maintenance and repair of turbines; emergency situations such as a drowning or chemical spill; draw-downs because of shoreline maintenance; drought operations; increased or decreased hydropower demand; and other circumstances.

Zone 4: Reservoir elevations in Zone 4 indicate severe drought conditions. Careful, long range analyses and projections of inflows, pool levels, and upstream and downstream water needs will be made when pool levels are in Zone 4. Peak generation will typically be suspended. Continuous operation of the small unit will continue in order to maintain the 240 cfs minimum flow release.

Table 7-1. Top of Conservation and Action Zone Elevations, Allatoona Lake

Date	Elevation (feet NGVD29)			
	Top of Zone 1	Top of Zone 2	Top of Zone 3	Top of Zone 4
1 Jan	823.00	823.00	823.00	818.00
16 Jan	823.00	823.00	823.00	818.00
1 Feb	825.59	825.59	825.59	818.00
1 Mar	830.29	830.29	830.29	824.00
30 Apr	840.00	840.00	840.00	831.83
1 Jun	840.00	840.00	838.49	836.00
1 Jul	840.00	840.00	837.02	828.00
1 Sep	840.00	835.34	834.00	824.29
5 Sep	840.00	835.04	833.58	824.05
1 Oct	835.00	833.09	830.86	822.49
15 Nov	835.00	829.71	826.14	819.80
15 Dec	827.17	823.00	823.00	818.00
31 Dec	823.00	823.00	823.00	818.00

Table 7-2. Typical Hours of Peaking Hydroelectric Power Generation at Allatoona

Action zone	Allatoona (hours of operation)
Zone 1	up to 4
Zone 2	up to 3
Zone 3	up to 2
Zone 4	0

7-04. Standing Instructions to Damtender. During normal operations, the powerhouse operators will operate the Allatoona Project in accordance with the daily hydropower schedule. Any deviation from the schedule must come through the Water Management Section. Normally, flood control instructions are issued by the Water Management Section in the Mobile District Office. However, if a storm of flood-producing magnitude occurs and all communications are disrupted between the Mobile District and the powerhouse operators, the operators will follow instructions in Exhibit C - Standing Instructions to the Damtender for Water Control.

7-05. Flood Risk Management. The prime objective of flood risk management is to retain flood waters in Allatoona when the Rome, Georgia, stage is above the flood stage of 25 feet at the USGS "Oostanaula River Near Rome, GA" (gage # 02388500), and to release stored waters without causing or unduly prolonging downstream flood damages, and to manage the release/storage options to minimize flooding whether actions are prior to an event or after an event while utilizing all available information. The key gage used to obtain this "prime objective" is USGS gage #02388525 as explained in Table 7-3.

The basic plan for flood risk management is defined by flood action zones within the flood risk management storage of the pool similar to how the conservation storage is defined by action zones to guide operations. Figure 7-1 provides guidance for initiating induced surcharge releases and Table 7-5 describes the operating procedures. The induced surcharge schedule is implemented whenever it is apparent that 100 percent of the flood risk management storage will be used. The induced surcharge operation is a rationale operation which protects the structural integrity of the dam while providing reasonable downstream flood protection. There are five flood actions zones defined above the top of the conservation storage identified as zones A through E. These action zones are shown on Plate 7-2. Table 7-3 contains a detailed description of the flood risk management regulations based on the action zones when above the top of conservation. Table 7-4 provides key elevations for the top of the flood action zones.

When the reservoir is in the lowest flood zone, (Zone A), releases can be controlled to the minimum flow needed from the small unit. As the reservoir rises to higher flood zones, flood risk management may diminish depending on inflow forecasts. For the larger floods, induced surcharge releases may be required.

Releases are scheduled based on the Allatoona pool level and stages at Rome, Georgia. Usually this provides optimum protection for Cartersville and Kingston, Georgia, and the upper Coosa River. If conditions dictate, other restraints may influence releases.

During the rising phase of a flood, normal power operation as a peaking plant will be permitted unless predictions indicate that the power releases added to the uncontrolled area runoff will cause or aggravate damaging flood stages along the lower Etowah River and at Rome, Georgia. Runoff is retained in the flood storage space when releases are restricted to prevent flooding downstream. When the flood is receding downstream, the water in flood storage will be released in accordance with the rules in Table 7-3 and on Plate 7-2 without exceeding the bankfull capacity downstream. There may be minor alterations to the evacuation rules when the pool approaches the top of conservation pool in order to permit realistic scheduling of power generation. This scheduling of power releases is on a weekly basis and is reviewed each day. Often daily changes are necessary when the downstream flow is near bankfull capacity or weather conditions are unstable.

Table 7-3. Flood Regulations Above Top of Conservation

Flood Regulations Above Top of Conservation Pool
Flood Zone E (highest) - Only minimum continuous release will ordinarily be made while Rome stage (USGS gage 02388525) is above or expected to rise above 28 feet (moderate flood stage). However, if inflows are predicted to exceed flood control space before Rome has crested, then powerhouse releases which are less than inflow will be made until either the stage at Rome has peaked or until greater (surcharge) releases are required (Figure 7-1 and Plate 7-3). Assuming that surcharge releases do not govern, after Rome has crested, peaking power will be made if the releases do not reverse the falling trend at Rome. Increasing releases will be made as the stage at Rome drops below 28 feet. Releases of channel capacity (about 9,500 cfs) will be made whenever such a release does not reverse the falling trend at Rome. Surcharge Releases: Infrequently inflows into Allatoona will be of such magnitude that the stage at Rome does not govern the operation of Allatoona but rather the structural stability of the dam will govern. Whenever this happens, surcharge releases will be made. Figure 7-1 shows the relationship of the last 3-hour Allatoona inflow and the current pool elevation and also indicates the required release strategy. If a surcharge release is required then Plate 7-3 defines the required release (see also para. 7-05.a. and Table 7-4). This surcharge requirement is pertinent in Zones B, C, D, and E as a function of pool elevation and last 3-hour inflow.
Flood Zone D - Only minimum continuous release will ordinarily be made while Rome stage is above or expected to rise above 28 feet. However, if inflows are predicted to exceed flood control space before Rome has crested, powerhouse releases which are less than inflow may be made until either the stage at Rome has peaked or greater (surcharge) releases are required (see Flood Zone E). Once Rome has fallen below 28 feet, up to full channel capacity (about 9,500 cfs) will be discharged. The release of powerhouse capabilities (about 6,500 cfs) may follow if consideration of downstream conditions and expected weather conditions make this prudent.
Flood Zone C - Only minimum continuous release will ordinarily be made while Rome stage is above or expected to rise above 28 feet. However, if inflows are predicted to exceed flood control space before Rome has crested, powerhouse releases which are less than inflow may be made until either the stage at Rome has peaked or greater (surcharge) releases are required (see Flood Zone E). After Rome has receded below 25 feet, releases will be up to channel capacity (about 9,500 cfs). Generally, releases will be at turbine capacity (about 6,500 cfs). Scheduled peak power releases of less than 6,500 dsf/day may be used if the scheduled releases sufficiently lower the pool in light of expected weather conditions.
Flood Zone B - Only minimum continuous release will ordinarily be made while Rome stage is above or expected to rise above 25 feet. However, if inflows are predicted to exceed flood control space before Rome has crested, powerhouse releases which are less than inflow and do not violate the Rome 25 foot stage may be made until either the stage at Rome has peaked or greater (surcharge) releases are required (see Flood Zone E) to protect the structure. Floodwaters will be evacuated by regular scheduled hydropower releases which do not violate bankfull flows. Normally, the schedule will be to remove the floodwater within two weeks. A faster evacuation may be scheduled if additional rainfall is expected in the next several days.
Flood Zone A (lowest) - Only minimum continuous release will ordinarily be made while Rome stage is above or expected to rise above 25 feet. This zone has the least urgency for being evacuated. It is allowable to take several weeks to evacuate zone A. The pool is allowed to rise to elevation 842 feet NGVD29 in the summer weekends without releases above the minimum 240 cfs. During dry periods, water may be retained indefinitely in zone A as a precaution for possible droughts.

Table 7-4. Top of Flood Action Zone Elevations, Allatoona Lake

Date	Elevation (feet NGVD29)			
	Top of Zone A	Top of Zone B	Top of Zone C	Top of Zone D
1 Jan	827	834	840	844
28 Feb	835.47	837.91	840	844
31 Mar	840	840	842.04	846.70
1 May	842	842	844.02	849.30
1 Jun	842	842	846	852
30 Sep	842	842	846	852
1 Nov	839.1	839.1	842.35	851.82
20 Nov	835.27	837.49	840	848.44
15 Dec	830.23	835.36	840	844
31 Dec	827	834	840	844

a. Induced Surcharge Operations. If current pool levels and inflow rates indicate that runoff from a storm will appreciably exceed the storage capacity remaining below elevation 860 feet NGVD29; the flood risk management operation will be directed by the induced surcharge curves shown on Plate 7-3. Figure 7-1 provides guidance for initiating induced surcharge releases and Table 7-5 describes the operating procedures. This schedule follows the objectives set forth in EM 1110-2-3600 as follows:

1) Peak rate of reservoir release during damaging floods should not exceed peak rates of the corresponding floods that would have occurred under runoff conditions prevailing before construction of the reservoir.

2) The rate of increase in reservoir releases during significant increment of time should be limited to values that would not constitute a major hazard to downstream interests.

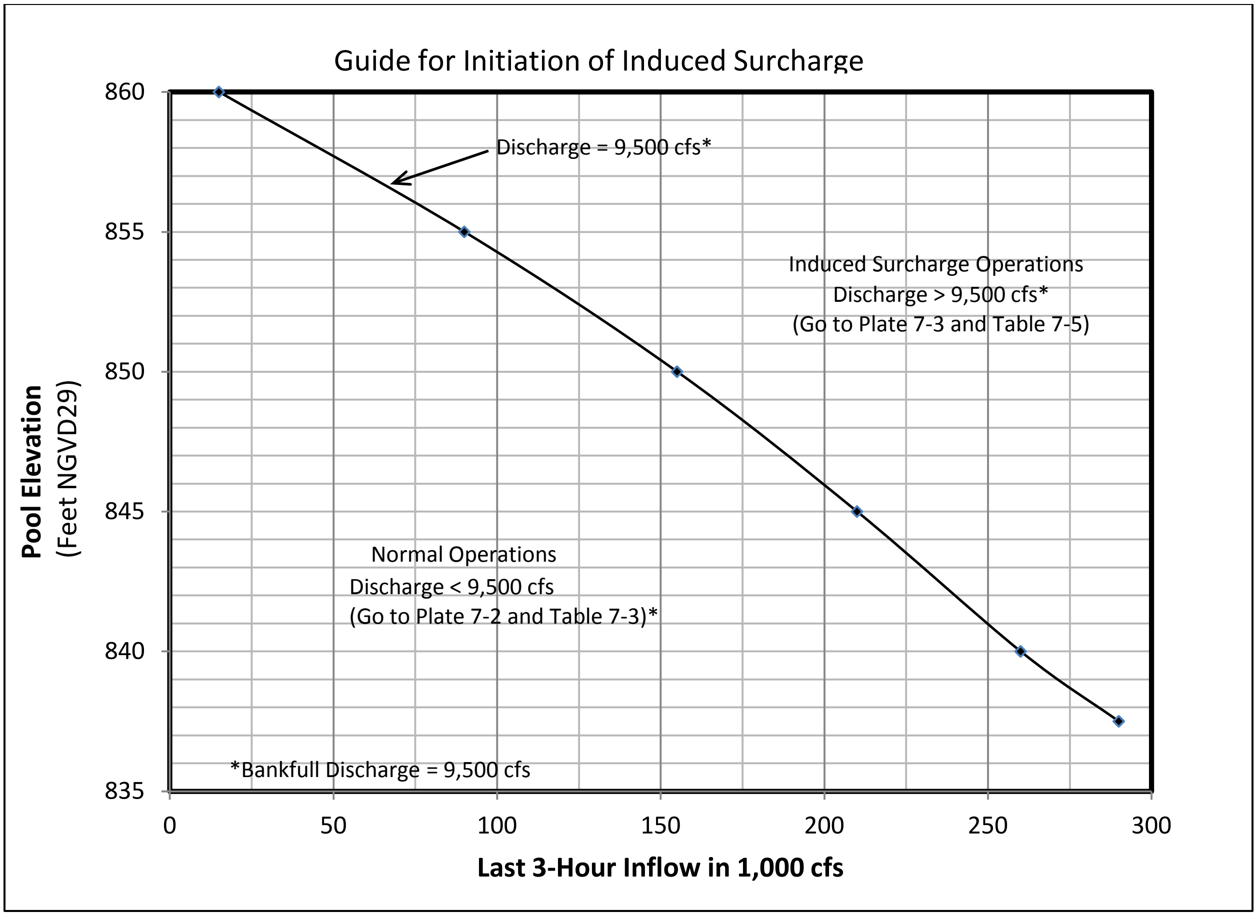


Figure 7-1. Guide for Initiation of Induced Surcharge

Table 7-5. Induced Surcharge Operating Instructions

(1) Follow regular flood risk management regulation schedule until larger releases are required by this schedule. When pool rises to 859.5 feet NGVD29, pass the inflow up to 9,500 cfs (channel capacity), unless larger releases are required by the surcharge schedule.

(2) Adjust the outflow each hour on the basis of the average inflow for the preceding 3 hours and the current reservoir elevations indicated by the curves. The 3-hour inflow may be increased if the forecasted inflows increase appreciably and would cause a flood wave downstream due to much higher releases in the next hour. Do not decrease gate settings as long as pool is rising.

(3) After the reservoir elevation starts to fall, maintain the current gate opening until the pool level recedes to elevation 859.5 feet NGVD29, then pass inflow or release at the maximum allowable rate under the regular flood risk management regulation schedule, whichever is greater. Normal operations should be followed once the inflow drops below 9,500 cfs.

(4) Discharge may be made through turbines and/or spillway. The two large turbines release a combined discharge of 6,500 cfs.

A lower outflow can be released in the earlier stages of the flood event if there is a possibility that the flood wave would create a hazard downstream; however, a release up to channel capacity of 9,500 cfs would be feasible before the actual use of the induced surcharge curve if weather and flow conditions indicate a need to postpone the rapid increase of discharge shown in the induced surcharge curve.

The gate operating machinery is provided with limit switches which will open gates in 0.5 foot increments up to a 12-foot opening. In following the induced surcharge schedule, the gates will be opened as uniformly as practicable with no gate opening more than 0.5 foot larger than any other gate opening.

An example of induced surcharge operations is the routing of the spillway design flood through the reservoir. This is shown on Plate 7-4. The maximum pool elevation is 872.1 feet NGVD29 as compared with 870.2 feet NGVD29 for the original induced surcharge plan and 868.4 feet NGVD29 for the constant pool operating plan. Special considerations of spillway gate openings after a probable maximum flood (PMF) are based upon concerns about the safety of Allatoona Dam. Under current induced surcharge operations, the last gate openings are maintained until pool levels recede to 859.5 feet NGVD29. Then, the greater of the inflow or the maximum allowable under the regular flood risk management schedule, are released.

The routing of another large flood, the Standard Project Flood, (SPF) is shown on Plate 7-5 and is an example of the induced surcharge operation which is less severe than the PMF. The SPF will exceed the maximum flood stage of 863 feet NGVD29 for buildings on Federal lands within Allatoona Lake.

Allatoona has only been in an induced surcharge operation one time since the project was constructed. This occurred in 1964 as a result of a series of floods with very little flood evacuation between the storms. The resulting pool level reached elevation 861.19 feet NGVD29. The April 1979, March 1990, and September 2009 floods are examples where induced surcharge operations were not used. The 16-18 March 1990, flood at Rome, Georgia, is a good example of the usage of the flood storage pool at the Allatoona Project to reduce flood damages downstream. The retention of the 40,700 cfs daily peak inflow into Allatoona Lake reduced the natural Rome, Georgia, river stage by seven feet and by 17 feet at Kingston, Georgia. The rainfall of 5.3 inches on 16-17 March 1990, and the storing of water within the Allatoona Lake resulted in the inflow exceeding the releases from 17-23 March 1990. The resulting Allatoona pool reached elevation 855.82 feet NGVD29 and induced surcharge operations were not used. To date, the maximum one-day inflow into Allatoona Lake was 53,534 cfs, which occurred on 21 September 2009. The second highest one-day inflow was 45,845 cfs, which occurred on 3 February 1982. Examples of project operation during flood events are shown on Plates 4-1 thru 4-8.

b. Instructions for Spillway Gates and Sluices. When it is necessary to release water other than through the turbines, the following instructions apply:

1) If pool is above elevation 835.0 feet NGVD29 (spillway crest), the discharge will be made preferably through spillway gates. Discharge uniformly across spillway (or as nearly so as possible) by setting gates so that no gate opening is more than 0.5 foot larger or smaller than any other gate opening. Gates will be opened in the following order: 11, 1, 6, 8, 4, 10, 2, 7, 5, 3, 9: this order of operation will be reversed when closing. Gates are numbered in order across the spillway commencing with number 1 adjacent to the powerhouse. The spillway gates will be operated in accordance with the gate regulation schedule to ensure that the top of the gates remain out of the water. The gate operating schedule is shown on Plate 7-6.

2) When the pool is above elevation 835.0 feet NGVD29 and the required discharge cannot be maintained through spillway gates, or if the pool is below elevation 835.0 feet NGVD29, it will be necessary to discharge through the sluices. The four, 5'-8"x 10'-0" sluices will be opened in steps not exceeding five feet so that no sluice is opened more than five feet until all sluices are opened that amount. The sluices may be operated in any order. Sluice outflow capacity is shown on Plate 2-9. Short-time releases of 11,200 cfs may be made using the sluice gate as long as the tailwater does not exceed elevation 697.0 feet NGVD29 or causes overtopping of the sump wall in the future Unit #3 draft tube.

Flood risk management operations at Allatoona Dam reduce peak stages of the Etowah River below the dam downstream to its confluence with the Oostanaula River at Rome, Georgia. Unless induced surcharge operations govern, which is rare, releases of stored flood waters will not be made until Rome, Georgia, stage falls below flood stage which can take several weeks. During that period, the threat of additional rainfall may delay some releases.

Flood level reductions at Rome are primarily affected by the Allatoona Project with the Carters Project usually providing incidental flood stage reductions at Rome, Georgia. The flood operation also provides assistance in the flood risk management operation at Weiss Dam on the Coosa River by reducing the inflow into that project. Weiss Dam is described in detail in Appendix B of the Alabama-Coosa River Basin Master Water Control Manual and Carters regulation is described in Appendix H.

The extent that Allatoona can provide protection from a given storm depends on the rainfall distribution and movement, storm centering and flood characteristics, and the elevation of Allatoona Lake at the beginning of the flood event. Local area storms tend to be better managed since the local runoff below Allatoona Dam will have flowed through Weiss Dam before the flood evacuation releases are required from Allatoona Dam.

The flood risk management storage between pool levels 840 and 860 feet NGVD29 (302,580 acre-feet or 5.11 inches of runoff) would completely control a flood equal to 40 percent of the standard project flood. If the initial Allatoona pool were at elevation 823 feet NGVD29 (467,280 acre-feet or 7.89 inches of runoff) a flood equal to 62 percent of the standard project flood could be completely controlled at the dam. Since the beginning of operations, the maximum one-day inflow of 53,534 cfs occurred on 21 September 2009. Effects of reservoir regulation on the September, 2009 flood are shown on Plates 4-7 and 4-8. The second highest one-day inflow was 45,845 cfs, which occurred on 3 February 1982.

The observed maximum pool was 861.19 feet NGVD29 on 10 April 1964. This maximum elevation was reached in part because of a series of floods that limited the flood evacuation releases. For floods larger than the April, 1964 event, there is always the possibility that the induced surcharge curve (high pool and inflows) would be required to pass large flows downstream. In such a case, the project would provide less than maximum flood risk management at Rome and there could be flood damages around the lake since many facilities have been built based upon the 863 feet NGVD29 level. Effects of reservoir regulation on the April 1964 flood are shown on Plates 4-1 and 4-2.

Flood records since 1891 indicate that the highest pool level that would have occurred before 1950 would have been elevation 860.3 feet NGVD29 in July 1916.

7-06. Recreation. Recreational activities are best served by maintaining a full conservation pool. Lake levels above top of conservation pool invade the camping and park sites. When the lake recedes several feet below the top of conservation pool, access to the water and beaches becomes limited. Water management personnel are aware of recreational effects caused by reservoir fluctuations and attempt to maintain reasonable lake levels, especially during the peak recreational use periods, but there are no specific requirements relative to maintaining recreational levels. Other project functions usually determine releases from the dam and the resulting lake levels. To classify recreation effects associated with conservation storage usage at Allatoona Lake, various impact levels have been identified. The impact levels are defined as pool elevations with associated effects on recreation facilities and exposure to hazards within the lake. The following are general descriptions of each impact level:

a. Initial Impact Level. The Initial Impact Level is defined at lake elevation 837.0 feet NGVD29. This is the elevation at which the recreational usage and recreation-related economy will begin to notice impact. Swimming areas will be reduced in size. Private docks will need adjusting and some boating hazards may become evident in some areas of the reservoir. Marina concessionaires will begin to need to move docks and water related business will decline.

b. Recreation Impact Level. The lake elevation of 835.0 feet NGVD29 is defined as the Recreation Impact Level. Recreation will be more severely affected at this level. All regular swimming areas will be exposed. Two boat ramps will be closed. Almost half of the private docks will be affected. Marina business will be severely reduced.

c. Water Access Impact Level. The lake elevation of 828.0 feet NGVD29 is defined as the Water Access Impact level. It is at this level that the most severe effects on recreation begin to occur. At this level, only half of boat ramps will be usable. Private docks will be totally unusable. Hazards to navigation will be numerous. Marinas will have severe problems such as gas docks being grounded and some slips being unusable. There will be reduction in recreational business activity.

The Water Control Plan takes the effects on recreation facilities into account in developing action zones for Allatoona Lake. In dry periods, the lake will often drop to or below the impact levels and Water Management personnel will keep the Operations Project Manager informed of projected pool levels through the district's weekly water management meetings. The Operations Project Manager will be responsible for contacting various lakeshore interests and keeping the public informed of lake conditions during drawdown periods. The Operations Project Manager will close beaches and boat ramps as necessary, patrol the lake, and mark hazards and perform other necessary tasks to mitigate the effects of low lake levels.

Many of the boat ramps become unusable as the lake level recedes. Table 7-6 lists end of ramp elevations for all boat ramps. Some work to extend and improve boat ramps has occurred when pool levels have been lowered during droughts, but much more work remains both by the Corps and local interests to retain lake access during periods of extreme drawdown.

Table 7-6. Elevation Where Boat Ramps Become Unusable

Public Ramps at Park Areas	Lowest ramp elevation at end of concrete	Public Ramps at Park Areas	Lowest ramp elevation at end of concrete
Allatoona Landing L&R	825.78	McKaskey	823.34
Bartow Carver	828.35	McKinney	822.75
Bartow C. Pk L	829.51	Old Hwy 41 #1 L	827.68
Bartow C. Pk R	822.01	Old Hwy 41 #1 R	822.43
Blockhouse L	812.79	Old Hwy 41 #3	828.83
Blockhouse C	816.39	Payne L	817.34
Blockhouse R	821.29	Payne C	821.36
Cherokee Co. Park	825.82	Payne R	830.39
Cherokee Mills L	819.04	Red Top Mtn. B/BR L	817.49
Cherokee Mills C	823.19	Red Top Mtn. B/BR R	822.39
Cherokee Mills R	818.84	Sweetwater Camp/G	831.00
Clark Creek L & R	825.53	Tanyard	832.14
Cooper Branch L&R	822.71	Upper Stamp Ck.	832.50
Dallas Rd	831.43	Stamp Ck. D/U L&R	818.74
Galts Ferry L	822.41	Victoria (New) L&R	832.72
Galts Ferry C&R	816.59	Victoria Old L	829.77
Holiday Marina	826.75	Victoria Old R	824.31
Glade Marina	821.74	Websters Ferry	821.79
Knox Bridge	830.8	Wilderness Camp L&R	821.34
Little River	823.9		

7-07. Water Quality. The minimum required continuous release from Allatoona Dam is 240 cfs. This minimum release is accomplished by operating the small turbine-generator unit continuously. If the small unit is out of service, a spillway gate or sluice gate will be opened or one of the main hydropower units will be operated to meet minimum flow requirements. During long periods of only minimum flow release, it is advisable to periodically release some water from the large turbines. Doing so will help the turbine-generators stay in good operating condition. Current leakage from the powerhouse amounts to about 40 to 60 cfs and is not included in the minimum releases through the turbines. The resultant total continuous flow from the project ranges from 280 to 300 cfs.

7-08. Fish and Wildlife. During the reproduction period for bass and crappie, the fluctuation of the pool will be limited to no more than one-half foot when practicable. The beginning and ending of the spawning season will be determined by Mobile District fishery biologists in cooperation with fish and game personnel from the State of Georgia and the U.S. Fish and Wildlife Service (USFWS).

15 March to 15 May is the expected timing for fish spawning at Allatoona Lake. The length of the spawning period depends on how rapidly temperatures increase after spawning begins, but in general, it varies from one to three weeks. During that period, the pool level should not be lowered more than six inches. Fish spawning operations are described in Division Regulation 1130-2-16, *Lake Regulation and Coordination for Fish Management Purpose*, dated 31 May 2010, and Mobile District's draft Standard Operating Procedure 1130-2-9, *Lake Reservoir Regulation and Coordination for Fish Management Purposes*, dated February 2005.

Operations for fish and wildlife do not supersede the normal operating procedure of maintaining the pool within the top of conservation. During a high-flow event, it might be necessary to decrease the pool by more than six inches to return the pool to within normal operating levels.

7-09. Water Supply. Under the authority of the Water Supply Act of 1958, the Corps has allocated storage in Allatoona Lake for municipal and industrial water supply by entering into contracts with two entities. The two entities that withdraw water from Allatoona Lake are the City of Cartersville, Georgia, under contracts DACW01-67-RE-002 (dated 12 July 1966) and DACW01-9-91-120 (dated 18 October 1991) and the Cobb County-Marietta Water Authority (CCMWA) under contract DA-01-076-CIVENG-64-116 (dated 10 October 1963). The City of Cartersville contracts provide for the use of a total of 2.24% (or 6,371 acre-feet) of the 284,580 acre-feet conservation storage (between 800 feet – 840 feet NGVD29) at Allatoona Lake (noted as 285,000 acre-feet in the contract) with an expected yield of 16.76 mgd. The CCMWA contract provides for the use of a total of 4.61% (or 13,140 acre-feet) of the 284,580 acre-feet conservation storage (between 800 feet – 840 feet NGVD29) at Allatoona Lake (noted as 285,000 acre-feet in the contract) with an expected yield of 34.5 mgd. The amounts of storage stated in these contracts were estimated, at the time the contracts were executed, to yield 16.76 mgd, and 34.5 mgd, respectively, during the critical drought, i.e., during the worst drought on record at the time the agreements were executed. The severity and frequency of droughts change over time, however, and more recent storage-yield analysis by the Corps has indicated that the estimated yield of Allatoona Lake storage has decreased.

For the purpose of managing water supply storage, the Mobile District has employed a storage accounting methodology that tracks multiple storage accounts, applying a proportion of inflows and losses, as well as direct withdrawals by specific users, to each account. The amount of water that may actually be withdrawn is ultimately dependent on the amount of water available in storage, which will naturally change over time.

Below are the state permitted withdrawals and contracted amounts.

Entity	State Permit	Contract Amount/Expected Yield
Cartersville	18 mgd	6,371 acre-feet/16.76 mgd
CCMWA	78 mgd	13,140 acre-feet/34.5 mgd

The necessary data to determine water supply storage availability is received daily, with computations performed weekly during normal conditions, and daily under extreme drought conditions. This accounting is especially critical during drought, when available water supply storage is reduced and conservation measures or alternative sources may be necessary. The formula used to calculate water supply storage is shown below:

Ending Storage = Beginning Storage + Inflow Share – Loss Share – User's Usage.
(with constraint that "Ending Storage" cannot be larger than User's total storage)

The conservation pool is drawn down as water usage exceeds inflow. The entire pool is drawn down and the individual accounts are also drawn down at different rates based on their usage. Users will be notified on a weekly basis of the available storage remaining, once their storage account balance drops below 30 percent.

7-10. Hydroelectric Power. The Allatoona Project is generally operated as a peaking plant for producing hydroelectric power, and, during off-peak periods, maintains a continuous flow of 240 cfs. The starting and stopping of hydropower turbines at Allatoona Dam is controlled remotely from the Carters Powerhouse. The Allatoona Project is manned with minimum personnel needed for maintenance and emergency operations. Provisions are made to operate the project on site should control or communications equipment be inoperative.

Reservoir releases required for conservation, or flood risk management operations in Sections 7-03 through 7-09 will normally be used to produce hydropower. Such production is scheduled during peak energy demand hours throughout the week. Additional hydropower can be supplied according to the reservoir's zone. Table 7-2 describes the typical number of hours for hydropower production. Historical hydropower production is shown on Plates 2-12 and 2-13. Actual monthly and annual production is tabulated. The average annual production from 1961 through 2013 is 154,534 megawatt hours (MWH). The annual production ranged from a low of about 51,820 MWH in 2007 to a high of about 240,005 in 1973.

Energy generated at Allatoona Dam is delivered to SEPA to be marketed to the government's preference customers under terms of contracts negotiated and administered by SEPA. The generation (and water release) is based on a declaration of energy and capacity available that is prepared weekly by the Mobile District on the basis of the overall ACT water control plan. The declarations, which are designed to keep the pools within the established seasonal and pondage limits, where practicable, are prepared by the Water Management Section of the Mobile District and furnished to the South Atlantic Division (SAD) office for coordination of the hydropower projects within the Alabama-Georgia-South Carolina Power Marketing System. Actual daily and hourly scheduling of generation is coordinated by the Water Management Section, SEPA, and the hydropower customers. Local restraints can dictate generation during certain hours.

The weekly power declaration may be modified by the Mobile District during the week. Special emergency requirements for downstream flow for structural stability, water quality emergencies or other reasons can usually be met by quickly arranged powerhouse releases. However, when a powerhouse release cannot be arranged, spillway releases can be made to meet the requirement.

In addition to the weekly declaration, the Water Management Section periodically prepares extended forecasts for all the hydropower plants in the Mobile District. Interactive weekly forecasting is often done to project operations for the coming weeks to determine generation and downstream flow support that is consistent with the ACT water control plan. The extended forecast is usually prepared weekly and is intended for use as a guide to determine where and when any problem might be developing in the system and to assist in making the weekly power declaration.

7-11. Navigation. Navigation is an authorized purpose of the Federal ACT System, and navigational flows were taken into account in updating the manual, including updating Allatoona operations. Due to the intervening APC projects, there are no specific reservoir regulation requirements to support navigation at Allatoona Dam. However, the seasonal variation in reservoir storage does redistribute downstream flows and other operations at Allatoona provide a benefit to downstream navigation.

7-12. Drought Contingency Plan. ER 1110-2-1941, *Drought Contingency Plans*, dated 15 September 1981, called for developing drought contingency plans for Corps' reservoirs. For the Allatoona Project, the Corps will coordinate water management during drought with other Federal agencies, private power companies, navigation interests, the states, and other interested state and local parties as necessary. Drought operations will be in compliance with the plan for the entire ACT Basin as outlined in Exhibit D, and summarized below. The plan includes operating guidelines for drought conditions and normal conditions.

In response to the 2006 - 2008 drought, APC worked closely with the State of Alabama to develop the APC draft *Alabama Drought Operations Plan* (ADROP) that specified operations at APC projects on the Coosa and Tallapoosa Rivers. The plan included the use of composite system storage, state line flows, and basin inflow as triggers to drive drought response actions. Similarly, in response to the 2006 - 2008 drought, the Corps recognized that a basin-wide drought plan must incorporate variable hydropower generation requirements from its headwater projects in Georgia (Allatoona Lake and Carters Lake), a reduction in the level of navigation service provided on the Alabama River as storage across the basin declines, and that environmental flow requirements must still be met to the maximum extent practicable.

Based upon experience gained during previous droughts, and in particular the 2006 - 2008 drought, a basin-wide drought plan composed of three components - headwater operations at Allatoona Lake and Carters Lake in Georgia; operations at APC projects on the Coosa and Tallapoosa Rivers; and downstream operations at Corps projects below Montgomery, Alabama, has been developed. The concept is graphically depicted in Figure 7-2 with the specifics shown on Table 7-7.

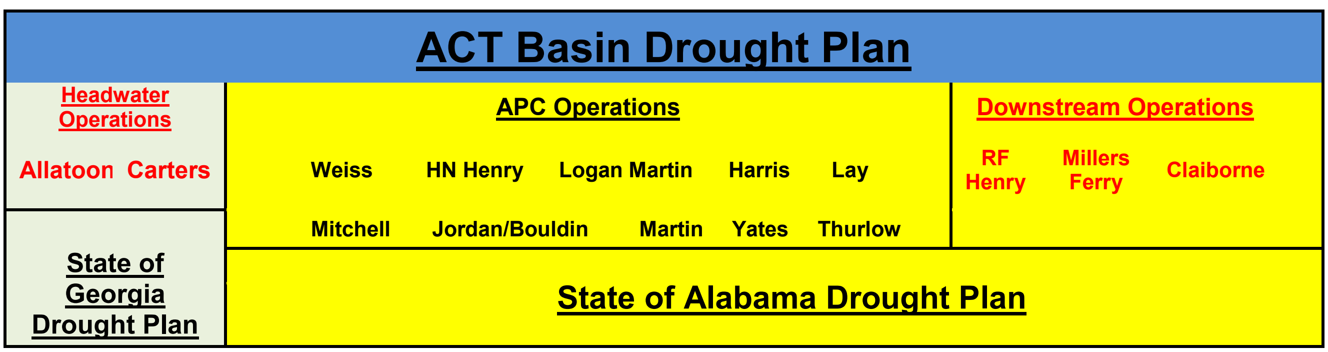


Figure 7-2. Schematic of the ACT Basin Drought Plan

a. Headwater Operations for Drought at Allatoona Lake and Carters Lake. Drought operations at Carters Lake and Allatoona Lake consist of progressively reduced hydropower generation as pool levels decline. For instance, when Allatoona Lake is operating in normal conditions (Zone 1 operations), hydropower generation would be zero to four hours per day. However, as the pool drops to lower action zones during drought conditions, generation would be reduced to zero to two hours per day. As Carters Lake pool level drops into Zone 2, minimum target flows would be reduced from seasonal varying values to 240 cfs.

b. Operations at APC Projects on the Coosa, Tallapoosa, and Alabama Rivers. Under current operations, APC provides a combined minimum flow of 4,640 cfs (seven-day average) from the Bouldin, Jordan, and Thurlow Projects on the Tallapoosa and Coosa Rivers. The minimum flow target of 4,640 cfs was originally derived from the 7Q10 flow at Claiborne Lake of 6,600 cfs. Those flows were established with the understanding that if APC provided 4,640 cfs, the Corps and intervening basin inflow would be able to provide the remaining water to meet 6,600 cfs at Claiborne Lake. However, as dry conditions continued in 2007, water managers realized that, if the basin inflows from rainfall were insufficient, the minimum flow target would not likely be achievable. Therefore, in coordination with APC, drought operations for the middle reaches of the ACT Basin have been revised and are described below.

The ADROP served as the initial template for developing proposed drought operations for the APC Drought Operation Plan (APCDOP) and ACT Basin. APCDOP operational guidelines for the Coosa, Tallapoosa, and Alabama Rivers have been defined in a matrix, on the basis of a Drought Intensity Level (DIL). The DIL is a drought indicator, ranging from one to three. The DIL is determined on the basis of three basin drought criteria (or triggers). The DIL increases as more of the drought indicator thresholds (or triggers) occur. The APCDOP matrix defines monthly minimum flow requirements for the Coosa, Tallapoosa, and Alabama Rivers as a function of DIL and time of year. Such flow requirements are modeled as daily averages.

The combined occurrences of the drought triggers determine the DIL. Three intensity levels for drought operations are applicable to APC projects.

- DIL1 - (moderate drought) one of three triggers occur
- DIL2 - (severe drought) two of three triggers occur
- DIL3 - (exceptional drought) all three triggers occur

Table 7-7. ACT Basin Drought Management Matrix

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Drought Level Response[a]	Normal Operations											
	DIL 1: Low Basin Inflows or Low Composite or Low State Line Flow											
	DIL 2: DIL 1 criteria + (Low Basin Inflows or Low Composite or Low State Line Flow)											
	DIL 3: Low Basin Inflows + Low Composite + Low State Line Flow											
Coosa River Flow[b]	Normal Operation: 2,000 cfs			4,000 (8,000)		4,000 – 2,000	Normal Operation: 2,000 cfs					
	Jordan 2,000 +/-cfs			4,000 +/- cfs		6/15 Linear Ramp down	Jordan 2,000 +/-cfs			Jordan 2,000 +/-cfs		
	Jordan 1,600 to 2,000 +/-cfs			2,500 +/- cfs		6/15 Linear Ramp down	Jordan 2,000 +/-cfs			Jordan 1,600 to 2,000 +/-cfs		
	Jordan 1,600 +/-cfs			Jordan 1,600 to 2,000 +/-cfs			Jordan 2,000 +/-cfs			Jordan 1,600 to 2,000 +/-cfs		Jordan 1,600 +/- cfs
Tallapoosa River Flow[c]	Normal Operations: 1200 cfs											
	Greater of: 1/2 Yates Inflow or 2 x Heflin Gage(Thurlow Lake releases > 350 cfs)				1/2 Yates Inflow					1/2 Yates Inflow		
	Thurlow Lake 350 cfs				1/2 Yates Inflow					Thurlow Lake 350 cfs		
	Maintain 400 cfs at Montgomery WTP (Thurlow Lake release 350 cfs)						Thurlow Lake 350 cfs			Maintain 400 cfs at Montgomery WTP (Thurlow Lake release 350 cfs)		
Alabama River Flow[d]	Normal Operation: Navigation or 7Q10 flow											
	4,200 cfs (10% 7Q10 Cut) - Montgomery				7Q10 - Montgomery (4,640 cfs)					Reduce: Full – 4,200 cfs		
	3,700 cfs (20% 7Q10 Cut) - Montgomery					4,200 cfs (10% 7Q10 Cut) - Montgomery				Reduce: 4,200 cfs-> 3,700 cfs Montgomery (1 week ramp)		
	2,000 cfs Montgomery				3,700 cfs Montgomery		4,200 cfs (10% 7Q10 Cut) - Montgomery			Reduce: 4,200 cfs -> 2,000 cfs Montgomery (1 month ramp)		
Guide Curve Elevation	Normal Operations: Elevations follow Guide Curves as prescribed in License (Measured in Feet)											
	Corps Variances: As Needed; FERC Variance for Lake Martin											
	Corps Variances: As Needed; FERC Variance for Lake Martin											
	Corps Variances: As Needed; FERC Variance for Lake Martin											

a. Note these are base flows that will be exceeded when possible.
b. Jordan flows are based on a continuous +/- 5% of target flow.
c. Thurlow Lake flows are based on continuous +/- 5% of target flow: flows are reset on noon each Tuesday based on the prior day's daily average at Heflin or Yates. d. Alabama River flows are 7-Day Average Flow.

The indicators used in the APCDOP to determine drought intensity include the following:

1. Low basin inflow
2. Low state line flow
3. Low composite conservation storage

Each of the indicators is described in detail below.

The DIL is computed on the first and third Tuesday of each month. Once a drought operation is triggered, the DIL can only recover from drought condition at a rate of one level per period. For example, as the system begins to recover from an exceptional drought with DIL=3, the DIL must be stepped incrementally back to zero to resume normal operations. In that case, even if the system triggers return to normal quickly, it will still take at least a month before normal operations can resume - conditions can improve only to DIL=2 for the next 15 days, then DIL=1 for the next 15 days, before finally returning to normal operations.

For normal operations, the matrix shows a Coosa River flow between 2,000 cfs and 4,000 cfs with peaking periods up to 8,000 cfs occurring. The required flow on the Tallapoosa River is a constant 1,200 cfs throughout the year. The navigation flows on the Alabama River are applied to the APC projects. The required navigation depth on the Alabama River is subject to the basin inflow.

For DIL=1, the Coosa River flow varies from 2,000 cfs to 4,000 cfs. On the Tallapoosa River, part of the year, the required flow is the greater of one-half of the inflow into Yates Lake and twice the Heflin USGS gage. For the remainder of the year, the required flow is one-half of Yates Lake inflow. The required flows on the Alabama River are reduced from the amounts when DIL=0.

For DIL=2, the Coosa River flow varies from 1,800 cfs to 2,500 cfs. On the Tallapoosa River, the minimum is 350 cfs for part of the year and one-half of Yates Lake inflow for the remainder of the year. The requirement on the Alabama River is between 3,700 cfs and 4,200 cfs.

For DIL=3, the flows on the Coosa River range from 1,600 cfs to 2,000 cfs. A constant flow of 350 cfs on the Tallapoosa River is required. It is assumed an additional 50 cfs will occur between Thurlow Lake and the city of Montgomery’s water supply intake. Required flows on the Alabama River range from 2,000 cfs to 4,200 cfs

In addition to the APCDOP, the DIL affects the navigation operations. During normal operating conditions, APC projects are operated to meet the navigation flow target or 4,640 cfs, whichever is greater. Once DIL is greater or equal to one, drought operations will occur, and navigation operations are suspended.

c. <u>Low Basin Inflow Trigger</u>. The total basin inflow needed for navigation is the sum of the total filling volume plus 4,640 cfs. Table 7-8 lists the monthly low basin inflow criteria. All numbers are in cfs-days. The basin inflow value is computed daily and checked on the first and third Tuesday of the month. If computed basin inflow is less than the value required, the low basin inflow indicator is triggered.

The basin inflow is the total flow above the APC projects excluding Allatoona Lake and Carters Lake. It is the sum of local flows, minus lake evaporation and diversions. Figure 7-3 illustrates the local inflows to the Coosa and Tallapoosa River Basin. The basin inflow computation differs from the navigation basin inflow, because it does not include releases from Allatoona Lake and Carters Lake. The intent is to capture the hydrologic condition across APC projects in the Coosa and Tallapoosa Basins.

Table 7-8. Low Basin Inflow Guide (in cfs-days)

Month	Coosa Filling Volume	Tallapoosa Filling Volume	Total Filling Volume	Minimum JBT Target Flow	Required Basin Inflow
Jan	628	0	628	4,640	5,268
Feb	626	1,968	2,594	4,640	7,234
Mar	603	2,900	3,503	4,640	8,143
Apr	1,683	2,585	4,269	4,640	8,909
May	248	0	248	4,640	4,888
Jun			0	4,640	4,640
Jul			0	4,640	4,640
Aug			0	4,640	4,640
Sep	–612	–1,304	–1,916	4,640	2,724
Oct	–1,371	–2,132	–3,503	4,640	1,137
Nov	–920	–2,748	–3,667	4,640	973
Dec	–821	–1,126	–1,946	4,640	2,694

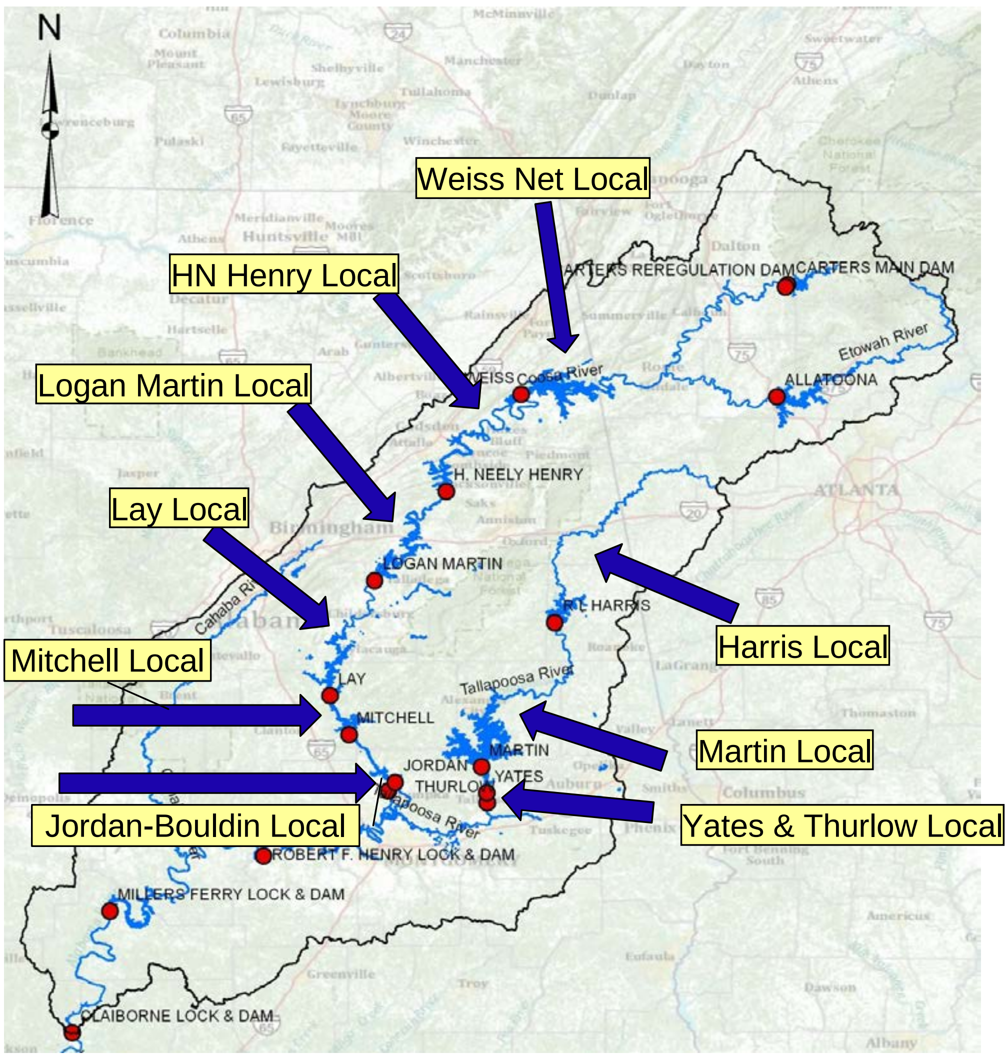


Figure 7-3. ACT Basin Inflows

d. Low State Line Flow Trigger. A low state line flow trigger occurs when the Mayo's Bar USGS gage measures a flow below the monthly historical 7Q10 flow. The 7Q10 flow is defined as the lowest flow over a seven-day period that would occur once in 10 years. Table 7-8 lists the Mayo's Bar 7Q10 value for each month based on flows from 1949 - 2006. The lowest seven-day average flow over the past 14 days is computed and checked at the first and third Tuesday of the month. If the lowest seven-day average value is less than the Mayo's Bar 7Q10 value, the low state line flow indicator is triggered. If the result is greater than or equal to the trigger value from Table 7-9, the flow is considered normal, and the state line flow indicator is not triggered.

The term *state line flow* is used in developing the drought management plan because of the proximity of the Mayo's Bar gage to the Alabama-Georgia state line and because it relates to flow data upstream of the Alabama-based APC reservoirs. State line flow is used only as a source of observed data for one of the three triggers and does not imply that *targets* exist at that geographic location. The APCDOP does not include or imply any Corps operation that would result in water management decisions at Carters Lake or Allatoona Lake.

Table 7-9. APC Drought Operations Plan - State Line Flow Trigger

Month	**Mayo's Bar (7Q10 in cfs)**
Jan	2,544
Feb	2,982
Mar	3,258
Apr	2,911
May	2,497
Jun	2,153
Jul	1,693
Aug	1,601
Sep	1,406
Oct	1,325
Nov	1,608
Dec	2,043

Note: Based on USGS Coosa River at Rome Gage
(Mayo's Bar, USGS 02397000) observed flow from 1949 to 2006

e. Low Composite Conservation Storage in APC Projects Trigger. Low composite conservation storage occurs when the APC projects' composite conservation storage is less than or equal to the storage available within the drought contingency curves for the APC reservoirs. Composite conservation storage is the sum of the amounts of storage available at the current elevation for each reservoir down to the drought contingency curve at each APC major storage project. The reservoirs considered for the trigger are R. L. Harris Lake, H. Neely Henry Lake, Logan Martin Lake, Lake Martin, and Weiss Lake Projects. Figure 7-4 plots the APC composite zones. Figure 7-5 plots the APC low composite conservation storage trigger.

If the actual active composite conservation storage is less than or equal to the active composite drought zone storage, the low composite conservation storage indicator is triggered.

The computation is performed on the first and third Tuesday of each month, and is compared to the low state line flow trigger and basin inflow trigger.

APC has two additional guide curves; the drought contingency curve and the operating inactive curve. The drought contingency curve is used to trigger drought operation at the project and is a component of the Low Composite Storage Trigger. The operational inactive curve reflects the level of storage required to support an APC system limit for 12 hours of hydropower generation needed for system reliability (black start operations). While these curves are not labeled as action zones, they have a similar purpose.

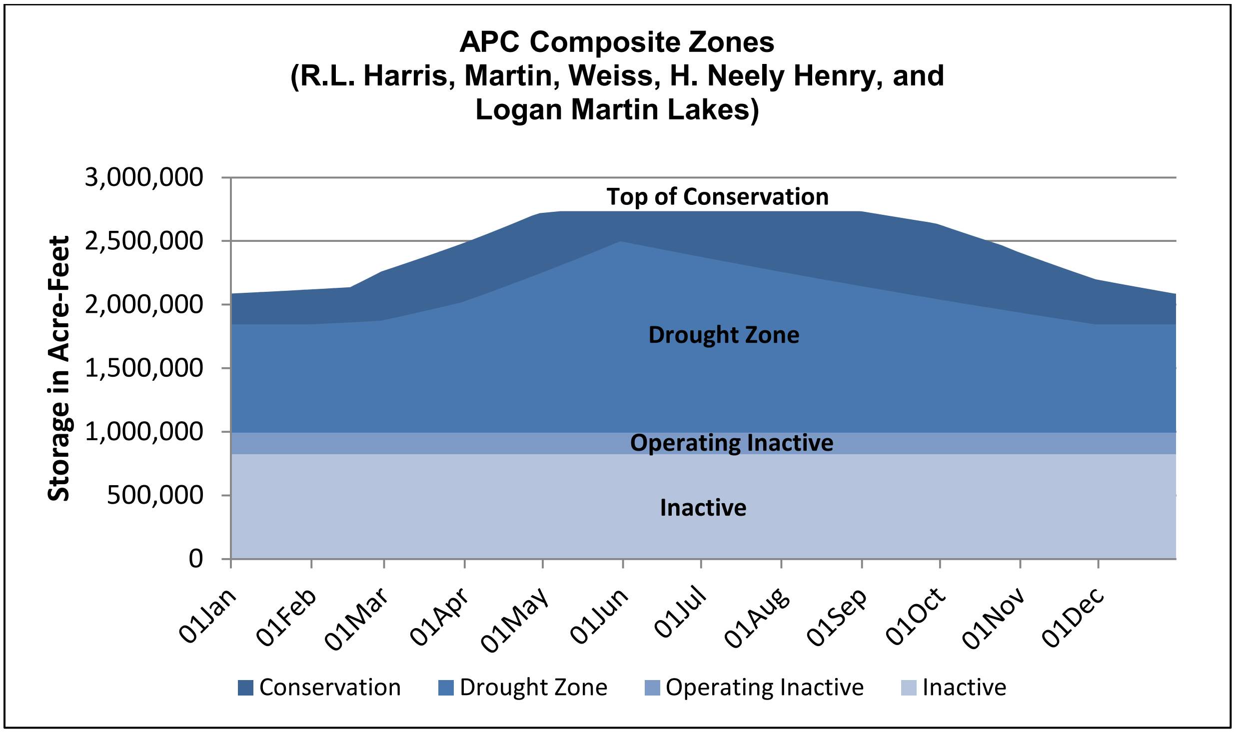


Figure 7-4. APC Composite Zones

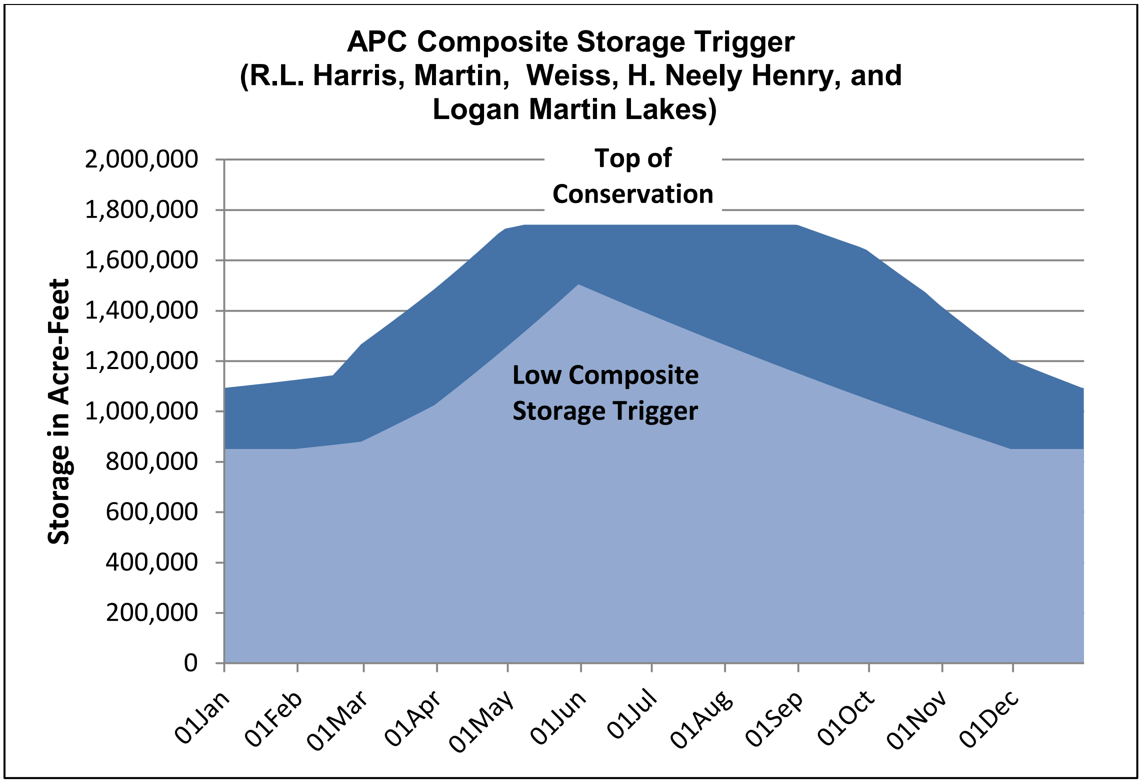


Figure 7-5. APC Low Composite Conservation Storage Drought Trigger

f. Operations for Corps Projects Downstream of Montgomery. Drought operations of the Corps' Alabama River projects (R.E. "Bob" Woodruff Lake [Robert F. Henry Lock and Dam], and William "Bill" Dannelly Lake [Millers Ferry Lock and Dam]) will respond to drought operation of the APC projects. When combined releases from the APC Bouldin, Jordan, and Thurlow Projects are reduced to 4,640 cfs, the Corps' Alabama River projects will operate to maintain a minimum flow of 6,600 cfs below Claiborne Lake. When the APCDOP requires flows less than 4,640 cfs, the minimum flow at Claiborne Lake is equal to the inflow into Millers Ferry Lock and Dam. There is inadequate storage in the Alabama River projects to sustain 6,600 cfs, when combined releases from the APC projects are less than 4,640 cfs.

g. Summary of Potential Drought Management Measures. Management measures developed for ACT Basin-wide drought operations consist of three major components:

- Headwater operations at Allatoona Lake and Carters Lake in Georgia
- Operations at APC projects on the Coosa and Tallapoosa Rivers
- Operations at Corps projects downstream of Montgomery

7-13. Flood Emergency Action Plans. The Corps is responsible for developing Flood Emergency Action Plans for the ACT System. The plans are included in the Operations and Maintenance Manuals for each system project. Example data available include emergency contact information and flood inundation information.

7-14. Other. Other considerations than just serving the authorized project purposes must be served from the basin as needed. Adjustments are made to system regulation at times for downstream construction, to aid in rescue or recovery from drowning accidents, environmental studies, or cultural resource investigation.

a. Regulation during Low Flows. There is a 240 cfs minimum release requirement at the Allatoona Project. With normal seepage from the project, the actual minimum flow released to meeting the minimum flow is around 300 cfs.

b. Correlation with Other Projects. Weiss Dam below Rome, Georgia, the levee system in the Rome area, and Carters Dam above Rome are affected in varying degrees by operations at Allatoona Dam. Flood risk management operations at Allatoona, Carters and Weiss Dams during the rising phase of a flood will normally be independent of each other. Following a flood, the emptying of flood storage at Allatoona may prolong the time required to evacuate flood storage at Weiss Dam. Allatoona releases will be made so as to minimize any undesirable conditions that might be created by the emptying operation and maintain its flood risk management objective at Rome. The Corps and APC have established regular and rapid exchange of data concerning the two projects to ensure the fullest coordination of operations.

The levee system at Rome, Georgia was built by the Corps for the protection of the Fourth Ward in Rome and the floodplain area north of the Coosa and west of the Oostanaula Rivers. The top of the levee is at elevation 605 feet NGVD29, corresponding to a stage of 43.3 feet on the NWS gage at the 5th Avenue Bridge across the Oostanaula River. Since flow from Allatoona Dam will ordinarily be curtailed whenever a stage of 25 feet or higher is expected, close coordination between outflows from the Allatoona and Carters Projects is required. As a general rule, the Allatoona flood inflows will be stored longer than the Carters flood inflows because Allatoona has a larger flood risk management storage and a shorter routing time to Rome, Georgia.

A major thermal-electric generating facility is located on the Etowah River near Euharlee, Georgia, about 16 miles downstream of Allatoona Lake. Plant Bowen generates a large portion of the power supply of Georgia. The Etowah River is the source of cooling water for the plant and during very dry periods, water releases from Allatoona may be necessary to assure sufficient flow in the Etowah River to allow for cooling water withdrawals. Under extreme low flow conditions, hydropower operations may be made over a 7-day period to keep Rome, Georgia Etowah River water intake submerged over the weekend

7-15. Deviation From Normal Regulation. The District Commander is occasionally requested to deviate from normal regulation. Prior approval for a deviation is required from the Division Engineer except as noted in subparagraph a below.

Deviation requests usually fall into the following categories:

a. Emergencies. Examples of some emergencies that can be expected to occur at a project are drowning and other accidents, failure of the operation facilities, chemical spills, treatment plant failures and other temporary pollution problems. Water control actions necessary to abate the problem are taken immediately unless such action would create equal or worse conditions. The Mobile District will notify the SAD office as soon as practicable.

b. Declared System Emergency. A Declared System Emergency can occur when there is a sudden loss of power within the electrical grid and there is an immediate need of additional power generation capability to meet the load on the system. In the Mobile District, a system emergency can be declared by the Southern Company or the Southeastern Power Administration’s Operation Center. Once a system emergency has been declared, the requester will contact the project operator and request generation support. The project operator will then lend immediate assistance within the projects operating capabilities. Once support has been given, the project operator should inform the Mobile District Office immediately. The responsibilities and procedures for a Declared System Emergency are discussed in more detail in Division Regulation Number 1130-13-1, *Hydropower Operations and Maintenance Policies*. It is the responsibility of the District Hydropower Section and the Water Management Section to notify SAD Operations Branch of the declared emergency. The Division Operations Branch should then coordinate with SEPA, District Water Management, and the District Hydropower section on any further actions needed to meet the needs of the declared emergency.

c. Unplanned Deviations. Unplanned instances can create a temporary need for deviations from the normal regulation plan. Unplanned deviations may be classified as either major or minor but do not fall into the category of emergency deviations. Construction accounts for many of the minor deviations and typical examples include utility stream crossings, bridge work, and major construction contracts. Minor deviations can also be necessary to carry out maintenance and inspection of facilities. The possibility of the need for a major deviation mostly occurs during extreme flood events. Requests for changes in release rates generally involve periods ranging from a few hours to a few days, with each request being analyzed on its own merits. In evaluating the proposed deviation, consideration must be given to impacts on project and system purposes, upstream watershed conditions, potential flood threat, project condition, and alternative measures that can be taken. Approval for unplanned deviations, either major or minor, will be obtained from the Division Office by telephone or electronic mail prior to implementation.

d. Planned Deviations. Each condition should be analyzed on its merits. Sufficient data on flood potential, lake and watershed conditions, possible alternative measures, benefits to be expected, and probable effects on other authorized and useful purposes, together with the district recommendation, will be presented by letter or electronic mail to SAD for review and approval.

7-16. Rate of Release Change. Gradual changes are important when releases are being decreased and downstream conditions are very wet, resulting in saturated riverbank conditions. The Corps acknowledges that a significant reduction in basin releases over a short period can result in some bank sloughing, and release changes are scheduled accordingly when a slower rate of change does not significantly affect downstream flood risk. Overall, the effect of basin regulation on streambank erosion has been reduced by the regulation of the basin because higher peak-runoff flows into the basin are captured and metered out more slowly.

VIII - EFFECT OF WATER CONTROL PLAN

8-01. General. Allatoona Dam and Lake was authorized as part of the general plan for the full development of the ACT River Basin as described in House Document No. 674, 76th Congress, 3rd Session, published in 1940. That report recommended the construction of Allatoona Dam and Reservoir as a multipurpose project including flood control, hydropower, and navigation. Along with the purposes specified in its authorizing documents, several other project purposes have been authorized at Allatoona through other congressional legislation including recreation, fish and wildlife conservation, water quality, and municipal and industrial (M&I) water supply.

The impacts of the *ACT Master Water Control Manual* and its Appendices, including this water control manual have been fully evaluated in an Environmental Impact Statement (EIS) that was published on November 2014. A Record of Decision (ROD) for the action was signed on May 2015. During the preparation of the EIS, a review of all direct, secondary and cumulative impacts was made. As detailed in the EIS, the decision to prepare the Water Control Manual and the potential impacts was coordinated with Federal and State agencies, environmental organizations, Indian tribes, and other stakeholder groups and individuals having an interest in the basin. The ROD and EIS are public documents and references to their accessible locations are available upon request.

8-02. Flood Risk Management. One of the major benefits of the water control operations at the Allatoona Project is flood risk management. Allatoona Lake contains storage space in which flood water is stored and later released in moderate amounts to prevent downstream flooding. During most years, one or more flood events occur in the ACT Basin. While most of those events are of minor significance, on occasion, major storms produce widespread flooding or unusually high river stages. Major flooding has occurred in April 1964 (reached maximum pool elevation of record of 861.19 feet NGVD29), April 1979, March 1990, and September 2009. Flood risk management operations at Allatoona Dam reduce the peak stages of the Etowah River below the dam downstream to its confluence with the Oostanaula River at Rome, Georgia. While those four floods also resulted in considerable damage, a total of more than $169 million in estimated damages was prevented by Allatoona Lake from all flooding events between 1986 and 2013 as a result of flood risk management operations.

a. <u>Spillway Design Flood</u>. Spillway Design Floods (SDF) is the criteria used by the Corps to design the spillway on a dam to prevent its overtopping due to the occurrence of an extremely rare flood event. The basis of the SDF is the Probable Maximum Precipitation (PMP) defined in the National Weather Service Hydrometeorological Report Nos. 51 and 52. The SDF total rainfall was 30.7 inches with a total storm runoff of 25.3 inches. The pattern was computed by centering the hypothetical storm over the drainage area above the dam site to get the largest runoff at the dam site. The SDF is not assigned a frequency of occurrence. The PMP was started with the pool at elevation 859.5 feet NGVD29 with only the spillway gates being used to pass inflows. After the pool starts to fall, the gate openings are maintained until the pool reaches elevation 859.5 feet NGVD29. At that point, the outflows are gradually reduced until the channel capacity of 9,500 cfs is reached. The SDF has a peak pool elevation of 872.1 feet NGVD29 feet with a maximum inflow and discharge of 382,000 and 333,000 cfs. This elevation is 37.1 feet above the crest of the spillway at elevation 835.0 feet NGVD29 and 7.9 feet below the top of the dam at elevation 880.0 feet NGVD29. Effects of reservoir regulation on the spillway design flood are shown on Plate 7-4.

b. <u>Standard Project Flood</u>. The Standard Project Flood (SPF) is a theoretical flood, based on rainfall criteria, that would be reasonably possible and has been used in hydrologic analyses of reservoirs and river reaches. The basis of the SPF is one-half of the flow of the Spillway Design Flood. Perhaps, one could use one half of the PMP total rainfall and runoff for an estimate of the SPF rainfall and runoff amounts. The routing of the SPF assumes a normal flood risk management operation in which flood waters are retained and discharged as downstream channel capacity permits. A large flood was assumed to have occurred a week before the SPF. Thus, surcharge releases would occur early in the SPF. The SPF is not assigned a frequency of occurrence and is only used as a comparison in any discharge-frequency analysis. The SPF has a peak inflow of 183,700 cfs and produces a pool elevation of 864.7 feet NGVD29. The maximum discharge is 180,000 cfs. This pool elevation is 29.1 feet above the crest of the spillway at elevation 835.0 feet NGVD29 and 15.9 feet below the top of the dam at elevation 880.0 feet NGVD29. Maximum flows at Cartersville, Kingston, and Rome (GA 1 Loop) gages would be near 192,000 cfs. The antecedent flood added 6,000 cfs to the baseflow of the SPF and started the pool at elevation 854.0 feet NGVD29. The effects of reservoir regulation on the SPF are depicted on Plate 7-5. Table 8-1 presents data for both the SDF and the SPF floods. In Table 8-1, natural flows are those flows that would occur without the presence of Allatoona Dam. The reservoir inflows account for the presence of the dam and reservoir. These flows are slightly higher because the reservoir is an impervious surface and increases the amount of run-off measured at the dam site.

Table 8-1. Design Floods

Design floods							
Flood Event	Natural Inflow	Reservoir Inflow	Reservoir Outflow	Pool Elevation	Cartersville Flow	Kingston Flow	Rome Flow
Spillway Design	280,000	382,000	333,000	872.1	342,000	343,000	345,000
Standard Project	140,000	184,000	180,000	864.7	192,000	192,000	192,000

c. Historic Floods. Significant floods occurred in April 1964, April 1979, March 1990 and September 2009. Effects of flood risk management operations for three of these floods are shown in Table 8-2. The effects of reservoir regulation on the 1964, 1979, 1990, and 2009 floods are shown on Plates 4-1 through 4-8.

Table 8-2. Historic Floods

Historic Floods							
Allatoona		Cartersville		Kingston		Rome	
Peak Inflow (cfs)	Peak outflow (cfs)	Observed Stage Feet	Natural Stage Feet	Observed Stage Feet	Natural Stage Feet	Observed Stage Feet	Natural Stage Feet
Flood of April 1964							
34,000	12,000	18	28	18	25	28	33
Flood of April 1979							
41,000	7,800			20	33	33	40
Flood of March 1990							
46,000	9,000			22	38	35	38

The September 2009 flood is of special interest for a variety of reasons. It occurred at the end of an extended low flow period, the lake level was relatively low, the storm was large, and the greatest rainfall was above the dam. The daily inflow for this flood is the highest of record (53,534 cfs). Reservoir regulation reduced downstream flows to about a third of natural flow. Table 8-3 lists the reductions for this flood. Plates 4-7 and 4-8 show the reservoir regulation and downstream effects for the 2009 flood event.

Table 8-3. Effects of Reservoir Regulation on September 2009 Flood

Effects of reservoir regulation on flood of September 2009						
Location	Peak Date & Time	Observed Flow (cfs)	Observed Stage (ft)	Computed Natural Flow (cfs)	Computed Natural Stage (ft)	Stage Reduction (ft)
Kingston	9/22/2009 @ 0300	19,100	16.7	75,200	32.5	15.8
Resaca	9/25/2009 @ 0500	13,300	18.9	62,700	20.7	1.75
Rome-Etowah	9/21/2009 @ 1830	19,700	29.9	70,100	57.2	27.75
Rome-Coosa	9/22/2009 @ 1800	28,200	23.9	77,800	38.5	14.6

8-03. Recreation. Allatoona Lake is an important recreational resource, providing significant economic and social benefits for the region and the nation. The project contains 11,862 acres of water at the summer conservation pool elevation of 840 feet NGVD29, plus an additional 37,683 acres of land, most of which is available for public use. A wide variety of recreational opportunities are provided at the lake including boating, fishing, camping, picnicking, water skiing, hunting, and sightseeing. Mobile District park rangers and other project personnel conduct numerous environmental and historical education tours and presentations, as well as water safety instructional sessions each year for the benefit of area students and project visitors. Allatoona Lake is one of the most visited Corps lake in the United States; averaging almost seven million recreational visits per year. The local and regional economic benefits of recreation at Allatoona Lake are significant. Annual recreational visitor spending within 30 miles of the project totals $144.66 million.

The effects of the Allatoona Lake water control operations on recreation facilities and use at the project are described as impact levels: Initial Impact Level, Recreation Impact Level, and Water Access Limited Level. The impact levels are defined as pool elevations with associated effects on recreation facilities and exposure to hazards within the lake. The following are general descriptions of each impact level:

a. Initial Impact Level. Reduced swim areas, some recreational navigation hazards are marked, boat ramps are minimally affected, a few private boat docks are affected.

b. Recreation Impact Level. All swim areas are unusable, recreational navigation hazards become more numerous, boat ramps are significantly affected, 20 percent of private boat docks are affected.

c. Water Access Impact Level. Most water-based recreational activities are severely restricted, most boat ramps are unusable, and navigation hazards become more numerous, 50 percent of private boat docks are affected. Table 8-4 shows the lake elevation for each impact level and the percent of time over a 70-year simulation of the proposed operation that each impact level would be reached at Allatoona Lake.

d. Allatoona Lake also has a High Water Action Plan that establishes guidelines to determine areas impacted by high water levels during the normal recreation season and the actions to be taken by Operations personnel for each stage.

Table 8-4. Reservoir Impact Levels – Allatoona Lake

837.0 Feet initial impact level	835.0 Feet recreation impact level	828.0 Feet water access limited impact level
68%	56%	20.4%

8-04. Water Quality. The water quality conditions that are generally present in Allatoona Lake are typical of water quality conditions and trends that exist in reservoirs throughout the ACT Basin. Water quality conditions in the main body of the reservoir is typically better than in the arms of the reservoir because of nutrient and sediment-rich, riverine inflows. Sediment and phosphorus concentrations are also highest in the upper arms and decrease toward the main pool as velocity is lowered and sediment is removed from suspension. During summertime thermal stratification of Allatoona Lake, dissolved oxygen levels and water temperatures are typically highest in the top 15 feet of the reservoir, with colder, anoxic or nearly anoxic conditions existing near the bottom. Additionally, chlorophyll *a* concentrations vary both seasonally and spatially and are highest from July to October during periods of low flow. Point and nonpoint sources from urban areas increase sediment and pollutant loads in the rivers immediately downstream. Reservoirs in the ACT Basin, including Allatoona Lake, typically act as a sink, removing pollutant loads and sediment. The mid-lake and dam forebay portions of Allatoona Lake meet all designated water use criteria. Both the Etowah River and Little River embayment sections of Allatoona Lake are listed on the 2012 draft Integrated 305(b) and 303(d) list because of chlorophyll *a* impairment. The chlorophyll *a* draft TMDL was completed in 2009, and a fecal coliform TMDL was completed in 2004. The reservoir is transitioning from mesotrophic to eutrophic because of the influx of phosphorus nutrients. Phosphorus levels have increased in the reservoir and its tributaries because of increases in urban lands and broiler and beef cattle production. Dissolved oxygen in the tailwaters of Allatoona Dam drops below 4 mg/L during the summer and through early fall, and can reach as low 1 mg/L.

8-05. Fish and Wildlife.

a. <u>Fish Spawning</u>. In developing the action zones for Allatoona Lake's water control plan, the needs of fish spawning was a factor influencing the selected elevations for each zone. The plan improves the ability to maintain steady reservoir levels during the spring fish spawning period, provide a gradual ramp down of river levels to prevent stranding endangered species, and to ensure adequate flows in the river to support threatened and endangered species. The Corps operates the ACT System to provide favorable conditions for annual fish spawning, both in the reservoirs and in the rivers. During the fish spawning period for Allatoona Lake, March 15 to May 15, the Corps' goal is to operate for a generally stable or rising lake level and a stable or gradually declining river stage for approximately four to six weeks during the designated spawning period. When climatic conditions preclude a favorable operation for fish spawning, the Corps consults with the state fishery agencies and the USFWS on balancing needs in the system and minimizing the effects of fluctuating lake or river levels. Operations for fish spawning help to increase the population of fish in the basin and attempt to offset the changed hydrology resulting from the installation of the dams.

b. <u>Threatened and Endangered Species</u>. The ACT System of reservoirs, including Allatoona Lake, is operated to comply with the Endangered Species Act of 1973. The USFWS by letter dated 20 March 2014, concurred that operation of the project, along with the other ACT projects would either have no effect or may affect but be not likely to adversely affect listed species in the basin. The Etowah River originates as a high-gradient stream in the Blue Ridge province of the Southern Appalachian Mountains and flows approximately 69 miles westward through Piedmont upland to Allatoona Lake. Habitat loss and modifications resulting from impoundments, timbering, agriculture, gold mining, and urban development have caused at least 35 mussel species and seven fish species to be extirpated from the Etowah River sub-basin. The upper mainstem and tributaries of the Etowah River support the federally endangered Amber darter and Etowah darter, and the federally threatened Cherokee darter.

The lower Etowah River extends 48.6 miles from the Allatoona Dam and Lake to its confluence with the Oostanaula River, forming the Coosa River in Rome, Georgia. Historically, the lower Etowah River contained more than 91 native fish species, including lake sturgeon and at least 51 mussel species. Most Federal and state endangered fish species are found in the upper Etowah River (above Allatoona Lake) and to a lesser extent in the lower Etowah River. Currently, only the Etowah Darter, listed as Endangered by the USFWS is found in the main stem of the Etowah River downstream of Allatoona Dam. Other listed species have been documented in downstream tributaries.

In 1996, American Rivers' list of the top 10 most endangered river systems in the United States included the Etowah River. The diversity of fish and mussels in the Etowah River is equal to the Conasauga River, which was considered to have the highest biodiversity in the Coosa River drainage area.

8-06. Water Supply. Under the authority of the Water Supply Act of 1958, the Corps has allocated storage in Allatoona Lake for municipal and industrial water supply by entering into contracts with two entities. The two entities that withdraw water from Allatoona Lake are the City of Cartersville, Georgia, under contracts DACW01-67-RE-002 (dated 12 July 1966) and DACW01-9-91-120 (dated 18 October 1991) and the Cobb County-Marietta Water Authority (CCMWA) under contract DA-01-076-CIVENG-64-116 (dated 10 October 1963). The City of Cartersville contracts provide for the use of a total of 2.24 percent (or 6,371 acre-feet) of the 284,580 acre-feet conservation storage (between 800 feet – 840 feet NGVD29) at Allatoona Lake (noted as 285,000 acre-feet in the contract) with an expected yield of 16.76 mgd. The CCMWA contract provides for the use of a total of 4.61 percent (or 13,140 acre-feet) of the 284,580 acre-feet conservation storage (between 800 feet – 840 feet NGVD29) at Allatoona Lake (noted as 285,000 acre-feet in the contract) with an expected yield of 34.5 mgd. The amounts of storage stated in these contracts were estimated, at the time the contracts were executed, to yield 16.76 mgd, and 34.5 mgd, respectively, during the critical drought, i.e., during the worst drought on record at the time the agreements were executed. The severity and frequency of droughts change over time, however, and more recent storage-yield analysis by the Corps has indicated that the estimated yield of Allatoona Lake storage has decreased.

For the purpose of managing water supply storage, the Mobile District has employed a storage accounting methodology that tracks multiple storage accounts, applying a proportion of inflows and losses, as well as direct withdrawals by specific users, to each account. The amount of water that may actually be withdrawn is ultimately dependent on the amount of water available in storage, which will naturally change over time.

Below are the state permitted withdrawals and contracted amounts.

Entity	State Permit	Contract Amount/Expected Yield
Cartersville	18 mgd	6,371 acre-feet/16.76 mgd
CCMWA	78 mgd	13,140 acre-feet/34.5 mgd

The necessary data to determine water supply storage availability is received daily, with computations performed weekly during normal conditions, and daily under extreme drought conditions. This accounting is especially critical during drought, when available water supply storage is reduced and conservation measures or alternative sources may be necessary. The formula used to calculate water supply storage is shown below:

Ending Storage = Beginning Storage + Inflow Share – Loss Share – User's Usage.
(with constraint that "Ending Storage" cannot be larger than User's total storage)

The conservation pool is drawn down as water usage exceeds inflow. The entire pool is drawn down and the individual accounts are also drawn down at different rates based on their usage. Users will be notified on a weekly basis of the available storage remaining, once their storage account balance drops below 30 percent.

8-07. Hydroelectric Power. The Allatoona Dam hydropower project, along with 22 other hydropower dams in the southeastern United States, composes the SEPA service area. SEPA sells hydroelectric power generated by Corps plants to a number of cooperatives and municipal power providers, referred to as preference customers. Hydroelectric power is one of the cheaper forms of electrical energy, and it can be generated and supplied quickly as needed in response to changing demand.

Hydropower is produced as peak energy at Allatoona Dam, i.e., power is generated during the hours that the demand for electrical power is highest, causing significant variations in downstream flows. Daily hydropower releases from the dam vary from zero during off-peak periods to as much as 6,500 cfs, which is turbine capacity. Often, the weekend releases are lower than those during the weekdays. Figure 8-1 shows effects of a typical release pattern from the powerhouse. Tailwater stages may vary significantly daily because of peaking hydropower operations at Allatoona Dam, characterized by a rapid rise in river stage immediately after generation is initiated and a rapid fall in stage as generation is ceased, generally from two to several hours later, depending on available basin inflows. Figure 8-2 depicts river stages immediately downstream of Allatoona Dam over a typical one-week period in late summer under normal conditions. River stages rise and fall by 2.5 to 3.0 feet before, during, and following peak hydropower generation. Except during high flow conditions when hydropower may be generated for more extended periods of time, this peaking power generation scenario with daily fluctuating stages downstream is repeated nearly every week day (not generally on weekends).

Projects with hydropower capability provide three principal power generation benefits:

a. Hydropower helps to ensure the reliability of the electrical power system in the SEPA service area by providing dependable capacity to meet annual peak power demands. That condition occurs when the reservoir is at its maximum elevation. Dependable capacity at hydropower plants reduces the need for additional coal, gas, oil, or nuclear generating capacity.

b. Hydropower projects provide a substantial amount of energy at a small cost relative to thermal electric generating stations, reducing the overall cost of electricity. Hydropower facilities reduce the burning of fossil fuels, thereby reducing air pollution. Between 1961 and 2013, Allatoona powerhouse produced an average of 154,534 megawatt hours per calendar year, with a minimum of 51,820 (year 2007) and a maximum of 240,005 (year 1973) MWH, dependent upon water availability (see Plates 2-12 and 2-13).

c. Hydropower has several valuable operating characteristics that improve the reliability and efficiency of the electric power supply system, including efficient peaking, a rapid rate of unit unloading, and rapid power availability for emergencies on the power grid. Hydropower generation by the Allatoona Dam Hydropower Plant, in combination with the hydropower power projects in the ACT Basin, helps to provide direct benefits to a large segment of the basin's population in the form of relatively low-cost power and the annual return of revenues to the Treasury of the United States. Hydropower plays an important role in meeting the electrical power demands of the region.

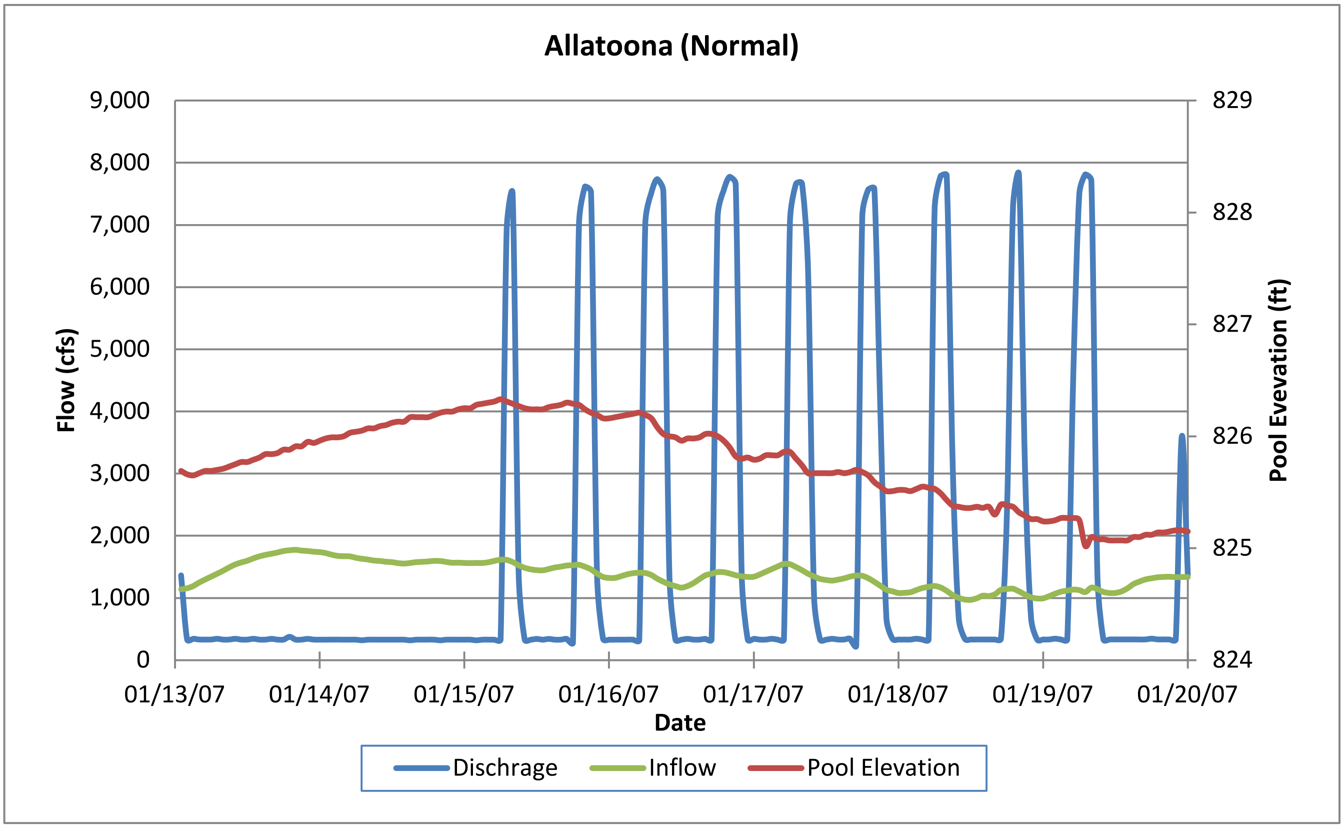


Figure 8-1. Allatoona Lake, Typical Release Pattern, Normal Conditions

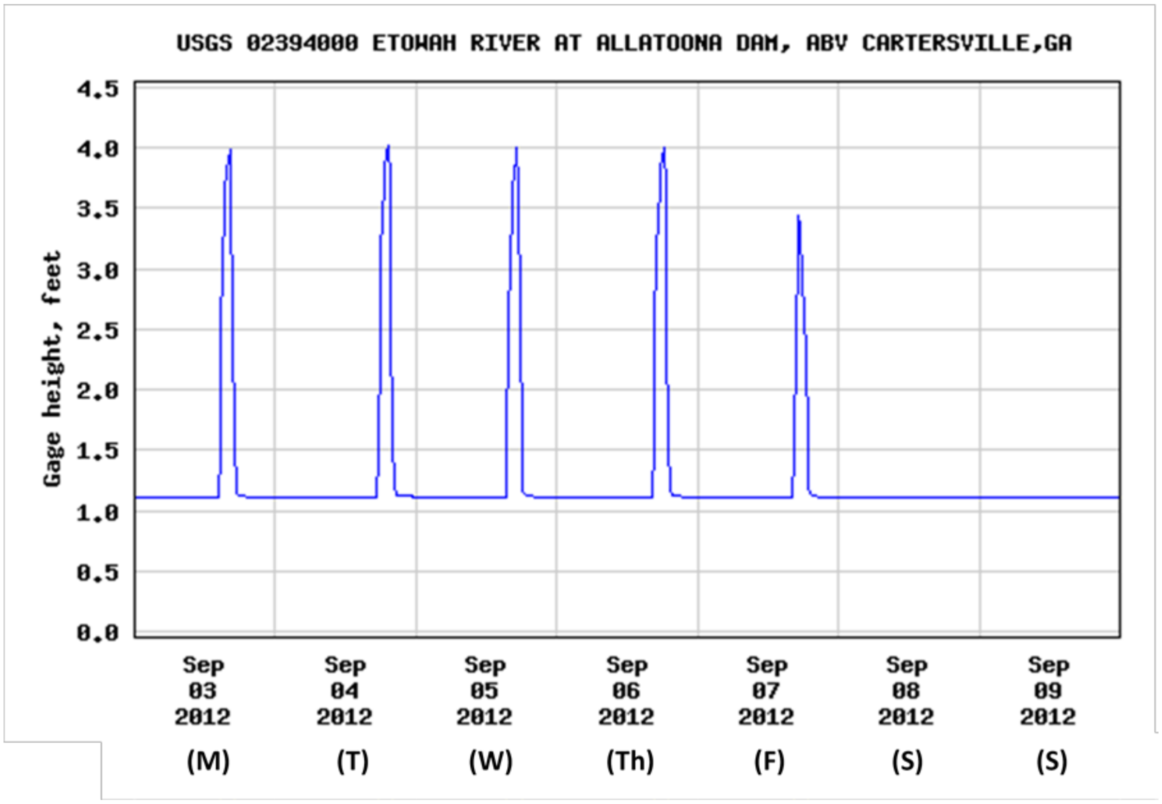


Figure 8-2. Etowah River at Allatoona Dam, Above Cartersville, Georgia (USGS02394000), Tailrace Gage Height

8-08. Navigation. Navigation is an authorized purpose of the Federal ACT System, and navigational flows were taken into account in updating the manual, including updating Allatoona operations. Due to the intervening APC projects, there are no specific reservoir regulation requirements to support navigation at Allatoona Dam. However, the seasonal variation in reservoir storage does redistribute downstream flows and other operations at Allatoona provide a benefit to downstream navigation.

8-09. Drought Contingency Plans. The importance of drought contingency plans has become increasingly obvious as more demands are placed on the water resources of the basin. During low flow conditions, the reservoirs within the basin may not be able to fully support all project purposes. Several drought periods have occurred since construction of Allatoona Dam in 1949. The duration of low flows can be seasonal or they can last for several years. Some of the more extreme droughts occurred in the mid 1950s, the early and mid 1980's, and most of the time period between late1998 to mid-2009. There were periods of high flows during these droughts but the lower than normal rainfall trend continued. Allatoona monthly inflows and percent of monthly inflows to the long-term average monthly flows for 1954-56, 1980-81, 1985-86 and 1998-2009 are shown on Table 8-5. Allatoona conservation storage of 284,580 acre-feet is 22 percent of the average annual inflow. This low storage to inflow ratio indicates that it is much *easier* to refill Allatoona Lake than a project like Lake Lanier, which has a storage to inflow ratio of 130 percent.

The purpose of drought planning is to minimize the effect of drought, to develop methods for identifying drought conditions, and to develop both long- and short-term measures to be used to respond to and mitigate the effects of drought conditions. During droughts, reservoir regulation techniques are planned to preserve and ensure the more critical needs. Minimum instream flows protect the area below Allatoona Dam and conservation efforts strengthen the ability to supply water supply needs.

For the Allatoona Dam Project, the Corps will coordinate water management during drought with other Federal agencies, private power companies, navigation interests, the states, and other interested state and local parties as necessary. Drought operations will be in compliance with the plan for the entire ACT Basin.

Table 8-5. Average and Actual Inflows Into Allatoona During Droughts

Allatoona - Average Monthly Inflow vs Actual Inflow during drought periods (Period of record: Jan 1950 - Dec 2011)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average flow	2389	2685	3173	2695	1882	1292	1125	873	837	921	1183	1754
1954 flow	3867	1702	2152	2115	1460	925	560	441	217	236	499	947
% of Avg.	162	63	68	78	78	72	50	51	26	26	42	54
1955 flow	1322	3114	1761	2293	1332	779	917	641	253	400	669	649
% of Avg.	55	116	55	85	71	60	82	73	30	43	56	37
1956 flow	630	2293	2466	2691	2021	793	1048	455	541	557	600	1596
% of Avg.	26	85	78	100	107	61	93	52	65	60	51	91
1980 flow	2768	2192	8326	4057	2987	1884	915	571	742	928	792	665
% of Avg.	116	82	262	151	159	146	81	65	89	101	67	38
1981 flow	620	2601	1394	1282	1446	1177	327	482	343	342	391	984
% of Avg.	26	97	44	48	77	91	29	55	41	37	33	56
1985 flow	1156	3094	1383	1185	1316	720	1040	1149	428	589	762	1060
% of Avg.	48	115	44	44	70	56	92	132	51	64	64	60
1986 flow	828	941	1186	644	727	284	162	174	431	1085	1135	1448
% of Avg.	35	35	37	24	39	22	14	20	52	118	96	83
1998 flow	3283	4949	4174	4703	3012	1526	795	840	370	397	787	1049
% of Avg.	137	184	132	175	160	118	71	96	44	43	67	60
1999 flow	1884	2162	1610	1017	1117	730	870	152	103	784	674	693
% of Avg.	79	81	51	38	59	57	77	17	12	85	57	40
2000 flow	1643	1175	1527	2353	688	316	221	484	1166	260	1228	755
% of Avg.	69	44	48	87	37	24	20	55	139	28	104	43
2001 flow	1965	1674	2884	1648	996	1936	1395	563	604	420	392	737
% of Avg.	82	62	91	61	53	150	124	64	72	46	33	42
2002 flow	2029	1200	2011	1365	1371	481	270	11	587	967	1913	3537
% of Avg.	85	45	63	51	73	37	24	1	70	105	162	202
2003 flow	1558	2803	3903	2054	3810	2677	3201	1504	893	743	1603	1521
% of Avg.	65	104	123	76	202	207	285	172	107	81	135	87
2004 flow	1602	2337	1378	1629	1128	1174	966	673	3481	867	1973	2607
% of Avg.	67	87	43	60	60	91	86	77	416	94	167	149
2005 flow	1529	3028	3240	3019	1546	1907	4051	1508	613	803	710	1510
% of Avg.	64	113	102	112	82	148	360	173	73	87	60	86
2006 flow	2171	2018	1850	1546	821	473	273	415	591	741	1513	935
% of Avg.	91	75	58	57	44	37	24	48	71	80	128	53
2007 flow	2556	1320	1523	892	470	285	396	58	-5	92	213	609
% of Avg.	107	49	48	33	25	22	35	7	-1	10	18	35
2008 flow	677	1435	2054	1072	713	291	513	619	125	192	212	1250
% of Avg.	28	53	65	40	38	22	46	71	15	21	18	71
2009 flow	2600	1151	2252	2326	1846	772	341	542	5244	3273	3409	4440
% of Avg.	109	43	71	86	98	60	30	62	626	355	288	253
2010 flow	3344	3928	3559	2358	2034	1142	802	490	256	373	473	771
% of Avg.	140	146	112	87	108	88	71	56	31	40	40	44
2011 flow	931	1480	3112	2249	846	590	356	113	386	181	667	1199
% of Avg.	39	55	98	83	45	46	32	13	46	20	56	68

While commonly referred to as observed data, reservoir inflows are actually calculated from pool elevations and project discharges. A reservoir elevation-storage relationship results in an inflow calculated for a given pool level change and outflow (total discharge) by using the continuity relationship. The reservoir continuity equation described below maintained the flow volume:

INFLOW = OUTFLOW + CHANGE IN STORAGE
where: INFLOW is in units of cfs/day
OUTFLOW is in units of cfs/day
CHANGE OF STORAGE is in units of cfs/day

The reservoir discharge value, OUTFLOW, is the total discharge from turbines, spillway gates, or navigation locks. Its associated value comes from rating tables for these structures. The CHANGE IN STORAGE comes from subtracting the daily storage on day two from day one. The daily storage value comes from the storage-elevation tables using the adjusted midnight pool elevation for each day. CHANGE IN STORAGE = $STORAGE_i$ – $STORAGE_{i+1}$. Negative inflow calculations can occur when there is a decrease in storage which exceeds the project's outflow. Evaporative losses, direct reservoir withdrawals, and losses to groundwater are several causes of negative inflow calculations.

8-10. Flood Emergency Action Plans. Normally, all flood risk management operations are directed by the Mobile District Office. If, however, a storm of flood-producing magnitude occurs and all communications are disrupted between the Mobile District Water Management Section and Allatoona Dam, emergency operating procedures, as described in Exhibit C, Standing Instructions to Damtenders for Water Control, will begin. If communication is broken after some instructions have been received from the Mobile District Water Management Section, those instructions will be followed for as long as they are applicable.

Flood emergency operations at Allatoona Dam are the responsibility of the Allatoona Power Project Manager. It is his responsibility to obtain the gage readings at Rome, Georgia by whatever means possible before making any power releases other than that required for station service. The plans are intended to serve only as temporary guidance for operating a project in an emergency until Mobile District staff can assess the results of real-time hydrologic model runs and issue more detailed instructions to project personnel. The benefits of Flood Emergency Action Plans are to minimize uncertainties in how to operate a project in a flood emergency, to facilitate quick action to mitigate the adverse impacts of a flood event, and to provide for emergency action exercises to train operating personnel on how to respond in an actual emergency flood situation.

8-11. Frequencies.

a. Peak Inflow Probability. A percent chance exceedance curve for inflow into Allatoona Lake is shown on Figure 8-3.

b. Pool Elevation Duration and Frequency. The water control plan for the ACT Basin influences the lake levels at Allatoona. Normal seasonal operating levels range from elevation 823 feet NGVD29 in the higher flow months to elevation 840 feet NGVD29 in the summer. Pool duration curves for the historic observed data, previous regulation plan, and current regulation plan as described in this manual are presented in Figure 8-4. Pool duration curves for operation under the previous regulation plan and the current regulation plan were modeled using the Reservoir Simulation (ResSim) model developed by the Hydrologic Engineering Center in Davis, California. Recreation impact levels are also shown. The observed and modeled period used in the analysis is January 1958 through December 2011.

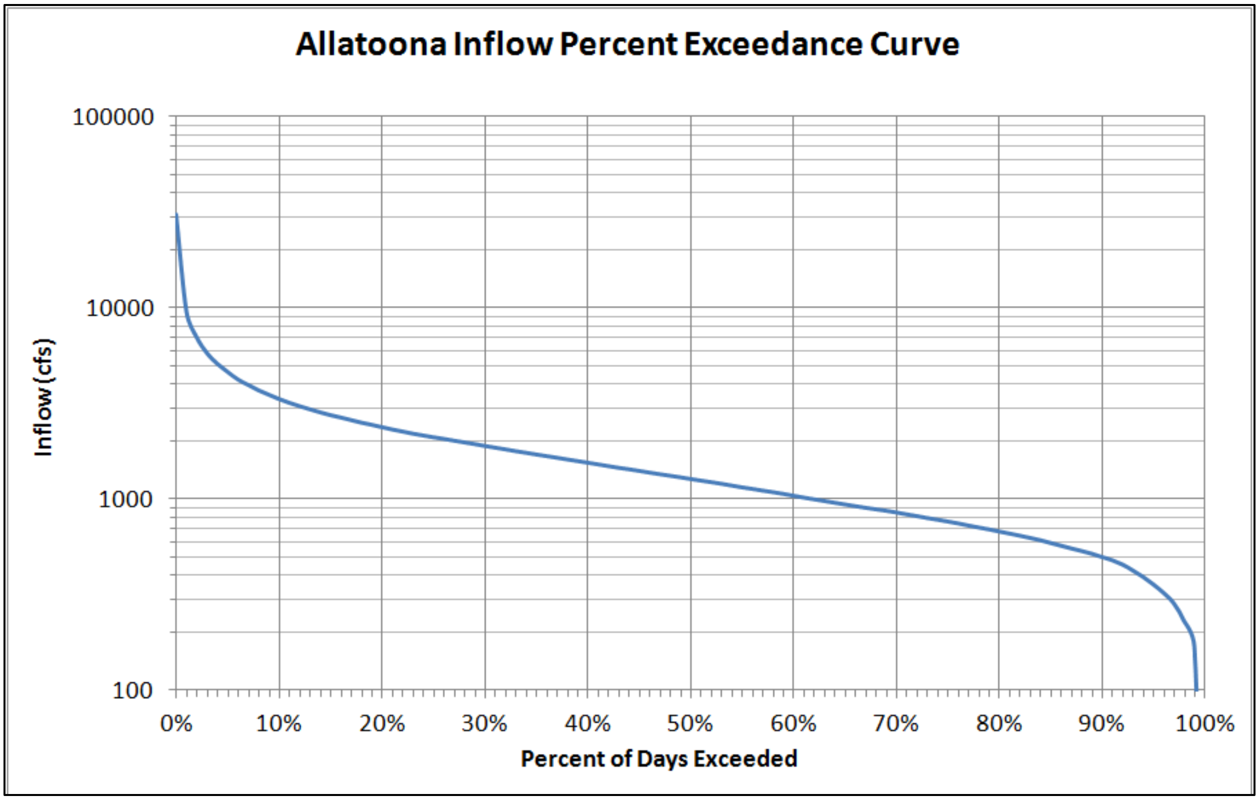


Figure 8-3. Allatoona Lake Inflow Percent Exceedance Curve Over the Modeled Period (1939-2011)

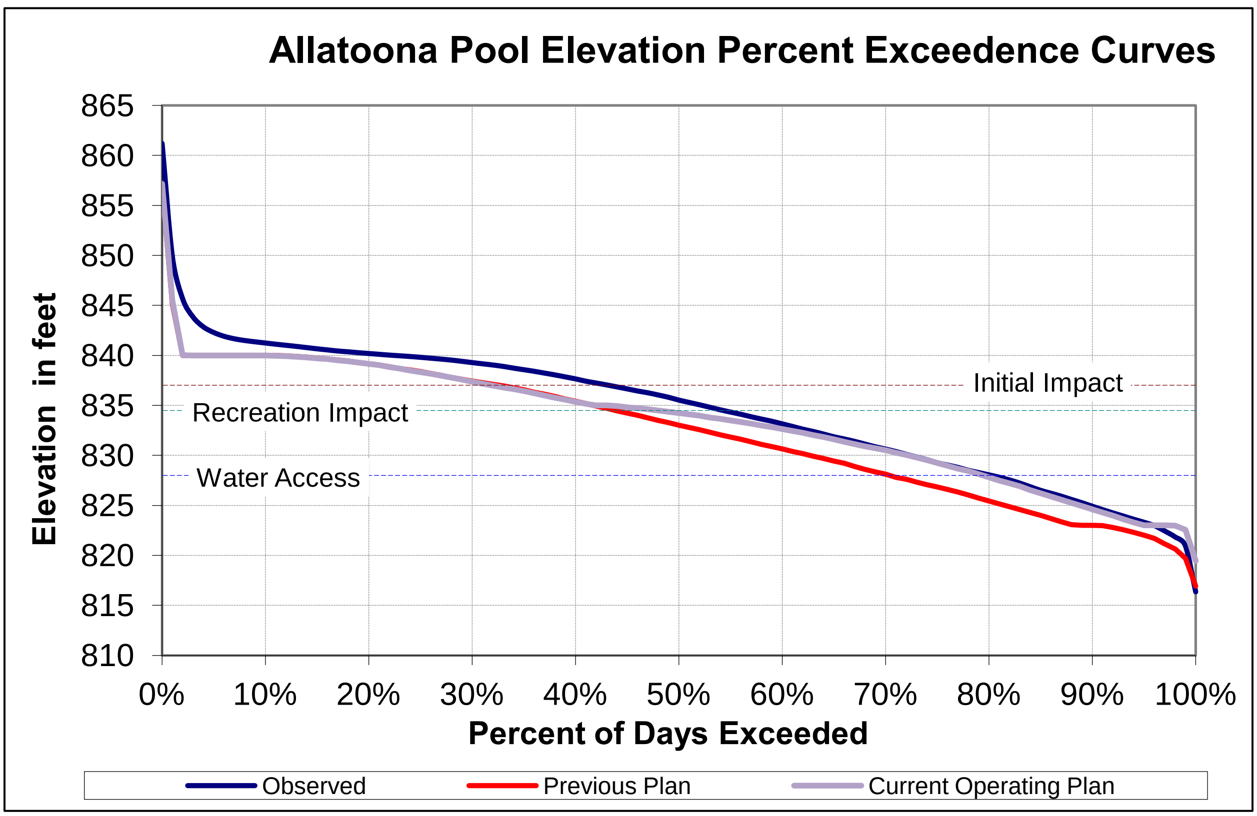


Figure 8-4. Allatoona Pool Elevation Percent Exceedence Curves

8-12. Other Studies – Examples of Regulation. In early 2010 the Corps, Mobile District, developed updated critical yields for the Allatoona and Carters Projects in the ACT Basin (Federal Storage Reservoir Critical Yield Analysis, Alabama-Coosa-Tallapoosa (ACT) and Apalachicola-Chattahoochee-Flint (ACF) River Basins, February 2010) in response to the following language in the FY 2010 Energy & Water Development Appropriations Bill, 111th Congress, 1st Session:

> Alabama-Coosa-Tallapoosa [ACT], Apalachicola-Chattahoochee-Flint [ACF] Rivers, Alabama, Florida, and Georgia - The Secretary of the Army, acting through the Chief of Engineers, is directed to provide an updated calculation of the critical yield of all Federal projects in the ACF River Basin and an updated calculation of the critical yield of all Federal projects in the ACT River Basin within 120 days of enactment of this act.

Robert F. Henry Lock and Dam, Millers Ferry Lock and Dam and Claiborne Lock and Dam are Federal projects in the ACT Basin that were excluded from the critical yield analyses because they are *run-of-river* impoundments with little or no usable water storage and cannot significantly contribute to critical yield.

Critical yield provides the basis from which water stored in a reservoir is allocated to various project purposes. The volume of water stored in a reservoir can be allocated to a specific project purpose (e.g., hydropower or water supply) based on a percent of critical yield. A change in critical yield may result in modification of the allocations for a project purpose.

The impact of water withdrawals upstream of the project on the critical yield of the project can be quantified by computing the critical yield with and without diversions. Withdrawals for the year 2006 was used in the analyses and showed that river withdrawals had a measurable impact, reducing critical yield as much as five percent at Allatoona Dam but only 0.8 percent at Carters Dam. The critical yield for Allatoona was determined to be 729 cfs without diversions and 693 cfs with diversions. The critical drought for the period of record occurred in 2007.

The critical yield is a mathematically derived value and is the maximum continuous release that could be maintained with historical project inflows combined with the complete use of conservation storage. In this instance, a withdrawal greater than 729 cfs (continuous release) would have drawn the pool below the bottom of conservation. Conversely, a withdrawal less than 729 cfs would not have fully utilized all the conservation storage in 2007. The drought of 2007 is the "defining drought" and a worse drought than 2007 would produce a "computed critical yield" less than 729 cfs.

IX - WATER CONTROL MANAGEMENT

9-01. Responsibilities and Organization. Many agencies in federal and state governments are responsible for developing and monitoring water resources in the ACT Basin. Some of the federal agencies are the Corps, U.S. Environmental Protection Agency, National Parks Service, U.S. Coast Guard, USGS, U.S. Department of Energy, U.S. Department of Agriculture, USFWS, and NOAA. In addition to the federal agencies, each state has agencies involved: GAEPD, The Coosa-North Georgia Regional Water Planning Council, and the Alabama Department of Environmental Management, Alabama Office of Water Resources.

a. U.S. Army Corps of Engineers. Authority for water control regulation of the Allatoona Project has been delegated to the SAD Commander. The responsibility for water control regulation activities has been entrusted to the Mobile District. Water control actions for the Allatoona Project are regulated to meet the federally authorized project purposes at Allatoona in coordination with other authorized projects in the ACT Basin. It is Mobile District's responsibility to develop water control regulation procedures for the Allatoona Project, including all foreseeable conditions. The Water Management Section monitors the project for compliance with the approved water control plan. In accordance with the water control plan, the Water Management Section performs water control regulation activities that include determination of project water releases, daily declarations of water availability for hydropower generation and other purposes; daily and weekly reservoir pool elevation and release projections; weekly river basin status reports; tracking basin composite conservation storage and projections; determining and monitoring daily and seven-day basin inflow; managing high-flow operations and regulation; and coordination with other District elements and basin stakeholders. When necessary, the Water Management Section instructs the project operator regarding normal water control regulation procedures and emergencies, such as flood events. The power plant at Allatoona Dam is operated remotely from the control room at the Carters Dam Powerhouse under direct supervision of the Power Project Manager. The Water Management Section communicates directly with the powerhouse operators at the Carters Powerhouse and with other project personnel as necessary. The Water Management Section is also responsible for collecting historical project data and disseminating water control information, such as historical data, lake level and flow forecasts, and weekly basin reports within the agency; to other Federal, state, and local agencies; and to the general public. The main mechanism for such data dissemination is the internet through web pages and computer-to-computer data transfers. The web address for water management data is http://www.sam.usace.army.mil/Missions/CivilWorks/WaterManagement.aspx

b. Other Federal Agencies.

1) National Weather Service (NWS). NWS is the Federal agency in NOAA that is responsible for weather and weather forecasts. The NWS along with its River Forecast Center maintains a network of reporting stations throughout the nation. It continuously provides current weather conditions and forecasts. It prepares river forecasts for many locations including the ACT Basin. Often, it prepares predictions on the basis of *what if* scenarios. Those include rainfall that is possible but has not occurred. In addition, the NWS provides information on hurricane tracts and other severe weather conditions. It monitors drought conditions and provides the information. Information is available through the Internet, the news, and the Mobile District's direct access.

2) U.S. Geological Survey (USGS). The USGS is an unbiased, multidisciplinary science organization that focuses on biology, geography, geology, geospatial information, and water.

The agency is responsible for the timely, relevant, and impartial study of the landscape, natural resources, and natural hazards. Through the Corps-USGS Cooperative Gaging program, the USGS maintains a comprehensive network of gages in the Allatoona Watershed and ACT Basin. The USGS Water Science Centers in Georgia and Alabama publish real-time reservoir levels, river and tributary stages, and flow data through the USGS NWIS web site. The Water Management Section uses the USGS to operate and maintain project water level gaging stations at each Federal reservoir to ensure the accuracy of the reported water levels.

3) Southeastern Power Administration (SEPA). SEPA was created in 1950 by the Secretary of the Interior to carry out the functions assigned to the Secretary by the Flood Control Act of 1944. In 1977, SEPA was transferred to the newly created U.S. Department of Energy. SEPA, headquartered in Elberton, Georgia, is responsible for marketing electric power and energy generated at reservoirs operated by the Corps. The power is marketed to nearly 500 preference customers in Georgia, Florida, Alabama, Mississippi, southern Illinois, Virginia, Tennessee, Kentucky, North Carolina, and South Carolina.

i. SEPA's objectives are to market electricity generated by the Federal reservoir projects, while encouraging its widespread use at the lowest possible cost to consumers. Power rates are formulated using sound financial principles. Preference in the sale of power is given to public bodies and cooperatives, referred to as preference customers. SEPA does not own transmission facilities and must contract with other utilities to provide transmission, or *wheeling* services, for the Federal power.

ii. SEPA's responsibilities include the negotiation, preparation, execution, and administration of contracts for the sale of electric power; preparation of repayment studies to set wholesale rates; the provision, by construction, contract or otherwise, of transmission and related facilities to interconnect reservoir projects and to serve contractual loads; and activities pertaining to the operation of power facilities to ensure and maintain continuity of electric service to its customer.

iii. SEPA schedules the hourly generation schedules for the Allatoona power project at the direction of the Corps on the basis of daily and weekly water volume availability declarations and water release requirements.

4) U.S. Fish and Wildlife Service (USFWS). The USFWS is an agency of the Department of the Interior whose mission is working with others to conserve, protect and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people. The USFWS is the responsible agency for the protection of federally listed threatened and endangered species and federally designated critical habitat in accordance with the Endangered Species Act of 1973. The USFWS also coordinates with other Federal agencies under the auspices of the Fish and Wildlife Coordination Act. The Corps, Mobile District, with support from the Water Management Section, coordinates water control actions and management with USFWS in accordance with both laws.

c. <u>State and County Agencies</u>

1) Alabama. The Alabama Office of Water Resources (OWR) administers programs for river basin management, river assessment, water supply assistance, water conservation, flood mapping, the National Flood Insurance Program and water resources development. Further, OWR serves as the state liaison with Federal agencies on major water resources related projects, conducts any special studies on instream flow needs, and administers environmental education and outreach programs to increase awareness of Alabama's water resources.

i. The Alabama Department of Environmental Management Drinking Water Branch works closely with the more than 700 water systems in Alabama that provide safe drinking water to four million citizens.

ii. The Alabama Chapter of the Soil and Water Conservation Society fosters the science and the art of soil, water, and related natural resource management to achieve sustainability.

2) Georgia. GAEPD conducts water resource assessments to determine a sound scientific understanding of the condition of the water resources, in terms of the quantity of surface water and groundwater available to support current and future in-stream and off-stream uses and the capacity of the surface water resources to assimilate pollution. Regional water planning councils in Georgia prepare recommended Water Development and Conservation Plans. Those regional plans promote the sustainable use of Georgia's waters by selecting an array of management practices, to support the state's economy, to protect public health and natural systems, and to enhance the quality of life for all citizens.

d. <u>Stakeholders</u>. Many non-federal stakeholder interest groups are active in the ACT Basin. The groups include lake associations, M&I water users, navigation interests, environmental organizations, and other basin-wide interests groups. Coordinating water management activities with the interest groups, state and Federal agencies, and others is accomplished as required on an ad-hoc basis and on regularly scheduled water management teleconferences that occur during unusual flood or drought conditions to share information regarding water control regulation actions and gather stakeholder feedback. The Master Water Control Manual includes a list of state and Federal agencies and active stakeholders in the ACT Basin that have participated in the ACT Basin water management teleconferences and meetings.

9-02. Interagency Coordination.

<u>Local Press and Corps Bulletins</u>. The local press includes any periodic publications in or near the Allatoona Watershed and the ACT Basin. Montgomery, Alabama, and Atlanta, Georgia, have some of the larger daily papers. These papers often publish articles related to the rivers and streams. Their representatives have direct contact with the Corps through the Public Affairs Office. In addition, they can access the Corps web pages. The Corps and the Mobile District publish e-newsletters regularly which are made available to the general public via email and postings on various web sites. Complete, real-time information is available at the Mobile District's Water Management homepage http://water.sam.usace.army.mil/. The Mobile District Public Affairs Office issues press releases as necessary to provide the public with information regarding Water Management issues and activities.

9-03. Framework for Water Management Changes. Special interest groups often request modifications of the basin water control plan or project specific water control plan. The Allatoona Project and other ACT Basin Projects were constructed to meet specific, authorized purposes, and major changes in the water control plans would require modifying, either the project itself or the purposes for which the projects were built. However, continued increases in the use of water resources demand constant monitoring and evaluating reservoir regulations and reservoir systems to insure their most efficient use. Within the constraints of Congressional authorizations and engineering regulations, the water control plan and operating techniques are often reviewed to see if improvements are possible without violating authorized project functions. When deemed appropriate, temporary variances to the water control plan approved by SAD can be implemented to provide the most efficient regulation while balancing the multiple purposes of the ACT Basin-wide System.

EXHIBIT A

SUPPLEMENTARY PERTINENT DATA

EXHIBIT A
SUPPLEMENTARY PERTINENT DATA

STREAM FLOW

Drainage area at dam site-square miles	1,122
Minimum mean monthly flow prior to construction (Oct 1931)-cfs	240
Minimum mean monthly flow after construction based on unimpaired flows (September 2007)-cfs	148
Minimum mean monthly flow after construction based on flows computed at the project without correcting for losses (Sept. 2007)-cfs	-5
Maximum mean monthly flow prior to construction (Dec 1932)-cfs	9,360
Maximum mean monthly flow after construction based on unimpaired flows (March 1980)-cfs	8,249
Maximum mean monthly flow after construction based on flows computed at the project without correcting for losses (March 1980)-cfs	8,326
Average daily flow (1896 – 1949 Prior to construction)-cfs	2,257
Average daily flow (1950 – 2012) unimpaired flows)-cfs	1,764
Average daily flow (1950 – 2012) computed at the project-cfs	1,706
Discharge at bankfull stage-cfs	9,500
Maximum recorded daily flow (Sept 2009)-cfs	53,534

SPILLWAY-DESIGN FLOOD

National Weather Service 72-hr storm at Long. 84^o 23' and Lat, 34^o 18'	
Total rainfall-inches	30.7
Total storm runoff-inches	25.3
Total volume of storm runoff-acre feet	1,496,000
Peak rates of flow	
Reservoir inflow-cfs	382,000
Reservoir outflows -cfs	333,000
Duration of flood-days	9
Maximum pool elevation feet-NGVD29	872.1
Top of flood risk management pool, elevation feet-NGVD29	860.0

RESERVOIR

Summer top of conservation, 1 May – 5 Sep, elevation feet-NGVD29	840.0
Winter top of conservation pool, 31 Dec 15-Jan, elevation feet-NGVD29	823.0
Bottom of conservation pool, elevation feet-NGVD29	800.0
Storage volumes-acre feet	
Maximum pool, spillway design flood; (elevation 872.1 feet-NGVD29)	886,200
Total storage,-(elevation 860 feet-NGVD29)	670,047
Total storage,-(elevation 840 feet-NGVD29)	367,471
Total storage,-(elevation 823 feet-NGVD29)	202,769

inactive storage, below elevation 800 feet-NGVD29	82,891
Summer flood risk management storage, (elev. 840 – 860 feet NGVD29)/inches of runoff	302,576/5.11
Summer conservation storage, (elev. 840 – 800 feet NGVD29/inches of runoff	284,580/4.81
Winter flood risk management storage, (elev. 823 – 860 feet NGVD29/inches of runoff	467,278/7.89
Winter conservation storage, elev. 800 – 823 feet NGVD29/inches of runoff	119,878/2.03
Reservoir areas-acres Area within taking line-acres	
Maximum pool, spillway design flood, elev. 872.1 feet NGVD29 - acres	25,670
Top of flood risk management pool, elev. 860 feet NGVD29 – acres	19,201
Top of summer pool, elev. 840 feet NGVD29 - acres	11,862
Top of winter pool, elev. 823 feet NGVD29 - acres	7,606
Top of inactive storage, elev. 800 feet NGVD29 - acres	3,251
Purchased in fee simple - acres	37,742
River bed - acres	500
Total - acres	38,242
Flowage easement - acres	208
Parks and campgrounds	
Wildlife areas - acres	11,683
Length of shore line-miles	
Top of summer pool, elev. 840 feet NGVD29 - miles	270
Length of reservoir at elev. 840 - feet NGVD29 - river miles	28

<u>DAM</u>

Type, main dam	Concrete gravity
Length overall-feet	1,250
Non-overflow section, length - feet	750
Height of main dam above river bed-feet	190
Top of dam, elevation - feet NGVD29	880
Saddle dikes, total length - feet	4,200
Top of saddle dikes, elevation - feet NGVD29	875

<u>SPILLWAY</u>

Net length-feet	400
Crest elevation feet-NGVD29	835.0
Crest tainter gates	9@40’x26’; 2@20’x26’
Top of spillway gates, closed, elevation – feet NGVD29	860.0
Total discharge capacity – (pool elev. 870.3)-cfs	321,000
Total discharge capacity – (pool elev. 860.0)-cfs	184,000

FLOOD RISK MANAGEMENT SLUICE

Number of sluices-5’8”x10’0”	4
Discharge capacity at elev. 860 feet NGVD29 - cfs	17,300
Discharge capacity at elev. 840 feet NGVD29 - cfs	16,200
Discharge capacity at elev. 823 feet NGVD29 - cfs	15,100
Discharge capacity at elev. 800 feet NGVD29 - cfs	13,600

POWER PLANT

Present installation-kw	
Two units at 42,000 each and 1 small unit at 2,400 (nameplate) - kw	86,400
Two units at 40,000 each and 1 small unit at 2,200 (declared) - kw	82,200
Penstocks three-20’ and one-5.5’ dia. Steel pipes	

POWER DATA

Gross static head at full summer pool (840 feet NGVD29) - feet	150.0
Minimum gross head at bottom of conservation (800 feet NGVD29) - feet	110.0
Average designed head - feet	138.0
Tailwater elevations, feet-NGVD29	
Maximum, design storm-outflow 321,000 cfs - feet NGVD29	733.1
Sump Wall Limit, Turbines and Sluice outflow 11,200 cfs - feet NGVD29	697.0
Downstream bankfull capacity outflow 9,500 cfs - feet NGVD29	696.5
Normal, 2 large units operating outflow 6,500 cfs - feet NGVD29	694.7
Normal, 1 large unit operating outflow 3,250 cfs - feet NGVD29	692.6
Minimum, outflow 203 cfs - feet NGVD29	690.0
Plant output	
Installed capacity, at rated power factor - kw	86,800
Installed capacity, at unity power factor - kw	96,400
Designed dependable capacity - kw	82,200
Overload capacity, at unity power factor - kw	96,4000
Historical average annual energy (1961 – 2013) - kwh	154,534,000

1

EXHIBIT B

UNIT CONVERSIONS

AND

VERTICAL DATUM CONVERSION INFORMATION

AREA CONVERSION

UNIT	m^2	km^2	ha	in^2	ft^2	yd^2	mi^2	ac
1 m^2	1	10^{-6}	10^{-4}	1550	10.76	1.196	3.86×10^{-7}	2.47×10^{-4}
1 km^2	10^6	1	100	1.55×10^9	1.076×10^7	1.196×10^6	0.3861	247.1
1 ha	10^4	0.01	1	1.55×10^7	1.076×10^7	1.196×10^4	3.86×10^{-3}	2,471
1 in^2	6.45×10^{-4}	6.45×10^{10}	6.45×10^{-8}	1	6.94×10^{-3}	7.7×10^{-4}	2.49×10^{-10}	1.57×10^7
1 ft^2	.0929	9.29×10^{-8}	9.29×10^{-6}	144	1	0.111	3.59×10^{-8}	2.3×10^{-5}
1 yd^2	0.8361	8.36×10^{-7}	8.36×10^{-5}	1296	9	1	3.23×10^{-7}	2.07×10^{-4}
1 mi^2	2.59×10^6	2.59	259	4.01×10^9	2.79×10^7	3.098×10^6	1	640
1 ac	4047	0.004047	0.4047	6.27×10^6	43560	4840	1.56×10^{-3}	1

LENGTH CONVERSION

UNIT	cm	m	km	in.	ft	yd	mi
cm	1	0.01	0.0001	0.3937	0.0328	0.0109	6.21×10^{-6}
m	100	1	0.001	39.37	3.281	1.094	6.21×10^{-4}
km	10^5	1000	1	39,370	3281	1093.6	0.621
in.	2.54	0.0254	2.54×10^{-5}	1	0.0833	0.0278	1.58×10^{-5}
ft	30.48	0.3048	3.05×10^{-4}	12	1	0.33	1.89×10^{-4}
yd	91.44	0.9144	9.14×10^{-4}	36	3	1	5.68×10^{-4}
mi	1.01×10^5	1.61×10^3	1.6093	63,360	5280	1760	1

FLOW CONVERSION

UNIT	m^3/s	m^3/day	l/s	ft^3/s	ft^3/day	ac-ft/day	gal/min	gal/day	mgd
m^3/s	1	86,400	1000	35.31	3.05×10^6	70.05	1.58×10^4	2.28×10^7	22.824
m^3/day	1.16×10^{-5}	1	0.0116	4.09×10^{-4}	35.31	8.1×10^{-4}	0.1835	264.17	2.64×10^{-4}
l/s	0.001	86.4	1	0.0353	3051.2	0.070	15.85	2.28×10^4	2.28×10^{-2}
ft^3/s	0.0283	2446.6	28.32	1	8.64×10^4	1.984	448.8	6.46×10^5	0.646
ft^3/day	3.28×10^{-7}	1233.5	3.28×10^{-4}	1.16×10^{-5}	1	2.3×10^{-5}	5.19×10^{-3}	7.48	7.48×10^{-6}
ac-ft/day	0.0143	5.451	14.276	0.5042	43,560	1	226.28	3.26×10^5	0.3258
gal/min	6.3×10^{-5}	0.00379	0.0631	2.23×10^{-3}	192.5	4.42×10^{-3}	1	1440	1.44×10^{-3}
gal/day	4.3×10^{-8}	3785	4.38×10^{-4}	1.55×10^{-6}	11,337	3.07×10^{-6}	6.94×10^{-4}	1	10^{-6}
mgd	0.0438		43.82	1.55	1.34×10^5	3.07	694	10^6	1

VOLUME CONVERSION

UNIT	liters	m^3	in^3	ft^3	gal	ac-ft	million gal
liters	1	0.001	61.02	0.0353	0.264	8.1×10^{-7}	2.64×10^{-7}
m^3	1000	1	61,023	35.31	264.17	8.1×10^{-4}	2.64×10^{-4}
in^3	1.64×10^{-2}	1.64×10^{-5}	1	5.79×10^{-4}	4.33×10^{-3}	1.218×10^{-8}	4.33×10^{-9}
ft^3	28.317	0.02832	1728	1	7.48	2.296×10^{-5}	7.48×10^6
gal	3.785	3.78×10^{-3}	231	0.134	1	3.07×10^{-6}	10^6
ac-ft	1.23×10^6	1233.5	75.3×10^6	43,560	3.26×10^5	1	0.3260
million gallon	3.785×10^6	3785	2.31×10^8	1.34×10^5	10^6	3.0684	1

COMMON CONVERSIONS

1 million gallons per day (MGD) = 1.55 cfs
1 day-second-ft (DSF) = 1.984 acre-ft = 1 cfs for 24 hours
1 cubic foot per second of water falling 8.81 feet = 1 horsepower
1 cubic foot per second of water falling 11.0 feet at 80% efficiency = 1 horsepower
1 inch of depth over one square mile = 2,323,200 cubic feet
1 inch of depth over one square mile = 0.0737 cubic feet per second for one year

VERTICAL DATUM CONVERSION INFORMATION

LEVEL ABSTRACT

SURVEY OF LAKE ALLATOONA — ABSTRACTED BY SCN
ORDER 3rd — ADJUSTED BY SCN — VERTICAL DATUM NAVD88
DATE — CHECK BY SCN
9/23/2009 — RUN BY TRD

STATION	# OF TURNS	F OR B	SUM OF ROD READINGS BS	SUM OF ROD READINGS FS	DIFF OF ELEV	ELEVATIONS-STATIC UNADJUSTED	CORRECTION	ADJUSTED	MEAN STATIC	REMARKS	
Lake Allatoona Dam Headwater											
LOOP 1									MEAN F & B		
BM-1						879.923	0.000	879.923	879.923	Elevation Held Static Solution	Brass disk just inside the entrance gate to the top of the dam
	1	F	4.997	4.786	0.211						
TP-1				MEAN	0.211	880.134	0.000	880.134	880.134		Turning Point
	1	F	4.129	4.061	0.068						
RP-2				MEAN	0.068	880.202	0.000	880.202	880.202		Bolt in sidewalk closest to the gage house door
	1	B	4.163	4.23	-0.067						
TP-1				MEAN	-0.067	880.135	-0.001	880.134			Turning Point
	1	B	4.834	5.045	-0.211						
BM-1				MEAN	-0.211	879.924	-0.001	879.923	879.923		Brass disk just inside the entrance gate to the top of the dam
	4	Sum Turns									
LOOP 2									MEAN F & B		
BM-1						879.923	0.000	879.923	879.923	Elevation Held	Brass disk just inside the entrance gate to the top of the dam
	1	F	4.629	1.304	3.325						
RP-1				MEAN	3.325	883.248	0.000	883.248	883.249		Chiseled square on right end of bridge railing near the entrance gate
	1	F	1.117	1.042	0.075						
RP-4				MEAN	0.075	883.323	0.000	883.323	883.323		Angle iron used for tape downs left of entrance gate on bridge railing. Held on top (vertical leg) of the angle
	1	F	1.344	4.526	-3.182						
BM-2				MEAN	-3.182	880.141	0.000	880.141	880.141		Brass disk in the center upstream side of the top of the dam
	1	F	4.61	4.555	0.055						
TBM-1				MEAN	0.055	880.196	0.000	880.196	880.193		Chiseled square used for making tape downs at the old staff. Located on a half oval shaped extension of the dam over the railing, left of the door to the gage room and right of the old staff
	1	F	4.843	5.336	-0.493						
TP-2				MEAN	-0.493	879.703	0.000	879.703	879.703		Turning Point
	1	F	4.976	4.829	0.147						
BM-3				MEAN	0.147	879.850	0.000	879.850	879.850		Brass disk in center of road at the far left side of the dam
	1	B	4.65	4.797	-0.147						
TP-2				MEAN	-0.147	879.703	-0.001	879.702			Turning Point
	1	B	5.256	4.768	0.488						
TBM-1				MEAN	0.488	880.191	-0.001	880.190			Chiseled square used for making tape downs at the old staff. Located on a half oval shaped extension of the dam over the railing, left of the door to the gage room and right of the old staff
	1	B	4.496	4.548	-0.052						
BM-2				MEAN	-0.052	880.139	-0.001	880.138			Brass disk in the center upstream side of the top of the dam
	1	B	4.644	1.459	3.185						
RP-4				MEAN	3.185	883.324	-0.001	883.323	883.323		Angle iron used for tape downs left of entrance gate on bridge railing. Held on top (vertical leg) of the angle
	1	B	1.371	1.444	-0.073						
RP-1				MEAN	-0.073	883.251	-0.001	883.250			Chiseled square on right end of bridge railing near the entrance gate
	1	B	1.216	4.543	-3.327						
BM-1				MEAN	-3.327	879.924	-0.001	879.923	879.923	Elevation Held	Brass disk just inside the entrance gate to the top of the dam
	12	Sum Turns									

LEVEL ABSTRACT

SURVEY OF LAKE ALLATOONA | ABSTRACTED BY SCN
ORDER 3rd | ADJUSTED BY SCN | VERTICAL DATUM NAVD88
DATE | CHECK BY SCN
9/23/2009 | RUN BY TRD

STATION	# OF TURNS	FOR B	SUM OF ROD READINGS		DIFF OF	ELEVATIONS-STATIC			MEAN		
			BS	FS	ELEV	UNADJUSTED	CORRECTION	ADJUSTED	STATIC	REMARKS	
LOOP 3									MEAN F & B		
BM-1						879.923	0.000	879.923	879.923	Elevation Held	Brass disk just inside the entrance gate to the top of the dam
	1	F	4.978	5.019	-0.041						
RP-3				MEAN	-0.041	879.882	0.000	879.882	879.882		Square bolt closest to the road on downstream side of the end of the curb in parking area outside of gate to the top of the dam. Near guy wire and solitary pine tree
	1	F	1.278	12.971	-11.693						
TP-3				MEAN	-11.693	868.189	0.000	868.189	868.190		Turning Point
	1	F	0.215	10.898	-10.683						
E-1				MEAN	-10.683	857.506	0.000	857.507	857.507		Leaning brass disk downhill towards lake from parking area, 20 ft. upstream and 30-40 ft. downhill from RP 3. Not a stable starting point
	1	B	11.253	0.57	10.683						
TP-3				MEAN	10.683	868.189	0.001	868.190			Turning Point
	1	B	12.702	1.01	11.692						
RP-3				MEAN	11.692	879,881	0.001	879.882			Square bolt closest to the road on downstream side of the end of the curb in parking area outside of gate to the top of the dam. Near guy wire and solitary pine tree
	1	B	5.245	5.204	0.041						
BM-1				MEAN	0.041	879.922	0.001	879.923		Elevation Held	Brass disk just inside the entrance gate to the top of the dam
	6	Sum Turns									
LOOP 4											
RP-3						879.882	0.000	879.882		Elevation from Loop 3	Square bolt closest to the road on downstream side of the end of the curb in parking area outside of gate to the top of the dam. Near guy wire and solitary pine tree
	1	F	2.96	7.49	-4.530				MEAN F & B		
TP-4				MEAN	-4.530	875.532	-0.002	875.350	875.350		Turning Point
	1	F	0.46	22.37	-21.910				MEAN F & B		
RP-5				MEAN	-21.910	853.442	-0.004	853.438	853.438		Rock with a Bolt
	1	F	22.31	21.91	0.400				MEAN F & B		
Gage @ 854				MEAN	0.400	853.842	-0.006	853.836	853.836		Gage at 854.00
	1	F	22.06	0.53	21.530				MEAN F & B		
TP-6				MEAN	21.530	875.372	-0.008	875.364	875.364		Turning Point
	1	F	7.67	3.15	4.520						
RP-3				MEAN	4.520	879.892	-0.010	879.882		Elevation from Loop 3	Brass disk just inside the entrance gate to the top of the dam
	5	Sum Turns									

LEVEL ABSTRACT

SURVEY OF LAKE ALLATOONA | ABSTRACTED BY SCN
ORDER 3rd | ADJUSTED BY SCN
DATE | CHECK BY SCN
9/23/2009 | RUN BY TRD

VERTICAL DATUM NAVD88

STATION	# OF TURNS	FOR B	SUM OF ROD READINGS		DIFF OF	ELEVATIONS-STATIC			MEAN		
			BS	FS	ELEV	UNADJUSTED	CORRECTION	ADJUSTED	STATIC	REMARKS	

Lake Allatoona Dam Headwater Final Elevations

Point	ELEVATION NAVD88 Feet	ELEVATION Furnished NGVD29 Feet	DIFF NAVD88 NGVD29 Feet	DESCRIPTION
BM-1	879.923	880.059	-0.136	Brass disk just inside the entrance gate to the top of the dam
TP-1	880.134			Turning Point
RP-2	880.202	880.377	-0.175	Bolt in sidewalk closest to the gage house door
RP-1	883.249	883.383	-0.134	Chiseled square on right end of bridge railing near the entrance gate
RP-4	883.323	883.455	-0.132	Angle iron used for tape downs left of entrance gate on bridge railing. Held on top (vertical leg) of the angle.
BM-2	880.140	880.029	0.111	Brass disk in the center upstream side of the top of the dam
TBM-1	880.193	880.323	-0.130	Chiseled square used for making tape downs at the old staff. Located on a half oval shaped extension of the dam over the railing, left of the door to the gage room and right of the old staff
TP-2	879.703			Turning Point
BM-3	879.850	879.98	-0.130	Brass disk in center of road at the far left side of the dam
RP-3	879.882	880.029	-0.147	Square bolt closest to the road on downstream side of the end of the curb in parking area outside of gate to the top of the dam. Near guy wire and solitary pine tree
TP-3	868.190			Turning Point
E-1	857.507	857.641	-0.135	Leaning brass disk downhill towards lake from parking area, 20 ft. upstream and 30-40 ft. downhill from RP 3. Not a stable starting point
TP-4	875.350			Turning Point
RP-5	853.438			Rock with a Bolt
GAGE & 854	853.836			Gage at 854.00
TP-6	875.364			Turning Point

METHOD	READING	DATE/TIME
VISABLE	852.36	9/25/2009 @ 9:55:00 AM
ELECTRONIC	852.40	9/25/2009 @ 10:00:00 AM

853.836	NAVD88 Elevation on Gage @ 854.00'
854.000	Actual gage reading
-0.164	Difference (NAVD88 & Staff Gage)

LEVEL ABSTRACT

SURVEY OF LAKE ALLATOONA — ABSTRACTED BY SCN

ORDER 3rd — ADJUSTED BY SCN — VERTICAL DATUM NAVD88

DATE — CHECK BY SCN

9/23/2009 — RUN BY TRD

STATION	# OF TURNS	FOR B	SUM OF ROD READINGS		DIFF OF	ELEVATIONS-STATIC			MEAN		
			BS	FS	ELEV	UNADJUSTED	CORRECTION	ADJUSTED	STATIC	REMARKS	
Lake Allatoona Dam Tailwater											
LOOP 4									MEAN F & B		
D-4						736.579	0.000	736.579	736.579	Elev establish from COE Mon	Bronze tablet set in concrete pad 30 feet downstream and 40 feet shoreward of powerhouse entrance door. Origin of level run
	1	F	6.88	0.45	6.430				MEAN F & B		
BM-RW				MEAN	6.430	743.009	-0.001	743.008	743.009		4-inch bronze tablet set in curb located 100 feet upstream and 18.5 feet shoreward of powerhouse entrance door
	1	F	1.183	7.993	-6.810				MEAN F & B		
BM-K9				MEAN	-6.810	736.199	-0.002	736.198			2-inch bronze tablet set in pad located 102 feet upstream and 24 feet streamward of powerhouse entrance door
	1	B	8.118	1.306	6.812						
BM-RW				MEAN	6.812	743.011	-0.002	743.009			4-inch bronze tablet set in curb located 100 feet upstream and 18.5 feet shoreward of powerhouse entrance door
	1	B	1.027	7.456	-6.429						
D-4				MEAN	-6.429	736.582	-0.003	736.579		Elev establish from COE Mon	Bronze tablet set in concrete pad 30 feet downstream and 40 feet shoreward of powerhouse entrance door. Origin of level run
	4	Sum Turns									
LOOP 5									MEAN F & B		
D-4						736.579	0.000	736.579	736.579	Elev establish from COE Mon	Bronze tablet set in concrete pad 30 feet downstream and 40 feet shoreward of powerhouse entrance door. Origin of level run
	1	F	4.343	1.72	2.623				MEAN F & B		
RM-2				MEAN	2.623	739.202	0.000	739.202	739.202		Chiseled square in concrete shelf at gage house
	1	B	1.841	4.463	-2.622						
D-4				MEAN	-2.622	736.580	-0.001	736.579		Elev establish from COE Mon	Bronze tablet set in concrete pad 30 feet downstream and 40 feet shoreward of powerhouse entrance door. Origin of level run
	2	Sum Turns									

LEVEL ABSTRACT

SURVEY OF LAKE ALLATOONA — ABSTRACTED BY SCN
ORDER 3rd — ADJUSTED BY SCN — VERTICAL DATUM NAVD88
DATE — CHECK BY SCN
9/23/2009 — RUN BY TRD

STATION	# OF TURNS	FOR B	SUM OF ROD READINGS		DIFF OF	ELEVATIONS-STATIC			MEAN		
			BS	FS	ELEV	UNADJUSTED	CORRECTION	ADJUSTED	STATIC	REMARKS	
LOOP 6									MEAN F & B		
D-4						736.579	0.000	736.579	736.579	Elev establish from COE Mon	Bronze tablet set in concrete pad 30 feet downstream and 40 feet shoreward of powerhouse entrance door. Origin of level run
	1	F	4.14	12.63	-8.490				MEAN F & B		
2				MEAN	-8.490	728.089	-0.001	728.088	728.088		Turning Point
	1	F	0.458	12.948	-12.490				MEAN F & B		
3				MEAN	-12.490	715.599	-0.001	715.598	715.598		Turning Point
	1	F	1.243	5.43	-4.187				MEAN F & B		
RP-1				MEAN	-4.187	711.412	-0.002	711.410	711.410		Outside most end of vertical angle iron leaded to left side of tailrace wing wall
	1	F	5.298	6.516	-1.218				MEAN F & B		
GAGE				MEAN	-1.218	710.194	-0.003	710.192	710.192		Top Gage (710.00)
	1	B	6.422	5.203	1.219						
RP-1				MEAN	1.219	711.413	-0.003	711.410			Outside most end of vertical angle iron leaded to left side of tailrace wing wall
	1	B	5.324	1.136	4.188						
3				MEAN	4.188	715.601	-0.004	715.597			Turning Point
	1	B	12.716	0.226	12.490						
2				MEAN	12.490	728.091	-0.004	728.087			Turning Point
	1	B	12.616	4.123	8.493						
D-4				MEAN	8.493	736.584	-0.005	736.579		Elev establish from COE Mon	Bronze tablet set in concrete pad 30 feet downstream and 40 feet shoreward of powerhouse entrance door. Origin of level run
	8	Sum Turns									
LOOP 7									MEAN F & B		
BM-K9						736.198	0.000	736.198	736.198	Elevation from Loop 4	2-inch bronze tablet set in pad located 102 feet upstream and 24 feet streamward of powerhouse entrance door
	1	F	3.465	5.433	-1.968				MEAN F & B		
BM-K6				MEAN	-1.968	734.230	0.000	734.229	734.229		2-inch bronze tablet set in sidewalk located 103 feet upstream and 110 feet streamward of powerhouse entrance door
	1	F	5.453	3.885	1.568				MEAN F & B		
BM-C1				MEAN	1.568	735.798	-0.001	735.797	735.797		2-inch bronze tablet set in sidewalk located 124 feet upstream and 247 feet streamward of powerhouse entrance door
	1	B	3.95	5.518	-1.568						
BM-K6				MEAN	-1.568	734.230	-0.001	734.229			2-inch bronze tablet set in sidewalk located 103 feet upstream and 110 feet streamward of powerhouse entrance door
	1	B	5.42	3.451	1.969						
BM-K9				MEAN	1.969	736.199	-0.001	736.198		Elevation from Loop 4	2-inch bronze tablet set in pad located 102 feet upstream and 24 feet streamward of powerhouse entrance door
	4	Sum Turns									

LEVEL ABSTRACT

SURVEY OF LAKE ALLATOONA — ABSTRACTED BY SCN

ORDER 3rd — ADJUSTED BY SCN — VERTICAL DATUM NAVD88

DATE — CHECK BY SCN

9/23/2009 — RUN BY TRD

STATION	# OF TURNS	FOR B	SUM OF ROD READINGS		DIFF OF ELEV	ELEVATIONS-STATIC UNADJUSTED	CORRECTION	ADJUSTED	MEAN STATIC	REMARKS
			BS	FS						

Lake Allatoona Dam Tailwater Final Elevations

Point	ELEVATION NAVD88 Feet	ELEVATION Furnished NGVD29 Feet	DIFF NAVD88 NGVD29 Feet	DESCRIPTION
D-4	736.579	736.286	0.293	Bronze tablet set in concrete pad 30 feet downstream and 40 feet shoreward of powerhouse entrance door. Origin of level run
BM-RW	743.009	742.71		4-inch bronze tablet set in curb located 100 feet upstream and 18.5 feet shoreward of powerhouse entrance door
BM-K9	736.198	735.898	0.299	2-inch bronze tablet set in pad located 102 feet upstream and 24 feet streamward of powerhouse entrance door
RM-2	739.202	738.892	0.310	Chiseled square in concrete shelf at gage house
2	728.088			Turning Point
3	715.598			Turning Point
RP-1	711.410	711.114	0.296	Outside most end of vertical angle iron leaded to left side of tailrace wing wall
GAGE	710.192			Top Gage (710.00)
BM-K6	734.229	733.924	0.305	2-inch bronze tablet set in sidewalk located 103 feet upstream and 110 feet streamward of powerhouse entrance door
BM-C1	735.797	735.924	-0.127	2-inch bronze tablet set in sidewalk located 124 feet upstream and 247 feet streamward of powerhouse entrance door

METHOD	READING	DATE/TIME
VISABLE	695.33	9/25/2009 @ 9:55:00 AM
ELECTRONIC	695.32	9/25/2009 @ 10:00:00 AM

710.192	NAVD88 Elevation on Gage @ 710.00'
710.00	Actual gage reading
0.191	Difference (NAVD88 & Staff Gage)

SURVEY DATASHEET (Version 1.0)

PID:	BBBM47
Designation:	BM1
Stamping:	1
Stability:	Most reliable; expected to hold position well
Setting:	Massive structures (other than listed below)
Mark Condition:	G
Description:	THE MARK IS FOUND ON THE NORTH END OF ALLATOONA DAM WHERE SR 120 SPUR TERMINATES. LOCATED NEAR CENTERLINE OF DAM, MARK IS 33.2' NE OF A LIGHT POLE, 41.4' SE OF THE S CORNER OF A CONCRETE STAIRWELL. AND 30.8' SW OF THE CENTERLINE OF AN ACCESS GATE TO THE NORTH END OF THE DAM.
Observed:	2009-09-29T12:30:00Z See Also 2009-10-06
Source:	OPUS - page5 0909.08

Close-up View

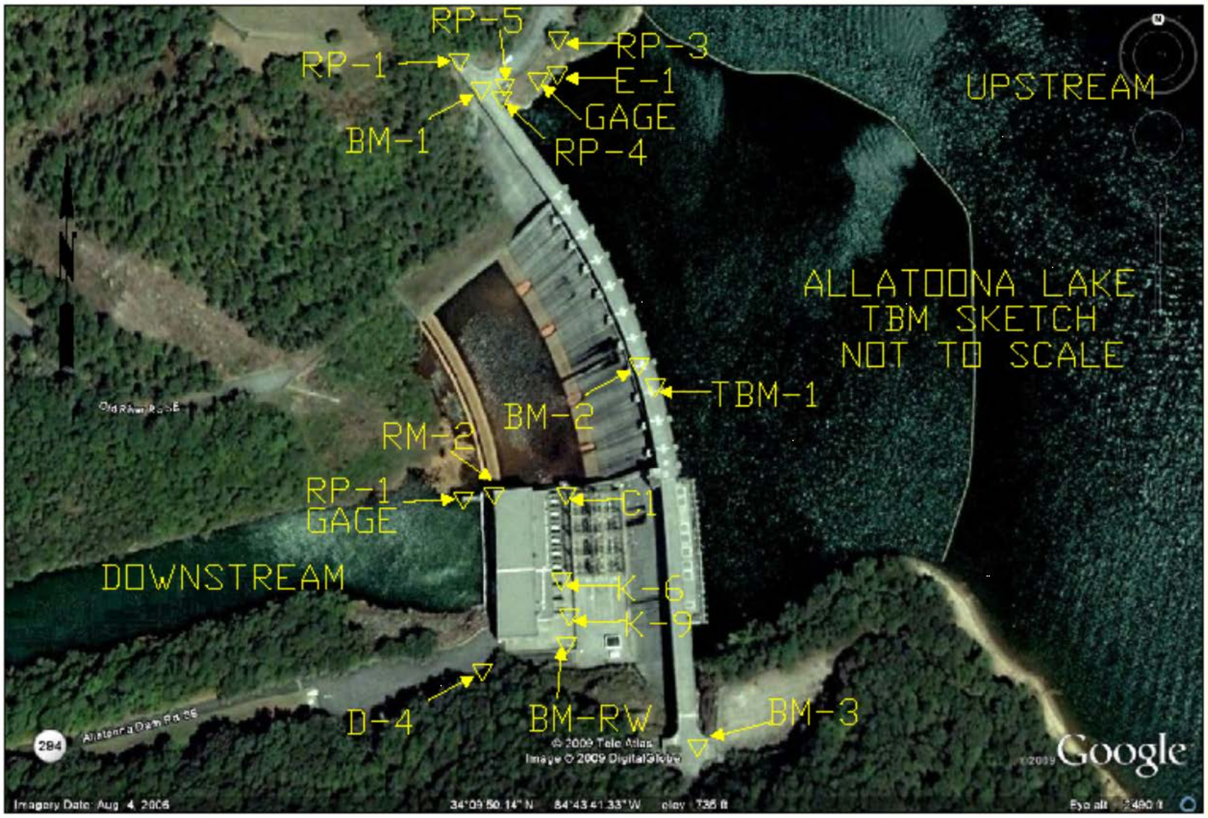
REF_FRAME: NAD_83 (CORS96)	EPOCH: 2002.0000	SOURCE: NAVD88 (Computed using GEOID03)	UNITS: m	SET PROFILE	DETAILS

LAT:	34° 9' 55.17435"	± 0.013 m
LON:	-84° 43' 43.62824"	± 0.018 m
ELL HT:	238.778	± 0.041 m
X:	485367.359	± 0.017 m
Y:	-5260836.485	± 0.041 m
Z:	3561769.250	± 0.013 m
ORTHO HT:	268.201	± 0.059 m

	UTM 16	SPC 1002(GA W)
NORTHING:	3782818.246m	461983.251m
EASTING:	709354.925m	648174.457m
CONVERGENCE:	1.27593869°	-0.31568334°
POINT SCALE:	1.00014031	0.99993310
COMBINED FACTOR:	1.00010282	0.99989562

SURVEY DATASHEET (Version 1.0) Page 1 of 1

The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.



Allatoona Dam and Lake

EXHIBIT C

STANDING INSTRUCTIONS TO THE DAMTENDERS FOR WATER CONTROL

STANDING INSTRUCTIONS TO THE DAMTENDER
FOR WATER CONTROL
ALLATOONA DAM AND LAKE

1. BACKGROUND AND RESPONSIBILITIES

a. General Information. These Standing Instructions to the Project Operator for Water Control are written in compliance with Section 9-2 of EM-1110-2-3600 (Engineering and Design, *Management of Water Control Systems*, 30 November 1987) and with ER-1110-2-240 (Engineering and Design, *Water Control Management*, 8 October 1982). A copy of these Standing Instructions must be kept on hand at the project site at all times. Any deviation from the Standing Instructions will require approval of the District Commander.

(1) **Project Purposes**. The Allatoona Project is operated for flood risk management, hydropower, recreation, fish and wildlife conservation, water quality, water supply and navigation (only incidental benefits due to reregulation of flow by APC projects downstream). Water Control actions are in support of these project purposes and for purposes of the ACT River system.

(2) **Chain of Command**. The Project Operator is responsible to the Water Control Manager for all water control actions.

(3) **Structure**. Allatoona Dam is located on the Etowah River, 48 river miles above Rome, Georgia. Allatoona Dam and Lake are located within Bartow, Cherokee, and Cobb Counties. The drainage area above Allatoona Dam is approximately 1,122 square miles.

(4) **Operation and Maintenance (O&M)**. All O&M activities are the responsibility of the U.S. Army Corps of Engineers under the supervision of the Mobile District, Operations Division, and the direction of the Allatoona Dam (Allatoona Lake) Operations Project Manager.

b. Role of the Project Operator. The term Project Operator refers to both the Carters Powerhouse Operator and to the Allatoona Powerhouse Personnel. Operation of the hydropower units and data reporting is the responsibility of the Carters Powerhouse Operator. Operation of the spillway and sluice gates is the responsibility of the Allatoona Powerhouse Personnel.

(1) **Normal Conditions (dependent on day-to-day instruction)**. The Water Control Manager will coordinate the daily water control actions regarding hydropower releases with the Southeastern Power Administration (SEPA), and will notify the Project Operator of these changes. The Project Operator will then receive instructions from SEPA via hourly generation schedule updates. This daily communication will be increased to an hourly basis if the need develops. Daily generation schedules and updates are provided to the Water Management Section. In the event that water cannot be passed through the hydropower units or if additional releases in excess of hydropower capacity are needed, the Water Control Manager will coordinate releases through the spillway and/or sluice gates with the Powerhouse Operator at the Carters Powerhouse. The Carters Project Operator then dispatches Allatoona Powerhouse personnel for spillway and sluice operations.

(2) **Emergency Conditions (flood, drought, or special operations)**. During emergency conditions, the Project Operator will be instructed by the Water Control Manager on a daily or hourly basis for all water control actions. In the event that communications with Water Management Section are cut off, the Project Operator will continue to follow the water control

plan and contact the Water Management Section as soon as communication is reestablished. Specific operator instructions are shown below:

Operator instructions in the event of lost communications with Water Management Section	
Condition	Action
II. Rome stage is above 20' and rising. Pool is below Elevation 850 feet-NGVD29	Halt scheduled releases
II. Rome stage is above 20' and rising. Pool is above Elevation 850 feet-NGVD29	Continue scheduled releases
III. Rome stage is below 22' and falling.	Make scheduled releases
IV. Rome is above 25'. or Kingston is above11'. or Cartersville is above 18'.	Make no releases unless called for in Condition V.
V. Releases are required by the Induced Surcharge Schedule. See Plate 7-2.	Release the greater of: requirements from Induced Surcharge Schedule, or releases from condition III,
<u>NOTES</u>: Bankfull stages at Rome, Kingston and Cartersville are 20, 9, and 15 feet, respectively. If Rome stage cannot be obtained, then make projection by using the rate of change of the last known 3 hours to estimate the current stage. If a rainfall of 4 inches or greater occurs the rate of rise at Rome should be in the range of one foot per three hours. If Rome stage is expected to exceed 25 feet and Induced Surcharge Schedule does not call for release, then halt generation. Condition II implies a previous flood condition and the pool should be lowered.	

2. DATA COLLECTION AND REPORTING

a. <u>General</u>. Report hourly the pool elevation, tailwater elevation, turbine discharge, spillway discharge, capacity, and general project status on the computer and have it accessible to the Water Control Manager by computer network.

b. <u>Daily Reporting</u>. The Project Operator will record the following items daily and will report them by 6:30 AM (0630) Central Time to the Water Management Section either by computer network, by fax machine (251-694-4058), or by telephone conversation (251-690-2737):

(1) Pool elevation and tailwater elevation in feet above mean sea level at 6 am and 12 midnight (0600 and 2400) for the period since the last report.

(2) Average plant discharge in cubic feet per second for the first 4 hours of each day and for the 24 hours of the previous day.

(3) Average turbine discharge for the 24 hours of the previous day.

(4) Inflow to the lake in cubic feet per second for the first 4 hours of each day and for the 24 hours of the previous day.

(5) Current day's generation schedule and previous day's actual generation in megawatt-hours. Include the schedule for the current day's generation.

(6) Total current generating capacity of the plant in megawatts.

c. Gage Verification. In accordance with the USACE Guidance Memorandum for Critical Gage Instrumentation dated 15 Dec 2006, the Allatoona Powerhouse personnel will perform gage reading verifications by providing the pool level automated instrumentation gage reading and staff gage readings. Weekly reports are sent to the Water Management Section which provide gage verification readings for all projects so that potential gage equipment issues can be addressed. In the event that the automated gage equipment malfunctions or if the difference in stage readings is greater than 0.3 feet, the Project Operator will report readings from the staff gage until the automated gage is rectified.

d. Regional Hydrometeorological Conditions. The Project Operator will be informed by the Water Control Manager of any regional hydro-meteorological conditions that may impact water control actions.

3. WATER CONTROL ACTION AND REPORTING

a. Normal Conditions. During normal conditions, all releases will be made through the turbine units. The Project Operator will follow the Allatoona Dam and Lake Water Control Manual for normal water control actions and will report directly to the Water Control Manager.

b. Emergency Conditions. During high flows, the Project Operator will follow the instructions from the Water Control Manager and SEPA generation schedule updates regarding the suspension of releases during flood events and for resuming releases. If needed, the Project Operator will follow the instructions for the spillway and/or sluice gate settings to achieve the desired release rate.

c. Inquiries. All significant inquiries received by the Project Operator from citizens, constituents, or interest groups regarding water control procedures or actions must be referred directly to the Water Control Manager.

d. Water Control Problems. The Project Operator must immediately notify the Water Control Manager, by the most rapid means available, in the event that an operational malfunction, erosion, or other incident occurs that could impact project integrity in general or water control capability in particular.

EXHIBIT D

Alabama-Coosa-Tallapoosa (ACT) River Basin

Drought Contingency Plan

DROUGHT CONTINGENCY PLAN

FOR

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

ALLATOONA DAM AND LAKE
CARTERS DAM AND LAKE
ALABAMA POWER COMPANY COOSA RIVER PROJECTS
ALABAMA POWER COMPANY TALLAPOOSA RIVER PROJECTS
ALABAMA RIVER PROJECTS

US Army Corps of Engineers ®

South Atlantic Division
Mobile District

May 2015

DROUGHT CONTINGENCY PLAN
FOR THE
ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

I – INTRODUCTION

1-01. Purpose of Document. The purpose of this Drought Contingency Plan (DCP) is to provide a basic reference for water management decisions and responses to water shortage in the Alabama-Coosa-Tallapoosa (ACT) River Basin induced by climatological droughts. As a water management document it is limited to those drought concerns relating to water control management actions for Federal U.S. Army Corps of Engineers (Corps) and Alabama Power Company (APC) dams. This DCP does not prescribe all possible actions that might be taken in a drought situation due to the long-term nature of droughts and unique issues that may arise. The primary value of this DCP is in documenting the overall ACT Basin Drought Management Plan for the system of Corps and APC projects; in documenting the data needed to support water management decisions related to drought regulation; and in defining the coordination needed to manage the ACT project's water resources to ensure that they are used in a manner consistent with the needs which develop during a drought. This DCP addresses the water control regulation of the five Corps impoundments and the APC Coosa and Tallapoosa projects (Table 1) in regard to water control regulation during droughts. Details of the drought management plan as it relates to each project and its water control regulation during droughts are provided in the water control manual within the respective project appendix to the ACT Basin Master Water Control Manual.

II – AUTHORITIES

2-01. Authorities. The following list provides the policies and guidance that are pertinent to the development of drought contingency plans and actions directed therein.

A. ER 1110-2-1941, "Drought Contingency Plans", dated 15 Sep 1981. This regulation provides policy and guidance for the preparation of drought contingency plans as part of the Corps of Engineers' overall water management activities.

B. ER 1110-2-8156, "Preparation of Water Control Manuals", dated 31 Aug 1995. This document provides a guide for preparing water control manuals for individual water resource projects and for overall river basins to include drought contingency plans.

C. ER 1110-2-240, "Water Control Management", dated 8 Oct 1982. This regulation prescribes the policies and procedures to be followed in water management activities including special regulations to be conducted during droughts. It also sets the responsibility and approval authority in development of water control plans.

D. EM 1110-2-3600, "Management of Water Control Systems", dated 30 Nov 1987. This guidance memorandum requires that the drought management plan be incorporated into the project water control manuals and master water control manuals. It also provides guidance in formulating strategies for project regulation during droughts.

Table 1. Reservoir impoundments within the ACT River Basin

River/Project Name	Owner/State/ Year Initially Completed	Total storage at Full Pool (acre-feet)	Conservation Storage (acre-feet)	Percentage of ACT Basin Conservation Storage (%)
Coosawattee River				
Carters Dam and Lake	Corps/GA/1974	383,565	141,402	5.9
Carters Reregulation Dam	Corps/GA/1974	17,500	16,000	0.1
Etowah River				
Allatoona Dam and Lake	Corps/GA/1949	367,471	284,580	10.8
Hickory Log Creek Dam	CCMWA/Canton/ 2007	17,702	NA	NA
Coosa River				
Weiss Dam and Lake	APC/AL/1961	306,655	263,417	10.0
H. Neely Henry Dam and Lake	APC/AL/1966	120,853	118,210	4.5
Logan Martin Dam and Lake	APC/AL/1964	273,467	144,383	5.5
Lay Dam and Lake	APC/AL/1914	262,887	92,352	3.5
Mitchell Dam and Lake	APC/AL/1923	170,783	51,577	1.9
Jordan Dam and Lake	APC/AL/1928	236,130	19,057	0.7
Walter Bouldin Dam	APC/AL/1967	236,130	NA	--
Tallapoosa River				
Harris Dam and Lake	APC/AL/1982	425,721	207,317	7.9
Martin Dam and Lake	APC/AL/1926	1,628,303	1,202,340	45.7
Yates Dam and Lake	APC/AL/1928	53,908	6,928	0.3
Thurlow Dam and Lake	APC/AL/1930	17,976	NA	--
Alabama River				
Robert F. Henry Lock and Dam/R.E. "Bob" Woodruff Lake	Corps/AL/1972	247,210	36,450	1.4
Millers Ferry Lock and Dam/William "Bill" Dannelly Lake	Corps/AL/1969	346,254	46,704	1.8
Claiborne Lock and Dam and Lake	Corps/AL/1969	102,480	NA	--

III – DROUGHT IDENTIFICATION

3-01. **<u>Definition</u>**. Drought can be defined in different ways - meteorological, hydrological, agricultural, and socioeconomic. In this DCP, the definition of drought used in the *National Study of Water Management During Drought* is used:

> "Droughts are periods of time when natural or managed water systems do not provide enough water to meet established human and environmental uses because of natural shortfalls in precipitation or streamflow."

That definition defines drought in terms of its impact on water control regulation, reservoir levels, and associated conservation storage. Water management actions during droughts are intended to balance the water use and water availability to meet water use needs. Because of hydrologic variability, there cannot be 100 percent reliability that all water demands are met. Droughts occasionally will be declared and mitigation or emergency actions initiated to lessen the stresses placed on the water resources within a river basin. Those responses are tactical measures to conserve the available water resources (USACE 2009).

3-02. Drought Identification. There is no known method of predicting how severe or when a drought will occur. There are, however, indicators that are useful in determining when conditions are favorable: below normal rainfall; lower than average inflows; and low reservoir levels, especially immediately after the spring season when rainfall and runoff conditions are normally the highest. When conditions indicate that a drought is imminent, the Corps Water Management Section (WMS) and APC will increase the monitoring of the conditions and evaluate the impacts on reservoir projects if drought conditions continue or become worse for 30-, 60-, or 90-day periods. Additionally, WMS and APC will determine if a change in operating criteria would aid in the total regulation of the river system and if so, what changes would provide the maximum benefits from any available water.

Various products are used to detect and monitor the extent and severity of basin drought conditions. One key indicator is the U.S. Drought Monitor available through the U.S. Drought Portal, www.drought.gov. The National Weather Service (NWS) Climate Prediction Center (CPC) also develops short-term (6- to 10-day and 8- to 14-day) and long-term (1-month and 3-month) precipitation and temperature outlooks and a U.S. Seasonal Drought Outlook, which are useful products for monitoring dry conditions. The Palmer Drought Severity Index is also used as a drought reference. The Palmer index assesses total moisture by using temperature and precipitation to compute water supply and demand and soil moisture. It is considered most relevant for non-irrigated cropland and primarily reflects long-term drought. However, the index requires detailed data and cannot reflect an operation of a reservoir system. The Alabama Office of the State Climatologist also produces a Lawn and Garden Moisture Index for Alabama, Florida, Georgia, and South Carolina, which gives a basin-wide ability to determine the extent and severity of drought conditions. The runoff forecasts developed for both short- and long-range periods reflect drought conditions when appropriate. There is also a heavy reliance on the latest El Niño Southern Oscillation (ENSO) forecast modeling to represent the potential effects of La Niña on drought conditions and spring inflows. Long-range models are used with greater frequency during drought conditions to forecast potential effects on reservoir elevations, ability to meet minimum flows, and water supply availability. A long-term, numerical model, Extended Streamflow Prediction, developed by the NWS, provides probabilistic forecasts of streamflow and reservoir stages on the basis of climatic conditions, streamflow, and soil moisture. Extended Streamflow Prediction results are used in projecting possible future drought conditions. Other parameters and models can indicate a lack of rainfall and runoff and the degree of severity and continuance of a drought. For example, models using data of previous droughts or a percent of current to mean monthly flows with several operational schemes have proven helpful in forecasting reservoir levels for water management planning purposes. Other parameters considered during drought management are the ability of the various lakes to meet the demands placed on storage, the probability that lake elevations will return to normal seasonal levels, basin streamflows, basin groundwater table levels, and the total available storage to meet hydropower marketing system demands.

3-03. Historical Droughts. Drought events have occurred in the ACT Basin with varying degrees of severity and duration. Five of the most significant historical basin wide droughts occurred in 1940-1941, 1954-1958, 1984-1989, 1999-2003, and 2006-2009. The 1984 to 1989 drought caused water shortages across the basin in 1986. This resulted in the need for the Corps to make adjustments in the water management practices. Water shortages occurred again from 1999 through 2002 and during 2007 through 2008. The 2006 to 2009 drought was the most devastating recorded in Alabama and western Georgia. Precipitation declines began in December 2005. These shortfalls continued through winter 2006-07 and spring 2007, exhibiting the driest winter and spring in the recorded period of record. The Corps and APC had water levels that were among the lowest recorded since the impoundments were constructed. North Georgia received less than 75 percent of normal precipitation (30-year average). The drought reached peak intensity in 2007, resulting in a D-4 Exceptional Drought Intensity (the worst measured) throughout the summer of 2007.

3-04. **<u>Severity</u>**. Water shortage problems experienced during droughts are not uniform throughout the ACT River Basin. Even during normal, or average, hydrologic conditions, various portions of the basin experience water supply problems. The severity of the problems are primarily attributed to the pattern of human habitation within the basin; the source of water utilized (surface water vs. ground water); and the characteristics of the water resources available for use. During droughts, these problems can be intensified. A severe drought in the basin develops when a deficiency of rainfall occurs over a long time period and has a typical duration of 18 to 24 months. The number of months of below normal rainfall is more significant in determining the magnitude of a drought in the basin than the severity of the deficiency in specific months. However, the severity of the rainfall deficiency during the normal spring wet season has a significant impact on the ability to refill reservoirs after the fall/winter drawdown period. Another confounding factor which influences droughts in the basin is the variability of rainfall over the basin, both temporarily and spatially.

IV – BASIN AND PROJECT DESCRIPTION

4-01. **<u>Basin Description</u>**. The headwater streams of the Alabama-Coosa-Tallapoosa (ACT) River Basin rise in the Blue Ridge Mountains of Georgia and Tennessee and flow southwest, combining at Rome, Georgia, to form the Coosa River. The confluence of the Coosa and Tallapoosa Rivers in central Alabama forms the Alabama River near Wetumpka, Alabama. The Alabama River flows through Montgomery and Selma and joins with the Tombigbee River at the mouth of the ACT Basin to form the Mobile River about 45 miles above Mobile, Alabama. The Mobile River flows into Mobile Bay at an estuary of the Gulf of Mexico. The total drainage area of the ACT Basin is approximately 22,739 square miles: 17,254 square miles in Alabama; 5,385 square miles in Georgia; and 100 square miles in Tennessee. A detailed description of the ACT River Basin is provided in the ACT Master Water Control Manual, Chapter II – Basin Description and Characteristics.

4-02. **<u>Project Description</u>**. The Corps operates five projects in the ACT Basin: Allatoona Dam and Lake on the Etowah River; Carters Dam and Lake and Reregulation Dam on the Coosawattee River; and Robert F. Henry Lock and Dam, Millers Ferry Lock and Dam, and Claiborne Lock and Dam on the Alabama River. Claiborne is a lock and dam without any appreciable water storage behind it. Robert F. Henry and Millers Ferry are operated as run-of-river projects and only very limited pondage is available to support hydropower peaking and other project purposes. APC owns and operates eleven hydropower dams in the ACT Basin; seven dams on the Coosa River and four dams on the Tallapoosa River. Figure 1 depicts the percentage of conservation storage of each project in the ACT Basin. Figure 2 shows the project locations within the basin. Figure 3 provides a profile of the basin and each project.

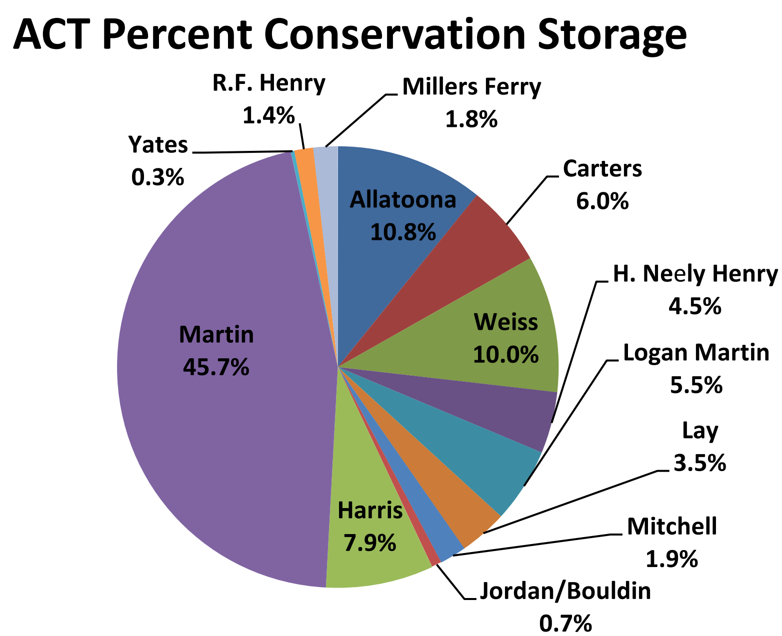


Figure 1. Alabama-Coosa-Tallapoosa River Basin Percent Conservation Storage

A. **General.** Of the 16 reservoirs (considering Jordan Dam and Lake and Bouldin Dam as one reservoir and Carters Lake and Carters Reregulation Dam as one reservoir), Lake Martin on the Tallapoosa River has the greatest amount of storage, containing 45.7 percent of the conservation storage in the ACT Basin. Allatoona Lake, R.L. Harris Lake, Weiss Lake, and Carters Lake are the next four largest reservoirs in terms of storage. APC controls approximately 80 percent of the available conservation storage; Corps projects (Robert F. Henry Lock and Dam, Millers Ferry Lock and Dam, Allatoona Lake, and Carters Lake) control 20 percent. The two most upstream Corps reservoirs, Allatoona Lake and Carters Lake, account for 16.8 percent of the total basin conservation storage.

Figure 2. Alabama-Coosa-Tallapoosa River Basin Project Location Map

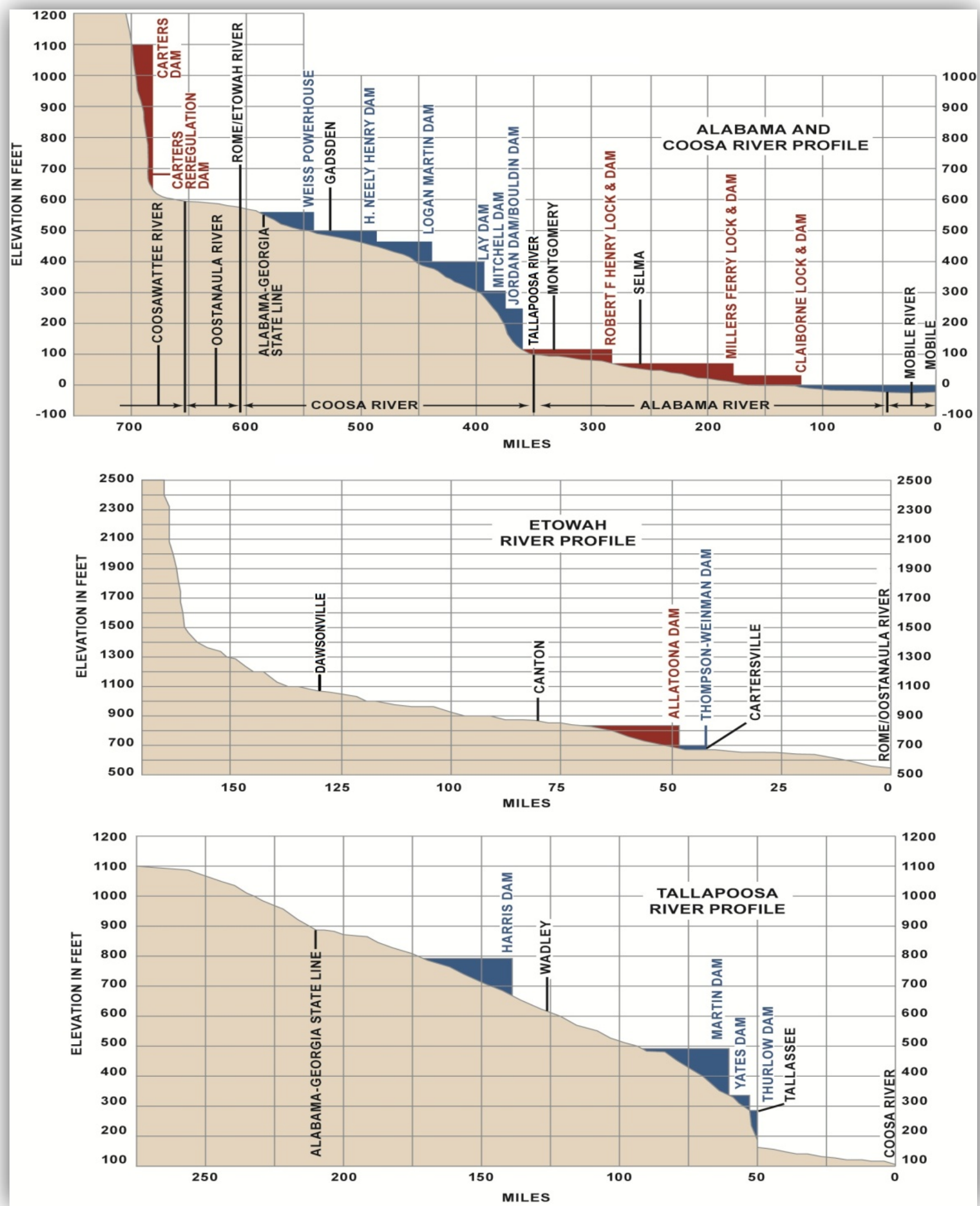


Figure 3. Alabama-Coosa-Tallapoosa River Basin Profile Map

B. **Allatoona Dam and Lake**. The Corps' Allatoona Dam on the Etowah River creates the 11,862 acres Allatoona Lake. The project's authorization, general features, and purposes are described in the Allatoona Dam and Lake Water Control Manual. The Allatoona Lake top of conservation pool is elevation 840 feet NGVD29 during the late spring and summer months (May through August); transitions to elevation 835 feet NGVD29 in the fall (October through mid-November); transitions to a winter drawdown to elevation 823 feet NGVD29 (1-15 January); and refills back to elevation 840 feet NGVD29 during the winter and spring wet season as shown in the water control plan guide curve (Figure 4). However, the lake level may fluctuate significantly from the guide curve over time, dependent primarily upon basin inflows but also influenced by project operations, evaporation, withdrawals, and return flows. A minimum flow of about 240 cfs is continuously released through a small unit, which generates power while providing a constant flow to the Etowah River downstream. Under drier conditions when basin inflows are reduced, project operations are adjusted to conserve storage in Allatoona Lake while continuing to meet project purposes in accordance with four action zones as shown on Figure 4.

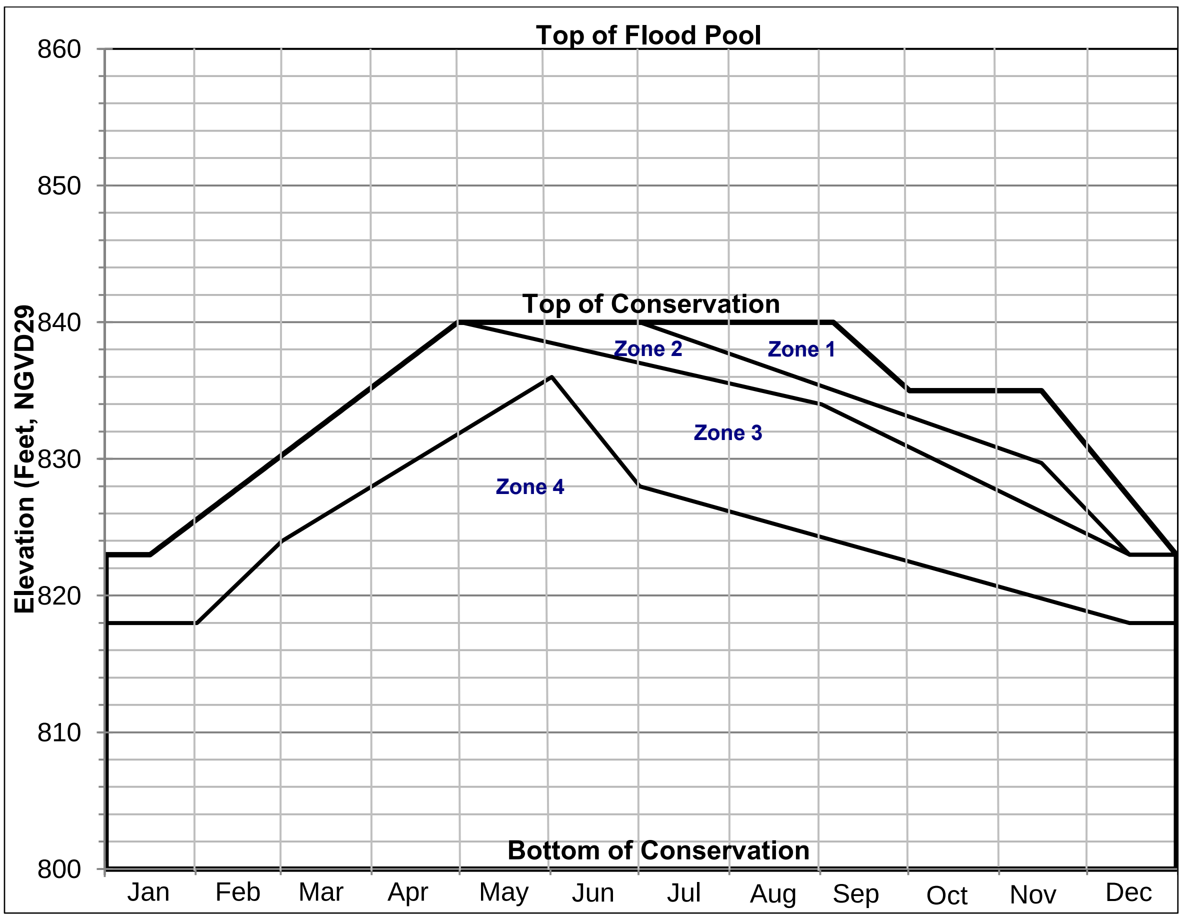


Figure 4. Allatoona Lake Guide Curve and Action Zones

C. **Carters Dam and Lake and Reregulation Dam**. Carters Lake is formed by Carters Dam, a Corps' reservoir on the Coosawattee River in northwest Georgia upstream of Rome, Georgia. The Carters project is a pumped-storage peaking facility that utilizes a Reregulation Dam and storage pool in conjunction with the main dam and lake. The project's authorization, general features, and purposes are described in the Carters Dam and Lake and Regulation Dam water control manual. The Carters Lake top of conservation pool is elevation 1,074 feet NGVD29 from 1 May to 1 November; transitioning to elevation 1,072 feet NGVD29 between 1 November and 1 December; remains at elevation 1,072 feet NGVD 29 from 1 December to April; then transitioning back to 1,074 feet NGVD29 between 1 April and 1 May. This is shown in the water control plan guide curve (Figure 5). As expected with a peaking/pumped storage operation, both Carters Lake and the reregulation pool experience frequent elevation changes. Typically, water levels in Carters Lake vary no more than 1 to 2 feet per day. The reregulation pool will routinely fluctuate by several feet (variable) daily as the pool receives peak hydropower discharges from Carters Lake and serves as the source for pumpback operations into Carters Lake during non-peak hours. The reregulation pool will likely reach both its normal maximum elevation of 696 feet NGVD29 and minimum elevation of 677 feet NGVD29 at least once each week. However, the general trend of the lake level may fluctuate significantly from the guide curve over time, dependent primarily upon basin inflows but also influenced by project operations and evaporation. Carters Regulation Dam provides a seasonal varying minimum release to the Coosawattee River for downstream fish and wildlife conservation. Under drier conditions when basin inflows are reduced, project operations are adjusted to conserve storage in Carters Lake while continuing to meet project purposes in accordance with action zones as shown on Figure 5. In Zone 2, Carters Regulations Dam releases are reduced to 240 cfs.

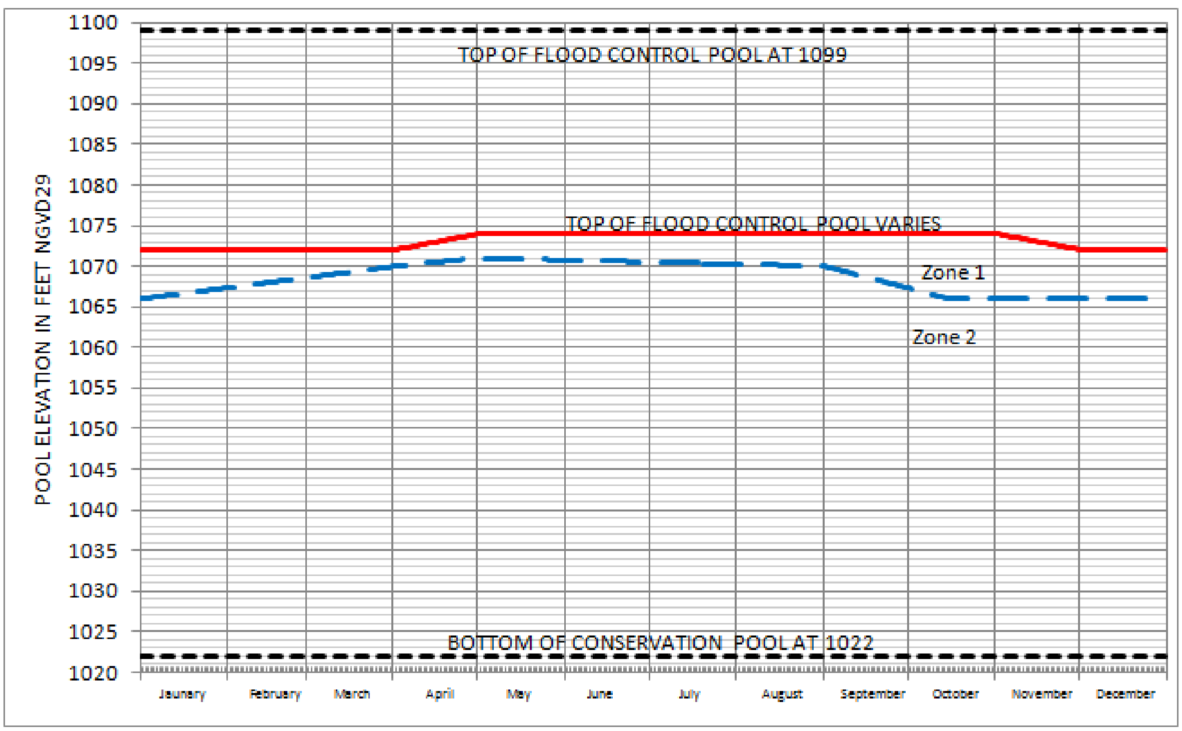


Figure 5. Carters Lake Guide Curve and Action Zones

D. **APC Coosa River Projects**. APC owns and operates the Coosa Hydro system of projects at Weiss Lake, H. Neely Henry Lake, Logan Martin Lake, Lay Lake, Mitchell Lake, and Jordan/Bouldin Dam and Lake on the Coosa River in the ACT Basin. APC Coosa River projects function mainly to generate electricity by hydropower. In addition, the upper three projects (Weiss, H. Neely Henry, and Logan Martin) operate pursuant to Public Law 83-436 regarding the requirement for the projects to be operated for flood risk management and navigation in accordance with reasonable rules and regulations of the Secretary of the Army. The rules and regulations are addressed in a memorandum of understanding between the Corps and APC (Exhibit B of the *Master Water Control Manual, Alabama-Coosa-Tallapoosa (ACT) River Basin, Alabama, Georgia*), in individual water control manuals for the three projects, and in this ACT Basin DCP. The Weiss Lake is on the Coosa River in northeast Alabama, about 80 mi northeast of Birmingham, Alabama, and extends into northwest Georgia for about 13 miles upstream on the Coosa River. The dam impounds a 30,027 acres reservoir (Weiss Lake) at the normal summer elevation of 564 feet NGVD29 as depicted in the regulation guide curve shown in Figure 6 (source APC). The H. Neely Henry Lake is on the Coosa River in northeast Alabama, about 60 miles northeast of Birmingham, Alabama. The dam impounds an 11,200 acres reservoir at the normal summer elevation of 508 feet NGVD29 as depicted in the regulation guide curve shown in Figure 7 (source APC). The Logan Martin Lake is in northeast Alabama on the Coosa River, about 40 miles east of Birmingham, Alabama. The dam impounds a 15,269-acre reservoir at the normal summer elevation of 465 feet NGVD29 as depicted in the regulation guide curve shown in Figure 8 (source APC). The projects' authorizations, general features, and purposes are described in the Weiss, H. Neely Henry, and Logan Martin water control manual appendices to the ACT Basin Master Water Control Manual.

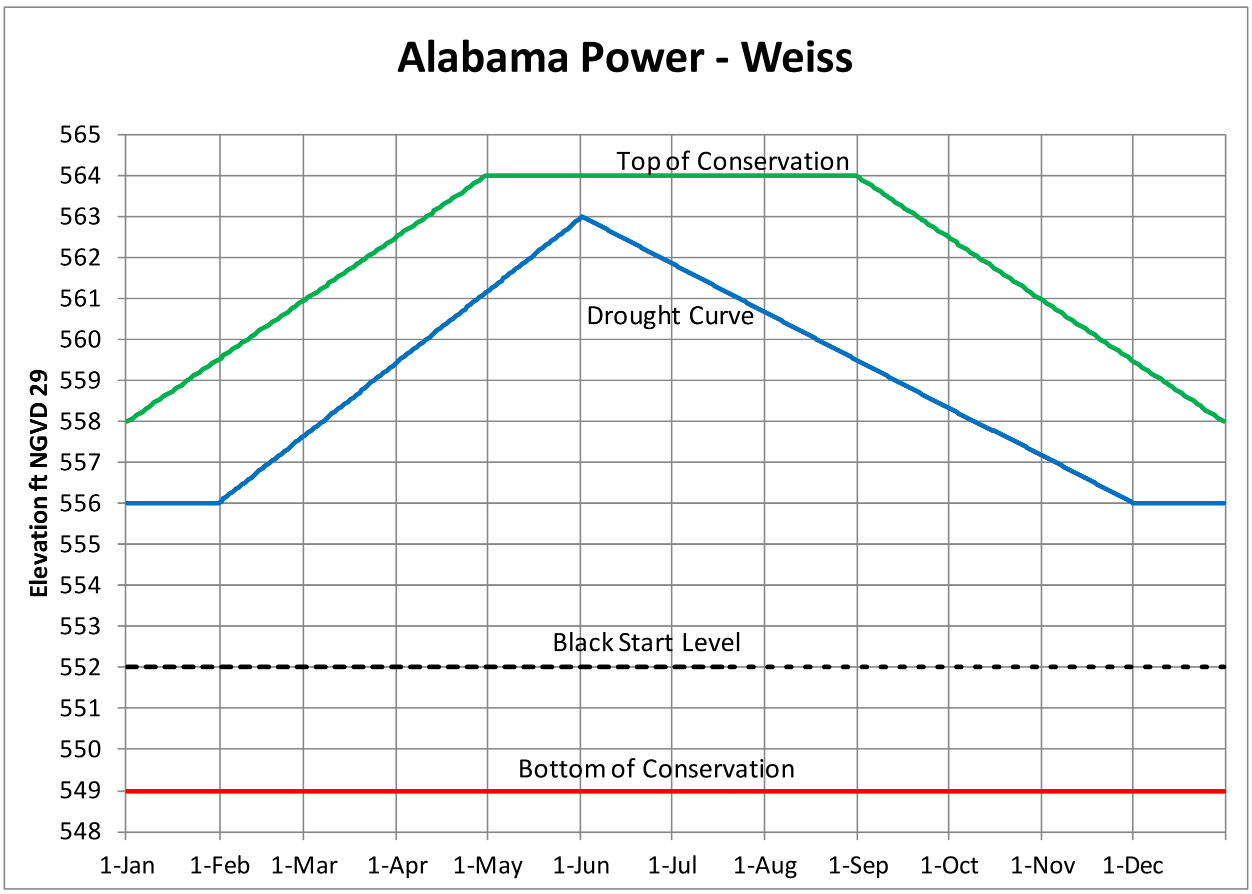


Figure 6. Weiss Lake Guide Curve

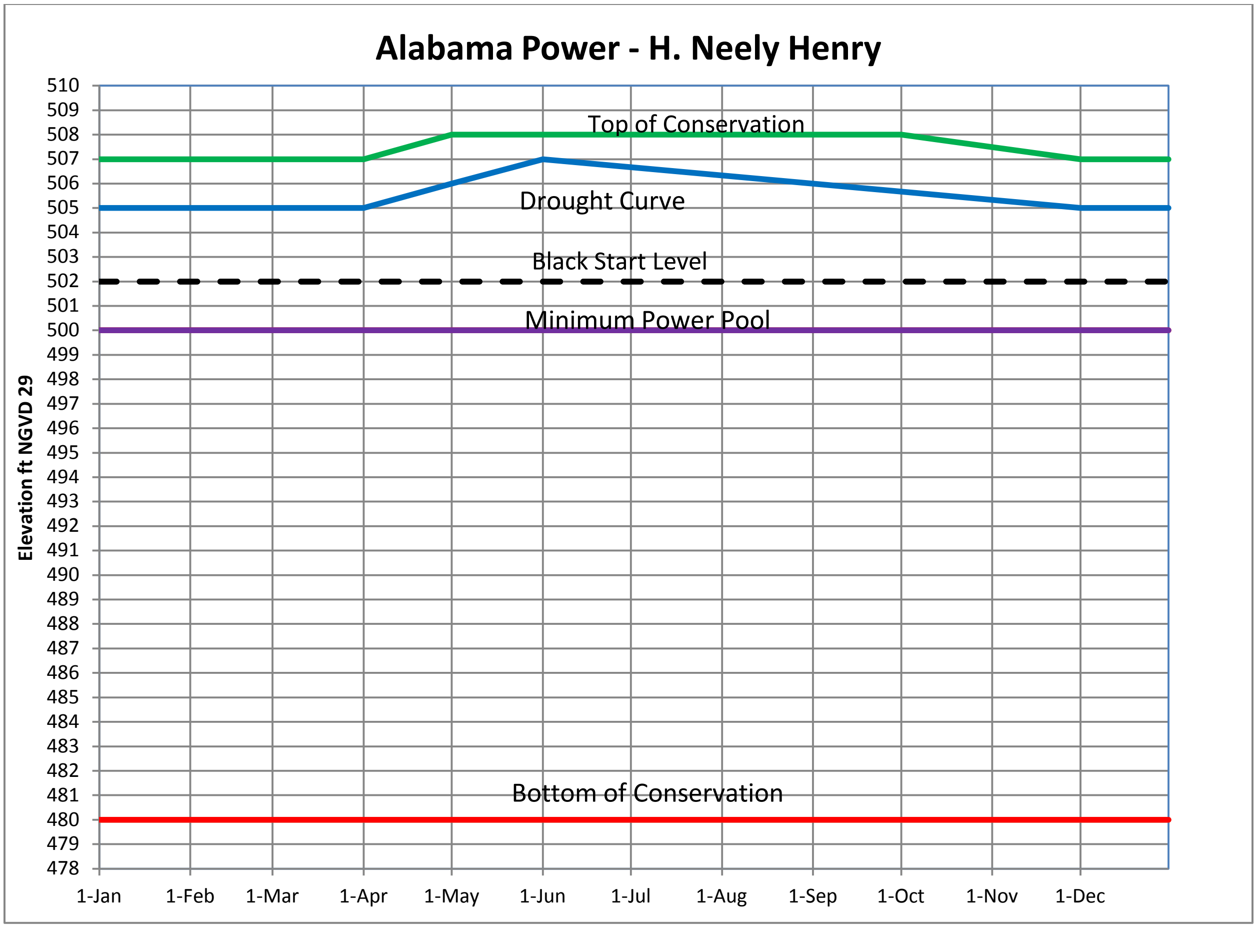


Figure 7. H. Neely Henry Lake Guide Curve

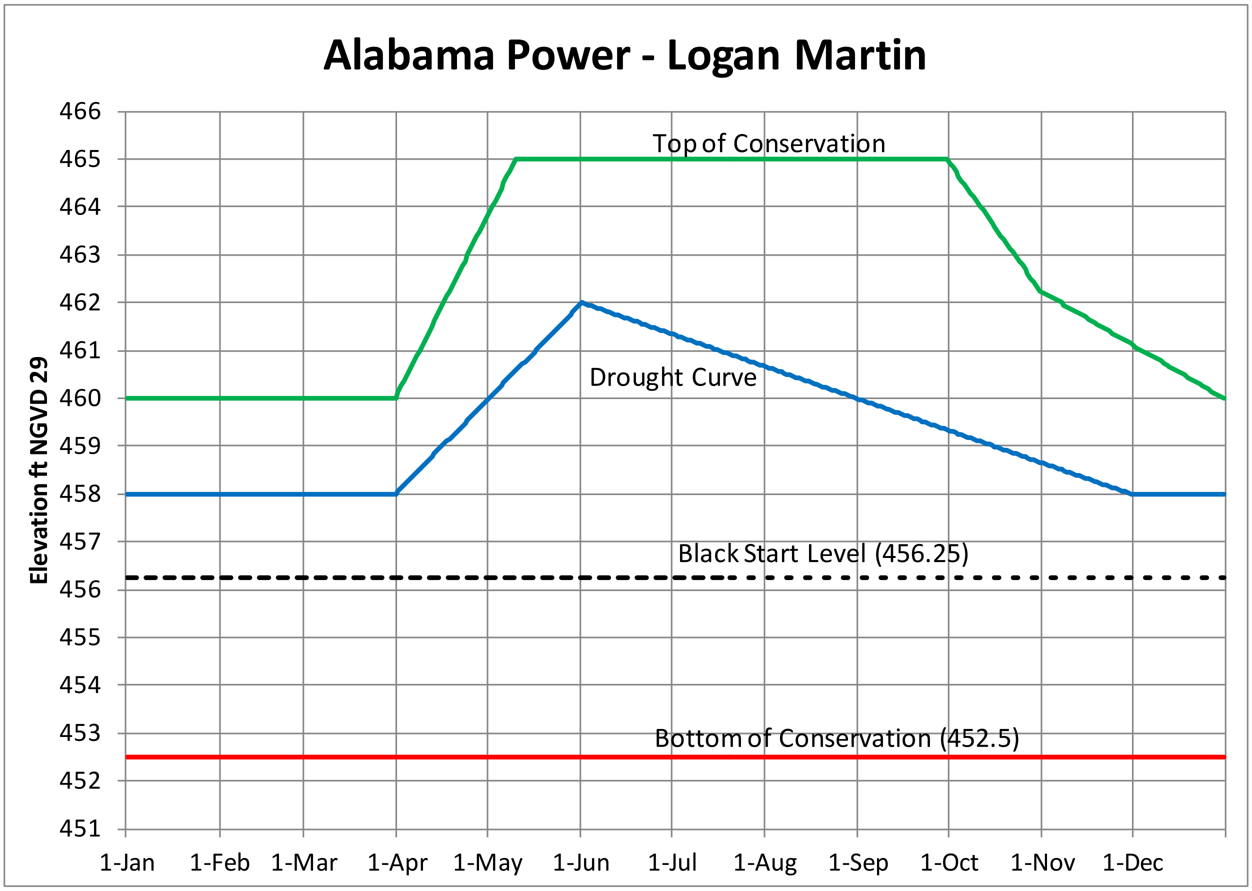


Figure 8. Logan Martin Lake Guide Curve

The downstream Coosa River APC run-of-river hydropower projects (Lay Dam and Lake, Mitchell Dam and Lake, and Jordan/Bouldin Dams and Lake) have no appreciable storage and are operated in conjunction with the upstream Coosa projects to meet downstream flow requirements and targets in support of the ACT Basin Drought Plan and navigation.

E. **APC Tallapoosa River Projects**. APC owns and operates the Tallapoosa River system of projects at Harris Dam and Lake, Martin Dam and Lake, Yates Dam, and Thurlow Dam in the ACT Basin. APC Tallapoosa River projects function mainly to generate electricity by hydropower. In addition, the Robert L. Harris Project operates pursuant to 33 CFR, Chapter II, Part 208, Section 208.65 regarding the requirement for the project to be operated for flood risk management and navigation in accordance with reasonable rules and regulations of the Secretary of the Army. The rules and regulations prescribed are described in a memorandum of understanding between the Corps and APC, individual water control manuals for the APC projects, and this DCP.

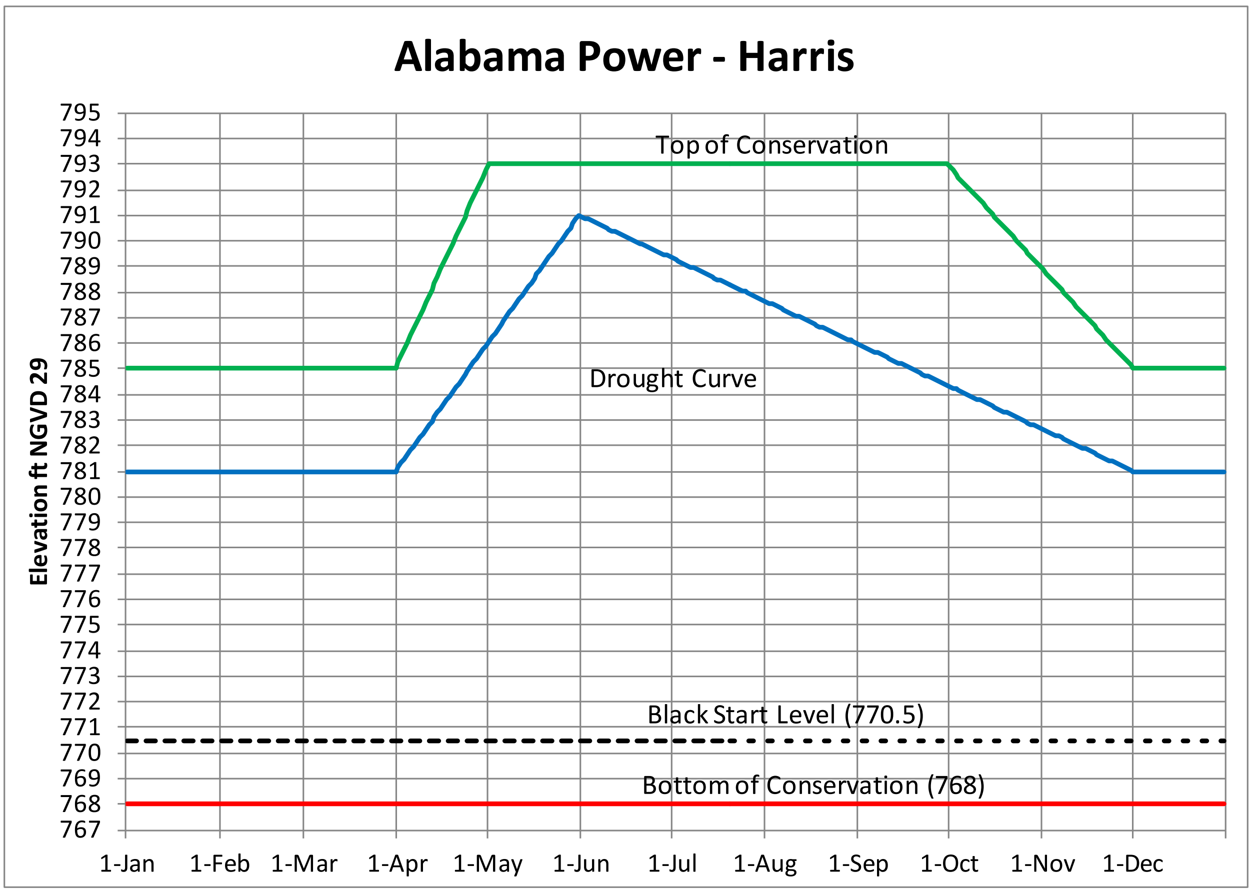


Figure 9. Robert L. Harris Lake Guide Curve

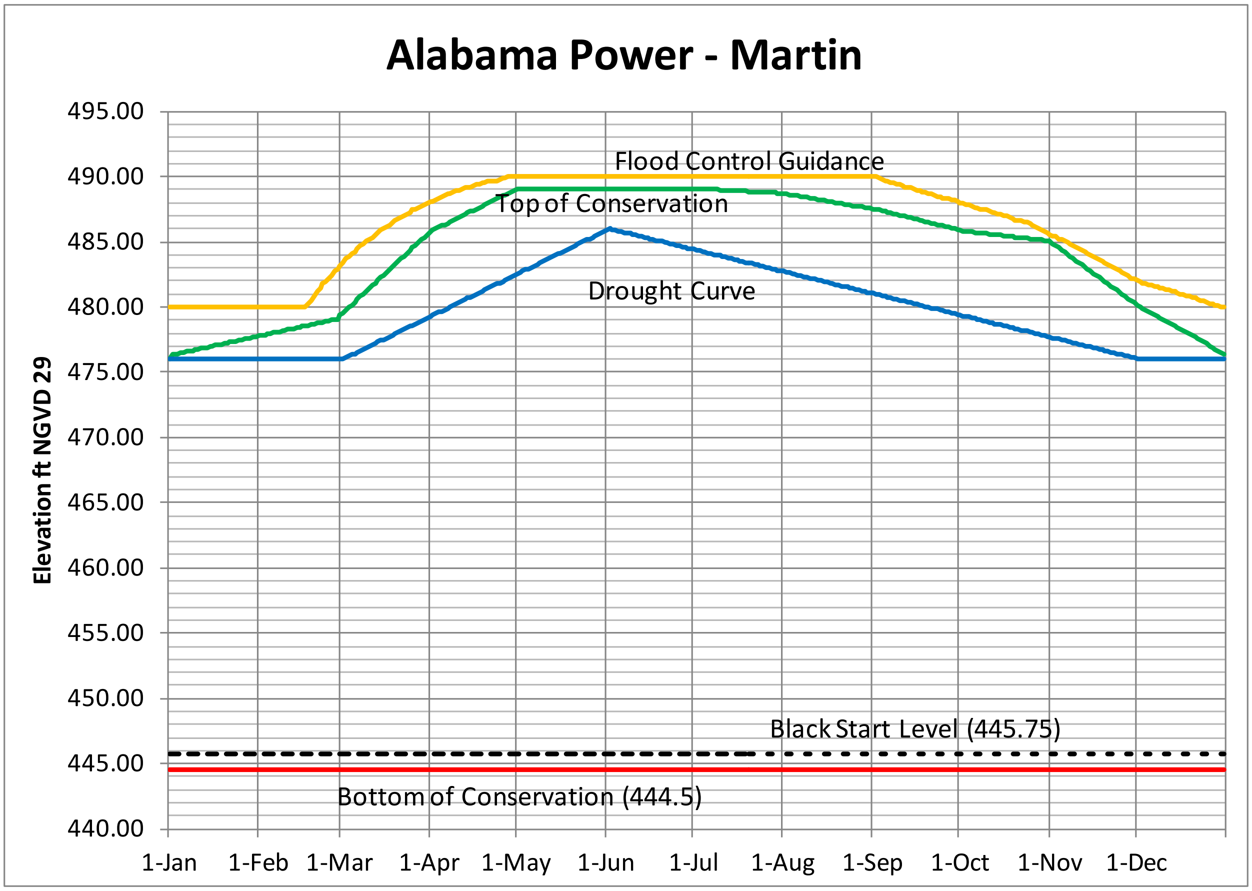


Figure 10. Martin Lake Guide Curve

F. **Corps Alabama River Projects**. The Corps operates three run-of-river lock and dam projects (Robert F. Henry, Millers Ferry, Claiborne) on the Alabama River in the lower ACT Basin to support commercial navigation. Claiborne Lake, together with R.E. “Bob” Woodruff Lake and William “Bill” Dannelly Lake, are collectively referred to as the Alabama River Lakes. The primary location used for communicating the available reliable navigation depth is the Claiborne Lock and Dam tailwater elevation. The water surface elevation is related to the available navigation depth based on the latest hydrographic surveys of the lower Alabama River reach downstream of Claiborne.

(1) Robert F. Henry. The R.E. “Bob” Woodruff Lake is created by the Robert F. Henry Lock and Dam on the Alabama River at river mile 236.3. R.E. “Bob” Woodruff Lake extends from the Robert F. Henry Lock and Dam upstream to the Walter Bouldin Dam. In addition to hydropower and navigation, R.E. “Bob” Woodruff Lake provides recreation and fish and wildlife conservation. R.E. “Bob” Woodruff Lake is 77 miles long and averages 1,300 feet wide. It has a surface area of 12,510 acres and a storage capacity of 234,200 acre-feet at a normal pool elevation of 126 feet NGVD29. Lake levels are typically fairly stable with minimal fluctuation between the operating pool elevation limits, 123 feet NGVD29 to 126 feet NGVD29. The emergency drawdown pool elevation is 122 feet NGVD29. An authorized 9-foot-deep by 200-foot-wide navigation channel exists over the entire length of the lake. The Jones Bluff

hydropower plant generating capacity is 82 MW (declared value). The lake is a popular recreation destination, receiving up to two million visitors annually.

(2) Millers Ferry. The William "Bill" Dannelly Lake is created by the Millers Ferry Lock and Dam on the Alabama River at river mile 133. William "Bill" Dannelly Lake is 103 miles long and averages almost 1,400 feet wide. The reservoir has a surface area of 18,500 acres and a storage capacity of 346,254 acre-feet at a normal full pool elevation of 80 feet NGVD29. Lake levels remain fairly stable on a day-to-day basis with minimal fluctuation between the operating pool elevation limits, 79 feet NGVD29 to 80 feet NGVD29. It has an authorized 9-foot-deep by 200-foot-wide navigation channel which extends the entire length of the reservoir. The facility is a multipurpose reservoir constructed by the Corps for both navigation and hydropower. The reservoir also provides recreational benefits and has lands managed for wildlife mitigation. The Millers Ferry hydropower plant generating capacity is 90 MW (declared value). The reservoir provides ample recreation opportunities. Recreation visitors number three million annually.

(3) Claiborne. Claiborne Lake is created by the Claiborne Lock and Dam on the Alabama River at river mile 72.5. The lake is similar to a wide river, averaging about 800 feet wide, with a surface area of 5,930 acres. Claiborne Lake extends 60 miles upstream to the Millers Ferry Lock and Dam. Storage capacity in the lake is 96,360 acre-feet at a normal pool elevation of 35 feet NGVD29. The operating pool elevation limits are between 32 feet NGVD29 and 36 feet NGVD29. The lake has an authorized 9-foot-deep, 200-foot-wide navigation channel extending its entire length. The primary purpose of the Corps project is navigation. No hydropower generating capability exists at the project. The lake also provides recreation benefits and lands managed for wildlife mitigation.

G. As other ACT water management objectives are addressed, lake levels might decline during prime recreation periods. Drought conditions will cause further drawdowns in lake levels. While lake levels will be slightly higher than what would naturally occur if no specific drought actions are taken, reservoir levels will decline thus triggering impacts associated with reaching initial recreation and water access limited levels. Large reservoir drawdowns impact recreational use: access to the water for boaters and swimmers is inhibited; submerged hazards (e.g., trees, shoals, boulders) become exposed or nearly exposed, posing safety issues; and exposed banks and lake bottoms become unsightly and diminish the recreation experience. Consequently certain levels are identified in each Corps impoundment at which recreation would be affected. The *Initial Impact level* (IIL) represents the level at which recreation impacts are first observed (i.e., some boat launching ramps are unusable, most beaches are unusable or minimally usable, and navigation hazards begin to surface). The *Recreation Impact level* (RIL) defines the level at which major impacts on concessionaires and recreation are observed (more ramps are not usable, all beaches are unusable, boats begin having problems maneuvering in and out of marina basin areas, loss of retail business occurs). The level at which severe impacts are observed in all aspects of recreational activities is called the *Water Access Limited level* (WAL). At this point, all or almost all boat ramps are out of service, all swimming beaches are unusable, major navigation hazards occur, channels to marinas are impassable and/or wet slips must be relocated, and a majority of private boat docks are unusable. The individual project water control manuals describe the specific impact levels at each project and provide information regarding the effects of the water control plans on recreation.

V – WATER USES AND USERS

5-01. Water Uses and Users.

A. Uses – The ACT Basin rivers and lakes provide for wastewater dilution, M&I water supply, fish and wildlife propagation, hydropower generation, and recreational boating and fishing.

B. Users – The following tables list the surface water uses and water users within Georgia and Alabama in the ACT Basin.

Table 2. Surface water use: ACT Basin (Georgia 2005)

Water use category	Quantity (mgd)	% of total
Total Use	788.98	100%
Public Supply	154.78	19.6%
Domestic and Commercial	0.30	0.0%
Industrial and Mining	32.49	4.1%
Irrigation	11.31	1.4%
Livestock	16.18	2.1%
Thermoelectric Power Generation	573.92	72.8%

Table 3. M&I surface water withdrawal permits in the ACT Basin (Georgia)

River basin	Permit holder	Permit number	County	Source water	Permit limit max day (mgd)	Permit limit monthly average (mgd)
Coosa River Basin (Georgia)—upstream counties to downstream counties						
Coosa	Dalton Utilities, Conasauga R	155-1404-01	Whitfield	Conasauga River	49.400	40.300
Coosa	Dalton Utilities, Mill Creek	155-1404-02	Whitfield	Mill Creek	13.200	7.500
Coosa	Dalton Utilities, Coahulla Cr	155-1404-03	Whitfield	Coahulla Creek	6.000	5.000
Coosa	Dalton Utilities, Freeman Sprngs	155-1404-04	Whitfield	Freeman Springs	2.000	1.500
Coosa	Dalton Utilities - River Road	155-1404-05	Whitfield	Conasauga River	35.000	18.000
Coosa	Chatsworth WW Commission	105-1405-01	Murray	Holly Creek	1.100	1.000
Coosa	Chatsworth WW Commission	105-1405-02	Murray	Eton Springs	1.800	1.800
Coosa	Chatsworth WW Commission	105-1409-01	Murray	Carters Lake	2.550	2.300
Coosa	Chatsworth, City of	105-1493-02	Murray	Coosawattee River	2.200	2.000
Coosa	Ellijay, City of - Ellijay R	061-1407-01	Gilmer	Ellijay River	0.550	0.450
Coosa	Ellijay - Gilmer County W & S Authority	061-1408-01	Gilmer	Cartecay River	4.000	4.000
Coosa	Calhoun, City of	064-1411-03	Gordon	Big Spring	7.000	6.000
Coosa	Calhoun, City of	064-1412-01	Gordon	City Of Calhoun Spring	0.638	0.537
Coosa	Calhoun, City of	064-1492-02	Gordon	Oostanaula River	6.200	3.000

Table 3 (continued). M&I surface water withdrawal permits in the ACT Basin (Georgia)

River basin	Permit holder	Permit number	County	Source water	Permit limit max day (mgd)	Permit limit monthly average (mgd)
Coosa	Calhoun, City of	064-1493-01	Gordon	Coosawattee River	18.000	16.000
Coosa	Jasper, City of	112-1417-02	Pickens	Long Swamp Creek	1.000	1.000
Coosa	Bent Tree Community, Inc.	112-1417-03	Pickens	Chestnut Cove Creek and unnamed creek	0.250	0.230
Coosa	Bent Tree Community, Inc.	112-1417-04	Pickens	Lake Tamarack	0.250	0.230
Coosa	Big Canoe Utilities Company, Inc.	112-1417-05	Pickens	Lake Petit	1.000	1.000
Coosa	Big Canoe Utilities Company, Inc.	112-1417-06	Pickens	Blackwell Creek	2.650	2.650
Coosa	Etowah Water & Sewer Authority	042-1415-01	Dawson	Etowah River	5.500	4.400
Coosa	Cherokee County Water & Sewerage Auth	028-1416-01	Cherokee	Etowah River	43.200	36.000
Coosa	Gold Kist, Inc	028-1491-03	Cherokee	Etowah River	5.000	4.500
Coosa	Canton, City of	028-1491-04	Cherokee	Etowah River	23.000	18.700
Coosa	Canton, City of (Hickory Log Creek)	028-1491-05	Cherokee	Etowah River	39.000	39.000
Coosa	Bartow County Water Department	008-1411-02	Bartow	Bolivar Springs	0.800	0.800
Coosa	Adairsville, City of	008-1412-02	Bartow	Lewis Spring	5.100	4.100
Coosa	New Riverside Ochre Company, Inc.	008-1421-01	Bartow	Etowah River	5.000	5.000
Coosa	New Riverside Ochre Company, Inc.	008-1421-02	Bartow	Etowah River	6.000	6.000
Coosa	Emerson, City of	008-1422-02	Bartow	Moss Springs	0.630	0.500
Coosa	Gerdau AmeriSteel US, Inc. – Cartersville Steel Mill	008-1423-01	Bartow	Pettit Creek	2.000	1.500
Coosa	Baroid Drilling Fluids, Inc.	008-1423-02	Bartow	Etowah River	3.400	2.500
Coosa	Cartersville, City of	008-1423-04	Bartow	Etowah River	26.420	23.000
Coosa	Georgia Power Co. - Plant Bowen	008-1491-01	Bartow	Etowah River	520.000	85.000
Coosa	CCMWA	008-1491-05	Bartow	Allatoona Lake	86.000	78.000
Coosa	Cartersville, City of	008-1491-06	Bartow	Allatoona Lake	21.420	18.000
Coosa	La Fayette, City of Dry Creek	146-1401-01	Walker	Dry Creek	1.000	0.900
Coosa	La Fayette, City of Big Spring	146-1401-02	Walker	Big Spring	1.650	1.310
Coosa	Mount Vernon Mills - Riegel Apparel Div.	027-1401-03	Chattooga	Trion Spring	9.900	6.600
Coosa	Summerville, City of	027-1402-02	Chattooga	Raccoon Creek	3.000	2.500
Coosa	Summerville, City of	027-1402-04	Chattooga	Lowe Spring	0.750	0.500
Coosa	Mohawk Industries, Inc.	027-1402-05	Chattooga	Chattooga R./ Raccoon Cr.	4.500	4.000
Coosa	Oglethorpe Power Corp.	057-1402-03	Floyd	Heath Creek	3,838.000	3,030.000
Coosa	Floyd County - Brighton Plant	057-1414-02	Floyd	Woodward Creek	0.800	0.700

Table 3 (continued). M&I surface water withdrawal permits in the ACT Basin (Georgia)

River basin	Permit holder	Permit number	County	Source water	Permit limit max day (mgd)	Permit limit monthly average (mgd)
Coosa	Cave Spring, City of	057-1428-06	Floyd	Cave Spring	1.500	1.300
Coosa	Floyd County	057-1428-08	Floyd	Old Mill Spring	4.000	3.500
Coosa	Berry Schools, The (Berry College)	057-1429-01	Floyd	Berry (Possum Trot) Reservoir	1.000	0.700
Coosa	Inland-Rome Inc.	057-1490-01	Floyd	Coosa River	34.000	32.000
Coosa	Georgia Power Co. - Plant Hammond	057-1490-02	Floyd	Coosa River	655.000	655.000
Coosa	Rome, City of	057-1492-01	Floyd	Oostanaula & Etowah R	18.000	16.400
Coosa	Rockmart, City of	115-1425-01	Polk	Euharlee Creek	2.000	1.500
Coosa	Vulcan Construction Materials, L.P.	115-1425-03	Polk	Euharlee Creek	0.200	0.200
Coosa	Cedartown, City of	115-1428-04	Polk	Big Spring	3.000	2.600
Coosa	Polk County Water Authority	115-1428-05	Polk	Aragon, Morgan, Mulco Springs	1.600	1.100
Coosa	Polk County Water Authority	115-1428-07	Polk	Deaton Spring	4.000	4.000
Tallapoosa River Basin (Georgia)						
Tallapoosa	Haralson County Water Authority	071-1301-01	Haralson	Tallapoosa River	3.750	3.750
Tallapoosa	Bremen, City of	071-1301-02	Haralson	Beech Creek & Bremen Reservoir (Bush Creek)	0.800	0.580
Tallapoosa	Bowdon, City of Indian	022-1302-01	Carroll	Indian Creek	0.400	0.360
Tallapoosa	Southwire Company	022-1302-02	Carroll	Buffalo Creek	2.000	1.000
Tallapoosa	Villa Rica, City of	022-1302-04	Carroll	Lake Paradise & Cowens Lake	1.500	1.500
Tallapoosa	Carrollton, City of	022-1302-05	Carroll	Little Tallapoosa River	12.000	12.000
Tallapoosa	Bowdon, City of Lake Tysinger	022-1302-06	Carroll	Lake Tysinger	1.000	1.000

Source: GAEPD 2009a

Table 4. M&I surface water withdrawals in the ACT Basin (Georgia)

Basin (subbasin)	Withdrawal by	County	Withdrawal (mgd)
Coosa River Basin (Georgia)			
Coosa (Conasauga)	Dalton Utilities	Whitfield	35.38
Coosa (Conasauga)	City of Chatsworth	Murray	1.26
Coosa (Coosawattee)	Ellijay-Gilmer County Water System	Gilmer	3.12
Coosa (Coosawattee)	City of Fairmount	Gordon	0.06
Coosa (Oostanaula)	City of Calhoun	Gordon	9.10
Coosa (Etowah)	Big Canoe Corporation	Pickens	0.48
Coosa (Etowah)	City of Jasper	Pickens	1.00
Coosa (Etowah)	Bent Tree Community	Pickens	0.07
Coosa (Etowah)	Lexington Components Inc (Rubber)	Pickens	0.01
Coosa (Etowah)	Etowah Water and Sewer Authority	Dawson	1.50
Coosa (Etowah)	Town of Dawsonville	Dawson	0.10
Coosa (Etowah)	City of Canton	Cherokee	2.83
Coosa (Etowah)	Cherokee County Water System	Cherokee	15.81
Coosa (Etowah)a	Gold Kist, Inc.	Cherokee	1.94

Table 4 (continued). M&I surface water withdrawals in the ACT Basin (Georgia)

Basin (subbasin)	Withdrawal by	County	Withdrawal (mgd)
Coosa (Etowah)	City of Cartersville	Bartow	13.26
Coosa (Etowah)	New Riverside Ochre Company, Inc (Chemicals)	Bartow	1.67
Coosa (Etowah)	Gerdau AmeriSteel US, Inc. – Cartersville Steel Mill (Primary metals)	Bartow	0.16
Coosa (Etowah)	Georgia Power Co – Plant Bowen	Bartow	38.92
Coosa (Etowah)	CCMWA	Bartow	44.42
Coosa (Upper Coosa)	City of Lafayette	Walker	1.20
Coosa (Upper Coosa)	City of Summerville	Chattooga	2.05
Coosa (Upper Coosa)	Mount Vernon Mills – Riegel Apparel Division (Textiles)	Chattooga	2.74
Coosa (Oostanaula)	City of Cave Spring (Domestic/Commercial)	Floyd	0.30
Coosa (Etowah / Oostanaula)	City of Rome	Floyd	9.98
Coosa (Upper Coosa)	Floyd County Water System	Floyd	2.57
Coosa (Upper Coosa)	Inland-Rome Inc. (Paper)	Floyd	25.74
Coosa (Upper Coosa)	Georgia Power Co - Plant Hammond	Floyd	535.00
Coosa (Upper Coosa)	Polk County Water Authority	Polk	2.22
Coosa (Etowah)	Vulcan Construction Materials	Polk	0.09
Tallapoosa River Basin (Georgia)			
Tallapoosa (Upper)	City of Bremen	Haralson	0.32
Tallapoosa (Upper)	Haralson County Water Authority	Haralson	2.05
Tallapoosa (Upper)	City of Bowdon	Carroll	0.75
Tallapoosa (Upper)	Southwire Company	Carroll	0.09
Tallapoosa (Upper)	City of Carrollton	Carroll	5.37
Tallapoosa (Upper)	City of Temple	Carroll	0.26
Tallapoosa (Upper)	City of Villa Rica	Carroll	0.58
Tallapoosa (Upper)	Carroll County Water System	Carroll	4.08

Table 5. Surface water use - ACT Basin (Alabama, 2005) (mgd)

ACT subbasin	HUC	Public supply	Industrial	Irrigation	Livestock	Thermo-electric	Total, by Subbasin
Upper Coosa	03150105	2.12	0	3.10	0.40	0	5.62
Middle Coosa	03150106	33.24	65.83	7.91	0.87	142.68	250.53
Lower Coosa	03150107	10.96	0.89	5.10	0.35	812.32	829.62
Upper Tallapoosa	03150108	0.90	0	0.15	0.40	0	1.45
Middle Tallapoosa	03150109	19.09	0	0.52	0.32	0	19.93
Lower Tallapoosa	03150110	38.22	2.23	4.22	0.28	0	44.95
Upper Alabama	03150201	10.40	30.63	3.84	0.84	4.14	49.85
Cahaba	03150202	52.90	0	3.49	0.25	0	56.64
Middle Alabama	03150203	0	21.04	1.73	0.48	0	23.25
Lower Alabama	03150204	0	54.61	0.64	0.02	0	55.27
Total - By Use Category		167.83	175.23	30.70	4.21	959.14	1337.11

Source: Hutson et al. 2009

Table 6. M&I surface water withdrawals in the ACT Basin (Alabama)

Basin (subbasin)	Withdrawal by	County	Withdrawal (mgd)
Coosa River Basin (Alabama)			
Coosa (Upper)	Centre Water Works & Sewer Board	Cherokee	1.19
Coosa (Upper)	Piedmont Water Works & Sewer Board	Calhoun	0.93
Coosa (Middle)	Jacksonville Water Works & Sewer Board	Calhoun	1.34
Coosa (Middle)	Anniston Water Works & Sewer Board	Calhoun	0.08
Coosa (Middle)	Fort Payne Water Works Board	DeKalb	8.10
Coosa (Middle)	Goodyear Tire and Rubber Company	Etowah	9.87
Coosa (Middle)	Gadsden Water Works & Sewer Board	Etowah	14.86
Coosa (Middle)	Alabama Power Co – Gadsden Steam Plant	Etowah	142.68
Coosa (Middle)	SIC 32 – Unnamed Stone, Glass, Clay, and/or Concrete Products	St. Clair	3.49
Coosa (Middle)	Talladega/Shelby Water Treatment Plant	Talladega	6.44
Coosa (Middle)	Talladega County Water Department	Talladega	0.81
Coosa (Middle)	Talladega Water Works & Sewer Board	Talladega	1.62
Coosa (Middle)	Bowater Newsprint, Coosa Pines Operation	Talladega	52.47
Coosa (Lower)	Sylacauga Utilities Board	Talladega	3.25
Coosa (Lower)	SIC 22 – Unnamed Textile	Talladega	0.89
Coosa (Lower)	Goodwater Water Works & Sewer Board	Coosa	0.46
Coosa (Lower)	Alabama Power Co – E.C. Gaston Plant	Shelby	812.32
Coosa (Lower)	Clanton Waterworks & Sewer Board	Chilton	1.79
Coosa (Lower)	Five Star Water Supply	Elmore	5.46
Tallapoosa River Basin (Alabama)			
Tallapoosa (Upper)	Heflin Water Works	Cleburne	0.51
Tallapoosa (Upper)	Wedowee Gas, Water, and Sewer	Randolph	0.39
Tallapoosa (Middle)	Roanoke Utilities Board	Randolph	1.29
Tallapoosa (Middle)	Clay County Water Authority	Clay	1.87
Tallapoosa (Middle)	Lafayette	Chambers	0.53
Tallapoosa (Middle)	Central Elmore Water & Sewer Authority	Elmore	4.83
Basin (subbasin)	**Withdrawal by**	**County**	**Withdrawal (mgd)**
Tallapoosa (Middle)	Alexander City Water Department	Tallapoosa	10.57
Tallapoosa (Lower)	West Point Home, Inc	Lee	2.23
Tallapoosa (Lower)	Opelika Water Works Board	Lee	2.61
Tallapoosa (Lower)	Auburn Water Works Board	Lee	5.75
Tallapoosa (Lower)	Tallassee	Tallapoosa	1.98
Tallapoosa (Lower)	Tuskegee Utilities	Macon	2.71
Tallapoosa (Lower)	Montgomery Water Works & Sewer Board	Montgomery	25.17
Alabama River Basin			
Alabama (Upper)	Montgomery Water Works & Sewer Board	Montgomery	10.40
Alabama (Upper)	International Paper	Autauga	30.63
Alabama (Upper)	Southern Power Co – Plant E. B. Harris	Autauga	4.14
Alabama (Cahaba)	Birmingham Water Works & Sewer Board	Shelby	52.90
Alabama (Middle)	International Paper – Pine Hill	Wilcox	21.04
Alabama (Lower)	Alabama River Pulp Company	Monroe	54.61

Source: Hutson et al. 2009

VI. – CONSTRAINTS

6-01. <u>General.</u> The availability of water resources in the ACT Basin is constrained by existing water supply storage contracts, Corps water control manuals, minimum flow requirements from Allatoona and Carters Dams, APC FERC licenses, Corps-APC Memorandum of Understanding, and industrial water quality flow needs. Existing water supply storage contracts do not include the use of the inactive storage pool and would require developing and implementing an emergency storage contract in order to access this water resource. Each Corps project has a water control manual that specifies operational requirements for varying basin conditions and requires a deviation approval to operate outside the parameters established by the manual. The Allatoona Project has a minimum flow release requirement of 240 cfs for downstream purposes. The Carters Project has a seasonally varying minimum flow release requirement that ranges from 250 – 865 cfs during normal conditions and a minimum of 240 cfs during low flow conditions. The APC projects are operated under FERC licenses which define specific operational requirements for each project and require approval from FERC and possibly the Corps and State agencies before any revised operations could be implemented. The Corps and APC projects are also operated under the rules and regulations found in the Corps-APC Memorandum of Understanding, which describes operational requirements for flood conditions and navigation within the ACT Basin. Some industrial NPDES permits within the ACT Basin have water quality discharge limitations which are impacted by the volume of water flow in the river.

VII – DROUGHT MANAGEMENT PLAN

7-01. <u>General</u>. The Drought Contingency Plan (DCP) for the ACT Basin implements drought conservation actions on the basis of composite system storage, state line flows, and basin inflow as triggers to drive drought response actions. The DCP also recognizes that a basin-wide drought plan must incorporate variable hydropower generation requirements from its headwater projects in Georgia (Allatoona Dam and Carters Dam), a reduction in the level of navigation service provided on the Alabama River as storage across the basin declines, and that environmental flow requirements must still be met to the maximum extent practicable. The ACT basin-wide drought plan is composed of three components — Headwater regulation at Allatoona Lake and Carters Lake in Georgia; Regulation at APC projects on the Coosa and Tallapoosa Rivers; and Downstream Alabama River regulation at Corps projects downstream of Montgomery, Alabama.

A. **Headwater Regulation for Drought at Allatoona Lake and Carters Lake**. Drought regulation at Allatoona Lake and Carters Lake consists of progressively reduced hydropower generation as pool levels decline in accordance with the conservation storage action zones established in the projects' water control plans. For instance, when Allatoona Lake is operating in normal conditions (Conservation storage Zone 1); hydropower generation typically ranges from 0 to 4 hours per day. However, as the pool drops to lower action zones during drought conditions, generation could be reduced to 0 to 2 hours per day. As Carters Lake pool level might drop into a conservation storage Zone 2, seasonal varying minimum target flows would be reduced to 240 cfs. The water control manual for each project describes the drought water control regulation plan in more detail.

B. **Drought Regulation at APC Projects on the Coosa, Tallapoosa, and Alabama River**. Regulation guidelines for the Coosa, Tallapoosa, and Alabama Rivers have been defined in a drought regulation matrix (Table 7) on the basis of a Drought Intensity Level (DIL). The DIL is a drought indicator, ranging from one to three. The DIL is determined on the basis of three basin drought criteria (or triggers). A DIL from 1 to 3 indicates some level of drought conditions. The DIL increases as more of the drought indicator thresholds (or triggers) occur. The drought regulation matrix defines minimum average daily flow requirements on a monthly basis for the Coosa, Tallapoosa, and Alabama Rivers as a function of the DIL and time of year. The combined occurrences of the drought triggers determine the DIL. Three intensity levels for drought operations are applicable to APC projects.

DIL 1 — (moderate drought) 1 of 3 triggers occur
DIL 2 — (severe drought) 2 of 3 triggers occur
DIL 3 — (exceptional drought) all 3 triggers occur

(1) Drought Indicators. The indicators used to determine drought intensity include the following:

1. **Low basin inflow**. The total basin inflow needed is the sum of the total filling volume plus 4,640 cfs. The total filling volume is defined as the volume of water required to return the pool to the top of the conservation guide curve and is calculated using the area-capacity tables for each project. Table 8 lists the monthly low basin inflow criteria. The basin inflow value is computed daily and checked on the first and third Tuesday of the month. If computed basin inflow is less than the value required, the low basin inflow indicator is triggered. The basin inflow is total flow above the APC projects excluding Allatoona Lake and Carters Lake. It is the sum of local flows, minus lake evaporation and diversions. Figure 11 illustrates the local inflows to the Coosa and Tallapoosa Basins. The basin inflow computation differs from the navigation basin inflow, because it does not include releases from Allatoona Lake and Carters Lake. The intent is to capture the hydrologic condition across APC projects in the Coosa and Tallapoosa Basins.

Table 7. ACT Basin Drought Regulation Plan Matrix

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Drought Level Response[a]	Normal Operations											
	DIL 1: Low Basin Inflows or Low Composite or Low State Line Flow											
	DIL 2: DIL 1 criteria + (Low Basin Inflows or Low Composite or Low State Line Flow)											
	DIL 3: Low Basin Inflows + Low Composite + Low State Line Flow											
Coosa River Flow[b]	Normal Operation: 2,000 cfs			4,000 (8,000)		4,000 – 2,000	Normal Operation: 2,000 cfs					
	Jordan 2,000 +/-cfs			4,000 +/- cfs		6/15 Linear Ramp down	Jordan 2,000 +/-cfs			Jordan 2,000 +/-cfs		
	Jordan 1,600 to 2,000 +/-cfs			2,500 +/- cfs		6/15 Linear Ramp down	Jordan 2,000 +/-cfs			Jordan 1,600 to 2,000 +/-cfs		
	Jordan 1,600 +/-cfs			Jordan 1,600 to 2,000 +/-cfs			Jordan 2,000 +/-cfs			Jordan 1,600 to 2,000 +/-cfs		Jordan 1,600 +/- cfs
Tallapoosa River Flow[c]	Normal Operations: 1200 cfs											
	Greater of: 1/2 Yates Inflow or 2 x Heflin Gage(Thurlow Lake releases > 350 cfs)				1/2 Yates Inflow					1/2 Yates Inflow		
	Thurlow Lake 350 cfs				1/2 Yates Inflow					Thurlow Lake 350 cfs		
	Maintain 400 cfs at Montgomery WTP (Thurlow Lake release 350 cfs)						Thurlow Lake 350 cfs			Maintain 400 cfs at Montgomery WTP (Thurlow Lake release 350 cfs)		
Alabama River Flow[d]	Normal Operation: Navigation or 4,640 cfs flow											
	4,200 cfs (10% Cut) - Montgomery				4,640 cfs - Montgomery					Reduce: Full – 4,200 cfs		
	3,700 cfs (20% Cut) - Montgomery					4,200 cfs (10% Cut) - Montgomery				Reduce: 4,200 cfs-> 3,700 cfs Montgomery (1 week ramp)		
	2,000 cfs Montgomery				3,700 cfs Montgomery		4,200 cfs (10% Cut) - Montgomery			Reduce: 4,200 cfs -> 2,000 cfs Montgomery (1 month ramp)		
Guide Curve Elevation	Normal Operations: Elevations follow Guide Curves as prescribed in License (Measured in Feet)											
	Corps Variances: As Needed; FERC Variance for Lake Martin											
	Corps Variances: As Needed; FERC Variance for Lake Martin											
	Corps Variances: As Needed; FERC Variance for Lake Martin											

a. Note these are based on flows that will be exceeded when possible.
b .Jordan flows are based on a continuous +/- 5% of target flow.
c. Thurlow Lake flows are based on continuous +/- 5% of target flow: flows are reset on noon each Tuesday based on the prior day's daily average at Heflin or Yates.
d. Alabama River flows are 7-Day Average Flow.

Table 8. Low Basin Inflow Guide (in cfs-days)

Month	Coosa Filling Volume	Tallapoosa Filling Volume	Total Filling Volume	Minimum JBT Target Flow	Required Basin Inflow
Jan	628	0	628	4,640	5,268
Feb	626	1,968	2,594	4,640	7,234
Mar	603	2,900	3,503	4,640	8,143
Apr	1,683	2,585	4,269	4,640	8,909
May	248	0	248	4,640	4,888
Jun			0	4,640	4,640
Jul			0	4,640	4,640
Aug			0	4,640	4,640
Sep	–612	–1,304	–1,916	4,640	2,724
Oct	–1,371	–2,132	–3,503	4,640	1,137
Nov	–920	–2,748	–3,667	4,640	973
Dec	–821	–1,126	–1,946	4,640	2,694

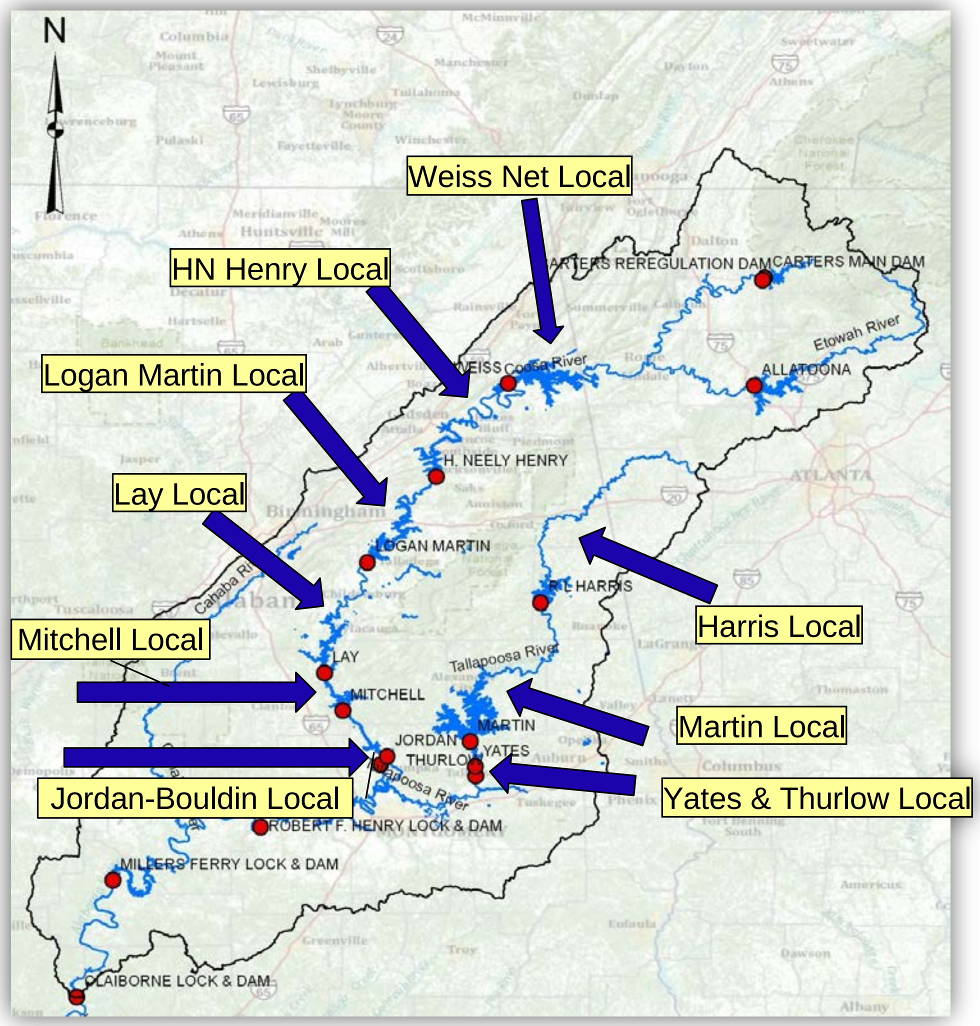


Figure 11. ACT Basin Inflows

2. **Low composite conservation storage**. Low composite conservation storage occurs when the APC projects' composite conservation storage is less than or equal to the storage available within the drought contingency curves for the APC reservoirs. Composite conservation storage is the sum of the amounts of storage available at the current elevation for each reservoir down to the drought contingency curve at each APC major storage project. The reservoirs considered for the trigger are R.L. Harris Lake, H. Neely Henry Lake, Logan Martin Lake, Lake Martin, and Weiss Lake. Figure 12 plots the APC composite zones. Figure 13 plots the APC low composite conservation storage trigger. If the actual active composite conservation storage is less than or equal to the active composite drought zone storage, the low composite conservation storage indicator is triggered. That computation is performed on the first and third Tuesday of each month, and is considered along with the low state line flow trigger and basin inflow trigger.

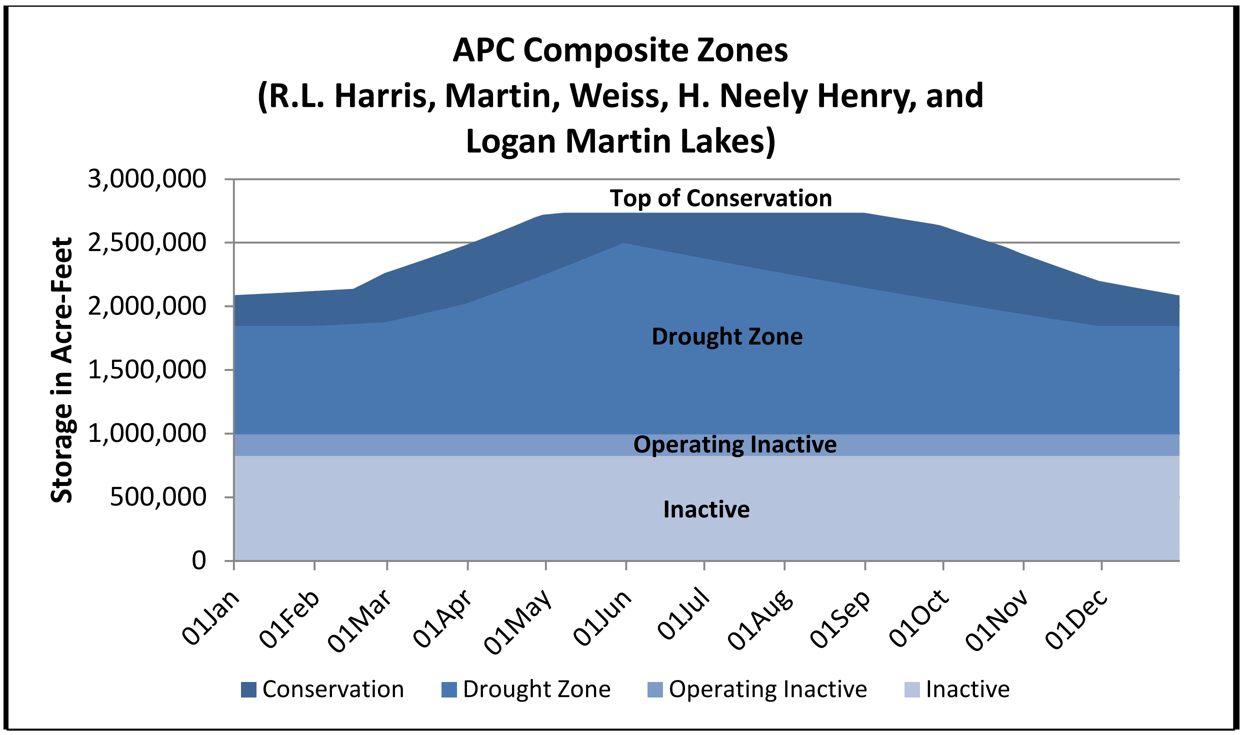


Figure 12. APC Composite Zones

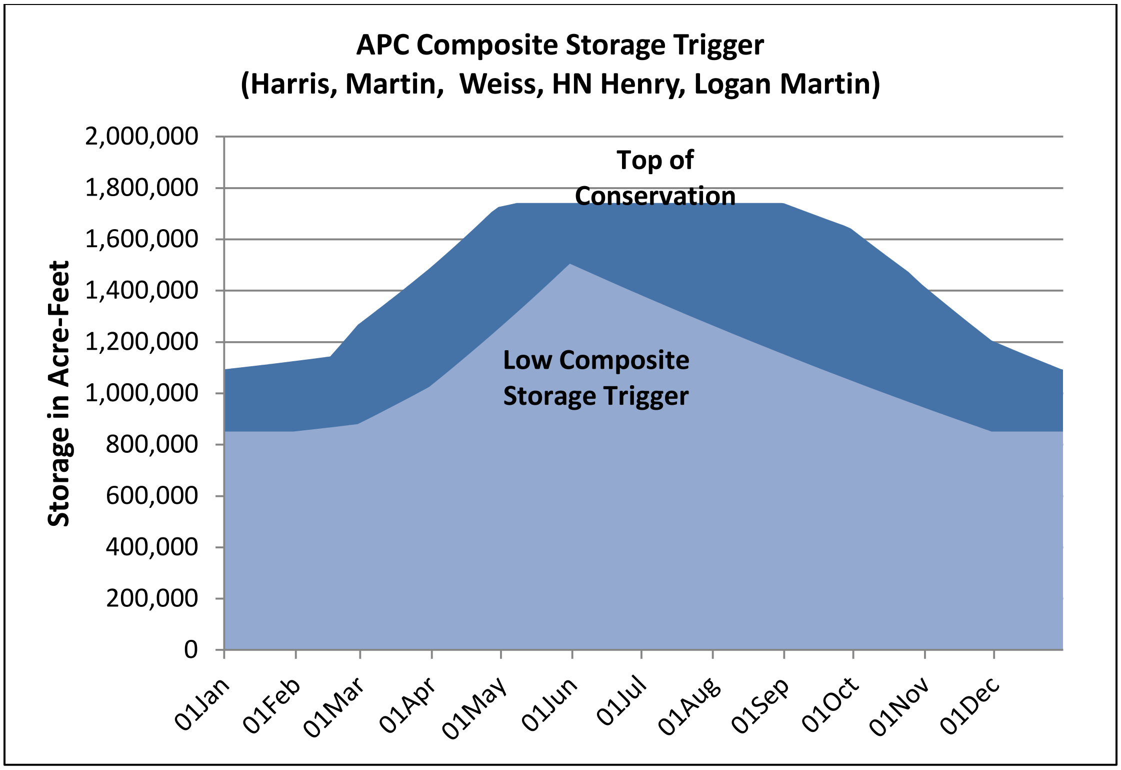


Figure 13. APC Low Composite Conservation Storage Drought Trigger

3. **Low state line flow**. A low state line flow trigger occurs when the Mayo's Bar USGS gage measures a flow below the monthly historical 7Q10 flow. The 7Q10 flow is defined as the lowest flow over a 7-day period that would occur once in 10 years. Table 9 lists the Mayo's Bar 7Q10 value for each month (determined from observed flows from 1949 – 2006). The lowest 7-day average flow over the past 14 days is computed and checked at the first and third Tuesday of the month. If the lowest 7-day average value is less than the Mayo's Bar 7Q10 value, the low state line flow indicator is triggered. If the result is greater than or equal to the trigger value from Table 9, the flow is considered normal, and the state line flow indicator is not triggered. The term state line flow is used in developing the drought management plan because of the proximity of the Mayo's Bar gage to the Alabama-Georgia state line and because it relates to flow data upstream of the Alabama-based APC reservoirs. State line flow is used only as a source of observed data for one of the three triggers and does not imply that flow targets exist at that geographic location. The ACT Basin drought matrix does not include or imply any Corps regulation that would result in water management decisions at Carters Lake or Allatoona Lake.

Table 9. State Line Flow Triggers

Month	Mayo's Bar (7Q10 in cfs)
Jan	2,544
Feb	2,982
Mar	3,258
Apr	2,911
May	2,497
Jun	2,153
Jul	1,693
Aug	1,601
Sep	1,406
Oct	1,325
Nov	1,608
Dec	2,043

Note: Based on USGS Coosa River at Rome Gage (Mayo's Bar, USGS 02397000) observed flow from 1949 to 2006

(2) Drought Regulation. The DIL is computed on the first and third Tuesday of each month. Once a drought operation is triggered, the DIL can only recover from drought condition at a rate of one level per period. For example, as the system begins to recover from an exceptional drought with DIL 3, the DIL must be stepped incrementally back to zero to resume normal operations. In that case, even if the system triggers return to normal quickly, it will still take at least a month before normal operations can resume - conditions can improve only to DIL 2 for the next 15 days, then DIL 1 for the next 15 days, before finally returning to normal operating conditions.

For normal operations, the matrix shows a Coosa River flow between 2,000 cfs and 4,000 cfs with peaking periods up to 8,000 cfs occurring. The required flow on the Tallapoosa River is a constant 1,200 cfs throughout the year. The navigation flows on the Alabama River are applied to the APC projects. The required navigation depth on the Alabama River is subject to the basin inflow.

For DIL 1, the Coosa River flow varies from 2,000 cfs to 4,000 cfs. On the Tallapoosa River, the required flow is the greater of one-half of the inflow into Yates Lake or twice the Heflin USGS gage from January thru April. For the remainder of the year, the required flow is one-half of Yates Lake inflow. The required flows on the Alabama River are reduced from the amounts required for DIL 0.

For DIL 2, the Coosa River flow varies from 1,600 cfs to 2,500 cfs. On the Tallapoosa River, the minimum is 350 cfs for part of the year and one-half of Yates Lake inflow for the remainder of the year. The requirement on the Alabama River is between 3,700 cfs and 4,200 cfs.

For DIL 3, the flows on the Coosa River range from 1,600 cfs to 2,000 cfs. A constant flow of 350 cfs on the Tallapoosa River is required. It is assumed an additional 50 cfs will occur between Thurlow Lake and the City of Montgomery water supply intake. Required flows on the Alabama River range from 2,000 cfs to 4,200 cfs

In addition to the flow regulation for drought conditions, the DIL affects the flow regulation to support navigation operations. Under normal operations, the APC projects are operated to meet the needed navigation flow target or 4,640 cfs flow as defined in the navigation measure section. Once drought operations begin, flow regulation to support navigation operations is suspended.

7-02. <u>Extreme Drought Conditions</u>. An extreme drought condition exists when the remaining composite conservation storage is depleted, and additional emergency actions may be necessary. When conditions have worsened to this extent, utilization of the inactive storage must be considered. Such an occurrence would typically be contemplated in the second or third year of a drought. Inactive storage capacities have been identified for the two Federal projects with significant storage (Figures 14 and 15). The operational concept established for the extreme drought impact level and to be implemented when instituting the use of inactive storage is based on the following actions:

(1) Inactive storage availability is identified to meet specific critical water use needs within existing project authorizations.

(2) Emergency uses and users will be identified in accordance with emergency authorizations and through stakeholder coordination. Typical critical water use needs within the basin are associated with public health and safety.

(3) Weekly projections of the inactive storage water availability to meet the critical water uses in the ACT Basin will be utilized when making water control decisions regarding withdrawals and water releases from the Federal reservoirs.

(4) The inactive storage action zones will be developed and instituted as triggers to meet the identified priority water uses (releases will be restricted as storage decreases).

(5) Dam safety considerations will always remain the highest priority. The structural integrity of the dams due to static head limitations will be maintained.

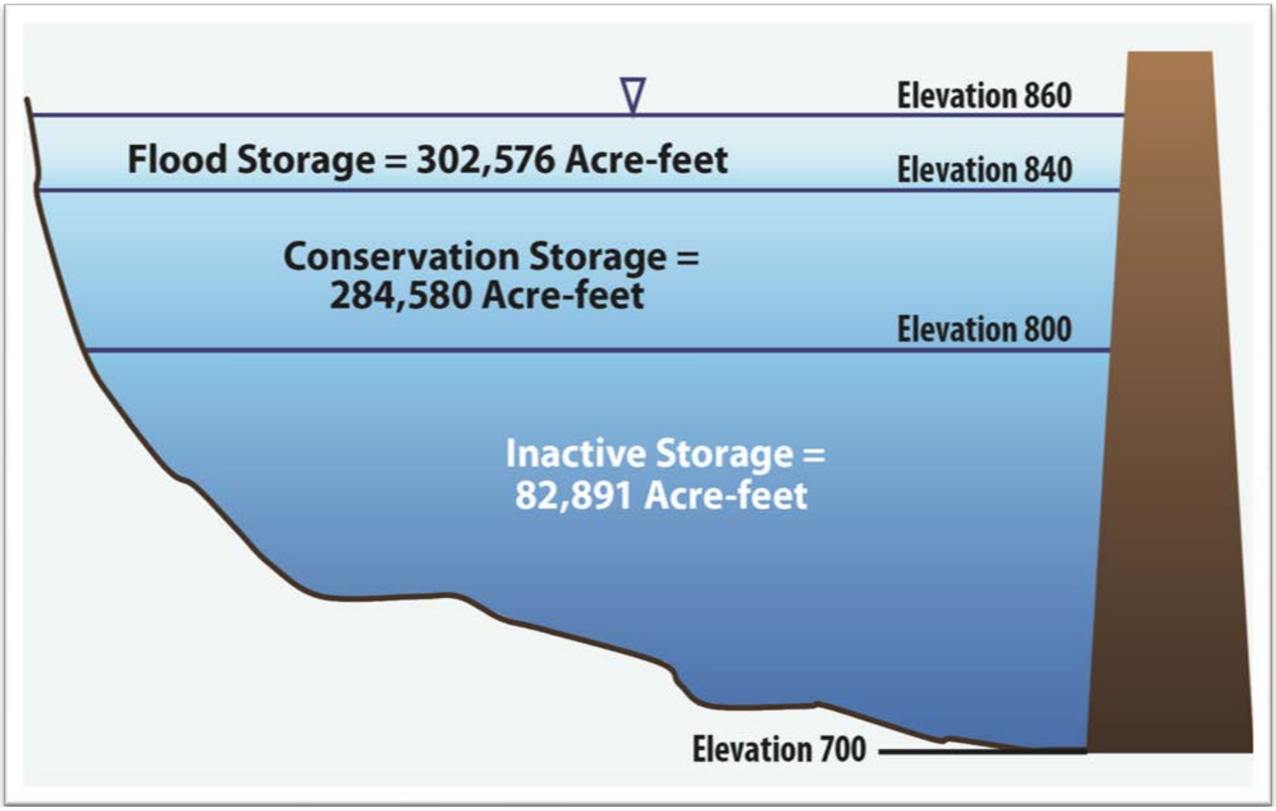


Figure 14. Storage in Allatoona Lake

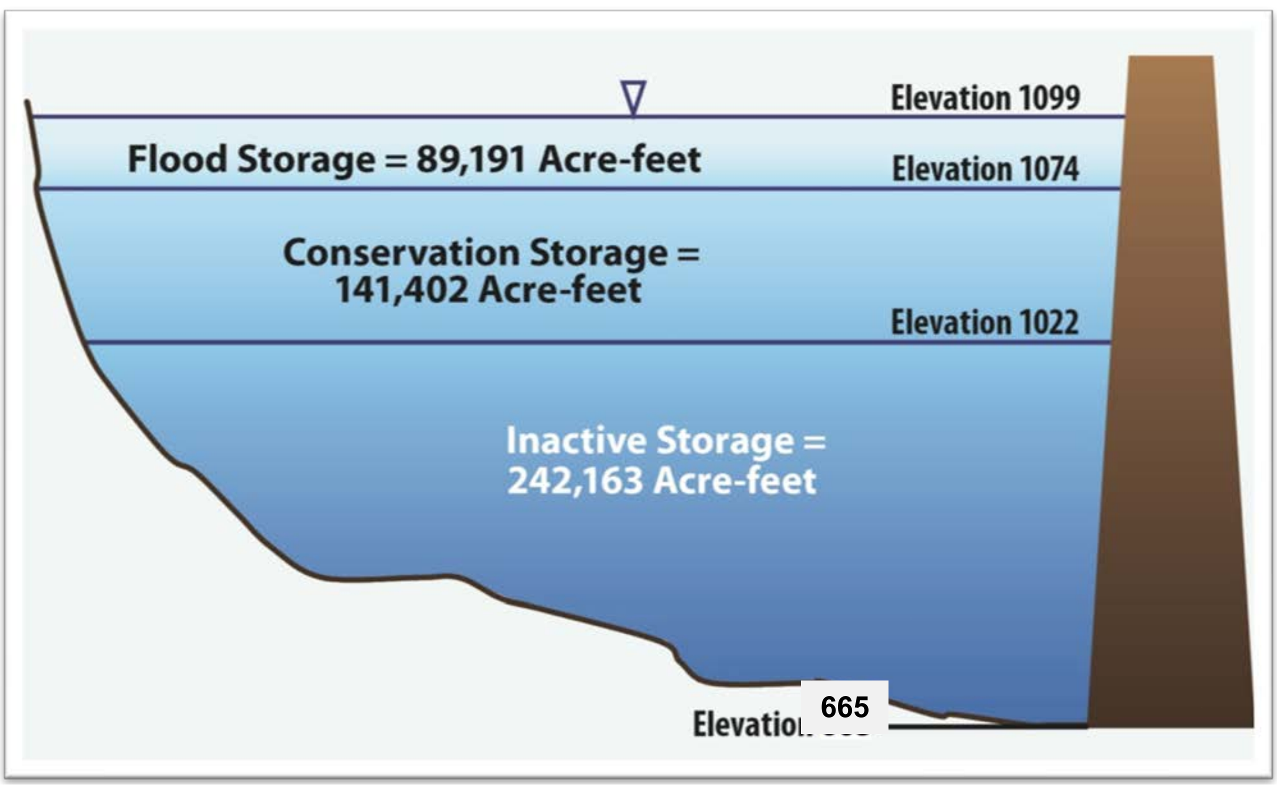


Figure 15. Storage in Carters Lake (excluding reregulation pool)

VIII – DROUGHT MANAGEMENT COORDINATION AND PROCEDURES

8-01. USACE Coordination. It is the responsibility of the Mobile District Water Management Section and APC to monitor climatological and hydrometeorological conditions at all times to make prudent water management decisions. The Water Management Section makes daily decisions and coordinates with APC every two weeks or more often if conditions warrant and with other district representatives from the various areas for which the river systems are operated -- hydropower, recreation, navigation, environmental, and others to exchange information concerning the operation of the river system. This coordination includes conducting weekly meetings with these other district elements. Daily water management decisions regarding water availability, lake level forecasts, and storage forecasts are determined using the information obtained along with current project and basin hydrometeorological data. A weekly District River System Status report is prepared that summarizes the conditions in each of the river basins. When conditions become evident that normal low flow conditions are worsening, the Water Management Section will elevate the district coordination to a heightened awareness. When drought conditions are imminent, Emergency Management representatives will be notified of the conditions and will be included in the regular coordination activities.

8-02. Interagency Coordination. The Water Management Section will support the environmental team regarding actions that require coordination with the U.S. Fish and Wildlife Service (USFWS) for monitoring threatened and endangered species and with the Environmental Protection Agency (EPA), Georgia Environmental Protection Division (GAEPD), and Alabama Department of Environmental Management (ADEM) regarding requests to lower minimum flow targets below Claiborne Dam.

8-03. Public Information and Coordination. When conditions determine that a change in the water control actions from normal regulation to drought regulation is imminent, it is important that various users of the system are notified so that any environmental or operational preparations can be completed prior to any impending reduction in reservoir discharges, river levels, and reservoir pool levels. In periods of severe drought within the ACT Basin it will be within the discretion of the Division Commander to approve the enactment of ACT Basin Water Management conference calls. The purposes of the calls are to share ongoing water management decisions with basin stakeholders and to receive stakeholder input regarding needs and potential impacts to users within the basin. Depending upon the severity of the drought conditions, the calls will be conducted at regular monthly or bi-weekly intervals. Should issues arise, more frequent calls would be implemented.

a. Local Press and Corps Bulletins. The local press consists of periodic publications in or near the ACT Basin. Montgomery, Columbus, and Atlanta have some of the larger daily papers. The papers often publish articles related to the rivers and streams. Their representatives have direct contact with the Corps through the Public Affairs Office. In addition, they can access the Corps Web pages for the latest project information. The Corps and the Mobile District publish e-newsletters regularly which are made available to the general public via email and postings on various websites. Complete, real-time information is available at the Mobile District's Water Management homepage http://water.sam.usace.army.mil/. The Mobile District Public Affairs Office issues press releases as necessary to provide the public with information regarding Water Management issues and activities and also provides information via the Mobile District web site.

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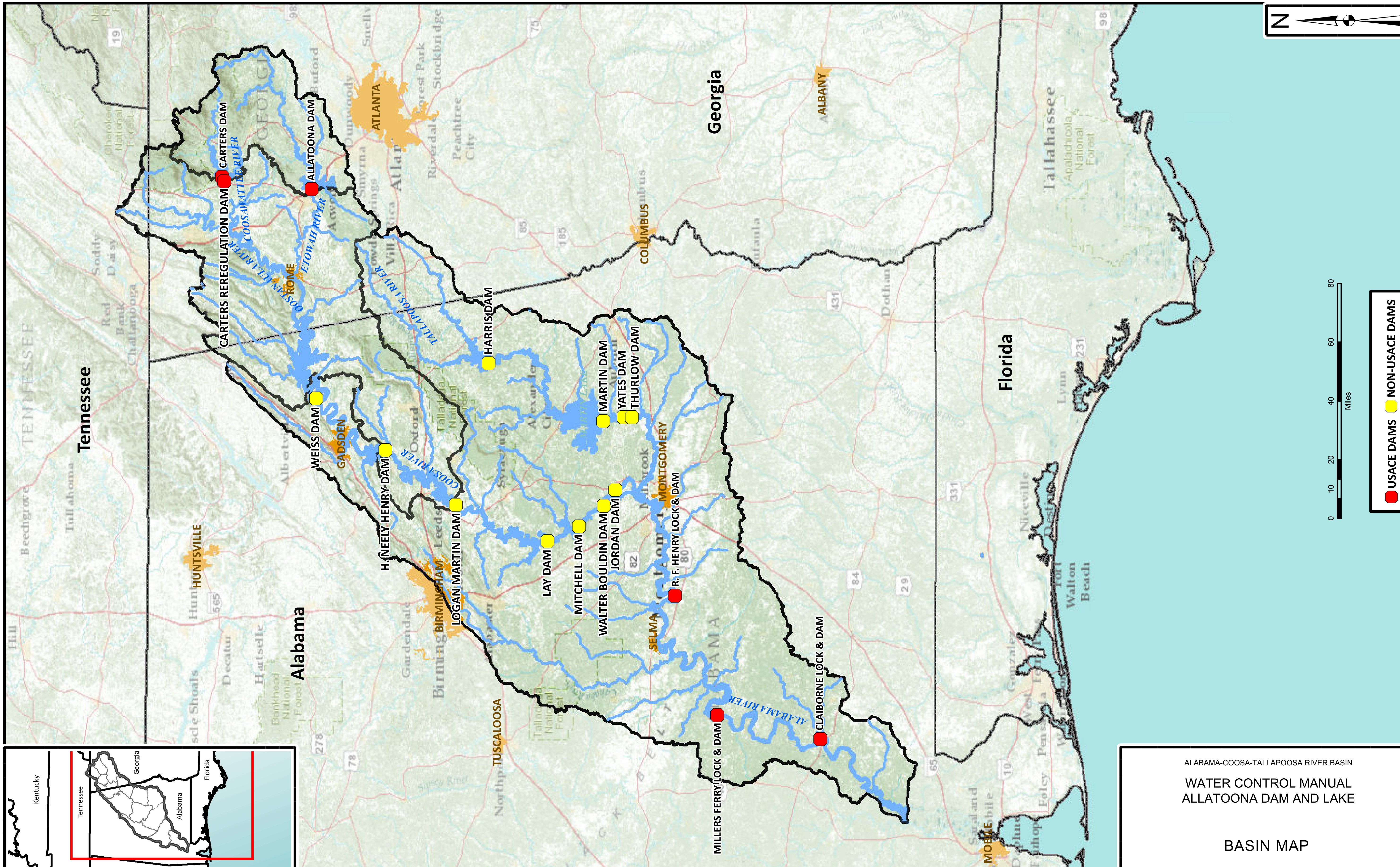
PLATES



ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

BASIN MAP

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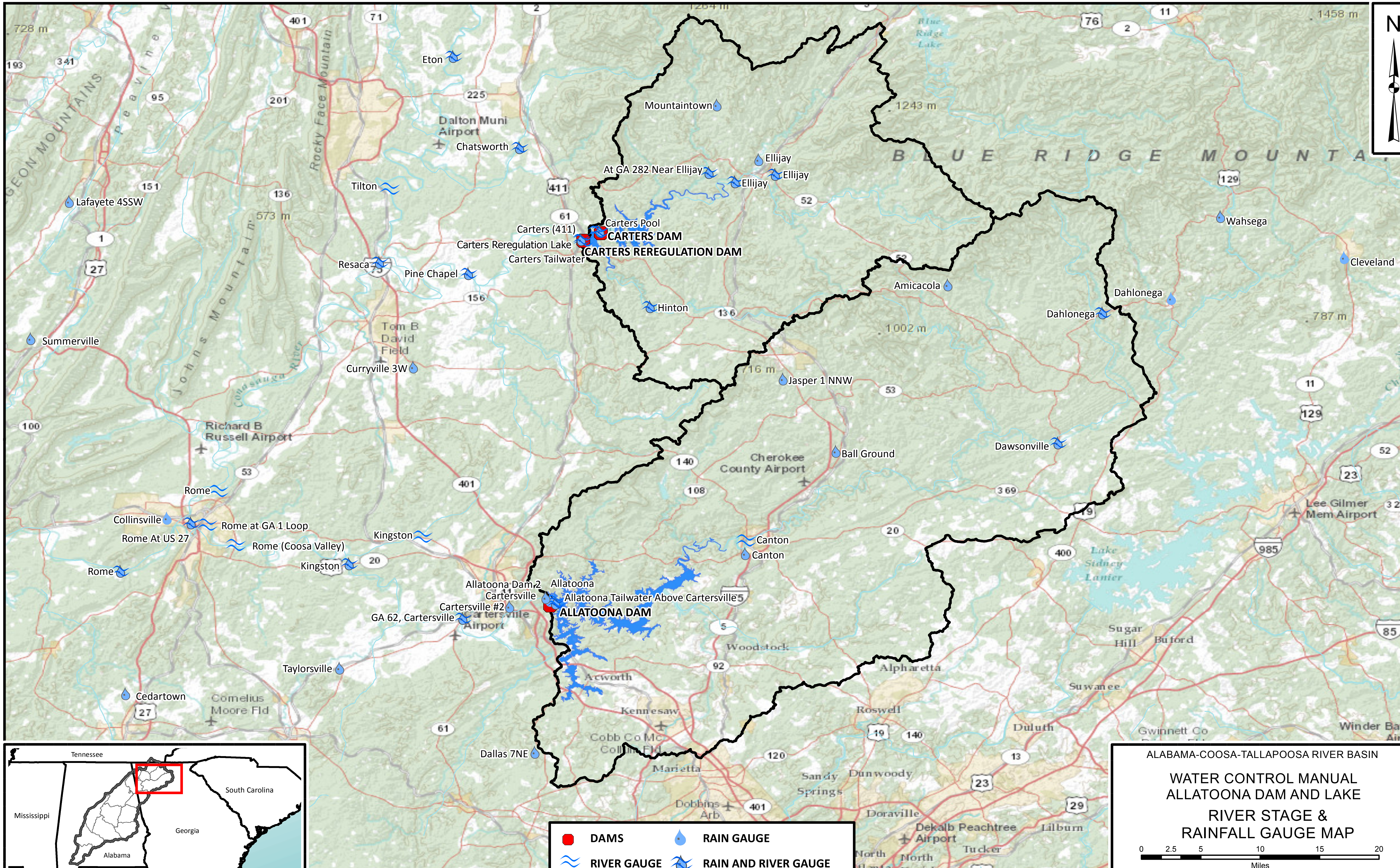
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ALABAMA-COOSA-TALLAPOOSA RIVER BASIN
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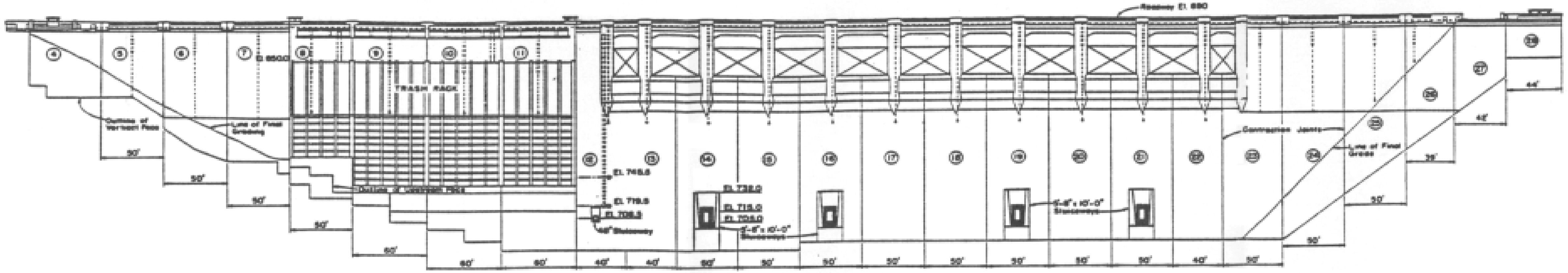
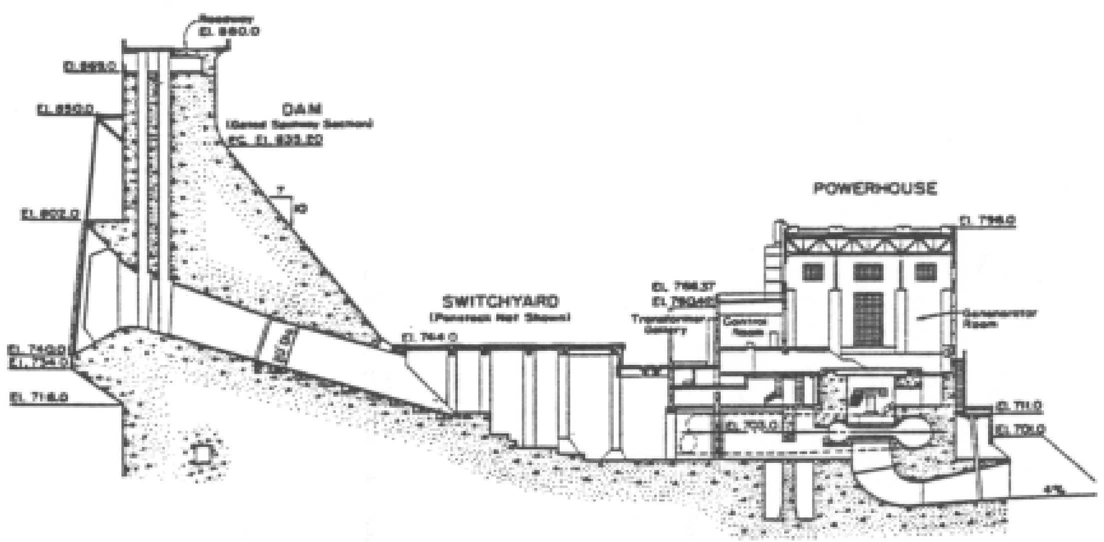
RIVER STAGE &
RAINFALL GAUGE MAP
0 2.5 5 10 15 20
Miles
DAMS
RAIN GAUGE
RIVER GAUGE
RAIN AND RIVER GAUGE
CARTERS DAM
CARTERS REREGULATION DAM
ALLATOONA DAM
Eton
Mountaintown
Chatsworth
Tilton
At GA 282 Near Ellijay
Ellijay
Ellijay
Ellijay
Carters Pool
Carters (411)
Carters Reregulation Lake
Carters Tailwater
Resaca
Pine Chapel
Hinton
Amicacola
Dahlonega
Dahlonega
Wahsega
Cleveland
Lafayete 4SSW
Summerville
Curryville 3W
Jasper 1 NNW
Ball Ground
Dawsonville
Rome
Collinsville
Rome at GA 1 Loop
Rome At US 27
Rome (Coosa Valley)
Kingston
Kingston
Rome
Canton
Canton
Allatoona Dam 2
Allatoona
Cartersville
Allatoona Tailwater Above Cartersville
Cartersville #2
GA 62, Cartersville
Taylorsville
Cedartown
Dallas 7NE
Tennessee
Mississippi
Alabama
Georgia
South Carolina
B L U E R I D G E M O U N T A I N S



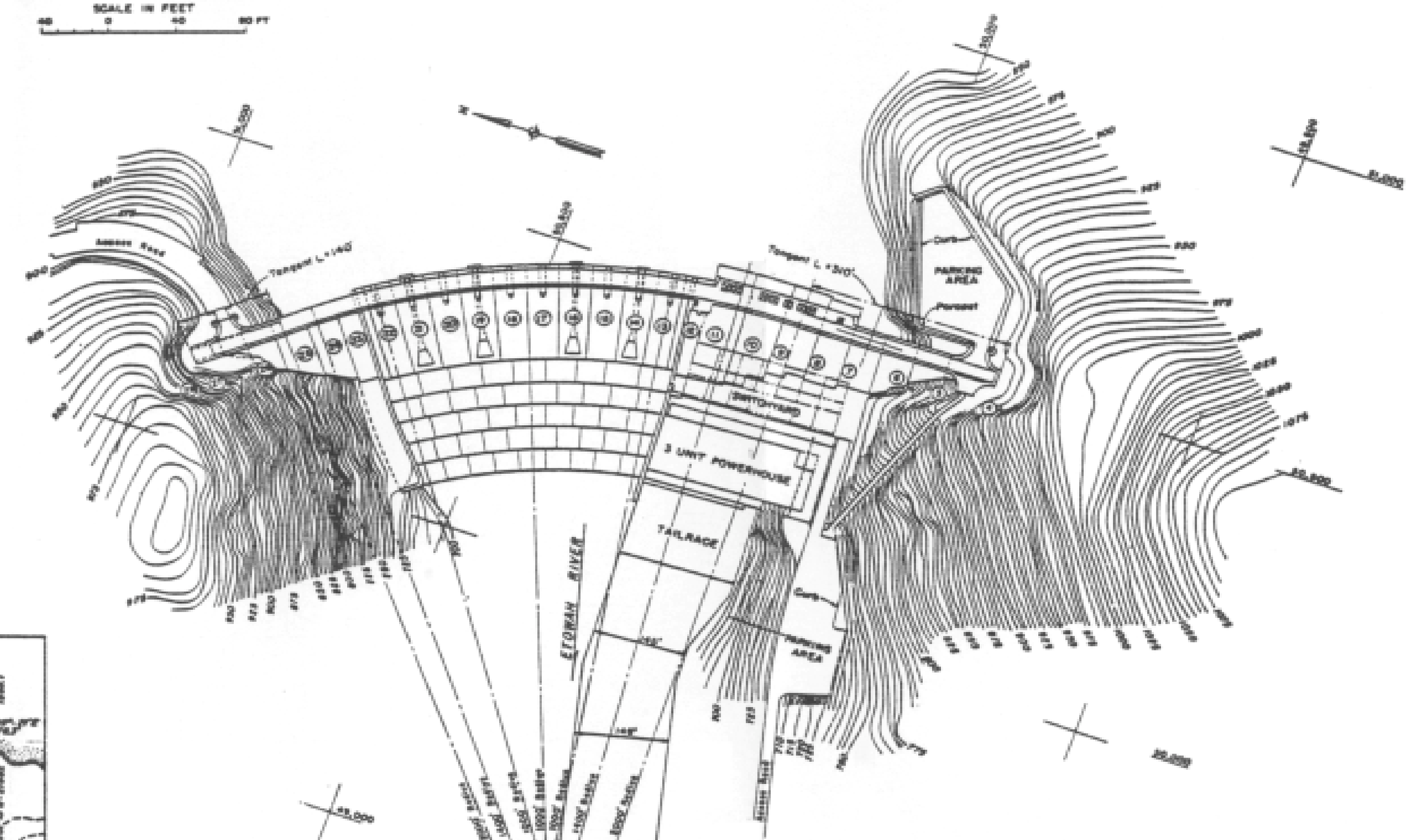
UPSTREAM ELEVATION

SCALE IN FEET



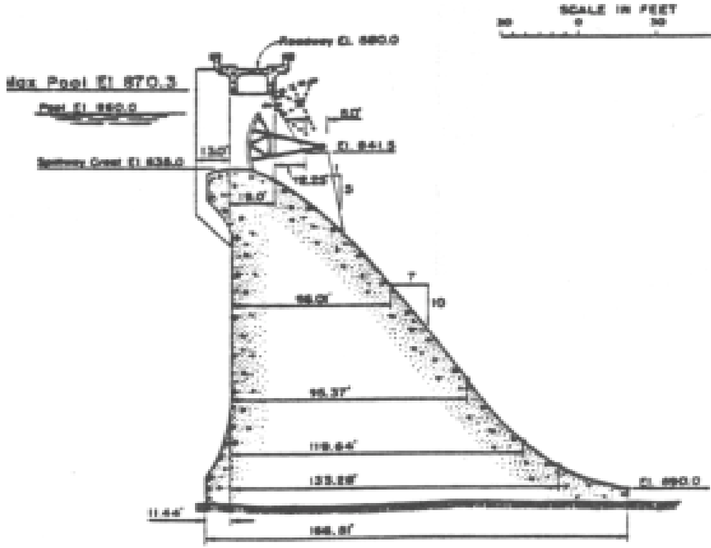
TRANSVERSE SECTION

SCALE IN FEET



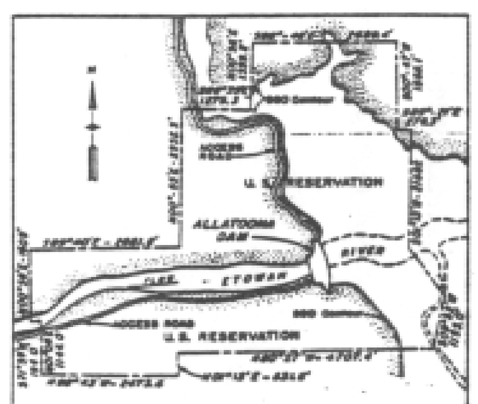
PLAN

SCALE IN FEET



OVERFLOW SECTION

SCALE IN FEET



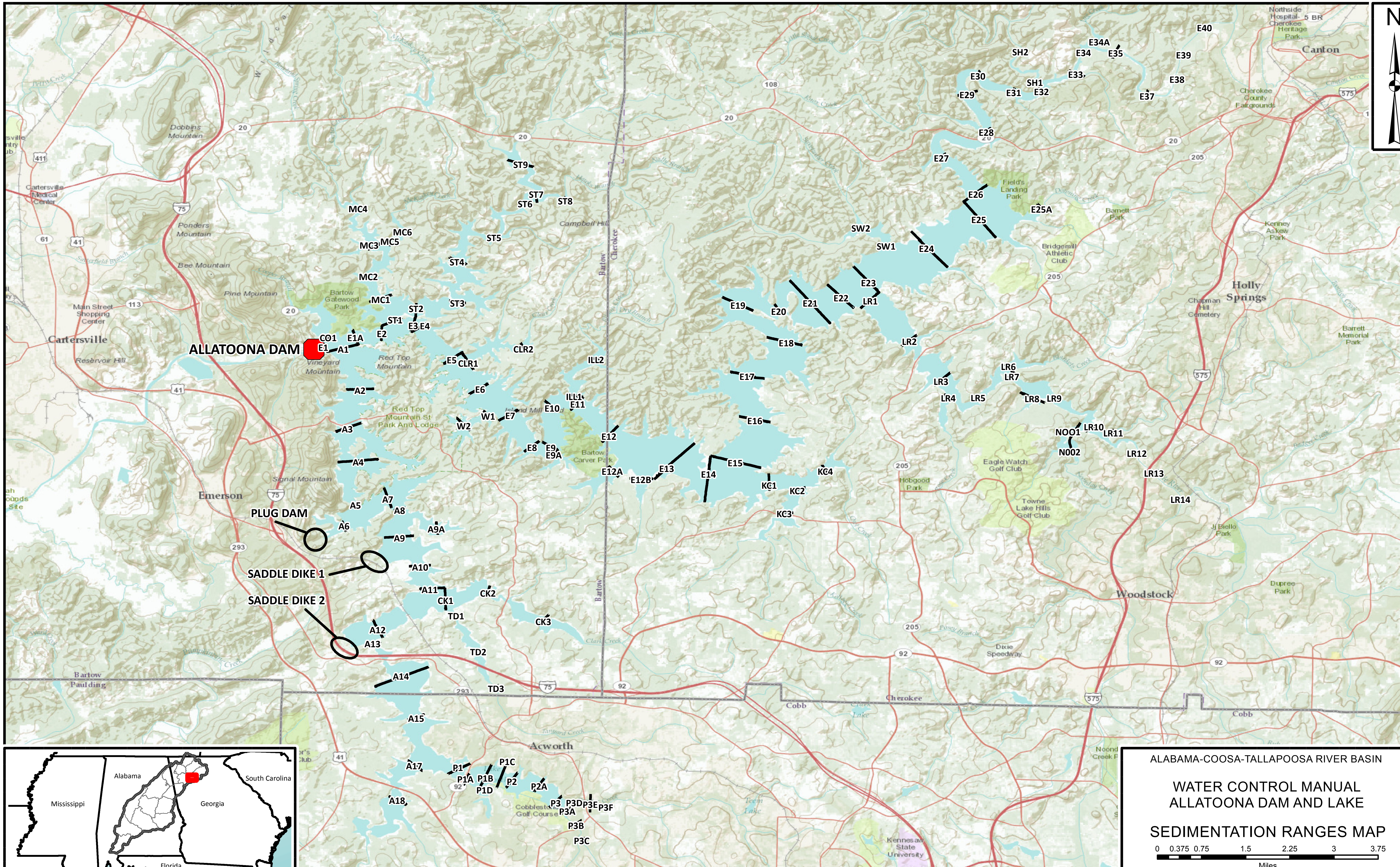
PROPERTY MAP

SCALE IN FEET

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

PLAN AND SECTIONS OF DAM AND POWERHOUSE



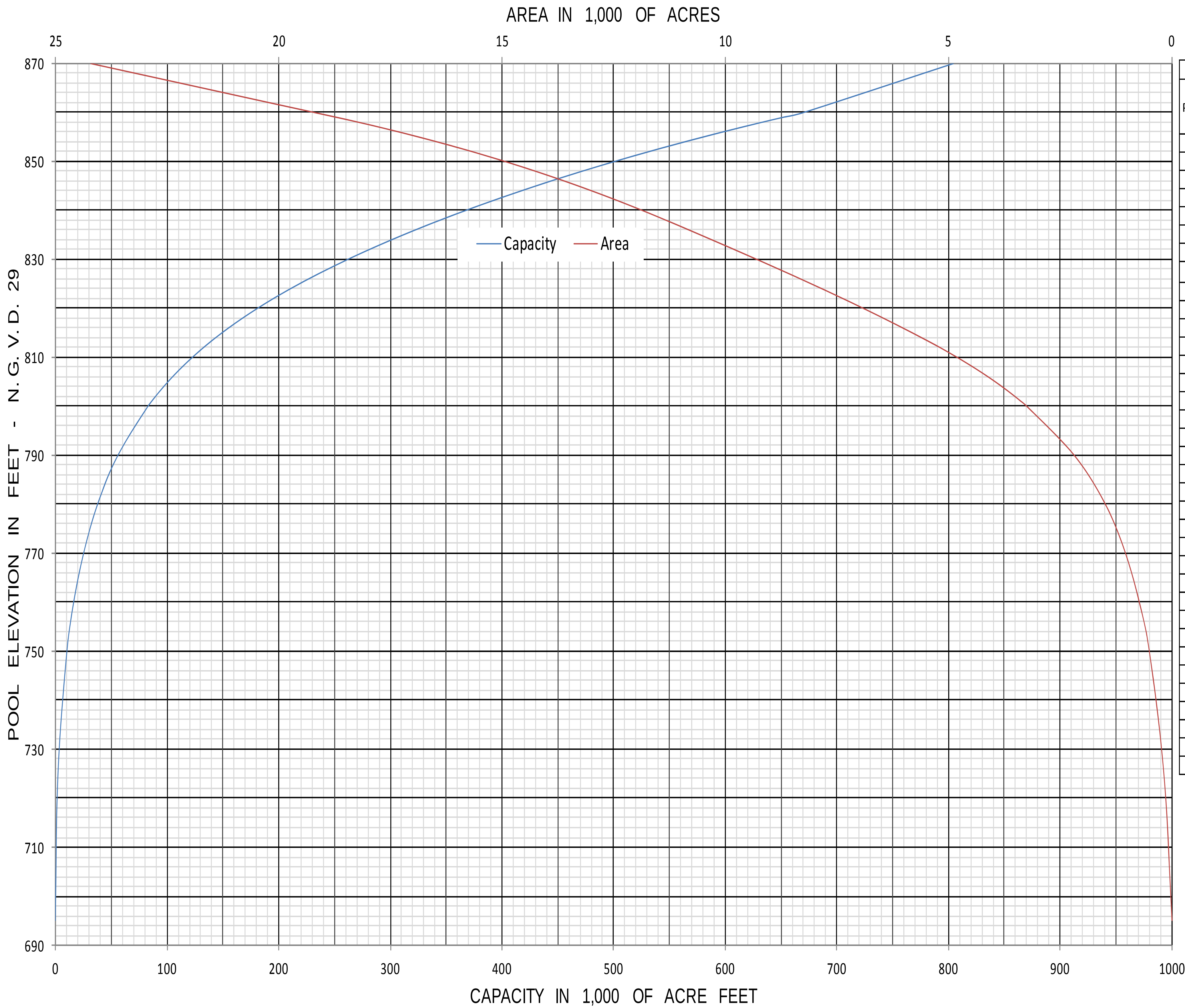
ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

SEDIMENTATION RANGES MAP

0 0.375 0.75 1.5 2.25 3 3.75
Miles

R005_19MAY11_SEDIMENTATION_RANGES_MAP_11X17.mxd



AREA CAPACITY TABLE

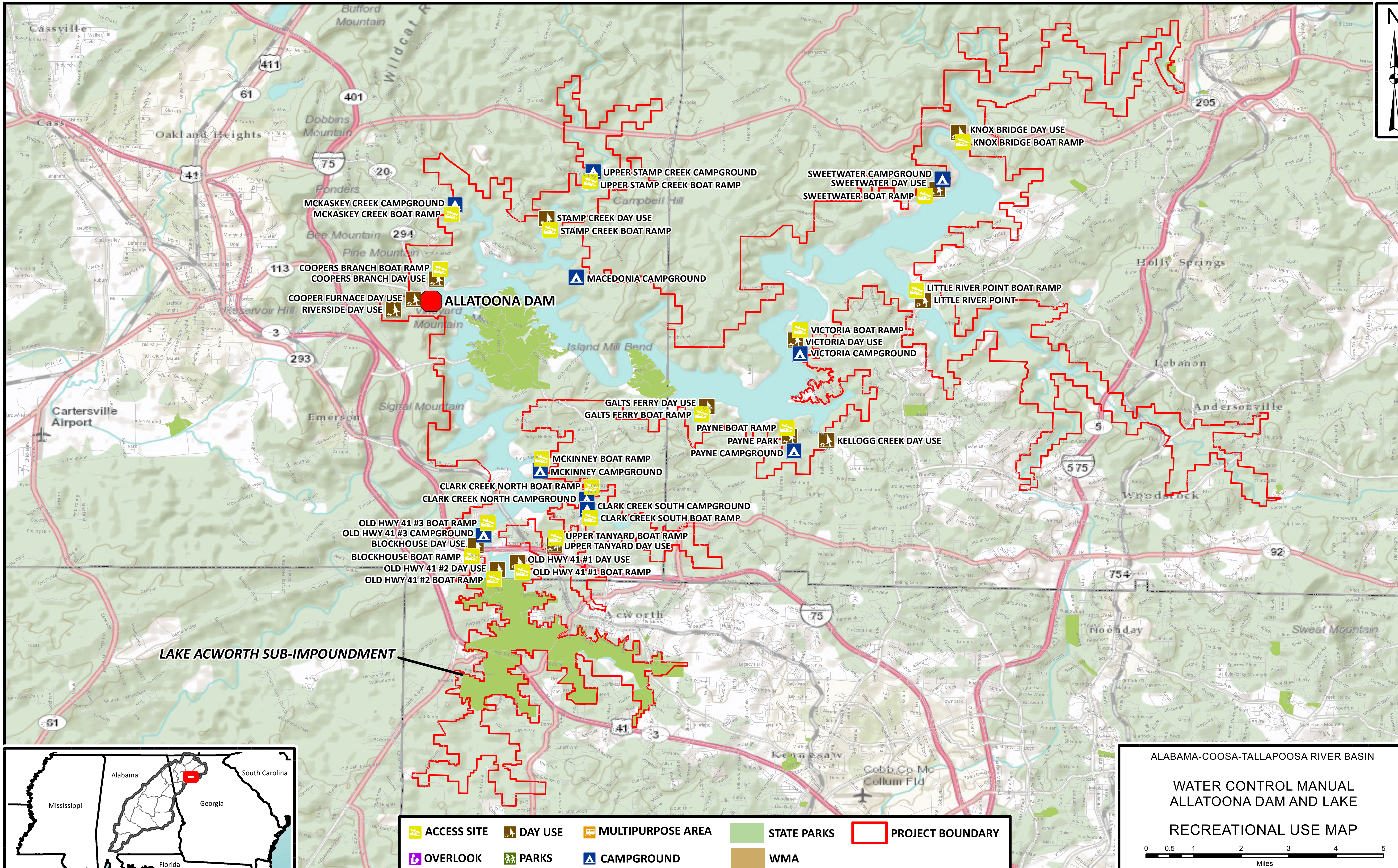
Pool Elevation (Feet)	Total Area (Acres)	Total Storage (Acre-Feet)	Pool Elevation (Feet)	Total Area (Acres)	Total Storage (Acre-Feet)
695	0	0	828	8801	243769
725	182	2359	829	9046	252893
750	508	10382	830	9293	261863
760	734	16534	831	9542	271281
770	1042	25326	832	9793	280994
780	1493	37861	833	10045	290868
790	2190	56021	834	10298	301040
[3]800	3251	82891	[4]835	10552	311465
801	3381	86207	836	10808	322145
802	3516	89655	837	11067	333082
803	3657	93241	838	11329	344281
804	3804	96971	839	11594	355743
805	3957	100851	[2]840	11862	367471
806	4116	104887	841	12134	379469
807	4281	109085	842	12411	391741
808	4452	113451	843	12695	404294
809	4629	117991	844	12988	417136
810	4812	122711	845	13289	430274
811	5001	127617	846	13599	443718
812	5196	132715	847	13918	457476
813	5397	138011	848	14246	471558
814	5602	143511	849	14584	485973
815	5811	149217	850	14933	500731
816	6024	155135	851	15293	515844
817	6241	161267	852	15665	531323
818	6462	167619	853	16050	547181
819	6686	174193	854	16449	563431
820	6913	180993	855	16863	580087
821	7142	188021	856	17293	597165
822	7373	195279	857	17740	614681
823	7606	202769	858	18205	632553
824	7841	210493	859	18692	651101
825	8078	218453	[1,5]860	19201	670047
826	8317	226651	870	24200	804000
827	8558	235089			

[1] Top of flood control
[2] Top of conservation
[3] Minimum conservation
[4] Spillw ay crest elevation
[5] Top of gates – closed position

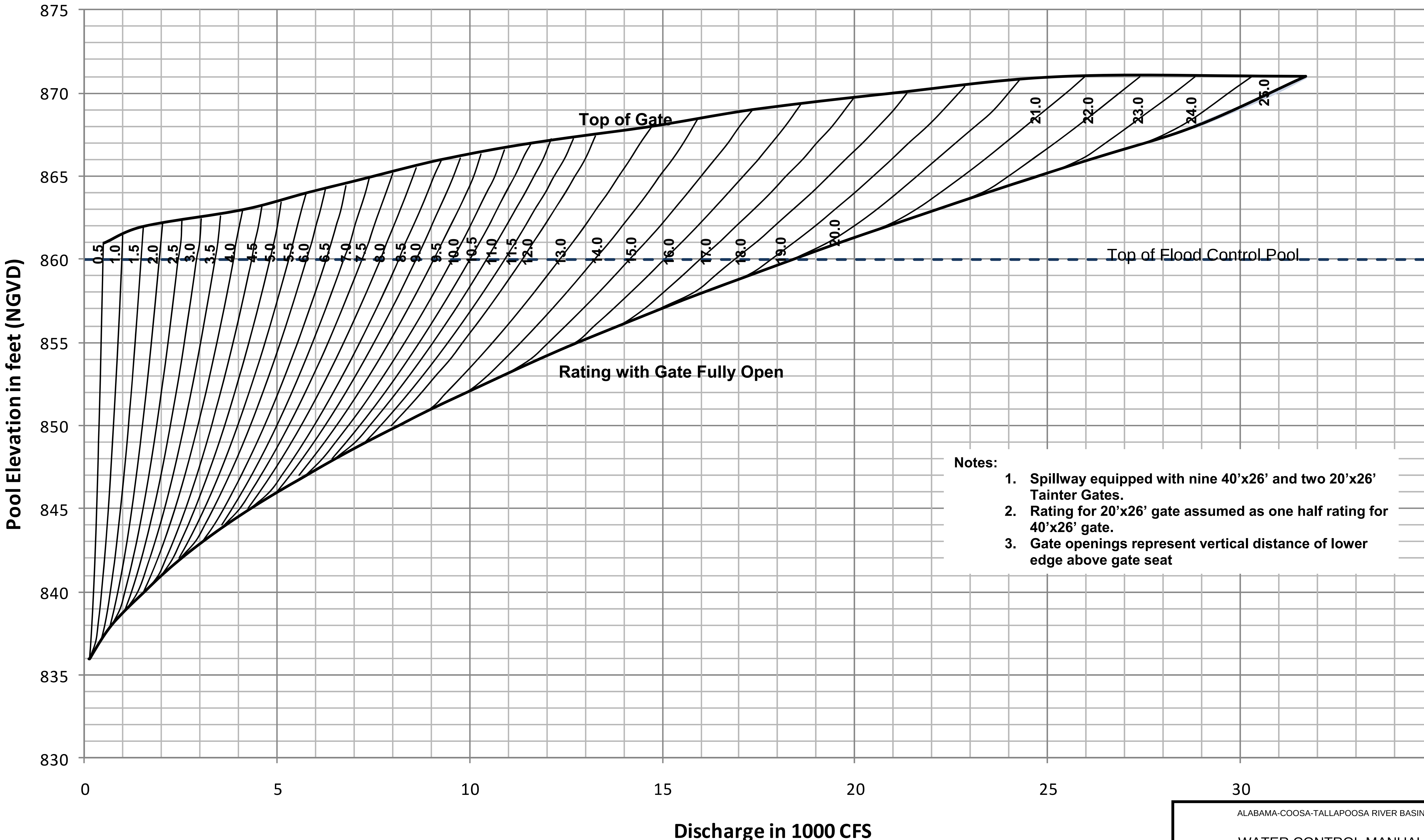
ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

AREA AND CAPACITY



ALLATOONA DAM
KNOX BRIDGE DAY USE
KNOX BRIDGE BOAT RAMP
SWEETWATER CAMPGROUND
SWEETWATER DAY USE
SWEETWATER BOAT RAMP
UPPER STAMP CREEK CAMPGROUND
UPPER STAMP CREEK BOAT RAMP
MCKASKEY CREEK CAMPGROUND
MCKASKEY CREEK BOAT RAMP
STAMP CREEK DAY USE
STAMP CREEK BOAT RAMP
COOPERS BRANCH BOAT RAMP
COOPERS BRANCH DAY USE
MACEDONIA CAMPGROUND
COOPER FURNACE DAY USE
RIVERSIDE DAY USE
LITTLE RIVER POINT BOAT RAMP
LITTLE RIVER POINT
VICTORIA BOAT RAMP
VICTORIA DAY USE
VICTORIA CAMPGROUND
GALTS FERRY DAY USE
GALTS FERRY BOAT RAMP
PAYNE BOAT RAMP
PAYNE PARK
PAYNE CAMPGROUND
KELLOGG CREEK DAY USE
MCKINNEY BOAT RAMP
MCKINNEY CAMPGROUND
CLARK CREEK NORTH BOAT RAMP
CLARK CREEK NORTH CAMPGROUND
CLARK CREEK SOUTH CAMPGROUND
CLARK CREEK SOUTH BOAT RAMP
OLD HWY 41 #3 BOAT RAMP
OLD HWY 41 #3 CAMPGROUND
BLOCKHOUSE DAY USE
BLOCKHOUSE BOAT RAMP
UPPER TANYARD BOAT RAMP
UPPER TANYARD DAY USE
OLD HWY 41 #1 DAY USE
OLD HWY 41 #1 BOAT RAMP
OLD HWY 41 #2 DAY USE
OLD HWY 41 #2 BOAT RAMP
LAKE ACWORTH SUB-IMPOUNDMENT
Cassville
Cass
Oakland Heights
Bufford Mountain
Dobbins Mountain
Ponders
Campbell Hill
Bee Mountain
Pine Mountain
Reservoir Hill
Island Mill Bend
Signal Mountain
Emerson
Cartersville Airport
Holly Springs
Lebanon
Andersonville
Woodstock
Acworth
Noonday
Sweat Mountain
Kennesaw
Cobb Co Mc Collum Fld
Mississippi
Alabama
Georgia
South Carolina
Florida
ACCESS SITE
DAY USE
MULTIPURPOSE AREA
STATE PARKS
PROJECT BOUNDARY
OVERLOOK
PARKS
CAMPGROUND
WMA
N
ALABAMA-COOSA-TALLAPOOSA RIVER BASIN
WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE
RECREATIONAL USE MAP
0 0.5 1 2 3 4 5
Miles



Notes:

1. Spillway equipped with nine 40'x26' and two 20'x26' Tainter Gates.
2. Rating for 20'x26' gate assumed as one half rating for 40'x26' gate.
3. Gate openings represent vertical distance of lower edge above gate seat

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

SPILLWAY RATING CURVES FOR ONE 40'X26' TAINTER GATE

SPILLWAY GATE DISCHARGE TABLE FOR ALLATOONA RESERVOIR

CFS Discharge of One 40 Foot Radial Gate with Openings at Indicators in Feet

Pool	0.5	0.75	1	1.25	1.5	1.75	2	2.25	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10	10.5	11	11.5
836	120	130	140																								
837	155	225	295	348	400																						
838	180	268	355	433	510	583	655	678	700																		
839	205	305	405	495	585	673	760	840	920	1065	1100																
840	225	335	445	550	655	755	855	948	1040	1220	1380	1535	1550														
841	245	365	485	600	715	828	940	1045	1150	1355	1545	1730	1900	2000													
842	265	395	525	650	775	895	1015	1133	1250	1475	1690	1905	2100	2290	2460	2500											
843	280	418	555	690	825	958	1090	1218	1345	1590	1825	2065	2285	2495	2700	2890	3050										
844	295	443	590	733	875	1015	1155	1293	1430	1695	1955	2210	2455	2690	2915	3135	3355	3550	3650								
845	310	465	620	770	920	1070	1220	1365	1510	1795	2070	2350	2615	2870	3120	3360	3605	3825	4050	4260	4300						
846	325	488	650	808	965	1123	1280	1435	1590	1890	2185	2480	2765	3040	3310	3570	3840	4085	4330	4565	4795	5000					
847	340	508	675	843	1010	1175	1340	1500	1660	1980	2290	2605	2905	3200	3490	3775	4060	4330	4595	4855	5110	5345	5580	5750			
848	350	525	700	878	1055	1223	1390	1560	1730	2065	2390	2725	3040	3355	3660	3965	4270	4560	4850	5130	5405	5660	5920	6180	6420	6500	
849	360	543	725	910	1095	1270	1445	1623	1800	2145	2485	2835	3170	3505	3825	4145	4470	4780	5085	5385	5685	5965	6245	6523	6790	7035	7300
850	375	563	750	940	1130	1313	1495	1680	1865	2225	2580	2945	3295	3645	3980	4320	4665	4990	5315	5635	5950	6250	6555	6855	7143	7410	7705
851	385	580	775	970	1165	1355	1545	1735	1925	2300	2670	3050	3410	3780	4130	4485	4850	5190	5535	5870	6205	6525	6850	7175	7480	7765	8085
852	400	600	800	1003	1205	1400	1595	1790	1985	2375	2760	3155	3530	3910	4275	4645	5025	5380	5745	6100	6450	6790	7130	7475	7800	8110	8450
853	410	615	820	1030	1240	1440	1640	1843	2045	2450	2845	3250	3640	4035	4415	4800	5195	5570	5945	6315	6685	7040	7400	7765	8110	8435	8795
854	420	633	845	1058	1270	1478	1685	1895	2105	2520	2925	3345	3750	4160	4555	4950	5360	5750	6145	6530	6915	7285	7665	8045	8410	8755	9130
855	430	648	865	1085	1305	1518	1730	1945	2160	2585	3005	3440	3855	4280	4685	5100	5525	5925	6335	6735	7135	7525	7915	8315	8695	9055	9455
856	440	663	885	1110	1335	1555	1775	1995	2215	2650	3085	3530	3960	4395	4815	5240	5680	6095	6515	6935	7350	7755	8160	8575	8975	9350	9765
857	450	678	905	1138	1370	1593	1815	2040	2265	2715	3160	3620	4060	4505	4940	5380	5830	6260	6695	7125	7560	7975	8400	8830	9245	9640	10070
858	460	693	925	1163	1400	1628	1855	2088	2320	2780	3235	3705	4155	4615	5060	5515	5980	6420	6870	7315	7760	8195	8630	9075	9505	9915	10365
859	470	708	945	1188	1430	1663	1895	2133	2370	2840	3305	3790	4250	4725	5180	5645	6125	6580	7040	7500	7960	8405	8855	9315	9760	10185	10650
860	480	723	965	1213	1460	1698	1935	2178	2420	2900	3380	3870	4345	4830	5300	5775	6265	6735	7210	7680	8150	8610	9075	9550	10010	10450	10930
861	490	738	985	1238	1490	1735	1980	2235	2490	2980	3450	3930	4420	4930	5410	5910	6400	6900	7380	7840	8320	8820	9290	9790	10260	10700	11200
862					1520	1773	2025	2273	2520	3020	3520	4020	4520	5020	5520	6020	6520	7020	7520	8020	8520	9010	9500	10010	10500	10960	11460
863												4100	4610	5120	5630	6140	6650	7160	7670	8190	8710	9200	9720	10220	10720	11200	11710
864															5740	6260	6780	7300	7830	8360	8890	9400	9920	10430	10940	11450	11980
865																		7480	8010	8540	9060	9580	10110	10650	11180	11680	12210
866																					9240	9760	10300	10840	11390	11910	12470
867																									11600	12120	12700

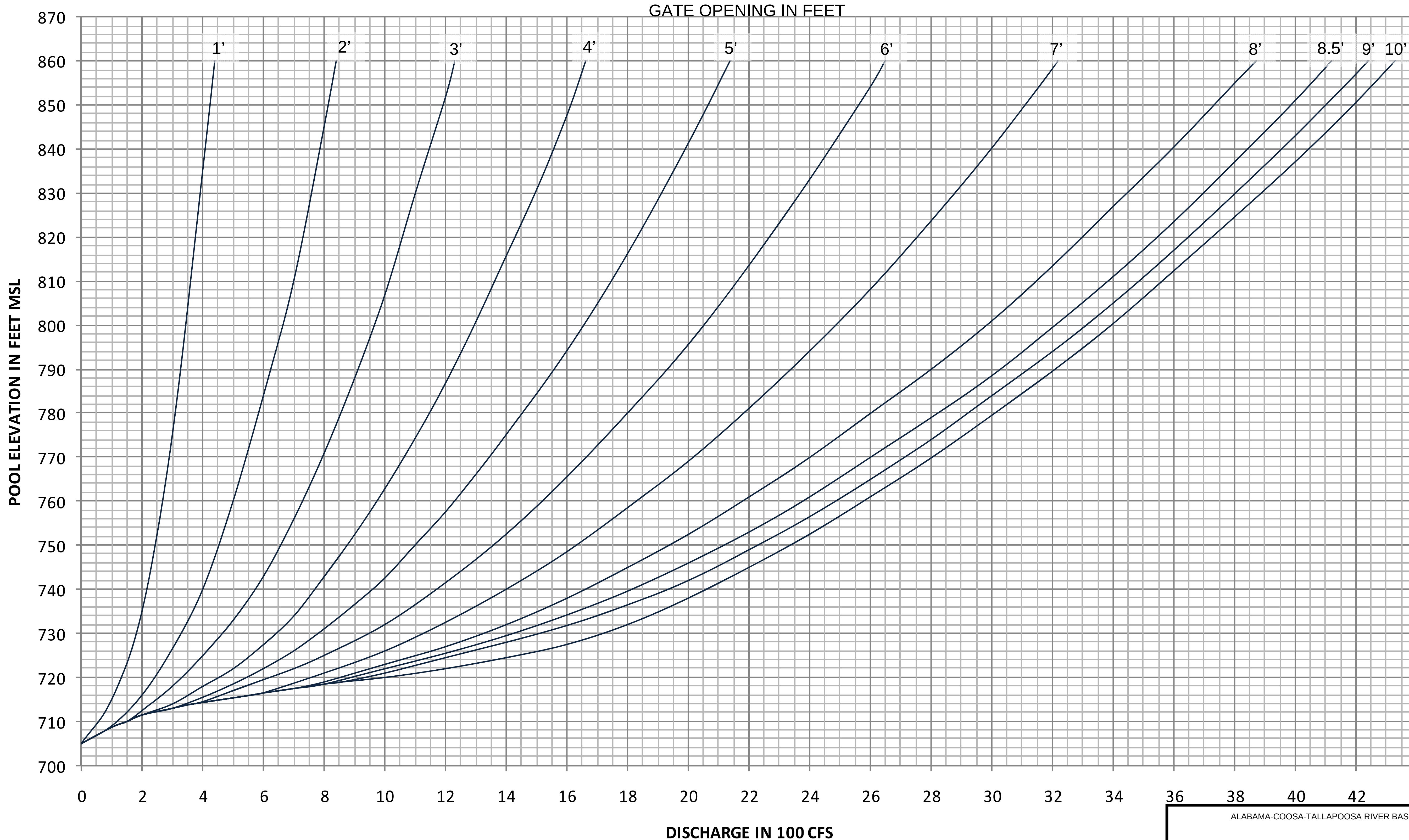
CFS Discharge of One 40 Foot Radial Gate with Openings at Indicators in Feet

Pool	12	12.5	13	13.5	14	14.5	15	15.5	16	16.5	17	17.5	18	18.5	19	19.5	20	20.5	21	21.5	22	22.5	23	23.5	24	24.5	25
848																											
849																											
850	7965	8058	8150																								
851	8370	8670	8970	8985	9000																						
852	8755	9078	9400	9650	9900																						
853	9120	9468	9815	10135	10455	10653	10850																				
854	9775	9995	10215	10555	10895	11228	11560	11680	11800																		
855	9820	10208	10595	10958	11320	11673	12025	12383	12740	12770	12800																
856	10150	10558	10965	11348	11730	12103	12475	12855	13235	13543	13850																
857	10470	10895	11320	11723	12125	12518	12910	13313	13715	14115	14515	14728	14940														
858	10780	11223	11665	12085	12505	12918	13330	13753	14175	14598	15020	15430	15840	15945	16050												
859	11080	11540	12000	12438	12875	13308	13740	14183	14625	15068	15510	15943	16375	16788	17200												
860	11375	11853	12330	12783	13235	13685	14135	14595	15055	15518	15980	16435	16890	17368	17845	18123	18400										
861	11650	12155	12660	13135	13610	14075	14540	15020	15500	15985	16470	16955	17440	17930	18420	18860	19300	19450	19600								
862	11940	12460	12980	13465	13950	14440	14930	15425	15920	16420	16920	17420	17920	18450	18980	19480	19980	20395	20810	20835	20860						
863	12210	12740	13270	13780	14290	14790	15290	15805	16320	16850	17380	17890	18400	18945	19490	20030	20570	21085	21600	21875	22150						
864	12490	13035	13580	14100	14620	15135	15650	16185	16720	17270	17820	18350	18880	19440	20000	20500	21000	21610	22220	22765	23310	23365	23420				
865	12740	13300	13860	14390	14920	15460	16000	16555	17110	17665	18220	18770	19320	19900	20480	21045	21610	22210	22810	23405	24000	24400	24800				
866	13000	13575	14150	14700	15250	15800	16350	16925	17500	18075	18650	19200	19750	20350	20950	21530	22110	22740	23370	23985	24600	25225	25850	25975	26100		
867	13270	13845	14420	14980	15540	16120	16700	17275	17850	18435	19020	19610	20200	20800	21400	22010	22620	23260	23900	24550	25200	25850	26500	27000	27500		
868			14720	15285	15850	16425	17000	17600	18200	18810	19420	20015	20610	21245	21880	22500	23120	23775	24430	25100	25770	26435	27100	27765	28430	28635	28840
869							17340	17960	18580	19195	19810	20410	21010	21655	22300	22955	23610	24280	24950	25635	26320	27000	27680	28390	29100	29490	29880
870													21450	21878	22750	23188	24090	24533	25480	25903	26860	27565	28270	28975	29680	30270	30860
871																			25970	26685	27400	28110	28820	29555	30290	30995	31700

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

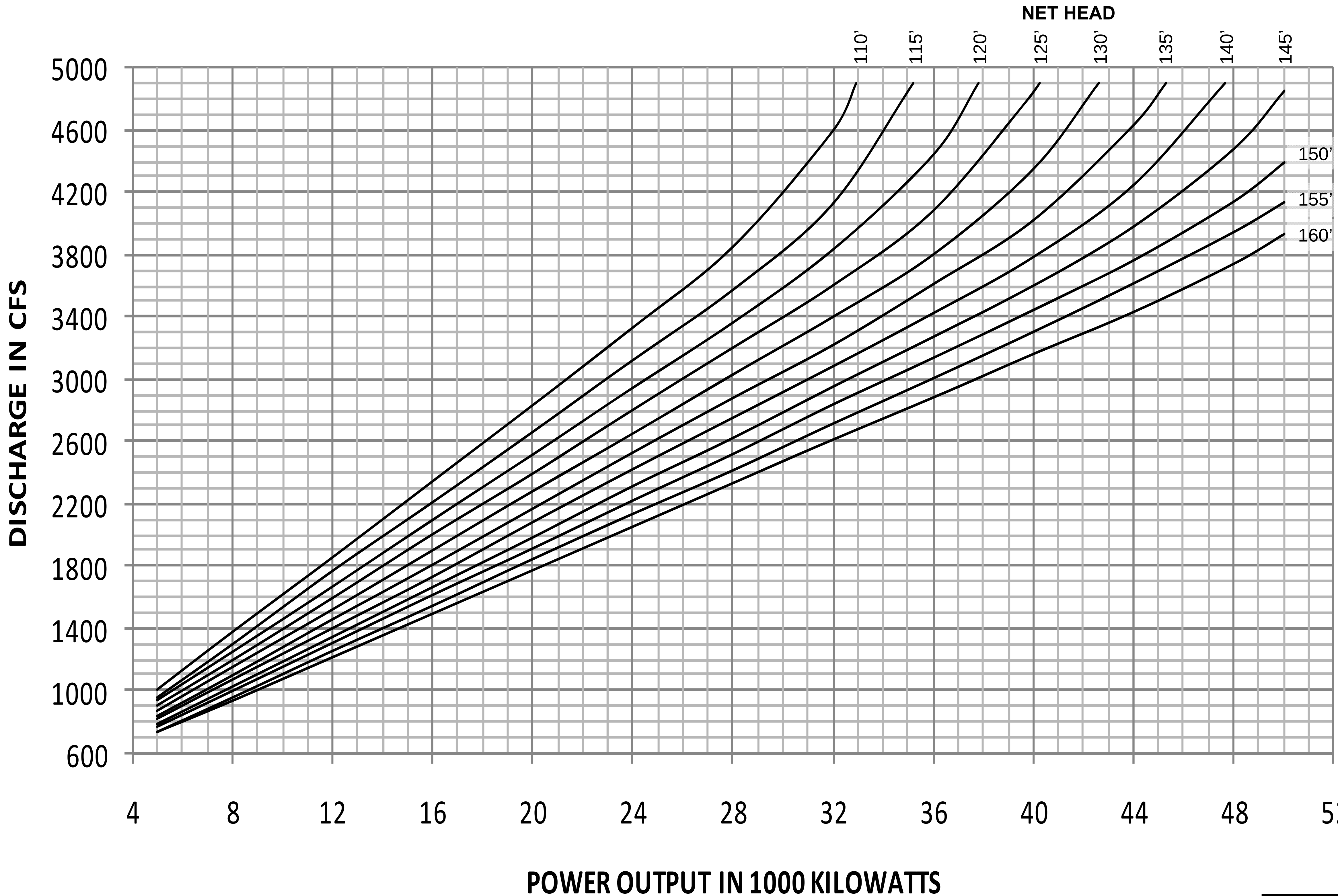
SPILLWAY RATING TABLES



ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

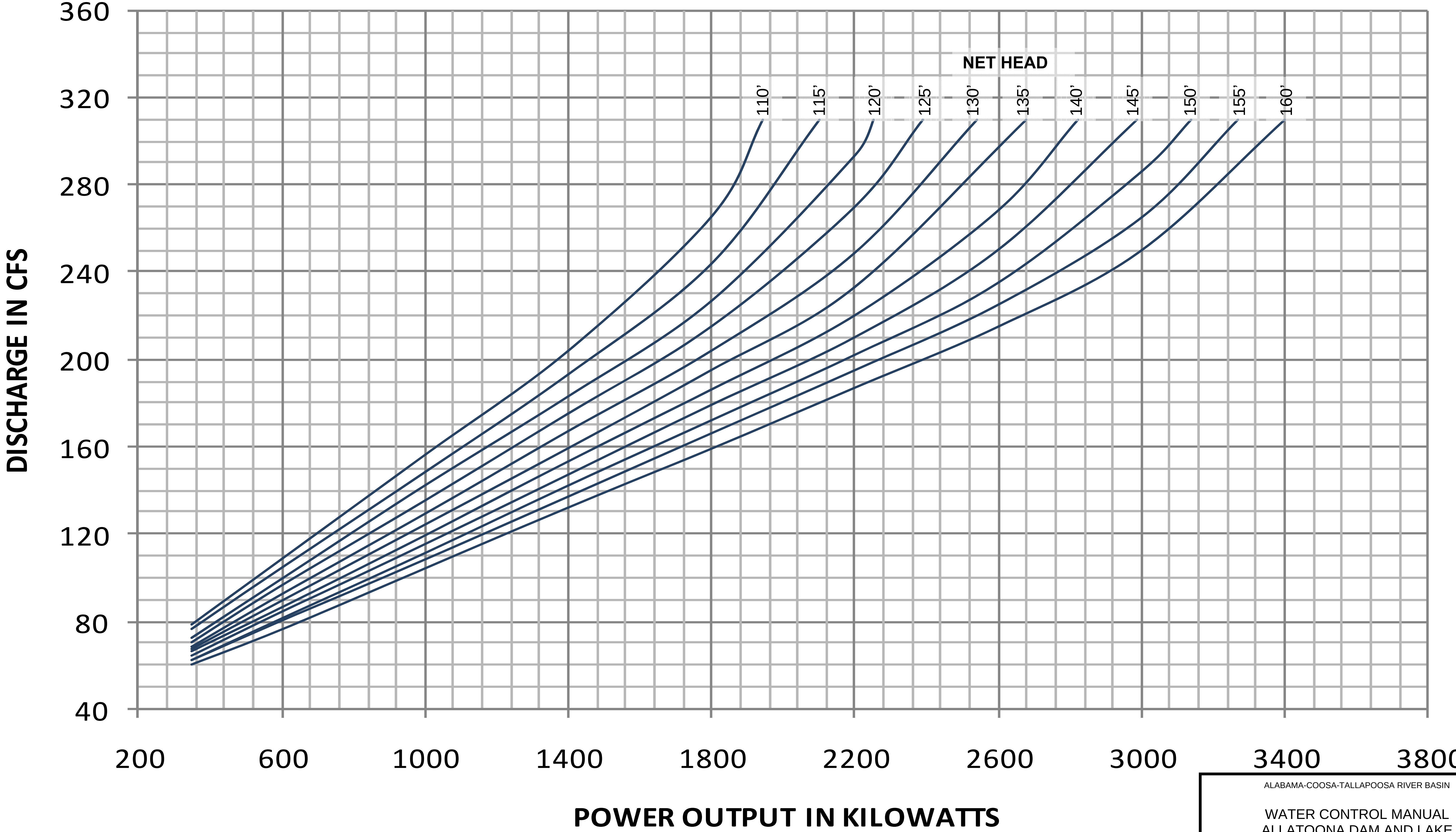
RATING CURVES FOR ONE 5’8” X 10’ SLUICE



ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

PERFORMANCE CURVES MAIN TURBOGENERATOR UNIT



ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

PERFORMANCE CURVES
SMALL TURBOGENERATOR UNIT

Monthly Hydropower Production at Allatoona (MWH)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Max	Min
1961	7361	4092	43419	21882	16462	13599	13870	11388	9884	5030	4894	22038	173919	43419	4092
1962	31970	15328	24575	23584	15107	9509	10708	10976	4623	5684	10178	15770	178012	31970	4623
1963	11719	8013	25023	10902	34898	12943	14672	9291	9220	14282	10011	16755	177729	34898	8013
1964	14723	24797	15489	38517	39029	15578	12138	9349	9298	26376	10671	20471	236436	39029	9298
1965	10479	18538	11230	24373	12772	14202	9127	7916	9958	6939	9149	9624	144307	24373	6939
1966	5117	13852	28898	11673	28435	15779	9281	10705	8997	7410	16021	12063	168231	28898	5117
1967	10010	7699	7791	3909	17483	17103	20772	17125	23456	11467	23491	26632	186938	26632	3909
1968	29200	9743	19718	16603	17842	10254	8515	7483	8072	11038	12961	13189	164618	29200	7483
1969	16823	19323	9797	16886	14984	7998	6327	14978	9546	12247	12746	11118	152773	19323	6327
1970	7948	4930	10324	9571	9076	13038	9702	10978	8592	4667	8101	11361	108288	13038	4667
1971	12604	11822	24248	13450	15696	8505	12961	19817	11905	9739	14044	21751	176542	24248	8505
1972	34784	18610	11758	9344	25830	12172	8718	12190	8120	5534	17593	22810	187463	34784	5534
1973	23925	15808	19011	31133	32297	35406	15372	11873	8797	14844	14659	16880	240005	35406	8797
1974	32770	22644	11457	30582	16209	12978	10356	13171	11884	9106	10868	15944	197969	32770	9106
1975	17121	20796	26481	24917	18050	11816	9981	12339	8358	18684	16886	15605	201034	26481	8358
1976	19171	14354	27117	41222	21739	15149	17069	10315	9849	7336	10796	12082	206199	41222	7336
1977	14846	5296	12538	39588	22074	8231	7632	8092	7746	12291	35362	18389	192085	39588	5296
1978	26592	18287	10330	8218	20459	9910	7319	12652	6804	7613	9055	9492	146731	26592	6804
1979	14464	9725	35641	35598	36656	15036	12100	12214	6273	17486	21525	13104	229822	36656	6273
1980	18314	11744	22969	57520	41060	13068	12399	8068	7466	7037	10011	10548	220204	57520	7037
1981	6897	6815	5348	4898	7799	11660	8936	7628	8085	4149	5015	4672	81902	11660	4149
1982	15531	36606	19072	17343	19692	11138	9276	12735	9060	10835	14906	31573	207767	36606	9060
1983	18820	14986	16832	25819	22787	12524	9817	11561	6507	7373	12879	40364	200269	40364	6507
1984	31346	15684	19238	18856	30652	12577	18466	26162	11771	14138	3658	15432	217980	31346	3658
1985	11618	11347	7400	5190	7376	4923	8393	8878	6149	7350	14979	12171	105774	14979	4923
1986	5662	4338	3703	4885	4870	4477	2154	2082	2011	2112	3777	14472	54543	14472	2011
1987	15428	10760	18349	8491	5104	7224	9019	8175	4301	6147	4812	4147	101957	18349	4147
1988	12005	7692	5087	1811	1705	5046	4079	5203	5563	5123	4646	7114	65074	12005	1705
1989	10197	4828	15628	12175	8378	18587	27457	11517	7844	45402	23298	16988	202299	45402	4828
1990	24740	25852	46514	35470	17650	8737	10909	10367	9059	10805	11244	11581	222928	46514	8737

ALABAMA-COOSA-TALLAPOOSA BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

HISTORICAL HYDROPOWER PRODUCTION

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Monthly Hydropower Production at Allatoona (MWH)

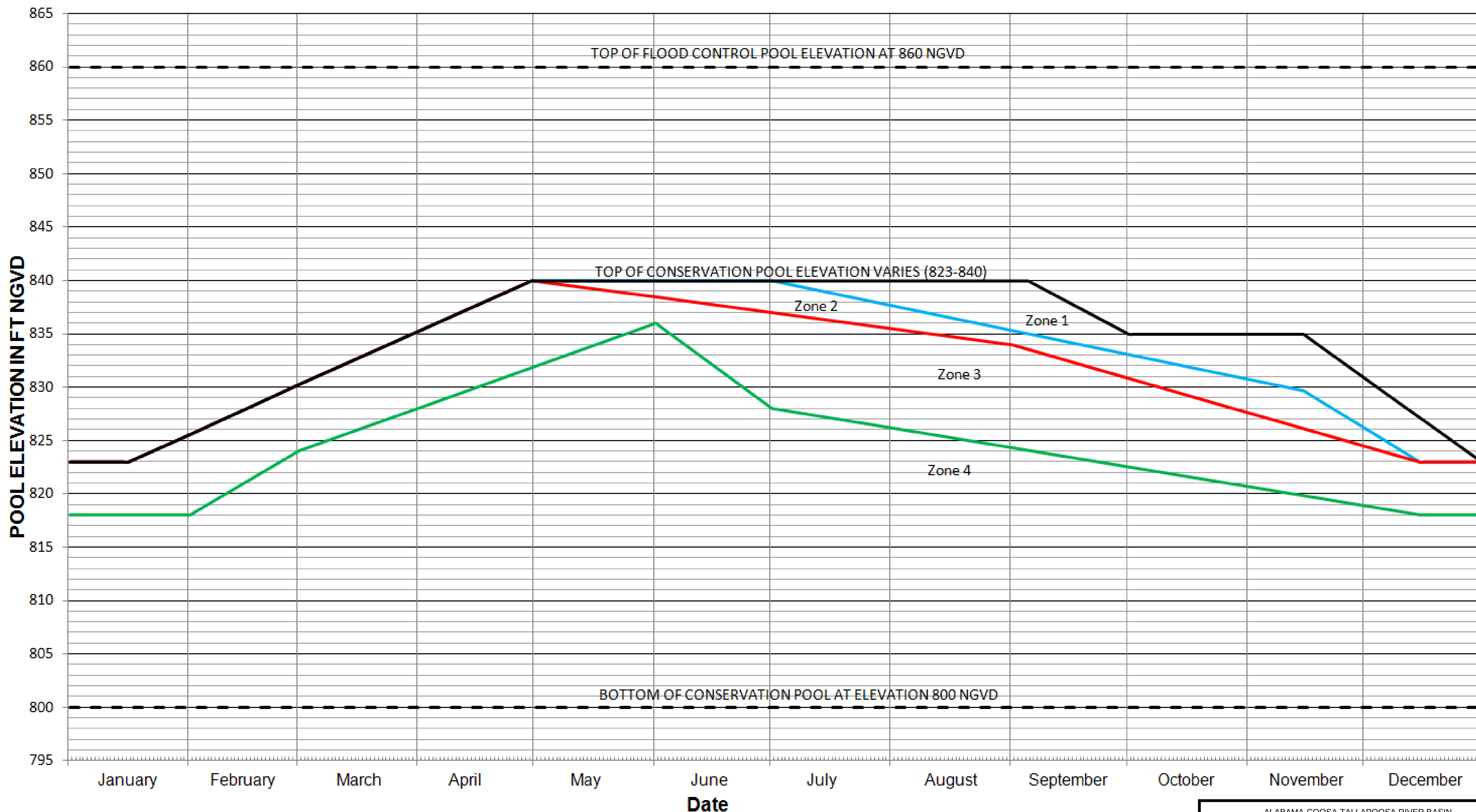
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Max	Min
1991	13858	10668	19752	12390	29552	12945	13162	15512	14787	11845	15735	16259	186465	29552	10668
1992	13619	11142	19363	11235	6844	10876	12788	9112	11895	10468	16275	22245	155862	22245	6844
1993	28448	17203	21485	16712	14273	10055	10190	5311	6389	8014	10275	9247	157602	28448	5311
1994	10145	9878	14421	24186	10558	11054	17030	11632	14537	20383	6740	10977	161541	24186	6740
1995	6790	16185	21851	4953	8995	7312	8241	7787	10524	18704	28541	13737	153620	28541	4953
1996	12956	35495	25484	13693	13820	11193	6187	7722	8876	9930	13121	16479	174956	35495	6187
1997	13063	10774	24498	7439	17366	15505	12358	8301	6398	13533	28644	14021	171900	28644	6398
1998	21279	27233	20496	32429	24075	13660	8389	8157	8758	6853	5607	8646	185582	32429	5607
1999	9324	13021	6048	2112	4180	5086	10442	6915	3210	4226	9680	8572	82816	13021	2112
2000	4136	3722	4370	12690	5877	6692	4996	6762	8695	6281	6523	8839	79583	12690	3722
2001	6496	5351	12355	12381	8048	13715	13711	9515	7217	7024	6634	7413	109860	13715	5351
2002	7700	5553	2892	8502	10971	4575	5496	5486	4171	4287	20800	21967	102400	21967	2892
2003	16783	10395	21182	7930	28155	23440	27229	12615	8462	11187	16743	14735	198856	28155	7930
2004	7425	10580	5711	5047	6416	8294	9785	7319	16850	19905	15401	28334	141067	28334	5047
2005	9862	7586	17701	25420	11639	15335	31545	13904	8510	8485	11544	13270	174801	31545	7586
2006	11680	7317	9773	3991	5880	6016	5733	4489	4617	6322	14765	7192	87775	14765	3991
2007	17136	2828	3473	2388	2674	3254	3518	4594	3309	3534	3425	1687	51820	17136	1687
2008	1669	1553	4123	8228	4944	7490	4990	4019	4879	5246	6284	9465	62890	9465	1553
2009	14630	4455	5736	17252	15197	2396	4786	5915	8860	24752	23740	25151	152870	25151	2396
2010	15996	15625	15505	11803	14137	10247	6047	6226	5698	4641	5410	11532	122867	15996	4641
2011	3888	7538	7125	15308	10328	5061	5506	4932	1940	2047	4636	11745	80054	15308	1940
2012	8374	3232	7236	2547	8941	4009	6069	4131	3357	5557	5598	5268	64319	8941	2547
2013	6491	13584	10444	15205	24661	14889	19771	20045	7950	14994	8815	24155	181004	24661	6491
Average	14603	12551	16151	16571	16409	11175	11047	9918	8285	10499	12513	14813	154534		
Max	34784	36606	46514	57520	41060	35406	31545	26162	23456	45402	35362	40364			
Min	1669	1553	2892	1811	1705	2396	2154	2082	1940	2047	3425	1687			

ALABAMA-COOSA-TALLAPOOSA BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

HISTORICAL HYDROPOWER PRODUCTION

Page 2 of 2



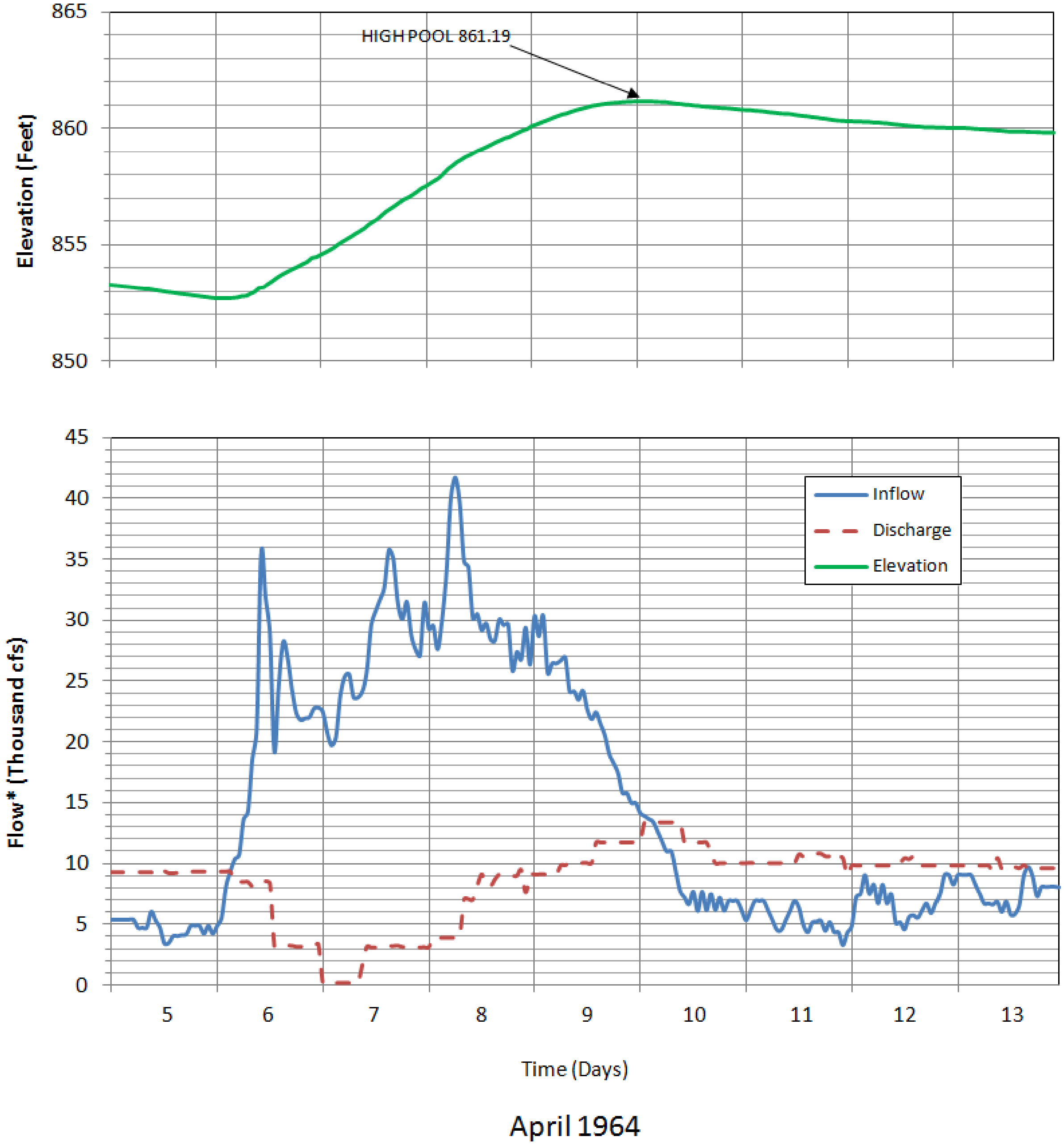
Refer to Plate 7-1 for additional information about water control zones and Plate 7-2 for additional information about flood regulation above conservation pool.

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

TOP OF CONSERVATION POOL AND ACTION ZONES

FLOW, DISCHARGE AND POOL FOR APRIL 1964 FLOOD



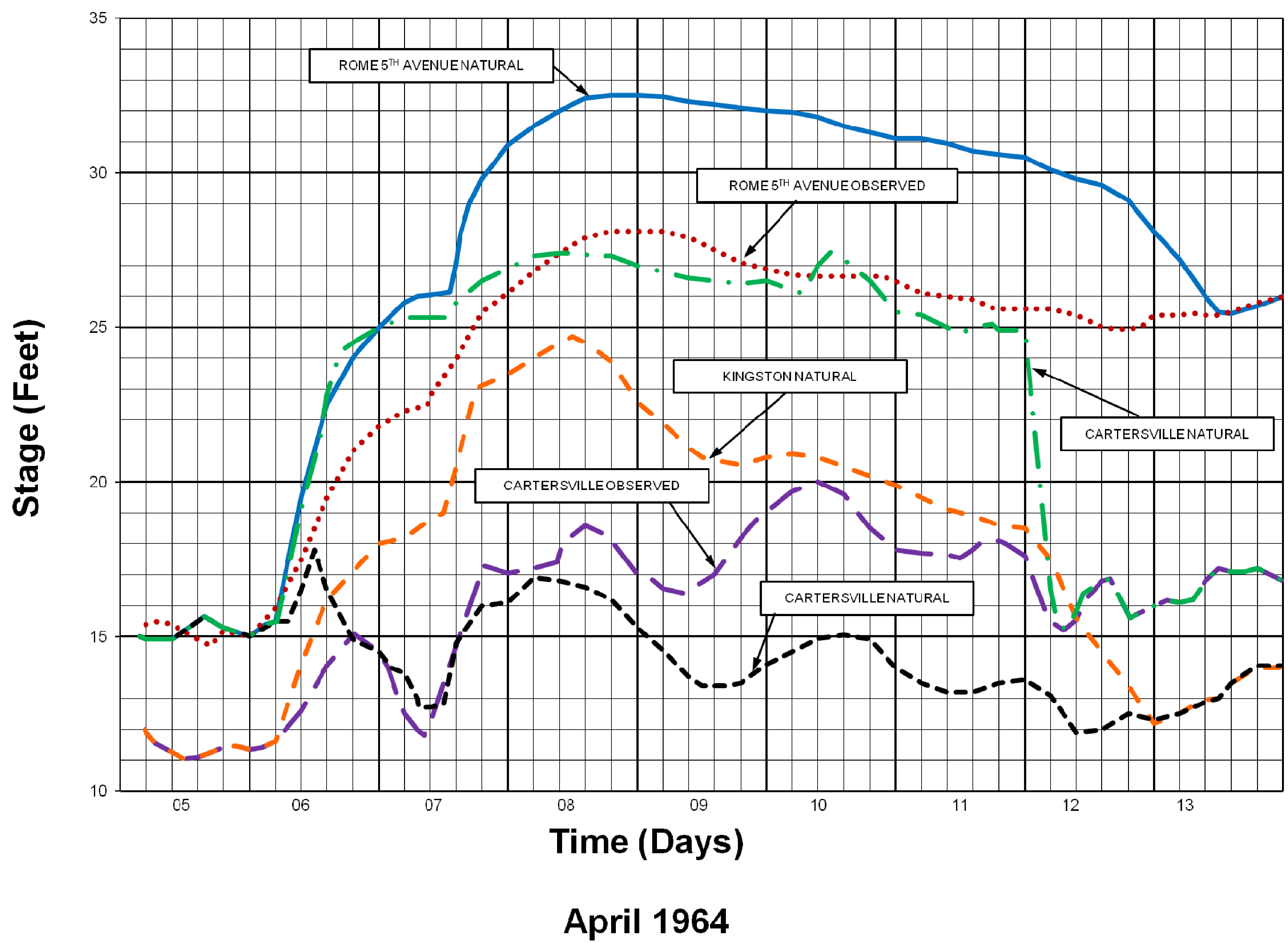
*Inflow values are averages of previous 3-hours

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

APRIL 1964 FLOOD
FLOW, DISCHARGE, AND POOL

OBSERVED APRIL 1964 STAGES BELOW ALLATOONA DAM

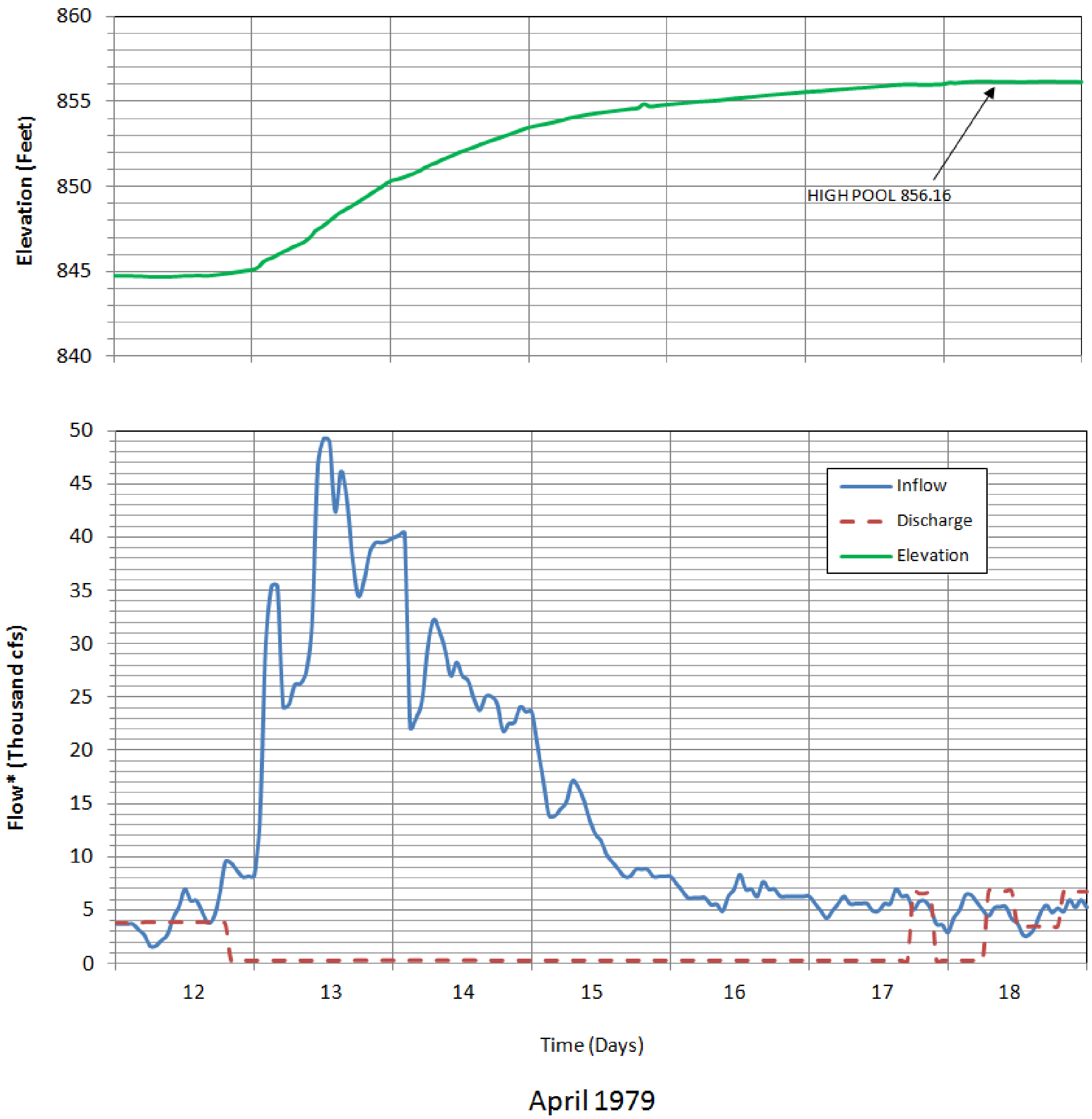


ALABAMA-COOSA-TALLAPOOSA BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

OBSERVED APRIL 1964 STAGES BELOW ALLATOONA DAM

FLOW, DISCHARGE AND POOL FOR APRIL 1979 FLOOD

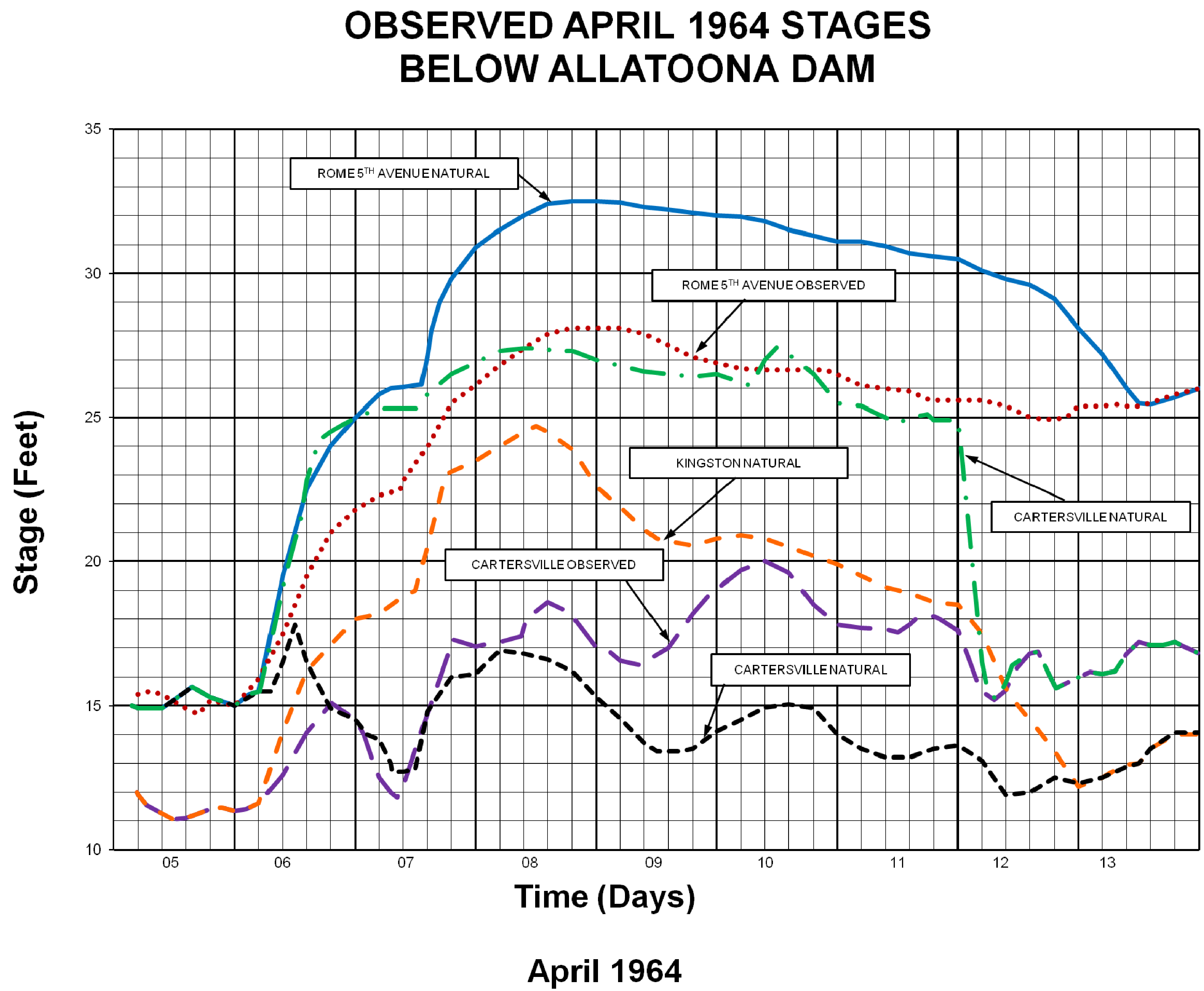


*Inflow values are averages of previous 3-hours

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

APRIL 1979 FLOOD
FLOW, DISCHARGE, AND POOL

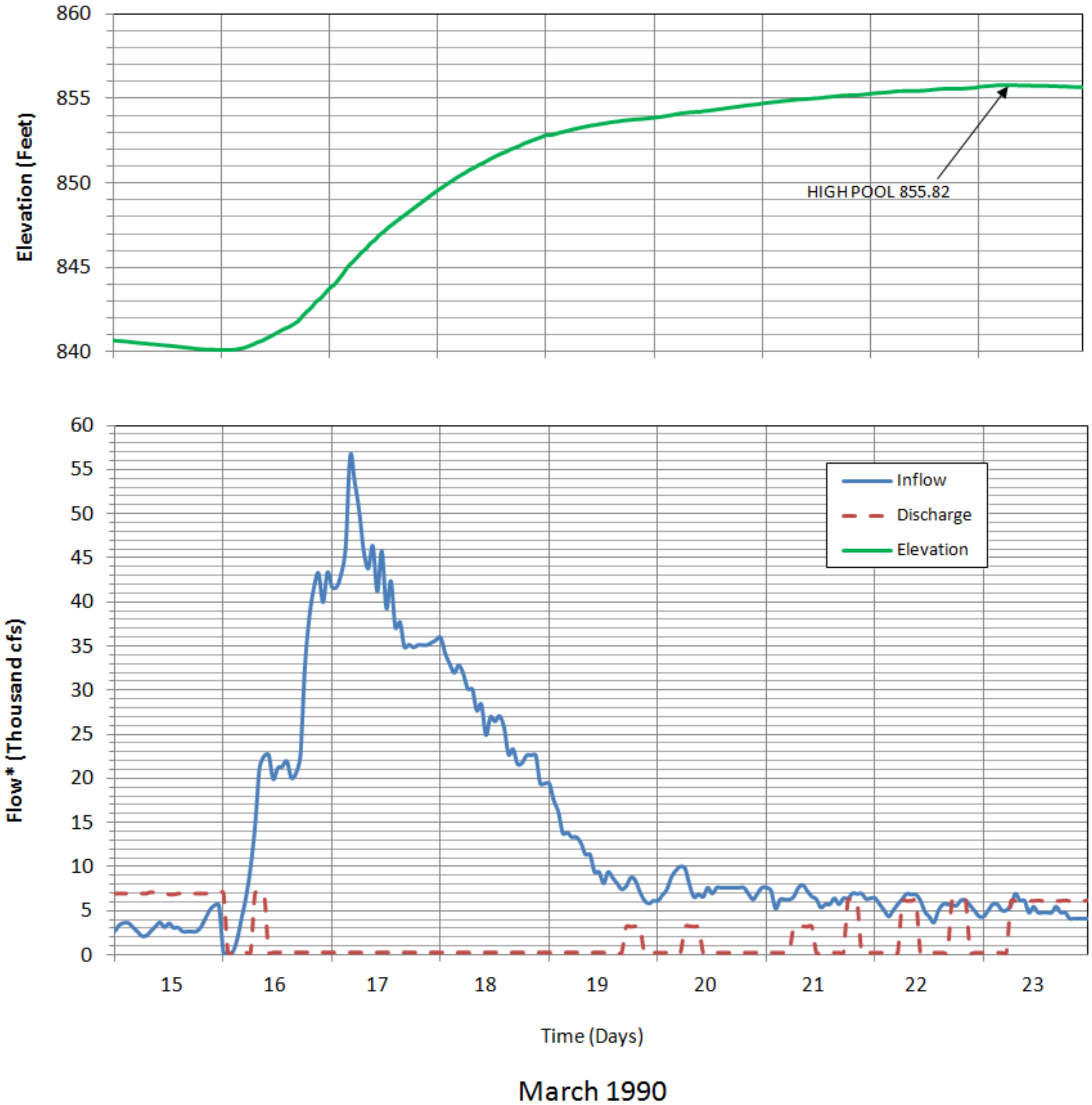


ALABAMA-COOSA-TALLAPOOSA BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

**OBSERVED APRIL 1979 STAGES
BELOW ALLATOONA DAM**

FLOW, DISCHARGE AND POOL FOR MARCH 1990 FLOOD

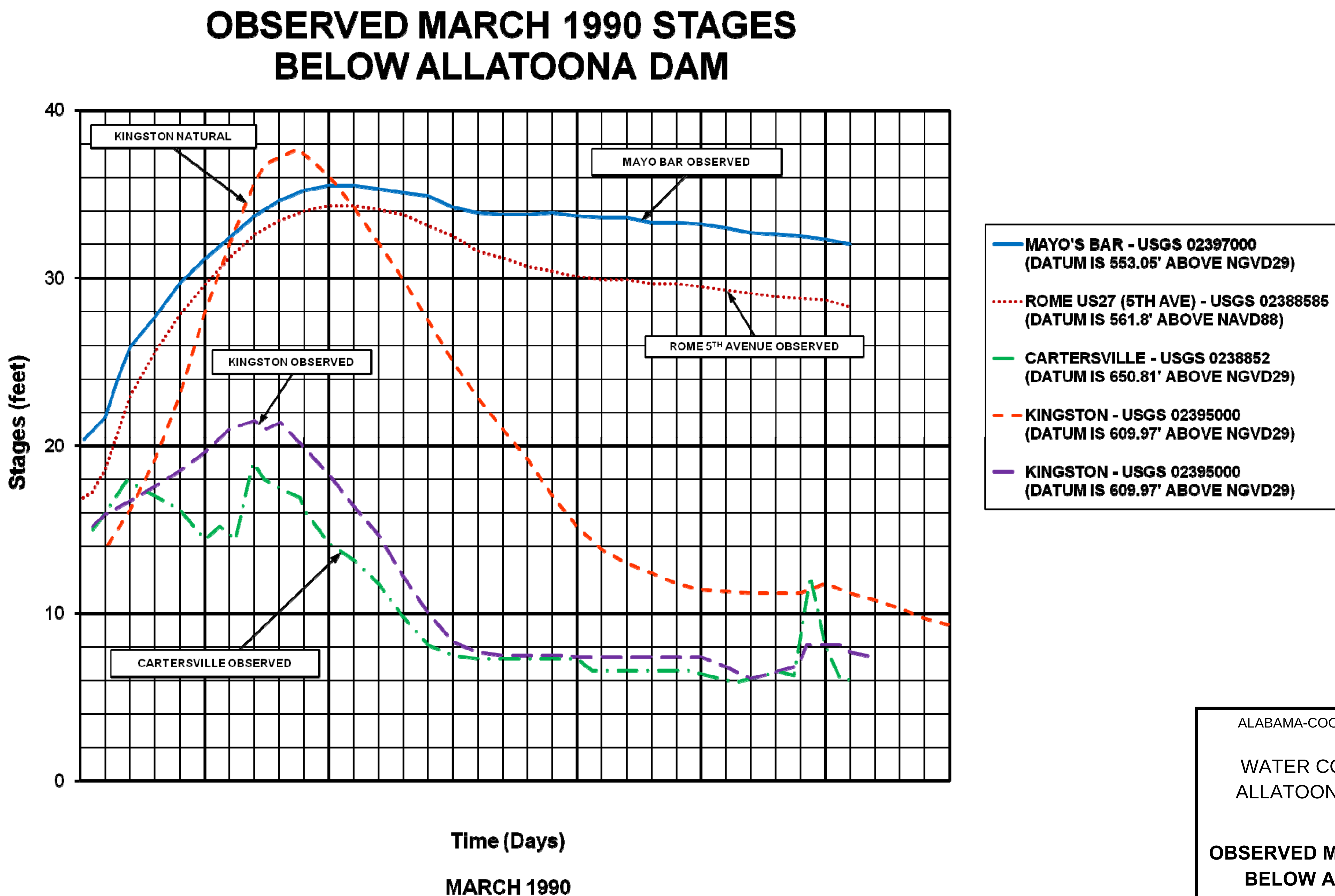


*Inflow values are averages of previous 3-hours

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

MARCH 1990 FLOOD
FLOW, DISCHARGE, AND POOL

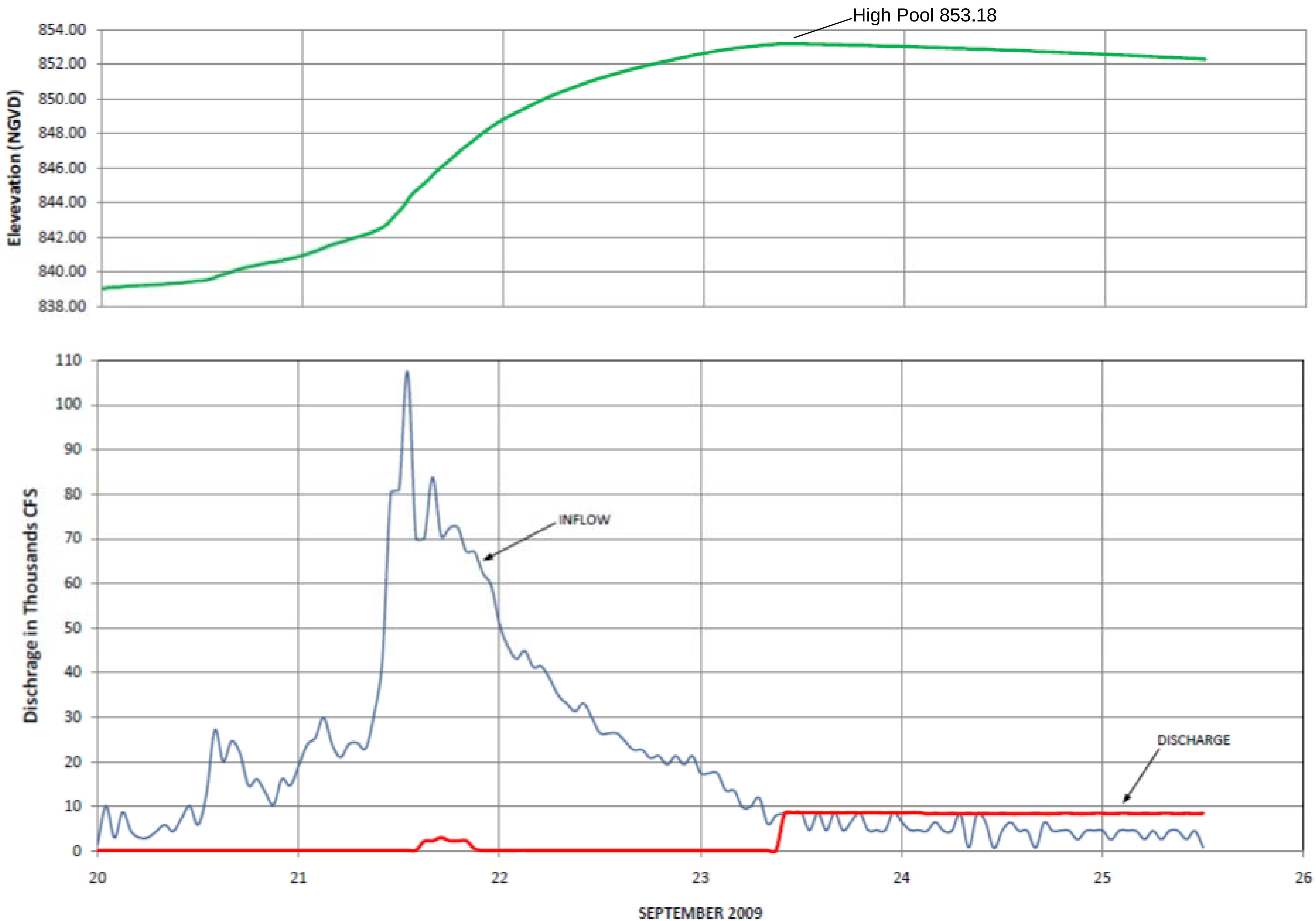


ALABAMA-COOSA-TALLAPOOSA BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

OBSERVED MARCH 1990 STAGES BELOW ALLATOONA DAM

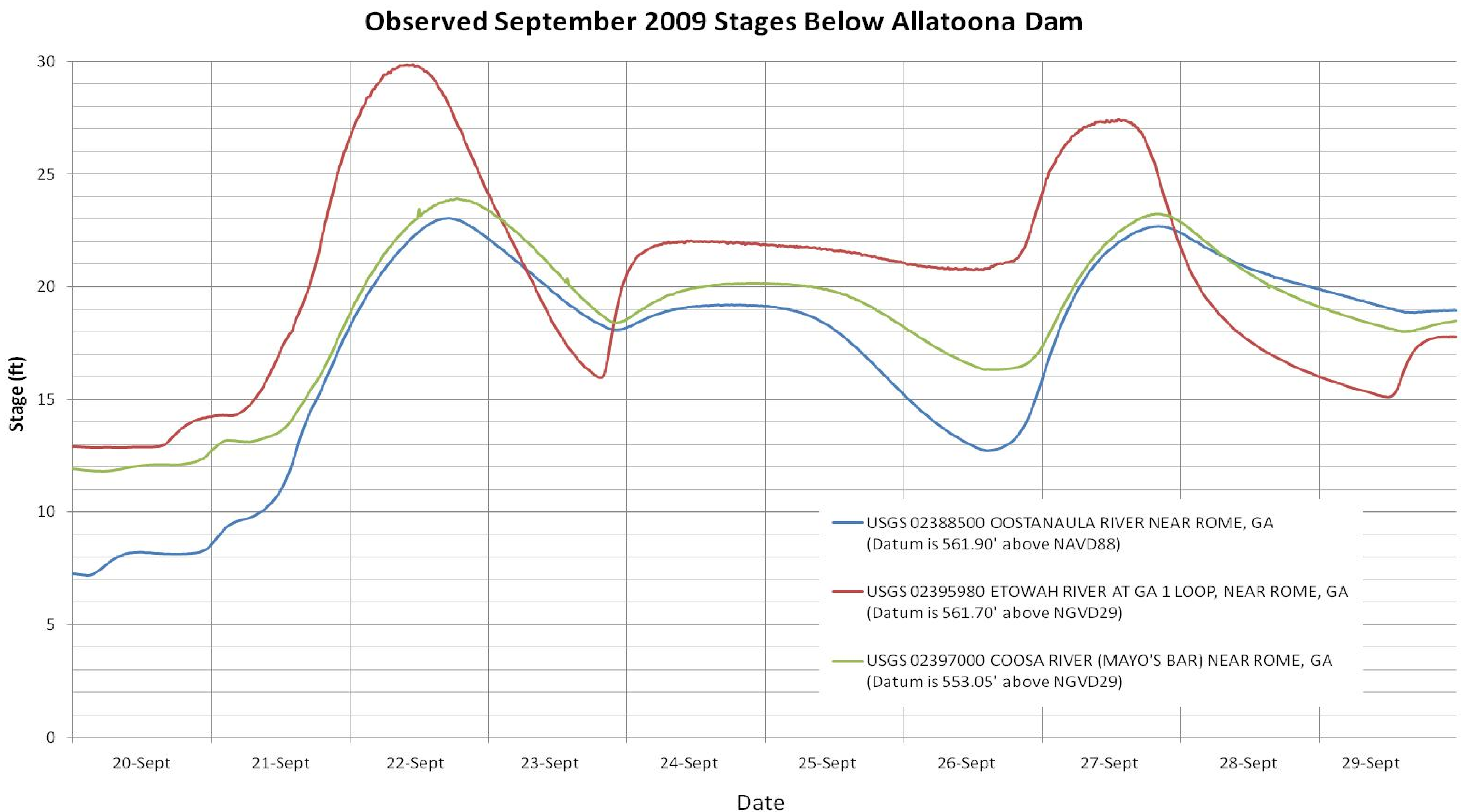
FLOW, DISCHARGE AND POOL
FOR SEPTEMBER 2009 FLOOD



ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

SEPTEMBER 2009 FLOOD
FLOW, DISCHARGE AND POOL



ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

SEPTEMBER 2009 FLOOD OBSERVED STAGES BELOW ALLATOONA DAM

ALLATOONA ESTIMATED (1896-1938) MONTHLY INFLOW IN CFS													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1896	2480	2760	1670	1320	640	550	820	280	360	440	980	950	1104
1897	2190	2370	4340	4160	1900	1730	2170	1570	650	1070	1010	1750	2076
1898	2060	1160	1880	2140	1070	920	2520	3840	3610	4210	2610	3540	2463
1899	3820	5480	6110	4340	3090	3020	3250	2820	1370	860	1130	2020	3109
1900	1800	3940	3660	3600	2570	3000	3400	2520	2480	3750	3620	2390	3061
1901	3670	3930	3480	4230	4400	4450	2420	4660	2730	1960	1940	5000	3573
1902	4230	4960	5390	2810	1770	2240	1720	1050	1650	1340	1820	2300	2607
1903	2780	7240	7370	4820	2670	4860	2230	1320	820	830	890	750	3048
1904	1320	1690	1680	1200	860	880	770	1810	410	320	540	870	1029
1905	2170	3270	1460	1200	1990	1230	1820	1210	690	850	650	4400	1745
1906	4300	1600	7210	2300	1500	2400	2570	2060	1810	2930	2710	2240	2803
1907	2190	2990	3150	1990	2060	1700	1140	1110	1040	740	1600	2520	1853
1908	2440	4360	3680	3310	2320	1470	1270	1080	810	820	760	2080	2033
1909	1970	5080	6980	2850	3270	3330	1900	2540	1290	1230	870	1550	2738
1910	1520	1980	1670	1280	2630	1880	1990	1200	860	710	620	1070	1451
1911	1770	1280	1140	3720	1190	790	1200	940	570	1260	1420	1510	1399
1912	2410	4280	6220	4270	3160	3040	3020	2020	1640	1640	1140	1290	2844
1913	2490	3480	6010	2320	1680	1270	1330	1120	790	740	670	950	1904
1914	930	1260	1070	2860	850	690	840	830	580	990	720	3070	1224
1915	3060	3870	2240	1400	1970	1250	1250	870	880	2760	1100	4170	2068
1916	2120	2500	1630	1220	1540	1280	7760	2340	1180	800	960	1550	2073
1917	2720	5490	9210	3960	1900	1720	1590	1560	2000	920	650	680	2700
1918	2970	2050	970	2790	1880	950	1390	1200	890	2190	1650	4340	1939
1919	4330	4300	4650	2840	1910	1960	1350	1230	900	1060	970	4660	2513
1920	3790	4660	5130	8190	4130	2510	2580	4540	1690	1180	1810	5160	3781
1921	3220	7390	2680	1530	1200	990	1880	1880	1490	1340	1920	2000	2293
1922	4070	4150	4420	3250	4180	2970	2280	1500	1420	1650	2340	4550	3065
1923	2940	3150	2960	4410	4880	4410	4210	4230	3590	2510	2410	4180	3657
1924	3890	3940	3690	4060	4010	4190	4120	2120	950	1270	1060	1990	2941
1925	4930	2120	2430	2100	2100	1220	1460	1240	1370	2970	2960	2670	2298
1926	3860	2710	3040	2780	2660	2770	3040	4320	3600	3340	3450	4270	3320
1927	3420	4310	3730	3610	1740	1580	1660	1450	1040	1220	1320	2150	2269
1928	1550	1970	2050	2710	3980	2980	2850	1510	1650	950	840	780	1985
1929	1260	2750	6870	3030	4470	2190	1570	1370	2000	1200	3530	1950	2683
1930	2090	2260	3630	1660	1730	890	690	520	660	520	1240	1050	1412
1931	1270	1200	1230	2110	1150	670	690	550	380	240	410	2990	1074
1932	3860	4660	2950	2970	2600	2350	2330	1960	1620	2340	2600	9360	3300
1933	1370	1640	1390	1460	1680	980	1730	2340	470	720	490	1630	1325
1934	880	2040	4080	1540	1960	1260	1220	1640	690	1550	930	1290	1590
1935	2050	1520	2390	3010	2060	1110	940	1210	660	530	2330	890	1558
1936	6690	4960	3330	7450	2280	1680	1220	1480	15960	1430	950	1990	4118
1937	5100	3220	2090	3880	2550	1380	1030	1300	910	1380	790	890	2043
1938	960	880	2670	5260	1350	1440	1820	1190	680	420	750	660	1507
Avg	2766	3276	3573	3068	2315	1958	2024	1803	1647	1423	1469	2467	2316

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

ALLATOONA ESTIMATED MONTHLY INFLOWS

ALLATOONA ESTIMATED (1939-1949) MONTHLY INFLOW IN CFS													
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
1939	1490	3120	2750	1960	1660	1360	870	1040	740	520	470	640	1385
1940	1130	1610	2020	1680	1100	1000	1440	1700	680	480	820	1240	1242
1941	1370	1010	1590	1180	690	610	2560	840	420	350	630	1220	1039
1942	1020	2720	3620	1610	1410	1220	950	1080	1240	1020	850	2980	1643
1943	2450	2820	3910	3180	1970	1310	1520	1010	850	700	780	910	1784
1944	1520	4220	5200	3680	2450	1420	1080	840	650	560	720	1050	1949
1945	1510	2630	2230	2210	1760	1130	1130	940	1140	890	1100	2480	1596
1946	6790	6640	6350	3730	4200	2310	1510	790	720	820	870	900	2969
1947	4230	1700	2170	2340	1540	1240	810	680	450	690	1770	1550	1598
1948	1270	4230	3390	2780	1600	1100	2220	2170	830	640	4160	2770	2263
1949	3910	4650	2950	3030	2640	1900	2470	1590	2080	1490	1420	1520	2471
Avg	2426	3214	3289	2489	1911	1327	1505	1153	891	742	1235	1569	1813

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

**ALLATOONA
MONTHLY INFLOWS**

ALLATOONA (1950-1984) MEAN MONTHLY, MINIMUM, AND MAXIMUM INFLOW (CFS)															
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Min	Max	Avg
1950	2209	2120	2989	1751	1377	1519	1378	863	1124	1010	755	1084	755	2989	1515
1951	1156	1417	2730	2869	1278	1075	1007	471	714	586	1064	3657	471	3657	1502
1952	2231	2275	7236	2820	1736	1350	618	993	498	498	807	1306	498	7236	1864
1953	2958	2932	2547	1756	2346	898	1102	443	801	491	575	1833	443	2958	1557
1954	3867	1702	2152	2115	1460	925	560	441	217	236	499	947	217	3867	1260
1955	1322	3114	1761	2293	1332	779	917	641	253	400	669	649	253	3114	1178
1956	630	2285	2466	2691	2021	793	1048	455	541	557	600	1596	455	2691	1307
1957	1875	2780	1882	4117	1504	1130	578	310	445	657	1755	2003	310	4117	1586
1958	1521	2113	2649	2603	1761	909	1679	830	572	777	635	801	572	2649	1404
1959	1392	2000	2034	2165	1718	1536	727	402	529	1453	738	1182	402	2165	1323
1960	2198	2796	2640	2676	1284	821	635	665	924	987	724	902	635	2796	1438
1961	1043	6737	3185	3206	1908	1725	1489	903	563	407	656	5315	407	6737	2261
1962	2520	3418	2981	3953	1543	1182	983	479	647	546	1366	1211	479	3953	1736
1963	2066	1773	4844	2988	2665	2126	1630	851	1118	649	858	1564	649	4844	1928
1964	4099	3024	7422	8271	4225	1794	1482	1174	716	2409	1275	2235	716	8271	3177
1965	2160	2916	3838	2896	1719	1688	976	691	675	681	710	645	645	3838	1633
1966	1322	4649	3980	3105	3108	1448	918	981	628	1224	1163	1209	628	4649	1978
1967	1993	1986	1810	1718	1976	2098	2530	3339	1468	1091	2422	3299	1091	3339	2144
1968	4340	2151	3219	3068	2236	1340	1018	617	782	552	1139	1795	552	4340	1855
1969	2387	3455	2277	2873	2017	1117	748	1909	1007	674	899	1167	674	3455	1711
1970	1445	1336	2463	1902	1197	1488	777	793	449	1049	993	914	449	2463	1234
1971	2154	3296	3656	2514	1663	1004	1953	1966	1130	788	1013	2452	788	3656	1966
1972	5511	2707	2490	2054	3232	1465	1181	929	656	654	1433	3243	654	5511	2130
1973	3075	3027	4255	4799	4346	2815	1745	1275	1278	1041	1178	2336	1041	4799	2598
1974	4486	3731	2505	4253	2159	1447	1288	1489	859	615	1001	1940	615	4486	2148
1975	2800	4140	4847	2612	2483	1522	1159	1004	1054	1754	1628	1645	1004	4847	2221
1976	3670	2226	6232	3602	2822	1867	1792	833	539	713	836	1623	539	6232	2230
1977	2208	1485	4930	4189	1504	851	545	560	726	2101	3440	2086	545	4930	2052
1978	4699	2215	2447	1869	2244	1199	657	1585	462	349	528	1101	349	4699	1613
1979	2640	2964	3940	7119	2336	1795	1553	985	1325	1312	1990	1238	985	7119	2433
1980	2768	2214	8326	4057	2987	1884	915	571	742	928	792	665	571	8326	2237
1981	620	2601	1394	1282	1446	1177	327	482	343	342	391	984	327	2601	949
1982	3385	5759	2356	4227	1958	1136	1096	1327	595	1318	1327	3661	595	5759	2345
1983	2159	3196	3118	4166	2625	1550	1552	511	984	637	1943	5472	511	5472	2326
1984	2833	2915	3263	3367	3512	1557	2579	2254	802	692	859	1271	692	3512	2159

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

ALLATOONA
MONTHLY INFLOWS

ALLATOONA (1985-2013) MEAN MONTHLY, MINIMUM, AND MAXIMUM INFLOW (CFS)															
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Min	Max	Avg
1985	1156	3094	1383	1185	1316	720	1040	1149	428	589	762	1060	428	3094	1157
1986	828	941	1186	644	727	284	162	174	431	1085	1135	1448	162	1448	754
1987	2498	2200	2847	1733	997	911	459	279	198	104	426	823	104	2847	1123
1988	2092	1266	865	1510	516	98	342	204	452	706	604	488	98	2092	762
1989	1643	1889	2665	1853	1266	3012	2583	1094	1747	3819	2012	2154	1094	3819	2145
1990	4297	5978	7365	2603	2015	1011	999	621	1132	1225	790	1439	621	7365	2456
1991	1932	2556	3181	2539	3283	1711	1548	1658	1329	707	1363	1666	707	3283	1956
1992	2118	3036	3040	1988	1376	1278	1464	1399	984	984	3283	4131	984	4131	2090
1993	5247	2972	3461	2644	1853	1123	526	491	264	396	952	1105	264	5247	1753
1994	1634	2484	3531	2970	1378	1635	1463	1435	800	1021	1058	1211	800	3531	1718
1995	1733	3267	2925	1575	1233	1118	419	944	539	2417	2943	1527	419	3267	1720
1996	4398	3844	5403	2814	1694	1213	627	792	721	464	891	1721	464	5403	2049
1997	2507	2962	3270	2067	2007	1846	1412	748	1088	2025	1500	1799	748	3270	1936
1998	3283	4949	4174	4703	3012	1526	795	840	370	397	787	1049	370	4949	2157
1999	1884	2162	1610	1017	1117	730	870	152	103	784	674	693	103	2162	983
2000	1643	1179	1527	2353	688	316	221	484	1166	260	1228	755	221	2353	985
2001	1965	1674	2884	1648	996	1936	1395	563	604	420	392	737	392	2884	1268
2002	2029	1200	2011	1365	1371	481	270	11	587	967	1913	3537	11	3537	1312
2003	1558	2803	3903	2054	3810	2677	3201	1504	893	743	1603	1521	743	3903	2189
2004	1602	2366	1378	1629	1128	1174	966	673	3481	867	1973	2607	673	3481	1654
2005	1529	3028	3240	3019	1546	2133	4051	1508	613	803	710	1510	613	4051	1974
2006	2171	2018	1850	1546	821	473	273	415	591	741	1513	935	273	2171	1112
2007	2556	1320	1523	892	470	285	396	58	-5	92	213	609	-5	2556	701
2008	677	1451	2054	1072	713	291	513	619	125	192	212	1250	125	2054	764
2009	2600	1151	2252	2326	1846	772	341	542	5244	3273	3409	4440	341	5244	2350
2010	3409	3925	3507	2280	2053	1098	767	630	408	541	480	928	408	3925	1669
2011	1090	1787	3271	2817	1193	570	402	425	537	434	736	1482	402	3271	1229
2012	1902	1424	2042	1192	1174	576	479	489	455	674	447	1372	447	2042	1019
2013	2816	2942	2833	2810	4575	2312	2832	2750	1431	1160	1627	4554	1160	4575	2720
Avg	2383	2677	3157	2669	1905	1286	1124	886	826	907	1161	1775			

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

ALLATOONA
MONTHLY INFLOWS

1939

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1		2232	6926	2302	1720	2162	1115	824	881	721	480	550
2	730	2192	5448	2088	1632	1896	1095	793	963	659	472	807
3	714	3016	4356	1876	1568	1656	1071	731	987	635	470	745
4	934	4642	3302	1842	1518	1642	1230	757	972	611	471	630
5	1509	3206	3068	1906	1474	1530	1123	709	1022	599	474	611
6	1600	3444	3536	2140	1470	1422	1026	662	920	577	477	557
7	1291	4810	3634	2304	1562	1384	923	796	878	572	483	531
8	1103	3134	3008	2028	1678	1410	887	660	682	556	487	512
9	887	2946	2718	1996	1934	1378	879	602	607	540	484	504
10	960	3082	2736	1978	1696	1344	1026	587	586	526	476	494
11	1133	3366	3652	1954	1574	1468	1123	527	553	520	476	487
12	1427	2818	3328	2126	1450	1778	898	486	523	507	481	490
13	2469	2220	3264	2014	1402	1764	829	602	489	494	489	501
14	2585	2744	2702	1828	1474	1852	771	1103	510	483	489	528
15	2177	4690	2452	1686	1482	1663	699	1087	742	479	470	518
16	1789	4200	2268	1634	1434	1467	667	1330	607	467	460	507
17	1477	3028	2096	1656	1388	1291	655	2087	555	481	472	500
18	1691	2676	1986	1722	1350	1362	666	3963	588	489	478	494
19	1819	2318	1914	1582	1416	1255	603	2452	570	486	473	508
20	1439	2980	1852	1552	2112	1155	627	1752	578	478	489	556
21	1279	2580	1840	1498	1854	1097	951	1396	600	480	529	596
22	1166	2312	1752	1484	1816	1039	914	1006	552	472	561	615
23	1088	2020	1706	1390	2148	1005	723	897	520	459	541	653
24	1176	1838	1664	1312	1986	954	779	965	491	439	518	860
25	1589	1828	1660	1762	1788	948	768	927	522	432	511	986
26	1306	3004	1656	3978	1588	993	860	909	868	490	504	880
27	1190	3876	1660	3322	1824	991	836	877	2013	663	501	1034
28	1158	6960	1850	2384	2164	1025	839	881	1120	609	503	1118
29	1316		1954	2182	1996	1189	909	805	916	554	501	920
30	3396		2686	1866	1800	1044	945	749	842	529	489	802
31	3079		2668		1796		868	927		499		730

1940

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	674	814	1586	1936	1502	911	824	837	1542	519	1133	935
2	630	872	1484	1914	1592	841	870	770	1241	513	1715	1202
3	612	914	1518	1890	1416	787	896	672	883	513	1119	1064
4	645	1148	1856	1990	1352	744	1107	585	802	498	892	934
5	642	1314	1560	2098	1272	726	1131	569	872	491	749	853
6	638	2026	1424	1950	1226	740	1078	585	813	486	755	796
7	664	2261	1414	1684	1190	672	1297	802	865	485	742	760
8	701	1896	1706	1684	1165	719	1473	674	823	504	672	734
9	692	1528	1920	1678	1131	2725	1788	586	780	508	649	725
10	828	1514	1806	1488	1121	1079	2313	552	755	491	662	706
11	932	1772	1962	1418	1163	1030	2563	881	740	482	869	700
12	1517	1504	2508	1382	1126	1214	2830	2523	672	474	1326	680
13	2005	1326	4164	1322	1074	1264	3562	9668	645	467	1104	695
14	3056	1430	5140	1268	1064	1044	3080	7725	617	458	924	762
15	4058	1404	3884	1258	1068	1076	2326	4204	588	463	828	901
16	2485	1414	2948	1228	1135	1330	2290	3282	566	488	748	1162
17	1849	1522	2332	1118	1077	1308	2080	1694	552	503	706	1605
18	1380	2094	1900	1200	1031	1118	1584	1274	531	491	675	1306
19	1132	3282	2044	2198	1005	960	1406	1105	519	484	670	1099
20	971	2654	1884	3978	961	980	1204	994	514	477	648	1002
21	921	2094	1658	2504	927	855	1092	938	500	470	639	917
22	915	1742	1564	2132	923	795	1013	881	487	463	640	858
23	910	1478	1436	1878	895	858	920	852	469	460	638	831
24	879	1356	1420	1642	892	931	858	822	499	459	643	868
25	836	1355	1678	1520	916	1049	798	762	718	456	710	950
26	812	1259	1478	1462	948	969	751	736	847	454	744	1428
27	812	1241	1406	1398	1050	853	721	690	734	452	861	1831
28	816	2023	1502	1318	1000	808	704	854	659	449	885	2355
29	816	1949	1606	1296	1046	1098	763	1788	610	478	812	4423
30	816		2100	1306	1126	928	791	2380	566	652	833	3244
31	814		2206		996		806	1873		861		2502

1941

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2216	1002	916	1505	930	534	1301	755	605	332	743	536
2	2356	988	885	1422	902	567	1396	706	577	323	1025	516
3	2918	1027	910	1337	874	637	1772	744	689	317	759	750
4	2506	1009	1125	1280	847	617	2568	864	639	320	681	1744
5	2079	970	1292	1303	843	595	7810	1190	588	331	656	2569
6	1688	959	1271	1289	851	515	9144	1804	536	321	828	1494
7	1447	951	1706	1228	882	478	7850	1197	488	309	797	1267
8	1326	923	2489	1185	1006	481	5132	1126	453	309	696	976
9	1249	898	2205	1232	900	516	3508	1014	466	313	588	792
10	1182	894	1882	1567	840	563	2750	896	466	329	520	718
11	1136	873	1677	1447	783	599	2124	827	460	422	486	682
12	1094	957	1512	1320	754	1070	2360	1006	491	389	471	693
13	1065	1054	1364	1259	725	811	1896	1128	494	362	461	938
14	1059	1435	1279	1177	713	669	1714	1172	451	363	450	1331
15	1084	1569	1211	1135	687	617	2164	1083	420	353	446	1001
16	1357	1359	1300	1102	675	526	2034	1087	387	352	444	890
17	1533	1213	1430	1072	673	478	2122	789	380	348	447	810
18	1355	1108	1265	1058	667	446	2358	722	372	332	445	730
19	1241	1032	1261	1032	661	417	2322	623	357	330	443	696
20	1152	988	1325	1010	636	401	2900	599	338	342	484	671
21	1086	955	1373	1006	619	468	2170	577	326	337	733	724
22	1057	945	1670	1014	601	512	2230	558	315	334	772	897
23	1088	924	1836	1005	582	670	2160	540	316	327	788	1824
24	1089	924	2309	1127	565	985	1328	515	318	312	1096	3639
25	1104	944	2226	1427	546	1021	1167	548	323	307	877	2538
26	1115	948	2014	1236	525	779	1294	698	377	305	718	2252
27	1155	948	1936	1134	517	715	1022	630	413	350	654	1917
28	1154	961	2716	1072	516	704	879	683	367	633	586	1499
29	1092		2042	997	500	626	826	1103	358	615	551	1244
30	1054		1770	959	486	801	758	782	352	527	536	1092
31	1021		1643		488		733	613		572		956

1942

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1013	1567	1438	1808	1223	1024	2179	642	738	1458	1041	1190
2	1593	1360	1612	1732	1200	973	1896	635	741	1122	1038	2116
3	1452	1200	2202	1702	1129	930	1335	593	714	1007	945	1565
4	1375	1138	2358	1666	1220	930	1290	569	650	930	896	1560
5	1343	1100	2670	1642	2029	916	1018	589	680	987	856	1756
6	1188	1321	3006	1616	1549	879	946	794	1111	1150	823	1958
7	1076	2439	3218	1658	1326	955	861	906	1307	957	820	2762
8	1002	1912	3152	1898	1314	1089	833	1305	1495	884	817	4168
9	913	1580	3532	2128	1178	707	1020	1355	1084	882	779	3116
10	839	1437	2966	2812	1130	1153	1539	1129	1029	881	781	2492
11	775	1288	2484	2380	1103	3904	1007	943	839	1004	921	1906
12	825	1214	2178	2140	1090	2611	963	806	729	932	896	1589
13	844	1119	2010	1826	1147	2070	855	737	679	882	803	1421
14	827	1203	2042	1682	1284	1976	885	683	645	819	799	1295
15	801	1730	2156	1598	1525	1414	931	620	669	775	771	1223
16	789	3639	2402	1536	1651	1606	821	645	711	749	750	1235
17	761	13732	2776	1524	1434	1828	846	664	1031	725	748	1226
18	755	12128	3050	1478	1237	1220	791	1086	908	728	749	1140
19	890	5650	3714	1468	1090	1133	722	2134	782	722	749	1107
20	1062	4524	4810	1426	1170	1048	669	2679	695	784	750	1067
21	913	2956	10850	1398	1584	958	663	2822	615	1014	731	1036
22	861	1988	13292	1378	3470	924	649	2232	576	984	752	1066
23	825	1790	7676	1376	2158	998	689	1820	553	860	868	1418
24	792	1876	5752	1357	1768	952	916	1580	553	1019	1235	1529
25	807	1948	4154	1331	1376	847	841	1198	841	1210	1070	1666
26	868	1718	3070	1310	1244	811	872	918	1517	2459	951	2360
27	1022	1614	3092	1303	1650	802	995	848	4963	1897	903	3846
28	1651	1486	3444	1276	1545	806	973	737	5402	1495	813	6010
29	1496		2914	1248	1254	629	729	714	2903	1198	792	12536
30	1334		2476	1247	1174	870	667	701	2190	1009	994	14218
31	1445		2108		1096		641	753		956		8324

ALABAMA-COOSA-TALLAPOOSA BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

UNIMPAIRED FLOWS

1943	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	5566	2184	1646	2368	2202	1530	2865	1071	899	652	678	636
2	3942	1916	1684	2362	2114	1468	2470	1936	793	645	676	636
3	2546	2146	1648	2290	2070	1436	2146	1331	711	650	676	636
4	2148	3824	1644	2234	2066	1398	1812	1175	710	708	677	651
5	1906	7154	1696	2104	2026	1371	1706	1337	707	695	673	664
6	1750	9444	1980	2066	1988	1339	1706	1465	671	645	732	665
7	1676	6604	2080	2060	1996	1328	1506	1231	671	636	910	737
8	1806	5050	1814	2046	2022	1299	1431	1189	653	635	1694	754
9	1756	3910	1734	2002	2126	1328	1427	1132	628	614	1602	702
10	1604	3008	1770	2656	2114	1515	1225	969	585	606	1213	687
11	1558	2716	2110	3260	2200	1517	1241	1015	554	600	1038	684
12	1496	2500	2972	4564	2664	1518	2309	1085	536	592	903	677
13	1434	2262	3496	4320	2282	1417	1701	1201	521	548	807	658
14	1382	2124	3508	3726	2078	1328	1886	1105	519	643	766	654
15	1380	1954	3268	2942	1998	1280	1593	1088	515	1066	736	633
16	1476	1850	3182	2316	1896	1182	1241	985	520	1402	729	619
17	2032	1778	4452	2826	1830	1105	1207	897	530	931	722	596
18	3312	1754	5188	3650	1776	1102	1063	783	530	863	703	602
19	4960	1770	6168	7416	1754	1095	1094	722	835	764	699	631
20	4018	1752	10328	6896	1698	1050	2284	707	1687	700	683	618
21	3296	1774	12054	5022	1676	1064	1654	687	2659	669	678	624
22	2526	1798	11754	4042	1696	1102	1359	666	2340	660	676	612
23	1976	1760	8154	3290	1752	1157	1166	658	1697	642	671	626
24	1802	1720	5994	3502	2134	1507	890	648	1232	637	653	665
25	1996	1724	4408	3206	2352	1243	926	697	897	636	650	916
26	2636	1678	3392	2954	2276	1120	1410	665	775	653	651	2565
27	4080	1636	3240	2676	1924	1032	1593	763	729	684	651	2415
28	4198	1638	3018	2434	1824	1124	1108	813	698	771	651	1844
29	3710		2690	2324	1772	1494	1162	927	675	726	651	2165
30	3018		2478	2228	1598	2714	1030	1395	671	698	652	1630
31	2554		2398		1584		930	1240		685		1364

1944	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1431	920	4848	6310	2684	1714	1066	973	707	759	486	1157
2	1746	908	3354	4546	2514	1676	1057	1000	681	632	489	962
3	4396	903	2756	3674	2478	1668	1027	982	628	596	490	867
4	4170	900	2622	3422	2572	1614	1056	931	587	571	490	789
5	2812	881	3164	3200	2652	1634	1019	984	564	552	487	810
6	2214	944	3912	3046	3070	1746	1019	1243	564	565	484	894
7	1608	1211	7414	2948	2720	1870	1013	1209	582	592	476	1160
8	1412	1626	5330	2834	2536	1654	1133	1035	540	584	478	2112
9	1436	3737	4310	2880	2334	1618	1052	892	593	559	501	1933
10	1405	5078	3386	3228	2232	1540	1021	799	677	527	566	1545
11	1306	5408	2750	3478	2158	1622	1097	726	838	507	591	1401
12	1212	6120	2788	4086	2074	1558	1176	758	1147	570	556	1293
13	1158	4136	2810	3776	2030	2284	2039	754	1128	712	543	1136
14	1171	3848	2550	3844	2062	1698	1677	804	923	852	533	1022
15	1501	5136	2362	4518	1966	1590	1595	897	767	732	531	940
16	1824	4124	2246	5106	1960	1447	1408	1133	678	668	597	887
17	1547	5160	2600	4502	1924	1345	1107	998	620	595	605	869
18	1410	6844	3374	4150	1870	1346	1080	1077	598	549	584	841
19	1309	5832	7610	3942	2028	1321	1263	935	624	526	654	852
20	1226	5046	13324	3720	2588	1360	1411	778	659	532	886	863
21	1164	4314	8984	3792	5156	1317	1277	711	683	569	954	819
22	1096	3540	6434	3504	3310	1270	1200	657	699	549	799	791
23	1055	3346	6200	3478	3020	1175	1052	641	623	528	733	781
24	1026	3438	4684	3936	2830	1115	886	619	585	524	667	772
25	1009	4394	3952	3834	3518	1059	816	604	555	518	655	778
26	1017	7514	3684	3644	2320	1027	778	580	551	498	742	865
27	1096	10204	4634	4122	2156	994	737	614	562	480	1230	978
28	1085	8918	7012	3700	2146	985	734	772	546	467	2210	886
29	1044	6665.671	12242	3292	1994	974	751	820	551	464	1456	1013
30	993		11680	2970	1858	984	813	771	658	466	1341	1585
31	952		8026		1756		889	747		475		1730

1945	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2368	938	1890	1760	2292	1148	788	1178	543	664	825	973
2	2654	915	2134	2259	2112	1129	874	1146	522	703	837	1008
3	1971	962	2702	2487	2134	1146	878	1056	496	816	878	1328
4	1698	1296	4994	2092	1972	1101	893	1041	457	724	1003	2139
5	1455	2930	4600	1967	1874	1057	931	1824	445	688	925	4891
6	1378	2910	3674	1708	1790	1012	891	1628	469	782	871	3434
7	1645	2334	3032	1607	1696	1013	847	1928	508	923	837	2619
8	2036	2146	2292	1534	1723	1027	767	1555	491	823	807	2066
9	1898	1774	1998	1483	1663	1015	696	1215	471	737	778	1579
10	1659	1583	1862	1442	1685	993	679	1012	447	707	770	1466
11	1483	1879	1758	1385	2009	980	642	861	466	654	770	1450
12	1387	2431	1712	1351	2255	905	845	774	474	631	785	1300
13	1573	4704	1702	1333	2868	870	1434	789	716	600	832	1270
14	1849	5045	1698	1299	2822	875	2352	869	2021	591	975	1388
15	1597	3600	1691	1360	2388	955	2234	909	2824	598	1189	1488
16	1481	3010	1651	1412	2046	1163	2609	949	3300	666	1029	1408
17	1371	2970	1612	1796	1847	1393	1795	933	5342	637	958	1277
18	1301	3880	1697	1846	1768	1739	1349	834	3013	608	942	1260
19	1444	2928	1876	1580	1655	2032	1179	714	2273	591	1038	1243
20	1703	2794	2069	1418	1557	2220	940	668	1460	577	1348	1203
21	1499	3118	2935	1370	1466	1844	872	650	1106	499	1468	1140
22	1422	3948	2424	1422	1393	1456	807	633	969	794	2465	1105
23	1363	3946	2087	2252	1364	1166	744	699	868	2697	2151	1678
24	1241	3262	1843	3612	1314	1005	710	822	800	2084	1704	2592
25	1174	2686	1721	6066	1322	940	911	1011	781	1478	1471	5414
26	1134	2206	1843	5286	1416	892	888	918	744	1653	1250	6578
27	1096	1980	2599	4040	1606	850	750	798	711	1295	1168	4960
28	1066	1940	2094	3336	1379	812	969	693	689	1095	1162	4414
29	1033		1938	3328	1330	776	1738	628	668	986	1103	5048
30	996		1783	2612	1255	765	1914	587	660	898	1032	4518
31	963		1703		1172		1421	570		850		4798

1946	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	4050	7292	3110	7484	3380	2816	1536	1029	697	740	712	838
2	3192	5104	3032	5444	5080	2982	1770	991	670	673	712	796
3	2718	4334	2884	4204	6156	2734	3296	964	636	670	715	761
4	3250	3696	2850	3970	7026	2620	2130	945	622	665	735	749
5	3908	3578	2766	3826	5498	2468	1900	980	635	641	737	738
6	11984	3816	3288	3716	4382	2310	1788	998	593	704	715	713
7	30974	5240	4066	4006	3702	2262	1586	992	560	784	783	715
8	29256	6204	8710	4570	3294	2236	1516	955	565	1184	1091	724
9	16886	10512	15248	4992	3068	2204	1476	905	633	1796	1065	730
10	12928	22436	8272	4962	2930	2420	1666	851	679	1434	907	718
11	8644	24318	6090	5052	2846	2176	1458	810	729	1105	915	719
12	6406	13550	4974	4362	2940	2108	1536	778	742	1012	983	734
13	5250	8922	3534	3846	3142	2014	1624	743	653	961	931	791
14	5134	7166	4686	3472	4038	1956	1470	714	633	839	848	857
15	5642	4692	6028	3314	4904	2970	1500	708	611	796	821	763
16	6238	4140	6608	3376	7320	3128	2120	723	613	771	821	753
17	6014	3980	7724	4246	6402	3358	1616	724	676	738	874	784
18	5178	4140	5992	3846	5238	3004	1448	693	712	735	1088	863
19	4342	5408	5016	3498	4128	2880	1438	704	661	734	1022	963
20	3728	6204	4110	3346	3720	2464	1318	692	636	729	943	1134
21	3348	4990	3588	3128	3440	2270	1270	678	597	707	882	1701
22	3064	4568	3376	3016	3276	2220	1310	672	712	705	882	1606
23	2832	4100	3228	2992	3096	2094	1323	681	1571	700	862	1319
24	2714	3784	3192	2932	3380	1982	1261	720	1385	694	820	1181
25	2626	3524	3362	3102	3884	1752	1212	759	1091	715	846	1044
26	2572	3390	4640	3658	6080	1764	1199	734	947	853	862	938
27	2536	3292	6002	3144	4936	1882	1142	746	810	858	1019	888
28	2564	3204	10446	2944	3968	1680	1119	730	726	774	1033	858
29	2892		19766	2874	3474	1582	1081	715	706	762	932	905
30	3964		18108	3052	2960	1592	1044	770	742	743	891	1222
31	7338		9064		2824		1015	773		732		1629

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

UNIMPAIRED FLOWS

1947	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2595	2040	1538	1624	2278	1335	1071	685	455	355	680	987
2	4937	1850	1573	1622	2194	1229	964	687	432	349	1470	936
3	3532	1730	1517	1676	1976	1194	893	700	423	347	1594	921
4	2966	1674	1600	1656	1860	1151	851	706	404	349	1196	902
5	2260	1626	1770	1746	1738	1087	834	661	383	347	1450	925
6	1876	1586	2617	1708	1704	1077	882	720	370	402	1696	1030
7	1714	1634	3175	1696	1608	1040	943	775	396	521	1585	1004
8	1800	1634	4856	1668	1570	985	903	768	438	688	2322	1134
9	1693	1526	4530	1790	1510	953	847	733	547	925	1972	1442
10	1555	1480	3506	1970	1472	914	809	707	565	916	2192	1659
11	1523	1448	2806	2136	1460	896	765	704	572	718	4020	2303
12	1891	1436	2336	2906	1404	965	752	714	673	584	4316	1977
13	2145	1432	2186	2854	1388	1061	731	751	552	514	2914	1853
14	2620	1411	2372	3604	1387	1575	712	753	488	478	2280	1921
15	2822	1411	2196	4442	1377	1591	630	643	534	478	2060	2199
16	3672	1388	2056	5074	1322	1132	763	634	729	742	2286	4007
17	5188	1364	1894	5216	1286	1070	1406	720	576	2238	1740	3148
18	5776	1464	1816	3700	1254	994	1575	711	505	1774	1566	2398
19	7764	1668	1812	3078	1223	1049	1088	799	496	1216	1533	1970
20	15660	2319	1890	2482	1249	1187	1070	865	464	1048	1465	1605
21	19588	3137	1798	2216	1494	1265	905	731	450	746	1341	1492
22	10406	2454	1708	2020	1761	1977	786	675	433	626	1268	1400
23	6576	2152	1718	1886	1521	2410	718	706	425	574	1320	1332
24	4860	1848	1874	1828	1390	1619	677	721	408	558	1495	1298
25	2634	1662	2046	1784	1371	1422	652	849	402	591	1669	1320
26	2368	1596	1816	1732	1396	1382	623	740	393	602	1459	1374
27	2184	1540	1740	1666	1278	1373	598	593	372	576	1314	1310
28	1986	1538	1828	1694	1326	1477	597	564	358	656	1238	1241
29	1856		1766	1748	1903	1305	615	517	353	709	1099	1184
30	1934		1710	1840	1846	1160	577	491	354	638	1024	1136
31	2390		1674		1436		647	479		552		1136

1948	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1256	2309	2024	5598	1628	1745	1024	2384	858	742	569	9984
2	1630	2036	2360	4788	1664	1502	906	3650	813	715	1065	7546
3	1447	1800	2622	4120	1758	1368	827	4482	839	673	3338	4616
4	1340	1620	2536	3624	1850	1288	737	8176	930	663	2726	3096
5	1270	1790	2508	3338	1926	1219	692	10422	1158	658	2040	2610
6	1174	2780	2844	3416	1858	1173	644	3948	1282	648	2864	2790
7	1124	4558	5970	3440	2014	1272	633	2980	1195	643	2905	2772
8	1088	9200	5158	3838	1782	1358	669	2480	1142	686	1946	2666
9	1077	9528	3836	3966	1676	1209	974	1772	1042	700	1618	2492
10	1042	8420	3326	3384	1608	1141	1630	1604	969	643	1400	2306
11	1018	7024	2726	3242	1524	1092	5186	1492	957	650	1344	2158
12	1052	7822	2378	3022	1504	1037	5367	1492	918	669	1226	1998
13	1300	10406	2180	2790	1492	1025	4528	1495	865	641	1128	1932
14	1554	9082	2028	2806	1480	996	4566	1471	858	623	1084	1912
15	1303	7054	1990	2720	1440	989	8058	1472	858	622	1047	1858
16	1245	5110	2018	2508	1394	1090	5654	1473	807	604	1061	1902
17	1216	3996	2174	2346	1348	1079	5080	1457	775	598	1396	2080
18	1138	3182	2048	2168	1319	995	4232	1405	750	619	1801	1946
19	1103	2822	2026	2070	1287	1067	3162	1232	732	636	2217	2148
20	1078	2656	2052	1988	1242	1046	1913	1160	707	621	3492	2250
21	1096	2508	2494	1960	1206	997	1496	1107	697	619	3218	2056
22	1130	2556	3102	1896	1185	1279	1313	1082	684	628	4108	1952
23	1133	2412	7234	1892	1148	1111	1202	1164	695	684	4156	1882
24	1183	2262	6622	1838	1112	991	1111	1137	690	706	4244	1906
25	1179	2136	4784	1800	1094	919	1032	1253	667	677	3708	2382
26	1167	2046	4248	1808	1106	845	970	1121	663	662	3742	2712
27	1233	2032	5346	1752	1373	781	990	1067	636	645	6488	2386
28	1395	1976	4810	1694	2414	767	1096	1021	705	640	13186	2526
29	1644	1959.67	4066	1682	2847	988	1173	966	810	641	23966	2904
30	1747		3998	1632	2570	1397	1160	930	759	643	17730	4580
31	2287		4710		2050		1285	880		644		3806

1949	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	3194	4318	3104	3796	4894	2308	2290	1680	1399	1140	2704	1185
2	2848	3770	2992	3342	5334	2120	1910	1726	1290	1098	2472	1160
3	2434	3926	2868	3126	4508	1886	1780	1850	1259	1066	2104	1142
4	2086	5026	2814	2950	3768	1760	1728	1956	1221	1070	1798	1139
5	7132	4976	2742	2822	3280	1690	1864	1802	932	1049	1620	1120
6	15662	4160	2688	2880	2948	1770	1808	1558	5347	1076	1476	1132
7	13456	3866	2688	2716	2802	1612	1896	1406	10397	1296	1410	1194
8	7790	3472	2770	2612	2648	1600	1822	1342	5624	1268	1406	1342
9	7864	4558	2918	2526	2656	1628	1728	1336	3660	1156	1354	1251
10	6530	7698	3628	2440	2652	1604	1610	1307	3636	1151	1310	1286
11	4554	6732	3304	2562	2650	1672	1666	1283	2480	1103	1316	1444
12	3208	5226	3060	3280	2552	1924	2710	1246	1696	1130	1274	1459
13	2634	4694	2834	4912	2412	1846	4210	1240	1614	1753	1266	1638
14	2500	3936	2616	5080	2314	2166	3426	1208	1522	1286	1297	1668
15	2430	3550	2516	4042	2248	2054	4884	1185	1486	1284	1275	1592
16	2308	4432	2456	3518	2184	2442	4476	1180	1452	1907	1234	1612
17	2266	5518	2476	3018	2148	2610	4528	1621	1446	3235	1216	1448
18	2278	4830	2520	2746	2106	2076	4028	3067	1404	3004	1198	1632
19	2314	6002	2602	2530	2044	1888	3758	1874	1398	2298	1188	2790
20	2274	7718	2410	2468	2042	1708	3594	1582	1376	1928	1187	2276
21	2230	5498	2420	2490	2124	1686	3054	2060	1272	1572	1185	1910
22	2286	4914	3084	2742	2114	1858	2398	1894	1244	1398	1162	1942
23	2450	4404	4684	2616	1984	1776	2140	2250	1277	1313	1132	2294
24	2318	3630	3550	2482	2012	1606	2138	1750	1279	1261	1199	2214
25	2278	3322	3292	2360	2408	1800	2002	1610	1155	1252	1461	1756
26	2190	3196	3258	2270	2040	2620	1764	1472	1167	1311	1388	1584
27	2192	3284	2938	2344	1950	2104	1688	1344	1221	1259	1293	1948
28	2388	3346	2966	2660	2016	1998	1612	1408	1265	1272	1267	1642
29	2558		3138	3268	2072	2070	1546	1608	1248	1551	1222	1147
30	2646		3118	4954	2262	1934	1482	1424	1189	1593	1211	1291
31	3676		3654		2500		1438	1407		2860		1420

1950	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1548	1417	2323	1947	1659	1757	685	1298	1198	580	813	829
2	1837	1414	2360	2044	1700	1754	681	1168	1471	568	793	924
3	2063	1579	2103	2096	2259	2398	722	997	1229	583	761	990
4	2055	1458	1847	2109	1992	4215	726	906	914	635	771	1353
5	2071	1523	1869	2516	1680	4817	743	864	1438	648	810	1469
6	1962	1674	2021	2470	1510	2674	861	938	1935	663	779	1347
7	1904	2314	2371	2121	1384	2093	900	847	2314	681	758	1730
8	1785	3001	2763	1981	1325	1837	769	815	2812	639	758	2327
9	1611	2820	2648	1912	1304	2321	733	804	3070	605	757	1651
10	1547	2969	2382	1832	1328	1758	761	765	2310	601	759	1361
11	1679	2795	3404	1761	1337	1589	864	787	1471	553	755	1203
12	1614	2511	3979	1761	1406	1344	1463	896	1169	544	759	1133
13	1714	2332	7639	1699	1525	1251	1629	806	1000	505	738	1076
14	1638	2346	10364	1650	1514	1304	1478	859	910	525	743	1041
15	1699	2609	6186	1661	1564	1225	1441	1230	850	533	751	995
16	1788	2296	4106	1617	1425	1149	1670	1063	818	571	740	953
17	2029	2081	3208	1625	1276	1192	1481	1081	783	823	749	924
18	2689	1909	2696	1622	1311	1068	1163	1040	767	1187	777	907
19	3028	1808	2393	1628	1269	1100	1077	1033	747	1443	798	895
20	4260	1821	2248	1631	1379	1057	1057	850	681	3461	810	902
21	2747	1772	2291	1593	1302	1125	1110	731	681	3213	882	881
22	2182	1871	2121	1603	1233	1302	1527	659	698	2090	854	838
23	1726	2114	2059	1682	1223	1207	1844	670	766	1710	780	823
24	1417	1902	2017	1648	1203	975	2523	685	725	1602	724	796
25	1342	1785	2071	1669	1170	883	2574	694	687	1431	703	832
26	1267	1624	2187	1885	1125	853	2849	773	643	1107	685	861
27	1212	1812	2201	1690	1065	775	3217	1060	624	972	745	899
28	1271	1839	2675	1525	1143	727	2582	1191	623	914	777	912
29	1328		2445	1456	1224	710	1744	1010	615	857	777	1045
30	1388		2178	1566	1236	727	1381	1065	618	852	745	1118
31	1490		1967		1988		1320	1087		839		1035

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

UNIMPAIRED FLOWS

1951	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	959	1517	1058	3472	1937	950	2216	701	313	576	1552	734
2	964	1982	1151	2998	1817	908	2724	604	380	529	1805	971
3	948	1647	1197	3485	1810	858	2287	557	374	515	1349	1113
4	1013	1404	1295	2770	1712	806	2139	505	320	493	1073	1761
5	1006	1395	2298	2565	1620	877	1926	483	292	456	1057	2672
6	961	1444	2779	2461	1559	942	1297	575	288	411	1029	1826
7	960	1672	3895	2458	1480	955	1019	570	240	420	1256	1390
8	1059	1861	5861	3481	1451	1167	882	896	242	426	1412	1208
9	1027	1652	3804	3260	1448	1414	822	1008	240	384	1102	1169
10	1053	1444	2604	2683	1417	1311	758	972	254	422	922	1260
11	1107	1299	2064	2350	1399	1236	745	870	439	436	838	1204
12	1192	1185	2017	2692	1425	1191	749	891	735	387	859	1227
13	1446	1213	2158	2504	1365	1687	789	599	734	416	941	1505
14	1645	1218	2044	2210	1312	1628	716	576	1031	434	1085	1710
15	2019	1154	1818	2030	1275	1335	684	658	1347	381	1359	4716
16	2003	1145	1771	1874	1279	1263	667	630	915	401	1584	3972
17	1696	1241	1814	2267	1234	1449	629	559	556	398	1514	2830
18	1382	1308	1844	2469	1203	1885	582	499	480	391	1249	3689
19	1260	1348	2030	2925	1225	1473	677	433	487	455	1028	6333
20	1265	1438	2308	4504	1202	1126	714	404	712	510	927	7373
21	1141	1659	2074	4190	1214	1034	632	374	783	541	885	14209
22	1098	1821	1807	5230	1203	972	608	362	1032	770	831	14142
23	1054	1582	1633	4700	1194	906	601	337	1984	827	821	6416
24	1095	1378	1544	3909	1206	834	646	347	1368	832	787	4489
25	1058	1249	1539	2800	1138	790	710	335	1914	1158	823	3581
26	1005	1199	1557	2378	1108	773	965	326	1229	920	792	5234
27	968	1155	2955	2229	1433	812	1024	313	1219	783	820	4727
28	963	1097	3481	2163	1238	886	1145	314	1117	948	797	3733
29	972		7351	2101	1082	1070	1075	338	841	1151	771	2684
30	1175		8717	2130	1047	1730	1045	343	631	1213	701	2183
31	1280		5656		977		1023	319		1299		1979

1952	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1820	2350	2524	3533	2293	1561	890	693	790	527	517	860
2	1774	2362	3160	3502	2147	1404	846	698	743	508	528	933
3	1860	2910	3567	3079	2028	1342	800	661	700	480	543	1250
4	1867	4013	8478	2835	1950	1320	819	594	600	450	533	1107
5	2384	3624	6396	2805	1975	1290	822	992	516	455	552	1070
6	2389	2927	4092	2731	1832	2379	805	1099	515	506	526	1177
7	2076	2451	2986	2625	1754	1723	784	2159	505	506	506	1081
8	1790	2243	3719	2514	1800	1417	829	3665	472	545	556	1341
9	1732	2109	5303	2529	1792	1552	737	3142	468	634	599	1428
10	1858	1997	7435	2499	1713	1683	709	2110	566	793	661	2404
11	1944	1990	16200	2553	1768	1756	695	1344	576	699	805	3429
12	1752	1987	17016	2519	1778	1879	676	964	594	640	811	2218
13	1675	1960	7434	2589	1640	1693	709	809	1145	585	670	1503
14	1602	2225	4582	2652	1583	1466	808	716	1184	583	600	1226
15	1541	2241	3317	2453	1556	1363	799	760	1249	578	597	1051
16	1545	2295	2945	2360	1569	1500	791	832	1620	544	594	997
17	1517	2463	2808	2279	1672	1567	783	853	1234	524	766	985
18	1533	2160	2766	2261	1745	1439	744	803	771	527	810	971
19	1555	1976	4467	2181	1788	1385	613	743	679	507	1146	915
20	1822	1887	6228	2141	2184	1318	584	677	860	491	2787	913
21	2064	1836	9341	2074	1989	1451	641	666	775	472	1490	1008
22	2477	1761	14340	2080	1692	1401	695	554	701	483	1048	993
23	3785	1756	23851	2243	1618	1199	623	582	772	497	907	929
24	2762	1932	21936	3023	1672	1142	630	542	699	513	839	1019
25	2264	1994	10525	4272	1824	1058	608	506	571	537	807	992
26	2569	2044	6380	4506	1701	1068	586	453	547	541	878	890
27	2783	2484	4904	5516	1632	1046	501	587	539	555	1107	866
28	3914	2325	4412	4403	1587	1060	522	613	531	550	947	982
29	4342	2196.985	4174	3126	1586	1380	489	723	528	559	881	1297
30	3412		3896	2507	1875	1016	523	837	521	528	854	1488
31	2649		3603		1799		579	898		520		2816

1953	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	3203	1468	2702	1732	4196	959	888	677	314	685	532	645
2	2456	1420	3689	1664	3626	898	947	639	457	621	530	726
3	2405	1389	4070	1654	3005	874	1059	658	559	572	556	764
4	1998	1458	4332	1678	4773	883	1001	599	595	534	538	1160
5	1656	1416	4276	1651	5157	915	1403	558	885	503	510	1540
6	2088	1450	3413	1644	5716	947	1032	588	1031	494	506	1176
7	2777	1650	2835	1785	6358	981	808	560	597	485	519	1504
8	3996	1624	2463	1720	5087	1011	825	544	453	467	497	1558
9	8459	1491	2422	1614	3251	925	960	544	408	468	532	2181
10	10716	1519	2341	1813	2419	900	748	541	369	488	530	4759
11	6852	1661	2395	1839	2089	871	614	464	338	516	552	2830
12	3958	2633	2516	2054	1946	865	549	476	328	506	493	2400
13	2755	3188	2417	2379	1787	822	532	452	312	514	492	2877
14	2123	2870	2203	1990	1710	1121	594	458	297	516	477	2846
15	1834	3872	2103	1689	1669	1129	607	452	297	524	489	2646
16	1768	3964	2108	1637	1604	1073	801	490	314	553	495	1899
17	1716	3211	2041	1561	1688	1257	985	523	487	560	545	1508
18	1969	2737	2083	1540	1755	1109	1089	591	512	535	569	1239
19	2137	2958	2458	1641	1844	939	1257	603	541	516	574	1231
20	2035	3762	2341	1523	1980	852	1884	664	1035	526	643	1303
21	2667	7864	2256	1491	1711	956	1934	575	940	505	719	1424
22	2563	7253	2488	1456	1491	1018	2257	510	505	477	821	1956
23	2456	4841	2787	1486	1359	921	3633	491	711	474	1113	2186
24	3292	3926	2780	1468	1270	981	2454	466	933	514	939	1865
25	2740	3492	2448	1476	1185	1042	1298	415	1486	536	763	1529
26	2254	3249	2154	1555	1127	946	948	408	2424	518	721	1377
27	1956	2932	2013	1470	1073	953	841	382	2996	560	620	1454
28	1877	2850	1936	2069	1029	1007	777	360	2081	713	590	1498
29	1864		1857	2314	1003	928	702	362	1297	659	568	1832
30	1716		1797	3429	1000	851	700	350	849	556	559	2299
31	1571		1734		998		691	310		538		2038

1954	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1656	1684	2315	4863	1923	1167	544	394	297	269	325	708
2	1468	1660	2092	3979	1898	1386	570	416	261	244	352	619
3	1327	1621	1879	3170	2092	1395	644	387	269	250	362	625
4	1298	1509	1814	2422	2536	1508	634	332	274	236	394	609
5	1230	1509	1621	2119	2200	1295	616	350	256	234	435	693
6	1198	1468	1563	2029	1829	1087	630	318	247	212	484	1748
7	1160	1452	1459	1956	1606	1019	625	386	313	200	425	1341
8	1114	1440	1416	1933	1528	964	569	360	331	207	412	846
9	1095	1492	1340	2402	1461	930	550	634	329	218	381	813
10	1081	1489	1382	1724	1393	883	994	1523	371	220	402	1106
11	1124	1500	1361	1688	1436	882	675	1011	337	247	393	898
12	1199	1557	1349	1744	1547	1028	654	273	282	278	372	751
13	1338	1441	1357	1666	1610	997	659	298	247	279	381	775
14	3701	1471	1933	1727	1970	963	666	416	234	283	410	932
15	4677	1450	1602	1816	1904	1049	772	415	238	268	418	939
16	13125	1533	1427	2031	1676	1118	786	436	287	239	468	963
17	18912	1693	1495	2377	1497	1232	662	459	288	237	651	1023
18	9214	1759	1543	2172	1476	1467	618	533	289	244	637	1609
19	4635	1783	1652	1723	1552	1121	581	644	301	269	557	1773
20	4281	2204	2448	1598	1405	968	459	721	273	279	619	1249
21	5223	3415	2086	1566	1324	848	433	643	260	305	644	930
22	8608	2458	1799	1559	1254	807	658	565	257	306	524	782
23	9543	2034	1751	1661	1195	792	633	530	265	295	477	726
24	5127	1790	2002	2085	1136	756	625	521	251	305	477	657
25	3545	1721	2747	2334	1123	752	629	460	262	304	475	605
26	2715	1703	3353	2226	1079	689	628	485	231	335	511	591
27	2410	1723	3784	1915	1073	636	592	451	264	340	551	650
28	2205	1800	5571	1778	1075	612	622	425	268	359	684	669
29	1978		4473	1890	1097	567	513	415	245	355	1175	881
30	1885		3774	1889	1178	562	441	406	237	369	996	1841
31	1735		3409		1124		387	329		327		1673

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

UNIMPAIRED FLOWS

1955	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1709	987	1627	1810	1138	925	534	595	364	608	537	597
2	2907	1176	1721	2289	1130	900	526	682	371	657	510	665
3	2037	1350	1548	3320	1069	889	579	821	349	535	542	729
4	1478	2644	1737	2726	1098	890	808	852	342	399	446	745
5	1197	3367	1852	2695	1023	952	917	1005	329	409	445	792
6	1033	6849	1826	2506	1022	923	1005	994	361	430	393	793
7	982	15132	2096	2663	987	950	1048	868	340	434	408	717
8	1147	11330	1943	2596	959	1029	1005	798	328	488	461	708
9	1257	4306	1667	2590	925	976	940	787	300	563	474	658
10	1462	2851	1534	2322	1006	899	984	805	281	397	443	634
11	2148	1965	1598	3181	1034	1048	1104	641	273	326	502	630
12	1911	1717	1621	4598	1068	1052	1279	572	270	320	534	610
13	1446	1437	1524	3603	1319	860	1314	531	256	321	525	585
14	1206	1399	1568	3555	1655	790	1098	1061	259	323	548	623
15	1098	1378	1536	3098	1202	788	930	1096	265	325	621	587
16	1269	1387	1467	2511	1096	746	997	1115	254	335	633	613
17	1234	1545	1485	2051	1406	714	945	1135	257	351	673	619
18	1224	1529	1498	1845	1362	709	778	1136	246	350	652	719
19	1511	1351	1486	1794	1301	763	665	526	261	347	741	882
20	1549	1397	1768	1704	1309	857	656	496	264	365	928	859
21	1307	1810	1841	1782	1378	832	1009	540	264	358	882	727
22	1220	2008	3670	1919	1866	774	1331	547	254	308	667	702
23	1106	4968	3647	1944	3071	796	1386	469	253	283	821	663
24	1058	4144	2536	1851	2535	810	1493	447	247	276	1520	632
25	1003	3001	2018	1693	2666	845	1577	386	287	280	1229	647
26	964	2175	1737	1490	2122	918	1224	355	386	459	1145	636
27	925	1835	1545	1356	1576	805	963	348	338	490	1032	591
28	902	1695	1418	1326	1279	693	771	355	396	543	731	575
29	843		1366	1244	1131	601	712	369	472	757	633	573
30	816		1296	1191	1067	581	686	358	576	861	596	574
31	934		1442		989		616	377		542		561

1956	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	552	980	2369	1572	2513	996	1497	624	607	487	651	537
2	563	1360	2199	1527	2955	942	1578	567	518	490	717	526
3	558	2076	2336	1542	4606	940	1424	675	508	464	627	502
4	545	3478	2047	2108	5100	899	1038	644	410	484	572	498
5	531	4298	1744	2466	4088	878	1155	599	547	506	615	516
6	510	4437	1568	4135	3610	866	1203	510	778	487	597	526
7	496	4907	1475	6720	4336	895	1213	467	1634	443	617	540
8	474	3143	1408	3873	3759	879	1538	412	1063	463	769	547
9	470	2319	1404	2743	2907	810	1808	391	672	392	771	548
10	362	1855	1312	2331	2410	787	1565	397	475	395	591	661
11	387	1573	1374	2321	2135	801	1387	409	426	387	571	707
12	401	1517	1562	2457	1890	867	1021	420	397	370	557	959
13	405	1353	2052	2407	1744	1023	1001	413	379	344	555	1452
14	380	1320	3663	2720	1633	946	1109	397	371	347	542	1991
15	497	1277	5151	3048	1529	1050	1150	397	319	367	633	2820
16	494	1442	8391	7698	1395	1037	1435	397	265	384	644	3606
17	540	1688	8314	5848	1329	973	1317	466	272	414	699	1896
18	584	2668	5117	3601	1317	842	1126	432	269	437	817	1425
19	741	2299	3218	2688	1274	874	814	494	303	629	757	1180
20	1077	2250	2196	2258	1225	865	711	927	301	732	615	1145
21	944	2362	1819	2059	1216	910	783	985	311	878	590	1492
22	835	1973	1644	1959	1177	768	724	616	306	1841	588	2234
23	797	1669	1564	1886	1137	799	717	506	533	1490	544	3663
24	927	1520	1465	1783	1087	914	1108	442	588	915	514	5982
25	931	1767	1434	1729	1099	848	874	416	735	708	517	4236
26	852	2127	1431	1696	1141	781	696	410	1561	615	516	2666
27	732	2348	1440	1630	1151	720	646	412	1118	572	526	1776
28	723	3270	1462	1654	1136	686	596	475	620	529	595	1405
29	735	2854.503	1841	1695	1058	938	535	495	562	547	588	1235
30	788		2240	1864	1152	1030	503	603	520	580	570	1151
31	810		1768		1115		592	632		584		1055

1957	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	966	8135	2799	2104	1719	959	1234	413	227	1007	614	1430
2	1090	7014	2278	4230	1753	1020	1174	417	204	842	641	1310
3	1362	5253	2044	6662	1777	1043	1067	378	200	1047	620	1270
4	1571	5162	1847	8548	1934	1089	980	372	193	1538	639	1224
5	3496	4615	1919	17885	1805	1324	900	385	185	966	652	1367
6	2760	4441	1845	18020	1663	1467	803	364	271	722	725	1551
7	2121	3701	1828	8835	1489	1547	731	294	308	638	714	1690
8	1657	3013	2237	5127	1529	1363	656	306	326	549	775	2901
9	1442	2512	2150	4031	1686	1496	619	293	399	502	910	3268
10	1337	2206	1884	2885	1765	1203	589	312	576	474	852	2411
11	1246	2012	1810	2531	2113	1143	539	360	494	444	668	1840
12	1149	1823	1710	2343	2422	1130	518	441	399	446	662	1548
13	1180	1716	1694	2261	2112	1095	550	473	353	454	664	1374
14	1096	1627	1576	2232	1878	1125	547	528	379	475	819	1321
15	1105	1585	1556	2247	1920	1067	571	499	380	559	1685	1318
16	1126	1648	1518	2127	1733	989	627	486	435	560	2158	1312
17	1083	1607	1541	2019	1439	976	659	420	585	586	2854	1331
18	983	1530	1527	2279	1396	898	824	494	534	989	3924	1675
19	892	1567	2007	2445	1403	828	723	543	494	982	5544	1951
20	934	1675	1944	2376	1415	776	636	510	501	632	3937	3722
21	840	1547	1773	2278	1320	798	600	437	496	558	2418	5624
22	1003	1475	1984	2457	1352	953	544	386	467	541	1975	3403
23	1740	1482	2120	2348	1351	1174	529	340	430	529	2318	2504
24	2330	1590	2023	2483	1403	1434	503	319	366	598	2388	2023
25	2023	1733	2453	2193	1451	1752	540	297	365	870	2898	1847
26	2610	2137	2358	1968	1374	1532	556	292	565	725	2760	2037
27	2512	2543	2001	1826	1235	1245	451	283	664	620	2410	2114
28	2808	2596	1817	1731	1162	1109	461	279	763	589	1941	1858
29	3566		1678	1657	1005	1470	494	259	1084	602	1664	1793
30	5321		1785	1721	1016	1392	429	246	1404	625	1618	1636
31	4932		1915		1015		428	223		604		1509

1958	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1448	1589	3660	2270	2023	1206	658	1531	491	2458	693	795
2	1385	1601	2591	2259	1972	1190	655	1289	457	2521	891	750
3	1245	1471	2095	2206	2043	1153	641	1081	391	1929	782	712
4	1234	1694	1809	2497	2121	1097	652	982	391	1070	619	739
5	1183	1906	1812	2641	2145	1129	707	889	413	846	597	701
6	1155	2155	1818	3063	2811	1063	1234	1042	408	741	588	649
7	1198	3096	1941	3116	2977	1025	1630	901	409	663	583	613
8	1192	3106	2163	2596	2405	1000	1996	846	397	584	547	637
9	1110	2440	2483	2312	2231	990	3579	812	392	548	575	638
10	1118	1972	2830	2210	2270	944	3364	795	455	549	594	619
11	1164	1744	2460	2369	2268	899	2140	800	440	568	565	625
12	1210	1622	2260	2121	2619	878	2077	880	530	532	554	695
13	1292	1616	2319	2433	2485	1000	1971	1179	690	553	560	648
14	1779	1585	2684	2880	2042	978	2390	1144	613	587	555	751
15	1724	1567	2502	3404	1784	985	2776	972	469	563	585	815
16	1453	1577	2365	5828	1659	1076	2008	836	558	563	598	771
17	1327	1333	2284	4274	1641	1031	1373	967	569	583	597	717
18	1217	1221	2776	3333	1607	864	1305	815	554	563	612	725
19	1185	1270	2991	2626	1629	845	1292	692	753	534	578	680
20	1210	1357	2478	2417	1585	993	1377	612	801	548	555	654
21	1344	1300	2238	2314	1603	947	1493	608	1154	519	535	654
22	1850	1371	2084	2361	1451	900	2143	725	2134	513	541	703
23	1869	1380	2278	2589	1346	907	1854	720	1204	510	561	753
24	2146	1768	2663	2261	1332	1008	1971	772	748	500	563	859
25	3216	2485	3964	2169	1291	869	3167	1222	623	479	590	1016
26	2656	3870	4536	2113	1350	891	2008	973	544	486	738	951
27	2182	5233	5196	2038	1253	1155	1617	669	561	495	819	916
28	1804	5042	4025	2021	1190	1005	1339	622	530	510	796	1385
29	1664		3288	2241	1213	750	1210	585	1255	530	1087	1726
30	1594		2701	2339	1183	710	1164	554	1387	635	1070	1311
31	1556		2473		1165		1199	533		652		1119

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

UNIMPAIRED FLOWS

1959

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1072	1107	1172	2090	1364	7108	858	475	1297	307	835	766
2	1275	1164	1148	2900	1360	4665	850	467	864	294	792	782
3	1189	1213	1302	2524	1257	3065	846	488	670	279	778	843
4	1005	1415	1568	2093	1207	2090	895	500	582	370	702	838
5	935	1724	1806	1789	1136	1648	816	511	537	426	733	833
6	843	1599	3258	1627	1077	1676	738	489	509	673	814	839
7	873	1376	2963	1486	1043	1855	721	502	497	2508	903	885
8	909	1245	2257	1424	1036	1517	702	545	736	2900	781	876
9	1003	1194	1865	1583	1044	1300	628	476	746	3351	754	870
10	981	1315	1660	1871	1101	1173	576	484	723	3043	705	896
11	917	2085	1614	2521	1211	1134	613	509	624	2964	692	954
12	929	2533	2177	3523	1210	1132	815	482	765	2475	685	1177
13	971	6070	2559	3916	1275	1085	720	504	666	2162	694	2061
14	1042	6725	2514	2979	1315	1066	679	514	675	2704	709	1527
15	1080	4142	4097	2311	1137	997	707	435	742	3005	667	1282
16	1286	3040	4320	2084	987	940	907	523	693	2091	688	1390
17	1299	2276	3114	2027	968	867	1023	528	555	1351	722	1403
18	1101	1944	2328	2092	1599	836	1157	423	521	1063	739	1688
19	1113	1709	1922	2960	1673	823	994	537	454	991	689	2351
20	1476	1506	1769	3137	2036	836	1018	598	440	855	720	1912
21	1819	1441	1760	2540	2539	1082	1083	467	430	961	712	1448
22	5428	1373	1718	2180	2242	1385	904	489	402	1066	725	1299
23	3531	1391	1567	1963	1565	1456	787	446	416	1085	692	1202
24	2416	1459	1530	1784	1476	1676	790	378	401	1106	779	1093
25	1773	1331	1469	1688	1448	1998	795	378	374	1164	977	1057
26	1419	1246	1476	1735	1506	1697	947	363	355	945	851	1047
27	1252	1234	1651	1706	1393	1142	820	352	351	883	806	1033
28	1175	1160	1764	1678	2249	971	673	348	401	759	856	1052
29	1128		1614	1673	3424	886	532	349	380	712	896	1276
30	1086		1965	1567	4226	883	517	366	331	871	815	1245
31	1162		2093		6197		501	582		898		1109

1960

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1289	5936	2019	4176	1868	917	621	489	622	1377	1025	551
2	1497	4112	2061	3958	1826	897	601	407	825	998	938	519
3	2923	2993	2388	4819	1634	1001	559	477	698	913	753	503
4	3157	2486	2178	7856	1574	986	549	435	587	927	683	507
5	2367	2647	1905	5874	1621	1031	536	496	507	961	616	500
6	2158	3357	1892	4310	1569	1254	608	518	456	1507	649	554
7	2221	2677	2030	3386	1637	1103	799	549	400	1841	648	603
8	2153	2541	2007	2969	1909	1089	1269	520	397	1699	602	569
9	1832	2407	2298	2676	1742	1340	987	737	365	2050	586	659
10	1634	2448	2471	2494	1564	1007	939	808	331	1919	611	697
11	1475	4287	2671	2340	1495	879	1016	786	347	1501	632	938
12	1426	3450	2536	2274	1457	881	1164	933	333	1164	601	1924
13	1440	3062	2669	2190	1424	829	770	1468	319	1004	547	1424
14	1454	3471	2734	2155	1387	823	628	1205	336	914	543	1084
15	1561	3040	2969	2110	1376	837	554	871	570	863	547	1001
16	1771	2620	3307	2113	1340	794	492	788	690	830	547	910
17	1704	2473	3721	2091	1333	802	493	802	1102	802	518	831
18	2054	2439	3595	2058	1254	834	490	532	2102	828	512	864
19	2034	2887	3245	2044	1211	761	486	596	1198	814	503	927
20	1715	2599	2798	1993	1186	701	579	732	738	864	509	904
21	1577	2474	2563	1957	1152	679	814	662	547	913	570	972
22	1358	2495	2301	2097	1127	752	682	780	488	790	616	1102
23	1249	2412	2204	2037	1089	785	686	1105	440	695	675	939
24	1246	2251	2175	1897	1140	765	706	1120	484	656	1037	868
25	1345	2239	2143	1822	1114	859	653	747	674	648	854	864
26	1429	2313	2078	1804	1089	830	509	639	921	667	711	864
27	1788	2081	2152	1764	1130	789	515	531	1699	672	636	874
28	3010	1978	2469	1812	1188	776	854	499	3944	687	603	906
29	3653	2087.148	2661	1709	1043	712	980	479	3943	764	588	932
30	4687		4236	1711	966	715	700	522	1990	757	606	1028
31	7419		5226		977		564	538		790		1112

1961

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1453	943	4570	6121	2548	1243	1640	942	959	466	503	520
2	1589	943	3642	4712	3119	1187	1516	909	948	450	544	518
3	1291	925	3234	3473	2563	1240	1374	881	853	495	545	506
4	1126	929	3128	2776	2172	1272	1314	974	791	652	529	568
5	1051	933	3313	2358	2003	1569	1308	951	729	610	586	590
6	962	970	4017	2182	1949	1795	1258	844	688	516	533	660
7	932	1084	4660	2185	2003	1557	1231	939	697	506	511	681
8	894	1539	5679	2220	2038	1481	1270	1003	695	490	489	911
9	867	1565	6479	2359	2241	1379	1234	1039	645	503	453	1525
10	815	1312	5191	4102	2366	1591	1257	1000	609	501	444	5671
11	867	1194	3542	3934	2539	1544	1281	899	613	488	473	9023
12	891	1062	2710	5431	2493	1519	1533	941	655	481	506	17124
13	899	1011	2834	6513	2280	1558	2831	789	626	464	574	25497
14	893	984	2987	5046	1986	1618	2785	820	604	439	613	15262
15	1415	972	2892	3728	1826	1598	2127	791	704	423	735	6254
16	1257	1038	2588	3493	1815	1833	2229	790	675	426	814	6900
17	1245	1371	2624	3094	1660	1633	2262	749	534	424	923	8135
18	1098	2031	2667	2670	1610	1514	1962	680	549	430	696	15335
19	1087	8186	2875	2342	1639	1460	1783	679	573	412	583	14952
20	1190	10568	2557	2250	1722	1444	1981	819	597	415	565	7278
21	1157	20454	2322	2176	1730	2529	1795	897	589	419	772	3830
22	1072	24907	1996	2099	1750	3279	1925	1062	595	434	809	2751
23	1033	21316	1669	2055	2099	2142	1676	1169	559	421	957	2337
24	1020	16344	1613	2174	1971	2243	1579	1365	543	415	1520	2190
25	1011	19946	1584	2621	1771	1961	1374	1334	518	407	1264	2040
26	1032	24320	1678	2839	1724	1913	1156	1196	502	424	797	2032
27	1097	13977	1766	3354	1643	2111	1083	1246	492	386	666	2119
28	937	6317	1891	3440	1515	2922	1020	1072	465	383	621	2230
29	957		2532	3106	1437	2181	969	940	464	446	555	1916
30	942		3145	2552	1368	1754	895	888	451	459	526	1776
31	976		4301		1319		882	909		478		1425

1962

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1380	2681	2897	4717	2448	1594	800	755	295	698	437	921
2	1319	2431	2650	3819	2159	1422	892	610	300	827	438	919
3	1064	2161	2376	3115	2033	1512	866	688	291	1090	409	909
4	1078	2041	2240	2959	2010	1651	1142	673	319	1350	430	892
5	1221	1989	2159	3214	1983	1577	1435	633	457	1006	405	938
6	1682	2012	2117	3596	1913	1560	1999	673	541	759	605	905
7	2383	1820	2110	4975	1951	1362	2673	672	730	667	809	850
8	2137	1841	2342	4411	1883	1227	1736	746	1335	617	889	795
9	1911	1861	2959	4055	1785	1135	1974	706	760	694	1212	772
10	1800	1877	3663	4674	1800	1439	1388	585	564	608	1828	720
11	1685	1680	6003	5886	1768	1528	1058	524	483	513	1264	712
12	1618	1681	7196	10744	1696	1682	907	503	551	522	1012	691
13	1587	1693	4882	9939	1637	1864	941	522	514	533	1338	705
14	1619	1647	3725	6655	1572	1641	935	626	613	524	1054	718
15	1702	1665	3022	4725	1570	1141	917	568	733	495	950	782
16	1928	1701	2645	3809	1501	1026	897	488	871	486	980	843
17	1915	1802	2451	3251	1548	972	884	532	2643	475	991	843
18	1951	1646	2387	3014	1460	1016	777	520	1807	454	1285	805
19	2086	2121	2410	2806	1414	968	661	505	988	477	2274	796
20	2299	4295	2359	2676	1349	962	626	527	691	480	2276	781
21	2244	5494	2809	2603	1326	1011	627	514	535	457	2896	813
22	2117	11246	3110	2574	1268	944	596	511	478	486	5098	964
23	2141	11516	2715	2500	1240	870	623	605	520	468	3185	1324
24	2475	8820	2566	2548	1248	960	696	498	517	421	1982	1349
25	3169	6517	2511	2478	1202	971	874	433	511	380	1497	2009
26	5376	4591	2849	2439	1224	950	1055	421	521	413	1213	3167
27	4438	3694	2803	2582	1203	1258	863	400	572	447	1087	2391
28	5489	3141	2483	2577	1387	1274	830	378	567	459	1025	2015
29	6113		2603	2624	1408	994	778	362	484	457	1000	2151
30	4178		2781	2547	1594	820	834	331	544	491	953	3033
31	3248		3093		1632		863	325		479		2282

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

UNIMPAIRED FLOWS

1963

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1805	2246	1538	1709	20665	1403	2876	1845	706	1830	676	1721
2	1507	2376	2012	1653	9127	1322	2288	1509	815	1196	868	1255
3	1314	3467	1928	1624	5086	1240	1870	1294	794	962	829	1140
4	1183	3125	2375	1693	3331	1265	1619	1095	808	889	707	1108
5	1106	2644	3203	1664	2705	1219	1546	1053	820	846	691	961
6	1064	2186	9922	1739	2385	1135	1602	1008	824	785	743	965
7	1008	1854	8183	1909	1956	1127	1725	912	605	765	764	923
8	1054	1755	4469	1824	1747	1107	1641	866	619	737	649	920
9	1148	1607	3373	1631	1676	1010	1355	892	567	679	629	1275
10	1372	1558	5652	1634	1547	962	1193	801	636	651	638	1699
11	1612	1507	7168	1532	1498	911	1055	811	594	692	617	2190
12	3170	1550	12009	1493	1651	848	1054	782	694	674	590	4104
13	2631	1551	22749	1418	1680	820	1105	771	858	660	570	3792
14	2016	1450	17014	1407	2453	965	1265	823	1017	680	600	3125
15	1626	1349	6919	1348	2220	1364	1330	795	1254	676	596	2650
16	1446	1293	4692	1337	1837	1476	1317	739	871	641	637	1987
17	1810	1453	4249	1301	1652	2138	1412	768	612	642	660	1675
18	2412	1516	4123	1357	1613	2284	1540	774	553	661	684	1456
19	3161	1865	3259	1377	1582	2496	1491	756	546	646	667	1315
20	7293	2137	2743	1440	1527	2607	1413	741	540	662	659	1251
21	4933	1913	2415	1428	1504	3892	1772	755	532	653	642	1216
22	3412	1621	1827	1336	1412	4520	1911	900	491	628	647	1199
23	2550	1487	1663	1244	1388	4120	1509	818	470	631	690	1210
24	2071	1437	1750	1178	1363	3963	2047	749	404	615	915	1386
25	1739	1446	1903	1117	1493	2912	1854	870	391	616	803	1243
26	1654	1381	2056	1574	1891	2734	2186	863	1246	614	823	1239
27	1619	1409	2191	3376	2235	3731	1880	970	1762	580	1136	1187
28	1521	1412	2004	5861	2548	3907	1762	997	3127	568	1314	1168
29	1465		1850	12301	2788	3514	2142	999	6913	582	2370	1205
30	1706		1775	25767	2224	3177	2027	955	3283	594	2917	1450
31	2154		1734		1653		2253	792		599		1638

1964

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	3555	2769	3321	4200	8242	2582	1164	1462	658	3994	1013	1284
2	3172	2520	4117	4018	8345	2684	1242	1412	640	3831	985	1482
3	2473	2323	7152	4133	13847	2675	1450	1324	628	3572	974	1706
4	2120	2371	5611	6683	10896	2411	1568	1313	633	5870	964	2119
5	1887	2416	5990	9226	7596	2452	1268	1572	650	9328	936	2827
6	1855	3949	4721	15798	5064	2587	1239	1313	646	6162	941	2367
7	2259	3494	3908	22817	4365	2483	1244	1200	625	3077	960	1912
8	2426	2915	3473	28517	4261	2192	1275	1017	605	1958	957	1636
9	3985	2475	3121	22106	3953	2000	1389	977	588	1383	938	1515
10	4591	2297	3125	10910	4240	1810	1558	981	580	1203	938	1570
11	3112	2297	2934	7454	4095	1895	1767	1189	611	1066	932	1573
12	2550	2320	2946	6668	4206	1918	1588	1295	821	1061	916	1809
13	2755	2434	4680	7190	4027	2316	1987	1106	760	1228	907	2057
14	2286	3413	5855	7763	3686	2034	1600	1080	655	2071	927	1828
15	2010	3195	13625	6187	3359	1812	1314	1129	603	2419	890	1605
16	1860	4390	14980	5191	3226	1584	1376	1478	556	4374	899	1530
17	1721	4158	8432	4597	3152	1530	1742	2208	551	3913	933	1462
18	1715	4736	5395	4667	2963	1495	1515	1614	570	2937	933	1622
19	1686	5031	4091	4209	2789	1455	1532	1332	578	1902	939	1734
20	1763	4103	3776	4111	2607	1407	1583	1273	663	1431	999	1895
21	2007	3348	3671	4090	2552	1394	2142	1381	617	1216	1012	2377
22	2976	2833	3405	3719	2832	1434	2284	1408	557	1183	1063	2158
23	4689	2576	5566	3905	2726	1431	2727	1371	503	1154	1471	2220
24	7093	2491	8618	4782	2636	1549	1862	1284	488	1125	1766	2494
25	19232	2508	11410	5077	2552	1657	1652	1113	440	1092	3873	4025
26	18506	2670	27113	6285	2294	1562	1412	896	462	1096	3573	4169
27	7834	2487	26922	7976	2144	1487	1215	822	526	1068	2475	4898
28	4735	2390	13871	9067	2124	1329	1106	864	1182	1082	1798	3837
29	3484	2917.236	6860	8112	2222	1278	1075	842	1590	1065	1616	3042
30	2927		5142	7332	2443	1193	1080	804	3832	1038	1432	2416
31	2744		4492		2459		1337	751		1076		2161

1965

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2000	1932	2461	3461	2285	1179	1106	767	708	1890	485	673
2	1914	2130	2922	3387	2149	1187	1171	739	795	2096	503	621
3	2068	2123	3690	3367	2069	1235	1219	684	847	1301	512	658
4	1934	2017	3642	3698	1994	1285	1342	703	813	905	477	633
5	1788	2537	3935	3676	1900	1734	1326	733	590	738	423	624
6	1709	2807	3463	3455	1846	1998	1265	873	523	677	534	597
7	1677	4362	2979	3113	1859	2098	1178	1094	506	689	530	626
8	1669	5300	2704	2869	1853	2787	1258	1594	530	791	749	597
9	1693	4046	2527	2723	1899	2597	1174	1258	538	717	795	607
10	1771	3425	2525	2906	1896	2226	1073	1043	703	629	862	659
11	2065	3219	2523	2907	1839	2186	1127	843	798	592	711	646
12	1843	3354	2661	3191	1818	2514	1069	749	975	565	660	633
13	1704	3673	2947	3249	1655	2701	942	749	1170	563	491	716
14	1603	3282	2779	2914	1532	2656	884	719	1025	556	492	785
15	1555	2927	2549	2523	1563	2650	867	661	760	552	699	732
16	1558	2723	2413	2634	1537	2720	890	667	721	552	806	751
17	1554	2802	2438	2651	1476	2204	839	625	754	529	897	820
18	1469	2885	2681	2492	1601	1717	772	572	699	538	532	774
19	1465	2662	2506	2495	1687	1439	738	565	608	537	444	693
20	1451	2409	2310	2636	1924	1288	753	557	600	521	508	671
21	2243	2267	2188	2364	1994	1244	713	579	611	574	762	667
22	2838	2253	3207	2225	3084	1166	697	620	616	650	1302	664
23	3747	2311	3966	2146	2452	1106	848	724	587	642	1759	638
24	6044	2460	6932	2180	1995	1089	862	715	672	591	1380	666
25	4509	3499	10615	2973	1574	1265	892	724	752	550	988	676
26	3212	3322	8265	2985	1587	1197	1132	808	664	541	735	735
27	2408	2770	7914	4191	1412	1117	1232	771	591	557	789	681
28	2116	2555	5603	3798	1363	1118	1151	610	689	514	780	658
29	1991		4880	2879	1321	1133	1345	567	861	490	735	611
30	1961		4634	2522	1255	1133	1425	536	946	517	678	625
31	2041		3853		1215		931	661		517		639

1966

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	693	931	3952	1447	3819	1979	1323	818	519	761	913	887
2	729	1048	6578	1674	3655	1881	1425	688	560	777	954	962
3	947	1066	7120	1723	3015	1881	1407	708	557	661	1205	863
4	1158	1008	18960	2357	2522	1804	1340	799	588	567	1090	808
5	1332	956	22276	2396	2214	1750	1311	816	596	549	898	842
6	2852	938	10328	1856	2175	1743	1233	894	542	512	861	824
7	2020	923	5445	1589	2036	1760	1158	1419	472	508	958	855
8	1427	946	4090	1475	2041	1666	1136	1083	427	556	1154	1094
9	1163	1007	3187	1418	1926	1802	1023	1140	406	575	1432	1149
10	956	1377	2744	1359	1875	1764	900	1767	424	756	2023	1268
11	900	3949	2404	1367	2360	1681	879	1680	483	845	3250	1766
12	896	5025	2194	1326	2779	1546	843	1907	473	670	2368	1432
13	1207	13780	2074	1333	3808	1544	813	1896	542	640	1848	1209
14	1522	21004	2021	1332	5974	1568	860	1628	880	674	1405	1130
15	1902	12616	2025	1337	4532	1632	962	1409	752	688	1259	1073
16	3311	12235	2188	1319	3772	1587	1085	1174	703	1241	1138	1041
17	2388	14260	2063	1290	4167	1706	1490	1024	829	1810	1047	991
18	1709	8207	1919	1234	3699	1640	1482	1119	886	2173	1005	939
19	1335	5267	1807	1404	3493	1518	1124	992	1095	4591	962	932
20	1184	3668	1694	3162	3137	1384	986	890	1373	3010	921	917
21	1111	2953	1752	3719	2776	1320	859	947	1035	2107	892	947
22	1114	2545	1793	9101	2764	1247	799	822	765	1595	883	931
23	1297	2271	1763	10429	2821	1188	742	899	662	1585	894	950
24	1212	2202	2096	5892	2414	1144	714	771	647	1798	884	1035
25	1081	1965	2067	4478	2242	1140	697	620	600	1899	873	1074
26	1063	2208	1799	4178	2693	1116	673	631	605	1709	902	1088
27	1059	2226	1724	5921	4946	1172	643	630	626	1341	887	1268
28	985	2738	1595	7040	5432	1204	704	576	681	1097	960	1556
29	939		1557	5651	3567	1281	670	556	812	982	961	3093
30	928		1365	4989	2879	1284	697	569	737	871	877	2726
31	801		1208		2292		826	532		920		2333

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

UNIMPAIRED FLOWS

1967

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2419	1385	2185	1296	1614	2626	2016	1249	2222	1203	4690	2717
2	2509	1380	1922	1250	1539	3687	2107	1853	2148	1152	7748	2456
3	2062	1399	1752	1251	1499	3799	2291	1576	2031	1142	4767	3082
4	1742	1432	1750	1237	1718	6658	1932	1512	1844	1105	2819	2893
5	1556	1503	1854	1197	2474	6683	1750	2051	1764	1110	1970	2438
6	1943	1613	1865	1162	2581	4766	2468	1321	1650	1105	1638	2171
7	2291	2034	2627	1165	2960	2832	5104	1218	1611	1128	1508	2024
8	4352	2009	2703	1131	3584	2206	7044	1201	1675	1088	1402	1970
9	4669	1890	2403	1080	2702	1858	5930	1110	1810	1138	1301	2346
10	3281	1865	2308	1091	1746	1611	4769	1110	1978	1202	1275	3092
11	2447	1878	2719	1114	1625	1491	3959	1245	1790	1124	1275	5509
12	1949	2193	2604	1078	1685	1413	3517	1157	1736	1054	1200	5343
13	1761	1945	2229	1067	3068	1286	3098	1066	1447	1049	1166	4002
14	1920	1721	1973	1166	2508	1153	4061	1052	1419	1055	1277	3148
15	2032	1637	1753	1144	2069	1143	3181	1014	1440	1040	1197	2623
16	1788	1723	1644	1077	2019	1119	2205	935	1347	1022	1185	2396
17	1649	1880	1555	1011	1693	1112	1775	923	1354	1027	1200	2461
18	1540	3022	1549	958	1650	1209	1665	958	1398	1134	1216	2877
19	1416	2929	1596	894	1600	1287	1571	933	1305	1098	1152	3465
20	1429	2833	1604	906	1878	1226	1532	1199	1233	1015	1323	5464
21	1372	3375	1687	1053	2088	1254	1871	1997	1249	1008	1553	4952
22	1323	2782	1771	1265	2380	1313	1737	4060	1259	1024	3045	4636
23	1278	2247	1638	1535	2920	1371	1561	6755	1202	1046	3283	4941
24	1313	1963	1490	2968	2620	1288	1509	14132	1171	1103	3185	3896
25	1388	1764	1482	3318	1937	1251	1726	19196	1146	1299	5136	3288
26	1452	1745	1500	4438	1620	1163	1553	13601	1220	1418	3823	2910
27	1948	1808	1479	6935	1458	1387	1585	5914	1221	1170	2939	2775
28	2206	2069	1490	4424	1429	1444	1532	4942	1327	1088	2306	2884
29	1828		1516	2700	1296	1562	1429	3614	1485	1151	2142	3458
30	1576		1445	1853	1618	2496	1485	2915	1316	1855	2436	3072
31	1449		1349		1669		1395	2481		2432		2843

1968

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2805	2552	2277	2140	2497	1830	1062	1343	1147	607	588	1060
2	2969	2718	2127	2205	2128	1753	1085	1034	1362	506	727	1281
3	3041	2986	2226	3616	1888	1896	1174	1110	895	492	749	1379
4	3670	2719	2134	4046	1845	1641	1247	1020	773	593	996	1676
5	4136	2560	2063	7788	1767	1431	1273	1032	973	531	1194	1691
6	4141	2407	1944	7750	1688	1587	1223	874	1373	566	893	1329
7	5609	2389	1885	5432	1619	1636	1204	751	1045	732	834	1190
8	6351	2384	1934	3578	1597	1830	1080	688	787	792	854	1065
9	6521	2287	2238	2957	1623	1994	1163	626	639	642	882	980
10	10448	2229	3588	2734	1873	1889	1238	635	665	615	1132	971
11	14321	2213	4773	2719	1961	1548	1297	608	664	640	1170	964
12	8777	2154	9707	2635	2517	1393	1282	612	556	634	1058	955
13	5941	2090	12130	2446	2780	1361	1515	635	528	653	989	975
14	4652	2102	6107	2480	2930	1295	1301	660	534	662	854	1182
15	4058	2107	4140	2691	3286	1303	1113	627	561	691	906	1165
16	3496	2078	3487	2661	3245	1303	1033	663	570	604	1330	1010
17	3282	2067	3445	2367	3201	1317	1023	660	604	623	1589	976
18	3080	2012	3064	2300	2827	1347	935	625	763	675	2959	955
19	2916	1979	2713	2780	2290	1303	1003	603	1576	765	2894	983
20	2843	1943	2681	2454	1902	1258	979	736	1603	714	1999	1554
21	2829	1933	2503	2232	1645	1248	950	704	1137	627	1343	1955
22	2872	1877	2573	2217	1582	1193	850	568	886	574	1114	3503
23	2907	1879	2926	2231	1557	1260	817	542	715	529	1013	6833
24	3354	1886	2709	2400	2106	1445	780	495	739	481	925	4103
25	3280	1846	2376	2530	2239	1230	770	486	659	537	934	2757
26	3058	1895	2304	2413	2745	1142	864	436	656	503	882	2148
27	2863	1976	2157	2500	4116	1181	900	400	734	494	860	1948
28	2673	2054	2114	2610	3347	1109	893	361	688	526	859	2390
29	2592	2178.224	2100	2683	2262	994	950	424	545	539	959	2763
30	2578		2072	2830	2149	1037	1128	497	606	516	933	2136
31	2529		2093		2022		1442	566		519		1944

1969

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1823	3628	1919	1756	1802	1312	754	739	953	794	972	781
2	1529	6568	1874	1732	1771	1430	726	841	1098	759	2033	793
3	1513	10929	1771	1837	1735	1596	687	2358	987	852	1350	778
4	1434	8195	1864	1923	1710	1379	684	2367	964	749	1103	819
5	1324	5240	1815	2209	1657	1313	659	1579	933	765	989	825
6	1264	4375	1909	3351	1957	1260	634	1073	884	744	794	900
7	1238	4650	2201	2781	2209	1226	707	779	949	742	802	1111
8	1179	3967	2130	2347	2295	1185	776	699	905	809	807	1579
9	1162	4197	2048	2097	3103	1211	812	681	837	799	767	1234
10	1160	3474	2087	1999	2901	1262	802	600	742	717	791	1085
11	1126	2922	1855	2147	2244	1314	767	543	672	741	886	1115
12	1094	2616	1752	2152	1866	1216	698	542	619	705	843	1050
13	1088	2568	1659	2392	1699	1182	670	556	680	703	827	956
14	1063	2324	1648	2739	1789	1176	578	853	656	719	801	890
15	1049	2308	1579	4220	1946	1764	536	1242	670	664	747	880
16	1015	2508	1968	6654	2258	1846	514	4038	679	614	680	846
17	1373	2461	2251	5111	2542	1385	468	3351	778	637	762	834
18	2174	2303	2660	6265	2774	1220	671	1828	728	658	809	830
19	2794	2374	4622	6211	3574	1158	709	1527	769	745	867	924
20	8696	2302	3610	4533	3993	1117	825	3092	1112	756	1220	917
21	9081	2212	2936	3369	2600	1150	1234	2308	1647	880	1072	956
22	4912	2145	2620	2745	2056	1087	1265	3917	1731	931	951	1158
23	3678	2305	2606	2350	1812	1026	1147	11250	2285	722	918	1333
24	3493	2277	3679	2179	1716	1016	1411	3843	2695	612	898	1242
25	3266	2121	3643	2170	1631	997	1300	2482	1709	671	884	1303
26	2717	2057	2831	2072	1610	903	967	2045	1184	664	914	2071
27	2397	1958	2425	2027	1559	888	932	1527	1014	622	906	1821
28	2223	1866	2049	1989	1409	832	889	1165	875	682	859	1559
29	2446		1944	2034	1400	771	851	1068	890	697	863	1453
30	2484		1891	1893	1391	759	707	983	831	611	856	1531
31	2556		1809		1331		627	909		642		2890

1970

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2697	1537	1154	2010	1667	1507	608	708	425	292	2022	783
2	1953	1703	1125	3164	1775	2050	581	701	413	270	1401	759
3	1675	1796	1101	3209	2001	3655	539	639	452	276	1273	731
4	1459	1543	1113	2500	2465	5216	527	660	549	278	1087	713
5	1344	1443	1137	2135	2296	4836	507	661	853	244	913	720
6	1359	1373	1109	1937	1878	3274	480	507	1144	274	870	687
7	1383	1340	1063	1820	1585	2251	450	583	824	280	938	680
8	1203	1319	1054	1679	1393	1631	538	898	685	303	973	677
9	1063	1316	1028	1591	1314	1485	493	1033	631	323	1035	716
10	1011	1339	1001	1585	1298	1364	552	2124	505	386	1349	709
11	1214	1287	979	1555	1244	1440	577	2296	474	507	1557	730
12	1427	1199	937	1443	1170	1376	534	1434	498	568	1220	789
13	1575	1146	946	1433	1128	1344	456	980	504	476	1080	945
14	1465	1225	920	1435	1155	1181	500	889	476	474	958	909
15	1380	1283	959	1360	1139	1138	474	831	474	621	909	833
16	1316	1412	949	1356	1133	1071	446	774	466	593	892	918
17	1368	1726	1924	1591	1204	991	478	790	422	437	862	1073
18	1668	1627	3155	1548	1137	981	565	868	410	587	905	1044
19	1591	1437	4871	1708	1001	890	810	974	399	695	935	956
20	1428	1318	9966	1619	971	867	1178	882	413	1511	1043	967
21	1360	1213	8546	1479	931	856	1672	852	442	2536	1236	942
22	1195	1182	8976	1184	892	855	1900	757	398	1622	1085	948
23	1222	1212	5609	1102	872	817	2196	763	455	1196	958	962
24	1271	1212	3801	2424	886	789	1884	911	446	1143	901	1510
25	1286	1267	2738	2894	853	754	1447	716	408	1503	830	1387
26	1456	1398	2307	2259	897	747	1104	609	411	1332	818	1131
27	1827	1294	1954	3406	925	751	931	564	433	1420	824	1115
28	1544	1202	1812	2791	901	702	844	524	376	1708	826	1106
29	1461		1686	2098	1006	655	896	534	363	2397	802	1177
30	1865		1724	1801	1450	628	850	474	335	4876	784	1273
31	1778		1760		1450		737	479		3218		1283

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

UNIMPAIRED FLOWS

1971	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1333	1778	4850	2956	2474	1236	1721	6212	1797	816	1079	1410
2	1431	1799	6227	2806	2114	1105	1418	5357	2108	783	1455	1489
3	1479	2304	7755	2732	1972	1035	1347	5234	1760	779	1659	1819
4	1571	2675	6677	2670	1792	1081	1283	4007	1218	800	1780	2500
5	4614	5286	4913	2619	1742	1072	1354	3692	1009	812	1247	3075
6	3737	5515	3632	2657	1632	1086	1688	2872	933	860	1046	3551
7	2196	4395	3335	2760	1595	986	2095	2222	850	801	929	5202
8	1740	4247	3021	2522	1603	1037	1710	2115	808	702	873	5587
9	1677	4049	2662	2361	1706	1014	1879	2021	813	672	886	3400
10	1544	3210	2553	2247	1784	974	1479	1963	795	673	860	2658
11	1393	2615	2665	2133	1715	1021	1272	1987	787	686	812	2266
12	1350	2363	2474	2068	1797	1056	1243	2029	827	681	868	2053
13	1311	2320	2482	2112	2355	1059	1385	1668	813	697	888	2036
14	1325	2190	2558	1983	2520	1129	1451	1506	754	701	834	2071
15	1470	2019	2456	1832	2283	1118	1569	1270	963	693	828	2082
16	1690	1925	2593	1847	2526	1016	1913	1204	1188	720	836	2192
17	1481	1787	2461	1828	2236	1014	1761	1180	1431	856	822	2967
18	1365	1810	2284	1799	1989	1135	1447	1178	2294	743	800	2772
19	1180	1901	2426	1923	1783	1301	955	1112	2089	726	798	2355
20	1184	2593	2668	1854	1649	1258	957	1173	1524	706	867	2387
21	1324	3038	2393	2528	1582	1229	1100	1236	1221	730	883	3861
22	1496	4574	2197	2876	1554	1097	1859	1227	1103	899	895	2713
23	1910	5961	2659	3196	1465	906	2274	1300	1052	1541	873	2220
24	3103	4617	3398	3751	1403	840	6264	1261	951	1544	1051	2005
25	6081	3927	3814	3093	1452	880	4097	1058	954	1464	1413	1824
26	5546	3986	6520	2631	1410	931	3926	900	946	1119	1250	1737
27	3755	4974	5628	2481	1210	933	2421	899	925	935	1108	1718
28	2833	4820	5004	3917	1244	1198	2045	866	890	840	1134	1745
29	2305		4082	3556	1251	1561	1796	866	857	814	1125	1564
30	2022		3938	3001	1113	1667	2100	1205	845	877	1372	1624
31	1922		3294		1119		3736	1390		976		1964

1972	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1872	2754	2180	2807	1624	1694	1149	1878	526	885	844	1429
2	3339	2596	2255	2602	1570	1614	1152	1936	695	665	854	1305
3	4453	2783	2633	2377	1704	1555	1342	1451	874	614	1512	1199
4	7006	3107	2433	2336	1797	1569	1318	1226	907	584	1634	1184
5	13887	2981	2160	2321	1705	1542	1327	1149	1068	551	1171	1182
6	8418	2875	2128	2466	1592	1557	1328	2177	1149	695	1066	1287
7	5024	3204	2115	2446	1702	1708	1143	1508	844	649	1056	1373
8	5658	3013	2326	2871	1946	1595	1036	1225	647	550	1980	1284
9	6911	2722	2382	2768	2803	1502	958	1091	600	503	1641	1262
10	11756	2696	2221	2580	2144	1477	923	1043	581	497	1200	1250
11	19108	2726	2101	2260	2914	1394	906	1072	541	516	1349	1285
12	16060	2850	2043	2281	4360	1330	872	1000	535	464	1462	1603
13	8705	3726	1949	2184	5811	1246	876	940	539	477	1524	2929
14	7091	3541	2098	2083	15551	1203	872	1135	551	539	2543	3798
15	5291	3070	2084	1968	12523	1209	962	953	600	555	2394	9334
16	4231	2808	2137	1916	6208	1195	1104	817	673	535	1703	12400
17	3442	2690	2344	1813	3609	1319	1105	774	710	499	1290	6149
18	3091	2734	2221	1776	2785	1955	1220	782	886	512	1122	3794
19	2840	2823	2160	1764	2705	2105	1110	786	893	486	1131	3201
20	2766	2582	2357	1884	2610	2500	1009	775	689	498	1716	3415
21	2714	2443	2385	1926	2649	2827	869	804	565	537	1558	5730
22	2657	2386	4136	2161	2752	2276	796	751	551	596	1329	7789
23	2604	2289	3655	2454	2565	1534	817	702	522	619	1262	5078
24	2472	2240	2982	2075	2183	1280	807	667	573	1094	1228	3676
25	2374	2284	2562	1834	2032	1194	1067	691	591	1115	1285	2887
26	2242	2293	2608	1676	2069	1187	1164	737	606	813	1632	2408
27	2275	2309	2562	1626	1937	1153	1367	806	667	870	1628	2123
28	2471	2190	3105	1562	1852	1155	2321	663	825	1646	1437	1940
29	2547	2255.858	3318	1562	1831	1213	2408	620	722	1480	1334	2247
30	2952		3386	1528	1813	1248	2859	560	838	983	1296	2316
31	2831		2950		1772		2106	542		981		3175

1973	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	3475	3638	1872	8893	3287	3581	2046	1433	901	2942	1036	1619
2	3074	8771	1889	6335	3027	3172	1943	1627	873	3062	1024	1422
3	2730	6786	2062	4510	2989	2912	1942	1423	833	2208	892	1729
4	3216	4861	2241	3570	3014	3111	1845	1351	801	1503	853	1907
5	3331	3614	2325	4419	2799	3113	1793	1290	782	1215	819	4723
6	3727	3131	2388	4950	3604	4571	1749	1242	760	1043	788	4668
7	3736	3024	2536	6366	4044	5249	1764	1293	759	1030	765	2966
8	3885	2992	2812	9139	5687	3931	1854	1334	742	1022	746	2046
9	3348	3448	3310	6599	7607	3168	1923	1343	751	964	815	1634
10	2882	3024	3592	4658	5859	2913	1772	1345	731	925	850	1448
11	2470	2783	3544	3471	4063	2694	1757	1521	1049	927	801	1304
12	2280	2541	4607	3134	3638	2569	1682	1457	1294	884	761	1286
13	2151	2491	3799	3019	3058	2629	1614	1721	1598	867	803	1297
14	2096	2607	4309	2817	2769	2782	1502	1491	4482	850	772	1347
15	2080	2901	5256	2753	2540	2763	2017	1581	3106	867	754	1331
16	1984	2602	6721	2730	2360	2736	2051	1426	1938	818	861	1388
17	2236	2450	13304	2729	2637	2713	2017	1464	1491	806	977	1283
18	2612	2252	9092	2675	3771	2600	2055	2339	1315	746	889	1227
19	3098	2175	6394	2780	3958	2255	1975	2059	1285	744	977	1215
20	3671	2153	4745	2915	5585	2347	1851	1504	1093	746	1081	1282
21	5007	2083	5087	2679	5018	2764	1726	1418	998	777	1495	1621
22	5832	2024	4269	2928	4411	3361	1525	1218	940	766	2521	1514
23	4478	2081	3700	3784	3231	2770	1659	1078	908	781	1675	1387
24	4237	2021	3256	4715	3753	2410	1807	1095	904	755	1362	1693
25	3230	1957	3150	8336	3763	2142	2000	1047	902	758	1193	1993
26	2814	1938	3280	8102	4361	2142	2229	1006	854	822	1198	2810
27	2934	1955	3051	9905	4414	2069	2032	971	872	822	1315	5057
28	2545	1910	2852	7291	9162	2098	1833	954	1633	842	2579	3521
29	2329		3942	5252	10082	2681	1569	924	2309	1088	3414	4094
30	2513		4675	3736	6323	2239	1409	881	2503	1043	2041	5290
31	3242		7078		4443		1346	879		902		7468

1974	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	12350	3065	2605	3686	1962	2162	1086	783	1343	604	608	2185
2	8200	2859	2573	6654	1982	2417	1128	848	1291	590	577	1905
3	5853	3095	2517	7677	2251	2310	1270	1041	1178	544	615	1341
4	5146	3050	2437	12345	2430	2012	1722	1518	1094	562	603	1170
5	4636	2920	2409	15190	2368	1773	2639	1653	983	576	635	1082
6	4143	2919	2341	8826	3173	1637	2004	1590	958	599	732	1262
7	5076	3422	2261	5145	2379	1911	2237	1675	1076	610	664	1429
8	4626	4022	2229	3831	2051	2091	2340	2050	1014	585	584	2415
9	4165	3553	2181	3805	1909	1907	1932	3178	907	590	662	2444
10	4047	3078	2090	3155	1976	1744	1764	2097	903	607	673	1859
11	3896	2871	2143	3312	2056	1883	1654	1711	876	594	698	1444
12	4249	2729	2176	3356	2435	1580	1073	1732	898	560	863	1225
13	3508	2967	2087	4774	2604	1527	1014	1759	1310	600	899	1204
14	3168	3626	2016	4879	2156	1449	1006	1649	1049	723	781	1155
15	3712	4773	2019	4847	1930	1360	943	1480	908	775	803	1216
16	3372	5861	1982	3545	1927	1354	910	1693	845	1012	890	1474
17	3017	6343	2008	2989	1884	1256	906	1976	832	1238	913	1373
18	2749	4859	2046	2679	1761	1211	853	2253	794	922	1254	1221
19	2964	4035	2220	2555	1668	1192	798	1836	752	715	1524	1155
20	3025	4016	2464	2520	1815	1154	789	1379	735	651	2538	1158
21	3937	3927	2793	2466	1916	1169	860	1161	728	595	2472	1114
22	3712	5408	2911	2433	1886	1227	919	1068	713	606	1671	1265
23	3405	5046	2503	2525	2882	1145	932	1013	707	625	1200	1615
24	3222	4228	2213	2347	3002	1141	1208	959	700	634	926	2072
25	3668	3365	2047	2227	2503	1136	1506	896	720	622	822	3210
26	3998	2975	2003	2176	2150	1031	1665	804	733	631	815	3538
27	5919	2793	2409	2081	2855	993	1638	1016	732	627	714	3050
28	5133	2689	2709	1999	2591	1175	1510	1069	777	637	1029	2840
29	4989		3726	1993	2014	1066	1094	1108	769	614	1085	3134
30	3982		5483	1990	1748	1046	892	1286	655	593	1218	3819
31	3411		4266		1842		845	1638		593		3551

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

UNIMPAIRED FLOWS

1975

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2855	2088	2657	4832	2633	1996	1771	1598	747	2535	905	2359
2	2332	2758	2563	4093	3514	1808	1964	1572	710	5051	945	2360
3	2025	3936	2436	3638	2819	1539	2100	1298	558	3089	916	2082
4	2077	5226	2276	3253	2917	1433	1855	1110	547	2029	908	1673
5	2009	8623	2277	2970	2758	1485	1434	1363	653	1679	1045	1511
6	1870	6501	2289	2773	2753	1491	1280	1372	758	1667	1097	1445
7	1810	4651	2347	2835	5348	1592	1244	1466	869	1600	1346	1400
8	1856	3350	2524	2933	4629	1697	1306	1460	2053	1657	1851	1317
9	2300	2846	2421	2942	3463	1758	1195	1528	1338	1714	1556	1309
10	2731	2684	2502	3065	2937	1793	1066	1491	990	1456	1736	1280
11	4951	2587	4215	2896	2390	2070	1151	1478	1330	1197	1979	1196
12	4623	3527	6224	2777	2156	2478	1052	1458	1100	1063	2234	1173
13	5684	3457	8309	2755	2170	2142	948	1232	1075	952	4012	1165
14	4024	3192	15531	2728	2089	1680	903	964	948	936	2856	1225
15	3033	3178	12263	2670	2194	1482	857	888	807	1092	1992	1259
16	2422	3737	7357	2661	2886	1391	981	837	730	1306	1585	1355
17	2104	5274	5531	2567	2578	1399	879	786	743	2232	1404	1495
18	1904	4706	4820	2449	2557	1366	903	742	977	4748	1427	1396
19	1862	6606	5515	2389	2153	1413	949	721	1088	2736	1415	1260
20	1804	4375	5020	2346	1913	1604	929	684	965	1952	1415	1183
21	1776	3617	4157	2268	1764	1597	932	659	1032	1484	1930	1219
22	1713	3646	3964	2236	1652	1395	999	651	1037	1318	1993	1200
23	2463	3801	3882	2200	1642	1231	1014	630	1539	1174	1644	1253
24	2888	5271	4204	2206	1588	1201	1071	686	2076	1141	1675	1285
25	5039	5215	4754	2185	1543	1131	1249	686	1709	1119	1534	1384
26	5664	4270	3869	2126	1795	1168	1244	709	1292	1097	1445	1803
27	4077	3236	3459	2069	2175	1161	1058	853	1140	1066	1382	1983
28	2798	2830	3870	2014	2045	1240	990	853	1034	1048	1510	1679
29	2315		4283	2038	2122	1420	948	842	1394	1028	1667	2044
30	2104		7217	2052	2318	1859	1228	777	1602	957	1761	2453
31	1886		6134		1991		1319	723		977		4478

1976

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	5785	2989	1661	24672	2309	2483	2232	1038	663	707	1137	1322
2	4162	3220	1603	13457	2414	2307	2067	976	691	492	743	1031
3	3553	2886	1662	7061	2084	2169	2149	898	723	509	690	918
4	3546	2602	1663	5451	1831	2267	2829	978	751	470	649	924
5	3049	2358	1690	4566	1770	1995	5326	1057	844	612	579	914
6	2883	2304	1925	3918	1792	1843	3983	1104	796	671	596	1007
7	2966	2183	2111	3523	1808	1669	3728	1243	728	862	572	1612
8	4604	2098	1901	3234	2041	1604	2630	1196	655	1297	568	1762
9	3592	2045	1974	2963	1958	1526	2070	985	605	1370	572	1333
10	2865	1941	2858	2735	1795	1589	1807	871	563	1117	596	1360
11	2526	1889	3633	2686	1772	1540	1539	823	541	812	557	1313
12	2388	1874	4714	2626	2061	1480	1377	765	545	672	712	1882
13	2290	1838	12375	2520	2938	1448	1382	784	509	629	772	2325
14	2437	1782	10450	2398	3490	1416	1275	748	478	606	701	2121
15	2376	1605	9415	2302	8599	1312	1247	745	480	586	778	2148
16	2158	1855	15738	2262	7574	1322	1203	891	482	583	770	2589
17	2023	1867	16962	2161	4875	1393	1265	867	442	566	728	1934
18	1906	2020	8629	2161	3171	1848	1240	741	456	522	669	1654
19	1794	2695	5473	2133	2378	2391	1182	696	470	530	664	1441
20	1735	2470	4358	2120	2084	3577	1226	639	466	538	660	1555
21	1672	2111	4707	2198	1952	2996	1413	603	514	561	682	2371
22	1704	2908	4337	2182	1878	2311	1188	582	508	553	660	1886
23	1637	2718	3672	2158	1824	1746	1137	610	461	620	637	1636
24	4002	2289	3042	2167	1786	1662	1119	686	460	588	679	1601
25	4945	2080	2794	2188	1799	1627	1235	838	434	706	694	1567
26	9206	1954	2846	2133	2022	1672	1300	731	447	1011	962	2126
27	12485	1860	2893	2124	2253	2158	1501	955	586	904	1196	2087
28	7918	1797	4581	1988	3097	1969	2078	1103	603	773	1522	1768
29	4595	1687.908	7489	1988	5200	1830	1540	1032	602	734	2136	1487
30	3429		15004	2056	4144	1920	1270	819	695	715	1930	1287
31	3062		22693		3103		1133	784		1012		1267

1977

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1319	1209	2116	13178	1943	1172	946	498	310	846	919	2461
2	1201	1176	1872	9276	2109	1098	1268	463	306	2536	1751	2627
3	1255	1168	1669	10062	2055	1040	1104	402	277	2247	3865	1988
4	1336	1172	1899	10556	2260	1049	798	387	268	1314	4840	2117
5	1457	1114	2234	15419	2069	963	741	324	305	1058	10496	1826
6	1557	1106	2334	11409	1835	910	596	408	397	992	20481	1768
7	2679	1011	2559	6233	1699	988	585	374	635	2722	13931	1804
8	3571	1002	2339	4622	1617	917	517	434	1213	3242	5573	1525
9	4087	991	1980	4133	1528	807	510	866	1059	9188	3955	1680
10	7823	1056	2158	3447	1383	841	587	817	873	6765	2911	1881
11	5099	1152	2776	3037	1260	835	529	611	772	4359	2125	1472
12	3514	1303	3230	2725	1275	864	508	611	551	2050	1761	1461
13	2608	1635	7780	2505	1326	871	519	541	553	1352	1552	1562
14	2390	1652	5706	2245	1298	864	528	555	817	1002	1381	1636
15	3052	1447	3861	2154	1361	898	489	828	960	914	1437	1957
16	2508	1287	2673	1971	1378	870	529	834	808	812	1463	1992
17	2026	1163	2187	1926	1312	876	552	878	1338	742	1806	2000
18	1581	1126	2013	1926	1338	1012	547	1174	1204	686	1940	2566
19	1426	1112	2097	1929	1331	1004	459	940	1079	653	1673	2496
20	1409	1075	2497	2017	1323	901	419	565	1094	622	1474	2195
21	1406	1100	2736	2069	1315	953	348	552	993	629	1452	1840
22	1483	1522	4446	2061	1385	896	313	516	662	629	1547	1684
23	1492	1705	3720	2088	1414	757	421	520	578	1219	1506	1767
24	1518	2590	2859	2539	1527	875	438	588	639	1686	1528	1849
25	1520	2931	2279	2121	1472	822	456	801	673	2092	1508	3657
26	1431	2565	2100	1728	1644	727	547	606	713	5102	1569	3459
27	1467	2258	4730	1614	1810	719	652	531	760	3388	1521	2658
28	1530	2400	7518	1694	1738	749	511	482	754	2177	1716	2275
29	1453		12703	1740	1651	824	546	446	639	1476	2586	2033
30	1337		24383	1762	1548	924	615	377	602	1176	2364	2054
31	1276		24212		1282		654	358		1029		2296

1978

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2073	3087	1989	1631	2435	1144	646	953	563	468	327	966
2	1947	2957	1960	1623	2545	1143	601	722	574	503	339	939
3	1800	2854	2078	1607	2315	1124	600	715	620	443	362	909
4	1920	2704	2240	1557	2196	1123	561	1523	609	368	347	1384
5	2150	2588	2066	1536	2462	1278	502	3548	565	315	368	2425
6	3052	2527	1947	1473	3275	1587	467	2875	529	297	354	1775
7	4307	2423	2255	1438	3764	1785	497	4748	496	303	378	1315
8	5048	2380	2905	1409	4548	2444	572	3859	475	308	391	1217
9	8411	2344	3636	1476	6940	3076	583	3145	482	303	408	1534
10	5560	2317	6553	1463	5063	2265	641	4828	475	325	375	2199
11	3949	2259	5040	1569	3273	1753	691	2853	491	413	391	1554
12	2951	2267	3945	1848	2358	1528	623	2290	552	358	375	1094
13	2690	2296	3055	1719	2083	1459	760	1894	546	407	378	905
14	2583	2385	2716	1598	2023	1383	831	1607	544	555	391	762
15	2431	2181	2637	1490	1862	1206	1061	1342	574	467	485	729
16	2563	2176	2405	1576	1702	1028	1693	1333	594	342	490	733
17	2954	2042	2224	1935	1606	1022	1249	1164	549	389	533	818
18	3956	2031	2116	2149	1616	1091	787	1058	546	348	782	808
19	3777	1978	2067	4218	1577	1003	661	969	499	411	804	746
20	5649	2004	2014	3412	1485	997	572	875	449	362	514	792
21	4774	1879	1965	2510	1555	1006	581	821	430	383	512	850
22	3902	1895	1949	1938	1482	937	562	702	407	363	446	953
23	4768	1861	1928	2004	1414	812	599	640	447	394	511	854
24	5778	1874	1792	1933	1469	833	688	586	468	336	600	821
25	9440	1791	1764	2217	1400	802	717	632	488	383	670	930
26	16394	1866	1801	2469	1235	753	695	624	483	364	557	970
27	11497	1826	1777	2165	1252	743	659	664	505	376	708	807
28	6614	1946	1655	1763	1258	697	675	672	434	342	947	846
29	4605		1686	1881	1254	648	603	637	447	328	1055	753
30	3750		1653	1927	1245	635	522	571	472	322	1000	886
31	3355		1633		1184		516	566		323		1727

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

UNIMPAIRED FLOWS

1979	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2332	1374	3407	4762	2385	5487	1263	995	1637	1747	2164	1508
2	2559	1397	6280	6176	2082	4318	1086	957	1543	1576	2788	1432
3	2739	1247	6514	14037	2056	3406	1008	927	1398	1393	3234	1394
4	1979	1501	13073	15688	2300	2912	951	901	1585	1390	2386	1321
5	1736	1646	19618	10505	2226	2414	890	870	1323	1969	1531	1289
6	1788	1736	12210	5972	2084	2108	1165	811	1006	1720	1179	1297
7	2171	2197	5794	4337	2067	2095	1197	815	885	1303	1098	1303
8	5246	2312	4779	3879	1965	2172	1202	761	780	1106	1282	1284
9	3510	2203	4011	5171	2037	1951	1449	982	720	1021	1569	1236
10	2488	1961	3403	5448	2673	1846	1696	1090	696	979	2207	1202
11	1894	1729	3169	9390	2789	1741	1666	1174	714	811	2777	1266
12	1601	1618	2855	9835	2997	1603	1624	1394	671	851	2612	1169
13	1647	1484	2433	19038	2958	1502	1679	1265	723	886	2149	1254
14	1566	1422	2166	27367	2938	1430	1368	936	1000	823	1687	1300
15	1354	1448	2152	16939	2109	1383	1187	744	1022	781	1385	1242
16	1253	1450	2003	6897	1899	1362	1110	693	974	801	1321	1110
17	1228	1499	1805	5350	1809	1352	993	670	984	781	1306	1156
18	1646	1565	1842	4315	1837	1339	1141	658	1105	766	1278	1059
19	2133	1727	1822	3714	1794	1323	1530	657	1329	796	1234	1073
20	2992	1917	1827	3592	1963	1240	2016	822	1148	828	1213	1099
21	8028	2550	1838	2970	2354	1260	2750	858	1005	891	1258	1089
22	5350	4436	2024	2748	2582	1290	3132	858	1467	887	1460	1128
23	4242	5694	2064	2724	2463	1318	3265	1137	1360	904	1641	1120
24	3749	8562	2316	3005	2656	1225	2521	1264	1071	941	2210	1163
25	3162	10461	2195	3037	2644	1294	2083	1435	1180	835	2731	1384
26	2705	8691	2007	3663	2083	1256	1918	1617	1615	765	4007	1290
27	2238	4976	1836	3982	2036	1185	1658	1734	1844	842	3191	1193
28	1864	3704	1760	3212	2013	1131	1427	1369	2887	991	2392	1173
29	1767		1726	2477	2633	1124	1206	1187	3020	1102	1941	1171
30	1539		1732	2327	3482	1181	1186	1228	2414	1554	1676	1245
31	1427		1902		3943		1113	1246		2346		1375

1980	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1301	2629	1580	4644	2460	2098	1414	773	928	2827	902	821
2	1280	2252	1680	4288	2235	2069	1246	739	754	2005	803	777
3	1204	2110	1994	4048	2210	2011	1277	721	584	1144	747	742
4	1201	1885	2336	3644	2101	1929	1195	667	565	845	700	699
5	1348	1821	3674	3581	2118	1885	1166	711	475	654	687	698
6	1306	1795	7504	3464	1944	1890	1116	691	445	610	626	699
7	1298	2093	7514	3353	1984	1789	1100	625	468	557	648	736
8	1411	2408	16560	3086	1990	1690	1058	602	417	535	650	722
9	1719	2699	16580	3441	1976	1567	1009	635	373	514	641	668
10	2176	3414	9501	3748	2015	1462	1004	602	375	522	616	733
11	2495	3252	6875	5107	2015	1364	1003	646	343	543	629	741
12	4139	2722	6624	5691	2060	1358	964	780	308	494	572	650
13	3093	2255	11025	7783	2004	1380	919	716	310	484	639	676
14	2637	2214	7702	11884	1983	1387	884	645	307	490	725	682
15	2292	2216	6442	8145	2189	1479	856	614	339	488	743	656
16	3022	2492	5604	4806	2529	1550	813	638	342	653	973	694
17	3810	2865	7144	3971	3452	1679	789	675	399	941	938	673
18	5493	2517	16094	3510	5142	1863	736	636	676	1174	776	588
19	5510	2236	13397	3241	5196	1863	727	601	588	2350	671	614
20	4588	2139	9334	3216	5957	1634	722	626	492	1643	688	632
21	3815	2040	14487	2935	5852	1691	695	564	540	1117	742	595
22	3507	1995	13930	2782	4797	1892	688	525	582	733	777	593
23	5718	1984	8352	2665	5106	2472	767	520	570	695	827	650
24	4201	1787	6438	2579	5238	3818	939	494	525	660	1066	684
25	3388	1704	6779	2712	4371	4650	1075	574	686	748	1236	725
26	2704	1627	6449	2967	3440	3249	1242	555	1214	947	1077	735
27	2258	1605	6334	3159	2748	2625	1315	493	1025	969	1020	701
28	2074	1592	7258	2996	2419	1757	1386	552	1557	1151	1127	669
29	1978	1604.383	12539	2760	2292	1557	1151	616	2294	1351	1010	624
30	2072		7924	2525	2436	1469	900	767	3028	1147	925	633
31	2555		6067		2208		762	796		1009		624

1981	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	607	848	1208	3624	880	2339	504	287	485	110	355	1329
2	596	1158	1353	2409	714	2886	580	334	521	127	349	1581
3	585	1385	1272	2104	675	2799	727	419	575	115	345	1128
4	588	1124	1314	1875	677	3060	723	375	511	86	320	842
5	583	929	1615	1908	701	3726	661	624	624	118	294	615
6	571	830	1678	2157	664	2763	740	673	524	180	327	543
7	619	803	1367	1897	639	2278	744	884	374	184	338	486
8	675	1583	1267	1609	756	1938	695	1070	907	177	325	439
9	627	2692	1114	1444	666	1530	523	875	547	224	311	393
10	543	3435	1092	1402	636	1211	419	586	398	273	321	382
11	504	7237	997	1293	684	1143	401	571	357	324	318	391
12	535	5571	936	1174	834	1035	362	582	297	239	303	482
13	574	3580	959	1101	683	997	315	441	312	214	282	529
14	567	2105	977	1070	727	1042	318	357	368	207	304	661
15	605	1804	904	992	761	921	348	350	363	159	285	895
16	606	2133	967	984	730	691	292	338	502	192	288	853
17	624	2923	1012	990	709	649	300	316	620	262	287	694
18	599	4437	994	1071	898	613	513	377	426	296	257	628
19	627	6801	1185	1038	994	591	400	786	272	358	236	498
20	673	5310	1146	1052	1121	568	323	728	179	353	276	488
21	791	3681	1010	1043	1058	587	341	802	102	364	313	684
22	790	2440	970	1036	870	530	281	869	37	346	302	572
23	719	2005	1009	971	653	605	257	822	23	528	329	953
24	674	1732	987	1042	1518	524	252	380	52	750	422	1291
25	689	1483	908	1001	2989	506	220	341	117	786	524	1583
26	650	1366	921	859	3348	494	172	286	164	892	487	1901
27	650	1247	884	926	5554	524	221	265	214	1103	506	1578
28	671	1244	1945	919	5644	356	204	280	214	785	753	1158
29	637		2215	873	4193	394	166	258	175	577	980	1616
30	615		3723	883	2498	485	229	402	132	456	999	2136
31	778		4578		2174		303	440		412		2414

1982	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	7077	9319	3044	1461	2385	1613	1171	1285	776	437	887	4855
2	6838	11521	2738	1538	2194	1755	912	1159	921	451	953	5551
3	8925	28726	2312	1918	2116	1479	812	884	965	421	1067	4845
4	17126	29035	2286	2092	1983	1477	755	757	829	409	1478	4374
5	13075	12889	2586	2117	1785	1585	809	681	682	605	1284	4957
6	5877	6366	2722	2691	2215	1401	768	809	633	789	986	7485
7	3609	4799	3623	2599	2257	1207	751	908	546	901	838	4829
8	2727	3916	3656	2279	2887	1114	860	1299	510	1633	785	3232
9	1999	3518	3081	2747	2621	1077	1107	1748	497	2014	786	3123
10	1527	3536	2443	2526	2415	1009	1608	2404	524	1480	851	3834
11	1203	2923	2142	2128	1774	1075	2391	3002	626	2659	808	4547
12	1137	2434	2109	2828	1659	1072	1865	2359	884	2957	915	8023
13	1151	2171	2111	3097	1547	1241	1437	1540	886	4369	1337	5901
14	1226	2153	2088	4687	1542	1209	1296	1327	1123	4871	1174	4376
15	1161	2257	2552	4543	1481	1120	1127	1662	883	3109	1056	3202
16	1112	2555	3330	4122	1525	998	1121	1724	699	1823	1184	3596
17	1095	3529	3242	3289	1541	968	1195	2455	585	1256	1219	3295
18	1149	3277	3256	3385	1647	945	1265	3121	562	962	1392	2821
19	1178	2600	2961	3185	1956	936	995	2636	547	916	1769	2601
20	1556	2165	2481	2948	1863	936	944	1513	558	861	1654	2446
21	2479	1897	2140	2708	2364	930	867	1095	470	832	1366	2190
22	3568	1785	2069	2377	2267	914	866	966	453	833	1309	2001
23	2737	1638	1896	3107	2320	938	1156	852	479	731	1373	1893
24	2661	1703	1771	4137	2880	973	1033	835	483	705	1196	1815
25	2162	1863	1689	5704	2452	1006	1005	809	505	703	1134	1794
26	1765	2143	1691	9047	2024	1019	993	733	572	702	1132	1969
27	1492	2685	1606	8482	1753	1175	844	687	645	655	1460	2047
28	1301	3553	1546	5820	1877	1450	847	702	608	684	1767	2288
29	1408		1557	4103	1762	1595	880	684	531	717	3401	2868
30	1363		1520	2922	1595	1354	989	671	434	712	3989	2530
31	3588		1562		1564		1331	742		708		2818

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

UNIMPAIRED FLOWS

	1983											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2929	4114	2163	3175	2242	1739	1518	931	1186	552	531	3477
2	3591	8195	2063	3142	2291	1738	1528	1245	1574	532	467	4127
3	3883	7110	2146	3386	2181	1644	1448	1054	2053	551	549	6646
4	3476	5516	2941	3162	2197	2013	1238	1021	2082	546	696	15550
5	2683	3675	3176	3133	2064	2293	1375	856	1725	572	772	12468
6	2381	3172	5245	5096	1945	2488	1664	788	1379	594	668	16788
7	2166	3450	4897	6514	1843	2394	1254	744	1445	549	677	15041
8	2112	3108	3976	8388	1853	2266	1072	720	1184	513	553	9521
9	1978	2728	2897	12875	1832	1969	1043	735	737	528	519	5693
10	1917	2551	2459	12026	1807	1734	928	636	755	488	509	4730
11	1910	2649	2258	7261	1780	1580	978	547	802	676	526	5683
12	1765	2448	2121	5050	1748	1481	881	584	787	724	570	8501
13	1731	2317	2113	4143	1816	1396	860	557	870	1106	646	5706
14	1752	2291	2116	3698	2120	1359	839	524	920	1221	699	3793
15	1728	2205	1948	3398	2198	1338	811	496	839	989	1075	2730
16	1649	2092	1902	3221	2598	1317	772	505	657	745	1917	2276
17	1696	2072	1931	2995	3653	1433	800	486	622	679	1197	1973
18	1736	1954	2157	2812	4296	1665	809	482	619	641	1257	1862
19	1691	1952	2414	2682	5103	1790	837	474	684	631	1396	1731
20	1707	2094	2530	2584	7559	1791	722	462	765	600	1749	1833
21	1929	2388	3509	2692	5879	1651	764	432	1217	653	2910	1917
22	2544	2773	3316	2733	4260	1459	719	410	1341	687	3594	2225
23	2415	4056	2949	2925	3332	1418	628	392	939	825	3264	2552
24	2281	3461	2985	3426	2760	1388	622	408	727	1291	6524	2282
25	2153	2989	3999	3237	2244	1283	809	412	624	975	5513	1813
26	1974	2481	4108	2781	2071	1291	858	442	569	767	3243	2886
27	1925	2227	6425	2512	1960	1276	766	443	561	659	1882	3521
28	1949	2154	6081	2335	1827	1398	696	427	573	667	3404	6444
29	1886		4464	2358	1820	1683	691	517	541	595	3554	7793
30	2008		3472	2291	1801	1548	702	547	529	549	2426	5472
31	3605		3205		1727		706	890		515		3383

	1984											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2580	2197	3974	3192	5168	2150	2501	8303	1331	791	757	1552
2	2299	2125	3272	3181	5756	1959	1908	8512	1170	802	762	1427
3	2021	2075	2873	3655	8520	1793	1539	5811	1187	888	765	2464
4	2045	2189	2682	4211	10592	1738	1640	4276	1157	883	781	2621
5	1953	2076	2563	4605	7226	1714	1658	3091	1070	880	856	2477
6	1896	1944	2621	3791	4829	1584	2160	2373	977	907	869	3296
7	1840	1965	2360	3421	3807	1531	2670	2016	959	907	790	2645
8	2123	2009	2238	3165	4119	1559	2524	1689	954	751	804	1718
9	2257	1889	2176	3379	4470	1529	1684	1521	954	753	905	1417
10	2869	1994	2173	3993	3647	1506	1430	1618	971	753	873	1259
11	4365	2476	2122	3367	3212	1568	1248	1815	965	691	1151	1156
12	3379	2754	2176	3005	2806	1532	1350	1905	974	656	1217	1072
13	2707	3260	2124	2782	2487	1504	1362	2128	924	670	1008	1004
14	2349	5624	2252	2771	2294	1407	1588	2168	910	638	822	978
15	2113	4411	2227	2535	2252	1322	1637	1797	911	647	792	944
16	2330	3446	2398	2550	2103	1256	2093	1533	878	651	768	917
17	2353	2758	2598	2530	1995	1237	2006	1487	833	631	793	864
18	2713	2465	3462	3171	2025	1147	4131	1515	855	617	743	882
19	3712	2279	4026	3313	2055	1174	3099	1466	856	683	736	837
20	3162	2314	4737	4022	2015	1253	2302	1368	835	747	775	815
21	2592	2257	7795	4305	2027	1254	1622	1349	834	807	786	854
22	2812	2268	5598	4107	2300	1685	1503	1294	830	861	755	976
23	2863	2847	4206	4227	2172	1567	2888	1200	792	966	750	936
24	4635	2996	3008	3538	2066	1461	1810	1161	756	862	758	908
25	6299	3335	2852	3085	2131	1432	1539	1190	784	796	766	913
26	4585	3578	3106	3026	2369	1296	1913	1268	760	780	1006	894
27	3575	5177	3134	3114	3540	1420	2711	1788	719	775	1074	843
28	3052	6586	4233	3287	3830	1792	4113	2039	733	738	1303	877
29	2677	5455.744	5751	3517	4637	2483	5061	1994	743	896	1758	905
30	2459		4610	3602	4000	4454	7286	2152	744	960	1714	909
31	2283		3509		3348		10202	1831		797		980

	1985											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1209	7049	2273	1225	1489	809	862	1760	868	921	684	2898
2	1268	7312	2085	1177	1727	737	881	1335	844	1289	1282	2257
3	1516	6260	1925	1198	2378	702	1066	1153	697	1231	971	1580
4	1886	4578	1696	1489	2015	734	1232	926	661	881	818	1190
5	1818	4105	1724	1434	1407	834	1534	673	662	674	754	1073
6	1414	5332	1604	1898	1390	914	1863	626	609	554	655	971
7	1273	4258	1528	1816	1315	931	1884	661	578	489	591	931
8	1097	3193	1487	1491	1403	1336	1267	686	542	455	611	871
9	957	2540	1486	1081	1984	1353	808	656	536	448	588	870
10	940	2172	1476	1063	2111	1001	632	760	487	396	566	924
11	957	1996	1405	1133	2549	847	558	757	590	411	552	1015
12	906	2467	1344	1117	2259	867	507	640	544	461	562	1154
13	930	2412	1317	1305	2195	886	634	544	534	444	549	1442
14	967	2046	1244	1315	1872	856	656	502	528	455	525	1536
15	971	1894	1219	1471	1480	843	665	875	533	500	542	1247
16	951	1773	1203	1852	1186	835	685	945	404	474	559	1029
17	1071	1736	1213	1604	1112	910	698	1637	388	405	573	939
18	1189	1682	1177	1245	1026	898	509	2541	394	418	571	877
19	1052	1676	1250	1171	962	829	446	1647	372	494	631	825
20	887	1759	1304	1103	925	858	421	995	390	540	613	845
21	834	1850	1328	1091	919	805	430	796	403	614	637	871
22	822	1713	1596	1101	865	695	611	1113	424	774	727	828
23	848	1909	1825	1137	993	631	1049	1351	443	897	852	789
24	918	1948	1584	1110	1082	614	1618	1599	644	817	732	762
25	978	2250	1405	1068	917	614	1755	2731	729	726	676	669
26	990	3759	1367	1040	872	598	1684	2679	536	718	744	610
27	986	3303	1250	965	843	585	1558	1992	494	636	832	604
28	999	2480	1227	953	874	633	2096	1487	515	625	1116	776
29	1566		1203	997	877	646	2478	1251	677	623	1495	788
30	2526		1259	1350	917	723	2301	1043	750	589	2981	789
31	3468		1194		821		2048	936		511		865

	1986											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1463	820	842	872	542	863	422	254	375	236	691	1738
2	1244	813	797	869	490	706	522	226	852	247	646	2075
3	1020	820	806	822	463	621	474	181	1283	225	615	1998
4	960	823	815	804	454	560	384	136	1569	182	629	1590
5	884	904	762	807	453	503	354	98	1147	158	628	1326
6	839	944	762	867	463	496	247	75	1104	136	604	1191
7	765	968	793	838	521	542	207	155	771	171	602	1104
8	755	962	789	850	560	529	182	224	541	323	664	1187
9	743	856	765	1024	499	560	154	266	458	287	690	1406
10	752	832	829	927	471	538	93	266	476	518	647	1728
11	753	904	1057	764	453	529	135	274	462	832	653	2015
12	764	1004	1329	772	399	478	140	202	606	1131	657	2186
13	714	951	1677	753	391	443	134	144	767	1092	706	1777
14	732	1039	2752	728	460	393	141	158	505	2096	678	1463
15	723	1291	2484	721	425	359	142	148	331	1844	709	1306
16	790	1327	2020	690	466	364	175	158	284	1368	723	1241
17	802	1237	1672	622	656	318	142	170	290	646	758	1145
18	850	1552	1573	670	595	282	158	170	283	512	886	1269
19	1060	1708	1684	698	615	267	175	158	290	424	993	1257
20	1084	1550	2131	710	989	251	154	371	322	369	1066	1099
21	893	1243	1905	736	779	185	89	503	318	365	1809	1144
22	843	1075	1545	765	497	239	82	430	303	373	1604	1129
23	845	968	1297	681	522	250	41	364	288	663	1319	1224
24	814	988	1153	547	496	248	107	306	274	1498	1490	1859
25	854	774	1083	603	580	269	517	305	232	3344	1884	2245
26	950	880	1002	657	1102	288	551	323	213	7351	2687	1834
27	992	879	980	669	1802	253	444	337	210	3613	3999	1581
28	791	939	942	659	2499	264	474	371	202	2531	2701	1360
29	811		939	757	2883	326	417	409	197	1348	2164	1231
30	848		926	661	2218	392	278	379	222	964	1575	1170
31	831		908		1501		188	320		761		1082

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

UNIMPAIRED FLOWS

1987

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1079	1752	16073	2897	1143	951	1073	289	107	334	228	382
2	1117	1895	9108	2597	1258	1007	1351	337	119	302	211	366
3	1057	2116	5328	2589	1189	922	1509	400	119	214	153	317
4	1029	1884	3737	2834	1164	970	1257	756	117	181	182	339
5	969	1695	2900	2532	1181	823	1262	984	121	149	172	358
6	947	1619	2613	2156	1100	743	984	1013	272	164	191	336
7	936	1641	2389	1998	979	659	870	890	431	180	204	329
8	908	1641	2174	1928	1024	644	728	890	561	158	340	397
9	874	1491	2294	1854	1053	631	583	706	496	174	331	399
10	924	1348	2170	1753	1037	620	556	517	427	186	555	482
11	998	1314	1882	1725	1087	626	566	439	322	192	762	599
12	883	1321	1837	1761	1389	684	508	410	349	165	541	551
13	887	1387	1800	1725	1454	938	455	307	499	149	372	547
14	907	1378	1776	1831	1438	1066	457	279	448	125	363	563
15	935	1436	1772	2324	1525	1081	465	248	338	153	585	836
16	2079	1529	1860	2261	1377	1357	401	220	307	173	667	1332
17	3355	1703	1959	2005	1169	1217	410	327	314	170	1028	906
18	4860	1513	2037	1866	1095	1497	443	344	246	196	1463	678
19	9232	1395	2392	1696	1191	1320	395	320	285	195	975	637
20	6979	1376	2284	1590	1165	1486	353	291	318	180	596	602
21	4734	1355	2062	1485	1120	1609	353	281	348	166	488	623
22	3243	1351	1832	1415	1047	1682	338	181	242	181	366	801
23	3199	1633	1730	1367	1009	1412	337	161	206	172	365	824
24	3353	1614	1661	1351	952	1167	364	195	191	219	392	847
25	3709	1933	1927	1264	925	996	360	199	181	230	391	1157
26	5482	3926	1913	1335	854	1124	307	192	189	227	441	1494
27	4255	5652	1874	1253	834	1007	303	193	195	252	555	1473
28	3066	11388	2315	1270	936	753	255	180	260	311	561	2863
29	2249		2305	1270	878	915	235	140	254	298	503	2648
30	1985		2391	1188	935	975	185	181	304	268	480	1807
31	1903		3095		941		226	156		277		1269

1988

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1160	1294	743	799	855	373	159	199	139	1251	475	613
2	1425	1747	758	1130	857	350	163	193	305	2131	475	579
3	1234	2519	757	1180	833	322	146	545	354	2990	596	565
4	1129	2995	815	1148	809	303	213	575	577	3258	605	531
5	1139	3306	893	1234	891	263	274	889	1114	1686	942	501
6	809	2485	851	1059	823	277	263	912	739	809	1233	501
7	752	1816	861	964	741	272	202	982	414	641	988	465
8	1443	1457	904	870	794	269	174	885	326	536	643	426
9	875	1278	1024	1040	797	238	171	715	298	465	597	456
10	688	1156	1399	1668	813	241	192	348	375	371	546	440
11	783	1077	1457	2111	855	207	200	317	533	385	480	429
12	807	1026	1228	4742	796	220	251	304	749	362	483	445
13	851	999	1169	3990	679	205	339	234	1567	296	498	425
14	1001	959	1144	2885	663	232	308	151	859	274	479	402
15	1167	1022	987	1979	688	223	255	170	699	324	478	412
16	1397	1071	910	1509	636	218	248	161	570	307	493	408
17	1779	1030	873	1557	589	270	223	132	684	356	489	392
18	5345	991	870	1584	559	291	189	188	1075	425	551	403
19	5727	1012	903	1989	522	322	199	187	848	545	540	420
20	11457	1034	929	1917	493	363	409	240	610	608	583	445
21	7948	979	830	1668	496	313	751	360	546	635	757	440
22	5175	903	810	1361	517	248	916	405	419	670	731	469
23	2595	886	858	1275	505	245	1836	323	333	616	645	459
24	1801	838	838	1485	548	204	1261	301	312	478	588	551
25	1448	796	892	1377	567	204	873	238	268	476	582	774
26	1223	777	1063	1167	547	185	499	211	219	387	640	725
27	1050	781	1015	1060	464	277	441	188	229	330	731	578
28	923	764	872	934	441	160	412	149	210	315	1047	640
29	938	7519108	812	874	406	147	429	149	175	404	947	704
30	935		803	866	401	156	345	161	750	376	746	975
31	1079		785		384		225	136		398		1457

1989

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2293	842	5643	1551	1436	733	1401	1492	919	25688	963	1433
2	2218	796	4217	1623	1763	742	1435	1903	795	30111	962	1384
3	2299	824	4046	2122	1572	923	2535	1732	725	15197	980	1371
4	2107	815	3958	2471	1311	1106	5426	1354	709	6332	1085	1392
5	1575	993	8428	3465	1349	1343	6005	1147	697	4283	1340	1412
6	1432	1486	6313	3493	1753	1508	6572	1024	706	2972	1508	1674
7	1474	1641	4844	3210	1840	1330	6881	954	804	2246	1891	1976
8	1319	1558	3203	2968	1720	1050	5168	894	794	1838	2173	2835
9	1406	1338	2511	3743	2105	1020	2450	837	741	1462	1972	3474
10	1841	1121	2126	3117	2515	1178	1798	831	718	1253	1647	3602
11	2437	1011	1888	2538	2170	1050	1558	810	707	1138	1458	3307
12	3408	989	1810	2107	1743	978	1388	874	712	1186	1352	3676
13	3582	939	1683	1862	1499	1701	1345	910	856	1112	1399	4404
14	3164	885	1536	1811	1336	2302	1817	963	860	1072	1963	3351
15	2551	866	1445	1888	1330	3537	2120	1159	866	1040	2372	2772
16	2080	918	1397	1854	1247	4669	2262	1481	987	1124	3923	2349
17	1675	938	1359	1718	1098	4400	2855	1217	1020	992	3159	2013
18	1432	1257	1350	1608	1035	3438	3135	1054	714	1120	2543	1869
19	1266	2251	1544	1489	1035	4201	2832	924	653	1161	1801	1725
20	1133	2945	1647	1372	1206	6705	3063	890	742	1141	1855	1555
21	1088	4450	2327	1368	1296	11989	3136	851	774	986	2280	1262
22	982	4880	2670	1322	1164	10988	2808	940	1521	1031	2564	1262
23	959	3443	2725	1253	1158	8314	2246	907	2341	1000	4557	1243
24	918	2281	3305	1231	1326	5375	1887	1050	1877	1011	3657	1233
25	889	1760	2771	1186	1015	3334	1597	1328	1822	988	2849	1374
26	839	2422	2208	1149	943	2367	1437	1587	3456	988	2148	1520
27	882	2712	1822	1073	938	1720	1499	1983	3325	1024	1891	1515
28	901	6446	1763	1122	914	1409	1377	1644	4683	1091	1714	1563
29	871		1599	1257	817	1261	1195	1360	10821	1078	1572	1746
30	884		1528	1307	754	1301	1247	1072	13749	1058	1444	2218
31	874		1520		715		1740	1009		1025		3055

1990

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	4776	3024	4351	3186	2344	1502	648	785	543	551	774	865
2	3443	3620	5217	3119	2048	1686	630	675	452	582	743	1022
3	2957	3790	8475	3143	2013	1699	672	722	431	567	755	1161
4	3191	5265	6216	3089	1961	1771	580	727	355	553	735	1960
5	3596	5711	4784	2964	2016	1646	557	721	345	667	759	1658
6	4085	4686	4192	2827	1944	1577	577	758	302	670	844	1262
7	4070	4057	4220	2859	1964	1355	544	728	326	590	925	1049
8	3817	4958	4547	2816	2086	1335	483	892	326	652	894	970
9	3211	5482	5748	2706	2344	1268	596	1033	369	772	1030	899
10	2718	10575	6222	2647	3427	1264	610	1516	413	963	1438	850
11	2473	9028	4772	2957	2975	1202	1020	1250	1014	1449	1333	822
12	2270	6518	4017	2822	2502	1110	1534	1041	2043	1523	1057	779
13	2203	4699	3629	2673	2180	1133	1890	790	4780	1411	949	733
14	2072	5911	6946	2573	2004	1105	2718	670	5049	1100	830	781
15	2033	6502	10389	2606	1930	1114	2756	638	3876	840	772	809
16	1949	10000	14299	2557	1765	1249	1808	562	2478	900	786	818
17	1977	13308	30562	2441	1697	1154	1349	518	1155	896	773	865
18	2498	9747	30443	2314	1763	1059	1392	523	825	1269	747	1039
19	3598	8776	13747	2396	1876	994	1498	495	717	1784	748	1196
20	4030	7394	7755	2480	1939	966	1633	478	771	1713	743	1172
21	8382	6181	6297	2543	2457	893	1784	602	777	1826	717	1482
22	6436	5213	5530	2624	2100	900	1446	676	2123	2280	719	1762
23	6828	5295	4936	2603	1850	947	1245	774	1682	4395	742	1923
24	6316	4591	4490	2425	1603	961	1176	693	1091	3158	735	3872
25	10547	3697	4028	2227	1671	864	919	731	817	2156	715	3043
26	10184	3473	3849	2326	1876	853	748	597	687	1459	772	2345
27	7220	3186	3909	2413	2061	875	597	497	645	1128	758	1947
28	4732	3649	3567	2555	2442	783	713	572	597	984	804	1984
29	3868		3327	3123	2556	773	662	576	587	884	926	2038
30	3867		3791	2681	2059	729	673	511	535	830	890	1904
31	3339		3537		1609		710	528		788		2139

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

UNIMPAIRED FLOWS

1991

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2088	2932	3722	3490	4053	1798	1656	1670	1855	944	918	1555
2	1878	2306	6422	2678	3144	1879	1699	1635	2890	890	1343	1869
3	1737	1946	5765	2408	3158	1943	1908	1077	2114	870	1062	2593
4	1813	1715	5164	2236	4221	1755	1865	928	1782	862	794	3284
5	1677	1542	3711	2159	6196	1530	2122	894	1332	826	744	2544
6	1529	1487	3034	2360	7947	1438	2008	930	1195	829	659	1826
7	1437	1528	2791	2351	5800	1427	1618	1081	1212	842	661	1577
8	1454	1413	2596	2467	4365	1417	1294	1250	1139	820	683	1390
9	1686	1344	2553	2881	3228	1348	1271	1576	1081	819	663	1316
10	1926	1310	2269	3293	3250	1367	1139	2796	1049	793	653	1500
11	3097	1353	2261	2749	3024	1318	1154	2758	1005	770	697	1399
12	4108	1348	2337	2562	3530	1368	1377	4545	977	719	720	1279
13	3207	1352	2984	2395	3496	1507	1157	4041	969	800	685	1315
14	2516	1826	3289	2309	2979	1936	1068	2939	968	806	670	1433
15	2061	1856	2807	2115	2554	1800	1115	1953	908	877	709	1607
16	1819	1617	2468	1978	2376	1718	1391	1570	906	999	714	1420
17	1755	1639	2199	1918	3818	1657	1827	1209	1115	864	710	1280
18	1614	3548	2171	1905	3918	1526	2671	1062	1109	763	701	1206
19	1554	4239	2199	2058	3886	1598	3174	1045	1322	771	1368	1166
20	1631	7045	1958	2656	3765	1752	2391	1096	1515	783	2503	1184
21	1533	7463	1891	2185	3665	1766	1825	1118	1246	749	3261	1219
22	1389	5865	1821	1906	2459	1702	1405	1001	1101	813	5760	1250
23	1341	4324	1850	1807	2215	1803	1229	899	1695	802	4826	1272
24	1378	3433	1707	1733	2128	1956	1120	917	1706	720	3206	1700
25	1467	2876	1680	1829	2159	1947	1246	1049	2328	745	1738	1631
26	1464	2378	1958	2061	2294	2509	1282	1547	2408	778	1233	1616
27	1469	2529	2728	2872	2355	2940	1429	3069	1831	749	1154	1699
28	1816	3237	3560	4131	2880	3089	1492	2124	1045	714	1073	2012
29	2074		5466	4868	2586	2400	1831	1987	994	737	1095	3033
30	2467		7166	5277	2129	1951	1733	2202	962	815	1043	2431
31	3482		4809		1829		1663	2123		805		1956

1992

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2184	1507	2681	2571	1470	1259	1721	887	1038	804	1017	2469
2	2332	1445	2396	2271	1436	1292	3973	806	893	1177	1902	2316
3	3338	1437	2213	2179	1355	1348	7426	719	1006	1256	3220	2117
4	3604	1416	2314	2154	1409	2124	3719	589	1155	1951	2893	2002
5	2981	1385	2414	2097	1456	2532	2762	516	1835	2721	3603	1984
6	2225	1383	2720	2064	1490	1768	1826	482	1651	2197	3007	1956
7	1879	1363	4102	2081	1561	1453	1494	549	1417	1375	1794	1915
8	1623	1312	3678	2096	1827	1269	1135	575	1216	1072	1294	2029
9	1552	1268	3268	2246	1834	2106	954	583	1229	1132	1105	1801
10	1566	1262	3324	2272	1680	1756	879	627	1077	1039	1359	1891
11	1581	1232	3553	2316	1488	1574	978	977	1048	1023	1631	2172
12	1471	1247	3014	2557	1439	1719	916	996	954	1023	2464	1971
13	1531	1833	2589	2479	1333	1933	895	1667	884	939	4604	1790
14	1735	2372	2194	2131	1393	1727	839	2651	780	784	3011	2384
15	1686	3884	2121	2019	1288	1790	854	1744	742	774	2198	4358
16	1461	5532	2208	2102	1267	1616	1290	1432	688	779	1631	5822
17	1400	4203	2525	1900	1179	1479	1327	1177	669	780	1446	13543
18	1374	3628	2735	1851	1180	1339	1539	1129	704	731	1379	11210
19	1346	3043	4316	2047	1125	1328	1479	1163	761	727	1444	7837
20	1345	2708	4156	2149	1139	1313	1417	1268	821	698	1702	6866
21	2140	2667	3943	2536	1157	1150	1193	1279	880	704	2090	6825
22	2676	2534	3581	2641	1071	953	1345	1884	1970	697	3862	5115
23	3923	3937	4785	2285	1016	885	1364	1901	1597	731	6200	4294
24	4497	5723	4160	1885	993	875	1268	1586	1194	743	6694	3652
25	3677	6138	3689	1773	1020	830	1006	1155	1002	785	9277	3576
26	2601	9332	3172	1626	1033	818	887	1189	936	913	10241	3652
27	1945	6613	2871	1630	1049	893	829	1281	942	934	6583	4003
28	1930	4695	2745	1580	1012	857	853	2839	1068	977	4464	5907
29	1787	3480.948	2649	1502	1069	913	841	2936	1192	940	3278	5291
30	1669		2612	1482	1294	1132	826	1828	1014	911	2904	4094
31	1564		2830		1256		831	1302		973		3468

1993

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2989	2872	3090	2715	2024	1861	1191	453	282	181	1154	863
2	2778	2753	3486	2591	2240	1584	1131	428	263	205	783	885
3	2663	2634	3784	2733	2407	1315	997	501	269	235	743	872
4	2619	2649	5156	2756	2758	1258	883	816	306	244	932	1030
5	3076	2618	4713	3231	3110	1221	815	1111	333	217	1684	1811
6	3502	2797	3990	3477	2475	1182	778	1117	324	224	2249	1826
7	3364	2881	3173	3223	2116	1135	768	1257	306	236	1393	1277
8	3939	3234	2803	3005	1907	1087	690	1364	348	235	978	1090
9	4790	3134	2636	3052	1783	1000	687	1067	319	244	671	982
10	7386	3077	2535	4115	1723	1057	707	768	276	231	575	1103
11	9049	2858	2984	3421	1827	1091	707	651	273	201	530	1482
12	15164	3152	3149	2978	1857	1136	633	610	224	202	531	1361
13	13282	2973	4071	2813	1962	1459	698	586	204	216	573	1147
14	9630	3015	4288	2765	2164	1520	729	642	259	298	587	1080
15	6016	2932	4025	2726	2016	1342	679	654	280	342	632	1186
16	4554	3173	3776	3231	1837	1235	676	508	339	524	713	1127
17	4003	3300	3904	2983	1941	1100	737	511	446	762	666	1008
18	3582	2984	4121	2646	1947	1011	665	453	522	674	663	988
19	3635	2712	3844	2475	2018	1022	515	380	405	521	682	1019
20	3650	2689	3341	2335	2105	1003	482	367	411	522	611	1014
21	4267	2893	3078	2302	1906	1001	424	367	930	438	547	1257
22	5777	3822	2948	2272	1625	1134	389	347	921	478	503	1336
23	5481	3418	3012	2191	1608	1173	415	338	486	582	501	1135
24	6588	3145	3273	2344	1556	1066	519	342	415	549	591	1024
25	7933	3044	3449	2356	1555	1209	571	395	369	389	824	941
26	5813	3200	3244	2634	1654	1417	662	379	346	423	1087	909
27	4423	3463	4041	2491	1538	1445	661	349	316	469	3003	960
28	3660	3206	3602	2226	1435	1285	580	340	294	783	2845	1005
29	3303		3234	1970	1572	1477	473	350	234	944	1724	1170
30	3048		3014	1948	1686	1415	402	328	194	999	1204	1340
31	2950		2823		1722		367	312		986		1243

1994

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1127	1453	3729	3105	1791	1000	1634	1439	893	622	888	1345
2	1287	1304	6734	2656	1787	958	1201	1689	988	703	979	1336
3	1430	1333	6522	2401	1836	928	1091	1733	1031	894	887	1287
4	2205	1332	4687	2563	2227	890	1141	1705	885	1132	786	1511
5	2302	1423	3274	2568	2047	929	1298	1627	763	854	700	1905
6	1913	2029	2472	3188	1833	1150	1884	1483	922	668	1059	1808
7	1619	2006	2311	3527	1716	1393	1586	1266	1033	582	1118	1295
8	1618	2222	2284	2987	1741	1556	1554	1088	1013	637	1162	1294
9	1623	3053	2388	2514	1691	1500	1586	996	1033	621	1184	1310
10	1462	3208	4051	2321	1534	1622	1547	1004	1137	901	1254	1281
11	1420	3911	3632	2737	1418	1300	1547	923	986	927	1037	2180
12	1902	4960	2666	2778	1355	1250	1428	905	876	1285	1031	2052
13	2264	3478	2240	4764	1484	1246	1436	943	840	1647	868	1575
14	1875	2521	1910	5813	1464	1358	1592	1143	820	2458	886	1317
15	1636	1945	1782	5203	1784	1276	1514	1508	863	2747	862	1264
16	1507	1731	1692	7866	1940	1175	1358	2956	940	1793	821	1131
17	1451	1533	1624	5952	1638	1104	1285	4782	1131	1053	773	1217
18	1956	1501	1616	4210	1342	975	1153	3023	1362	1106	668	1185
19	1628	1475	1610	2900	1261	868	1223	2272	1116	951	811	1130
20	1516	1496	1542	2455	1196	846	1265	1910	845	1002	818	1095
21	1398	2474	1521	2124	1174	767	1176	1812	715	1302	825	1121
22	1289	3174	1875	1996	1161	751	1355	1774	706	1210	935	1074
23	1163	4365	2612	1899	1157	771	1537	1423	740	1291	960	1117
24	1229	5726	2890	1870	1192	819	1224	1115	851	1307	740	1116
25	1221	4243	6461	1860	1260	2156	1495	1018	895	1142	787	1090
26	1408	2852	5825	1868	1259	2547	2035	993	819	966	1334	1024
27	1757	2441	5047	1863	1481	7026	2475	951	706	782	1716	977
28	2242	3130	7216	1858	1409	6973	3806	892	614	664	2170	942
29	2700		6981	1806	1198	3937	2590	857	561	737	2851	862
30	2174		5315	1733	1066	2386	1726	929	568	745	2066	807
31	1800		3965		1034		1431	959		788		845

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

UNIMPAIRED FLOWS

1995	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	862	1555	4550	1506	1494	944	1100	354	580	715	1517	1109
2	850	1384	4025	1412	1888	1937	1239	346	564	1991	1699	1145
3	883	1328	3388	1392	1766	4016	938	347	519	3964	3014	1176
4	987	1307	3001	1391	1531	2834	908	380	426	7002	2364	1248
5	1089	1216	2902	1399	1504	1670	876	514	424	15442	3186	1187
6	1223	1200	4806	1323	1442	1393	750	641	411	13784	3815	1201
7	1931	1193	5377	1349	1261	1121	646	632	363	6187	7351	1395
8	1765	1342	8359	1310	1171	940	614	802	322	3318	12233	1235
9	1476	1849	7850	1384	1132	915	593	850	397	2155	6662	1496
10	1248	2184	5696	1411	1112	922	558	617	367	1684	4373	1737
11	1145	3278	3728	1464	903	935	546	545	400	1290	5708	1616
12	1863	3018	2935	1685	1310	1167	471	532	554	1236	8110	1384
13	2368	2508	2573	1725	1770	1369	433	447	670	1129	4308	1528
14	2343	3222	2359	1475	2114	989	396	303	1038	1158	2904	1360
15	3024	4909	2228	1356	2547	813	432	273	1436	1575	2172	1374
16	3136	7305	2122	1255	2487	745	423	247	1100	1045	1825	1359
17	2285	13728	2001	1275	1939	779	426	208	1118	870	1650	1694
18	1855	9328	1966	1255	1443	742	382	221	1042	822	1518	2097
19	1742	7158	1914	1764	1154	797	401	277	789	711	1438	3897
20	1986	4445	1906	2080	1159	837	337	320	686	710	1441	3649
21	1840	3373	1873	2859	1051	819	351	470	609	840	1385	2718
22	1566	2592	1862	3047	930	826	365	427	707	765	1307	2111
23	1442	2143	1729	2812	856	881	413	437	925	668	1217	1624
24	1349	1947	1663	2582	805	901	407	1946	814	765	1242	1516
25	1247	1868	1578	2293	829	1036	560	2594	688	810	1266	1370
26	1619	1982	1577	1804	798	1203	581	2894	713	739	1201	1269
27	1810	2510	1580	1504	889	1419	664	6608	615	639	1177	1252
28	2540	3320	1670	1411	1085	1248	671	4444	525	1135	1153	1133
29	3178		1589	1413	1132	978	660	1998	451	1082	1105	1148
30	2494		1501	1461	1010	919	470	967	484	918	1080	1220
31	1883		1478		887		392	778		1184		1242

1996	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1298	7746	2014	3602	3010	1277	760	1041	595	839	791	5181
2	1469	10391	1952	3220	2686	1234	692	1023	613	747	995	7698
3	1627	13901	1903	2878	2286	1213	677	1059	639	619	860	3695
4	1849	8603	4091	2674	2261	1237	661	840	685	575	732	2269
5	1537	5329	6919	2552	2149	1182	622	810	588	573	549	2549
6	2364	4114	15176	2269	2032	1271	670	800	614	527	869	1412
7	4018	3585	23761	2418	1985	1319	732	785	649	459	1043	1278
8	3502	3324	18423	2394	2060	1430	735	611	675	451	1906	1185
9	2682	3197	9352	2359	1909	2815	717	801	692	443	2148	1036
10	2673	2977	5663	2234	1861	3091	705	1462	709	423	1615	1137
11	1920	2710	4434	2212	1979	2297	596	1510	780	411	1037	1317
12	1847	2547	3775	2175	2256	2031	484	1731	622	469	775	1537
13	1854	2371	3917	2666	1962	1745	683	2147	509	456	730	2205
14	1748	2330	3778	2766	1753	1527	798	1632	635	471	699	2000
15	1706	2163	3819	2706	1745	1582	863	735	814	476	608	1667
16	1726	1998	4012	2666	1752	1528	1056	631	846	462	679	1439
17	2065	2563	4633	2599	1624	1381	1139	624	1253	415	705	1312
18	2025	2670	4169	2657	1569	1346	894	628	1242	582	703	1332
19	3304	2711	5356	3130	1518	1429	859	611	841	552	978	1121
20	3376	3338	4910	3977	1400	1167	828	617	524	521	1021	991
21	2615	3808	4174	6290	1402	1130	764	633	756	538	812	946
22	2187	2698	3315	4650	1325	1059	839	543	840	516	819	965
23	2062	2475	3067	3446	1310	1046	832	541	887	484	883	932
24	3899	2311	2898	2798	1313	869	738	575	763	515	814	1019
25	6766	2181	2954	2589	1379	916	684	632	784	595	867	1101
26	7937	2120	3063	2401	1598	892	858	725	704	632	1111	978
27	21754	2155	3022	2618	1686	786	932	973	764	671	1171	849
28	22225	2153	3406	2411	2012	734	808	720	893	868	928	1114
29	10054	2114.658	3803	2343	2127	769	813	639	1433	783	1565	1140
30	6209		3383	3016	1613	794	999	563	1206	737	980	1158
31	7292		3268		1343		974	590		775		1073

1997	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1305	2142	15785	1782	3672	3320	1515	2003	528	1117	1600	1499
2	1086	2018	10476	1722	3652	3100	1539	1368	521	847	1934	1429
3	1316	1966	6524	1657	6483	2260	1223	1116	481	795	1765	1342
4	1386	1975	4215	2418	6573	1606	1063	1028	458	759	1398	1467
5	1664	1920	3461	1945	4699	1459	976	878	391	678	1293	1361
6	2007	1915	3151	2132	2808	1414	984	810	396	646	1273	1350
7	2780	1679	2878	2717	2180	1369	919	822	411	629	1458	1258
8	2891	1947	2382	2236	1854	1452	967	884	463	615	1401	1202
9	5125	2100	2263	1271	1700	1421	922	944	470	558	1226	1412
10	5265	2030	2150	1793	1541	1349	817	1152	564	589	1217	1585
11	3598	1999	2212	1808	1416	1395	791	1231	698	579	1270	1439
12	2360	2264	2537	2045	1387	2072	817	1115	675	610	1299	1407
13	1897	2553	2796	2617	1438	2221	741	1101	548	577	1486	1379
14	1817	3466	5162	2157	1325	2874	723	1041	469	557	1626	1259
15	1751	3706	4679	1833	1335	3642	756	1069	438	563	1604	1196
16	2101	3253	3557	1714	1323	3290	767	971	463	542	1412	1170
17	2251	2601	2820	1674	1347	2645	715	935	457	531	1211	1126
18	1895	2164	2404	1602	1355	3173	666	824	362	602	1259	1108
19	1639	2100	2299	1613	1387	2382	698	787	373	598	1415	1191
20	1517	2071	2266	1983	1545	1770	730	747	371	594	1620	1223
21	1514	2123	2081	1998	1436	1447	2275	837	341	598	1744	1304
22	1584	2698	1882	1952	1288	1350	2972	674	420	680	3049	1990
23	2276	2365	1872	2055	1200	1323	5328	642	2430	1266	2571	2580
24	2187	2093	1864	2018	1244	1231	5780	632	2917	2698	1953	3333
25	4938	2340	1894	2015	1309	1229	3903	623	4293	4246	1596	5700
26	4878	5050	1997	2371	1422	1279	2013	621	4871	12043	1484	4000
27	3845	6890	2077	2672	1373	1614	1191	629	4265	15634	1338	3308
28	3463	12817	1952	3874	1361	1831	1063	561	2313	6906	1387	2881
29	3918		2091	3800	1729	1618	1177	593	2255	3868	1412	2381
30	2715		2230	3016	2366	1441	1040	577	1774	2557	1452	2112
31	2244		1943		2589		1686	595		1827		1859

1998	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1594	3478	2833	4216	5752	2679	1156	810	550	719	382	525
2	1426	5924	2478	4979	4868	2445	1106	795	601	611	382	465
3	1571	9380	2366	5970	4247	2638	1031	715	601	634	393	383
4	1575	18532	2379	8164	3794	2678	991	685	559	641	403	470
5	2556	16552	3039	6235	3406	2478	964	583	591	799	393	493
6	3380	9126	5829	4371	4423	2611	947	552	594	772	395	474
7	6073	5592	7159	4723	4475	2176	924	607	538	704	465	583
8	10971	4265	14349	4584	7118	1676	956	727	488	847	620	522
9	6816	3910	16913	6390	5656	1541	1061	832	447	896	776	526
10	4425	3263	10778	5556	5292	1585	1051	1091	413	611	1013	606
11	3184	2987	6374	4665	3941	1764	938	2002	373	587	1341	618
12	2695	2840	4611	3239	3339	1665	883	1285	330	571	1521	571
13	2476	2632	4005	3011	2669	1556	867	1017	321	503	1263	783
14	2412	2514	3637	3255	2500	1561	830	887	408	475	1298	1022
15	2746	2904	3270	3276	2356	1497	804	1021	408	423	2138	869
16	3740	3301	3100	3324	2356	1446	722	1145	456	390	2015	736
17	3857	4492	2880	8160	2319	1563	771	1879	480	410	1682	671
18	3131	5069	2815	9319	2261	1619	765	1743	453	427	1206	632
19	2885	3990	2861	6305	2121	1544	759	1233	450	469	834	664
20	2756	3308	2980	6562	2098	1821	711	1035	575	489	768	786
21	2655	3056	3079	5368	1979	1630	855	1728	527	477	727	857
22	2381	2903	2785	4903	1931	1399	896	1835	622	415	710	844
23	3072	3246	2637	4411	1882	1259	959	1144	1022	418	655	728
24	3004	3279	2643	3800	1860	1179	1209	1013	747	401	752	3413
25	2863	3110	2549	3271	1812	1038	1159	814	474	355	645	3882
26	2804	2888	2367	2843	1830	1028	1049	709	452	350	578	2802
27	3537	3376	2366	2705	1773	1040	973	625	403	405	581	2431
28	3999	3078	2338	2764	1874	996	1209	601	439	378	620	2643
29	3218		2285	3049	1922	997	1022	566	468	332	506	1827
30	2695		2375	3749	2265	1075	891	535	575	374	503	1651
31	2389		2391		3088			535	763.105	408		1230

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

UNIMPAIRED FLOWS

1999												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1103	6011	2054	1864	974	606	1714	382	217	386	779	549
2	1238	5731	1983	1952	891	638	1485	300	184	330	1299	505
3	1360	3785	2602	1652	913	744	1119	332	194	245	1467	498
4	1413	2817	2969	1524	1285	664	647	299	213	380	1122	537
5	1275	2271	2412	1398	1580	672	675	285	220	789	648	592
6	1113	2082	2065	1368	2538	574	899	335	207	494	609	692
7	933	1766	1858	1370	3825	517	1108	322	287	350	498	750
8	1077	1771	1699	1300	3443	488	1250	311	291	741	471	665
9	1204	1730	1749	1164	2468	541	1398	372	328	1033	476	691
10	1337	1644	1832	1137	1766	479	1458	361	392	2482	475	610
11	1306	1572	1688	1074	1416	524	1920	310	401	5927	430	783
12	1109	1578	1747	1027	1237	831	2070	313	397	2504	424	982
13	1425	1397	1774	995	1162	1003	2158	291	362	1705	438	1036
14	1476	1359	1915	995	1288	918	1582	239	297	1230	412	1409
15	3440	1518	2039	1024	1131	1212	1050	284	289	887	410	1563
16	3034	1634	1829	1084	1062	1429	805	252	290	661	430	1227
17	2354	1870	1560	1015	965	1420	680	212	176	652	406	959
18	1719	3213	1489	919	1006	1166	744	165	164	540	389	910
19	1714	2988	1478	911	1047	832	621	181	205	534	403	881
20	1316	2502	1399	937	968	605	629	170	195	537	407	814
21	1762	2053	1441	991	796	540	660	189	204	606	445	772
22	2124	1746	1496	884	844	640	1272	213	184	517	435	840
23	3292	1562	1381	905	760	692	953	337	207	523	682	837
24	4883	1497	1310	895	778	800	871	666	195	452	888	756
25	3654	1416	1306	967	734	1142	773	1185	190	434	1152	711
26	2447	1459	1296	993	680	1321	715	632	195	433	2263	743
27	1806	1461	1277	1112	612	1141	351	478	251	478	1953	653
28	1753	1682	1233	1159	642	1355	521	336	281	389	1226	605
29	1861		1273	1068	605	1500	438	310	456	403	859	581
30	2256		1370	982	657	1408	439	280	485	416	706	608
31	3774		1419		593		446	230		797		554

2000												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	614	1209	1055	2587	1023	488	726	1513	2766	322	292	759
2	721	1114	1043	3678	1099	469	556	1598	3054	336	236	728
3	791	1009	934	8546	1166	449	628	1746	2773	376	245	681
4	826	893	992	10772	1332	520	544	1378	1169	391	249	619
5	1000	986	1072	6750	1548	555	476	833	815	362	309	606
6	990	958	942	4239	1162	618	462	554	438	345	437	528
7	959	925	852	2743	1046	634	428	426	336	366	1794	481
8	1829	971	917	2104	933	517	270	360	349	329	2422	521
9	2280	1019	1121	1573	922	437	317	395	328	236	3985	545
10	5961	862	1130	1421	859	431	303	457	322	275	5512	534
11	5179	931	1290	1344	854	358	473	465	337	415	3487	587
12	3464	1460	1732	1285	791	327	564	552	301	368	1720	525
13	2075	1717	1574	1318	783	333	551	438	178	388	968	641
14	1450	2115	1521	1366	729	330	465	322	103	449	823	723
15	1209	2742	1350	1274	590	345	424	156	98	422	731	1043
16	1176	2208	1461	1187	604	417	206	105	95	262	686	1165
17	1079	1487	2246	1123	618	548	132	136	188	297	961	2330
18	1092	1296	2806	991	621	609	175	41	235	294	1127	1913
19	1165	1343	2465	862	644	686	254	420	1000	260	1051	1469
20	1276	1169	4498	886	782	676	289	478	1810	267	1181	1112
21	1347	1042	4085	910	859	559	334	577	3178	322	1005	935
22	1436	1064	3097	1041	886	349	330	610	3442	295	880	851
23	1766	1020	1912	1071	988	398	313	704	2833	302	923	777
24	2648	1011	1618	1113	856	339	386	355	1980	314	937	738
25	2204	1120	1457	1323	892	280	484	554	1985	310	1145	814
26	1751	1151	1311	1342	885	359	318	605	1597	359	1637	752
27	1434	1177	1293	1054	888	596	308	609	1028	394	1347	701
28	1367	1285	1279	1077	780	644	271	588	648	380	1032	750
29	1114	1199.21	1137	1101	866	683	290	642	491	344	887	797
30	1240		1074	1026	684	953	496	2014	395	339	764	717
31	1313		1482		488		1100	2278		306		612

2001												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	583	1518	1935	2387	932	3323	2819	879	1014	302	454	691
2	517	1133	2124	2397	930	4981	1982	670	1183	276	442	553
3	500	1026	2198	3097	860	3660	2858	764	1233	248	437	519
4	553	1000	2833	4112	792	2854	3116	819	1311	426	393	592
5	697	985	2693	3176	881	3472	2748	812	1204	524	412	438
6	870	970	2234	2662	877	2411	2130	891	930	1040	382	328
7	892	1018	1725	2319	872	1928	1701	888	760	1331	441	444
8	1029	1008	1567	2014	875	1895	1217	801	730	1006	374	499
9	1128	1087	1418	1962	889	1581	1040	704	718	845	410	421
10	1116	1185	1828	1815	900	1362	996	773	761	704	395	620
11	954	1228	2357	1661	924	1250	954	816	686	553	467	811
12	1044	1233	2833	1532	997	1088	846	799	578	521	380	843
13	1111	1269	6007	1611	917	1019	737	881	528	535	382	811
14	1068	1275	4972	1654	884	992	668	1192	435	536	385	911
15	1014	1508	5792	1769	721	1014	593	970	396	494	385	1009
16	1386	1493	5398	1846	621	1029	549	812	475	609	344	1055
17	2819	1766	3908	1600	679	956	562	757	487	498	404	1075
18	3996	1771	3316	1368	720	886	565	642	430	420	449	1418
19	8131	1556	3361	1261	702	768	730	547	610	378	452	1337
20	10679	1790	3755	1243	902	864	882	546	538	471	431	1006
21	5914	1860	3983	1297	1046	829	810	467	541	412	476	959
22	3430	2246	4004	1276	1084	785	793	406	623	494	492	946
23	2019	3291	2698	1221	1263	871	1773	331	584	456	526	936
24	1394	3188	2031	1230	1121	895	1892	366	810	501	656	1310
25	1367	3088	1924	1196	1467	879	2452	623	1020	462	893	1346
26	1279	4413	1843	1179	1693	1716	3666	658	768	473	868	1064
27	1176	3260	1923	1110	1814	2682	2765	662	529	445	825	943
28	1381	2308	1970	1097	1979	5432	1378	685	550	506	727	845
29	1515		2320	1072	2663	4392	1126	751	417	458	591	723
30	1608		3177	1002	2695	3580	1083	628	426	503	536	687
31	1719		2633		2612		1283	882		513		771

2002												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	686	1245	1234	7321	1532	644	552	153	108	696	1064	829
2	660	1163	1414	4553	3085	668	566	133	87	652	1019	828
3	649	1132	1950	2585	3411	874	598	89	42	685	1234	2196
4	788	1336	1801	2093	4753	984	572	100	74	614	1705	2606
5	752	1510	1386	1835	5188	1292	581	91	62	814	2105	6771
6	815	1709	1210	1553	3898	1303	470	111	55	878	4472	5182
7	932	2659	1178	1295	2092	1162	417	63	91	740	3104	3984
8	972	2509	1151	1321	1536	922	328	49	101	635	2081	2693
9	810	1957	1113	1245	1276	617	308	50	85	618	1851	2922
10	760	1587	1229	1270	1372	541	289	54	113	390	1880	3134
11	706	1396	1187	1359	1227	497	434	4	73	357	2351	6235
12	709	1210	1225	1480	1126	551	499	42	233	448	2859	4814
13	671	1160	1592	1604	1055	477	657	61	337	548	2535	3981
14	628	1103	1745	1554	1022	532	683	152	398	948	2402	3638
15	570	1076	1436	1364	879	629	768	233	546	1071	2310	3056
16	552	1037	1361	1280	912	648	565	333	944	1938	2984	2279
17	1221	983	1217	1195	908	548	393	373	808	1787	3496	2022
18	1926	947	1164	1116	966	539	278	513	845	1431	2772	2167
19	2991	953	1287	1060	903	527	254	593	1199	1104	2219	2110
20	5770	981	1244	1025	888	462	256	376	1330	938	1786	3392
21	4738	942	1615	1011	814	431	305	264	1162	916	2024	3329
22	4315	1013	1717	1005	750	421	291	186	1586	980	2415	4112
23	4156	967	1453	1086	679	435	294	159	1715	899	1855	4281
24	4117	922	1269	957	738	455	327	154	1263	606	1283	7342
25	7843	873	1305	1037	706	470	373	195	1087	537	1184	8431
26	5324	900	1234	1042	715	534	364	219	1312	814	1099	5796
27	3718	874	1402	1050	672	577	354	251	1675	1134	966	3647
28	2205	1113	3072	1035	703	551	358	238	1640	1443	862	2649
29	1684		4366	1226	641	562	311	226	1138	3519	829	2202
30	1382		5403	1155	602	527	171	161	884	2580	845	2056
31	1252		10057		573		147	117		1655		1960

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

UNIMPAIRED FLOWS

2003

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2006	2491	3548	1724	2102	1481	5583	2890	1130	863	767	1451
2	2109	2308	2962	1682	2096	1426	12032	2450	1079	829	725	1331
3	2036	1956	2765	1597	2371	1637	8044	2590	986	713	686	1157
4	1905	2069	5512	1634	4174	1848	4808	3307	977	776	823	1080
5	1615	2288	6141	1768	5613	2126	3381	3000	1177	747	788	1107
6	1496	2217	14502	2027	9986	2028	2767	2340	1129	797	864	1052
7	1365	2655	13000	2062	13826	2524	2443	2059	1001	795	925	933
8	1363	2738	8416	2195	11121	3090	2446	1860	993	832	888	1198
9	1414	2468	4568	2114	6275	2377	2348	1617	987	751	709	1369
10	1518	2272	3476	2154	4210	2076	2421	1626	883	883	639	1885
11	1610	2212	2912	2192	3390	2079	5694	1705	735	855	590	3289
12	1535	1948	2617	1899	2766	2301	4424	1668	779	896	565	2379
13	1479	1699	2397	1758	2603	3060	4225	1614	871	890	563	1987
14	1413	1819	2374	1670	2447	3459	4254	1526	838	852	561	1977
15	1437	2062	2339	1750	2356	4139	3927	1456	916	1059	720	2027
16	1384	2374	2259	1830	3076	4053	2825	1394	822	1009	1198	1659
17	1423	3305	2411	1823	3376	8056	2734	1355	785	948	2667	1741
18	1393	2735	2628	2217	3459	5883	2232	1419	661	1009	3204	1627
19	1347	2280	2537	2207	3660	7740	1923	1407	613	1070	7580	1577
20	1447	2828	2692	1852	3680	4087	1745	1350	908	732	5464	1490
21	1403	3109	2761	1830	2986	2840	1782	1253	1012	733	3689	1414
22	1393	5429	2351	2329	3124	2050	1846	1288	1204	647	1949	1458
23	1339	6200	2151	2576	3653	1866	2015	1165	2598	525	1492	1480
24	1247	4353	1994	2728	3065	1640	1723	1004	1746	674	1270	1814
25	1139	3233	1951	3420	2483	1594	1594	985	1141	820	1460	1730
26	1222	2776	1847	4087	2242	1535	1554	1032	1064	907	1547	1618
27	1402	3745	1851	3410	1874	1573	1390	967	990	1506	1600	1553
28	1629	5069	1808	2417	1597	1642	1338	971	1044	1322	2041	1405
29	2105		1869	1987	1248	3067	1524	1139	1024	933	2174	1305
30	3137		1882	1763	1361	4081	1456	1142	877	727	1764	1383
31	2922		1895		1290		1674	1244		785		1342

2004

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1132	1561	1441	1363	1467	1252	2018	681	683	798	901	1648
2	1146	1618	1590	1188	1650	1082	2364	691	931	801	1092	1750
3	1254	2020	2037	1077	1947	830	1942	736	944	774	1814	1495
4	1240	2786	1962	1076	1651	765	1738	825	793	726	2701	1950
5	1313	3043	1838	1078	1250	783	1893	807	1690	601	3055	2232
6	1540	4345	2010	1000	1111	796	1616	920	2086	643	1996	3378
7	1445	6389	2091	910	1027	764	1346	905	3052	560	1463	5290
8	1308	4287	1881	919	948	803	1240	653	4948	621	1114	5395
9	1376	2921	1597	1005	971	841	1062	506	3788	723	1059	5873
10	1366	2434	1480	1026	1087	725	873	843	1947	960	1044	7516
11	1274	2323	1358	2558	1452	661	894	771	1270	936	1037	5132
12	1227	2474	1305	2965	1535	811	780	1417	927	967	1346	3533
13	1188	2698	1456	5892	1678	1001	754	1536	788	1028	2085	2678
14	1132	2541	1555	4883	1712	996	828	1152	2565	895	1478	2160
15	1134	2425	1546	3760	1508	1086	1283	662	5581	772	1275	1881
16	1200	2725	1540	1975	1534	1394	983	628	9351	774	1157	1691
17	1195	2470	1531	1507	1632	1139	972	535	20390	1143	1087	1556
18	1261	2071	1294	1396	1588	934	998	544	14823	1091	904	1532
19	1375	1847	1162	1348	1615	820	853	484	9502	1377	1007	1419
20	1247	1728	1237	1233	1582	809	724	469	5103	1866	1145	1458
21	1171	1658	1216	1148	1168	903	586	545	2861	1507	1818	1609
22	1134	1538	1343	1135	973	1220	535	640	2266	961	3423	1742
23	1862	1647	1209	1170	993	1561	487	784	1720	1024	3635	2338
24	2437	1674	1174	1351	888	1765	698	950	1355	875	4884	3066
25	3021	1637	1073	1483	865	2095	863	1004	911	937	5939	2348
26	4959	1565	1117	1855	786	2757	1026	1002	854	954	4196	1977
27	3806	1724	994	2118	777	2566	1302	1026	779	980	2233	1768
28	2645	1563	1187	1602	703	2766	1173	898	1757	852	2214	1705
29	1786	1509.477	1271	1268	871	2762	839	965	1300	922	1942	1587
30	1687		1317	1316	934	2337	879	940	1122	949	1599	1436
31	1633		1440		1055		799	852		898		1443

2005

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1478	1998	3272	7473	3149	1821	1094	1400	1319	562	468	1000
2	1410	2211	2830	6755	2484	2201	1021	1353	1075	544	420	1066
3	1380	2914	2217	5134	2112	1951	1078	1159	894	466	385	1532
4	1408	2963	2137	3812	1849	2054	1331	1091	955	702	482	1912
5	1332	2472	2122	3276	1832	2277	2699	1037	868	707	524	3697
6	1228	2053	2345	3089	1864	2471	2951	1214	849	907	519	3175
7	1350	1781	2303	3268	1889	4001	5151	1435	774	1476	548	2039
8	1466	1672	2806	4201	1694	4226	5092	2813	791	1578	513	1252
9	1506	1569	2743	3981	1671	3570	9808	3124	712	1206	469	1150
10	1502	1569	2355	3167	1511	3185	10210	2621	754	974	416	1143
11	1627	1521	1968	2774	1428	3091	14528	3075	720	852	470	1054
12	1927	1613	1969	2421	1385	3217	17974	2201	694	759	571	1015
13	2083	1728	1886	2330	1457	3124	15526	2207	676	692	502	1252
14	2750	2136	2232	2290	1444	2413	7371	2374	627	588	628	1326
15	2490	2733	2292	2164	1642	1845	5650	1695	662	604	613	1968
16	2213	2261	2625	2071	1724	1516	3988	1528	676	615	751	3481
17	1849	1857	2808	1937	1565	1259	3169	1322	736	571	853	2470
18	1600	1760	2514	1896	1455	1342	2106	1267	744	574	772	1804
19	1501	2667	2117	1848	1448	2112	1654	1314	765	560	965	1440
20	1507	3709	2266	1841	1457	1219	1492	1306	656	1937	1171	1185
21	1630	6212	2782	2073	1562	1115	1334	1147	611	1931	1376	990
22	1383	10449	2943	2210	1466	1101	1292	1080	650	1917	2078	1044
23	1305	6599	4689	2471	1370	971	1028	1094	587	1918	1626	1097
24	1306	5095	4255	2478	1269	197	890	1344	636	1997	1009	1207
25	1298	3798	3566	2349	1120	1224	902	1129	638	614	745	1504
26	1184	3504	3996	2115	1086	1392	909	980	708	573	774	1810
27	1393	2987	4323	2414	1109	1584	879	1041	737	606	860	1496
28	1407	3449	8409	2347	1252	1574	1096	1094	749	604	909	1287
29	1471		7394	2300	1264	1465	1191	1246	674	602	1283	1158
30	1800		6516	2575	1620	1330	1312	1887	682	491	1379	1155
31	1959		6531		1679		1521	1699		526		1195

2006

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1250	1663	1617	1697	1179	717	370	370	1041	201	753	1236
2	1410	1510	1514	1878	1098	680	402	356	1384	164	723	1260
3	2075	1655	1441	1681	1225	741	380	391	1150	112	656	1067
4	1751	2305	1383	1618	1219	708	419	409	769	96	564	901
5	1475	2951	1308	1429	1273	728	493	304	571	77	591	780
6	1303	2736	1284	1388	1269	640	627	320	494	270	583	717
7	1204	3080	1297	1512	1323	638	574	350	444	244	656	667
8	1199	2701	1589	1712	1300	582	499	267	527	219	834	644
9	1136	2453	1678	1884	1414	582	430	250	579	184	936	591
10	1036	1887	2175	1687	1255	502	377	442	449	196	757	620
11	1354	1839	2228	1520	1235	506	479	542	876	189	695	637
12	1697	1912	2072	1353	1236	512	420	554	906	225	670	693
13	1872	1764	1574	1356	1186	477	445	561	1237	235	1640	721
14	2613	1546	1516	1246	1038	499	520	514	1869	316	2483	822
15	2592	1442	1377	1212	1060	488	621	376	1328	433	4142	809
16	2710	1405	1312	1078	950	407	463	469	698	544	11582	815
17	2832	1362	1161	1154	890	427	458	339	581	1230	6143	761
18	5391	1342	1765	1372	863	413	346	346	498	3469	3411	755
19	4133	1390	2504	1504	853	393	287	404	527	1463	1947	707
20	3043	1536	2836	1985	770	379	320	627	503	1076	1302	836
21	2549	2106	5616	2689	768	406	535	533	413	913	969	878
22	2639	2321	4506	2859	813	365	445	574	390	724	813	1125
23	2806	2983	3161	2404	838	535	629	650	451	654	790	1864
24	3775	3109	2170	2032	688	482	612	476	492	547	802	1628
25	3036	2811	1894	1553	697	911	535	360	695	962	767	1378
26	2233	2356	1551	1436	788	2434	339	433	625	1203	739	1501
27	1876	2070	1571	1569	737	1374	311	510	522	1813	675	1310
28	1711	1807	1495	1458	665	874	234	713	455	3555	675	1091
29	1624		1466	1215	672	755	301	922	444	2366	686	1313
30	1754		1559	1141	621	413	260	1000	401	1376	862	1710
31	1736		1576		648		373	1028		951		2237

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

UNIMPAIRED FLOWS

2007

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	5160	1759	2784	1195	651	341	612	440	355	41	144	357
2	3537	2063	5224	1448	626	317	812	352	212	59	150	358
3	2438	1899	3794	1422	869	424	660	355	151	71	158	375
4	1901	1580	2772	1464	1029	380	436	331	120	91	149	383
5	2530	1379	2038	1395	1199	314	392	316	134	88	135	341
6	4096	1251	1699	1190	1206	339	377	276	114	109	135	307
7	5606	1044	1556	1020	1030	400	405	247	98	116	119	300
8	9573	1013	1441	1003	811	424	429	199	88	118	135	291
9	5815	1009	1378	929	626	497	496	165	87	84	152	287
10	3866	941	1303	896	687	547	651	158	81	73	169	301
11	2389	1008	1222	904	690	454	737	150	128	88	175	303
12	1850	1139	1217	976	826	468	666	119	190	75	235	302
13	1602	1188	1210	989	814	454	564	108	197	62	252	388
14	1450	1284	1271	984	773	384	511	109	215	102	309	477
15	1464	1281	1332	1137	650	418	486	143	244	94	380	548
16	1391	1136	1533	1182	641	574	586	139	243	98	413	731
17	1324	1103	1515	964	659	510	672	152	114	97	375	813
18	1219	1079	1296	892	647	464	737	156	105	100	326	625
19	1243	1339	1156	888	597	544	720	144	105	122	300	502
20	1278	1466	1092	830	586	644	718	91	121	211	357	479
21	1529	1611	1023	795	561	489	546	101	136	341	372	511
22	2147	1713	1015	845	475	345	493	85	150	411	405	525
23	1974	1670	1005	798	518	436	287	106	143	526	522	633
24	1745	1419	990	792	516	392	238	124	151	675	513	812
25	1570	1522	1010	854	463	464	162	170	153	617	394	842
26	1445	1823	1011	794	411	735	305	150	128	415	408	873
27	1432	1702	981	911	432	636	380	269	112	299	457	897
28	1346	1996	958	845	370	538	499	374	109	235	469	1148
29	1274		954	708	273	737.6	578	395	88	209.3	385	1414
30	1405		1006	617	299	755.7	709	406	77	189.8	369	1708
31	1551		1067		323		498	445.8		163.9		1927.6

2008

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1493	1840	998	967	823	692	333	490	408	76	219	761
2	951	2304	1367	1148	837	632	243	441	378	85	226	602
3	703	1735	1649	1506	799	614	207	365	363	85	212	471
4	601	1447	2433	1794	820	520	314	339	319	101	209	422
5	556	1404	4545	2234	768	487	495	302	361	98	210	413
6	557	1276	3483	2309	677	460	589	242	348	299	225	421
7	556	1197	3060	1891	634	540	924	240	382	394	206	398
8	594	1061	3213	1358	691	532	1247	303	400	569	200	808
9	623	910	2652	1178	778	515	1893	257	422	918	204	1434
10	676	827	1904	1102	840	486	2335	167	392	846	203	2224
11	811	750	1466	1184	1124	493	1874	163	357	425	219	3767
12	983	755	1301	1382	1269	536	1204	139	295	279	262	3914
13	754	786	1836	1247	976	501	956	153	265	210	298	2218
14	675	819	2329	1035	877	434	1133	196	252	169	380	1227
15	690	939	4227	947	933	448	834	167	236	191	412	840
16	701	1142	4965	925	1150	431	494	120	227	240	357	668
17	819	1408	3153	956	1165	303	387	114	246	247	290	807
18	1010	2100	2250	920	971	241	321	94	216	225	223	1454
19	933	2030	2050	951	946	227	256	63	198	243	181	1228
20	786	1832	2356	970	904	262	252	50	178	214	208	1393
21	699	1815	2035	869	868	295	236	47	165	191	237	2032
22	670	2290	1607	769	846	296	246	196	146	229	232	1623
23	732	2436	1308	747	759	320	268	363	140	271	265	1249
24	727	2006	1152	742	752	308	322	1396	108	293	277	1075
25	652	1555	1099	777	713	283	258	2042	112	334	263	1106
26	603	1508	1015	877	629	253	264	3768	116	387	285	1150
27	601	1554	1067	918	569	332	292	4742	108	289	426	1073
28	659	1319	1076	1012	572	331	316	2634	119	223	489	1116
29	769.5	1081	1075	1040	592.8	348	302	1138.8	122	208	559	1227
30	1093.7		1128	903	703.7	344	299	683.4	105	208	663	1111
31	1333.1		1082.5		683		424.7	483.4		214		930

2009

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	875	861	4847	2455	1638	1047	347	871	847	1614	2376	3279
2	852	886	4309	2434	2245	1115	328	934	606	1591	2092	4991
3	965	877	2774	2567	2637	1169	357	763	380	1905	1769	6840
4	3347	851	1997	2433	3210	1263	381	546	320	1916	1667	4725
5	5934	794	1615	2045	4124	1438	414	395	270	2451	1545	3299
6	12552	786	1384	1760	4460	1388	546	318	261	2736	1497	2703
7	14883	775	1270	1594	4287	1175	625	280	302	3382	1430	3223
8	8870	790	1203	1715	3445	1086	570	239	318	2996	3457	4354
9	5152	796	1135	2029	2725	1072	559	200	405	2255	6084	8073
10	3406	816	1061	2810	2028	1056	557	222	647	3599	9126	7250
11	2987	858	1060	4988	1661	1160	608	224	640	4777	16016	4918
12	2451	922	1093	3806	1427	1218	655	227	463	8388	12347	3540
13	1928	912	1530	3769	1274	1119	814	258	791	9831	7466	3053
14	1520	905	2069	3516	1283	1026	802	276	1133	7953	4289	2994
15	1311	880	3375	2914	1395	986	678	226	2372	5767	3315	2800
16	1162	942	3813	2203	1406	886	517	205	4280	4169	2768	3803
17	1022	968	2966	1890	1441	857	466	243	3328	2994	2378	4574
18	1010	1281	2110	2154	1377	798	420	468	4524	2290	2112	6201
19	1015	2020	1686	2433	1189	775	354	691	12371	1850	1930	8190
20	944	1602	1445	3384	987	811	306	905	17251	1707	1884	6129
21	884	1198	1305	2973	966	767	343	1328	26729	1633	1891	4368
22	877	1044	1340	2745	1072	736	335	1282	27803	1561	1987	3365
23	850	966	1409	2232	1134	782	317	883	17111	1569	2145	3641
24	847	909	1615	2014	1416	733	354	557	8339	1806	2052	4006
25	844	1129	2189	1916	1669	583	348	520	5636	2070	1874	5572
26	842	1919	3013	1701	1692	558	310	722	5552	2247	1705	5351
27	844	2723	3993	1366	1687	512	325	788	5972	3083	1617	4313
28	862	4299	4948	1232	1627	457	418	1136	4570	4970	1589	3240
29	952		4448	1331	1293	434	553	1449	2850	3684	1644	2823
30	928		3325	1538	1176	406	783	1217	1951	2660	2538	2617
31	878		2597		1066		849	925		2306		2652

2010

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2627	2941	2873	2200	2694	2112	944	555	319	556	452	3363
2	2374	3093	3149	2143	3248	1966	979	578	286	508	429	2180
3	2208	4411	3393	2136	4684	1989	1026	588	291	382	455	1368
4	2172	6363	3069	2052	4691	1741	935	545	261	357	481	925
5	2136	10561	2713	2052	3578	1517	753	620	254	310	501	777
6	2125	8850	2494	2193	2416	1490	616	676	273	295	439	662
7	2206	7892	2399	2280	1974	1524	597	715	284	282	311	609
8	2248	5760	4131	2497	1808	1309	588	681	283	297	277	513
9	2165	4331	5482	2970	1663	1237	585	592	366	273	269	512
10	2109	4006	7276	2519	1652	1334	652	482	389	295	258	576
11	2109	3590	9295	2199	1698	1339	802	447	409	295	300	655
12	2038	3341	8156	2002	1730	1241	874	391	493	306	374	777
13	2000	3196	6869	1917	1686	1187	895	366	529	287	493	920
14	2081	3042	4812	1861	1665	1219	937	403	384	295	522	703
15	2347	2986	3818	1784	1890	1270	885	458	345	306	635	1123
16	2639	2935	3279	1751	2543	1427	964	406	329	277	769	1147
17	3512	2766	2983	1748	2009	1421	1299	464	262	234	759	1289
18	3822	2753	2705	1776	1705	1285	1286	826	228	232	586	1248
19	3337	2725	2594	1740	1867	1210	1602	905	236	240	503	1181
20	3066	2917	2532	1718	1858	1192	1239	940	201	227	441	593
21	3160	2995	2583	1697	2081	1083	951	1267	163	228	459	390
22	4444	3274	2771	2207	2124	996	786	1748	198	253	481	338
23	5193	3210	2665	2574	1919	964	784	949	213	299	456	405
24	6728	2949	2509	3873	1587	927	979	648	402	311	559	445
25	10491	2627	2397	6977	1495	825	1125	571	481	718	561	437
26	7064	2524	2426	4924	1456	764	1242	561	639	987	559	670
27	5108	2485	2357	3171	1494	767	1328	650	903	1426	593	634
28	3766	2745	2341	2424	1717	809	1164	564	965	1818	874	530
29	3289		2410	2100	1729	1000	794	473	632	1209	1118	449
30	3288		2345	1947	1804	952	598	417	589	674	1766	735
31	3319		2243		2129		533	359		542		958

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

UNIMPAIRED FLOWS

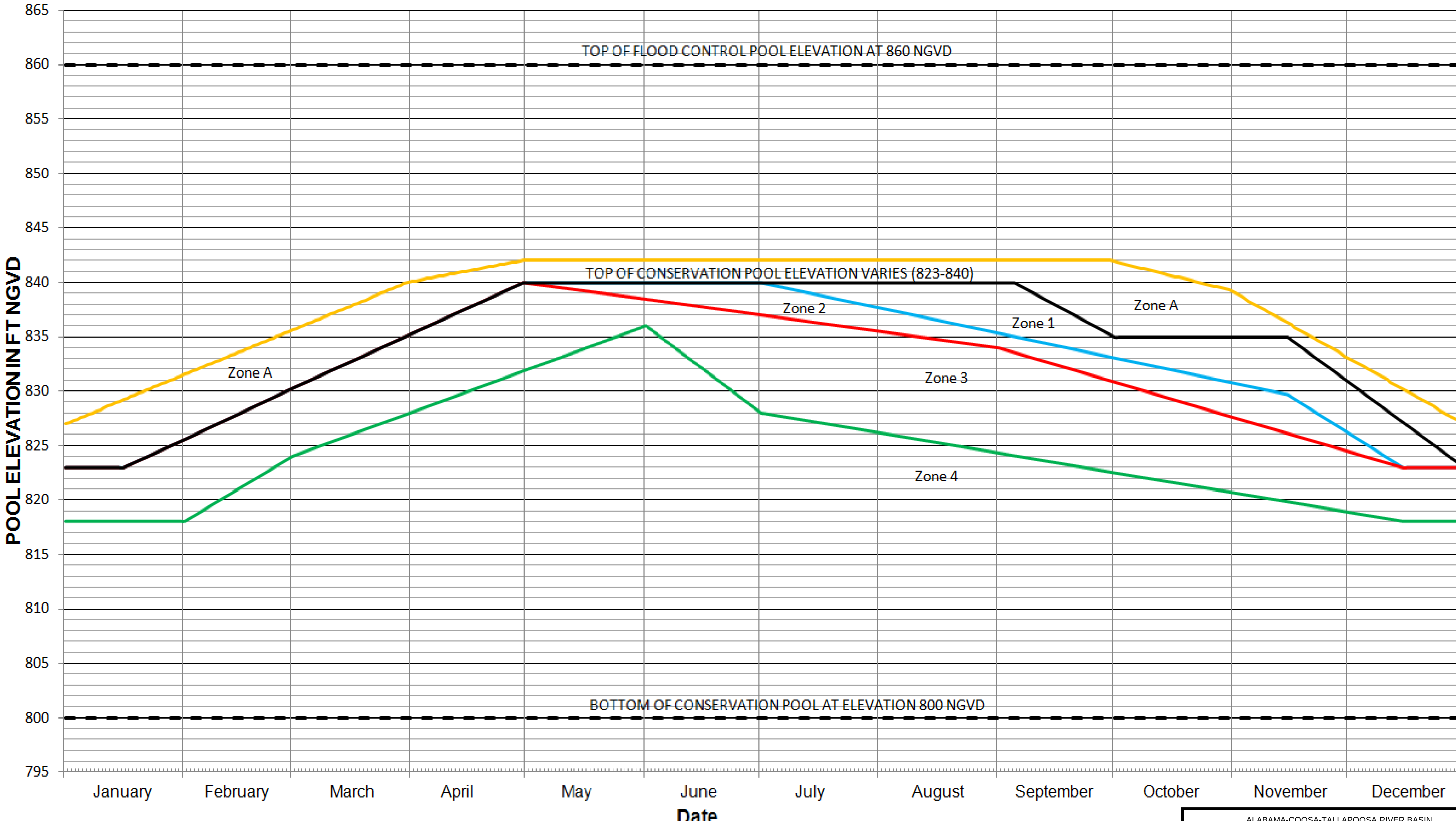
	2011											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1387	1975	1778	2432	1539	598	365	418	46	190	287	962
2	2242	3742	1634	2038	1417	523	484	551	90	169	354	742
3	1870	3549	1343	2182	1318	510	526	523	519	188	457	620
4	1270	3335	1365	2456	1247	496	564	572	689	161	544	657
5	922	3721	1654	3573	1210	472	706	558	901	155	591	846
6	830	2908	2732	3133	1125	450	675	503	1372	138	453	1031
7	883	2045	4805	2509	1083	420	496	323	1248	126	361	1619
8	851	1531	5033	1922	1048	417	439	385	693	154	317	1890
9	843	1240	7603	1717	1037	474	425	347	463	220	343	1332
10	951	1177	10319	1638	964	519	304	283	384	231	339	814
11	965	1081	6566	1605	924	486	239	235	304	303	327	547
12	839	944	3871	1575	889	482	204	206	255	360	318	437
13	776	912	2884	1756	914	684	212	181	214	367	307	297
14	770	902	2437	2347	971	764	217	211	234	300	551	322
15	743	822	2631	2848	961	836	258	221	183	299	719	446
16	748	789	2709	4442	926	975	280	233	191	254	1027	511
17	775	837	2236	4079	876	994	292	191	182	318	1473	591
18	815	825	1742	2963	803	743	338	205	183	358	1112	679
19	868	767	1494	2110	765	595	468	218	141	407	663	633
20	863	759	1325	1992	748	582	611	303	228	531	594	787
21	803	758	1256	2065	700	811	690	268	314	455	645	1263
22	753	713	1208	2026	693	1010	664	275	777	295	733	1898
23	774	764	1119	1931	673	1605	618	233	2005	249	957	3267
24	784	831	1367	1855	753	1929	596	202	997	265	982	2781
25	872	850	1789	1724	810	1283	670	133	613	222	743	2235
26	1006	1090	2891	2054	990	831	641	111	425	249	821	1892
27	1112	1355	4414	2046	1454	686	528	119	362	302	848	2144
28	974	1435	4743	2800	1369	558	403	125	316	302	1103	2484
29	906		4441	2445	956	462	348	79	260	297	1882	1846
30	1001		3932	1808	770	452	372	64	191	341	1554	1398
31	1428		3193		652		433	59		300		1116

	2012											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1017	1287	2129	1592	685	581	183	283	326	1251	173	242
2	927	1419	2796	1290	671	586	269	435	318	3125	242	237
3	778	1438	4522	1180	656	667	296	433	313	2126	235	248
4	710	1357	4613	1242	750	781	348	443	366	1013	344	240
5	730	1415	3226	1119	918	845	370	552	393	730	409	203
6	772	1486	1929	1052	1004	794	365	483	364	557	468	269
7	824	1342	1664	1036	1459	667	266	398	305	450	502	315
8	1030	1205	1688	949	1595	687	291	427	265	397	470	400
9	1352	1157	2060	870	1118	782	338	616	240	369	343	491
10	1480	1125	2274	854	835	904	472	743	238	307	298	585
11	1584	1059	1869	830	1281	1067	748	939	226	309	305	735
12	1932	1002	1609	778	1435	1143	1103	745	216	278	340	712
13	1688	965	1544	740	2170	922	1487	635	231	276	330	494
14	1317	991	1610	751	3467	709	1366	425	230	288	342	493
15	1140	984	1492	766	2575	602	988	414	239	313	340	538
16	1116	1059	1557	1205	1384	496	815	367	351	273	270	609
17	1267	1158	1556	1410	1091	442	687	321	420	315	247	802
18	1991	1190	1553	1970	1211	422	672	306	545	319	282	1167
19	2132	1180	1419	2130	1110	395	735	377	705	303	263	1173
20	2148	1221	1334	1702	989	383	801	372	556	275	252	1732
21	3171	1101	1404	1153	884	429	724	306	365	283	262	3273
22	3876	1049	1355	1119	834	412	692	243	291	228	289	1889
23	3838	1159	1484	1026	869	403	547	232	216	210	313	1347
24	4147	1107	1536	855	764	400	380	222	213	222	257	1877
25	3154	1017	1402	767	663	387	317	253	201	238	250	2743
26	2438	960	1167	757	631	329	290	309	183	228	280	4040
27	2482	952	1098	762	582	278	304	297	173	308	250	3719
28	2190	985	1069	745	608	244	320	314	297	238	225	2672
29	1741	1087	1062	740	559	252	276	352	487	253	276	1861
30	1403		1088	703	593	194	271	371	593	238	285	1516
31	1339		1413		612		232	309		218		985

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

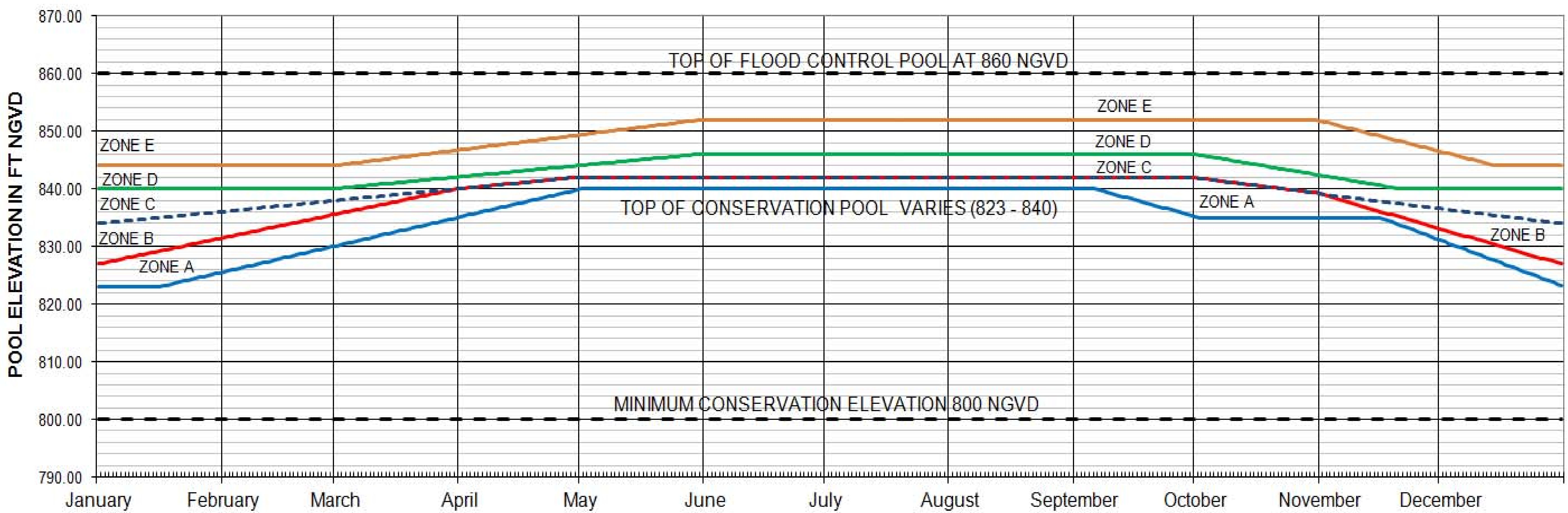
UNIMPAIRED FLOWS



ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

WATER CONTROL ZONES



Flood Regulations Above Top of Conservation Pool

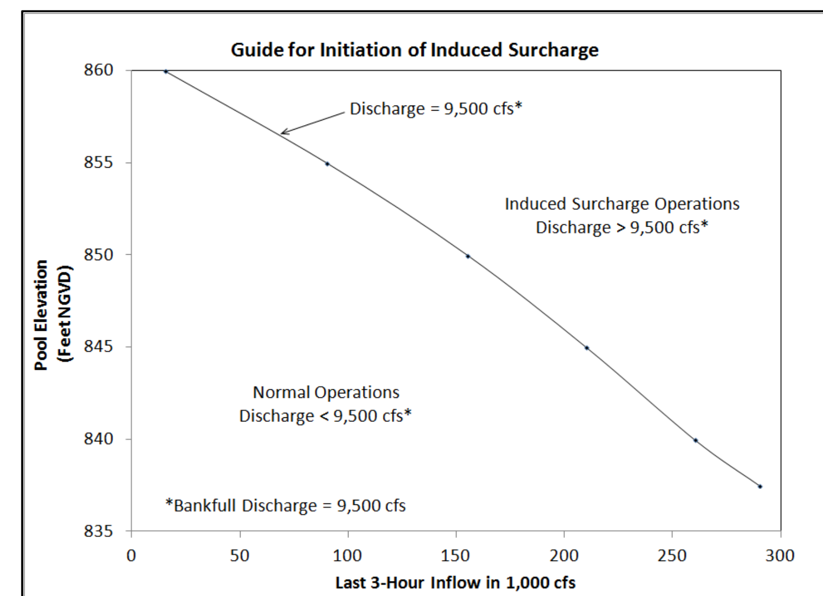
Zone E - Only minimum continuous release will ordinarily be made while Rome stage (USGS gauge 02388525) is above or expected to rise above 28 ft (moderate flood stage). However, if inflows are predicted to exceed flood control space before Rome has crested, powerhouse releases which are less than inflow may be made until either the stage at Rome has peaked or greater (surcharge) releases are required. Assuming that surcharge releases do not govern, after Rome has crested, peaking power will be made if the releases do not reverse the falling trend at Rome. Increasing releases will be made as the stage at Rome drops below 28 ft. Releases of channel capacity (about 9,500) cfs will be made whenever such a release does not reverse the falling trend at Rome. Surcharge Releases: Infrequently inflows into Allatoona will be of such magnitude that the stage at Rome does not govern the operation of Allatoona but rather the structural stability of the dam will govern. Whenever this happens, surcharge releases will be made. Figure 7-1 shows the relationship of the last 3-hour Allatoona inflow and the current pool elevation and also indicates the required release strategy. If a surcharge release is required then Plate 7-3 defines the required release (see also para. 7-05.a. and Table 7-4). This surcharge requirement is pertinent in Zones B, C, D, and E as a function of pool elevation and last 3-hour inflow.

Zone D - Only minimum continuous release will ordinarily be made while Rome stage is above or expected to rise above 28 ft. However, if inflows are predicted to exceed flood control space before Rome has crested, powerhouse releases which are less than inflow may be made until either the stage at Rome has peaked or greater (surcharge) releases are required (see Flood Zone E). Once Rome has fallen below 28 ft, up to full channel capacity (about 9,500 cfs) will be discharged. The release of powerhouse capabilities (about 6,500 cfs) may follow if consideration of downstream conditions and expected weather conditions make this prudent.

Zone C - Only minimum continuous release will ordinarily be made while Rome stage is above or expected to rise above 28 ft. However, if inflows are predicted to exceed flood control space before Rome has crested, powerhouse releases which are less than inflow may be made until either the stage at Rome has peaked or greater (surcharge) releases are required (see Flood Zone E). After Rome has receded below 25 ft (flood stage), releases will be up to channel capacity (about 9,500 cfs). Generally, releases will be at turbine capacity (about 6,500 cfs). Scheduled peak power releases of less than 6,500 dsf/day may be used if the scheduled releases sufficiently lower the pool in light of expected weather conditions.

Zone B - Only minimum continuous release will ordinarily be made while Rome stage is above or expected to rise above 25 ft. However, if inflows are predicted to exceed flood control space before Rome has crested, powerhouse releases which are less than inflow and do not violate the Rome 25 foot stage may be made until either the stage a Rome has peaked or greater (surcharge) releases are required (see Flood Zone E) to protect the structure. Floodwaters will be evacuated by regular scheduled hydropower releases which do not violate bankfull flows. Normally, the schedule will be to remove the floodwater within two weeks. A faster evacuation may be scheduled if additional rainfall is expected in the next several days.

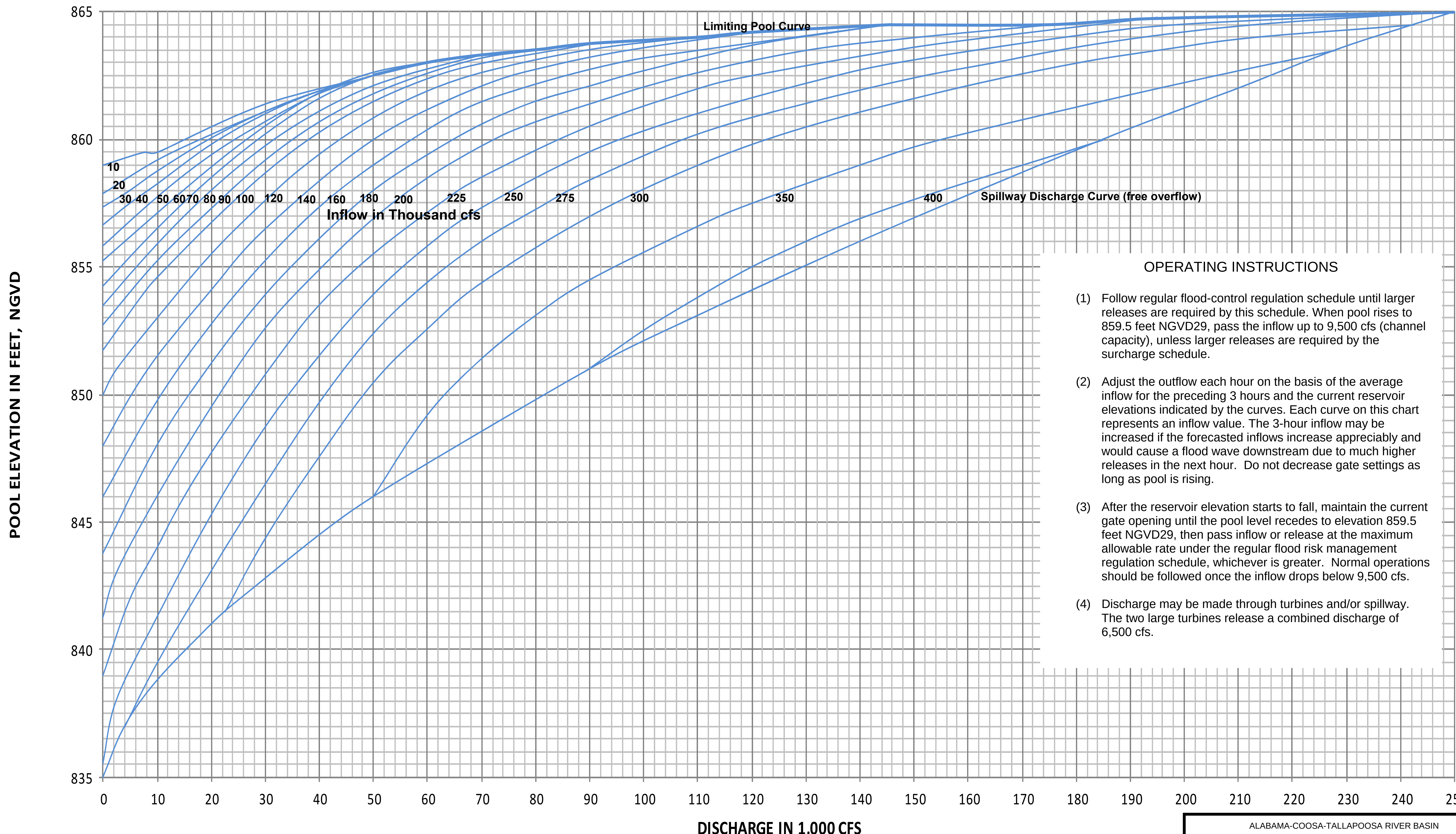
Zone A - This zone has the least urgency for being evacuated. During the winter/spring refill and summer months the pool may be allowed to rise to the top of Zone A on the weekends without releases above the minimum 240 cfs. During the fall step down period the pool may be held at the top of Zone A indefinitely if all project purposes are being met. Only minimum continuous releases will ordinarily be made while Rome stage is above or expected to rise above 25 feet.



ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

FLOOD REGULATION ABOVE CONSERVATION POOL



OPERATING INSTRUCTIONS

(1) Follow regular flood-control regulation schedule until larger releases are required by this schedule. When pool rises to 859.5 feet NGVD29, pass the inflow up to 9,500 cfs (channel capacity), unless larger releases are required by the surcharge schedule.

(2) Adjust the outflow each hour on the basis of the average inflow for the preceding 3 hours and the current reservoir elevations indicated by the curves. Each curve on this chart represents an inflow value. The 3-hour inflow may be increased if the forecasted inflows increase appreciably and would cause a flood wave downstream due to much higher releases in the next hour. Do not decrease gate settings as long as pool is rising.

(3) After the reservoir elevation starts to fall, maintain the current gate opening until the pool level recedes to elevation 859.5 feet NGVD29, then pass inflow or release at the maximum allowable rate under the regular flood risk management regulation schedule, whichever is greater. Normal operations should be followed once the inflow drops below 9,500 cfs.

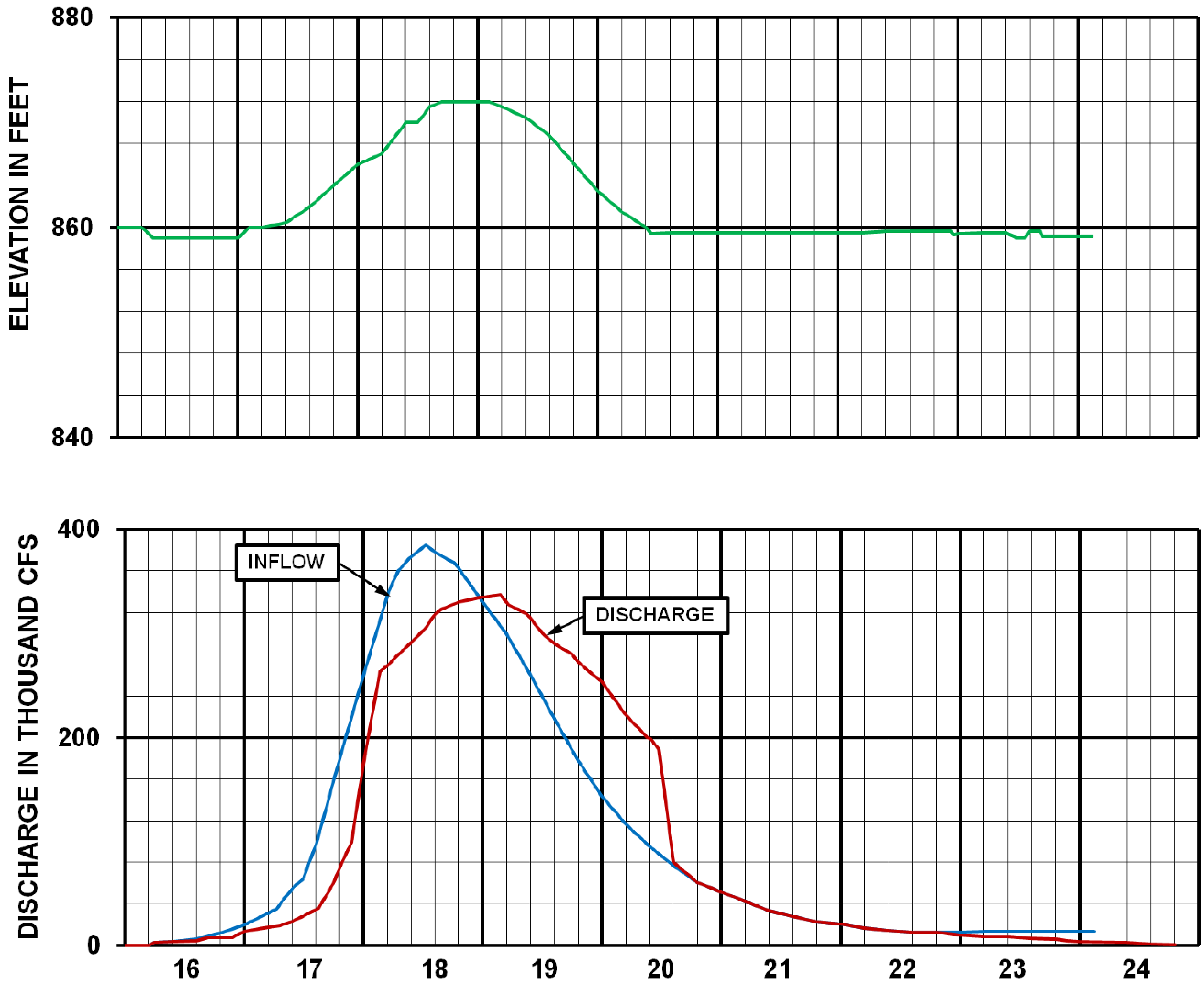
(4) Discharge may be made through turbines and/or spillway. The two large turbines release a combined discharge of 6,500 cfs.

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

INDUCED SURCHARGE SCHEDULE

FLOW, DISCHARGE, AND POOL FOR MAX PROBABLE FLOOD
(SPILLWAY DESIGN FLOOD)

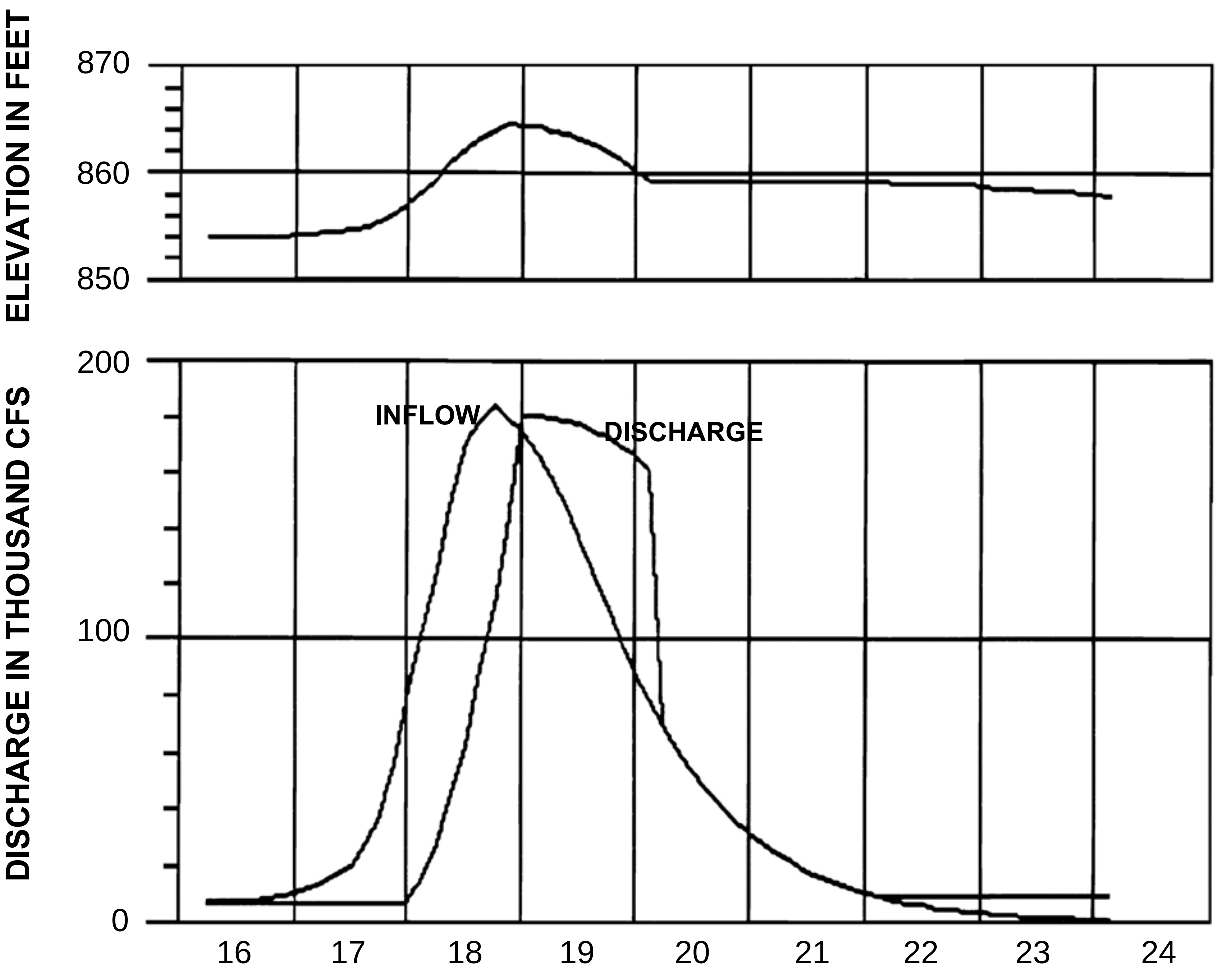


ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

FLOW, DISCHARGE, AND POOL FOR MAX PROBABLE FLOOD

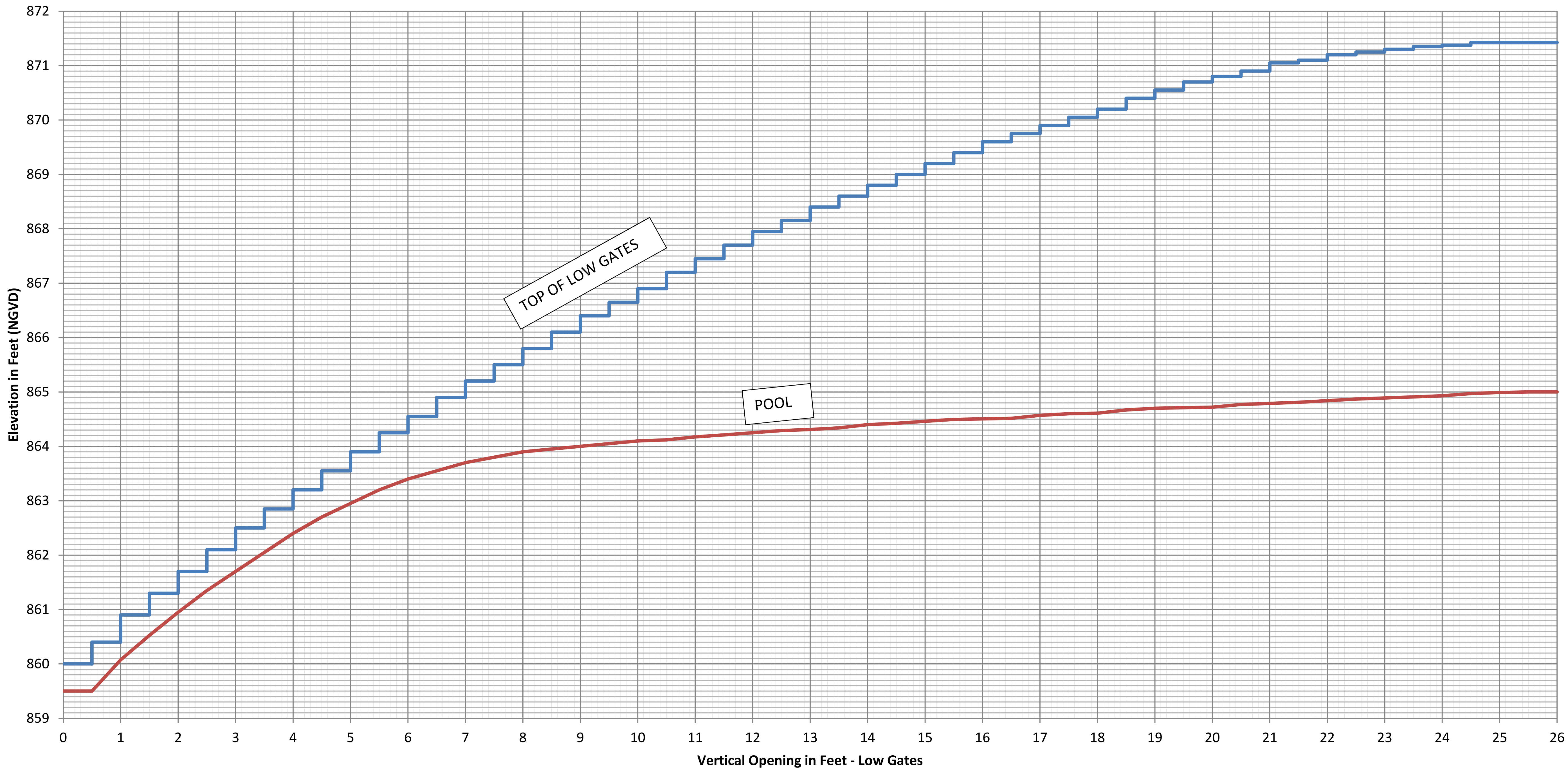
FLOW, DISCHARGE, AND POOL FOR STANDARD PROJECT FLOOD



ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

FLOW, DISCHARGE, AND POOL FOR STANDARD PROJECT FLOOD



NOTE: For Induced-surcharge operation, gates will be opened as uniformly as practicable with no gate opening more than 0.5 foot larger than any other gate opening.

When regular induced-surcharge operation would result in pool levels above this limiting schedule, gates will be opened as required so that the openings of the low gates will conform with the limiting schhedule.

All gates will be clear when the pool reaches elevation 865.0

ALABAMA-COOSA-TALLAPOOSA RIVER BASIN

WATER CONTROL MANUAL
ALLATOONA DAM AND LAKE

LIMITING GATE-OPENING SCHEDULE FOR INDUCED SURCHARGE OPERATION