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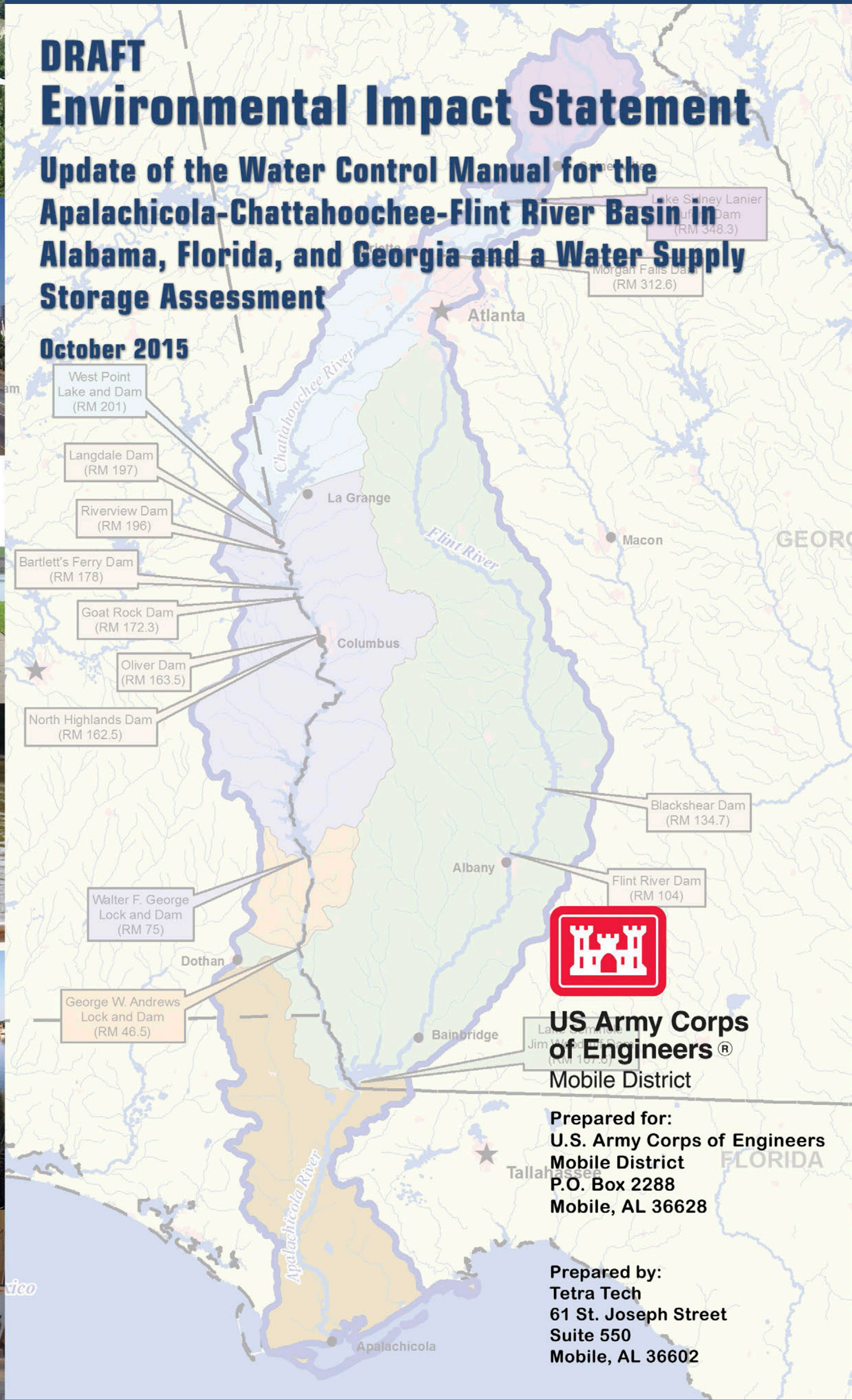
Environmental Impact Statement

Update of the Water Control Manual for the Apalachicola-Chattahoochee-Flint River Basin in Alabama, Florida, and Georgia and a Water Supply Storage Assessment

October 2015



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WATER CONTROL MANUAL

APPENDIX E

WEST POINT DAM AND LAKE

CHATTAHOOCHEE RIVER, GEORGIA AND ALABAMA

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

JUNE 1975

Revised August 1984 and XXX 2016

West Point 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, the following contact information can be used:

- Mobile District Water Management Section Chief (251) 690-2737 (office), (251) 509-5368 (cell)
- Mobile District Water Management Branch Chief (251) 690-2718 (office), (251) 459-3378 (cell)
- Mobile District Engineering Division Chief (251) 690-2709 (office), (251) 656-2178 (cell)
- West Point Project Manager's Office (706) 645-2937 during regular duty hours
- West Point Dam Powerhouse (706) 643-5391 during regular duty hours.

METRIC CONVERSION

Although values presented in the text are shown with 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 or NGVD). 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 14B-3R, and the relationship between current and legacy datums are in Exhibit B.

WATER CONTROL MANUAL

APPENDIX E

WEST POINT DAM AND LAKE
CHATTAHOOCHEE RIVER, GEORGIA AND ALABAMA

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PERTINENT DATA

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

GENERAL

Location (damsite) – Troup County GA, Chambers County AL, miles above mouth of Chattahoochee River	201.4
Drainage area, Buford Dam to West Point Dam, sq. m	2,406
Total drainage area above West Point Dam, sq. mi.	3,440

RESERVOIR

Top of conservation pool elevation, summer/winter - feet NGVD29	635/628
Bottom of conservation pool, feet NGVD29	620.0
Top of flood risk management pool - feet NGVD29	641
Peak pool for spillway design flood – feet NGVD29	646.4
Peak pool for standard project flood – feet NGVD29	640.9
Total flood risk management storage, winter (elev. 641 - 628) - acre-feet	332,503
Total flood risk management storage, summer - (elev. 641 - 635) - acre-feet	170,271
Conservation storage (elevation 635 to 620) - acre-feet	306,131
Inactive storage below elevation 620 feet NGVD29 - acre-feet	298,396
Area at top of conservation pool (elev. 635) - acres	25,864
Shoreline at maximum power pool (elev. 635), miles	604

TAILWATER ELEVATION

Three units running at max capacity (18,000 cfs) – feet NGVD29	565.5
Small unit running (675 cfs) – feet NGVD29	557.8
Minimum (no flow) – feet NGVD29	557.0

DAM

Length, concrete sections/earth embankments - feet	896/6,354
Top of dam elevation – feet NGVD29	652.0

SPILLWAY

Type	Concrete gravity ogee
Gross length - feet	350
Tainter gates, number	6
Tainter gates, width x height - feet	50 x 41

POWER PLANT

Generating capacity (declared*) MW (2 units @ 42, 1 unit @ 3)	87

* Declared generating 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; values shown are the nominal values reported.

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. Section 310.(b) of the Water Resources Development Act of 1990 expanded the requirements for public meetings and public involvement in preparing water control plans.

1-02. Purpose and Scope. This individual project manual describes the water control plan for the West Point Dam and Lake (West Point 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 West Point Project water control plan must be coordinated with the multiple projects in the Apalachicola-Chattahoochee-Flint (ACF) River Basin to ensure consistency with the purposes for which the projects were authorized. In conjunction with the ACF Basin Master Water Control Manual, this manual provides a general reference source for West Point 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 West Point Project water control regulation activities include the *Operation and Maintenance Manual* for the project and the *ACF Basin Master Water Control Manual* for the entire basin.

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

Appendix A - Jim Woodruff Lock and Dam and Lake Seminole

Appendix B - Buford Dam and Lake Sidney Lanier

Appendix C - Walter F. George Lock and Dam and Lake

Appendix D - George W. Andrews Lock and Dam and Lake George W. Andrews

Appendix E - West Point Dam and Lake

The original water control manual for West Point Dam and Lake was published in June of 1975. A revision to the 1975 manual was published in August of 1984. This revision supersedes any prior editions.

The Buford emergency action plan (EAP) entitled *Emergency Action Plan, West Point Dam Project, April 2013* serves to consolidate guidance documents regarding actions to be taken by project personnel should a emergency situation be identified. Guidance includes training for identification of indicators, notification procedures, remedial action scenarios, reservoir dewatering procedures, inventory of emergency repair equipment, and a list of local repair forces. Historical, definite project reports and design memoranda (see Section 3-02 for listing of design memoranda) also contain useful information.

Prior to the issuance of the ACF Basin Master Manual and the individual water control plans as appendices, the Corps considered the environmental impacts of its revised operations with the preparation of an Environmental Impact Statement (EIS). The EIS was prepared in compliance with the National Environmental Policy Act (1969), Council on Environmental Quality guidelines, and Corps implementing regulations. Access to the final document is available by request from the Mobile District.

1-04. Project Owner. The West Point Dam and Lake 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 West Point Project is the responsibility of the USACE Mobile District. Supervision and direction for this effort is provided by the project's Operations Project Manager.

1-06. Regulating Agencies. Authority for water control regulation of the West Point Project has been delegated to the South Atlantic Division (SAD) Commander. Water control regulation activities are the responsibility of the Mobile District, Engineering Division, Water Management Section (Mobile District). Water control actions for the West Point Project are regulated in a system-wide, balanced approach to meet the federally authorized purposes. It is the responsibility of the Mobile District to develop water control regulation procedures for the ACF Basin federal projects for all foreseeable conditions. The regulating instructions presented in the basin water control plan are issued by the Mobile District with approval of the SAD. The Mobile District monitors the project for compliance with the approved water control plan and makes water control regulation decisions on the basis of that plan. The Mobile District advises project personnel on an as-needed basis regarding water control regulation procedures to perform during normal, as well as abnormal or emergency situations.

II - DESCRIPTION OF PROJECT

2-01. Location. West Point Dam is on the Chattahoochee River at mile 201.4 above the mouth and 3.2 miles north of West Point, Georgia. It is 146.9 river miles below Buford Dam, 126.2 miles above Walter F. George Lock and Dam, 154.9 miles above George W. Andrews Lock and Dam, and 201.8 miles above Jim Woodruff Lock and Dam. The drainage area above the dam is 3,440 square miles. The location of the project is shown on Plates 2-1 and 2-3.

2-02. Purpose. West Point Dam and Lake is a multiple-purpose project, originally authorized by the Flood Control Act of 23 October 1962 to be operated in conjunction with the other federal works of improvement in the ACF Basin for the authorized system purposes. The West Point Project is operated to provide benefits for authorized purposes of hydropower, flood risk management, navigation, recreation, fish and wildlife conservation, and water quality. In addition, water supply withdrawals are made from West Point Lake pursuant to relocation agreements entered into at the time of construction. The increased flow in dry seasons also provides for increased water supply and water quality for municipal and industrial (M&I) uses downstream of the dam and permits increased production of hydroelectric energy at downstream plants. An aerial view of the West Point Project is shown in Figure 2-1.

Figure 2-1. West Point Dam and Lake

2-03. Physical Components. The West Point Dam is a concrete gravity type structure with rolled earthfill embankments joining the high ground on the east and west sides of the river. The total length of the concrete dam and earth embankments is 7,250 feet. The top of the structure is at elevation 652 feet NGVD29 and the length of the concrete portion of the dam is 896 feet. The principal structures that make up the concrete dam are an intake-powerhouse structure, a non-overflow section, a gated spillway in the main river channel, and a left embankment retaining wall that supports the earth embankment on the east abutment. The power plant and spillway gates are operated remotely from the control room of the Walter F. George Powerhouse via a microwave link between the two projects. The remote system also includes video cameras that provide control room personnel at the Walter F. George Powerhouse visual observations of the West Point Project. The general plan, elevations, and typical sections are shown on Plate 2-4.

a. Non-Overflow Section. The non-overflow section is 185 feet long and forms a tie between the earth embankment on the west side of the river and the powerhouse intake section. The length of the non-overflow section was determined by the clearance required between the terminal cone slopes and the powerhouse intake.

b. Spillway Section. The spillway section shown in Figure 2-1 is a gravity type ogee section 350 feet long with crest at elevation 597 feet NGVD29. The spillway contains six tainter gates, each 50 feet wide and 41 feet high, between 10-foot-thick piers supported on the overflow section. A service bridge with a 15-foot-wide roadway, safety curbs, and parapets is constructed over the spillway. The six spillway gates are provided with individual cylinder actuated flat wire rope hoisting equipment consisting of a long cylindrical torque tube with attached wire drum and ratchet gear assemblies. The entire hoisting equipment assembly is mounted on two self-aligning ball bushing bearings. Ratchet openings (also called “steps”) are not consistent for the individual gates. Table 2-1 shows the flow for one ratchet opening for each of the six gates. This table represents a refinement of the discharge rating provided in plate 2-5. Ratchet opening one for gate one has been reduced to 0.4 feet. The purpose of this refined chart is to assist the Mobile District and powerhouse operators in the selection of a spillway gate to open for low-flow maintenance when the powerhouse is unavailable (see Section 4-08 for additional information). If the powerhouse is unavailable, at least 670 cfs (the minimum required for water quality) must passed through the spillway by raising one gate to the first ratchet step.

Gates will normally be operated remotely by the powerhouse operators at Walter F. George Dam; however, controls are provided at each gate hoist assembly for local operation. A mechanical dial-type gate position indicator is provided for each hoist unit and is on the ratchet end of the hoist assembly. The hydraulic oil system consists of two individual pumping units each one serving three tainter gate hoists. Both units are driven by a common electric drive motor. Valves that are normally kept closed connect the two systems at each hoist enabling any gate to be operated from either pump if a unit is down. Electrical controls and valving are arranged to automatically circulate oil throughout the system for a predetermined length of time on startup. The operator can move any designated gate up or down at a rate of approximately one foot per minute. The gates are numbered 1 through 6, with the number 1 gate being closest to the powerhouse. The gates are normally raised in the sequence of their numbering, that is, gate number 1 is opened first and gate number 6 last. Stop logs will be used to close off the spillway opening between any two piers when maintenance work on the tainter gates is required. A roller bucket is formed at the base of the spillway. The gate operating schedule and rating are shown on Plates 2-5 through 2-8. The tailwater rating curve is shown on Plate 2-9.

Table 2-1. Ratchet Openings and Flows for Each Gate

		Gate number					
		1	**2**	**3**	**4**	**5**	**6**
Pool elevation (feet NGVD29)	**Opening for first ratchet step (feet)**	0.400	0.656	0.611	0.516	0.624	0.513
		Flow (cfs)					
620		510	835	780	655	795	655
621		520	855	800	670	815	670
622		535	875	815	685	830	685
623		545	890	835	700	850	700
624		555	910	850	715	865	715
625		565	925	865	725	880	725
626		575	940	880	740	895	740
627		585	955	895	750	910	750
628		595	975	910	765	930	765
629		505	990	925	775	945	775
630		615	1,005	940	790	960	785
631		625	1,020	955	800	970	795
632		630	1,035	965	810	985	805
633		640	1,045	980	825	995	820
634		650	1,060	990	835	1,010	830
635		655	1,075	1,005	845	1,020	840
636		665	1,090	1,020	855	1,035	850
637		675	1,105	1,030	865	1,050	865
638		680	1,120	1,045	880	1,065	880

c. Left Embankment Retaining Wall. The retaining wall at the left end of the spillway extends upstream and downstream from the axis of the dam supporting the earth embankment connecting the concrete dam to high ground on the east side of the river. The top of the wall is at elevation 652 feet NGVD29, and the upstream and downstream walls are sloped to fit the earthfill slopes. The wall is a gravity type concrete structure 590 feet long with a maximum height of 114 feet. It is 4 feet thick at the top with base thickness varying from about 35 feet to 82 feet. The wall is oriented normal to the dam and slopes both upstream and downstream. Therefore its height drops in both the upstream and downstream direction and the base width drops as the height drops. The central portion of the wall contains the tainter gate anchorage for the adjacent spillway bay and provides support for the spillway bridge. The downstream portion of the wall also serves as a spillway training wall.

d. Skimmer Weir. In the original planning of the project, a skimmer weir had been included; however, a part of the first stage cofferdam dike has been left in place to serve that function. The dike, which is in the west overbank area upstream of the power intake prevents flow at the lower reservoir depths from entering the intake. The top of the dike is at elevation 585 feet NGVD29.

e. Powerhouse and Intake. The powerhouse and intake structure are integrated into a reinforced concrete unit, which acts as a part of the dam. The structure is 321 feet in length and consists of five monoliths between the spillway and the non-overflow section. The intake structure provides waterway openings for three main generating units (two installed initially and one for a future unit) and one small generating unit to provide continuous minimum flow releases. The main turbines are propeller type with concrete, semi-spiral cases and rated at 51,500 horsepower each at a head of 58 feet. The small turbine is rated at 5,400 horsepower under the rated head of 77 feet and was selected to give maximum efficiency while discharging 675 cubic feet per second (cfs) at any head between 62 and 77 feet and will operate satisfactorily at a minimum head of 52 feet during peak power demand. The generators are direct-connected vertical shaft units with enclosed housing and surface air coolers. Each main generator has a rating of 48,840 kilovolt-amperes (kVA) at 0.90 power factor (rewound in 2009), and the small generator has a rating of 3,750 kVA at 0.9 power factor with all units being 3-phase, 60 Hertz. The rating for the main turbogenerators is shown in Plates 2-10 and 2-11 and for the small turbogenerator in Plate 2-12. Historical hydropower production is shown in Plates 2-13 and 2-14.

f. Switchyard. The switchyard is on an earth fill a short distance downstream and landward from the powerhouse. It is at elevation 600 feet NGVD29, providing a 5-foot freeboard over the standard project flood tailwater. The fenced area within the switchyard is approximately 170 feet by 225 feet. All switchyard equipment and structures are designed to operate at 115 kilovolts. Initially, the switchyard contains two transformer positions with space and other minimum provisions for a third transformer position to be added.

g. Downstream Floodway. The total estimated discharge for the two main units at rated capacity is 15,500 cfs. Operating at overload capacity, at full-power pool and including operation of the service unit, the total discharge is approximately 18,000 cfs.

In the original planning for the project, it was assumed that three main units would be installed and the maximum discharge through the power plant would be about 25,000 cfs. The original induced surcharge schedule was based on the assumption that this would be the minimum discharge when the pool exceeded the top of power pool. To accommodate that discharge, it was recommended that a floodway easement be taken below the dam. The recommended downstream floodway covers the reach of the Chattahoochee River extending from the West Point Dam downstream to Valley, Alabama, a distance of about eight miles and required the acquisition of about 700 acres.

On the basis of the present installed capacity, the maximum discharge through the turbines is about 18,000 cfs; therefore, the induced surcharge schedule was prepared with a beginning discharge of 18,000 cfs when the pool is above the top of power pool. With installation of the third generating unit, a revised induced surcharge schedule might be necessary.

h. Reservoir. The reservoir formed by the West Point Dam and shown on the upstream side of the dam in Figure 2-1 has an area of 25,864 acres at the top of the summer conservation pool (elevation 635 feet NGVD29) and covers parts of Troup and Heard Counties in Georgia, and Chambers and Randolph Counties in Alabama. At elevation 635 feet NGVD29, the pool extends from the dam site up the Chattahoochee River about 34 miles to the vicinity of Franklin, Georgia, and from the Chattahoochee River up Yellowjacket Creek about 10 miles to an area just north of LaGrange, Georgia. At elevation 635 feet NGVD29, the reservoir has a total storage capacity of 604,527 acre-feet. Area-capacity curves and a tabulation of selected area and capacity values are shown in Plate 2-15.

i. Future Lock. The West Point Project was planned so that a navigation lock could be added in the future, if authorized. During construction, some rock excavation was authorized to provide a suitable foundation for future construction of the lock. The lock would be in the right bank approximately 100 feet from the end of the concrete abutment.

2-04. Related Control Facilities. Operation of the West Point powerhouse and spillway gates is regularly remotely controlled by the Walter F. George powerhouse in Fort Gaines, Georgia. The remote control is accomplished through a microwave network between the West Point and Walter F. George Projects. The West Point powerhouse and spillway gates can be locally operated if conditions require. The West Point Project operates as part of a system with other federal reservoirs in the ACF River Basin. The Water Control Plan maximizes the conservation operations by using total storage in the projects. Privately owned dams along the Chattahoochee River receive headwater benefits from redistributed flows. Bartletts Ferry Dam and Lake Harding is a Georgia Power Company (GPC) facility downstream of West Point that reregulates power releases from West Point Dam, providing more stable flows in the river to facilitate water supply and water quality.

2-05. Real Estate Acquisition. The guide taking line for land acquisition was based on contour elevation 641 feet NGVD29 or 300 feet horizontal distance landward from the top of the summer conservation pool of elevation 635 feet NGVD29, whichever criteria required the greater area. The selection of the guide taking line was based on engineering and real estate interpretations of EM 405-2-150. Elevation 641 feet NGVD29 represents the reservoir pool elevation expected to result from the Standard Project Flood. Elevation 641 feet NGVD29 is three feet above the top of the spillway gates in closed position. Practically all the land below the guide taking line was acquired in fee except for approximately 600 acres in remote areas of the reservoir where flowage easements were acquired. There are 56,338 acres within the taking lines for land acquisition.

2-06. Public Facilities. Recreation at the West Point Project is provided by 25 recreation areas, 569 camping sites, 1,058 picnic sites, 12 playgrounds, 4 swimming area, 15 miles of trails, 1 fishing dock, 2 marinas with 200 boat slips, and 40 boat ramps (2012 data). Non-federal governments are using 8 public use areas, which include 6 parks and 2 commercial marinas. One of those areas, Burnt Village Park, has been included in the lease to Southern Harbor Marina. One 500-acre area remains available for lease by cost sharing with non-federal governments under Public Law 89-72.

Four public service areas are offered by the government for development and management through concession leases. The Corps provides a minimum amount of initial construction, generally consisting of an access road, boat launching ramp, car and boat trailer parking, shoreline improvement, and safety and sanitation facilities in those four public service areas. The minimum facilities by the Corps are provided to reduce the anticipated heavy recreational use in the government areas by making additional access available to the reservoir on a broad distribution basis. Experience has shown that limited initial development in public service areas is more likely to make the areas more attractive as an investment by private operations and will stimulate positive action in additional development much sooner.

Basic public recreation activities include picnicking, camping, bank fishing, sightseeing, boating, hiking, boat fishing, swimming and water skiing. Non-federal agencies are encouraged to provide modern basic recreational facilities and special facilities such as overnight accommodations, restaurants, snack bars, concessions, playground areas, and the like. Lessees of public service areas are required to furnish complete marina facilities and services, restaurant or snack bar, overnight accommodations, and to provide for sale of supplies that are normally needed by the recreationist. The Georgia Department of Natural Resources (GADNR) developed and manages the public wildlife recreation area. The distribution of recreational areas around the reservoir is shown in Plate 2-16. The public wildlife recreation areas developed and managed by the GADNR are not included in the above 25 public use recreation areas.

III - HISTORY OF PROJECT

3-01. Authorization. The first examination and survey of the ACF River System was made in 1872. Since then, Congress authorized a number of reports contemplating improvement of the river system. From those reports and surveys evolved a plan of improvement prepared by the Mobile District in response to a resolution by the Committee of Rivers and Harbors, House of Representatives, dated 28 April 1936, which called for a review of the reports with a view to determining if the existing projects should be modified in any way. That report is printed in House Document No. 342, 76th Congress, First Session. A general plan for future development presented in that document included a power storage project at a site known as Lanier, which is above West Point, Georgia, in the same general location as the West Point Dam site. A survey report of the Chattahoochee River at and in the vicinity of West Point, Georgia, was authorized in resolutions by the Committee on Public Works of the House of Representatives adopted 29 July 1955, and 31 July 1957, with a view to determine whether it was advisable to authorize construction of a multiple-purpose reservoir on the Chattahoochee River at and in the vicinity of West Point, Georgia. That report was published as House Document No. 570, 87th Congress, Second Session. Construction of the West Point Reservoir Project was authorized by the Flood Control Act of 23 October 1962.

3-02. Planning and Design. In view of the unbalanced civil works load between districts, the SAD Division Engineer assigned responsibility for design, construction, and real estate acquisition of the West Point Project to the Savannah District by letter dated 16 November 1962. Design Memorandum No. 1, Hydrology and Hydraulic Analysis was prepared by the district and submitted on 20 March 1964. Since then, 36 additional Design Memoranda have been submitted and approved by the Chief of Engineers. These memoranda are listed in Table 3-1.

Table 3-1. Design Memoranda

DM No. 1 - Hydrology and Hydraulic Analysis	March 1964
DM No. 2 - Hydropower Capacity	April 1964
DM No. 3 - Site Selection and Geology	September 1964
DM No. 4 - Preliminary Master Plan	November 1964
DM No. 5 - General Design Memorandum	February 1965
No. 6 - Construction Facilities	March 1965
No. 7 - Real Estate Area, 1	March 1965
DM No. 7 A- Real Estate Area, 2	March 1965
DM No. 7 B- Real Estate Area, 3	March 1965
DM No. 8 - Main Turbine and Governors	May 1965
DM No. 9 - Construction Materials	May 1965
DM No. 10 - West Earth Embankment	June 1965
DM No. 11 - Small Turbine Governor	June 1965
DM No. 12 - Necessity and Plan for Relocation of the Chambers County Roads	July 1965
DM No. 13 - Concrete Dam and Diversion Works	August 1965
DM No. 14 - Cemetery Relocations	November 1965
DM No. 15 - Necessity and Plan for Relocation of Georgia State Routes 109, 238, 244	December 1965
DM No. 16 - Necessity and Plan for Relocation of Power lines	April 1966
DM No. 17 - East Earth Embankment	April 1966
DM No. 18 - Necessity and Plan for the Relocation of Troup and Heard Counties Roads	May 1966
DM No. 19 - Necessity and Plan for Relocation of Telephone Lines	May 1966
DM No. 20 - Reservoir Clearing and Mosquito Control	August 1966
DM No. 21 - Preliminary Design Report, Power Plant	October 1966
DM No. 22 - Necessity and Plan for the Relocation of Georgia State Routes 109 and 219	September 1966
DM No. 23 - Necessity and Plan for the Relocation of the City of Lagrange Raw Water Intake Pumping Station and Appurtenances	March 1967
DM No. 24 - Necessity and Plan for the Relocation of the Atlantic Coast Line Railroad	September 1966
DM No. 25 - Jackson Creek Outfall Sewer	March 1967
DM No. 26 - Necessity and Plan for Relocation of Callaway Mills Raw Water Intake Pumping Station and Appurtenances	March 1967
DM No. 27 - Necessity and Plan for Relocation of U.S. Route 27	November 1966
DM No. 28 - Water Quality Monitoring System	May 1967
DM No. 29 - Intake Gate Hoists, Hydraulic System, and Controls	February 1968
DM No. 30 - Microwave Facilities	February 1970
DM No. 31 - Public Use and Administrative Facilities	Sep 1968 - April 1969
DM No. 32 - Powerhouse Design Analysis	October 1969
DM No. 33 - Necessity and Plan for Relocation of the Plantation Pipeline	September 1971
DM No. 34 - Hydrology Data Collection System	October 1973
DM No. 35 - Supplement No. 1 - Downstream Floodway Erosion Studies	October 1973
DM No. 36 - Necessity and Plan for Corrective Measures at the West Point Pepperell, Inc. Lanett Filter Plant Raw Water Pumping Station	October 1977
DM No. 37 - Master Plan	April 1981

3-03. Construction. Construction was started in 1965. The west earth embankment and an access road to the powerhouse area were completed in 1966. Construction of the concrete dam was started in May 1968 and was completed in August 1970. The contract for constructing the powerhouse was let in 1971. The total estimated cost of the project was more than $105 million.

Closure of the main channel was accomplished in May 1967, and the flow of the river was diverted through a channel that had been cut on the east bank of the river. The second stage closure was made on 21 June 1973, and the flow of the river was passed through the waterway opening that had been provided in the powerhouse intake structure for adding a future main generating unit.

Completion of the first main turbogenerator unit (unit No. 2) was accomplished in late May 1974; however, problems with the east bank earth dike prevented the start of the filling of the reservoir until 16 October 1974, delaying testing of the unit. Because of improper compacting during construction, the material in the east earth dike had to be removed and the embankment backfilled. The reservoir level reached elevation 617 feet NGVD29 on 15 November 1974. The No. 3 unit was made commercially available on 10 March 1975. The pool was held at elevation 617 feet NGVD29 until 30 April 1975, because of construction restrictions. On 1 May 1975, filling was resumed, and the reservoir reached full power pool, elevation 635 feet NGVD29, on 25 May 1975. The second large unit (No. 2) and the small unit (No. 1) were made commercially available on 10 April 1975.

3-04. Related Projects. West Point Dam and Lake is one of five government reservoir projects within the ACF Basin. In addition, seven privately owned dams are on the Chattahoochee River between Walter F. George and Buford Dam. The government reservoirs on the Chattahoochee River are operated as a system to accomplish authorized functions as described in the *ACF Basin Master Water Control Manual (with Appendices)*. Outflows from West Point Dam are influenced by the Master Manual and requirements at other Corps projects. The privately owned reservoirs on the Chattahoochee River do not alter flows longer than a few days.

3-05. Modifications to Regulations. From the time the West Point Project became operational in 1975, changes in needs and conditions in the ACF Basin have influenced certain modifications to the regulation of releases from the dam. The following describe the modifications to regulations that have occurred at the West Point Project.

a. <u>Hydropower</u>. The Southeastern Power Administration (SEPA) negotiates contracts for the sale of power from the West Point Hydropower Project in accordance with the Flood Control Act of 1944. Under the provisions of the Act, the Corps determines the amount of energy available at West Point each week and advises SEPA of the amount available, and SEPA arranges the sale. West Point Dam is within SEPA’s Georgia-Alabama-South Carolina system, which also contains Buford Dam and Walter F. George Dam on the Chattahoochee River, four projects in the ACT Basin, and three projects on the Savannah River. SEPA began dispatching (scheduling) power in 1996. Before that, Southern Company scheduled peaking generation from Corps projects. SEPA's scheduling provided more flexibility to meet customer needs. Hydropower generation in the 1970s was a driving force in releases from West Point Dam, and days of six to eight hours of generation were common. During the 1980s, several droughts occurred and resulted in a philosophical change to more conservative hydropower operations. SEPA values the capacity at each project and supports conservative use of the resource (water). As a result, power generation demands have been balanced between the projects weekly to enhance long-term generating capability of the entire system and to provide for the needs of other project purposes in the system.

b. Navigation. A major factor influencing reservoir regulation was the additional flow required to maintain the authorized 9.0-foot navigation depth on the Apalachicola River. At the time the ACF system of projects was constructed, a discharge from Jim Woodruff Dam of 9,300 cfs, together with dredging, provided a 9.0-foot deep navigation channel in the Apalachicola River. A discharge of 20,600 cfs from Jim Woodruff Dam is currently required for a 9.0-foot channel without dredging. The increase of 11,300 cfs to support a 9.0-foot channel is equivalent to 4.1 feet of storage at Lanier, 5.6 feet of storage from West Point, or 3.6 feet of storage from Walter F. George over a one week period. In practice any use of storage to support navigation would be distributed between the three ACF storage projects with consideration to the current action zone of each reservoir. The increasing flow requirements to achieve suitable navigation channel depth in the Apalachicola River are attributable to (1) channel degradation and (2) escalating flow diversion through Chipola Cutoff. In response to those changing conditions, it became necessary to periodically schedule the release of increased flows from Jim Woodruff Dam for periods of a few days to as long as two weeks to accommodate commercial river traffic. Those periods were known as navigation windows. During navigation windows, water was released in varying amounts from the upstream reservoirs, stored in the downstream reservoirs, and then released through Jim Woodruff Lock and Dam to provide sufficient flow in the Apalachicola River to achieve suitable navigation depths. In preparation for navigation windows, releases were made from West Point Dam to help supply sufficient water in storage downstream to successfully implement the navigation window. A discharge of 20,600 cfs from Jim Woodruff Dam is currently required for a 9.0-foot channel without dredging.

Increasing flow requirements plus the loss of water quality certification from Florida, which prevents the Corps from dredging the Apalachicola River, effectively closed commercial navigation on the Apalachicola River. Coordination with waterway users identified the need for changes in the Corps' water control operations to provide a more reliable flow regime, without dredging, to support at least a 7.0-foot navigation channel in the Apalachicola River. Through an iterative hydrologic modeling process, it was determined that a 5-month navigation season, January through May each year, can be provided that will improve navigation reliability without significantly affecting other project purposes. The 5-month navigation season included in the current Water Control Plan can, in the absence of maintenance dredging, improve the total reliability of a 7.0-foot navigation channel in the Apalachicola River from 21 percent to as much as 42 percent. Releases made from West Point Dam during hydropower operations contribute to the needed downstream navigation flows.

c. Revised Water Control Plan. The initial regulation plan for West Point Lake proposed in the General Design Memorandum included a seasonally varying top of conservation (power) pool that calls for the annual filling from elevation 625 to 635 feet NGVD29 to be accomplished during May. That plan did not contain the requirements for filling downstream Walter F. George Lake at the same time and maintaining navigation flows in the Apalachicola River below Jim Woodruff Dam. Subsequent studies showed that an average discharge of 3,000 cfs is needed from Walter F. George Dam during May to maintain minimum navigation flows below Jim Woodruff Dam. Maintaining such a discharge from Walter F. George Dam would mean that both lakes, West Point and Walter F. George, could not be filled during May in 26 of the 42 years studied. Other plans were studied including staggered filling times for the two lakes. The plan that appeared to be most satisfactory is to begin filling both West Point and Walter F. George Lakes on 15 April with the objective of having both Lakes full by the end of May. Such a plan does not depreciate the flood risk management effectiveness of West Point Dam. All floods that have occurred during the period of record after 15 April would be controlled to the same outflow as would have occurred under the original plan. Peak pool elevations for the floods would be somewhat higher, but in all cases, less than elevation 635 feet NGVD29. The slightly higher pool level at Walter F. George during the last half of April and early May does not result in any violation of flood easements in the lake or in excessive releases downstream. That plan was adopted during preparation of the initial water control manual for the West Point Project.

d. Revised Flood Risk Management Operations. Early flood risk management operations specified observing the water elevation of downstream gages and restricting the outflow from West Point Dam accordingly to prevent exceeding certain stages. However, this methodology proved problematic due to the relatively small drainage area between the dam and the control gages and the limited flood storage within the reservoir. Operating experience revealed that inflows to the project and the amount of remaining storage in the reservoir were more critical to flood risk management and that limiting the outflow throughout the flood event deemed more beneficial.

e. Changed Winter Conservation Pool Elevation. As part of a draft 1989 ACF water control manual update, raising the top of the winter conservation pool from 625.0 feet to 628.0 feet NGVD29 was evaluated. The original winter conservation pool elevation of 625.0 feet NGVD29 was based on an earlier determination that the channel capacity downstream of the project was limited to a bankfull flow of 25,000 cfs. Subsequent channel surveys revealed that the channel capacity would support a significantly greater bankfull flow of 40,000 cfs. With the ability to release greater volumes of water from the lake early in a flood event, the higher winter pool does not reduce the flood protection capability of West Point Dam. As a result of the analysis done for the draft 1989 manual update, the West Point Project began operating for a winter conservation pool elevation of 628 feet NGVD29 that year.

f. Revised Interim Operating Plan. The Revised Interim Operating Plan (RIOP) was implemented in June 2008 and modified in May 2012. The purpose of the RIOP was to support compliance with the Endangered Species Act of 1973 for federally listed threatened and endangered species and their federally designated critical habitat in the Apalachicola River and to avoid or minimize potential adverse effects associated with discretionary operations at Jim Woodruff Lock and Dam. The RIOP directly affected flows and fall rates in the Apalachicola River and prescribed the minimum flow releases to be made from Jim Woodruff Dam under specific hydrologic conditions. However, the releases made from Jim Woodruff Dam in accordance with the RIOP used the composite conservation storage of all the upstream reservoirs in the ACF System. The Corps operates five federal reservoirs on the ACF as a system, and releases made from Jim Woodruff Dam under the RIOP reflected the downstream end-result for system wide operations measured by daily releases from Jim Woodruff Dam into the Apalachicola River. The RIOP did not describe operational specifics at any of the four federal reservoirs upstream of Jim Woodruff Lock and Dam or other operational parameters at those reservoirs. Instead, the RIOP described the use of the composite conservation storage of the system and releases from the upstream reservoirs as necessary to assure that the releases made from Jim Woodruff Dam would comply with the Endangered Species Act of 1973 by minimizing effects on federally listed threatened and endangered species and federally designated critical habitat.

3-06. Principal Regulation Problems. There are no regulation problems that affect the West Point Dam water control operations.

IV - WATERSHED CHARACTERISTICS

4-01. General Characteristics. The Chattahoochee River drainage basin above West Point Dam has a long, narrow shape with an average of about 24 miles wide by 140 miles long. The drainage area for the entire Chattahoochee River Basin is 8,708 square miles, of which 3,440 square miles are above West Point Dam. The Chattahoochee River is formed in the Blue Ridge Mountains of north Georgia near the westernmost tip of South Carolina. The river flows southwesterly for 235 miles to West Point, Georgia, on the Alabama-Georgia line. Turning south at that point, it continues to the Walter F. George Dam, constituting the boundary between Georgia on the east and Alabama on the west. The average slope is about 2.7 feet per mile for the area above West Point and about 0.9 foot per mile for the river below West Point.

4-02. Topography. West Point Dam is in the Piedmont Region, north of the Fall Line. The northern portion of the basin extends into the Blue Ridge Region. Topographically, the Piedmont Region consists mostly of rolling hills although faulting has produced the impressive ridge of Pine Mountain near Warm Springs, Georgia. Isolated granitic plutons also rise above the Piedmont Region landscape to give prominent features like Stone Mountain.

4-03. Geology and Soils. Piedmont Region soils are commonly a red color for which Georgia is famous. The soils consist of kaolinite and halloysite (aluminosilicate clay minerals) and of 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 central Georgia. The abundance of clay has contributed to a tradition of folk pottery in central and north Georgia.

Mineral resources of the Piedmont Region include hard crushed stone. Granite has long been quarried for tombstones and other monuments in the eastern Piedmont near Elberton, Georgia. Granite was once quarried from Stone Mountain. Soapstone was mined by Native Americans in southwestern DeKalb County at Soapstone Ridge. One well-known kyanite mine in the Piedmont Region was at Grave's Mountain. Groundwater in the Piedmont Region largely flows along faults and fractures, making it difficult to find but often locally abundant.

4-04. Sediment. 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. Plans have been developed to measure the reservoir effects of sedimentation and retrogression at each of the government dams.

Both sedimentation and retrogression ranges have been established to monitor changes in reservoir and downstream channel conditions. The established ranges serve as a baseline to measure changes in reservoir volume and channel degradation. Reservoirs tend to slow river flow and accelerate deposition. Irregular releases for peaking power often have an erosive effect downstream. The year of the survey and number of ranges surveyed are shown in Table 4-1. The locations of sedimentation and retrogression ranges are shown on Plates 4-1 and 4-2.

Table 4-1. Sedimentation Ranges

Year Surveyed	No. of Ranges Surveyed	Total No. of Ranges Established
1978	30	30
1983	24	30
1997	29	30
2009	Hydrographic bathymetric surface	N/A

After the ranges were established in 1978, a periodic resurvey occurred in 1983 and 1997. In 2009, a hydrographic bathymetric survey of the entire lake was completed which allowed all previously established sedimentation ranges to be analyzed. Descriptive analyses are performed 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 resurvey 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. This sediment range data has not resulted in revised area/capacity curves for West Point Lake. Maintenance of the sedimentation and retrogression ranges typically occurs when they are resurveyed. Sediment data collection and results are discussed further in Section 5-03, Sediment Stations.

4-05. Climate. Chief factors that control the climate of the ACF 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 normal annual temperature for the middle Chattahoochee River Basin in the vicinity of the West Point Dam is 62.0 degrees Fahrenheit (°F). That is based on an arithmetic mean of the normal annual temperature at six stations in or near the basin for the period 1981 – 2010. The average monthly normal temperatures vary from a low of 43.3 °F in January to a high of 79.3 °F in July. Table 4-2 shows the monthly and annual normal temperatures for each station. The stations are Ashland 3 ENE, Lafayette, and Rock Mills, in Alabama; and Columbus WSO AP, LaGrange, and West Point, in Georgia. 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. Extreme temperatures events for the period of record for the six stations are presented in Table 4-4. Recorded temperatures have been as low as –10 F at LaGrange, Georgia, to as high as 107 °F at two of the locations.

b. Precipitation. The Chattahoochee River Basin above West Point Dam is in a region of heavy rainfall that is fairly well distributed throughout the year. The average normal annual precipitation over the basin is 52.93 inches, of which 25 percent occurs in the spring, 28 percent in the winter, 26 percent in the summer, and 21 percent in the fall. Normal monthly and annual precipitations in inches for selected stations in or near the West Point Project are shown in Table 4-3. Table 4-5 presents extreme rainfall events for the period of record for the same six stations. The table shows the highest monthly rainfall (19.09 inches at Lafayette, Alabama), the lowest monthly rainfall (0.00 at several stations), and the one-day highest rainfall (7.82 inches at LaGrange, Georgia). Annual values are also included.

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. Light snowfall can occur in the basin from November through March, but it seldom covers the ground for more than a few days and has never been a contributing factor in any major flood.

Table 4-2. Normal Mean Temperature (1981–2010) Near West Point Project

Station		(°F)												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Ashland 3 ENE, AL (010369)		42.0	45.9	52.9	59.9	67.8	74.7	78.0	77.6	71.6	61.4	52.7	44.1	60.8
Lafayette, AL (014502)		42.5	46.5	53.6	60.6	68.6	75.6	78.8	78.1	72.2	62.0	52.7	44.4	61.4
Rock Mills, AL (017025)		42.5	46.7	54.4	61.2	68.7	75.7	78.6	77.6	71.6	61.4	52.2	45.0	61.4
Columbus WSO AP, GA (092159)		45.8	49.6	56.0	63.5	72.1	78.5	81.5	80.9	75.4	65.4	55.9	47.3	64.4
LaGrange,, GA (094949)		44.3	47.8	54.9	61.9	69.5	76.6	79.2	78.6	72.6	62.6	54.1	45.8	62.4
West Point, GA (099291)		42.8	46.5	53.6	60.5	68.9	76.2	79.4	78.6	72.9	62.3	53.5	45.3	61.8
Average		43.3	47.2	54.2	61.3	69.3	76.2	79.3	78.6	72.7	62.5	53.5	45.3	62.0

Table 4-3. Normal Mean Rainfall (1981–2010) Near West Point Project

Station		(inches)												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Ashland 3 ENE, AL (010369)		5.18	5.89	5.85	4.49	4.72	4.35	5.11	4.47	3.73	3.95	5.14	5.27	58.15
Lafayette, AL (014502)		5.02	5.07	5.72	4.55	4.27	4.18	5.12	4.20	3.71	3.28	4.58	4.85	54.55
Rock Mills, AL (017025)		4.02	5.04	5.15	4.03	3.46	5.46	5.65	3.85	3.79	2.86	4.51	5.14	52.96
Columbus WSO AP, GA (092159)		4.34	4.80	5.61	3.70	3.34	4.18	4.86	3.94	3.32	2.91	4.15	4.47	49.62
LaGrange,, GA (094949)		4.60	4.72	5.26	4.15	2.95	3.90	5.56	4.09	3.74	3.29	4.64	5.39	52.29
West Point, GA (099291)		4.45	4.82	5.36	3.94	3.12	3.96	4.98	3.77	3.36	3.03	4.48	4.81	50.08
Average		4.60	5.06	5.49	4.14	3.64	4.34	5.21	4.05	3.61	3.22	4.58	4.99	52.93

Table 4-4. Extreme Temperature Near West Point Project (°F)

ASHLAND 3 ENE, ALABAMA (1940-2012)

	Monthly Averages			Daily Extremes			
	Max	Min.	Mean	High	Date	Low	Date
Jan	52.1	29.8	40.9	77	30/1975	-7	21/1985
Feb	56.7	32.0	44.4	80	27/1977	1	05/1996
Mar	64.7	39.1	51.9	86	11/1974	8	15/1993
Apr	74.0	46.7	60.4	91	27/1986	23	01/1963
May	79.8	54.8	67.3	94	24/1960	33	01/1963
Jun	86.2	62.7	74.5	101	02/2011	42	02/1966
Jul	88.6	66.4	77.5	106	17/1980	51	10/1963
Aug	87.7	65.6	76.7	103	27/2011	51	29/1992
Sep	82.7	59.6	71.2	97	01/1957	34	29/1967
Oct	73.5	47.3	60.4	90	03/1959	27	29/1968
Nov	64.4	39.3	51.9	83	01/1961	11	24/1970
Dec	55.7	32.7	44.2	78	14/1967	1	25/1983
Annual	**72.2**	**48.0**	**60.1**	**106**	**07/17/1980**	**-7**	**01/21/1985**
Winter	54.8	31.5	43.2	80	02/27/1977	-7	01/21/1985
Spring	72.8	46.9	59.8	94	05/24/1960	8	03/15/1993
Summer	87.5	64.9	76.2	106	07/17/1980	42	06/02/1960
Fall	73.6	48.7	61.2	97	09/01/1957	11	11/24/1970

LAFAYETTE, ALABAMA (1944-2012)

	Monthly Averages			Daily Extremes			
	Max.	Min.	Mean	High	Date	Low	Date
Jan	55.9	33.1	44.5	84	12/1949	-7	21/1985
Feb	60.4	35.7	48.0	86	26/1949	3	05/1996
Mar	67.8	42.4	55.1	89	10/1974	8	03/1980
Apr	76.4	49.2	62.8	93	27/1986	26	01/1987
May	82.7	57.5	70.1	98	31/1951	28	23/1947
Jun	88.9	64.4	76.6	103	28/1954	42	03/1956
Jul	90.4	67.5	78.9	107	23/1952	53	06/1970
Aug	90.1	66.8	78.4	103	17/1954	50	30/1968
Sep	85.0	61.5	73.3	100	19/1954	37	29/1967
Oct	76.0	50.2	63.1	99	05/1954	26	28/1957
Nov	66.0	41.3	53.6	85	01/1950	6	25/1950
Dec	57.6	34.6	46.1	81	03/1970	-1	13/1962
Annual	**74.8**	**50.4**	**62.5**	**107**	**07/23/1952**	**-7**	**01/21/1985**
Winter	58.0	34.5	46.2	86	02/26/1949	-7	01/21/1985
Spring	75.6	49.7	62.7	98	05/31/1951	8	03/03/1980
Summer	89.8	66.2	78.0	107	07/23/1952	42	06/03/1956
Fall	75.7	51.0	63.3	100	09/19/1954	6	11/25/1950

ROCK MILLS, ALABAMA (1938-2012)

	Monthly Averages			Daily Extremes			
	Max.	Min.	Mean	High	Date	Low	Date
Jan	55.3	31.3	43.3	83	12/1949	0	24/1963
Feb	59.2	33.2	46.1	82	13/1962	6	01/1966
Mar	67.1	39.5	53.3	87	18/1982	11	04/1943
Apr	76.7	46.7	61.7	92	30/1942	25	18/1983
May	83.6	55.1	69.3	98	24/1948	32	04/1971
Jun	89.9	62.8	76.4	103	28/1954	30	22/1954
Jul	91.4	66.6	79.0	107	25/1952	52	01/1950
Aug	91.0	65.7	78.3	104	04/1947	49	29/1992
Sep	85.5	60.1	72.8	100	01/1951	32	30/1967
Oct	76.7	46.9	61.8	99	05/1954	21	30/1952
Nov	66.2	37.6	51.9	86	01/1950	6	25/1950
Dec	57.2	32.1	44.7	80	01/1970	-1	13/1962
Annual	**75.0**	**48.1**	**61.6**	**107**	**07/25/1952**	**-1**	**12/13/1962**
Winter	57.2	32.2	44.7	83	01/12/1949	-1	12/13/1962
Spring	75.8	47.1	61.5	98	05/24/1948	11	03/04/1943
Summer	90.8	65.0	77.9	107	07/25/1952	30	06/22/1954
Fall	76.1	48.2	62.2	100	09/01/1951	6	11/25/1950

COLUMBUS WSO AP, GEORGIA (1948-2012)

	Monthly Averages			Daily Extremes			
	Max.	Min.	Mean	High	Date	Low	Date
Jan	57.6	36.5	47.0	83	11/1949	-2	21/1985
Feb	61.5	38.9	50.2	83	13/1962	10	05/1996
Mar	68.9	45.1	57.0	89	10/1974	16	03/1980
Apr	77.1	52.2	64.6	94	30/2012	28	07/1950
May	84.0	61.1	72.6	97	27/1953	39	02/1963
Jun	89.8	68.7	79.2	104	29/1978	44	03/1956
Jul	91.6	71.9	81.7	104	24/1952	59	01/1950
Aug	91.1	71.3	81.2	104	10/2007	57	05/1950
Sep	86.1	66.2	76.1	100	07/1990	38	30/1967
Oct	77.2	54.3	65.8	96	05/1954	24	30/1952
Nov	67.7	44.2	55.9	86	02/1961	10	25/1950
Dec	59.4	38.1	48.8	82	16/1971	4	13/1962
Annual	**76.0**	**54.0**	**65.0**	**104**	**07/24/1952**	**-2**	**01/21/1985**
Winter	59.5	37.8	48.7	83	01/11/1949	-2	01/21/1985
Spring	76.7	52.8	64.7	97	05/27/1953	16	03/03/1956
Summer	90.8	70.6	80.7	104	07/24/1952	44	06/03/1956
Fall	77.0	54.9	65.9	100	09/07/1990	10	11/25/1950

LAGRANGE, GEORGIA (1887-2012)

	Monthly Averages			Daily Extremes			
	Max.	Min.	Mean	High	Date	Low	Date
Jan	56.1	34.2	45.2	80	25/1943	-5	21/1985
Feb	59.9	35.9	47.8	82	28/1944	-10	13/1899
Mar	68.0	42.2	55.1	89	17/1945	11	04/1943
Apr	76.4	49.2	62.8	93	23/1896	26	01/1987
May	83.3	57.4	70.4	99	29/1941	33	02/1963
Jun	88.7	65.0	76.9	102	11/1977	41	01/1972
Jul	89.9	68.3	79.1	104	23/1952	50	15/1967
Aug	89.3	67.6	78.5	103	27/1938	49	29/1968
Sep	84.6	61.9	73.3	100	19/1954	32	30/1967
Oct	75.9	49.9	62.9	99	05/1954	24	26/1962
Nov	66.0	40.7	53.3	86	06/1943	3	29/1985
Dec	58.0	35.4	46.7	80	14/1971	-1	13/1962
Annual	**74.7**	**50.6**	**62.7**	**104**	**07/23/1952**	**-10**	**02/13/1899**
Winter	58.0	35.2	46.6	82	02/28/1944	-10	02/13/1899
Spring	75.9	49.6	62.8	99	05/29/1941	11	03/04/1943
Summer	89.3	67.0	78.1	104	07/23/1952	41	06/01/1972
Fall	75.5	50.9	63.2	100	09/19/1954	3	11/29/1895

WEST POINT, GEORGIA (1891-2012)

	Monthly Averages			Daily Extremes			
	Max.	Min.	Mean	High	Date	Low	Date
Jan	56.6	33.5	45.1	80	23/1937	-8	21/1985
Feb	59.8	35.3	47.6	84	28/1948	5	14/1905
Mar	67.5	42.2	54.8	95	22/1907	11	04/1943
Apr	75.7	49.3	62.5	94	30/1942	26	13/1940
May	83.0	57.8	70.4	100	28/1916	35	07/1944
Jun	89.4	65.7	77.6	104	29/1931	43	03/1956
Jul	91.0	69.2	80.1	106	14/1980	53	15/1967
Aug	90.3	68.6	79.4	106	21/1925	50	09/1976
Sep	85.9	63.0	74.4	106	06/1925	35	30/1967
Oct	76.8	50.4	63.6	99	03/1904	24	30/1952
Nov	66.5	40.6	53.6	93	25/1910	8	25/1950
Dec	57.9	34.8	46.3	80	13/1971	1	13/1962
Annual	**75.0**	**50.9**	**62.9**	**106**	**08/21/1948**	**-8**	**01/21/1985**
Winter	58.1	34.6	46.3	84	02/28/1948	-8	01/21/1985
Spring	75.4	49.7	62.6	100	05/28/1916	11	03/04/1943
Summer	90.2	67.8	79.0	106	08/21/1925	43	06/03/1956
Fall	76.4	51.4	63.9	106	09/06/1925	8	11/25/1950

Table 4-5. Extreme Rainfall Events Near West Point Project (inches)

	ASHLAND 3 ENE, ALABAMA (010369)						
	Record: 1940 - 2012						
	Mean	High	Year	Low	Year	1 Day Max.	
January	5.41	13.78	1972	0.46	1986	5.90	25/1976
February	5.55	14.76	1961	1.38	1968	4.47	11/1995
March	7.17	14.61	1976	1.02	1967	7.50	04/1979
April	4.58	10.95	1982	0.61	1986	4.30	05/1968
May	4.44	14.20	1991	0.81	1951	4.31	28/1996
June	4.42	11.20	1957	0.21	1988	5.73	04/1957
July	5.64	15.99	1941	0.65	1978	3.05	07/1975
August	4.07	9.75	1974	0.36	2011	3.65	12/1958
September	4.15	12.80	1988	0.27	1984	5.64	17/1988
October	3.65	12.30	1970	0.00	1941	5.49	05/1995
November	4.33	16.07	1948	0.11	1949	3.71	24/1983
December	5.21	16.98	1961	1.44	1979	4.21	10/1961
Annual	**58.62**	**76.02**	**2009**	**45.85**	**1987**	**7.50**	**03/04/1979**
Winter	16.18	29.49	1962	8.14	1986	5.90	01/25/1976
Spring	16.19	28.31	1991	4.95	1940	7.50	03/04/1979
Summer	14.12	22.02	1974	8.08	1986	5.73	06/04/1957
Fall	12.13	24.55	2009	3.87	1978	5.64	09/17/1988

	LAFAYETTE, ALABAMA (014502)						
	Record: 1944 – 2012						
	Mean	High	Year	Low	Year	1 Day Max.	
January	5.21	10.60	1947	1.16	1981	6.75	19/1947
February	5.55	19.09	1961	1.48	1951	5.75	24/1961
March	6.69	15.36	1980	2.03	1967	5.70	17/1990
April	5.09	16.40	1979	0.66	1986	7.38	13/1979
May	4.29	12.88	1991	0.26	1962	4.02	14/1991
June	3.60	14.83	1989	0.77	1968	5.25	18/1972
July	5.52	11.68	1985	0.87	1952	3.41	29/1977
August	3.62	8.74	1974	0.90	2011	2.15	30/1952
September	4.18	11.24	1956	0.39	1984	7.11	26/1956
October	2.88	10.62	2009	0.00	1963	4.00	29/1970
November	4.07	15.08	1948	0.33	1960	4.90	28/1948
December	5.21	13.94	1961	1.43	1979	4.93	10/1961
Annual	**55.91**	**80.18**	**1975**	**33.65**	**1954**	**7.38**	**04/13/1979**
Winter	15.97	24.49	1961	8.02	1951	6.75	01/19/1947
Spring	16.07	30.99	1980	7.46	1995	7.38	04/13/1979
Summer	12.74	22.83	1989	7.47	2011	5.25	06/18/1972
Fall	11.14	25.50	2009	2.80	1961	7.11	09/26/1956

	ROCK MILLS, ALABAMA (017025)						
	Record: 1938 - 2012*						
	Mean	High	Year	Low	Year	1 Day Max.	
January	5.39	11.49	1947	1.80	1941	4.23	11/1972
February	5.21	17.64	1961	0.28	1977	7.04	25/1961
March	6.42	12.47	1980	1.48	1982	5.32	16/1990
April	4.83	12.52	1979	1.34	2012	4.55	25/1945
May	3.95	7.79	1969	0.37	1965	2.90	03/2010
June	3.95	10.93	1989	0.48	1988	3.37	20/1972
July	5.12	10.27	1940	0.32	1952	4.04	10/1948
August	3.98	8.38	1992	0.70	1940	4.00	13/1945
September	3.74	12.08	1988	0.20	1984	4.83	16/1988
October	2.47	10.44	2009	0.00	1963	4.75	01/1965
November	4.18	16.86	1948	0.02	1939	4.69	27/1948
December	5.21	15.99	1961	0.89	1979	4.24	21/1972
Annual	**54.46**	**75.83**	**1975**	**35.02**	**1954**	**7.04**	**02/25/1961**
Winter	15.82	26.69	1962	7.88	2011	7.04	02/25/1961
Spring	15.20	23.58	1980	7.35	1954	5.32	03/16/1990
Summer	13.05	20.49	1941	4.34	1990	4.04	07/10/1948
Fall	10.39	22.77	1948	2.21	1939	4.83	09/16/1988

	COLUMBUS WSO AP, GEORGIA (092166)						
	Record: 1948 - 2012						
	Mean	High	Year	Low	Year	1 Day Max.	
January	4.14	8.35	1978	0.72	1989	3.21	13/1992
February	4.50	9.41	1961	1.20	2000	5.54	10/1981
March	5.66	13.30	2001	0.56	2004	5.38	16/1990
April	3.98	11.67	1953	0.10	1986	5.74	01/1981
May	3.75	8.45	1959	0.22	1962	4.77	03/2010
June	3.92	10.83	1967	0.51	2000	3.88	01/1959
July	5.28	13.24	1971	1.74	1957	5.45	03/1989
August	3.98	10.11	1991	0.80	1988	5.32	03/1977
September	3.30	9.47	2004	0.22	1984	4.15	17/1971
October	2.28	8.41	1995	0.00	1963	5.00	04/1964
November	3.62	12.45	1948	0.31	1956	5.44	10/2009
December	4.53	13.62	2009	0.43	1955	4.33	23/1956
Annual	**48.92**	**80.20**	**2009**	**26.39**	**1999**	**5.74**	**04/01/1981**
Winter	13.16	22.52	2010	6.93	2000	5.54	02/10/1981
Spring	13.39	24.33	2009	5.51	1995	5.74	04/01/1981
Summer	13.17	24.68	2005	6.31	1990	5.45	07/03/1989
Fall	9.20	18.44	2009	2.30	1961	5.44	11/10/2009

	LAGRANGE, GEORGIA (094949)						
	Record: 1887 – 2012						
	Mean	High	Year	Low	Year	1 Day Max.	
January	5.06	11.12	1936	0.81	1981	4.30	19/1943
February	5.07	18.46	1961	0.87	1898	7.82	25/1961
March	6.05	13.87	1980	1.02	1887	6.13	17/1990
April	4.66	13.20	1964	0.66	1986	6.84	25/1945
May	3.35	8.91	1991	0.22	1898	3.85	23/1967
June	4.00	8.51	2001	0.67	2000	5.00	13/1942
July	5.42	12.89	1955	0.72	1952	4.63	05/1994
August	4.18	9.53	1893	0.69	1988	4.64	19/1957
September	3.35	9.90	1956	0.00	1897	6.74	25/1956
October	2.66	9.77	1995	0.00	1963	4.80	01/1989
November	3.46	15.13	1948	0.12	1887	5.24	27/1948
December	4.73	14.00	1961	0.92	1889	4.67	04/1953
Annual	**52.00**	**74.97**	**1961**	**28.99**	**1954**	**7.82**	**02/25/1961**
Winter	14.86	24.20	1975	5.56	1938	7.82	02/25/1961
Spring	14.06	25.56	1980	3.94	1887	6.84	04/25/1945
Summer	13.60	26.29	1994	4.41	1988	5.00	06/13/1942
Fall	9.48	23.15	1992	3.20	1897	6.74	09/25/1956

	WEST POINT, GEORGIA (099291)						
	Record: 1891 - 2012						
	Mean	High	Year	Low	Year	1 Day Max.	
January	4.55	12.38	1925	1.02	1927	4.46	25/2010
February	5.10	18.25	1961	1.13	1951	7.18	25/1961
March	5.80	15.52	1929	0.75	1918	5.71	30/1960
April	4.46	14.86	1979	0.11	2012	5.25	14/1979
May	3.65	10.14	1991	0.21	2007	6.00	08/2003
June	3.81	10.57	1989	0.69	1984	4.69	13/1942
July	5.57	15.87	1985	0.55	1952	5.40	02/1915
August	4.12	12.47	1941	0.21	1925	5.02	17/1953
September	3.21	9.78	2009	0.07	1919	6.00	25/1956
October	2.63	10.69	2009	0.00	1963	4.55	01/1989
November	3.40	16.87	1948	0.34	1939	7.26	27/1948
December	4.95	11.36	2009	0.90	1955	6.05	29/1901
Annual	**51.24**	**76.70**	**2009**	**29.99**	**1954**	**7.26**	**11/27/1948**
Winter	14.60	24.45	1936	6.32	1938	7.18	02/25/1961
Spring	13.90	26.14	1929	4.51	1925	6.00	05/08/2003
Summer	13.50	24.77	2005	3.75	1980	5.40	07/02/1915
Fall	9.23	27.51	2009	2.80	1939	7.26	11/27/1948

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 affect the region. The autumn months are usually the driest time of the year, but flood producing storms can occur any time of the year.

A major flood before construction of West Point Dam occurred in March 1929. That storm resulted from a widely extending low-pressure area that developed over eastern Colorado. The system moved rapidly east causing heavy rainfall in Mississippi, Alabama, and Georgia. Some areas experienced nearly 30 inches of rain in a 3-day period. The March 1929 flood is discussed further in the *ACF Master Water Control Manual*.

In July 1994, Tropical Storm Alberto formed in the southeastern Gulf of Mexico between the Yucatan Peninsula and the western tip of Cuba on 30 June 1994. Alberto was near hurricane strength when it made landfall near Ft. Walton, Florida, on 3 July. The storm moved inland over the ACF Basin to the Atlanta, Georgia, area and then meandered southward. Up to 26 inches of rainfall occurred in areas between the Chattahoochee and the Flint Rivers. Record stages were recorded on some streams. The Mobile District Office (MDO) prepared a special report on the storm titled, *Flood of July 1994 Apalachicola-Chattahoochee-Flint River Basin*. The *ACF Master Water Control Manual* also describes the storm.

During a 4-day period on 5-8 May 2003, heavy rainfall occurred across north and central Georgia, especially in western and extreme northern counties. Some locations, such as Troup and southern Meriwether Counties, received almost a foot of rain. A large atmospheric blocking pattern was across the United States, which caused the normal west-to-east progression of weather systems to become nearly stationary. Soils were already saturated from previous rainfall, resulting in rapid rises of many of the small streams in the western half of north and central Georgia. Local rainfall amounts of 8 to 10 inches over a short period just upstream of West Point Lake near Franklin, Georgia, occurred on 8 May 2003. At West Point, Georgia, just downstream of West Point Dam, the river crested at 23.2 feet - more than 4 feet above flood stage - shortly after midnight Thursday night (8 May). That is the highest level since 26 February 1961, when the river rose to 24.9 feet. The Corps calculated the peak flow at 170,000 cfs. Without West Point Dam, it is estimated that the Chattahoochee River at West Point, Georgia, would have risen to around 34 feet.

A significant recent flood was the storm of September 2009. The flood happened after a severe drought and heavy rainfall occurred above and below Buford Dam. The floods of September 2009, resembled a tropical event but, in reality, were caused by steady rain for eight days. Between 15–18 September 2009, constant rain fell but not in unusual amounts. Most areas had an inch or less on 15 and 16 September and very little on 18 September. By 19 September, the rainfall increased, with 3 to 5 inches falling that day. Rain began falling on the Atlanta area on the 15th, with the National Weather Service (NWS) reporting only 0.04 inch that day at the Hartsfield-Jackson Atlanta International Airport. Additional rain fell throughout the week, with only a trace amount recorded for 18 September. However, a large rain event began to inundate the area on 19 September. The official NWS monitoring station at the Atlanta Airport recorded 3.70 inches of rainfall from daybreak to 8 p.m. (more than doubling the previous record for rainfall on that date), while outlying monitoring stations recorded 5 inches of rainfall in a 13-hour period. A total of more than 20 inches was recorded in areas above Buford Dam. A second area in Georgia, east of West Point, Georgia, received 15 to 20 inches of rainfall.

4-07. Runoff Characteristics. In the ACF Basin, rainfall occurs throughout the year but is less abundant from August to November. The amount (or percentage) of the rainfall that actually contributes to streamflow varies on a seasonal basis. Several factors such as plant growth and the seasonal rainfall patterns contribute to the volume of runoff. Figure 4-1 presents the average monthly rainfall and runoff for the basin between Atlanta and Columbus, Georgia, from the unimpaired flow dataset from 1939 - 2011. Figure 4-2 presents the same information for the area above Atlanta. The information was computed by comparing flows with rainfall over the basin. The percent of rainfall appearing as stream runoff is also presented for each month.

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, sluice gates, or spillway gates. 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 as seen below.

$$\text{CHANGE IN STORAGE} = \text{STORAGE}_i - \text{STORAGE}_{i-1}$$

where: STORAGE_i = storage at midnight of the current day in units of cfs/day
STORAGE_{i-1} = storage at midnight of the previous day in units of cfs/day

The daily storage value comes from the storage-elevation tables using the adjusted midnight pool elevation for each day. Negative inflow calculations can occur when there is a decrease in storage which exceeds the project's outflow. Evaporative losses, direct reservoir withdrawals, wind affecting the lake level reading, and losses to groundwater are several causes of negative inflow calculations.

Streamflows have been measured in the vicinity of the West Point Dam since 1896. Average monthly and annual flows for the period before construction of West Point Dam, 1896 through 1973, are shown in Plates 4-3, 4-4, and 4-5. Average monthly inflows since the project was constructed, 1975 through 2013, are tabulated in Plates 4-6 and 4-7. The tabulation also shows the maximum and minimum monthly flows and the maximum and minimum mean daily flow that occurred during each year. Plates 4-8 through 4-17, present graphically, the daily inflows, outflows, and pool elevations since the project was completed.

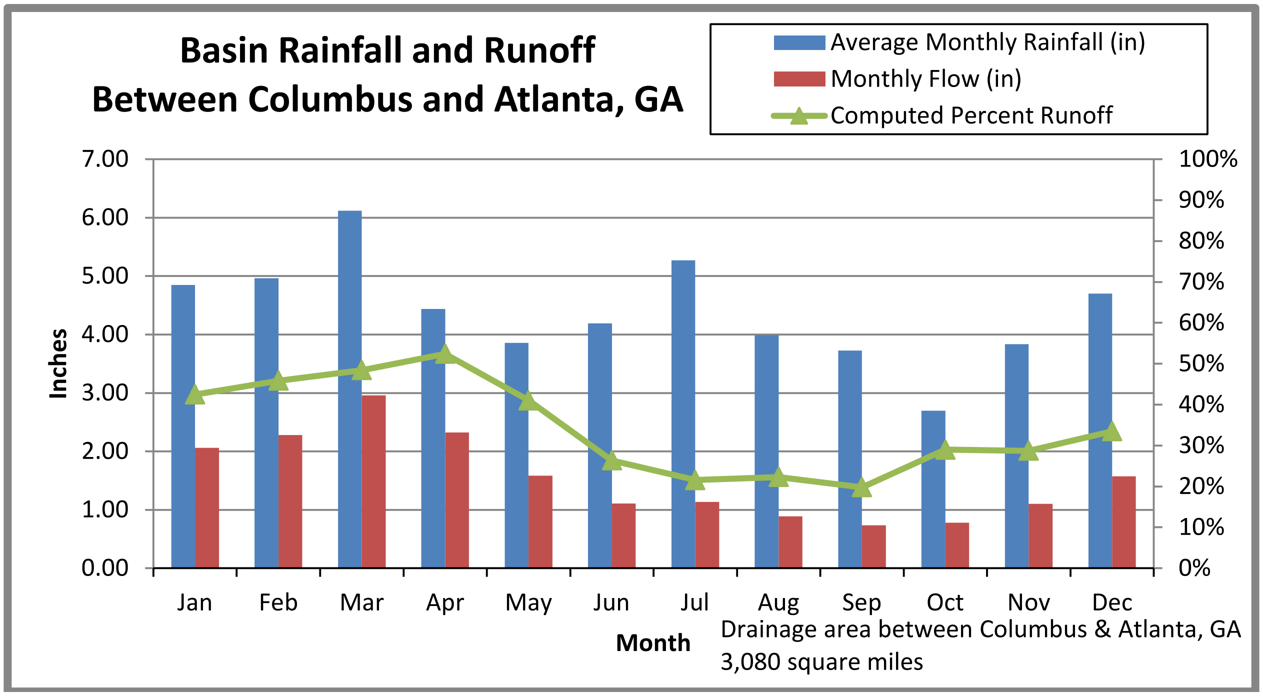


Figure 4-1. Basin Rainfall and Runoff between Columbus and Atlanta, Georgia

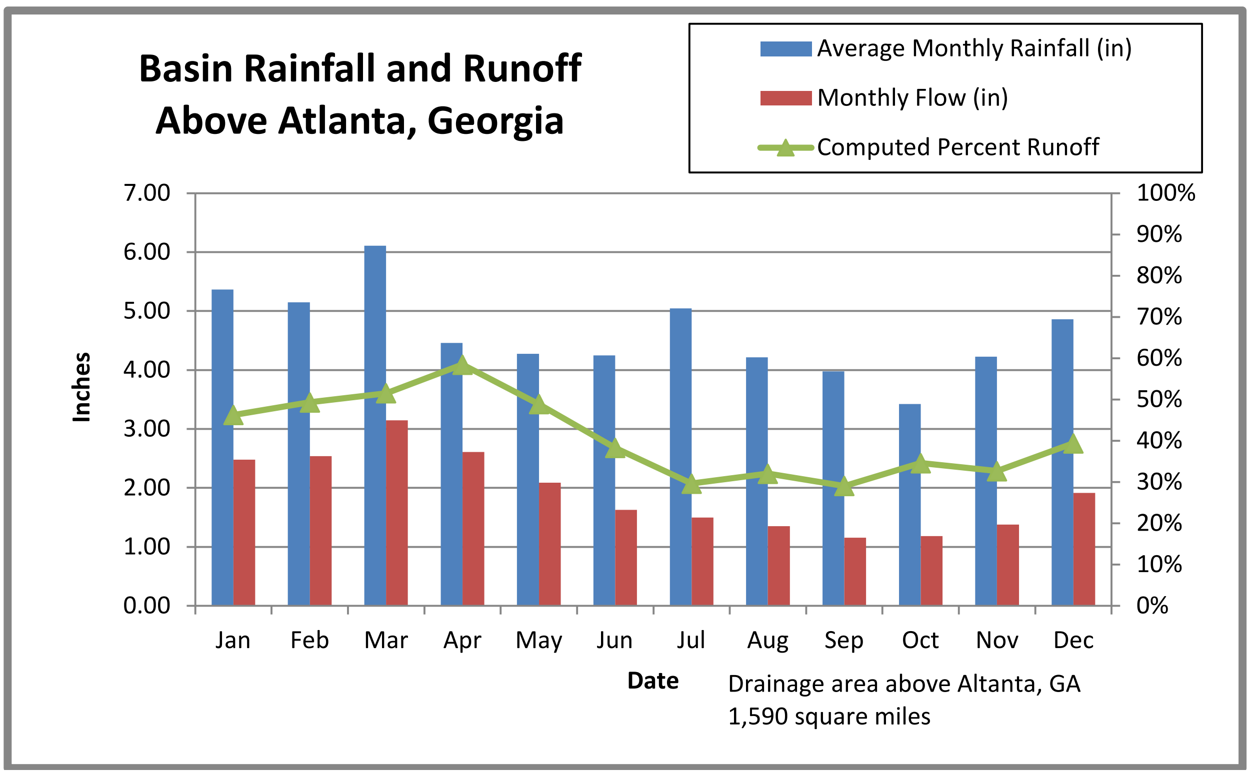


Figure 4-2. Basin Rainfall and Runoff above Atlanta, Georgia

4-08. Water Quality. During construction, a pre-impoundment water quality survey was conducted. Thirteen sampling stations were established for the study, which included the Chattahoochee River and its principal tributaries between Franklin and West Point, Georgia.

Eight stations were in the main river channel, and the remaining five were in the tributaries along this 35-mile stretch of the Chattahoochee River. Five physical parameters were measured: temperature, color, turbidity, pH and conductivity; and 11 chemical parameters: total dissolved solids, suspended solids, dissolved oxygen, biochemical oxygen demand, alkalinity, chloride, nitrogen, phosphorus, total organic carbon, manganese, and iron. The study before impoundment provides a baseline for water quality conditions before and after the lake was formed. Plate 4-18 shows the location of the monitoring stations.

Georgia's 2014 draft integrated 305(b)/303(d) list of impaired waters designates West Point Lake as not supporting designated uses because of polychlorinated biphenyls (PCBs). A total maximum daily load (TMDL) investigation for West Point Lake was completed in 1998 for PCBs, but it lists reduction at 0 percent because PCBs are no longer being used in Georgia. The PCBs found in fish in West Point Lake are from historic contamination. A TMDL investigation was also completed in 2000 for low dissolved oxygen below the West Point Dam in the Chattahoochee River.

Georgia collects profile data at compliance points in the reservoir for nutrients and additional water quality criteria. Site-specific nutrient standards have been developed for West Point Lake; chlorophyll *a* must be less than 27 micrograms per liter at the LaGrange water intake during the growing season, total nitrogen must be less than 4 milligrams per liter (mg/l), and phosphorus loading must be less than 2.4 pounds per acre-foot per volume of water a year. All water quality samples collected by Georgia Environmental Protection Division (GAEPD) have been within those ranges. In accordance with the state water plan, GAEPD is developing a three-dimensional hydrodynamic and water quality model that will further examine nutrient criteria in West Point Lake.

The City of LaGrange, Georgia, is also actively monitoring water quality at various locations in West Point Lake. The city's monitoring efforts are being conducted to document reservoir nutrients. The city's water supply intake is in West Point Lake. It has an intake structure in the lake that houses a series of intakes at the following elevations: 628, 623, 618, and 600 feet NGVD29. Its GAEPD permit allows a daily maximum of 22 million gallons per day (mgd), with a monthly average of 20 mgd. An older, inoperable intake existing before the construction of West Point Lake is at elevation 582 feet NGVD29. A number of other permitted withdrawals are on the Chattahoochee River upstream of West Point Lake.

In 2008, the data effort identified several violations of the State's nitrogen standard in waters entering the reservoir. Samples collected in the lake pool during the same period did not experience violations. Since 2008, nitrogen concentrations entering the reservoir have not violated the state's water quality standard for nitrogen.

The Corps monitors water quality in the tailrace of West Point Lake. Dissolved oxygen levels in the tailrace vary greatly, from 1 mg/l to 10 mg/l, and levels are typically less than 5 mg/l during late summer and early fall. Water temperature in the tailrace ranges from 50 °F to 80 °F and can approach 90 °F in July and August.

Monitoring of the waters released from West Point Lake is performed by equipment consisting essentially of a sample collection phase, a recorder phase, and a telemetering phase. The recorder module, analyzer module, and signal conditioner module are located at the Hardley Creek public recreation access area downstream from the dam. The sampling site is about 1,000 feet downstream from the dam. The specific water quality parameters monitored are dissolved oxygen, temperature, pH, conductivity and turbidity. The monitoring system also includes provisions for installing equipment to investigate 12 water quality parameters including iron and manganese concentrations. Dissolved oxygen and water temperature readings are telemetered to Walter F. George Dam. The water quality data from the Corps monitors are available from the Project's Resource Management Office and also the Mobile District (PD-EI).

Analysis of water quality and quantity needs for the West Point, Georgia, area was conducted by the U.S. Public Health Service in 1964, and its report was used as the basis for the water quality and quantity design for West Point Dam. The studies substantiated the need for a continuous discharge of 670 cfs with an initial dissolved oxygen concentration of not less than 4.0 mg/l. Thus, the small generating unit was designed to provide a minimum, continuous, off-peak flow of 675 cfs, and it was assumed that if the small unit is unavailable at any time when the large units are not generating, at least 670 cfs (the minimum required for water quality) would be passed through the spillway by raising one gate to the first ratchet step.

4-09. Channel and Floodway Characteristics

a. Channel and Floodway. The Cities of West Point and Columbus, Georgia, and Lanett, Valley, and Phenix City, Alabama, are all subject to flooding. Bankfull channel capacities downstream are 40,000 cfs at West Point and 32,000 cfs at Columbus. The West Point Project provides 391,283 acre-feet of flood storage including 162,232 acre-feet between elevations 628 and 635 feet NGVD29 available seasonally, and 170,271 acre-feet between elevations 635 and 641 feet NGVD29 for induced surcharge operations. The total rural area in the floodplain upstream of West Point Dam and Lake, between Morgan Falls Dam and West Point, is 19,900 acres of which about 15,800 acres are cleared and 4,100 acres are woodland. The floodplain is narrow, averaging only about one-quarter mile wide; the typical farm along the reach has some area in the fertile bottoms and some on the adjoining upland out of the reach of floods. Principal highway and railroad crossings are on high hills and are seldom affected by floods; however, some secondary roads are inundated when floods reach a few feet above bankfull.

b. Damage Centers and Key Control Points. Flooding and flood damages occur in the vicinity of the Cities of West Point and Columbus, Georgia, below West Point Dam and at Whitesburg, Georgia, in the upper reservoir area. The following Tables 4-6 through 4-11 provide the expected flood effects for various stages and the historical flood heights at West Point, Columbus and Whitesburg, Georgia. This information is taken from the Southeast River Forecast Center (SERFC) website.

Table 4-6. Flood Effects at West Point, Georgia (USGS Gage #02339500)*

Stage at West Point gage (feet)	Flood impacts
14	**ACTION STAGE**: Bank-full is reached in many locations especially on the Alabama side or right bank of the river downstream from the river gage.
17	**FLOOD STAGE**: Minor flooding begins. City Hall, Police, and Fire Departments get some minor water into the edge of the parking lot.
19	**MODERATE FLOOD STAGE**: Moderate flooding begins. Mainly farm lands undergo some flooding. Flood waters enter the parking lots near Fire House and 911 Center.
19.5	Water enters West Point City Works Department. Equipment needs to be moved.
20	Mainly low places on West Point City Streets flood.
21	**MAJOR FLOOD STAGE**: Major flooding begins. Parking lots of West Point City Hall, 911 Center, Police Department, and Fire Department flood out. Equipment needs to be moved. Evacuations need to begin.
22	Major flooding in West Point and to a lesser extent in Lanett, as basements of 100 to 200 businesses in West Point flood. Evacuations needed. In Lanett Alabama, South Gilmer Avenue and 1st Street flood.
23	Major and extensive flooding occurs. Expect 200 to 300 businesses and homes in West Point to be flooded. Water enters into West Point Fire Headquarters. I-85 southbound will close as entrance and exit ramps flood. In Lanett, Highway 24 closes, with East 10th Street and Avenue C flooded. In addition, flooding spreads further into Lanett, with South Gilmer Avenue and 11th Street flooded. Evacuations required.
24	Major to serious flooding occurs. Hundreds of businesses and homes in West Point and many streets in Lanett are flooded. Evacuations needed. Flood of Record, since the West Point Dam was built in the early 1970s occurs. This post-dam flood of record occurred on 9 May 2003 at 23.2 feet.
24.75	Major and extensive flooding occurs. Water reaches entrance to West Point Waste Water Treatment Plant.
26	Major flooding occurs. Hundreds of homes and businesses flooded. Highway 29 on left bank, 22 city blocks of West Point businesses flood and 5 blocks of residences on left bank flood. One of the highest crests of modern times before West Point Dam was 24.9 feet on 26 February 1961. Evacuations are required.
31.5	Waste Water Treatment Plant in West Point floods.

*Gage datum 551.67 feet above NGVD29

Table 4-7. Historical Crests at West Point, Georgia (#02339500)*

(1) 29.25 ft on 12/10/1919
(2) 25.60 ft on 04/01/1886
(3) 25.40 ft on 03/15/1929
(4) 25.00 ft on 12/30/1901
(5) 24.90 ft on 02/26/1961
(6) 24.60 ft on 01/19/1925
(7) **23.23 ft on 05/08/2003
(8) 22.90 ft on 04/08/1936
(8) 22.90 ft on 03/16/1912
(10) 22.40 ft on 11/29/1948

*Gage datum 551.67 feet above NGVD29
**with project in place

Table 4-8. Flood Effects at Columbus, Georgia (USGS Gage 02341460)*

Stage at Columbus gage (feet)	Flood impacts**
25	**ACTION STAGE**: Bankfull.
27	**FLOOD STAGE**: Flood stage is reached.
27	**MINOR FLOOD STAGE**
42	**MODERATE FLOOD STAGE**
47	**MAJOR FLOOD STAGE**

*Gage datum 551.67 feet above NGVD29
** New gage established Aug 2014.

Table 4-9. Historical Crests at Columbus, Georgia (#02341505)

(1) 55.20 ft on 03/15/1929
(2) 52.60 ft on 12/12/1919
(3) 49.80 ft on 02/26/1961
(4) 48.00 ft on 01/19/1925
(5) 45.89 ft on 04/08/1964
(6) 44.40 ft on 11/28/1949
(7) 43.00 ft on 03/21/1943
(8) **41.14 ft on 03/17/1990
(9) **39.95 ft on 05/09/2003
(10) 38.90 ft on 03/22/1942

*Gage datum 551.67 feet above NGVD29
**with project in place

Table 4-10. Flood Effects at Whitesburg, Georgia (USGS Gage 02338000)*

Stage at Whitesburg gage (feet)	Flood impacts
13	**ACTION STAGE**
15	**FLOOD STAGE**: Flood stage is reached and minor flooding occurs. Flood waters reach top of the boat ramp.
16	Minor flooding expands. Boat ramp parking lot floods.
17	Minor flooding continues. Payton Road Bridge near Cliff Payton Circle floods.
18	Minor flooding continues. Farm and pasture land begin to flood, and some evacuation of livestock in the floodplain of the river is required. A sod farm upstream also experiences flooding.
19	Minor flooding occurs to some unimproved dirt roads.
21	**MODERATE FLOOD STAGE**: Moderate flooding begins. Some access roads are flooded. More farm and pasture land are flooded out.
26	**MAJOR FLOOD STAGE**: Major flooding begins. Small coffer dams, at Georgia Power Plant Wansley 12 miles downstream, begin to be overtopped.
28	Major flooding continues. River intake buildings flood at Georgia Power Plant Yates.
30	Major flooding expands. The pumping station at Georgia Power Plant Wansley, 12 miles downstream, floods.
38	Major flooding continues. The Highway 27 bridge is flooded.

*Gage datum 551.67 feet above NGVD29

Table 4-11. Historical Crests at Whitesburg (#02338000) Above West Point

(1) **29.84 ft on 09/23/2009
(2) 29.11 ft on 12/11/1919
(3) 27.50 ft on 02/25/1961
(4) **25.90 ft on 03/18/1990
(5) 25.10 ft on 01/10/1946
(6) 25.00 ft on 11/29/1948
(7) **24.53 ft on 07/12/2005
(8) **23.90 ft on 03/16/1976
(9) **23.81 ft on 03/09/1998
(10) **23.79 ft on 04/14/1979

*Gage datum 551.67 feet above NGVD29
**with project in place

4-10. Upstream Structures. Buford Dam is about 147 river miles above West Point Dam. Buford Dam controls the runoff from 1,034 square miles and redistributes flow in the Chattahoochee River. The operation of Buford Dam reduces peak stages substantially at Morgan Falls Dam, located approximately 36 miles downstream. At Vinings, Georgia, and in the northwest suburbs of Atlanta near Bolton, Georgia, the river bottoms are subject to some overbank flow during the infrequent floods. Between Bolton, Georgia, and West Point, Georgia, a distance of about 100 river miles, no urban development is in the floodplain. The Town of Franklin, Georgia, 37 miles above West Point Dam, is on high ground, well above the flood zone. However, the effect of Buford Dam on floods decreases progressively downstream so that at West Point, Georgia, peak stages are only slightly reduced.

4-11. Downstream Structures. Between West Point, Georgia, and Valley, Alabama, just above the head of Bartletts Ferry Reservoir, the river flows through a 9-mile reach of considerable urban and industrial development, which is close to the river to make use of the power and water supply afforded by the stream. The Cities of West Point, Georgia, Lanett, and Valley, Alabama, are all along the river and partly subject to flooding.

The Chattahoochee River flows through West Point, Georgia, and floods affect parts of the city along both banks. The west bank flood zone suffers the greatest damage because it includes 90 acres of the main business district with retail stores, warehouses, service establishments, and dwellings subject to flooding. The east bank flood zone is mostly residential but contains a few businesses and one public high school. A channel and overbank clearing project, completed by the Corps in 1954, affords partial relief by lowering flood heights. However, major floods still cause severe damage at West Point, Georgia.

Lanett, Alabama, adjoins West Point Project on the west bank. The Town of Valley, Alabama, eight miles to the south also depends on textile mills that are subject to floods. The total area in the towns subject to inundation by high water is 300 acres. The flood of December 1919 caused extensive damage with water five to eight feet deep in portions of the textile mills. The reach of the river from West Point, Georgia, to Valley, Alabama, suffers far more flood damages than any other in the Chattahoochee Basin and the impact on the economy in the area is considerable. However, the hazard to human life is not usually great because there is ample warning of an approaching flood.

Between Valley, Alabama, and Columbus, Georgia, the river drops steeply through the zone known as the Fall Line. The original floodplain is occupied mostly by a continuous series of reservoirs for hydroelectric power development, and no appreciable damage occurs from flooding in this reach. At Columbus, Georgia, the river enters the Coastal Plain where the floodplain widens greatly extending two to three miles from the river in places. Sections of Columbus, Georgia, and Phenix City, Alabama, are in the river bottom and subject to flooding. Considerable agricultural activities occur below Columbus, Georgia, along the portion of the river and adjacent to the Walter F. George Lake. Those farm lands are inundated only by major floods. In the reach containing the Walter F. George and George W. Andrews Projects, extremely high floods inundate a total of about 44,000 acres, slightly more than half of which is cleared for farming. Between George W. Andrews and Jim Woodruff Dams are about 23,000 acres in the rural floodplain of which about one-third is cleared for farming.

4-12. Economic Data. The watershed above West Point Lake extends to Buford Dam in the Chattahoochee River Basin and consists of 10 Georgia counties and 2 Alabama counties. The watershed transitions from largely forest and agricultural land uses at West Point Lake to more urban and built-up land use categories in the upper reach of the watershed within the metropolitan Atlanta area. The watershed area below West Point Dam to Walter F. George Dam consists of 5 Alabama counties and 7 Georgia counties.

a. Population. The 2010 population of the 24 counties composing the West Point Lake Watershed and basin below was 4,259,262 persons. Table 4-12 shows the 2010 population and the 2010 per capita income for each county.

Nine major cities are in the West Point Lake watershed and basin below. The cities and their 2010 populations are Phenix City, Alabama - 32.822; Columbus, Georgia - 189,885; LaGrange, Georgia - 29,588; East Point Georgia - 33,712; Atlanta, Georgia - 420,003; Smyrna, Georgia - 51,271; Marietta, Georgia - 56,579; Roswell, Georgia - 88,346; and Alpharetta, Georgia - 57,551.

Table 4-12. Population and per Capita Income

County	2010 Population	Per Capita Income
Georgia		
Carroll	110,527	$ 20,551
Chattahoochee	11,267	21,739
Clay	3,183	16,123
Cobb	688,078	32,713
Coweta	127,317	25,730
DeKalb	691,893	28,064
Douglas	132,403	24,516
Fulton	920,581	36,412
Gwinnett	805,321	27301
Harris	32,024	28,753
Heard	11,834	16,706
Muscogee	189,885	21,717
Paulding	142,324	23,022
Quitman	2,513	16,327
Stewart	6,058	12,681
Talbot	6,865	16,855
Troup	67,044	19,314
Alabama		
Barbour	27,457	$ 15,875
Bullock	10,914	20,289
Chambers	34,215	16,626
Lee	140,247	22,794
Macon	21,452	16,380
Randolph	22,913	19,844
Russell	52,947	17,415
Total Population	4,259,262	
Source: U.S. Census Bureau, 2010		

b. Agriculture. The West Point Lake watershed and basin below consist of approximately 6,640 farms averaging 213 acres per farm. In 2012 the area produced almost $1.3 billion in farm products sold (including livestock). Agriculture in the West Point Lake watershed and basin is almost evenly split between row crops and livestock production. Row crops total 22 percent of the value of farm products sold, while livestock sales account for 78 percent. Cotton, peanuts, soybeans, and corn are the principle row crops. Livestock production consists primarily of beef cattle in the counties below West Point Lake and poultry operations in the counties in the immediate vicinity of the lake and in the upper counties of the watershed.

c. Industry. The leading industrial sectors that provide non-farm employment are wholesale and retail trade, services, and manufacturing. Those sectors account for a combined 66.1 percent of the non-farm employment in the basin. The remaining non-farm employment is provided by construction, finance, insurance, real estate, transportation and public utilities. In

2005, the West Point Lake area counties contained 3,612 manufacturing establishments that provided 161,742 jobs with total earnings of more than $11.4 billion. The value added by the area manufacturers totaled more than $21.0 billion. Table 4-13 gives information on the manufacturing activity for each county in the West Point Lake watershed and basin below.

Table 4-13. Manufacturing Activity

County	No. of Manufacturing Establishments	Total Manufacturing Employees	Total Earnings ($1,000)	Value Added by Manufactures ($1,000)
Georgia				
Carroll	123	7,616	$ 518,749	$ 738,564
Chattahoochee	(NA)	5	52	(NA)
Clay	(NA)	-	-	(NA)
Cobb	597	23,067	1,719,686	3,057,777
Coweta	84	4,609	234,481	530,239
Dekalb	588	20,181	1,480,731	4,006,557
Douglas	112	3,650	163,711	302,349
Fulton	794	35,448	3,388,450	6,126,659
Gwinnett	762	27,045	1,986,058	2,350,716
Harris	21	1,042	26,640	(D)
Heard	(NA)	(D)	(D)	(NA)
Muscogee	141	10,346	530,817	1,213,141
Paulding	48	1,186	50,778	93,799
Quitman	(NA)	(D)	(D)	(NA)
Stewart	(NA)	79	1,721	(NA)
Talbot	(NA)	10	52	(NA)
Troup	100	7,315	392,048	899,387
Alabama				
Barbour	40	4,404	$ 151,005	$ 311,384
Bullock	5	(D)	(D)	(D)
Chambers	37	4,033	171,665	334,859
Lee	100	7,112	343,344	890,988
Macon	(NA)	160	5,087	(NA)
Randolph	25	1,751	65,961	74,644
Russell	35	2,683	172,529	140,830
Totals	3,612	161,742	$ 11,403,565	$ 21,071,893

(NA) Not available
(D) Data withheld to avoid disclosure
Source: U.S. Census Bureau, County and City Data Book: 2007

d. <u>Employment</u>. According to the 2012 American Community Survey, more than 90 percent of all jobs in the West Point Project Area are provided by the private sector. The primary sources of employment are management and professional occupations and sales and office occupations; together, they account for, on average, over 50 percent of the total employment in the project area. Randolph, Troup, and Quitman Counties have manufacturing establishments that provide for more than 20 percent of the employment in the counties. Table 4-14 gives information on the employment by county for each county in the West Point Lake watershed and basin below.

Table 4-14. Employment

	Percent distribution by occupation					Percent in selected industries		Percent govern-ment workers (local state, or federal)
	Manage-ment, profes-sional, and related occupa-tions	Service occupa-tions	Sales and office occupa-tions	Con-struction, extraction, and main-tenance occupa-tions	Production, trans-portation, and material moving occupa-tions	Agricul-ture, forestry, fishing and hunting	Manu-facturing	
Georgia								
Carroll	29.6	15.9	24	11.3	19.2	0.8	15.5	3.8
Chattahoochee	26.7	24.8	22.6	9.8	16.2	3.1	5.3	15.2
Clay	27.9	26.1	15	18.8	12.3	14.9	11.5	14.8
Cobb	44	14.3	26.6	7.3	7.8	0.3	8.2	3.4
Coweta	32.5	15.1	25.9	11.5	15.1	0.7	15	5.2
Dekalb	42.4	16.1	24.8	6.9	9.8	0.2	6.4	6.1
Douglas	32.3	13.4	29.3	10.1	14.8	0.2	10.2	5.3
Fulton	48	15.2	24.6	4.8	7.4	0.3	6.3	3.6
Gwinnett	37.7	15.1	27.2	10.1	9.9	0.2	9.2	3.2
Harris	43.5	11.3	25.2	10.5	9.5	0.9	9.8	5.9
Heard	21.7	16.9	23.2	15.3	22.8	1.3	19.5	11.5
Muscogee	33.8	20.4	26.8	7.1	11.9	0.3	9.2	6.8
Paulding	33.3	15.3	27	12.3	12.2	0.3	10.1	5.1
Quitman	11.8	16.6	32.2	13.6	25.7	4.2	23.6	8.8
Stewart	21.1	23.9	18.6	12.3	24.1	7.9	19	12.7
Talbot	25.9	19.2	20.2	10.5	24.1	3.3	14.8	4.5
Troup	28.2	17.6	24	8.8	21.4	0.6	22.8	4.2
Alabama								
Barbour	28.1	16.7	23.8	10.7	20.8	3.5	24	7.4
Bullock	20.2	12.8	18.7	17.7	30.5	11.2	19.5	6.2
Chambers	24.2	14.3	27.6	12.3	21.6	1	22	3.6
Lee	36.4	16.5	24	10	13	1.1	11.9	4.3
Macon	25.6	25.3	25.2	10.2	13.7	1.3	10.5	7.2
Randolph	25.1	14.5	21	12.2	27.1	4.3	24.9	5.8
Russell	24.4	22.9	26.5	11.6	14.8	1	11.1	7.3

e. Flood Damages. The West Point Project provides flood damage protection for existing development in the Chattahoochee River floodplain. The floodplain below the West Point Dam consists of 171 residential structures, 18 public structures and 220 commercial structures. The appraised values of residential structure and contents total more than $7.7 million, public structures more than $5.5 million, and commercial structures about $177.5 million. The values for each category of structures in the Chattahoochee River floodplain below West Point Dam are given in Table 4-15 (USACE 1998 data).

Table 4-15. West Point Dam Floodplain Value Data

Category	Structure Value	Contents Value	Inventory Value	Equipment Value	Totals
Residential	$ 5,361,000	$ 2,363,000	$ -	$ -	$ 7,724,000
Public	2,643,000	-	893,000	2,024,000	5,560,000
Commercial	28,453,000	-	60,153,000	88,819,000	177,425,000
Totals	$ 36,457,000	$ 2,363,000	$ 61,046,000	$ 90,843,000	$ 190,709,000

The Corps' Water Management Office has developed an Annual Damage Reduction Summary that estimates the flood damages prevented by the West Point Dam. Table 4-16 shows the West Point Dam flood damages prevented by year from 1986 through 2013.

Table 4-16. Flood Damages Prevented by West Point Dam

Year	Flood damages Prevented ($)*
1989	0
1990	491,000
1991	11,000
1992	68,000
1993	290,000
1994	228,000
1995	1,100,000
1996	197,000
1997	95,200
1998	2,225,408
1999	2,225,409
2000	0
2001	0
2002	0
2003	49,770,266
2004	12,189,429
2005	11,554,000
2006	0
2007	0
2008	0
2009	4,021,518
2010	130,000
2011	0
2012	0
2013	37,100

Note: Years with zero values are drought or non-flood event years in the ACF Basin.
*Dollar values are indexed to each FY using Consumer Price Index

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 U.S. Geological Service (USGS) and 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 ACF 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.

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

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

Through the Corps-USGS Cooperative stream gage program, the Mobile District and the USGS operate and maintain stream gages throughout the ACF Basin. The Mobile District also partners with the USGS and the NWS for the majority of basin data collection and gage maintenance.

Plate 5-1 shows the location of rainfall and stream gage stations used to monitor conditions in the West Point Basin. Tables 5-1 and 5-2 list the stations along with pertinent information.

Table 5-1. Rainfall Only Reporting Network, West Point

Station	Agency ID	Latitude	Longitude	Elevation (ft NGVD29)
Buford Dam to West Point Dam				
Buford Dam, GA	CMMGI	34° 10"	84° 05'	1,150
Cumming 2N, GA	92408	34° 11'	84° 10'	1,295
Atlanta 9NW, GA	90444	33° 50'	84° 29'	885
Atlanta Hartsfield AP, GA	90451	33° 38'	84° 25'	1,010
Rock Mills, AL	17025	33° 09'	85° 17'	745
Newnan 5N, GA	96335	33° 26'	84° 47'	920
LaGrange 1N, GA	94949	33° 03'	85° 01'	715
Lafayette 2W, AL	14502	32° 54'	85° 26'	740
West Point Dam to Columbus, GA				
West Point Dam	WETG1	32° 55’	85° 11’	652
West Point, GA	99291	32° 52'	85° 11'	575
Hurtsboro, AL	14080	32° 15'	85° 24'	400
Columbus Metro AP, GA	92166	32° 30'	84° 56'	392
Opelika, AL	16129	32° 39'	85° 26'	640
Texas, GA	331339085131401 (USGS)	32° 36'	85° 10'	N/A
Centralhatchee, GA	332332085064901 (USGS)	33° 23'	85° 7'	N/A

Table 5-2. River-Stage and Rainfall Reporting Network, West Point

Stream	Station	Station number	River miles above mouth	Drainage area (sq. mi.)	Gage zero (ft. NGVD29)	Flood stage (ft.)	Operating agency	Rain Gage
Buford Dam to Columbus, GA								
Chattahoochee River	Buford tailwater	2334401	347.9	1,034	0		USGS	N
Chattahoochee River	Buford	2334430	348.1	1,040	912.04	12	USGS	N
Chattahoochee River	Norcross	2335000	330.77	1,170	878.14	12	USGS	Y
Chattahoochee River	Roswell	2335450	320.6	1,220	858.6	9	USGS	N
Big Creek	Roswell	2335757	2.11	103	940	10	USGS	N
Chattahoochee River	Morgan Falls	2335810	312.62	1,370	-12.52		USGS	Y
Chattahoochee River	Morgan Falls TW	2335815	312.62	1,370	-12.52	821	USGS	N
Chattahoochee River	Atlanta (Vinings)	2336000	302.97	1,450	750.1	14	USGS	N
Peachtree Creek	Atlanta	2336300	4	87	763.96	17	USGS	Y
Chattahoochee River	GA 280	2336490	298.77	1,590	736.35	24	USGS	N
Sweetwater Creek	Austell	2337000	5.5	246	857.01	10	USGS	Y
Chattahoochee River	Fairburn	2337170	281.79	2,060	718.3	20	USGS	Y
Snake Creek	Whitesburg	2337500	7	36	832.75	10	USGS	Y
Chattahoochee River	Whitesburg	2338000	259.85	2,430	682.06	15	USGS	Y
Chattahoochee River	Franklin	2338500	253.46	2,680	623.86	23	USGS	Y
Yellowjacket Creek	Hogansville	2338840	6.9	91	640.93	8	USGS	Y
Chattahoochee River	West Point Lake	2339400	201.4	3,440	0		USGS	Y
Chattahoochee River	West Point TW	2339402	201.6	3,443	0		USGS	N
Chattahoochee River	West Point, GA	2339500	198.96	3,550	551.67	17	USGS	Y
Chattahoochee River	Columbus, 14th St.	2341460	160.64	4,630	224	27	USGS	Y
Chattahoochee River	Columbus (removed 30 Sep 2014)	2341505	159.9	4,670	183.14	34	USGS	N
Columbus, GA to Walter F. George Lock and Dam								
Upatoi Creek	Columbus	2341800	12	342	230	24	USGS	Y
Chattahoochee River	W. F. George Lake	2343240	75.17	7,460	0		USGS	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. Much of the historic and current project hydrologic data are available to the public via the Mobile District website.

Data are collected at Corps sites and throughout the ACF 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. The 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 Data Collection System (DCS) 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 operates and maintains a Local Readout Ground Station (LRGS), which collects the data collection platform-transmitted, real-time data from the DOMSAT. Figure 5-3 depicts a typical schematic of how the system operates.

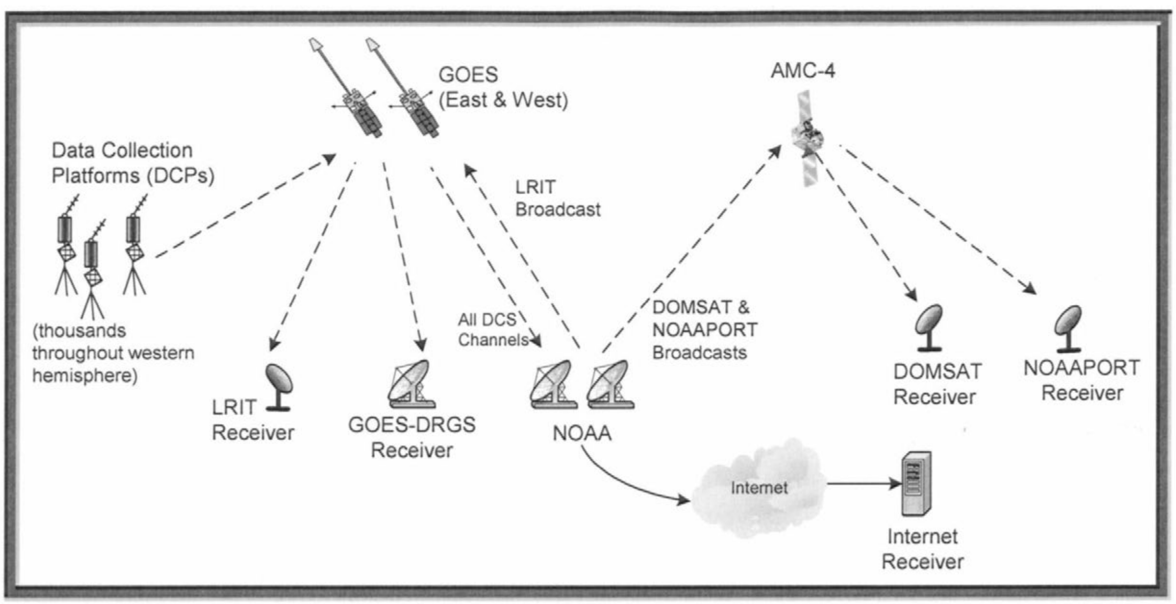


Figure 5-3. Typical Configuration of the GOES System

Typically, reporting stations log 15-minute data that are transmitted hourly. 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.

Other reservoir project data are obtained directly at a project are collected through each project's SCADA system. The Mobile District downloads the data both daily and hourly through the Corps' server network.

c. Maintenance. Maintenance of data reporting equipment is a cooperative effort among the Corps, the USGS, and the 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 ACF 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 ACF 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, GA 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

USGS Florida Water Science Center, 4446 Pet Lane, Suite 108, Lutz, FL 33559,
Phone: (813) 498-5000 Web: http://fl.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. Water quality monitoring by the Corps is limited in the ACF Basin. In most cases, other federal and state agencies maintain water quality stations for general water quality monitoring within the ACF Basin. In addition, real-time water quality parameters are collected at some stream gage locations maintained by the USGS.

The Corps operates a water quality monitoring station on the Chattahoochee River below West Point Dam. The water quality parameters monitored are dissolved oxygen, temperature, pH, and conductivity. The water quality data are collected monthly by project personnel and submitted to the Mobile District, Planning Division, Inland Environment (PD-EI) team.

5-03. Sediment Stations. In order to provide an adequate surveillance of sedimentation, a network of sediment ranges were established for West Point Lake in 1978. Quantitative computations can be made from these ranges to determine the extent and degree of sedimentation and erosion. General conditions and changes have been measured and recorded using this network. The network of sediment stations is shown on Plate 4-1.

Sediment surveys were conducted in 1983, 1997, and 2009. 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 West Point Lake".

Sediment is delivered via the many tributaries to West Point Lake, therefore sedimentation and erosion impacts may be independent between each of these tributaries. Overall, West Point Lake has consistently undergone light to no sedimentation in the main body of the Lake. Locations undergoing the greatest sedimentation are along the main stem of the Chattahoochee River. Light sedimentation is taking place in the western tributaries including Veasey, Stroud, Wehadkee, Turkey, and Whitewater Creeks. The eastern tributaries including Maple Creek and Yellow Jacket Creek are undergoing negligible sedimentation. Shoreline erosion is variable throughout the main lake and tributaries with approximately half of the shoreline erosion zones classed as undergoing some degree of erosion and half classed as undergoing deposition.

5-04. Recording Hydrologic Data. The WCDS/CWMS 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 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 time 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 supporting real-time operational decisions. Interagency data exchange has been implemented with the USGS and the 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 Voice over IP (VoIP) connections between every Division and District office worldwide. The VoIP allows all data and voice communications to transverse through the Corps' internet connection. The reliability of the Corps’ network is considered a command priority and, as such, supports a dedicated 24-hours-per-day Network Operations Center. Additionally, the use of satellite data acquisition makes for a very reliable water control network infrastructure.

The Mobile District has a critical demand for emergency standby for operation of the ACF Basin and to ensure that data acquisition and storage remain functional. Water Management must be able to function in cases of flooding or other disasters, which typically are followed by the loss of commercial electricity. The WCDS/CWMS servers and LRGS each have individual uninterruptable power supply (UPS) and a large UPS unit specifically for the portion of MDO in which Water Management 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 MDO 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 MDO 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 powerhouse and spillway at West Point Dam are operated remotely from the control room at the Walter F. George Project. The primary communication network of the Walter F. George Project is a SCADA system network. The SCADA network includes a microwave link between Walter F. George, George W. Andrews, and West Point Dam. The SCADA network also monitors powerhouse conditions and digitally records real-time project data hourly. The remote system provides a live video feed displaying the upper and lower pools of the West Point Project. Computer servers at Walter F. George are connected to the Mobile District through the Corps Network, permitting data transfer at any time. The data includes physical conditions at each of the reservoirs 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
Walter F. George Powerhouse	229-768-0141
West Point Dam Resource Office	706-645-2937

*West Point Dam is operated remotely from Walter F. George.

5-06. Communication with Project

a. Regulating Office with Project Office. The Water Management Section is the regulating office for the Corps' projects in the ACF Basin. Communication between the Mobile District and project offices is normally through daily hydropower generation schedules issued by SEPA. In addition, electronic mail, telephone, and facsimile are used daily for routine communication with the projects. During normal conditions on weekends, hydropower generation schedules can be sent out on Friday to cover the weekend period of project regulation, but they can change if deemed appropriate. If loss of network communication occurs, orders can be given via telephone.

During critical reservoir regulation periods and to ensure timely response, significant coordination is often conducted by telephone between the project office and the Mobile District. 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 using project recreation areas, campsites, and other facilities that could be affected by various project conditions.

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 Mobile District through the Corps' network. Operators have access to Mobile District Water Managers via email, land line and cell phone and notify the Mobile District if changes in conditions occur. Unforeseen or emergency conditions at the project that require unscheduled manipulations of the reservoir should be reported to the Mobile District 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 Mobile District. Water Management staff will manually input the information into the database. In addition, Mobile District Power Projects must verify pool level gage 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 when completed and furnished to the master waterplant. A Trouble Report to management communicates any discrepancies with the readings. Operations Division, Hydropower Section will be notified by e-mail when verification is complete. The e-mail notification will include findings of the verification.

Project personnel or the Hydropower Section with 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 Mobile District 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 West Point 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 for local law enforcement, government officials, and emergency management agencies. Specific actions to be taken at West Point Project are dependent upon the pool level and discharge rates and are described in Appendix E, High Water Action Plan.

Daily water release schedules can be obtained by calling (706) 645-2929.

5-09. Role of Regulating Office. The Water Management Section of the MDO 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 to meet the authorized purposes. 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 West Point Project. 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 are scheduled by the Mobile District in accordance with forecasts of reservoir inflow and pool stages. The NWS's River Forecast Center prepares river forecasts for the general public and for use by the Corps. In addition, the Mobile District maintains the capability to prepare forecasts for internal use only. Because the five federally owned reservoirs in the ACF Basin are operated as a system for conservation purposes, knowledge of total basin inflow is required.

ACF Basin inflow is computed by summing the daily local flow into the four federal reservoirs: Lake Sidney Lanier, West Point Lake, Walter F. George Lake, and Lake Seminole. Basin inflow is not the natural flow into the ACF Basin because basin inflow incorporates influences of reservoir evaporative losses, inter-basin water transfers, and consumptive water uses, such as municipal water supply and agricultural irrigation.

Expressed as a mathematical formula, the ACF Basin Inflow = Buford Local Flow + West Point Local Flow + Walter F. George Local Flow + Jim Woodruff Local Flow

"Local Flow" = Computed Inflow – Upstream Dam Discharge (with appropriate time lag)
"Computed Inflow" = Dam Discharge + Change in Reservoir Storage

Buford Local Flow $_{i}$ = Buford Computed Inflow $_{i}$
West Point Local Flow $_{i}$ = West Point Computed Inflow $_{i}$ – Buford Discharge $_{i-3}$
Walter F. George Local Flow $_{i}$ = Walter F. George Computed Inflow $_{i}$ – West Point Discharge $_{i-2}$
Jim Woodruff Local Flow $_{i}$ = Jim Woodruff Computed Inflow $_{i}$ – Walter F. George Discharge $_{i-1}$

where i is the current daily time step.

Flow requirements at the lower end of the basin, below Jim Woodruff Lock and Dam, are determined by conditions in the basin. On the Chattahoochee River, the observed inflows and outflows of upstream projects provide an estimate of future flows and requirements in the Apalachicola River. The Flint River is less developed, and a continuous monitoring of river gages and rainfall is necessary to predict total flow for that river. Authorized navigation functions require knowledge of river depths (or stages) at Blountstown, Florida. During stable flow conditions, accurate forecasts permit relatively uniform releases into the Apalachicola River. In addition, rapid decreases in river stages are to be avoided to prevent stranding endangered species. That requires forecasting the recession of high-flow events.

The Corps has developed techniques to conduct forecasting in support of the regulation of the ACF 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. The existing conditions include current inflows to the project, current lake elevation and current releases. The forecasted future conditions include future inflows from water which is already on the ground, future operations of upstream projects, and future expected releases all of which contribute to the future expected lake elevation. Meteorological and hydrologic forecasts can influence the projected release forecasts that are adjusted based on actual observed conditions.

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 efficiently regulate the ACF Basin.

a. Role of Corps. The Water Management Section maintains real-time observation of river and weather conditions data in the Mobile District. The Mobile District has capabilities to make forecasts for several areas in the ACF Basin. Observation of real-time stream conditions guides 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 ACF 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 Mobile District continuously monitors the weather conditions occurring throughout the basin and the weather and hydrologic forecasts issued by the NWS. The Mobile District then develops forecasts to meet the regulation objectives of the ACF projects. The Mobile District prepares 5-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 Mobile District 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 the preparation and public dissemination of forecasts relating to precipitation, temperatures, and other meteorological elements in the ACF Basin. The Mobile District use the NWS weather forecasts as a key source of information considered critical to its water resources management mission. The 24- and 48-hour Quantitative Precipitation Forecasts (QPFs) are invaluable in providing guidance for basin release determinations. The use of precipitation forecasts and subsequent runoff directly relates to project release decisions.

The 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, and Tallahassee, Florida. The SERFC routinely prepares and distributes 5-day streamflow and river-stage forecasts at key gaging stations along the Chattahoochee, Flint, and Apalachicola Rivers. Streamflow forecasts are available at additional forecast points during periods above normal rainfall. In addition, the SERFC provides a revised regional QPF on the basis of local expertise beyond the NWS Hydrologic Prediction Center QPF. The SERFC also provides the Mobile District with flow forecasts for selected locations on request. The SERFC prepares 7-day and longer forecasts for Bainbridge, Georgia, on the Flint River and for George Andrews on the Chattahoochee River and Blountstown, Florida, on the Apalachicola River. These forecasts can be compared to those prepared by the Mobile District.

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 the SERFC. Taking release decision data coupled with local inflow forecasts at forecast points along the ACF Basin, the SERFC can provide inflow forecasts into Corps projects. Having revised inflow forecasts from the SERFC, the Corps has up-to-date forecast data to make the following day’s release decisions. The Mobile District monitors observed conditions and routinely adjust release decisions based on observed data.

The USGS is responsible for maintaining and operating the network of river based gages that measure stage, flow, rainfall and often other parameters essential for the operation and monitoring of the ACF River Basin. This includes the critical gages at all flood risk management locations as well as all gages located at the federal projects on the ACF. The gage data is provided by the USGS through their website which updates each gage hourly. The Corps also retrieves USGS gage data directly from the gage DCP through the GOES system discussed in Chapter V of this manual. The Corps uses this near real-time data to make decisions on operations ranging from flood releases to daily hydropower releases during normal conditions. This data is also used by the Corps and SERFC in model calibration for forecasting flood releases and river stages.

USGS offices in Norcross, Georgia, and Montgomery, Alabama, are responsible for the maintenance of the gages located in the West Point Project area. In the event that a gage becomes inoperable, the Corps will inform the USGS office of responsibility by phone or email. The USGS will then deploy a team to perform maintenance on the gage, if they have not already done so. When any gage associated with flood risk management operations or a critical gage at a federal storage project malfunctions, the USGS will usually send a team to perform maintenance immediately upon becoming aware of the malfunction.

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). Decisions can be made on the basis of known events and *what if* scenarios. The Mobile District prepares forecasts and receives the official forecasts from SERFC.

a. Requirements. 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 reviewing what if scenarios.

b. Methods. In determining the expected inflow into West Point Lake, it is necessary to forecast the flows above West Point 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. Table 6-1 is used as a guide to estimate runoff as follows. Select a runoff value from Table 6-1 based on antecedent conditions. This runoff value is applied to the unit hydrograph in Table 6-2 and added to the observed inflow ((Table 6-1 Runoff Value * Table 6-2 hydrograph value) + observed inflow). 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.

For short-range flood forecasting the Water Management Section has begun utilizing the Corps Water Management System (CWMS) models developed to perform short term forecasts for the ACF basin. The CWMS model suite includes hydrologic modeling system (HEC-HMS) and reservoir simulation (HEC-ResSim) models to determine the anticipated reservoir operations based on the QPF provided by the SERFC. It also includes the capability to estimate inundation at downstream flood damage reduction locations using HEC-RAS (River Analysis System) and the ability to estimate damages at those locations using HEC-FIA (Flood Impact Analysis).

The Corps provides a link to the NWS website so that the Mobile District, 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 ACF 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 Mobile District 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.

Table 6-1. Rainfall and Runoff

Antecedent conditions	Rainfall (inches) Storm Total	Average basin rainfall (inches)									
		0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90
		Average runoff (inches)									
Wet	0	0.00	0.02	0.02	0.04	0.05	0.07	0.08	0.10	0.12	0.12
	1	0.14	0.16	0.19	0.21	0.24	0.26	0.30	0.33	0.36	0.41
	2	0.45	0.50	0.54	0.60	0.64	0.70	0.75	0.80	0.86	0.92
	3	0.98	1.04	1.10	1.16	1.22	1.29	1.35	1.42	1.48	1.55
	4	1.62	1.69	1.76	1.82	1.90	1.96	2.04	2.10	2.17	2.24
	5	2.31	2.38	2.44	2.52	2.58	2.66	2.72	2.80	2.86	2.94
	6	3.00									
Normal	0	0.00	0.00	0.02	0.03	0.04	0.04	0.06	0.06	0.08	0.08
	1	0.10	0.10	0.12	0.13	0.14	0.15	0.16	0.18	0.19	0.20
	2	0.22	0.23	0.24	0.26	0.28	0.30	0.31	0.33	0.34	0.36
	3	0.38	0.40	0.42	0.44	0.46	0.48	0.50	0.52	0.54	0.56
	4	0.58	0.60	0.62	0.65	0.68	0.70	0.72	0.74	0.76	0.78
	5	0.82	0.84	0.87	0.90	0.92	0.96	0.98	1.02	1.04	1.08
	6	1.10									
Dry	0	0.00	0.00	0.02	0.02	0.03	0.04	0.04	0.05	0.06	0.06
	1	0.07	0.08	0.09	0.10	0.11	0.12	0.14	0.14	0.16	0.16
	2	0.18	0.20	0.21	0.22	0.24	0.25	0.26	0.28	0.30	0.31
	3	0.32	0.34	0.36	0.38	0.38	0.40	0.42	0.44	0.46	0.48
	4	0.50	0.52	0.53	0.55	0.58	0.59	0.61	0.63	0.66	0.68
	5	0.70	0.72	0.75	0.78	0.80	0.83	0.86	0.88	0.92	0.94
	6	0.97									

Table 6-2. Unit Hydrographs for Forecast Areas above West Point

Time (hours)	Inflow area Buford to Whitesburg (D.A. = 1,390 sq.mi) 6-hour unit hydrograph (cfs)	Inflow area Whitesburg to West Point (D.A. = 978 sq. mi.) 6-hour unit hydrograph (cfs)	Inflow area Reservoir (D.A. = 32 sq. mi) 6-hour unit hydrograph (cfs)
0	0	0	0
6	5,200	2,110	860
12	13,200	6,840	860
18	24,600	14,290	860
24	27,600	19,980	860
30	18,200	19,730	0
36	11,100	15,630	
42	9,600	10,590	
48	8,300	6,440	
54	7,100	3,540	
60	6,000	2,100	
66	5,000	1,310	
72	4,000	870	
78	3,100	600	
84	2,400	430	
90	1,800	290	
96	1,200	190	
102	700	120	
108	300	60	
114	100	30	
120	0	10	

Note: D.A. = drainage area

6-03. Conservation Purpose Forecasts. Forecasts for conservation operations are accomplished similarly to flood condition forecasts. Releases from Buford Dam are applied with a 2-day lag and combined with runoff and other local inflows. This inflow forecast is then used to create a 7-day forecast of releases from West Point Dam.

a. Requirements. The ACF 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. Whenever possible, the NWS weather and hydrologic forecasts are used. Conservation requirements are the same as for flood conditions with the additional emphasis to ensure the minimum flow requirements downstream are supported by the project.

b. Methods. The Mobile District prepares 5-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 Mobile

District provides weekly hydropower generation forecasts based on current power plant capacity, latest hydrological conditions, and system water availability. The Mobile District has also begun testing CWMS for short term forecasts in normal conditions. These forecasts are typically no longer than five days, provide forecasting reservoir inflow, outflow and pool elevation, and assist in the planning of reservoir releases for the coming week. These forecasts incorporate the current observed conditions and a 48-hour QPF provided by SERFC.

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 purposes. These projections can vary from a 5-week forecast to a 6-month forecast.

b. Methods. During normal conditions, the current long-range outlook produced by the Corps is a 5-week forecast. For normal operating conditions, a forecast longer than this incorporates a greater level of uncertainty and reliability. In extreme conditions, 3-month and 6-month forecasts can be produced based on observed hydrology and comparative percentage hydrology inflows into the ACF 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 ACF reservoir projects.

6-05. Drought Forecast

a. Requirements. ER1110-2-1941, *Drought Contingency Plans*, dated 15 September 1981, called for developing drought contingency plans for Corps' reservoirs. Drought recognition and drought forecast information can be used in conjunction with the drought contingency plan, which is further discussed in Chapter VII.

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 West Point Lake to meet the demands placed on its storage, the probability that West Point 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. Drought Analysis. The top of conservation pool within West Point Lake varies seasonally from elevation 628 to 635 feet NGVD29. The bottom of conservation pool remains at elevation 620 feet NGVD29 for the entire year. Reservoir storage between elevations 635 and 620 feet NGVD29 is 306,131 acre-feet. Between 628 and 620 feet NGVD29, the storage is 143,899 acre-feet. In a normal non-drought period, this 143,899 acre-feet of storage is intended to supplement needs during the low-flow months. During prolonged low-flow or drought periods, this storage may be completely depleted meeting basin-wide water needs. As this lake is much smaller than Lanier, with a much larger drainage basin, the critical period for West Point Lake is less than one year. Figure 6-1 presents a graph of annual rainfall above West Point since 1939. The actual rainfall, average, and 10 year running average years are shown. A cyclical pattern of higher rainfall periods and droughts, both long-term and short-term, have occurred in the period. Figure 6-2 also shows the basin rainfall in the basin above West Point, along with the annual flow at the Dam for the same period. The average flow is also presented to demonstrate the drought periods. Figure 6-3 presents the West Point Dam flow along with the percent of rainfall appearing as runoff. Considering the limited storage and the long durations of some droughts, a drought plan is needed to best manage the water resources.

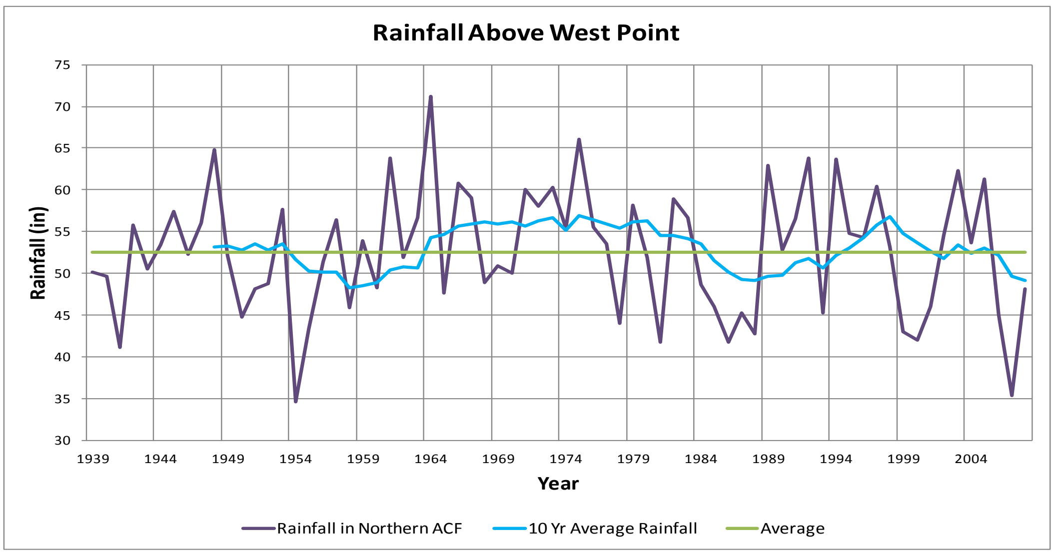
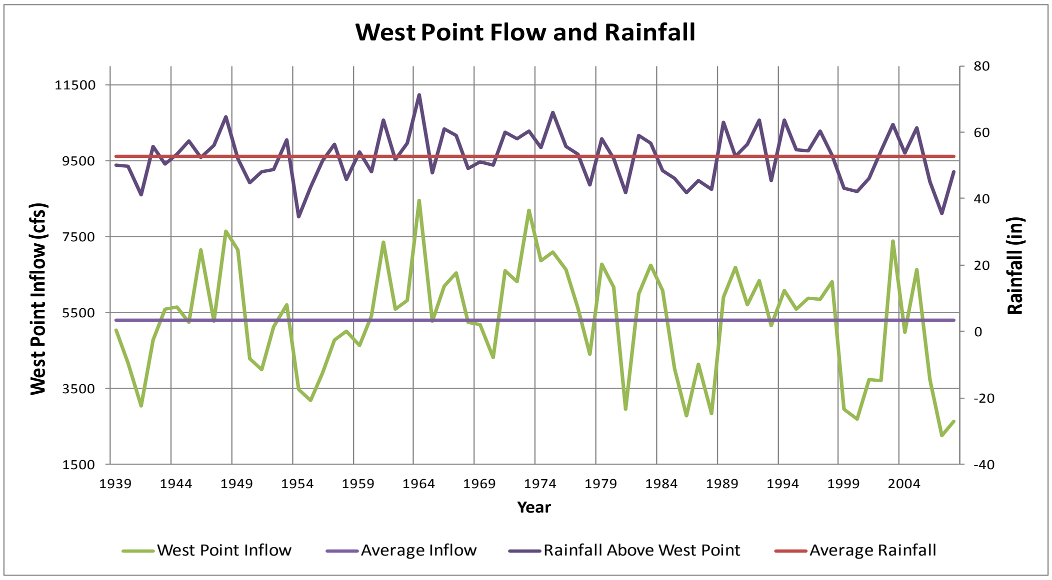


Figure 6-1. Rainfall Averaged Over Years



Note: The unimpaired inflow at West Point was used for West Point inflow. Annual rainfall averaged from various gages in the headwaters of West Point.

Figure 6-2. West Point Dam Flow and Rainfall

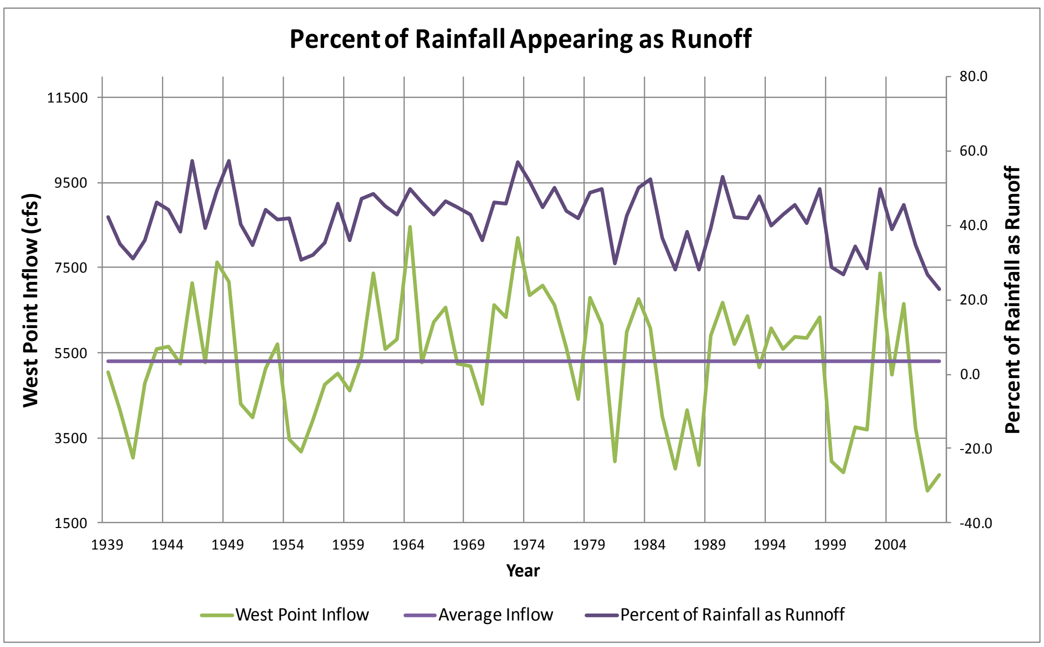


Figure 6-3. Percent of Rainfall Appearing as Runoff

d. Reference Documents. The drought contingency plan for the West Point Project is summarized in Section 7-12 below. The complete ACF Drought Contingency Plan is provided in Exhibit D.

VII - WATER CONTROL PLAN

7-01. General Objectives. The original congressionally authorized purposes for the West Point Dam and Lake are flood risk management, hydroelectric power, fish and wildlife conservation, navigation, and recreation. Since its initial authorization, several other project purposes have been authorized at West Point through subsequent nationwide authorizing legislation. Those purposes include water quality, water supply, and conservation of threatened and endangered species. The water control plan seeks to balance the needs of all project purposes at the West Point Project.

7-02. Constraints. Physical constraints of the project are generally limited to available powerhouse capacity and downstream channel capacity. West Point Dam has a minimum flow requirement of 670 cfs immediately downstream of the dam. 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 will be opened to meet that flow.

7-03. Overall Plan for Water Control

a. General Regulation. The water control operations of the West Point Project are in accordance with the regulation schedule as outlined in the following paragraphs. The Corps operates the West Point Project to provide for the authorized 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 Mobile District. Additionally, if communication between the District Office and the dam is interrupted, the operator will follow the emergency operation schedule found at Exhibit D, Instructions to the Damtenders for Water Control.

b. Conservation Pool. The West Point Lake 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 pool at West Point is regulated between a minimum elevation of 620 and a top of conservation between 628 and 635 feet NGVD29. The top-of-conservation pool guide curve and minimum conservation pool are shown in Figure 7-1 with other operating zones.

c. Guide Curves and Action Zones. The Corps operates the ACF system of reservoirs to provide for all the authorized project purposes. Each of the authorized project purposes is considered when making operational decisions, and those decisions affect how water is stored and released from the projects. The multiple water demands in the basin require that the Corps operate the system in a balanced manner in an attempt to meet all authorized purposes, while continuously monitoring the total system water availability to ensure that project purposes can at least be minimally satisfied during critical drought periods. The balanced water management strategy for the Corps reservoirs in the ACF Basin does not prioritize any project function but seeks to balance all project authorized purposes. Flow support may be required from West Point to support downstream requirements.

The *ACF Master Water Control Manual* and project appendices (to include this manual) prescribe guide curves to facilitate the water control regulation of the three major storage projects in the ACF Basin, Buford Dam/Lake Sidney Lanier, West Point, and Walter F. George. Figure 7-1 and Plate 7-1 depict the guide curve and action zones for West Point Lake in graphical form. The reservoir storage zones' elevation and volume associated with each guide curve are shown on Plates 7-2 and 7-3 respectively. Table 7-1 depicts the action zones for the West Point Project in tabular form. The guide curve defines the top of conservation storage water surface elevation associated with the storage limits, which guide the regulation for authorized purposes. The water control plan also establishes action zones within the conservation storage for each project. The zones are used to manage the lakes at the highest level possible while balancing the needs of all the authorized purposes. Zone 1, the highest zone, defines a reservoir condition where all authorized project purposes should be met. As lake levels decline, Zones 2 through 4 define increasingly critical system status where purposes can no longer be fully met. The action zones also provide guidance on meeting minimum hydroelectric power needs at each project. Table 7-2 below shows the typical hydropower by action zone that can be expected at West Point.

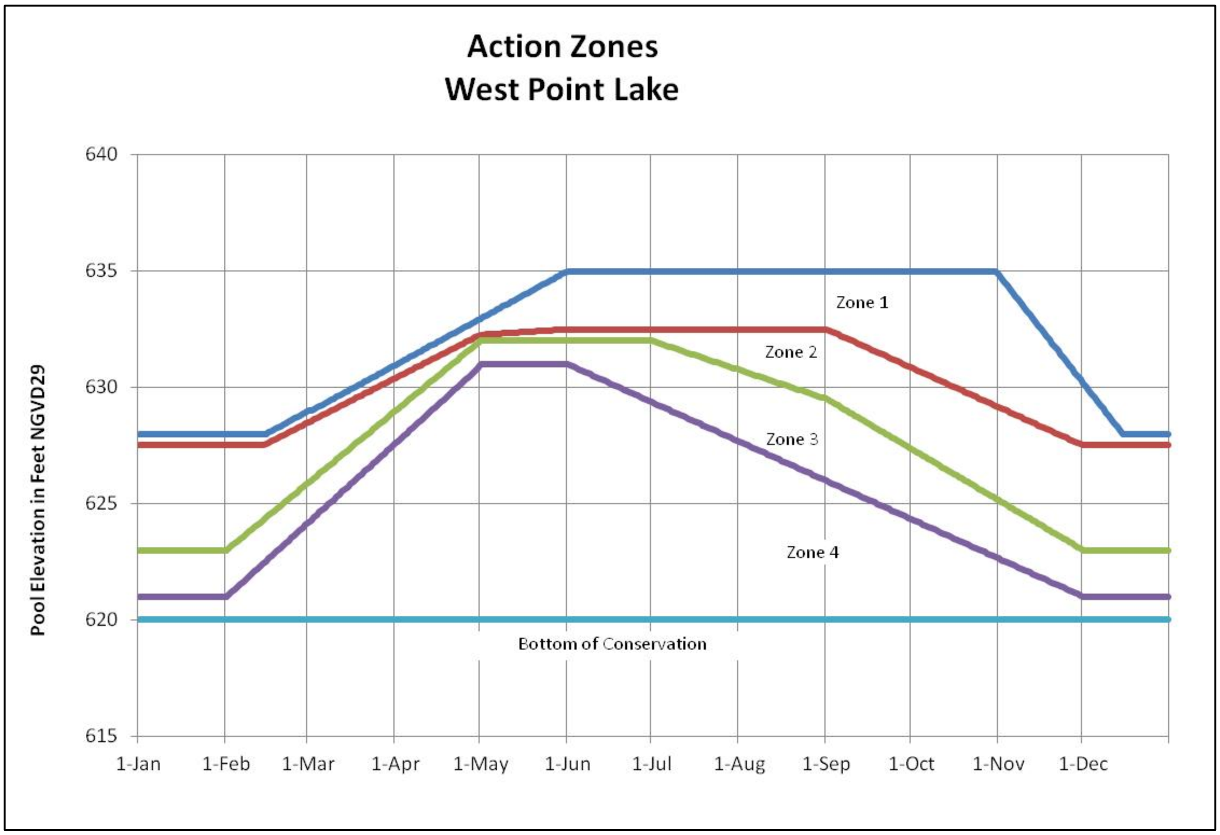


Figure 7-1. Action Zones for West Point Lake

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

Date	Elevation (feet NGVD29)			
	Top of Zone 1	Top of Zone 2	Top of Zone 3	Top of Zone 4
1 Jan	628.00	627.50	623.00	621.00
1 Feb	628.00	627.50	623.00	621.00
15 Feb	628.00	627.50	624.40	622.54
1 May	632.95	632.26	632.00	631.00
1 Jun	635.00	632.50	632.00	631.00
1 Jul	635.00	632.50	632.00	629.36
1 Sep	635.00	632.50	629.50	625.97
1 Nov	635.00	629.15	625.14	622.64
1 Dec	630.18	627.50	623.00	621.00
15 Dec	628.00	627.50	623.00	621.00
31 Dec	628.00	627.50	623.00	621.00

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

Action zone	West Point (hours of operation)
Zone 1	4
Zone 2	2
Zone 3	2
Zone 4	0

While hydropower would still be generated in Zone 4, it could not be generated on a regular peaking schedule under severe drought conditions.

The zones were derived on the ability of the reservoirs to refill (considering hydrology, watershed size, and physical constraints of each reservoir), recreation effects and hazard levels, and the proportionality of zone drawdown between projects. Other factors or activities might cause the lakes to operate differently than the action zones described. Examples of the factors or activities include exceptional flood damage reduction measures, fish spawn operations, approved deviations, maintenance and repair of turbines, emergency situations such as a drowning and chemical spills, draw-downs because of shoreline maintenance, releases made to free grounded barges, and other circumstances.

The storage projects are operated to maintain their lake level in the same zones concurrently. However, because of the hydrologic and physical characteristics of the river system and other factors that can influence lake levels, there might be periods when one lake is in a higher or lower zone than another. When that occurs, the Corps makes an effort to bring the lakes back into balance with each other as soon as conditions allow. By doing so, effects on the river basin are shared equitably among the projects.

The action zones are integral to the system-wide regulation of the ACF Basin through the concept of composite conservation storage. Composite conservation storage is calculated by combining the conservation storage of Lake Sidney Lanier, West Point Lake, and Walter F. George Lake. Composite conservation storage is shown in Figure 7-2. Each of the individual storage reservoirs consists of four action zones. The composite conservation storage uses the four zone concepts as well; i.e., Zone 1 of the composite conservation storage represents the combined storage available in Zone 1 for each of the three storage reservoirs. When composite conservation storage is in Zones 1 and 2, a less conservative operation is in place. When composite conservation storage is in Zone 3, hydropower is supported at a reduced level, water supply and water quality releases are met, and drought contingency operations are triggered. When composite conservation storage is in Zone 4, severe drought conditions exist and hydropower is likely generated only during concurrent uses. Navigation is not supported.

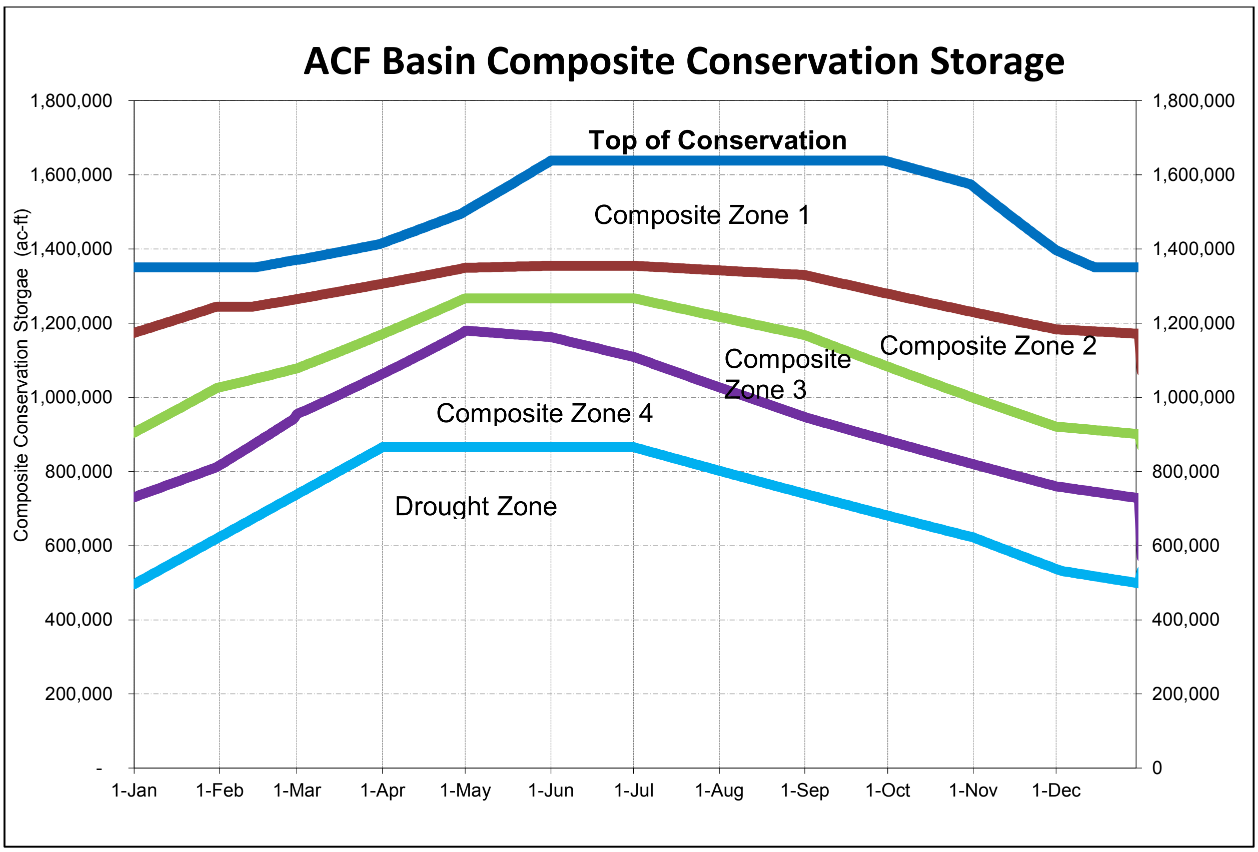


Figure 7-2. ACF Basin Composite Conservation and Flood Storage

The following definitions apply to the composite action zones:

Zone 1: If all the lakes are in Zone 1 or above, the river system would operate in a fairly normal manner. Releases can be made for hydroelectric power, water supply, and water quality. If system composite conservation storage is in Zone 1, releases can be made in support of a navigation season (January to April or May). Drought contingency operations cease when levels return to composite action Zone 1.

Zone 2: Hydroelectric power generation is supported at the same or a reduced level. Water supply and water quality releases are met. Minimum flow targets are met. If system composite conservation storage is in Zone 2, releases can be made in support of a navigation season (January to April or May).

Zone 3: Hydroelectric power generation is supported at a reduced level. Water supply and water quality releases are met. Minimum flow targets are met. If system composite conservation storage is in Zone 3, navigation is not supported. Drought contingency operations are triggered when levels drop to Zone 3.

Zone 4: Hydroelectric power demands will be met at a minimum level and might occur for concurrent uses only. Water supply and water quality releases are met. Minimum flow targets are met. If system composite conservation storage is in Zone 4, navigation is not supported.

Drought Zone: Hydroelectric power will only be met as a result of meeting other project purposes. Water supply and water quality releases are met. Minimum flow targets are met but are reduced to their lowest level. If system composite conservation storage is in the Drought Zone, navigation is not supported and the emergency drought operations are triggered. This reduces the minimum discharge from Jim Woodruff Dam to 4,500 cfs.

7-04. Standing Instructions to Damtenders. During normal operations, the powerhouse operators will operate the West Point Project in accordance with the daily hydropower schedule. Any deviation from the schedule must come through the Mobile District. Normally, flood risk management instructions are issued by the Water Management Section in the MDO. 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 (West Point is operated remotely from Walter F. George powerhouse).

7-05. Flood Risk Management. Operation of the West Point Project for flood risk management is in accordance with instructions issued by the MDO, and releases depend on the West Point pool level and expected conditions. The prime objective of flood risk management operations at the West Point Project is to reduce peak flows at West Point, Georgia, based on the downstream USGS gage “Chattahoochee River at West Point, GA” gage (# 02339500). This objective is met by regulating releases to maintain the West Point, GA USGS gage within the non-damaging bankfull flow of 40,000 cfs until such time as the induced surcharge schedule calls for greater release. This incidentally, also reduces the flood peak downstream in the Columbus, Georgia area. During the early stages of a flood event, the outflow from West Point Dam is planned to control, or limit, the peak outflow as the flood develops. However, water is not evacuated from the conservation storage to make room for an expected flood event. The decision to make releases up to 25,000 cfs is at the discretion of the Mobile District. Releases above 25,000 cfs exceed the flood easement; however, damaging out-of-bank flow does not occur until releases reach 40,000 cfs. Releases up to 40,000 cfs may be made if inflow exceeds 25,000 cfs and the reservoir rises above 635 feet NGVD29, unless induced surcharge operation has been triggered. Releases are then made to maintain flows within bankfull capacity of 40,000 cfs until such time as the induced surcharge schedule calls for an increase in the releases. The inflow and reservoir level are monitored continuously and compared to outflow requirements prescribed by the induced surcharge schedule.

a. Induced Surcharge Schedule. If current pool levels and inflow rates indicate that runoff from a storm will appreciably exceed the storage capacity below nearly 638.0 feet NGVD29 (top of gates in the closed position) flood risk management operations will be directed by the induced surcharge curves shown on Plate 7-4. As gates are open to meet the induced surcharge release, the available storage in the reservoir above 635 feet NGVD29, referred to as the induced surcharge pool, increases to a maximum elevation of 641 feet NGVD29. Table 7-3 describes the induced surcharge 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.

Table 7-3. Guidelines for Induced Surcharge Operations and Emptying Instructions

Induced Surcharge Operations

Note: At all elevations, follow regular flood risk management regulation schedule until larger releases are required by this schedule based on 3-hour inflow and pool elevation (induced surcharge). When pool rises above 635.0 feet NGVD29, pass the inflow up to 40,000 cfs (channel capacity), unless larger releases are required by the surcharge schedule on plate 7-4.

I. Pool Rising. 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.

II. Pool at Crest . When the pool appears to have crested, maintain the current gate opening for 6 hours to ensure that the inflow has peaked. After the reservoir elevation starts to fall, maintain the current gate opening until the pool level recedes to elevation 636.5 feet NGVD29.

III. Pool Falling.

A. Observe pool elevation and compute 3-hour average inflow every 3 hours (midnight, 3a.m., 6 a.m. etc.)

B. If following conditions exist:

1. Pool between 636.5 and 635.0 **AND** inflow is 10,000 cfs less than outflow

OR

2. Pool is less than 635.0 **AND** inflow is 3,000 cfs less than outflow

THEN

Reduce spillway discharge by 3,000 cfs an hour.

C. Once the capacity can be maintained within the normal capacity of the turbines, begin following the guidelines set forth in Table-7-5 and Plate-7-3 for flood risk management zones if the pool is still above the top of conservation. Otherwise, resume normal operations set forth by the water control plan.

An example of induced surcharge operations is the operation that occurred in the September 2009 flood. This is shown on Plate 8-8. The maximum pool elevation is 639.22 feet NGVD29. In this flood, the induced surcharge operations caused a release that only slightly exceeded bankfull capacity but reduced the peak flood wave that would have occurred by nearly 15,000 cfs. Other examples of induced surcharge operations are the floods of February 1990 and May 2003, shown on Plates 8-6 and 8-7, respectively.

Due to the limited flood storage at West Point Lake, the induced surcharge operation is used on average, about once every two years. The induced surcharge operation can cause a damage inducing release, but is designed to maximize the flood benefit as much as possible, while giving consideration to the integrity of the dam. There should never be an induced surcharge release greater than the current 3-hour average inflow. The West Point Project was designed to provide protection from small to moderate size floods. In the event of an extreme flood, West Point Lake would exhaust its flood storage and pass all inflows as prescribed in the induced surcharge schedule. Under current induced surcharge operations, the last gate openings are maintained until pool levels recede to 636.5 feet NGVD29. Then, the emptying instructions listed in Table 7-3 are followed.

b. Gate Operating Schedule. The gate opening schedule and the approximate discharge at each opening for varying pool elevations are shown in Plates 2-5 through 2-8. All gate operations, except for special operations, will be operated in the order and at the increments specified on those plates. The six spillway gates are numbered in sequence beginning at the right or west bank, adjacent to the powerhouse. The gates will normally be operated only during floods or at times when the required release cannot be discharged through the powerhouse.

c. Flood Risk Management Zones. Plate 7-5 and Table 7-4 delineates the flood risk management zones in West Point Lake. Instructions for operations within each zone are also included on Plate 7-5 and listed in Table 7-5. The Mobile District will use the instructions as a guide in formulating planned reservoir regulation activities. The flood risk management zones shown are above the top of conservation pool and provide guidance when the lake is at those elevations. When the lake is at or below the top of conservation pool, the guidance provided in Paragraph 7-03, Overall Plan for Water Control, will be followed. Instructions on Plate 7-5 will be followed to evacuate stored floodwater in a timely manner, while allowing a flexible scheduling for hydropower production.

Table 7-4. West Point Lake Flood Zones

Date	Elevation (feet NGVD29)		
	Top of Zone A	Top of Zone B	Top of Zone C*
1 Jan	631.0	635	641
15 Feb	631	635	641
15 Apr	634.65	635	641
15 May	636.5	636.5	641
1 Nov	636.5	636.5	641
1 Dec	632.75	635	641
15 Dec	631	635	641
31Dec	631	635	641

* Zone C extends to top of flood control pool.

Table 7-5. Instructions for Operation Within Flood Zones

Flood Regulations Above Top of Conservation Pool
Flood Zone C (highest) – If the pool elevation and 3 hour average inflow call for an induced surcharge release, follow the induced surcharge schedule depicted in Plate 7-2 and described in Table 7-3. Otherwise, maintain discharge below the bankfull capacity of 40,000 cfs or the 3-hour average inflow, whichever is less. Once the pool begin to fall, follow the emptying instructions listed in Table 7-3.
When releases are within the normal turbine capacity of 17,500 cfs, schedule sufficient releases of 16 to 24 hours of full generation with all units each day until the pool elevation enters Zone B. If significant rain is forecasted the spillway may be used up to a total discharge of 25,000 cfs to return the pool to zone B.
Flood Zone B - If the pool elevation and 3-hour average inflow call for an induced surcharge release, follow the induced surcharge schedule depicted in Plate 7-2 and described in Table 7-3. Otherwise, maintain discharge below the bankfull capacity of 40,000 cfs or the 3-hour average inflow, whichever is less. Once the pool begin to fall, follow the emptying instructions listed in Table 7-3.
When releases are within the normal turbine capacity schedule sufficient releases to lower pool elevation 2 feet or into Zone A within 5 days. Releases may be limited to the equivalent of 16 hours of full generation with all units each day. If significant rain is forecasted, schedule 24 hours of continuous generation until the pool reaches Zone A. The spillway may also be used up to a total discharge of 25,000 cfs to return the pool to Zone A.
Flood Zone A (lowest) - If the pool elevation and 3-hour average inflow call for an induced surcharge release, follow the induced surcharge schedule depicted in Plate 7-2. Otherwise, maintain discharge below the bankfull capacity of 40,000 cfs or the 3-hour average inflow, whichever is less.
Schedule sufficient releases to lower pool elevation one-half distance to bottom of Zone A within one week. In the event of forecasted drought conditions, water may be stored in Zone A indefinitely.

The flood risk management pool at West Point Lake is designed to reduce the flood wave from small and moderate sized floods. It does not have enough storage capacity to provide any beneficial flood damage reduction for very large floods. The top of the flood risk management pool is elevation 641 feet NGVD29; however, the elevation of the top of the spillway gates is only 638 feet NGVD29. This means an elevation of 641 feet NGVD29 can only be achieved if the gates are partially opened, creating more storage by increasing the top of gate elevation as they are raised. As the elevation approaches 641 feet NGVD29, the gates are raised higher and higher increasing the release until such time that inflow matches discharge and no flow reduction is provided downstream.

The project is designed to pass the Standard Project Flood without exceeding the elevation of 641 feet NGVD29. For this flood, inflow would equal discharge as the pool approached 641 feet NGVD29 and no reduction in flows downstream would be provided by the project. The Spillway Design Flood has an expected elevation of 646.4 feet NGVD29. For this flood, the spillway gates would be fully opened at elevation 641 feet NGVD29 and the pool would continue to rise above the top of the flood control pool. As of 2013, the flood storage at West Point has never been fully exhausted. The peak pool elevation of 639.89 feet NGVD29 occurred on 8 May 2003, as a result of a very intense rain event that occurred directly over the Lake. This storm is shown on Plate 8-7.

d. Notification of Potential Flood Conditions. Flooding can often occur with little warning and without an indication of potential flooding from forecasted weather conditions. Therefore, it is the responsibility of the powerhouse operators to notify the Mobile District of any conditions that may initiate flood risk management operations at West Point. Instructions for the responsibility of the project operator are included in Exhibit C; “Standing Instructions to the Damtenders for Water Control”. Exhibit C includes a table with conditions for which the operators should contact Water Management if exceeded as well as procedures to follow in the event the operator is unable to reach the Mobile District.

e. Constraints. West Point Dam is operated as part of the ACF River Basin, and during high-flow events, conditions at the other ACF projects and how increased releases from West Point will affect them should be considered when practicable. The channel capacity below West Point is 40,000 cfs. Releases from the dam should be below 40,000 cfs at all times until the induced surcharge schedule dictates otherwise.

7-06. Recreation. Recreational activities are best served by maintaining a full conservation pool at lake elevation 635.0 feet NGVD29. When the lake recedes several feet below the top of conservation pool, access to the water and beaches becomes progressively limited. Conversely, lake levels above top of conservation pool begin to flood certain public use areas and facilities. Water management personnel are aware of recreational effects caused by reservoir fluctuations at West Point Lake and attempt to maintain reasonable lake levels during the peak recreational use periods; however, other authorized purposes are also served by the project which often conflict with the ability to maintain a stable pool. To classify recreation effects associated with conservation storage usage at West Point Lake, various impact levels have been identified. They are briefly described below.

The effects of the West Point Dam water control operations on recreation facilities and use at West Point Lake 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 - The Initial Impact Level is defined at lake elevation 632.5 feet NGVD29. The swim areas are only marginally usable when the pool level falls below the impact level. Docks must be shifted to deeper water, if allowable. Unmarked recreational navigation hazards begin to appear. Approximately 35 percent of private docks become marginally usable with only two feet of water beneath them. Lanes of boat ramps can become partially silted in at some areas.

b. Recreation Impact Level - The lake elevation of 629.0 feet NGVD29 is defined as the Recreation Impact Level. At this level all swim areas become unusable. Public docks will need to be moved to deeper water if possible. Approximately 40 to 50 percent of private docks become unusable. Unmarked navigation hazards continue to emerge. Activities such as water skiing and wakeboarding become unsafe in some areas. Approximately 10 percent of project boat launch ramps are affected with less than six feet of water at the end of the slab. Other ramps continue to have silt buildup. Approximately 30 percent of courtesy ramps become unusable.

c. Water Access Impact Level - The lake elevation of 627.0 feet NGVD29 is defined as the Water Access Impact level. At this level, the most severe effects on recreation begin to occur. At this level, water is 50 to 100 feet from the normal shoreline and access to water is limited by extensive mud flats. Recreational navigation hazards continue to emerge and waterborne activities such as boating and water skiing are limited to the main bodies of the lake. The boat ramp at Highland Marina becomes unusable. Over 50 percent of courtesy docks at the boat ramps become unusable. Silt buildup and dropoffs continue to increase at boat ramps. Approximately 70 percent of private boat docks are unusable at this level.

The Water Control Plan takes the effects on recreation facilities into account in developing action zones for West Point 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 is responsible for contacting various lakeshore interests and keeping the public informed of lake conditions during drawdown periods. The Operations Project Manager closes beaches and boat ramps as necessary, patrols the lake, marks hazards and performs other necessary tasks to mitigate the effects of low lake levels.

Many facilities, both public and private, have been developed around the lakeshore. Much of the development cannot function at the full range possible between elevations 635 feet NGVD29 and 628 feet NGVD29. 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

Location of ramp	Bottom Elevation	Location of ramp	Bottom Elevation
R. Shaefer Heard Day Use Area	622.5	Horace King Park (south)	617
R. Shaefer Heard Campground	621.5	Horace King Park (north)	622
Long Cane Park	622	Whitetail Ridge Campground	623.5
Potts Road Access	622.5	Holiday Campground (west)	621.5
Earl Cook Recreation Area	622	Holiday Campground (east)	621
Glass Bridge Park	622.5	Wehadkee Park	621
McGee Bridge Park	622	Evansville Park	621
Yellowjacket Rec. Area (west)	617	Dewberry Park (south)	617
Yellowjacket Rec. Area (east)	621	Dewberry Park (north)	621
Georgia Park	619.5	Stateline Campground	622.5
Sunny Point Park (south)	617	Veasey Creek Park	621
Sunny Point Park (north)	621.5	Rocky Point Rec. Area (west)	617
Clark Day Use Park	621.5	Rocky Point Rec. Area (east)	621.5
Ringer Park (south)	617	Alligator Creek Park	623
Ringer Park (north)	621	Amity Campground (south)	624
Snake Creek Park	622	Amity Campground (north)	620.5
Liberty Hill Park	621	Anderson Park	621.5
Whitewater Creek Park	621.5		

7-07. Water Quality. Water control regulation of the ACF projects is not performed to meet specific water quality standards. However, the objective of water quality sustainability of the rivers is a goal the Corps attempts to meet through specific continuous minimum releases and other incidental releases that provide benefits to water quality in the basin. Analysis of water quality and quantity needs for the West Point, Georgia, area was conducted by the U.S. Public Health Service in 1964, and its report was used as the basis for the water quality and quantity design for West Point Dam. The studies substantiated the need for a continuous discharge of 670 cfs with an initial dissolved oxygen concentration of not less than 4.0 parts per million. Thus, the small generating unit was designed to provide a minimum, continuous, off-peak flow of 675 cfs. If the small unit is unavailable at any time when the large units are not generating, the minimum flow requirement of 670 cfs would be released over the spillway. There is an adjustable intake gate for the small generating unit and a dike in the west bank area upstream of the power intake, both of which are intended to prevent water from the lower reservoir depths from entering the turbine intakes.

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 and nesting seasons will be determined by Mobile District fishery biologists in cooperation with fish and game personnel from the states concerned and the U.S. Fish and Wildlife Service (USFWS).

The expected timing for fish spawning at West Point Lake is 1 April to 1 June. 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 from the benchmark elevation established at the start of fish spawning. 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. Additionally, during periods of high flows or drought conditions, it may be necessary to reduce lake levels more than the six inches.

7-09. Water Supply. Originally two entities in West Point Lake were authorized by relocation contracts to withdraw M&I water supply directly from the lake; LaGrange, Georgia (8.35 mgd) and the now defunct Milliken Carpet Company (12.96 mgd). Milliken Carpet Company assigned its relocation agreement to the city of LaGrange. The relocation contracts were issued because of the relocation of the respective water supply intakes and treatment facilities during project construction. LaGrange's intakes are at elevation 600, 620, 623, and 628 feet NGVD29. For the purpose of managing water supply storage, the Mobile District has employed a storage accounting methodology that applies 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.

Withdrawals also occur directly from the Chattahoochee, Flint, and the Apalachicola Rivers for water supply at a number of other downstream M&I water supply intakes including the Cities of LaGrange, West Point, Columbus, and a number of industries; however, the Corps does not make specific water supply releases for these withdrawals. Reservoir operations may be influenced by agricultural water withdrawals on the Flint River. Agricultural demands vary depending on the climatic conditions but are generally 1.5 to 2 times the withdrawals by M&I entities (USFWS 2006). Water withdrawals in Georgia are made pursuant to water withdrawal permits issued by GADNR.

7-10. Hydroelectric Power. The West Point Project is operated as a peaking plant for producing hydroelectric power, and, during off-peak periods, it maintains a continuous flow of approximately 675 cfs.

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. The level of hydropower support is determined by the reservoir's condition as well as its zone in relation to the other two federal storage projects in the ACF Basin. Typically, the West Point Project provides generation five days a week at plant capacity throughout the year, as long as their respective lake levels are in Zone 1 and drought operations have not been triggered. The minimum hours represent releases that normally meet water system demands and provide the capacity specified in marketing arrangements. During dry periods, generation could be eliminated or limited to conjunctive releases. The typical, but not required, hours of operation by action zone are presented in Table 7-2. Historical hydropower production is shown in Plates 2-13 and 2-14. Actual monthly and annual production are tabulated. The average annual production from 1976 through 2013 is 184,106 megawatt (MW) hours.

In addition to hydroelectric power generation being governed by action zone, there are also physical limitations that factor into the power generation decisions. During high flow conditions, the reduction in the difference in headwater and tailwater may cause the hydropower units at West Point Dam to become inoperable due to loss of head. A reduction in the generation capacity of a unit can also occur as a result of extremely low lake levels during droughts. Scheduled and unscheduled unit outages can also occur throughout the year affecting the ability to release flow through some or all the turbines.

SEPA markets the energy generated at West Point Dam to the government's preference customers, and enters into and administers the contracts with those entities to deliver that energy. The generation (and water release) is based on a weekly declaration of energy and capacity forecasted to be available that is updated daily by the Mobile District on the basis of the overall ACF water control plan and changing basin conditions. The declarations, which are designed to keep the ACF reservoir elevations balanced by zone, where practicable, are prepared by the Mobile District and furnished to the 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 Mobile District, SEPA, and the hydropower customers. Local restraints can dictate generation during certain hours.

In addition to the weekly declaration, the Mobile District 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 ACF 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. The existing project authorizes a 9-foot deep by 100-foot wide waterway from Apalachicola, Florida, to Columbus, Georgia, on the Chattahoochee River, and to Bainbridge, Georgia, on the Flint River. Conditions on the Apalachicola River have been such in recent years that a 9-foot deep channel has not been available for much of the year. Dredging on the Apalachicola River has been reduced since the 1980s because of a lack of adequate disposal area capacity in certain reaches of the river. No dredging has been conducted on the Apalachicola River since 2001 for a variety of reasons related to flow or funding levels and has been indefinitely deferred because of denial of a Section 401 Water Quality Certificate from the State of Florida. Also, the Apalachicola River was designated as a low use navigation project in FY2005 which greatly reduces the likelihood of receiving funding for maintenance dredging. The lack of dredging and routine maintenance has led to inadequate depths in the Apalachicola River navigation channel.

When supported by ACF Basin hydrologic conditions, the Corps will provide a reliable navigation season. The water management objective is to ensure a predictable minimum navigable channel in the Apalachicola River for a continuous period that is sufficient for navigation use.

Assuming basin hydrologic conditions allow, a typical navigation season would begin in January of each year and continue for 4 to 5 consecutive months (January through April or May). Figure 7-3 graphically represents the navigation season and its relationship to composite conservation storage. During the navigation season, the flows at the Blountstown, Florida, gage (USGS # 02358700) should be adequate to provide a minimum channel depth of 7 feet. The most recent channel survey and discharge-stage rating was used to determine the flow required to sustain a minimum navigation depth during the navigation season. Flows of 16,200 cfs provide a channel depth of 7 feet. Flows of 20,600 cfs provide a channel depth of 9 feet. The Corps' capacity to support a navigation season will be dependent on actual and projected system-wide conditions in the ACF Basin before and during January, February, March, April and May. Those conditions include the following:

- A navigation season can be supported only when ACF Basin composite conservation storage is in Zone 1 or Zone 2.
- A navigation season will not be supported when the ACF Basin composite conservation storage is in Zone 3 and below. Navigation support will resume when basin composite conservation storage level recovers to Zone 1.
- A navigation season will not be supported when drought operations are in effect. Navigation will not be supported until the ACF Basin composite conservation storage recovers to Zone 1.
- The determination to extend the navigation season beyond April will depend on ACF Basin inflows, recent climatic and hydrologic conditions, meteorological forecasts, and basin-wide model forecasts. On the basis of an analysis of those factors, the Corps will determine if the navigation season will continue through part or all of May.
- Down-ramping of flow releases will adhere to the Jim Woodruff Dam fall rate schedule for federally listed species during the navigation season.
- Releases that augment the flows to provide a minimum 7-foot navigation depth will also be dependent on navigation channel conditions that ensure safe navigation.

When it becomes apparent that downstream flows and depths must be reduced due to diminishing inflows, navigation bulletins will be issued to project users. The notices will be issued as expeditiously as possible to give barge owners, and other waterway users, sufficient time to make arrangements to light load or remove their vessels before action is taken at Jim Woodruff Lock and Dam to reduce releases.

Although special releases will not be standard practice, they could occur for a short duration to assist navigation during the navigation season. For instance, releases can be requested to achieve up to a 9-foot channel. The Corps will evaluate such request on a case by case basis, subject to applicable laws and regulations and the conditions above.

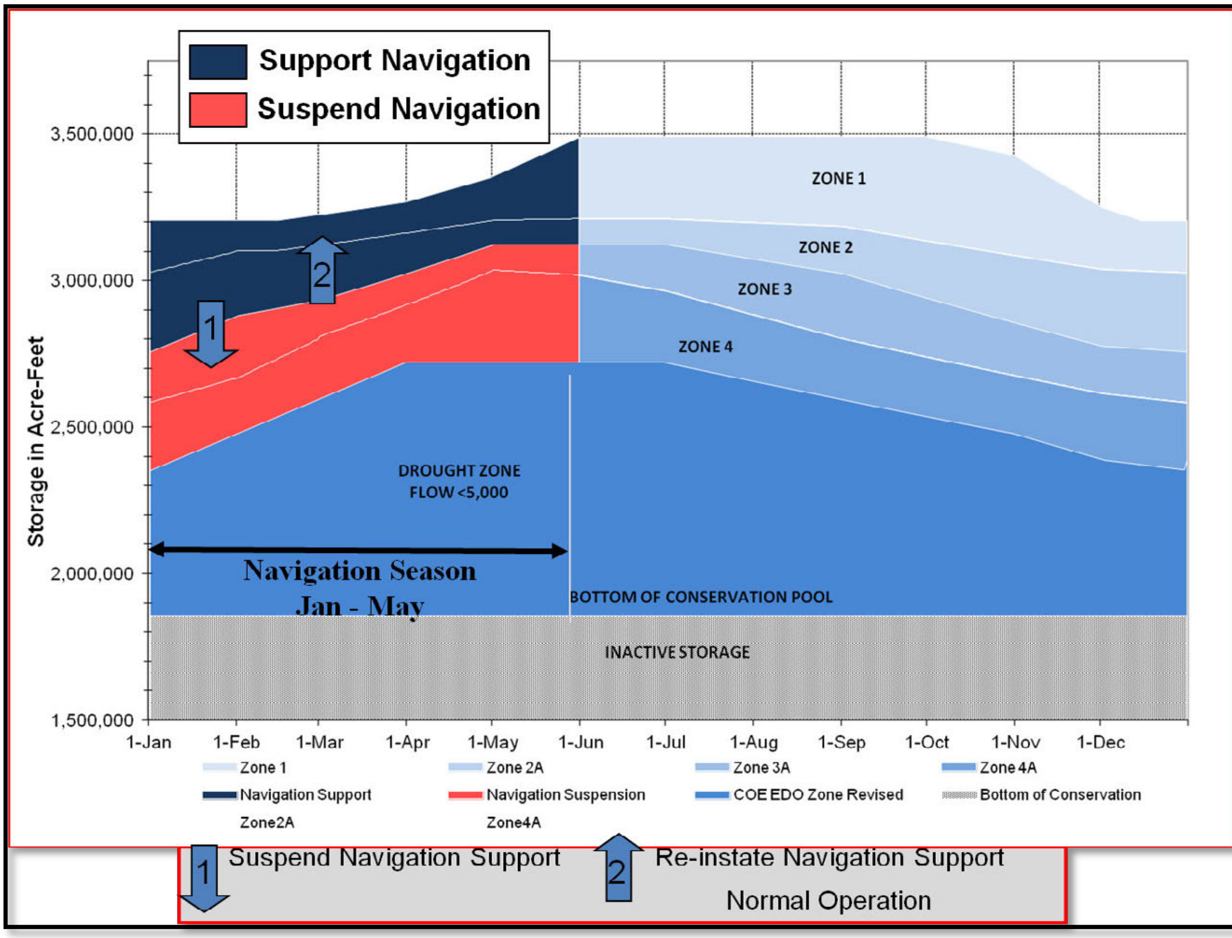


Figure 7-3. Composite Conservation Storage for Navigation

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 West Point Project, the Corps will coordinate water management during drought with other federal, state and local agencies, private power companies, navigations interests, and other interested stakeholders. Drought operations will be in compliance with the plan for the entire ACF Basin as outlined in Exhibit D, and summarized below.

Drought operations are triggered on the first day of the month following the day that ACF composite conservation storage enters Zone 3, from Zone 2 (Figure 7-4). At that time, all the composite conservation storage Zone 1-3 provisions (seasonal storage limitations, maximum fall rate schedule, and minimum flow thresholds) are suspended and management decisions are based on the provisions of the drought plan. Under the drought plan, the minimum discharge is determined in relation to composite conservation storage only. The drought plan for the ACF

Basin specifies a minimum release from Jim Woodruff Dam and temporarily suspends the other minimum release and maximum fall rate provisions until composite conservation storage in the basin is replenished to a level that can support the minimum releases and maximum fall rates. The drought plan also includes a temporary waiver from the water control plan to allow temporary storage above the winter pool guide curve at the West Point Project if the opportunity presents itself. There is also an opportunity to begin spring refill operations at an earlier date to provide additional conservation storage for future needs.

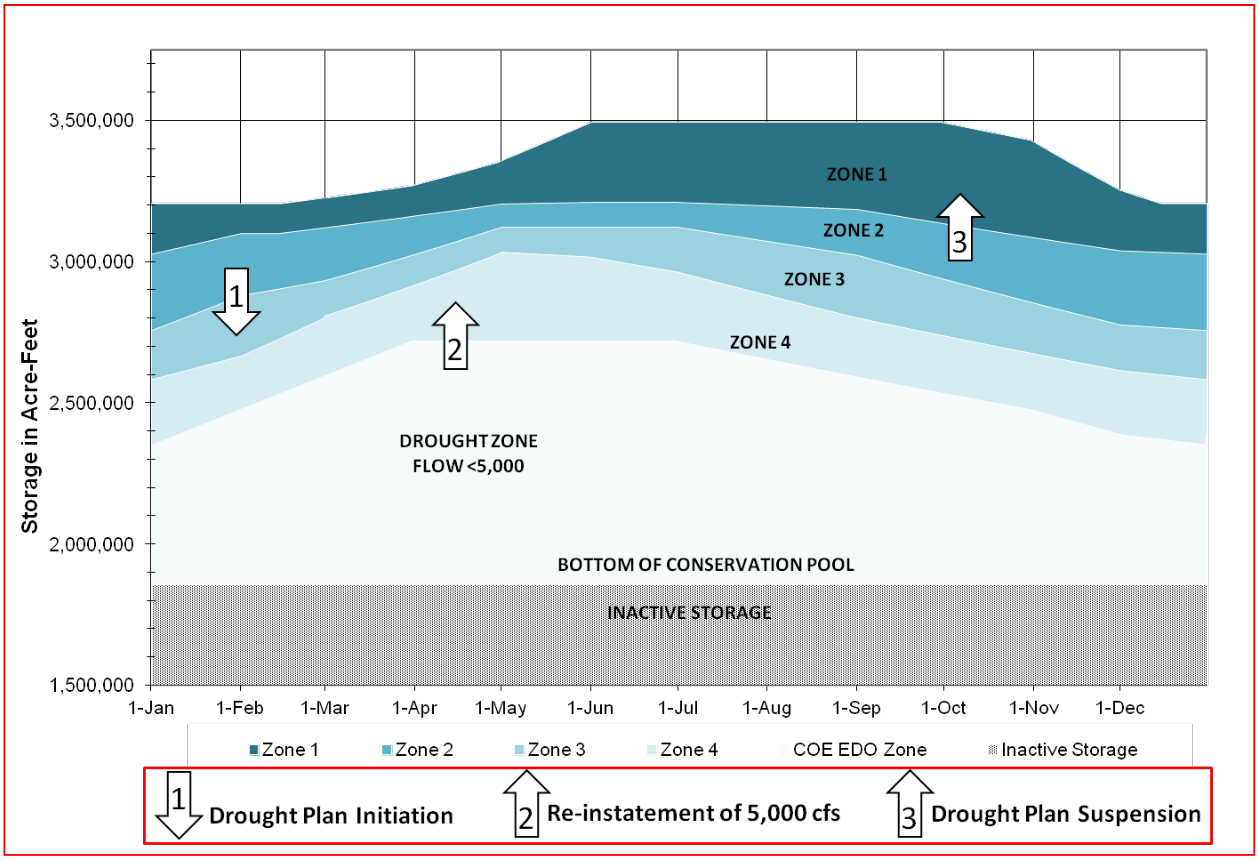


Figure 7-4. Drought Operation Triggers

The drought plan prescribes two minimum releases based on composite conservation storage in Zones 3 and 4 and an additional zone referred to as the Drought Zone. The Drought Zone delineates a volume of water roughly equivalent to the inactive storage in Buford, West Point and Walter F. George reservoirs plus Zone 4 storage in Buford. The Drought Zone line has been adjusted to include a smaller volume of water at the beginning and end of the calendar year. When the composite storage is within Zone 4 and above the Drought Zone, the minimum release from Jim Woodruff Dam is 5,000 cfs, and all basin inflow above 5,000 cfs that is capable of being stored may be stored. Once the composite conservation storage falls into the Drought Zone, the minimum release from Jim Woodruff Dam is 4,500 cfs and all basin inflow above 4,500 cfs that is capable of being stored may be stored. When transitioning from a minimum release of 5,000 to 4,500 cfs, fall rates will be limited to a 0.25-ft/day drop. The 4,500 cfs minimum release is maintained until composite conservation storage returns to a level above the top of the Drought Zone, at which time the 5,000-cfs minimum release is reinstated.

The drought plan provisions remain in place until conditions improve such that the composite conservation storage reaches Zone 1. At that time, the temporary drought plan provisions are suspended, and all the other provisions are reinstated. During the drought contingency operations, a monthly monitoring plan that tracks composite conservation storage to determine water management operations (the first day of each month will represent a decision point) will be implemented to determine which operational triggers are applied. In the event the composite conservation storage has not recovered to Zone 1 by 1 March, drought operations will be extended to the end of March unless all the Federal reservoirs are full. The month of March usually provides the highest inflows into the reservoirs, but also has some of the highest flow requirements for release from Jim Woodruff Dam. This extension of drought operations allows for the full recovery of the federal storage projects in preparation for the spawning and spring refill period that occur from April through June.

7-13. Flood Emergency Action Plans. The Corps is responsible for developing Flood Emergency Action Plans for the ACF System, in accordance with ER 1110-2-1156, *Engineering and Design Safety of Dams – Policy and Procedures*, 28 October 2011. The West Point Project Emergency Action Plan, dated April 2013 is a stand-alone document retained on site and in the MDO. Example data available are emergency contact information, flood inundation information, management responsibilities, and procedures for use of the plan.

7-14. Other. Other considerations, in addition to the authorized project purposes, may be accommodated on an as needed basis. 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 investigations.

a. <u>Extraordinary Drawdown of West Point Lake</u>. Droughts experienced in late 1980s and in the 2000s were extreme throughout the ACF Basin and caused water managers to consider what plans could be followed if the basin's total conservation storage, about 1.7 million acre-feet, were to be depleted or seriously threatened with depletion. Such an occurrence could be contemplated in the second or later year of a severe drought. Fortunately, the three storage reservoirs on the Chattahoochee River contain a significant volume of storage below the minimum conservation pool. West Point Lake contains 229,903 acre-feet of water below the conservation pool between elevations 620 and 597 feet NGVD29, which is the crest of the spillway. Use of that available, but normally inactive, storage would be a serious decision requiring higher headquarters approval. The prerequisites for the Mobile District Commander to recommend such an action would be as follows:

- Other reservoirs are nearly depleted.
- There is a clear public interest such as a water supply, water quality, or public safety need, for a release from West Point Lake, which would draw it below elevation 620 feet NGVD29.
- The need for release of water outweighs the adverse impact caused by the drawdown. Alternatives to the proposed release will be investigated.

To help ensure that those requirements are fulfilled, the District Commander will have performed the following tasks:

- A public notice will be issued describing as best as possible the expected drawdown and the circumstances that could make such a drawdown necessary.
- Congressional interests are notified.

- One or more public meetings will be held to explain the necessity for the drawdown.
- In-lake interests are given adequate time to prepare for the effects of the drawdown.

b. Correlation with Other Projects. In scheduling releases from West Point Dam, downstream navigation requirements will be considered. Releases for West Point must pass through Walter F. George and George W. Andrews projects, so initial releases for navigation are scheduled from Walter F. George. Andrews Lock and Dam acts as a reregulation dam to reregulate the effects of the Walter F. George peak power release entering the Lake Seminole. West Point Dam releases are also monitored by GPC to schedule releases from their six hydropower projects located downstream of the West Point Project.

c. High Water Action Plan. During periods of high inflow when the pool is expected to exceed its top of conservation, certain actions are taken by the project staff to prepare areas around the project for rising pool levels and to ensure public safety. In the event abnormally high releases (usually exceeding turbine capacity) are forecast to be made from the project, the project staff will also notify the downstream interests of potential flooding as a result of operations at the dam. Critical elevations and releases are discussed in detail in the High Water Action Plan provided in Exhibit E.

When a flood inducing storm is forecast, Water Management will contact the project site office and provide a forecast of daily peak pool elevations and releases from the project based on the best data available for the extent of the potential high inflow event. Anytime a change is made to this forecast, Water Management will inform the project site office as promptly as possible to allow project staff the time to make any additional preparations dictated by the High Water Action Plan. Details on communication with the project are discussed in more detail in Paragraph 5-06.

7-15. Deviation from Normal Regulation. Water management inherently involves adapting to unforeseen conditions. The development of water control criteria for the management of water resource systems is carried out throughout all phases of a water control project. The water control criteria are based on sound engineering practice utilizing the latest approved models and techniques for all foreseeable conditions. There may be further refinements or enhancements of the water control procedures, in order to account for changed conditions resulting from unforeseen conditions, new requirements, additional data, or changed social or economic goals. However, it is necessary to define the water control plan in precise terms at a particular time in order to assure carrying out the intended functional commitments in accordance with the authorizing documents (EM 1110-2-3600 Management of Water Control Systems). Adverse impacts of the water control plan may occur due to unforeseen conditions. When this occurs, actions will be taken within applicable authority, policies, and coordination to address these conditions when they occur through the implementation of temporary deviations to the water control plan, such as interim operation plans. Such deviations may require additional environmental compliance prior to implementation.

The Corps is occasionally requested to deviate from the water control plan. Prior approval for a deviation is required from the Division Commander except as noted in subparagraph a. Deviation requests usually fall into the following categories:

a. Emergencies. Examples of some emergencies that can be expected at a project are drowning and other accidents, failure of the operation facilities, failure of another ACF project, 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 reasonably be expected to create equal or worse conditions. The Mobile District will notify the Division 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 MDO 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 South Atlantic Division 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 the Division Office 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, streambank erosion has been reduced by capturing peak basin runoff in the reservoirs and metering the flows out more slowly than what would have occurred under natural conditions.

VIII - EFFECT OF WATER CONTROL PLAN

8-01. General. West Point Dam and Lake was authorized by the Flood Control Act of 23 October 1962 (Public Law 87-874), in accordance with House Document 570, 87th Congress, Second Session. The West Point Project is operated to provide benefits for authorized purposes including hydropower, flood risk management, navigation, recreation, fish and wildlife conservation, and water quality. In addition, water supply withdrawals are made from West Point Lake pursuant to relocation agreements entered into at the time of construction.

The impacts of the *ACF Master Water Control Manual* and its Appendices, including this water control plan, have been fully evaluated in an Environmental Impact Statement (EIS) that was published on (date). A Record of Decision (ROD) for the action was signed on (date). 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 in the ACF System is flood damage reduction. West Point Lake contains flood risk management storage space in which flood water is stored and later released in moderate amounts to prevent downstream flooding. Walter F. George Dam operates according to specified schedules for flood damage reduction while George W. Andrews and Jim Woodruff Dams operate to pass inflows. During most years, one or more flood events occur in the ACF Basin. While most of those events are of minor significance, on occasion, major storms produce widespread flooding or unusually high river stages. Before project construction, the record storm of December 1919, and major flooding events in July 1916, March 1929, and February 1961 resulted in extensive damage and loss of life in the basin. More recently, major floods occurred in February 1990, January 1996, May 2003, and September 2009. While those five floods also resulted in considerable damage, a total of almost $85 million in estimated damages was prevented by the West Point Dam Project from all flooding events between 1986 and 2013 as a result of flood risk management operations (see Table 4-16).

a. Spillway Design Flood. Spillway Design Flood (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) centered and oriented in a manner that produces maximum runoff. This flood is also often referred to as the Probable Maximum Flood (PMF). The SDF for the West Point Project was based on the March 1929 storm based on the observed rainfall and transposed in the basin above the dam site and rotated 20 degrees counter-clockwise to a position that would provide the maximum volume of rainfall. The PMP was determined to have an average total storm depth of 21.9 inches between Buford Dam and West Point Dam with an excess of 17.4 inches. The SDF cannot be assigned a frequency of occurrence and was not used in any frequency analysis. The West Point Dam SDF is shown on Plate 8-1. Initial pool elevation was assumed to be 635.0 feet NGVD29. This corresponds to full summer pool as well as the top of permanent flood risk management storage, identified as the storage between elevations 628 feet and 635 feet NGVD29. The peak pool elevation of the SDF is 646.4 feet NGVD29. Reservoir regulation reduced the peak inflow of 557,800 cfs to an outflow of 423,900 cfs. Duration of the flood was about seven days. Effects of the reservoir regulation of the spillway design flood are depicted on Plate 8-1 and summarized in Table 8-1. Recent guidance requires the PMP to be updated using Hydrometeorological Report (HMR) 51 and HMR 52 guidance and a new SDF be developed. The SDF is currently being reevaluated using this guidance and any changes to the SDF will be incorporated into the water control manual when available.

b. Standard Project Flood. 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 SPF cannot be assigned a frequency of occurrence and was not used in any discharge-frequency analysis. The SPF is shown in Plate 8-2. Initial pool elevation was assumed to be full winter pool of 625.0 feet NGVD29. Peak pool elevation is 640.9 feet NGVD29. Reservoir regulation reduced the peak inflow of 282,900 cfs to an outflow of 249,500 cfs. Duration of the flood was about seven days. Effects of the reservoir regulation of the SPF are depicted on Plate 8-2 and summarized in Table 8-1.

Table 8-1. Flood Events

Flood Event	Reservoir Inflow (cfs)	Reservoir Outflow (cfs)	Peak Pool Elevation (ft. NGVD29)
Spillway Design	557,800	423,900	646.4
Standard Project	282,900	249,500	640.9

c. Historical Floods. The flood of December 1919 was routed through the reservoir with an assumed beginning elevation of 625 feet NGVD29 and reached a peak pool elevation of 639.7 feet NGVD29 and peak hourly outflow of 73,200 cfs. The effects of reservoir regulation on the 1919 flood are shown in Plate 8-3. The routed historic floods of 1925 and 1961 are shown in Plates 8-4 and 8-5, respectively. These three floods all occurred before the construction of the project.

More recent significant floods are the floods of 1990, 2003 and 2009. The flood of 1990 represents a larger, but shorter duration flood. The peak pool elevation was 638.14 NGVD29, with a peak hourly inflow of 83,408 cfs and a peak hourly outflow of 49,588 cfs. The flood of 2003 produced the record high pool elevation of 639.89 feet NGVD29, as well as the record peak hourly inflow of 173,322 cfs, and a peak hourly outflow of 85,000 cfs. The flood of 2009 represents a long duration storm with a lower peak inflow. The peak hourly inflow into West Point Lake was 81,376 cfs but maintained an hourly inflow of near 60,000 cfs for nearly three days, resulting in a peak hourly outflow of 56,410 cfs and pool elevation of 639.22 NGVD29. This event was also unique as it started near full summer pool of 635 feet NGVD29. These three storms are depicted on Plates 8-6, 8-7 and 8-8 respectively, and discussed in more detail in Chapter IV.

8-03. Recreation. West Point Lake is an important recreational resource, providing significant economic and social benefits for the region and the Nation. The project contains 25,864 acres of water at the summer conservation pool elevation of 635.0 feet, plus an additional 55,784 acres of land, most of which is available for public use. A wide variety of recreational opportunities are provided at the lake including boating (40 boat ramps), fishing, camping (569 campsites), picnicking (1,058 picnic sites), water skiing, hunting and sightse peing. 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. West Point Lake received more than 2.0 million recreational visitors in 2012. The local and regional economic benefits of recreation at West Point Lake are significant. Annual recreational visitor spending within 30 miles of the project totals $63.9 million.

The effects of the West Point Dam water control operations on recreation facilities and use at West Point Lake 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, navigation hazards become more numerous, 50 percent of private boat docks are affected.

Table 8-2 shows the lake elevation for each impact level and the percent of time during the recreational season (May thru July), over a 73-year simulation of the proposed operation that each impact level would be reached at West Point Lake.

Table 8-2. Reservoir Impact Levels - West Point Lake, Alabama and Georgia

632.5 Feet initial impact level (percent time reached)	629.0 Feet recreation impact level (percent time reached)	627.0 Feet water access limited impact level (percent time reached)
39.9%	22.7%	3.3%

8-04. Water Quality. The water quality conditions that are generally present in West Point Lake are typical of water quality conditions and trends that exist in relatively deep reservoirs throughout the southeast. Water quality conditions in the main body of the reservoir are 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 West Point 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 ACF Basin, including West Point Lake, typically act as a sink, removing pollutant loads and sediment. A large portion of the nutrient and sediment load from Atlanta in the Chattahoochee River is assimilated and deposited in West Point Lake. Georgia's 2014 draft integrated 305(b)/303(d) list of impaired waters designates West Point Lake as not meeting supporting designated uses because of PCBs.

The Corps operates West Point Dam and Lake for the purpose of improving water quality. Water releases made during hydropower generation at West Point Dam provide sufficient flows to maintain acceptable downstream water quality levels in the river. A minimum release of approximately 670 cfs is maintained below the dam during off-peak hours for low-flow augmentation. That minimum flow helps to meet the water quality needs below the dam in the West Point, Georgia, area and provides additional benefits for water quality downstream of the project.

8-05. Fish and Wildlife. The water control plan improves the ability of the Corps to maintain steady reservoir levels during the spring fish spawning period, provides for a gradual ramp down of river levels to prevent stranding species, and prevents effects on federally listed threatened and endangered species and their federally designated critical habitat by ensuring adequate flows in the river.

a. Fish Spawning. The Corps operates the ACF System to provide favorable conditions for annual fish spawning, both in the reservoirs and in the Apalachicola River. Operations for fish spawning help to increase the population of fish in the basin. During the 1 April to 1 June fish spawning period at West Point Lake, the goal of the Corps is to operate for a generally stable or rising lake level for approximately four to six weeks. 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

b. Threatened and Endangered Species. The ACF system of reservoirs, including West Point Lake, is operated to comply with the Endangered Species Act of 1973 and related Biological Opinions provided by the U.S. Fish and Wildlife Service including the Biological Opinion prepared by them during the preparation of this Water Control Manual. Such compliance will include all Terms and Conditions and Reasonable and Prudent Alternatives that would minimize impacts to specific Threatened and Endangered species and their critical habitat and avoid jeopardy to their continued existence. Water releases from Jim Woodruff Dam directly support the federally threatened Gulf sturgeon (*Acipenser oxyrinchus desotoi*), endangered fat threeridge (*Amblema neislerii*), threatened purple bankclimber (*Elliptoideus sloatianus*), and threatened Chipola slabshell (*Elliptio chipolaensis*), and areas designated as critical habitat for those species in the Apalachicola River. The releases provide a benefit by assuring a minimum flow necessary to protect and support the species and their habitats.

8-06. Water Supply. Originally two entities in West Point Lake were authorized to withdraw M&I water supply directly from the lake; LaGrange, Georgia (8.35 mgd) and the now defunct Milliken Carpet Company (12.96 mgd). Milliken Carpet Company assigned its relocation agreement to the city of LaGrange. The water withdrawal contracts are relocation contracts that were issued because of the relocation of the respective water supply intakes and treatment facilities during project construction.

All other M&I water supply withdrawals in the ACF Basin outside the federal projects are limited by applicable state-issued water withdrawal permits and to the available flows of water in the rivers that are largely incidental to the Corps water control operations. While the Corps does not operate the ACF System specifically for M&I water supply in the Chattahoochee River Basin below metropolitan Atlanta, water control operations provide a relatively stable and dependable water supply source for various entities within the basin.

8-07. Hydroelectric Power. The West Point Dam hydropower project, along with 22 other hydropower dams in the southeastern United States, composes the SEPA service area. SEPA sells hydroelectric power generated at West Point Dam 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 West Point 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 about 675 cfs during off-peak periods to as much as 18,000 cfs, which is operating at overload turbine capacity at full power pool including operation of the service unit. Plate 8-9 shows the effects of peaking releases at West Point Dam. Historical hydropower production is shown in Plates 2-13 and 2-14.

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. For most plants, this 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 fossil fuel burning, thereby reducing air pollution. Between 1976 and 2013, West Point powerhouse produced an annual average of 184,106 megawatt hours (MWH) per calendar year, with a minimum of 56,881 and a maximum of 267,793 MWH, dependent upon water availability.

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 West Point Dam hydropower plant, in combination with the other hydropower power projects in the ACF 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.

8-08. Navigation. Generally, water releases made from West Point Dam that benefit navigation on the ACF System are incidental to its hydropower operations and releases for other downstream authorized project purposes. The operation of all the ACF Basin reservoirs as a coordinated and balanced system provides for the current capabilities to support navigation on the ACF Waterway.

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 system might not be able to fully support all project purposes. Several drought periods have occurred since construction of West Point Dam in 1975. The duration of low flows can be seasonal or they can last for several years. Some of the more extreme droughts occurred in 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.

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 West Point Dam and conservation efforts strengthen the ability to supply water supply needs.

For the West Point Dam and Lake Project, the Corps will coordinate water management during a 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 ACF Basin.

8-10. Flood Emergency Action Plans. Normally, all flood risk management operations are directed by the MDO. If, however, a storm of flood-producing magnitude occurs and all communications are disrupted between the District Office and project personnel at the Walter F. George powerhouse and West Point 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 District Office, those instructions will be followed for as long as they are applicable.

Flood emergency operations at West Point Dam are the responsibility of the West Point Power Plant Manager and the Walter F. George powerhouse operators. It is the responsibility of the West Point Operations Project Manager, West Point Power Plant Manager, and the Walter F. George powerhouse operators to follow the Emergency Action Plan for West Point Dam and Lake. 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 effects 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. The annual peak inflow frequency curve for West Point Lake, based on peak annual calculated project inflows from 1975 -2013, is shown on Figure 8-1.

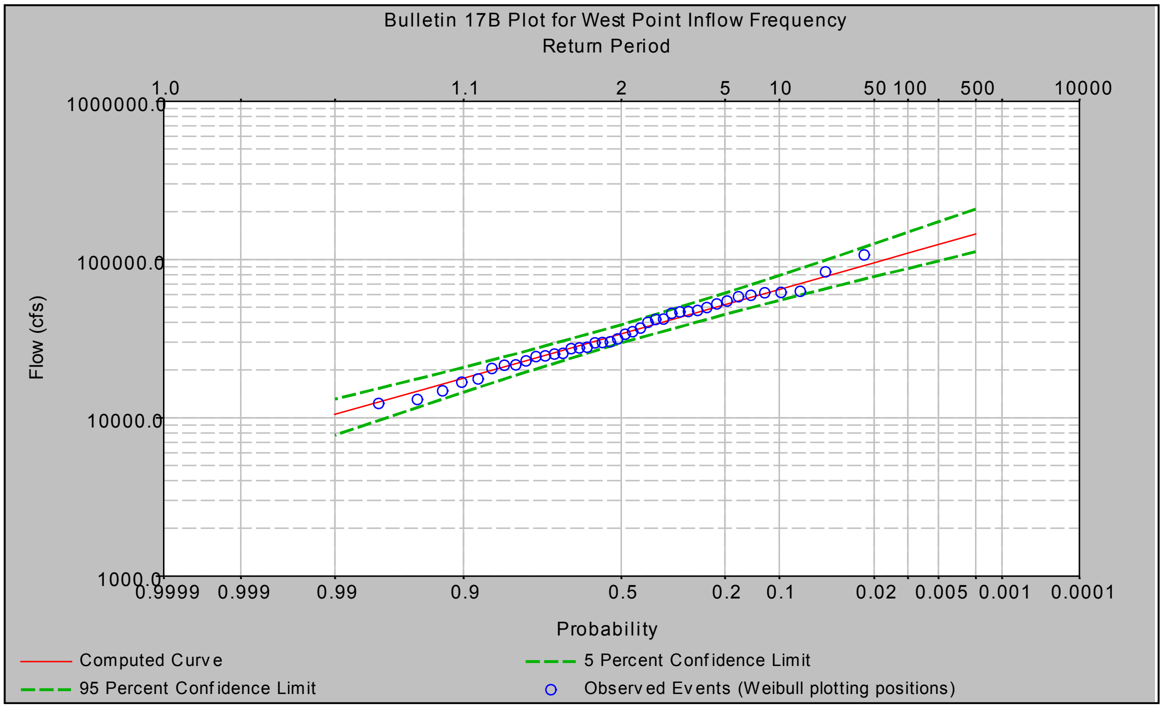


Figure 8-1. Annual Peak Inflow Frequency Curve at West Point Lake

b. Pool Elevation Duration and Frequency. The Water Control Plan for the ACF Basin influences the lake levels at West Point Lake. Normal seasonal operating levels range from elevation 628 feet NGVD29 in the winter to elevation 635 feet NGVD29 in the summer. Figure 8-2 shows the annual pool elevation duration. Three curves are presented: the observed data from the project, as well as model results from the previous water control plan and the updated water control plan presented in this manual. Pool elevation-duration curves for June and September are shown in Figures 8-3 and 8-4, respectively. The top of conservation, or full pool, for both June and September is 635 feet NGVD29. However, lake levels are usually lower in September than in June due to normally drier conditions. The unregulated flow frequency (1897 – 1974) and regulated flow frequency (1975 – 2013) at West Point (USGS gage #02339500) are shown on Plate 8-10.

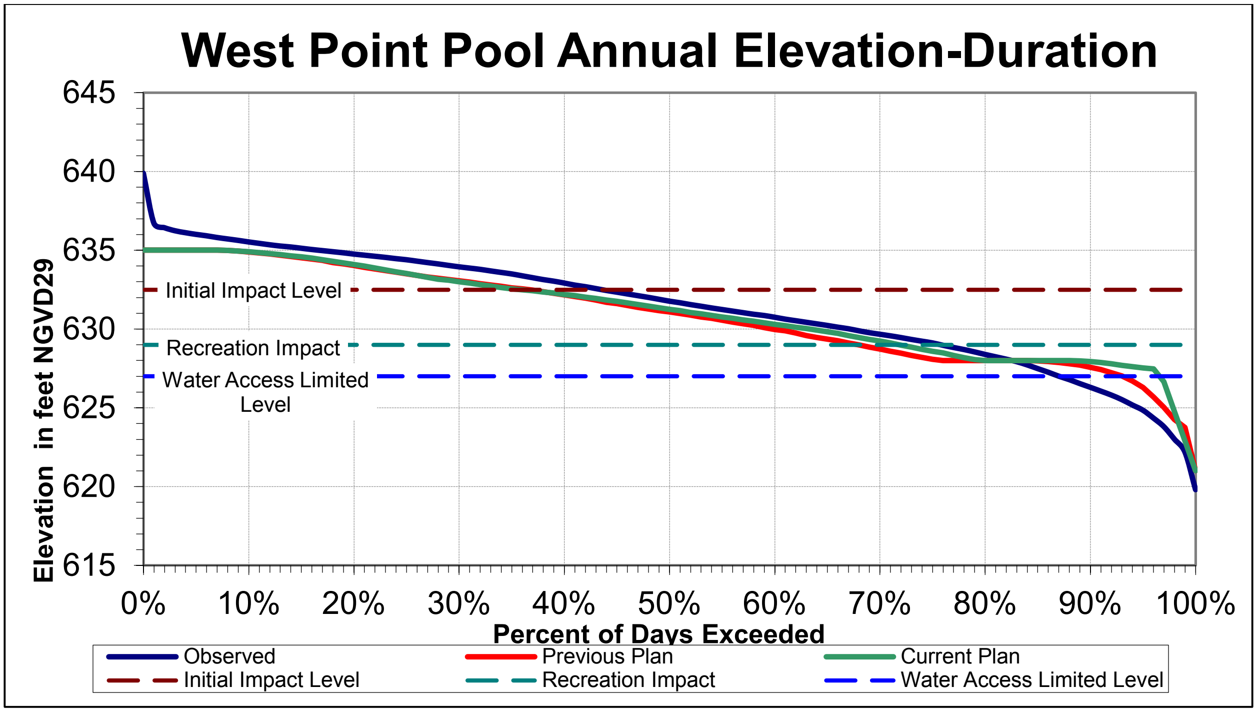


Figure 8-2. West Point Pool Annual Elevation Duration for Observed and Modeled Data

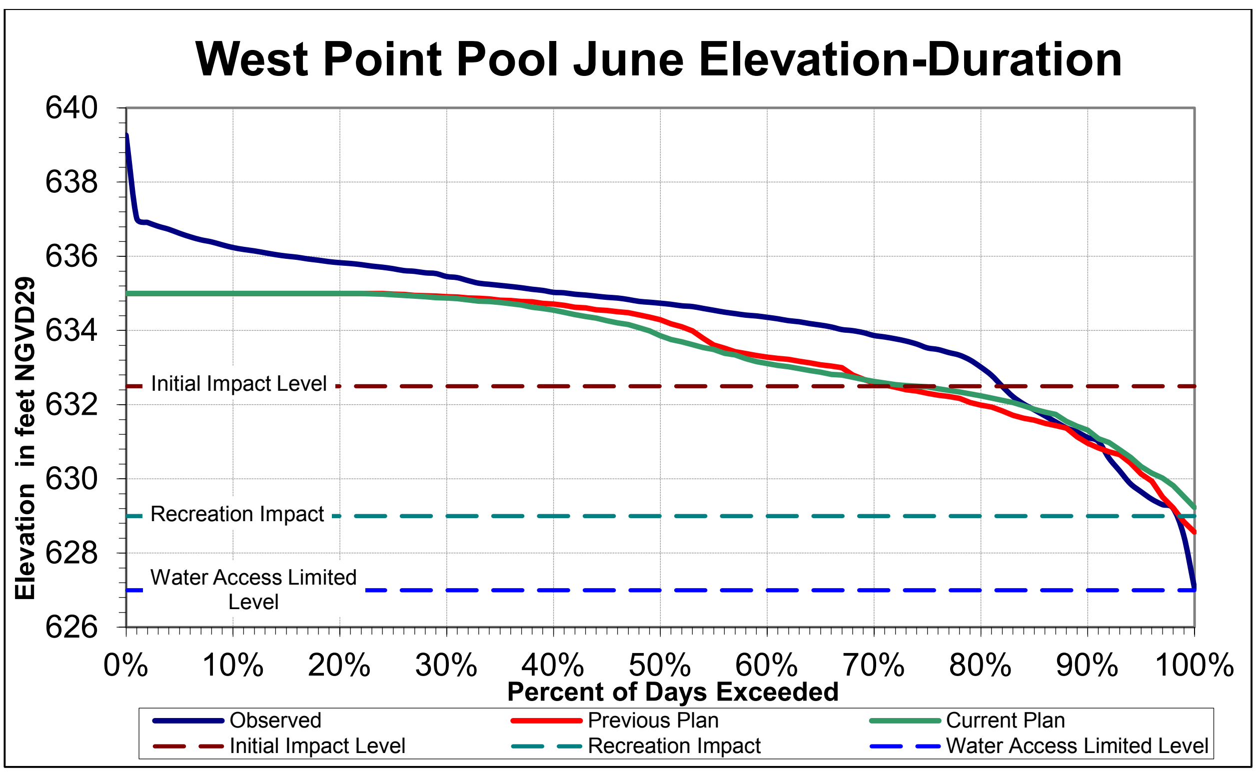


Figure 8-3. West Point Pool Elevation - June

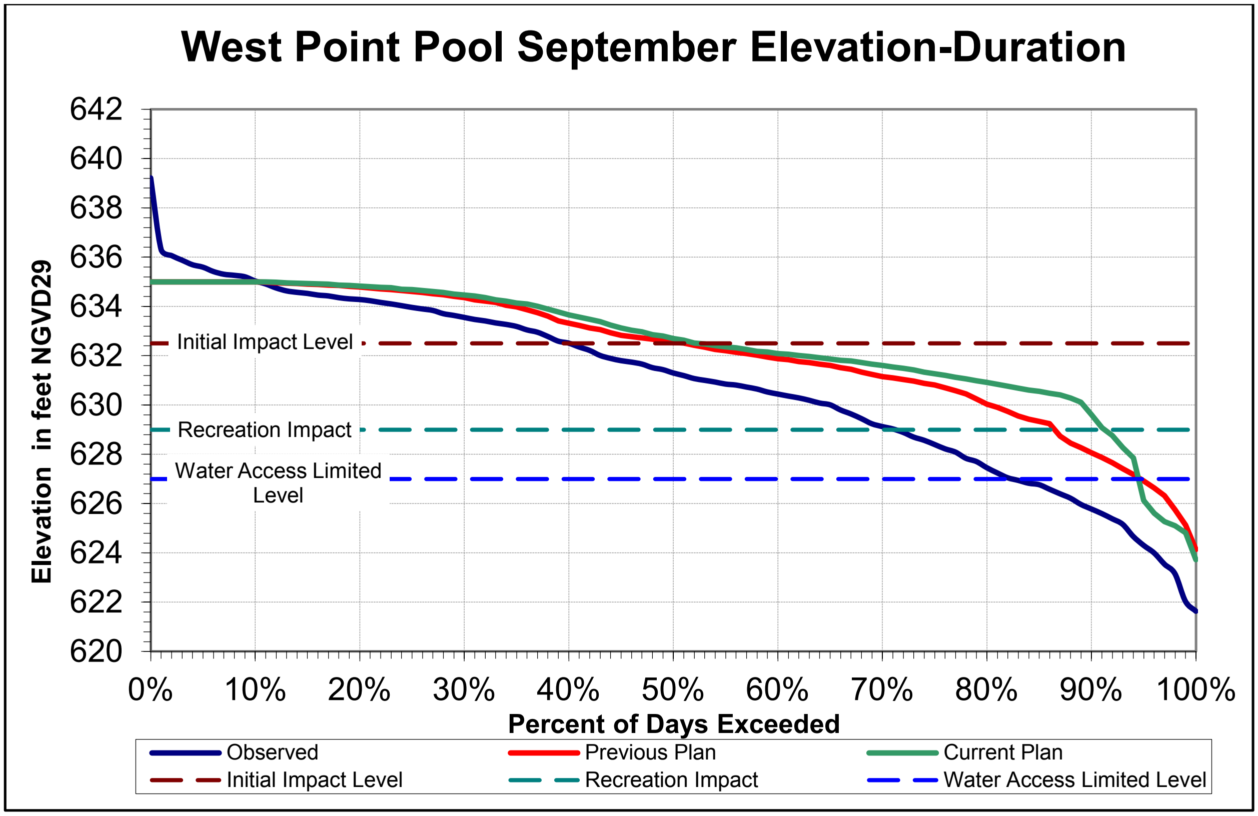


Figure 8-4. West Point Pool Elevation - September

c. Peak Flow Frequencies. Downstream locations are heavily affected by the presence of West Point Dam. Plate 8-10 shows the peak flow frequencies for the Chattahoochee River at West Point, Georgia gage (USGS #02339500) for the pre dam and post dam periods. This shows that the higher flows are far less frequent since the filling of the project in 1975.

8-12. Other Studies - Examples of Regulation. The inflow, outflow, and pool elevations at the West Point Project are plotted on Plates 4-8 through 4-17. The plots present the daily regulation for the project. An examination of the information presented reveals both short-term and seasonal redistribution of flows.

Reservoir development and other water uses in the ACF Basin contribute to an altered flow regimen. Consumptive uses and the existence of reservoirs have altered the volume and timing of flows. Table 8-3 and Figure 8-5 compare the monthly observed and unimpaired flows above the Walter F. George Project at Columbus, Georgia. The effects of West Point and Buford operations as well as water withdrawals and lake evaporation are reflected in those displays. Table 8-4 and Figure 8-6 present the same data for the Blountstown gage on the Apalachicola River. Effects throughout the basin are reflected in those displays.

Table 8-3. Columbus Average Flow for 1960 - 2011 (cfs)

	Observed avg flow (cfs)	Unimpaired avg flow (cfs)	Avg daily gain or loss due to redistribution and losses (cfs)
Jan	8,315	9,233	-918
Feb	10,371	10,826	-455
Mar	11,466	12,477	-1,011
Apr	9,341	10,255	-914
May	6,607	7,428	-821
June	5,233	5,599	-366
July	5,171	5,065	106
Aug	4,921	4,421	500
Sept	4,433	3,895	538
Oct	4,367	4,153	213
Nov	5,319	5,407	-87
Dec	7,174	7,210	-35
Total	82,717	85,968	-3,251
Average	6,893	7,164	-271

Notes:

There are average yearly losses of 3,251 month-second-feet.(average flow for a month in cfs)
Reservoir redistribution reduces flows from February through July and December. Flows increased from August through November.

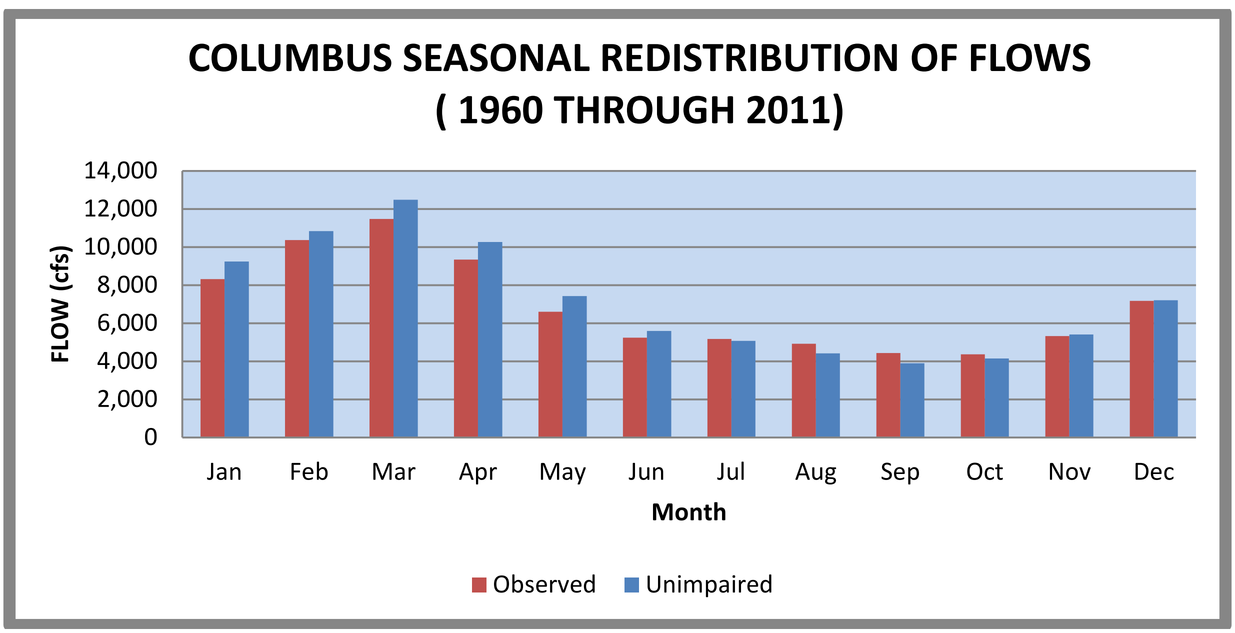


Figure 8-5. Seasonal Redistribution of Flows, Columbus, Georgia, 1960 – 2011

Table 8-4. Blountstown Average Flow for 1960 - 2011 (cfs)

	Observed avg flow (cfs)	Unimpaired avg flow (cfs)	Avg daily gain or loss due to redistribution and losses (cfs)
Jan	27,887	28,914	-1,027
Feb	35,173	35,628	-455
Mar	39,636	41,043	-1,407
Apr	32,950	34,328	-1,379
May	20,849	22,419	-1,570
June	16,662	17,626	-964
July	17,088	17,721	-633
Aug	14,868	14,928	-61
Sept	12,645	12,343	301
Oct	12,550	12,747	-197
Nov	13,662	14,152	-491
Dec	20,758	20,804	-46
Total	264,726	272,654	-7,928
Average	22,060	22,721	-661

Notes: There are average yearly losses of 7,928 month-second-feet (average flow for a month in cfs) Reservoir redistribution reduces flows from May through October and increases flows from November through April.

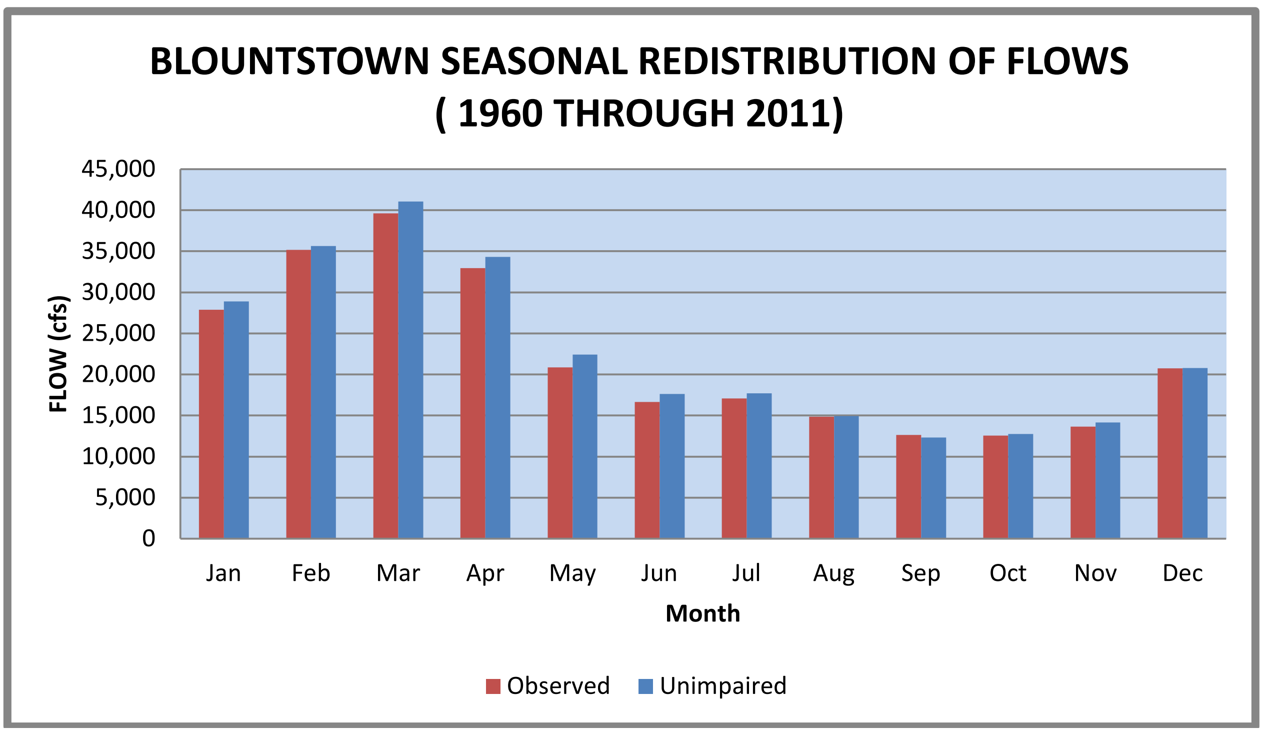


Figure 8-6. Seasonal Redistribution of Flows, Blountstown, Florida, 1960 - 2011

IX - WATER CONTROL MANAGEMENT

9-01. Responsibilities and Organization. Responsibilities for developing and monitoring water resources and the environment at the West Point Project are shared by many federal and state agencies including 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. Interested state agencies include GAEPD, Georgia Wildlife Resources Division, Alabama Department of Environmental Management (ADEM), Alabama Office of Water Resources (OWR), Northwest Florida Water Management District, Florida Department of Environmental Protection, and Florida Fish and Wildlife Conservation Commission.

a. U.S. Army Corps of Engineers. Authority for water control regulation of the West Point Dam and Lake Project has been delegated to the SAD Commander. The responsibility for day-to-day water control regulation activities has been entrusted to the Mobile District. Water control actions for West Point Project are regulated to meet its federally authorized project purposes at West Point in coordination with other authorized projects in the ACF Basin. It is Mobile District's responsibility to develop water control regulation procedures for the West Point Project. The Mobile District monitors the project for compliance with the approved water control plan. In accordance with the water control plan, the Mobile District performs water control regulation activities that include: determining project water releases, declaring water availability for authorized purposes daily, projecting daily and weekly reservoir pool levels and releases, preparing weekly river basin status reports, tracking and projecting basin composite conservation storage, determining and monitoring daily and 7-day basin inflow, managing high-flow regulation and coordinating internally within the Mobile District and externally with basin stakeholders. When necessary, the Mobile District instructs the project operator regarding normal water control regulation procedures, as well as abnormal or emergency situations, such as floods. The West Point Project is operated remotely from the control room at the Walter F. George powerhouse under direct supervision of the Power Project Manager. The Mobile District communicates directly with the powerhouse operators at the Walter F. George powerhouse and with other project personnel at West Point as necessary. The Mobile District is responsible for collecting historical project data, such as lake levels, flow forecasts and weekly basin reports with other federal, state, and local agencies; and the general public. The Mobile District website where this data is provided is: http://www.sam.usace.army.mil/.

b. Other Federal Agencies.

1) National Weather Service (NWS). The NWS is the federal agency in NOAA that is responsible for weather warnings and weather forecasts. With support from the Corps-NWS Cooperative Gaging Program, the NWS forecast offices, along with the Southeast River Forecast Center (SERFC), maintain a network of rainfall and flood reporting stations throughout the ACF Basin. NWS continuously provides current weather conditions and forecasts. The SERFC prepares river forecasts for many locations throughout the ACF Basin and provides the official flood stage forecasts along the ACF Rivers. Often, the SERFC prepares predictions on the basis of *what if scenarios*, such as Quantitative Precipitation Forecasts (QPFs). The QPF is a prediction of the spatial precipitation across the United States and the region. The Corps, NWS, and SERFC share information regarding rainfall, project data, and streamflow forecasts. In addition, the NWS provides information on hurricane forecasts and other severe weather conditions. They monitor drought conditions and provide the information to the public. The National Integrated Drought Information System is available for the ACF Basin at website www.drought.gov. This website provides a single source of information regarding drought

conditions by sharing information gathered from the NOAA Climate Prediction Center, the Corps, state agencies, universities, and other pertinent sources of data through the drought portal.

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 ACF Basin. The USGS Water Science Centers in Alabama, Florida, and Georgia publish real-time reservoir levels, river and tributary stages, and flow data through the USGS National Weather Information Service Web site. The Mobile District 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 almost 500 preference customers in Georgia, Florida, Alabama, Mississippi, southern Illinois, Virginia, Tennessee, Kentucky, North Carolina, and South Carolina.

i. The objectives of SEPA 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 for the West Point power project at the direction of the Corps on the basis of daily and weekly water volume availability declarations.

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 their 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 & Wildlife Coordination Act. The Corps, Mobile District, with support from the Mobile District, coordinates water control actions and management with USFWS in accordance with both laws.

c. State Agencies

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 Environment Management (ADEM) 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.

iii. The Alabama Department of Conservation and Natural Resources has jurisdiction over both freshwater and saltwater fisheries in the state.

2) Georgia. The Department of Natural Resources (GADNR) has statewide responsibilities for the management and conservation of Georgia's natural and cultural resources. Within GADNR, the Georgia Environmental Protection Division (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 through the selection of 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. Georgia Wildlife Resources Division protects non-game and endangered wildlife in the state.

3) Florida. The Northwest Florida Water Management District stretches from the St. Marks River Basin in Jefferson County to the Perdido River in Escambia County. The district is one of five water management districts in Florida created by the Water Resources Act of 1972. In the district's 11,305-square-mile area are several major hydrologic (or drainage) basins: Perdido River and Bay System, Pensacola Bay System (Escambia, Blackwater, and Yellow rivers), Choctawhatchee River and Bay System, St. Andrew Bay System, Apalachicola River and Bay System, and St. Marks River Basin (Wakulla River). The district is a cooperating agency with the Corps and USGS for operating and maintaining the Apalachicola River at Chattahoochee, Florida stream gage downstream of the Jim Woodruff Project.

i. The Florida Department of Environmental Protection has the primary role of regulating public water systems in Florida.

ii. The Florida Fish and Wildlife Conservation Commission has responsibility for both freshwater and saltwater fisheries in the state.

d. Georgia Power Company. The GPC is an electric utility headquartered in Atlanta, Georgia. It is the largest of the four electric utilities owned and operated by Southern Company. GPC is an investor-owned, tax-paying public utility serving more than 2.25 million customers in all but four of Georgia's 159 counties. It employs approximately 9,000 workers. It owns and operates 20 hydroelectric dams, 14 fossil fueled generating plants, and two nuclear power plants that provide electricity to more than two million customers.

e. Stakeholders. Many non-Federal stakeholder interest groups are active in the ACF 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 these 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 Manual includes a list of state and federal agencies and active stakeholders in the ACF Basin that have participated in the ACF Basin water management teleconferences and meetings.

9-02. Interagency Coordination

Local Press and Corps Bulletins. The local press includes any periodic publications in or near the West Point Watershed and the ACF Basin. Montgomery, Alabama, and Columbus, Georgia, have some of the larger daily newspapers which often publish articles related to the rivers and streams in the vicinity of the project. Their representatives have direct contact with the Corps through the Public Affairs Office. 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 West Point Project and other ACF 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 evaluation of reservoir regulations and systems to ensure 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 ACF Basin-wide System.

EXHIBIT A

SUPPLEMENTARY PERTINENT DATA

SUPPLEMENTARY PERTINENT DATA

WEST POINT DAM
CHATTAHOOCHEE RIVER, GEORGIA

LOCATION AND PURPOSE

On the Chattahoochee River, 201.4 miles above the mouth of the river, Troup County, Georgia, and Chambers County, Alabama, approximately three miles north of West Point, Georgia, and 146.9 miles below Buford Dam. The authorized purposes include flood risk management, power, fish and wildlife conservation and recreation. Other purposes include stream flow regulation.

GENERAL

Drainage area, Buford Dam to West Point Dam, sq. mi.	2,406
Total drainage area above West Point Dam, sq. mi.	3,440

STREAM FLOW AT DAMSITE - Before filling lake*

Period of record 1896–1973 (Before construction of West Point Dam (River flow was first interfered with in May 1967 when the river was diverted through a channel cut in the east bank.)	
Average flow cfs	5,628
Minimum monthly flow cfs (Sept. 1925)	333
Maximum monthly flow cfs (March 1929)	32,700
Period of record 1974–2013, (after construction of West Point Dam)	
Average flow cfs	4,712
Minimum monthly flow, cfs (Aug. 2002)	823
Maximum monthly flow, cfs (March 1990)	18,835
Estimated bankfull discharge, cfs	40,000

RESERVOIR

Top of conservation pool, feet NGVD29 – summer level	635.0
Top of conservation pool, feet NGVD29 – winter level	628.0
Minimum conservation pool, feet NGVD29	620.0
Elevation of spillway design flood	646.4
Elevation of standard project flood	640.9
Storage volumes, acre-feet	
Total storage at maximum flood pool (elev. 641)	774,798
Total storage at top of conservation pool (elev. 635)	604,527
Permanent flood risk management storage – (elev. 635 to elev. 628)	162,232
Surcharge flood risk management storage storage (elev. 641 – elev. 635)	170,271
Conservation storage – summer (elev. 635 to elev. 620)	306,131
Conservation storage – winter (elev. 628 to elev. 620)	143,899
Inactive storage below minimum power pool, elev. 620	298,396

PERTINENT DATA (Cont'd)

RESERVOIR (Continued)

Reservoir area, acres	
Maximum flood pool (elev. 641)	31,993
Top of conservation pool, summer level	25,864
Top of conservation pool, winter level	20,615
Minimum conservation pool,	15,512
Shoreline at maximum power pool (elev. 635), miles	
Mainland shoreline	604
Islands shoreline	14

DAM

Concrete gravity and earth embankment	
Length, feet	
Concrete sections	896
Earth embankments	6,354±
Elevations, feet, NGVD29	
Top of dam	652.0
Streambed	556
Spillway Crest	597.0
Top of tainter gates, closed	638.0
Service bridge	652
Maximum height, feet	
Concrete section	132±
Earth embankment	78
Maximum top width, feet	
Concrete (non-overflow)	20.5
Roadway	15.0
Earth embankment	25.0
Sideslopes, earth embankment	
Upstream	1 on 3
Downstream	1 on 2.5
Spillway	
Type	Concrete gravity ogee
Gross length, feet	350
Clear opening, feet	300
Piers, number	5
Piers, width, feet	10
Tainter gates, number	6
Tainter gates, width, feet	50
Tainter gates, height, feet	41
Type-of bucket	Roller
Radius of bucket, feet	50

PERTINENT DATA (Cont'd)

DAM (Continued)

Bucket lip, elevation	550.64
Intake-powerhouse section	
Length, feet (estimated)	321
Nonoverflow section	
Length, feet	185

POWER PLANT STRUCTURE

Right bank of the river between the earth dike and the spillway	
Size of building, feet	
Length	321
Width	164.5
Elevations, feet, NGVD29	
Bottom of substructure (main units)	504.5
Low point of draft tube	
Main units	509.0
Small unit	538.0
Centerline of distributor	
Main units	561.0
Small unit	556.0
Turbine room floor	
Main units	582.0
Small unit	567.0
Elevations, feet NGVD29	
Control room	582.0
Erection room	602.0
Transformer deck	602.0
Draft tube deck	599.0
Intake deck	652.0
Crane runway rail	626.0
Roof (high point of concrete slab	642.08)
Top of parapet	645.25
Trash racks	
Number of openings,	
Main units	9
Small unit	1
Size of rack opening, each main unit, feet	17.0 x 44.0
Spacing of bars, center-to-center, inches	6
Intake gates – Vertical lift, single leaf, tractor	
Number, each	
Main units	3

PERTINENT DATA (Cont'd)

POWER PLANT STRUCTURE (Continued)

Total of	6
Small unit	1
Size (clear opening), feet	
Main units	17.0 x 31.06
Small unit	9.0 x 9.0
Method of handling	Individual hydraulic hoists
Draft tube gates	
Type	Double leaf, vertical lift, slide
Number	
Main units (each)	3
Small unit	1
Number provided	3
Size (clear opening), feet	17.67 x 25.0
Method of handling	Gantry Crane

MAIN GENERATING UNITS

Number, initial	2
Number ultimate	3
Speed, rpm	100
Spacing of units, center-to-center, feet	77
Turbines	Fixed blade propeller, counter-clockwise rotation
Capacity, hp each	
at 52.5 feet net head,	45,000
at 58.0 feet net head	51,500
at best gate	48,000
Spiral cases	Concrete semi-spiral, three discharge passages
Draft tubes	Concrete elbow, three discharge passages
Generators	Vertical shaft, enclosed, self-ventilated, with thrust and guide bearing below rotor
Rating, each, Normal, continuous, kw	48,840
Power factor	0.90
Voltage (60 Hertz, 3-phase)	13,800

PERTINENT DATA (Cont'd)

SMALL GENERATING UNIT

Speed, rpm	327
Location	In erection bay block
Turbine	Fixed blade propeller, counter-clockwise rotation
Capacity, hp	
at 25 52.5 feet net head	3,500
at 77.feet net head (rated)	5,400
Number	1
Spiral case	steel, one discharge passage
Draft tube	concrete elbow, one discharge passage
Generator	Vertical shaft, enclosed, self-ventilated, with thrust and guide bearing above rotor, and guide bearing below the rotor
Rating, kw	
Normal, continuous	3,375
Normal, continuous, 60 °C rise	3,750
Maximum, continuous capability	4,312
Power factor	0.90
Voltage (60 Hertz, 3-phase)	4,160
Average annual energy (1976–2013), MWH	184,106

TAILWATER ELEVATION, FEET, NGVD29

Spillway design flood (423,900 cfs)	604.0
Standard project flood (249,500 cfs)	595.0
Maximum flood of record (73,200 cfs)	579.0
Three units running at max capacity (18,000 cfs)	565.5
Small unit running (675 cfs)	557.8
Minimum (no flow)	557.0

HEAD, NET FEET

Maximum	
Small unit (675 cfs)	77.0
One main unit (6,300 cfs)	73.0
Minimum	
Small unit only (675 cfs)	62.0
Both main units and small unit (18,000 cfs)	52.5
Mean operating	
Small unit (675 cfs)	62.0
Both main units (16,825 cfs)	63.2
Rated	
Small unit	77.0
Main units	58.0

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	$6. 27 \times 10^{6}$	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 WEST POINT LAKE
ORDER 3rd
DATE
9/1/2009

ABSTRACTED BY SCN
ADJUSTED BY SCN
CHECK BY SCN
RUN BY TRD

VERTICAL DATUM NAVD88

STATION	# OF TURNS	F OR B	SUM OF ROD READINGS BS	FS	DIFF OF ELEV	ELEVATIONS UNADJUSTED	CORRECTION	ADJUSTED	MEAN STATIC	REMARKS	
West Point Dam Headwater											
LOOP 1									MEAN F & B		
14B-3R						651.869	0.000	651.869	651.869	Elevation Held OPUS DB	NewAluminium CORPS Monument
	1	F	5.520	6.000	-0.480				MEAN F & B		
TBM-6				MEAN	-0.480	651.389	0.000	651.389	651.390		1/2" Rebar
	1	F	5.790	5.239	0.551				MEAN F & B		
TBM-1				MEAN	0.551	651.940	-0.001	651.939	651.941		Top Pipe in Cross (No Cap) Left Side Dam
	1	F	5.200	5.187	0.013				MEAN F & B		
TP-1				MEAN	0.013	651.953	-0.001	651.952	651.954		Turning Point
	1	F	5.127	5.129	-0.002				MEAN F & B		
TBM-7				MEAN	-0.002	651.951	-0.002	651.949	651.951		Top Bolt (SP-8)
	1	F	5.153	5.12	0.033				MEAN F & B		
TBM-2				MEAN	0.033	651.984	-0.002	651.982	651.984		Bottom Rebar at Corner fence
	1	F	5.085	5.156	-0.071				MEAN F & B		
TBM-8				MEAN	-0.071	651.913	-0.003	651.910	651.910		Top Pipe in Cross (No Cap) Right Side Dam
	1	F	5.142	5.119	0.023				MEAN F & B		
TBM-9				MEAN	0.023	651.936	-0.003	651.933	651.933		Top 3/8" Bolt
	1	F	5.036	5.286	-0.250				MEAN F & B		
14B-3Q				MEAN	-0.250	651.686	-0.004	651.683	651.683		NewAluminium CORPS Monument
	1	B	5.093	4.842	0.251						
TBM-9				MEAN	0.251	651.937	-0.004	651.933			Top 3/8" Bolt
	1	B	5.133	5.156	-0.023						
TBM-8				MEAN	-0.023	651.914	-0.004	651.910			Top Pipe in Cross (No Cap) Right Side Dam
	1	B	5.194	5.118	0.076						
TBM-2				MEAN	0.076	651.990	-0.005	651.985			Bottom Rebar at Corner fence
	1	B	5.136	5.168	-0.032						
TBM-7				MEAN	-0.032	651.958	-0.005	651.953			Top Bolt (SP-8)
	1	B	5.155	5.151	0.004						
TP-1				MEAN	0.004	651.962	-0.006	651.956			Turning Point
	1	B	5.048	5.061	-0.013						
TBM-1				MEAN	-0.013	651.949	-0.006	651.943			Top Pipe in Cross (No Cap) Left Side Dam
	1	B	5.346	5.898	-0.552						
TBM-6				MEAN	-0.552	651.397	-0.007	651.390			1/2" Rebar
	1	B	6.003	5.524	0.479						
14B-3R				MEAN	0.479	651.876	-0.007	651.869		Elevation Held OPUS DB	NewAluminium CORPS Monument
	16	Sum Turns									
LOOP 2									MEAN F & B		
TBM-2						651.982	0.000	651.982	651.982	Elevation From Loop 1	Bottom Rebar at Corner fence
	1	F	5.334	5.486	-0.152				MEAN F & B		
TBM-3				MEAN	-0.152	651.830	0.000	651.830	651.830		Chiseled square on upstream side of dam located above staff
	1	F	5.743	5.745	-0.002				MEAN F & B		
TBM-10				MEAN	-0.002	651.828	0.000	651.828	651.826		Turning Point
	1	F	5.570	4.784	0.786				MEAN F & B		
TBM-4				MEAN	0.786	652.614	0.000	652.613	652.613		Chiseled square on floor directly in front of well
	1	F	5.413	2.540	2.873				MEAN F & B		
TBM-5				MEAN	2.873	655.487	0.000	655.486	655.486		Chiseled square on encoder shelf
	1	B	2.526	5.399	-2.873						
TBM-4				MEAN	-2.873	652.614	-0.001	652.613			Chiseled square on floor directly in front of well
	1	B	5.393	6.181	-0.788						
TBM-10				MEAN	-0.788	651.826	-0.001	651.825			Turning Point
	1	B	6.258	6.252	0.006						
TBM-3				MEAN	0.006	651.832	-0.001	651.831			Chiseled square on upstream side of dam located above staff
	1	B	5.445	5.294	0.151						
TBM-2				MEAN	0.151	651.983	-0.001	651.982		Elevation From Loop 1	Bottom Rebar at Corner fence
	8	Sum Turns									

LEVEL ABSTRACT

SURVEY OF WEST POINT LAKE | ABSTRACTED BY SCN | VERTICAL DATUM NAVD88
ORDER 3rd | ADJUSTED BY SCN
DATE | CHECK BY SCN
9/1/2009 | RUN BY TRD

STATION	# OF	F OR B	SUM OF ROD READINGS		DIFF OF	ELEVATIONS			MEAN		
	TURNS		BS	FS	ELEV	UNADJUSTED	CORRECTION	ADJUSTED	STATIC	REMARKS	
LOOP 3									MEAN F & B		
14B-3Q						651.766	0.000	651.766	651.766	Elevation From Loop 1	NewAluminium CORPS Monument
	1	F	5.411	5.199	0.212				MEAN F & B		
RM-1				MEAN	0.212	651.978	0.000	651.978	651.979		Small Bolt (Top of Stairs)
	1	F	0.812	10.476	-9.664				MEAN F & B		
TP-2				MEAN	-9.664	642.314	0.001	642.315	642.314		Turning Point
	1	F	0.266	9.393	-9.127				MEAN F & B		
TP-3				MEAN	-9.127	633.187	0.001	633.188	633.187		Turning Point
	1	F	0.533	11.197	-10.664				MEAN F & B		
TP-4				MEAN	-10.664	622.523	0.001	622.524	622.524		Turning Point
	1	F	0.250	12.968	-12.718				MEAN F & B		
TP-5				MEAN	-12.718	609.805	0.001	609.806	609.807		Turning Point
	1	F	0.655	10.589	-9.934				MEAN F & B		
RM-2				MEAN	-9.934	599.871	0.002	599.873	599.874		Chiseled square on corner of sidewalk at bottom of steps that lead to the top of the dam. The steps are located just outside the fence that leads to the power house
	1	F	5.617	3.752	1.865				MEAN F & B		
TP-6				MEAN	1.865	601.736	0.002	601.738	601.739		Turning Point
	1	F	5.393	8.235	-2.842				MEAN F & B		
D				MEAN	-2.842	598.894	0.002	598.896	598.896		Brass Disk @ Corner
	1	F	5.396	1.801	3.595				MEAN F & B		
RP-2				MEAN	3.595	602.489	0.002	602.492	602.492		Outermost top of angle iron attached to left side of lower dam deck, located directly above staff gage
	1	B	1.670	5.266	-3.596						
D				MEAN	-3.596	598.893	0.003	598.896			Brass Disk @ Corner
	1	B	5.452	2.609	2.843						
TP-6				MEAN	2.843	601.736	0.003	601.739			Turning Point
	1	B	3.351	5.216	-1.865						
RM-2				MEAN	-1.865	599.871	0.003	599.874			Chiseled square on corner of sidewalk at bottom of steps that lead to the top of the dam. The steps are located just outside the fence that leads to the power house
	1	B	10.647	0.715	9.932						
TP-5				MEAN	9.932	609.803	0.004	609.807			Turning Point
	1	B	13.107	0.390	12.717						
TP-4				MEAN	12.717	622.520	0.004	622.524			Turning Point
	1	B	11.384	0.722	10.662						
TP-3				MEAN	10.662	633.182	0.004	633.186			Turning Point
	1	B	9.723	0.596	9.127						
TP-2				MEAN	9.127	642.309	0.004	642.313			Turning Point
	1	B	10.021	0.356	9.665						
RM-1				MEAN	9.665	651.974	0.005	651.979			Small Bolt (Top of Stairs)
	1	B	5.056	5.269	-0.213						
14B-3Q				MEAN	-0.213	651.761	0.005	651.766		Elevation From Loop 1	NewAluminium CORPS Monument
	18	Sum Turns									

LOOP 4									MEAN F & B		
D						598.896	0.000	598.896	598.896	Elevation From Loop 1	Brass Disk @ Corner
	1	F	5.336	1.747	3.589				MEAN F & B		
TBM-11				MEAN	3.589	602.485	-0.025	602.460	602.460		Mark on wall
	1	B	1.748	5.287	-3.539						
D				MEAN	-3.539	598.946	-0.050	598.896		Elevation From Loop 1	Brass Disk @ Corner
	2	Sum Turns									

LEVEL ABSTRACT

SURVEY OF WEST POINT LAKE — ABSTRACTED BY SCN — VERTICAL DATUM NAVD88
ORDER 3rd — ADJUSTED BY SCN
DATE — CHECK BY SCN
9/1/2009 — RUN BY TRD

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

West Point Dam Final Elevations

Point	ELEVATION NAVD88 Feet	Furnished ELEVATION NGVD29 Feet	DIFF NAVD88 NGVD29 Feet	DESCRIPTION
14B-3R	651.869			NewAluminium CORPS Monument
TBM-6	651.390			1/2" Rebar
TBM-1	651.941			Top Pipe in Cross (No Cap) Left Side Dam
TP-1	651.954			Turning Point
TBM-7	651.951			Top Bolt (SP-8)
TBM-2	651.984			Bottom Rebar at Corner fence
TBM-8	651.910			Top Pipe in Cross (No Cap) Right Side Dam
TBM-9	651.933			Top 3/8" Bolt
14B-3Q	651.683			NewAluminium CORPS Monument
TBM-3	651.830	651.882	-0.052	Chiseled square on upstream side of dam located above staff
TBM-10	651.826			Turning Point
TBM-4	652.613	652.665	-0.052	Chiseled square on floor directly in front of well
TBM-5	655.486	655.537	-0.051	Chiseled square on encoder shelf
RM-1	651.979			Small Bolt (Top of Stairs)
TP-2	642.314			Turning Point
TP-3	633.187			Turning Point
TP-4	622.524			Turning Point
TP-5	609.807			Turning Point
RM-2	599.874	599.771	0.103	Chiseled square on corner of sidewalk at bottom of steps that lead to the top of the dam. The steps are located just outside the fence that leads to the power house
TP-6	601.739			Turning Point
D	598.896			Brass Disk @ Corner
RP-2	602.492	602.441	0.051	Outermost top of angle iron attached to left side of lower dam deck, located directly above staff gage
TBM-11	602.460			Mark on wall

Staff Gage Information at Headwater

METHOD	READING	DATE/TIME
VISABLE	636.33	9/28/2009 @ 9:22:00 AM
ELECTRONIC	636.38	9/28/2009 @ 9:30:00 AM

14.910	Measurement from TBM-3
636.972	NAVD88 Elevation on Gage @ 637.00'
637.000	Actual gage reading
-0.028	Difference (NAVD88 & Staff Gage)

Staff Gage Information at Tailwater

METHOD	READING	DATE/TIME
	557.85	9/28/2009 @ 11:10:00 AM
VISABLE	557.85	9/28/2009 @ 11:10:00 AM
ELECTRONIC	N/A	

28.360	Measurement from TBM-11
574.100	NAVD88 Elevation on Gage @ 574.00'
574.000	Actual gage reading
0.100	Difference (NAVD88 & Staff Gage)

SURVEY DATASHEET (Version 1.0)

PID: BBBL91
Designation: 14B-3R
Stamping: 14B-3R 2009
Stability: Monument will probably hold position well
Setting: Massive structures (other than listed below)
Description: THE MARK IS AN ALUMINUM DISK SET AT THE SOUTHEAST END OF WEST POINT DAM, BEHIND A CONCRETE BARRIER WALL.

LOCATED IN A CONCRETE PLATFORM, EVEN WITH THE SURFACE OF WEST POINT DAM ROAD, THE MARK IS 37' NE FROM A POWER MANHOLE, 11.5' NW FROM E CORNER OF PLATFORM, AND 3.3' NE FROM EDGE OF CONCRETE BARRIER WALL.

Observed: 2009-08-26T13:48:00Z
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

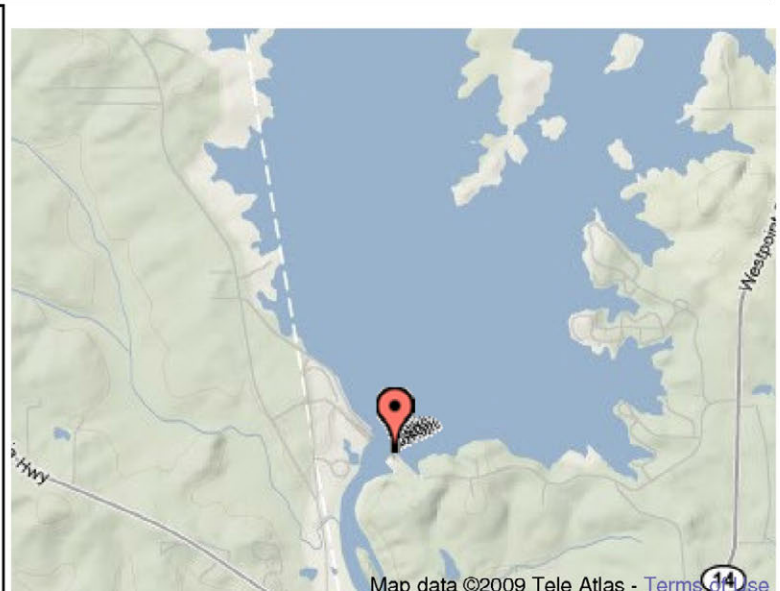
LAT:	32° 55' 4.46044"	± 0.011 m
LON:	-85° 11' 14.44405"	± 0.023 m
ELL HT:	169.636	± 0.019 m
X:	449656.854	± 0.022 m
Y:	-5340674.469	± 0.023 m
Z:	3446411.546	± 0.005 m
ORTHO HT:	198.690	± 0.047 m

	UTM 16	SPC 1002(GA W)
NORTHING:	3643643.378m	323959.856m
EASTING:	669498.933m	604533.501m
CONVERGENCE:	0.98529810°	-0.55471643°
POINT SCALE:	0.99995425	1.00001234
COMBINED FACTOR:	0.99992762	0.99998571

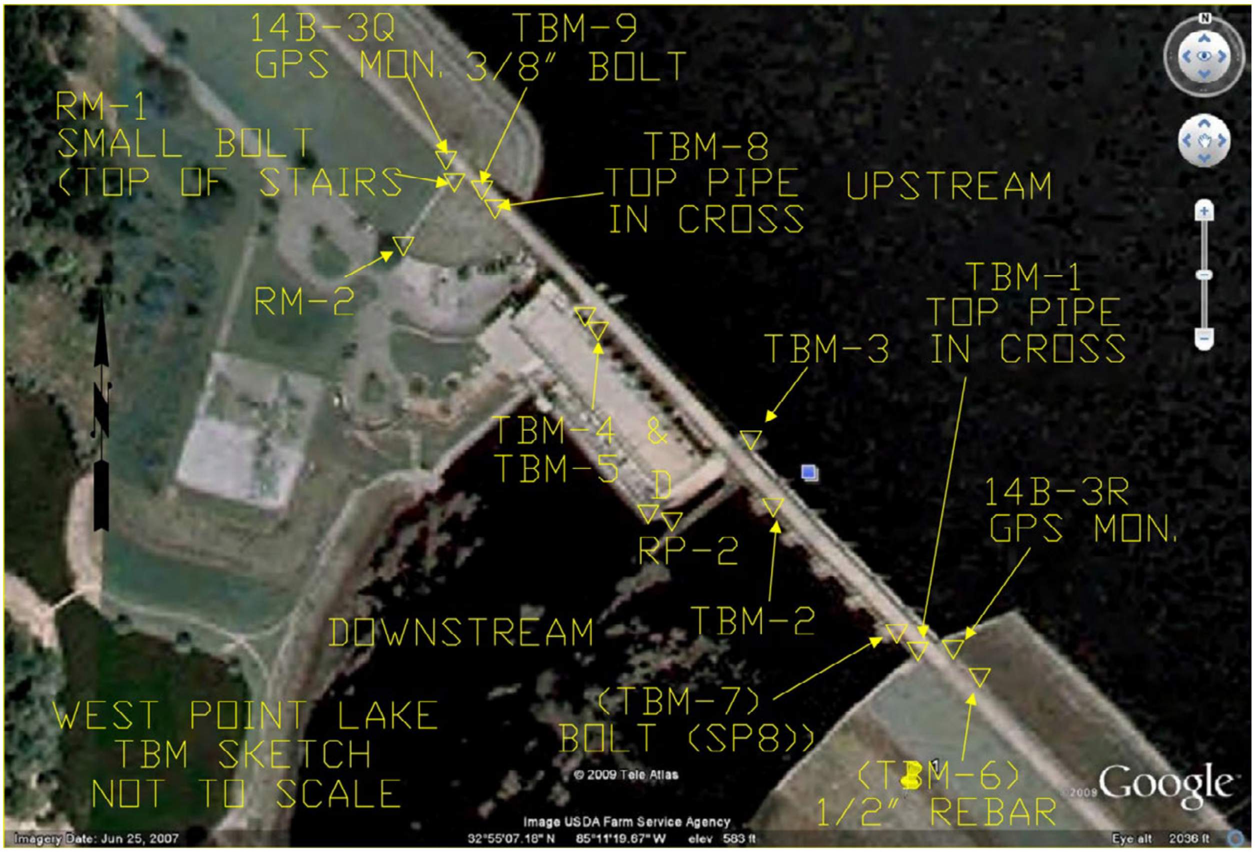
CONTRIBUTED BY

waller
Lowe Engineers, LLC

Horizon View



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.

1 

2 **West Point Dam and Lake**

3

EXHIBIT C

STANDING INSTRUCTIONS TO THE PROJECT OPERATOR FOR WATER CONTROL

STANDING INSTRUCTIONS TO THE DAMTENDER FOR WATER CONTROL WEST POINT DAM AND LAKE

1. BACKGROUND AND RESPONSIBILITIES

a. <u>General Information</u>. These “Standing Instructions to the Project Operator for Water Control” are written in compliance with Paragraph 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 West Point Dam and Lake project is operated for flood risk management, navigation, hydropower, recreation, fish and wildlife conservation, water quality, and water supply. Water Control actions are in support of these project purposes and for purposes of the ACF River system.

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

(3) **Structure**. West Point Dam is located at river mile 201.4 on the Chattahoochee River approximately 3.2 miles north of the town of West Point, Georgia. It s 146.9 miles below Buford Dam and 126.2 miles above Walter F. George Dam with a total drainage area of 3,440 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 West Point Dam Operations Project Manager.

b. <u>Role of the Project Operator</u>. The term Project Operator refers to both the Walter F. George powerhouse operator and to the West Point powerhouse personnel. Operation of the hydropower units and data reporting is the responsibility of the Walter F. George powerhouse operator. Operation of the spillway is the responsibility of the Walter F. George powerhouse operator in conjunction with personnel at the West Point powerhouse.

(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 generation schedule updates. This communication will be increased to an hourly basis if the need develops. Daily generation schedules and updates are provided to the Mobile District. 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 with the powerhouse operator at the Walter F. George powerhouse.

(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 flooding occurs and communications with Mobile District are cut off, the Project Operator will use the following chart as a guide until communications with the Mobile District are restored. If communication is lost after some instructions are issued, follow those instructions as long as they are applicable.

In the event that the pool elevation and inflow call for an induced surcharge release, refer to the guidance for induced surcharge releases on Plate 7-4. If fewer than 16 hours remain in the day when the above conditions are present (anytime after 8 a.m.), full-turbine capacity will be released until midnight.

	Initial conditions are: Flood producing rainfall occurred has or is occurring in the basin (two inches or more of rainfall).		
If pool elevation is…	**And…**	**Then**	**If Contact is Impossible Then**
Above 632	3-hour average inflow is 15,000 to 25,000 cfs	Contact Water Management	*Release turbine capacity 16 hours per day. (If turbines unavailable, spill 10,000 cfs around the clock.)
Above 632	3-hour average inflow is greater than 25,000 cfs	Contact Water Management	*Release turbine capacity 16 hours per day. (If turbines unavailable, spill 16,000 cfs around the clock.)
Below 632	3-hour average inflow is greater than 25,000 cfs	Contact Water Management	*Release turbine capacity 16 hours per day.
Below 632	3-hour average inflow is less than 25,000 cfs	Contact Water Management	Continue any prior scheduled release

2. DATA COLLECTION AND REPORTING

a. General. 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. Daily Reporting. The Project Operator will record the following items daily and will report them by 6:30 AM (0630) Central Time to the Mobile District either by computer network, by fax machine (251-694-4058), or by telephone conversation (690-690-2737):

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

(2) Precipitation in hundredths of an inch.

(3) 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.

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

(5) 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.

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

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

(8) The spillway gate step at 6:00 a.m.

c. Gage Verification

In accordance with the USACE Guidance Memorandum for Critical Gage Instrumentation dated 15-Dec 2006, the West Point and Walter F. George powerhouse personnel will perform gage reading verifications by providing the pool level automated instrumentation gage reading and staff gage readings. In the event that the automated gage equipment malfunctions or if the difference in stage readings is greater than 0.1 feet, the Project Operator will report readings from the staff gage until the automated gage is rectified.

d. Regional Hydro-meteorological 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 West Point 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 spillway 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

DROUGHT CONTINGENCY PLAN

(See Master Manual for draft DCP. Will be added to each appendix before final printing)

EXHIBIT E

HIGH WATER ACTION PLAN

WEST POINT PROJECT
Plan for High Water Levels
February 2013

I Reservoir Levels Above Maximum Power Pool Elevation (635 feet NGVD29)

1. Information obtained from flood events in 2003 shows high water levels that adversely affect recreational facilities at West Point Project:

   a. Pool Elevations 636.7 – 637.5 ft., NGVD29
   b. Pool Elevations 637.5 – 638.6 ft., NGVD29
   c. Pool Elevations 638. 6 – 639.5 ft., NGVD29

2. Potential adverse effects to swimming areas, marinas, boat launching ramps, campsites, and public and private boat docks, with actions to be taken at each of these pool elevations, follow:

   a. Pool Elevation (636.7 – 637.5 ft., NGVD29)

Pool elevations at or near this level adversely affect recreational use and increase the potential for facility closure. Actions to be taken primarily involve cautioning the public about potential hazards and preparing for worsening conditions. Campers with reservations for threatened or affected campsites will be notified.

Conditions	Actions
1. Public courtesy docks at **Earl Cook**, **Yellowjacket (south dock), Ringer**, and **RS Heard DUA** are inaccessible via land as walkways are inundated.	1. Erect temporary barriers or flagging at entrance to dock walkway. Check structural stability of dock/walkway and ensure joints and anchoring system allow dock to rise/fall with pool elevation.
2. Holiday Site 76 has water on tent pad at 637.09’ NGVD29. Sites 46, 77, 78 have water nearing, but not on site. Sites 44-47 will also be affected by power outage to site 46. **Amity** Site 68 taking on water at 637.13’ NGVD29. Sites 63, 64 have water nearing, but not on site. Sites 66 and 70 will also be affected by power outage to site 68. **RS Heard CG** Sites 3-10 & 108-115 have water nearing, but not on site. Sites 1, 2, 11, 107, 116, 117 and comfort station WRSH03 will be affected by power outage.	2. Turn electric power off, close campsites, and notify park attendants of closure. If site is available for reservation or is reserved, notify camper and the National Recreation Reservation Service (NRRS).

b. Pool Elevation (637.5 – 638.6 ft., NGVD29)

Adverse effects to recreation and concern for public safety significantly increase at this level, and specific actions are to be taken to identify hazards and inform the public of potentially dangerous conditions, as follows:

Conditions	Actions
1. Courtesy dock walkways at **Holiday, Long Cane, Sunny Point, Evansville, Glass Bridge, Amity , Anderson, Veasey Creek, Horace King, Dewberry, Yellowjacket (North), R.S. Heard , Clark, and Rocky Point** are inundated.	1. Erect temporary barriers or flagging at entrance to dock walkway. Check structural stability of dock/walkway and ensure joints & anchoring system are allowing dock to rise & fall with pool elevation.
2. **Amity-** Sites 31-36 & 63-72 have water on tent pads, camping loops for Sites 37-62 & 63-73 are inaccessible with water over roadways. Site 73 and comfort stations WA17 and WA09 will also be affected by **Whitetail Ridge-** Sites 14-16 & 39-43 are flooded. Sites 17 and 44 will also be affected by the power outages. **Holiday-** Sites 13, 49 & 108-111 are flooded. Sites 14 and 15 will also be affected by power outage. **RS Heard-**Sites 3-10, 98-100, 108-115 flooded. Site 97 will also be affected by the power outage.	2. Turn electric power off, close sites, and notify park attendants of closure. If sites are available for reservation or reserved, notify campers and the National Recreation Reservation Service (NRRS).
3. Large amounts of floating debris (natural and man-made) become partially submerged creating “hidden” hazards for boaters. Floating debris may collect around the intake structures on the dam.	3. Continue to monitor project area by boat. Mark hazards as necessary. Post “Warning” signs at boat ramps advising visitors exercise extreme caution. Initiate efforts to prevent floating debris from affecting operation of dam/powerhouse.
4. Marina operators and private dock owners must monitor their floating facilities to ensure that units are anchored and secured properly.	4. Coordinate with District Water Management officials on issuance of news releases to inform the public of water level forecasts and local issues such as boating and swimming hazards. Keep marina operators informed.

c. <u>Pool Elevation (638.6 – 639.5 ft., NGVD29)</u>

Adverse effects to recreation and public safety are extensive at this level, and the following actions are to be taken to identify hazards and inform the public of potentially dangerous conditions. Major facility closures will take place at this level.

Conditions	Actions
1. Public courtesy dock walkway at **McGee Bridge** is inundated.	1. Erect temporary barriers or flagging at entrance to dock walkway. Check structural stability of dock/walkway and ensure joints and anchoring systems are allowing dock to rise/fall with pool elevation.
2. **Holiday-** Sites 46, 50, 74, & 75 are flooded. **RS Heard Campground-** Sites 94-117 are flooded.	2. Turn electric power off, close sites, and notify park attendants of closure. If sites are available for reservation or reserved, notify campers and the National Recreation Reservation Service (NRRS).
3. Navigation aids become displaced at various locations on the project.	3. Continue to monitor project area by boat. Mark hazards as necessary. Develop complete listing of buoys that are off-station. Closely inspect bridge crossings and swimming areas via boat.
4. Group picnic shelters **Earl Cook #1 and #2, Veasey Creek, Horace King, and Long Cane** will have water nearing or at shelter.	4. Monitor shelters for possible closure. Visitor Center Attendant notify reservation parties of any closures. Users may request refund of fees paid or reschedule reservation dates.

R.S. Heard Campsites 2-5 at 639.22 feet NGVD29

Holiday Campground Causeway at 639.46 feet NGVD29

II. Downstream Impacts from West Point Dam Discharge Rates, 18,000 cubic feet per second (cfs) and Above:

1. Downstream structures and facilities will be affected by the discharge rate, as well as by inflows from local creeks below West Point Dam. If flows from local creeks are high, it can be assumed that the situation will worsen. The water level can be monitored by the USGS river gage (located at the West Point water intake plant along Chambers County 212 north of West Point) at the following link: http://water.weather.gov/ahps2/hydrograph.php?wfo=ffc&gage=wtpg1&view=1,1,1,1,1,1,1,1&toggles=10,7,8,2,9,15,6&type=0

   The following creeks will affect the areas south of their inlets, with direct effects on the areas listed below:

Creek	Affected Area
Oseligee	City of West Point
Long Cane	Lanier Hospital and Doctor's Office
Moores	Langdale Boat Ramp, Mill, & City of Valley Water Treatment Facility
Flat Shoals	Riverdale Mill & Riverview Park

a. West Point Dam Discharge Rate (18,000 – 34,000 cfs)

Little or no effect occurs at this release level. Public concern will be evident, especially from residents downstream. Actions are to be taken to identify expected discharge rates in order to inform the public.

Conditions	Actions
River will begin to exceed the normal riverbank limits at 18,000 cfs. Little or no physical effect to structures or facilities along the riverbank occurs at this release level.	Monitor low-lying areas (See Appendix B) and maintain contact with local municipalities. Issue news release on current conditions and expectations. Establish contact with District Water Management Officials. Coordinate planned increases in water releases with downstream stakeholders and EMA's (See Appendix A).

b. West Point Dam Discharge Rate (34,000 – 39,000 cfs) 14-17 River Feet (bankfull)

Discharge rates at or near this amount begin to have minor effects on yards and parks along the riverbank. Actions to be taken involve cautioning the public about potential hazards and preparation for possible worsening conditions.

Conditions	Actions
Downstream creek inflows along with this discharge rate will **threaten** low areas along the Chattahoochee River. Some low-lying areas will be flooded by high water. No businesses along the river will be affected.	Continue to monitor low-lying areas (See Appendix B) and maintain contact with local municipalities. Issue news release on current conditions and expectations. Maintain contact with District Water Management Officials.

City of West Point Recreation Complex. Photo taken at 38,200 cfs.

West Point water intake structure. Photo taken at 36,650 cfs.

c. West Point Dam Discharge Rate (39,000 – 57,000 cfs) 19 River Feet

Adverse effects to businesses and residential areas along the riverbank will begin when discharge rates exceed 39,000 cfs. Local officials are encouraged to caution the public about road closures, business closures and potential hazards.

Conditions	Actions
Conditions within the 100-year floodplain according to the *Special Flood Hazard Information Report,* USACE include: moderate flooding of homes, businesses, & roads along riverbank. Hwy. 29 bridge at the GA/AL line and bridge in West Point becomes impassable. ****At a release rate of 55,000 cfs all storm drains in West Point are backed up from the river and cannot handle additional rainfall.**	Continue to monitor low-lying areas (See Appendix B) and maintain contact with local municipalities. Maintain communication with local Emergency Management Agencies. Maintain contact with Water Management. Establish contact with Public Affairs and seek guidance for public inquires. Open road across dam for public use, in lieu of US 29 Bridge. 24-hour Park Ranger surveillance required.

Hwy. 29 at state line facing SE. Photo taken at 57,000 cfs.

West Point Fire Station. Photo taken at 57,000 cfs.

55,000 cfs release from the West Point Dam
Findings recorded on 24 September 2009

Chambers County Road 212, North of West Point:
1. 1270 Co Rd 212. Yellow house with carport. Water on all 4 sides of house, but not up to house. At 60,000 cfs water would be at the house.
2. 1246 Co Rd 212. Brick home. Water within 50 feet from back of house. Water is at stand alone storage shed to the north of the house.
3. 1150 Co Rd 212. Water covering all of back yard up to house and enters under the crawl space. Water up to the carport structure. At 60,000 water would be inside the home.
4. West Point Water Intake building and river gage. Water half way up brick foundation of intake building. Compound fence is under water.
5. Bridge, Co Rd 212. Water is within 5 feet of crossing the bridge.

West Point:
-Most storm drains are full of water in West Point (backed up from river).
6. 1400 3rd Ave, entire back yard, including swimming pool (that is no longer used) is covered in water. Water up to pool house building. At 60,000 water would be at the house and possibly inside structure.
7. 2nd Avenue, McCarty Funeral Home. Water completely fills ditch behind building. Water up to back side of garage. Water runs parallel to 2 other homes north of the funeral home.
8. Storm drain on 3rd Ave, south of Spectrum store, full of water.
9. Storm drain on 3rd Ave, adjacent to the Train Depot full of water.
10. 2nd Ave, Wood yard (across train tracks from Train Depot), water up to the office building and around both sides of structure.
11. Givorns shopping center. Water is close to building foundation at rear of building.
12. Storm drains on hwy 29 in front of Rogers BBQ, full of water.
13. Hwy 29 bridge/River, Interstate Valley Phone Company. Water is 1 foot below river bank. Outside: one AC unit on ground level; additional units on raised stands. Interior: network facilities are located on 2nd floor. At 60,000 cfs water would be up to building.
14. East 9th Street, behind Rogers BBQ. Water is within 25 – 30 feet from back of restaurant. At 60,000 cfs water would enter building.
15. Ave B and Ave C have water up to or very close to houses and out buildings. Some homes on Ave B have water up to and around three sides of each house impacting carports, out buildings and air conditioner units.
16. Episcopal Church on Ave C has water close to 2 buildings. Storm drain between 2 buildings full of water. Church would flood at 60,000 cfs release.

Valley:
17. 24th Street, White House along river. Water up to and under foundation. Water surrounds garage and car port buildings. Water covers entire front yard (river side) and along sides of home.
18. Medical Park: Dentist office water close to back wall and covers 1/3 of parking lot. Dialysis facility has water on 3 sides of building but not at building. Impacts most likely at a release rate of 60,000 cfs plus.
Road at back of Medical Park has water covering as well as the helicopter landing pad.

d. West Point Dam Discharge Rate (57,000 – 85,000 cfs)

Major flooding will occur to businesses and residents along the Chattahoochee River. Floodwaters will expand into the downtown area of West Point, GA and major business areas in Lanett and Valley, AL. Actions to be taken are primarily concerned with cautioning the public about potential and existing hazards.

Conditions	Actions
1. Hardley Creek Park will become inundated.	1. Close park and monitor for public safety.
2. Conditions on the 100 yr. flood plain according to the *Special Flood Hazard Information Report,* USACE include: major flooding of homes, businesses & roads along riverbank. Hwy. 29 bridge at the GA/AL line in West Point becomes impassable. Interstate 85 Bridge will be monitored by State Officials for structural stability.	2. Continue to monitor low-lying areas and maintain contact with local municipalities. Develop communications with local Emergency Management Agencies. Maintain contact with Water Management. Establish contact with Public Affairs and seek guidance for public inquires. Road across dam will remain open.
3. Knology Telecommunications Center near river in West Point will become threatened by rising water.	3. At 57,000 cfs, establish contact with Knology operations officials, listed in Appendix A.

APPENDIX A

Emergency Contact List

U.S. Army Corps of Engineers, Mobile District

Water Management:
James Hathorn - 251-690-2730
Bailey Crane - 251-694-4018

Emergency Operations Center:
251-690-2495

West Point Powerhouse Control Room:
706-643-5391

Walter George Control Room:
229-768-2154

Local Contacts

West Point, GA:
City Manager, Ed Moon 706-645-3522, cell 706-594-8637
Email emoon@cityofwestpointga.com
Chief of Police, Jeffery K. Cato, Office 706-773-3510
Email jcato@cityofwestpointga.com

Lanett, AL:
Chief of Police, Angie Spates, 334-644-5218, cell 706-590-7051
Email aspates@cityoflannett.com
911 Dispatch Center 334-576-0914

Valley, AL:
Chief of Police, Tommy Weldon, 334-756-5200
Mayor, Leonard Riley, cell 706-518-5225
Chief Fire Dept. Neal Marberry 334-756-7170, Email chiefnm@knology.net
Assistant Fire Chief, Kerry Pickard, Email k.pickard@eaws.fd

State of AL, State Patrol / DOT
State Troopers Headquarters, Opelika AL: 334-745-4651 (menu option 0)
DOT, Office 334-887-3341

State of GA, DOT:
G.D.O.T in Lagrange, Office 706-845-4115
Contacts: Havard Seldon, AE, David Neighbors, AAE, or Lee Yates

Troup County, GA:
Troup County 911 Center706-883-1700, EMA Office 706-884-0326
Director, Dennis Knight, at Troup County Fire Department, (706) 884-0326 or 706-883-1717
Troup County Sheriff, James Woodruff 706-883-1616

Chambers County, AL:
Sheriff, Sid Lockhart, Office 334-864-4333. 706-586-8414 & 8413 is local to West Point. Sid Lockhart Cell Phone, 706-773-6600, Home 334-576-3762
Email sheriff.lockhart@chamberscountyal.gov
Chambers County 911 Center 334-576-0915, Donnie Smith EMA/911 Director 334-576-0911
Email dsmith@chamberscounty911.com
Kathy Hornsby, Assistant EMA Director, Email planner@chamberscounty911.com

Heard County, GA:
Heard County 911 Center 706-675-3866 Director Chris Acosta
EMA Office706-675-6186, EMA Director is Scott Blue, Deputy Chief Steve Wirth
Email chiefblue@heardfire.com

Lee County, AL:
EMA Office 334-749-8161, EMA Director, Cathy Raines, Cell 334-275-6326, E mail kraines@leecoema.com
EMA Director, Johnny Langley, Cell 334-275-6325, Email jlangley@leecoema.com
Group pager 888-904-0911 (Notifies all)
Lee County Sheriff, Jay Jones, Office 334-749-5651

Russell County, AL:
EMA Director, Robert Franklin, Office 334-291-5079, Cell 334-664-0598, Email bfranklin@rcema.us
911 Center, 334-298-6535
Sheriff, Heath Taylor, 334-298-6535

Muscogee County, GA:
EMA Director Jeff Meyer, Office 706-653-3267
Deputy Director, Riley Land, Office 706-653-3267,
Email rland@columbusga.org

Harris County, GA:
Sheriff, Mike Jolley, Office 706-628-4211
DOT Office, 706-628-4011
EMA / 911 Director, Monty Davis, Office 706-628-7161, Email harriscty911ema@hotmail.com

Knology Telecommunications Contacts:
VP of Network Operations, Andy Sivell, Office 706-645-8168, Cell 706-773-0705
Field Service Operations, Chuck Goodwin, Office 334-576-9015, 706-518-9015

Intellicast Local Radar:
http://www.intellicast.com/Local/USLocalWide.asp?seg=LocalWeather&loc=katl&prodgrp=RadarImagery&Product=RadarLoop&prodnav=none&pid=none

National Weather Service:
http://www.nws.noaa.gov/

Appendix B

Downstream Checkpoints for Monitoring During Flood Conditions

West Point GA:

1. U.S. Highway 29 Bridge.
2. West Point Fire Department and City Hall Complex.

Lanett AL:

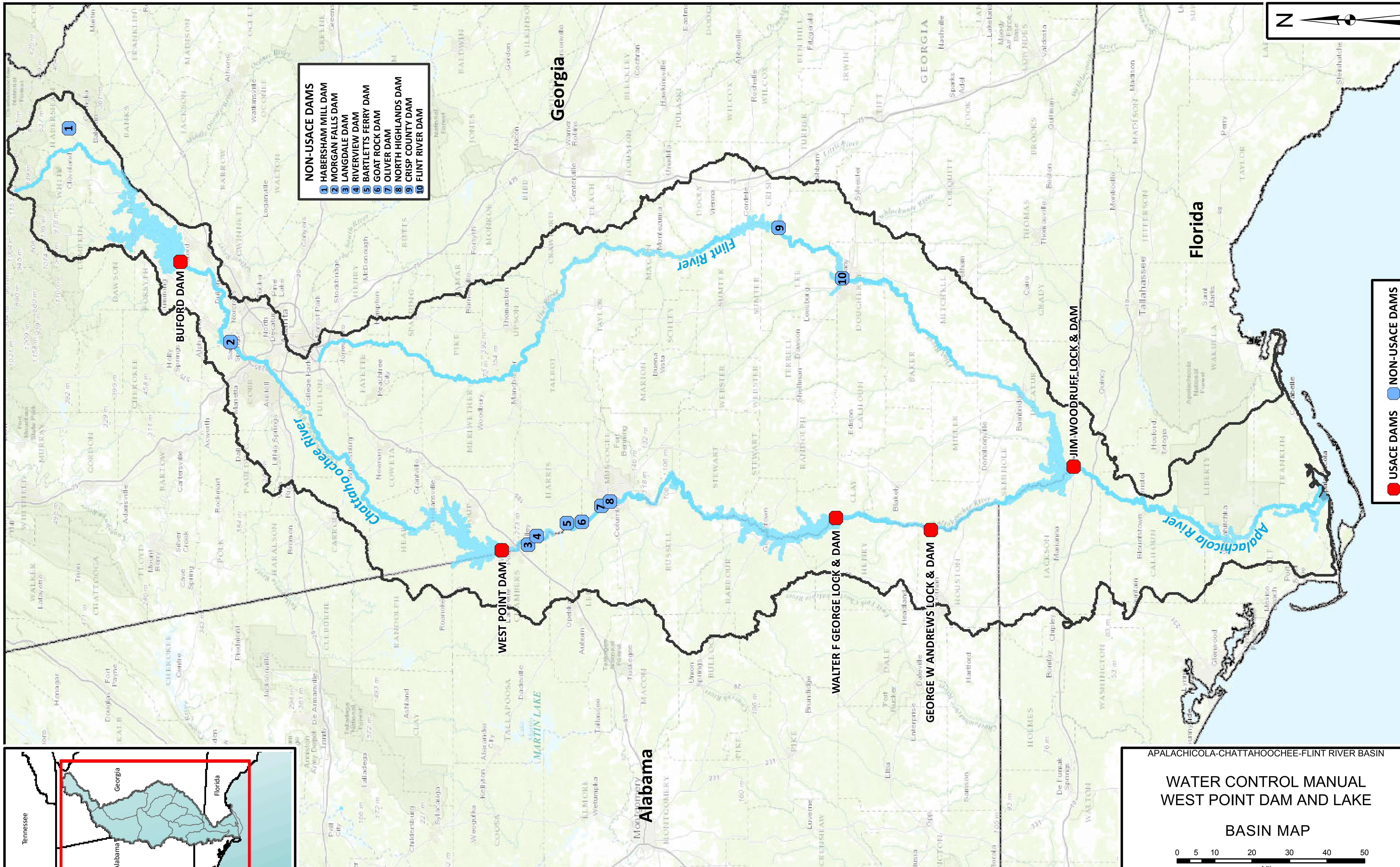
1. U.S. Highway 29, between the Alabama/Georgia state line and the mill.

Valley AL:

1. 24th St., on the Chattahoochee River in the Shawmut community.
2. Valley Medical Park: Riverbend Assisted Living Home, Valley Dialysis Center, Valley Orthopedic Clinic.
3. Chattahoochee River bank behind the Langdale Mill.
4. Langdale boat ramp and park.
5. Riverview boat ramp and park, below Riverdale Mill.

Note: Maps to all above locations are shown in “Plan for High Water Levels – Addendum to Appendix B.

PLATES



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

BASIN MAP

0 5 10 20 30 40 50
Miles

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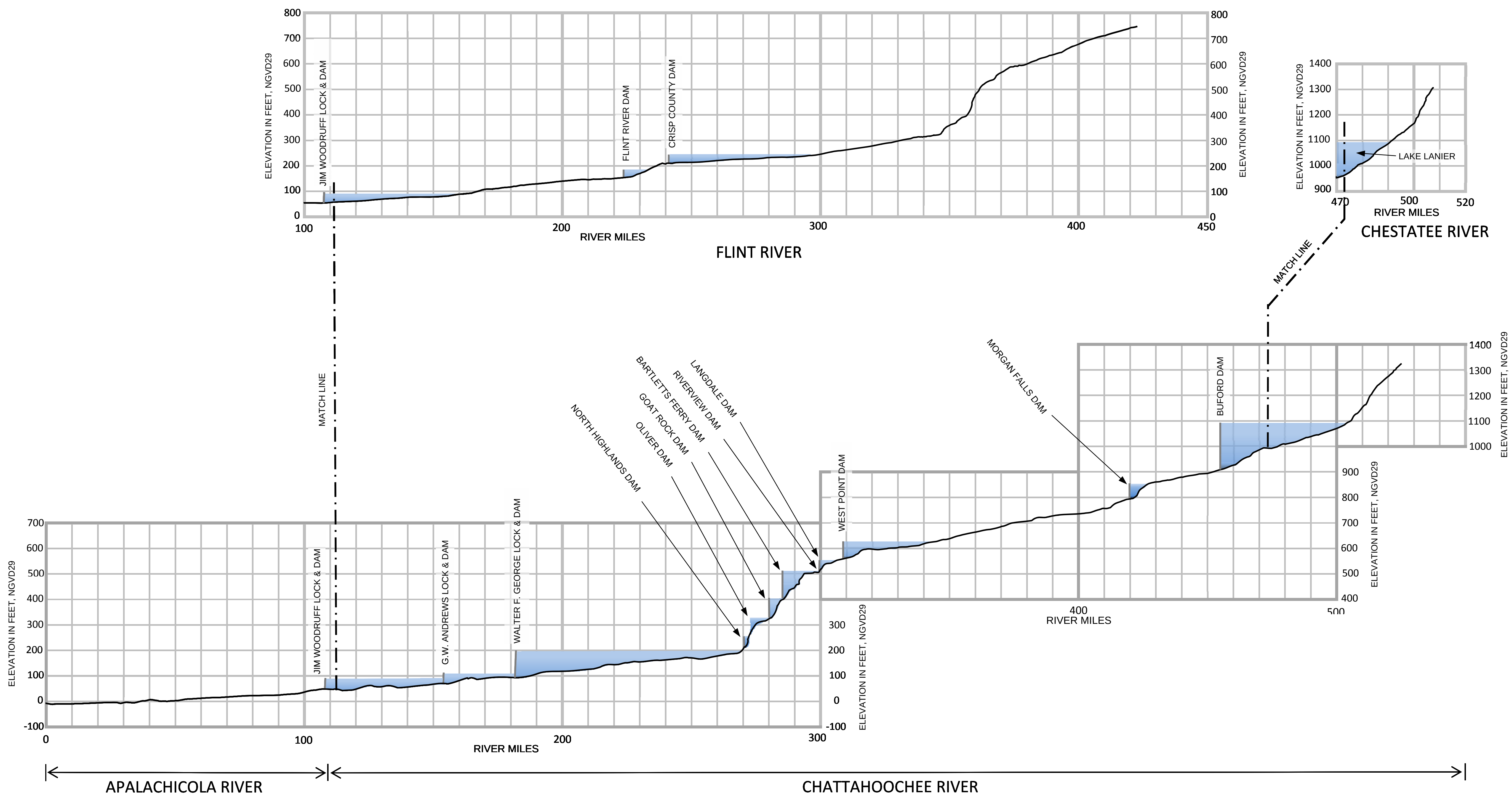
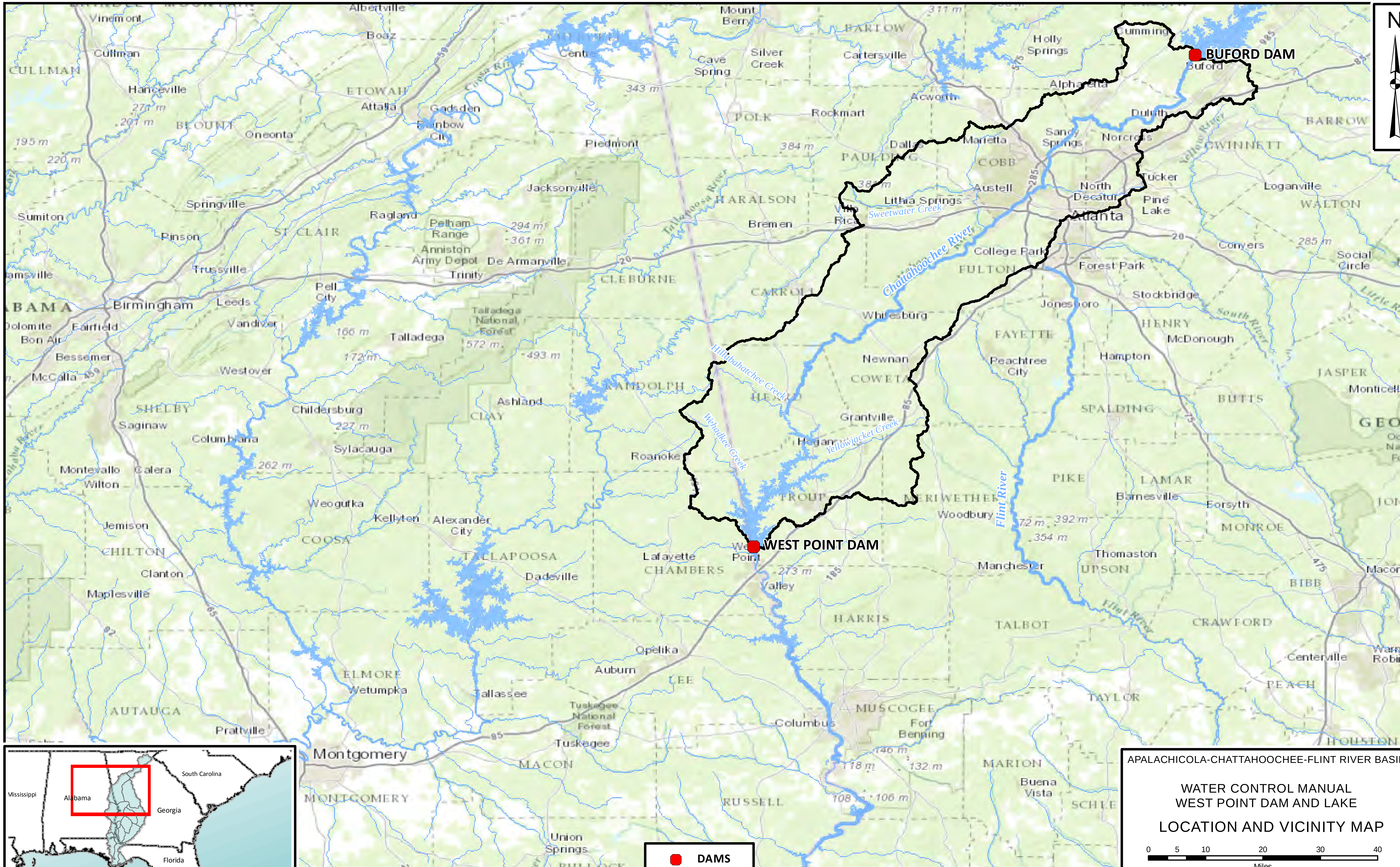


APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL

WEST POINT DAM AND LAKE

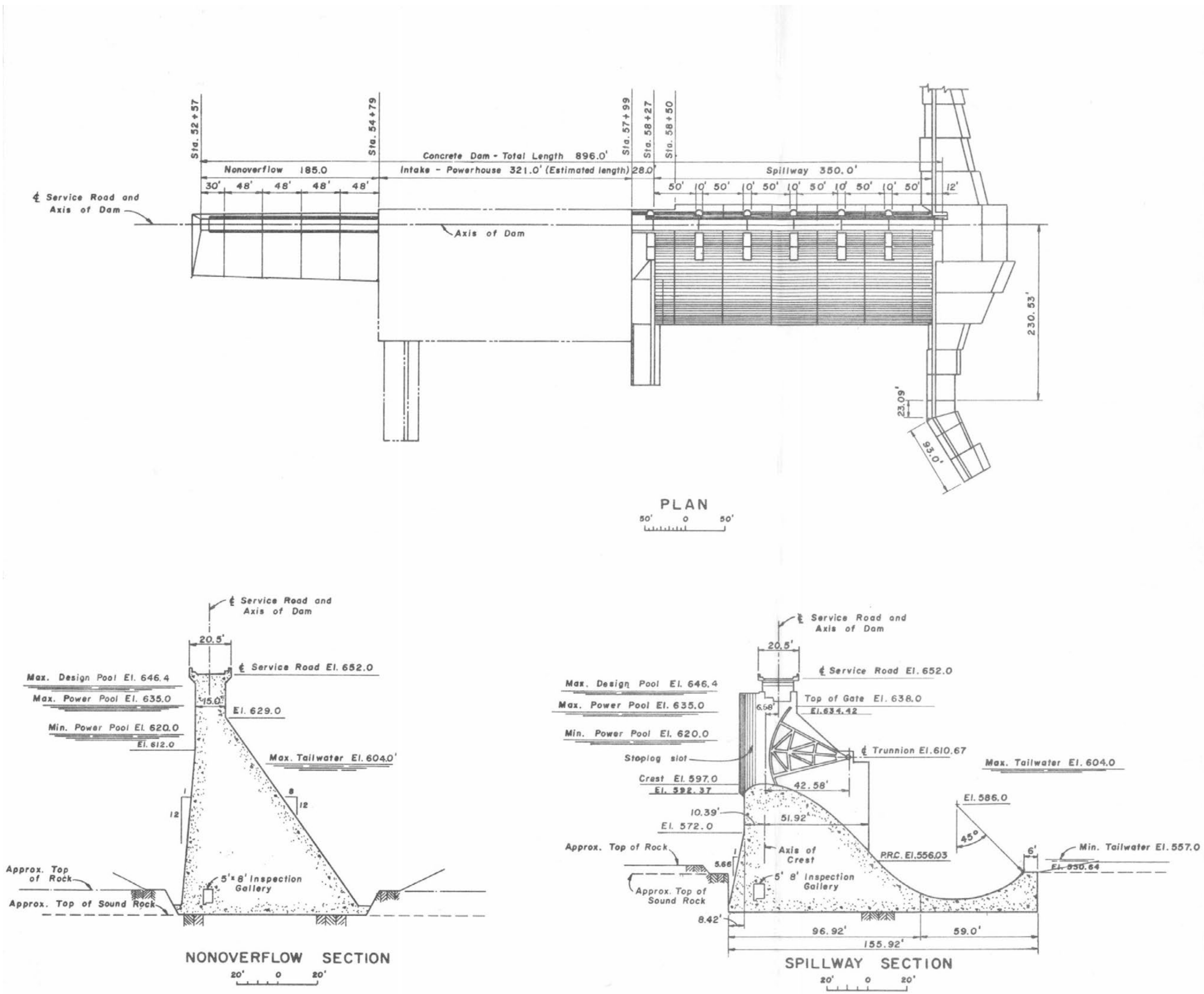
RIVER PROVILE AND RESERVOIR DEVELOPMENT



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

LOCATION AND VICINITY MAP



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

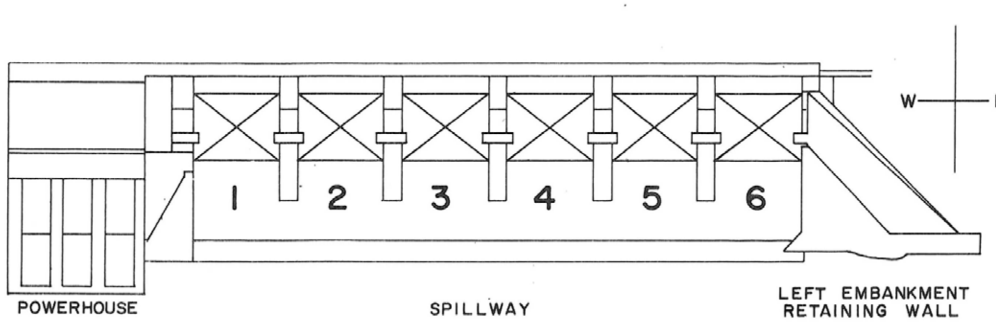
WATER CONTROL MANUAL

WEST POINT DAM AND LAKE

PLAN AND SECTIONS

GATED SPILLWAY RATING
WITHOUT POWERHOUSE FLOW

STEP NO	NO. OF GATES	RATCHET OPENING	NO. OF GATES	RATCHET OPENING	620	621	622	623	624	625	626	627	628	629	630	**631**	632	633	634	635	636	637	638	639	640	641
					POOL ELEVATION FEET-NGVD29																					
					DISCHARGE IN CUBIC FEET PER SECOND																					
1	1	1	5	CLOSED	510	520	535	545	555	565	575	585	595	605	615	625	630	640	650	655	665	675	680	690		
2	2	1	4	CLOSED	1,345	1,375	1,410	1,435	1,465	1,490	1,515	1,540	1,570	1,495	1,620	1,645	1,665	1,685	1,710	1,730	1,755	1,780	1,800	1,820		
3	3	1	3	CLOSED	2,125	2,175	2,225	2,270	2,315	2,355	2,395	2,435	2,480	2,420	2,560	2,600	2,630	2,665	2,700	2,735	2,775	2,810	2,845	2,880		
4	4	1	2	CLOSED	2,780	2,845	2,910	2,970	3,030	3,080	3,135	3,185	3,245	3,195	3,350	3,400	3,440	3,490	3,535	3,580	3,630	3,675	3,725	3,770		
5	5	1	1	CLOSED	3,575	3,660	3,740	3,820	3,895	3,960	4,030	4,095	4,175	4,140	4,310	4,370	4,425	4,485	4,545	4,600	4,665	4,725	4,790	4,850		
6	6	1	---------		4,230	4,330	4,425	4,520	4,610	4,685	4,770	4,845	4,940	4,915	5,095	5,165	5,230	5,305	5,375	5,440	5,515	5,590	5,670	5,745		
7	5	1	1	2	5,580	5,700	5,820	5,940	6,050	6,160	6,270	6,380	6,480	6,590	6,690	6,790	6,890	6,990	7,080	7,180	7,270	7,360	7,460	7,550		
8	4	1	2	2	6,630	6,780	6,920	7,060	7,190	7,320	7,450	7,580	7,710	7,830	7,950	8,070	8,190	8,310	8,420	8,540	8,650	8,760	8,870	8,980		
9	3	1	3	2	7,690	7,850	8,010	8,170	8,330	8,490	8,640	8,790	8,930	9,080	9,220	9,360	9,490	9,630	9,760	9,890	10,020	10,150	10,280	10,400		
10	2	1	4	2	8,740	8,930	9,110	9,290	9,470	9,650	9,820	9,990	10,160	10,320	10,480	10,640	10,800	10,950	11,100	11,250	11,400	11,550	11,690	11,830		
11	1	1	5	2	9,790	10,000	10,210	10,410	10,610	10,810	11,000	11,190	11,380	11,560	11,750	11,920	12,100	12,270	12,440	12,610	12,780	12,940	13,100	13,260		
12	---------		6	2	10,840	11,070	11,310	11,530	11,760	11,970	12,190	12,400	12,610	12,810	13,010	13,210	13,400	13,590	13,780	13,970	14,150	14,340	14,520	14,690		
13	1	3	5	2	11,830	12,140	12,400	12,650	12,890	13,130	13,370	13,600	13,830	14,050	14,270	14,490	14,700	14,920	15,120	15,330	15,530	15,730	15,930	16,130	16,320	
14	2	3	4	2	12,920	13,210	13,490	13,760	14,030	14,290	14,550	14,800	15,050	15,290	15,530	15,770	16,010	16,240	16,460	16,690	16,910	17,130	17,340	17,560	17,770	
15	3	3	3	2	13,960	14,270	14,580	14,870	15,160	15,450	15,730	16,000	16,270	16,540	16,800	17,050	17,310	17,560	17,800	18,050	18,290	18,520	18,760	18,990	19,220	
16	4	3	2	2	15,010	15,340	15,660	15,980	16,300	16,600	16,900	17,200	17,490	17,780	18,060	18,340	18,610	18,880	19,140	19,410	19,660	19,920	20,170	20,420	20,670	
17	5	3	1	2	16,050	16,410	16,750	17,100	17,430	17,760	18,080	18,400	18,710	19,020	19,320	19,620	19,910	20,200	20,480	20,760	21,040	21,310	21,580	21,850	22,110	
18	6	3	---------		17,090	17,470	17,840	18,210	18,750	18,920	19,260	19,600	19,930	20,260	20,580	20,900	21,210	21,520	21,820	22,120	22,420	22,710	23,000	23,280	23,560	
19	5	3	1	4	18,120	18,530	18,930	19,310	19,690	20,070	20,440	20,800	21,150	21,500	21,840	22,180	22,510	22,840	23,160	23,480	23,800	24,110	24,410	24,710	25,010	
20	4	3	2	4	19,150	19,590	20,010	20,420	20,820	21,220	21,610	21,990	22,370	22,740	23,100	23,460	23,810	24,160	24,500	24,840	25,170	25,500	25,830	26,150	26,460	
21	3	3	3	4	20,190	20,640	21,090	21,520	21,950	22,370	22,780	23,190	23,580	23,970	24,360	24,740	25,110	25,480	25,840	26,200	26,550	26,900	27,240	27,580	27,910	
22	2	3	4	4	21,220	21,700	22,170	22,630	23,080	23,520	23,950	24,380	24,800	25,210	25,620	26,010	26,410	26,790	27,180	27,550	27,920	28,290	28,650	29,010	29,360	
23	1	3	5	4	22,250	22,760	23,250	23,730	24,210	24,670	25,130	25,570	26,020	26,450	26,870	27,290	27,710	28,110	28,510	28,910	29,300	29,690	30,070	30,440	30,810	
24	---------		6	4	23,280	23,810	24,330	24,840	25,330	25,820	26,300	26,770	27,230	27,690	28,130	28,570	29,010	29,430	29,850	30,270	30,680	31,080	31,480	31,870	32,260	
25	1	5	5	4	24,300	24,860	25,400	25,930	26,450	26,960	27,460	27,960	28,440	28,920	29,380	29,850	30,300	30,750	31,190	31,620	32,050	32,470	32,890	33,300	33,710	34,110
26	2	5	4	4	25,320	25,900	26,470	27,030	27,570	28,110	28,630	29,140	29,650	30,150	30,640	31,120	31,590	32,060	32,520	32,970	33,420	33,860	34,300	34,730	35,160	35,580
27	3	5	3	4	26,340	26,950	27,540	28,120	28,690	29,250	29,790	30,330	30,860	31,380	31,890	32,390	32,890	33,370	33,860	34,330	34,800	35,260	35,710	36,160	36,610	37,040
28	4	5	2	4	27,360	27,990	28,610	29,220	29,810	30,390	30,960	31,520	32,070	32,610	33,140	33,670	34,180	34,690	35,190	35,680	36,170	36,650	37,120	37,590	38,050	38,510
29	5	5	1	4	28,380	29,040	29,680	30,310	30,930	31,530	32,120	32,710	33,280	33,840	34,390	34,940	35,480	36,000	36,520	37,040	37,540	38,040	38,540	39,020	39,500	39,980
30	6	5	---------		29,400	30,080	30,750	31,410	32,050	32,670	33,290	33,890	34,490	35,070	35,650	36,210	36,770	37,320	37,860	38,390	38,920	39,430	39,950	40,450	40,950	41,440



When it is necessary to release water other than through the turbines the discharge will be made through the spillway crest gates, discharging uniformly across the spillway (or as nearly so as possible) by opening gates so that no gate setting is more than one ratchet step larger or smaller than any other gate setting. Gates will be opened in the order of their numbered sequence, gate No. 1, first, No. 2, second and so on. This order of operation will be reversed when closing. As indicated above, gates are numbered in order

Note: Steps 1 -6 reflect revised calculations based on the 1984 manual revision.

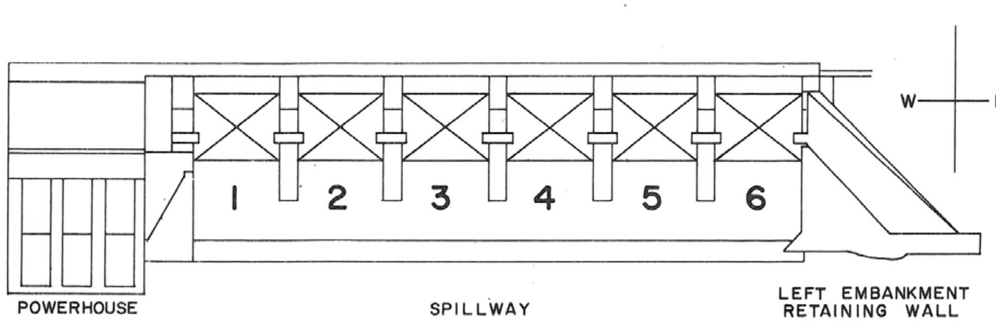
APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

GATED SPILLWAY SCHEDULE
Page 1 of 4

GATED SPILLWAY RATING
WITHOUT POWERHOUSE FLOW

STEP NO	NO. OF GATES	RATCHET OPENING	NO. OF GATES	RATCHET OPENING	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641
					POOL ELEVATION FEET-NGVD29																					
					DISCHARGE IN CUBIC FEET PER SECOND																					
31	5	5	1	6	31,410	32,150	32,870	33,570	34,260	34,940	35,600	36,250	36,890	37,520	38,140	38,750	39,350	39,940	40,520	41,100	41,660	42,220	42,770	43,320	43,850	44,380
32	4	5	2	6	33,420	34,210	34,980	35,740	36,480	37,210	37,920	38,620	39,300	39,980	40,640	41,290	41,930	42,570	43,190	43,800	44,410	45,010	45,600	46,180	46,760	47,320
33	3	5	3	6	35,430	36,270	37,100	37,910	38,700	39,470	40,230	40,980	41,710	42,430	43,130	43,830	44,520	45,190	45,860	46,510	47,160	47,790	48,420	49,040	49,660	50,260
34	2	5	4	6	37,440	38,340	39,210	40,070	40,910	41,740	42,540	43,340	44,110	44,880	45,630	46,370	47,100	47,810	48,520	49,220	49,900	50,580	51,250	51,910	52,560	53,200
35	1	5	5	6	39,450	40,400	41,330	42,240	43,130	44,000	44,860	45,700	46,520	47,330	48,130	48,910	49,680	50,440	51,190	51,920	52,650	53,370	54,070	54,770	55,460	56,140
36	---------		6	6	41,460	42,460	43,450	44,410	45,350	46,270	47,170	48,060	48,930	49,780	50,620	51,450	52,260	53,060	53,850	54,630	55,400	56,150	56,900	57,640	58,360	59,080
37	1	7	5	6	43,440	44,510	45,550	46,560	47,550	48,530	49,480	50,420	51,340	52,240	53,130	54,000	54,860	55,710	56,540	57,360	58,170	58,970	59,760	60,540	61,300	62,060
38	2	7	4	6	45,430	46,550	47,640	48,720	49,760	50,790	51,800	52,780	53,750	54,700	55,640	56,560	57,460	58,350	59,230	60,090	60,950	61,790	62,620	63,440	64,240	65,040
39	3	7	3	6	47,410	48,590	49,740	50,870	51,970	53,050	54,110	55,140	56,160	57,160	58,140	59,110	60,060	61,000	61,920	62,830	63,720	64,600	65,480	66,330	67,180	68,020
40	4	7	2	6	49,400	50,640	51,840	53,030	54,180	55,310	56,420	57,510	58,570	59,620	60,650	61,660	62,660	63,640	64,610	65,560	66,500	67,420	68,330	69,230	70,120	71,000
41	5	7	1	6	51,380	52,680	53,940	55,180	56,390	57,570	58,730	59,870	60,990	62,080	63,160	64,220	65,260	66,290	67,300	68,290	69,270	70,240	71,190	72,130	73,060	73,980
42	6	7	---------		53,370	54,720	56,040	57,330	58,600	59,830	61,050	62,230	63,400	64,540	65,670	66,770	67,860	68,930	69,980	71,020	72,050	73,050	74,050	75,030	76,000	76,960
43	5	7	1	8	56,220	57,670	59,090	60,470	61,820	63,140	64,430	65,700	66,940	68,160	69,360	70,540	71,700	72,850	73,970	75,080	76,170	77,240	78,300	79,350	80,380	81,400
44	4	7	2	8	59,080	60,620	62,130	63,600	65,030	66,440	67,820	69,160	70,490	71,790	73,060	74,320	75,550	76,760	77,960	79,130	80,290	81,430	82,560	83,670	84,770	85,850
45	3	7	3	8	61,930	63,570	65,170	66,730	68,250	69,740	71,200	72,630	74,030	75,410	76,760	78,090	79,390	80,680	81,940	83,190	84,410	85,620	86,810	87,990	89,150	90,300
46	2	7	4	8	64,790	66,520	68,210	69,860	71,470	73,040	74,590	76,100	77,580	79,030	80,460	81,860	83,240	84,590	85,930	87,240	88,530	89,810	91,070	92,310	93,530	94,740
47	1	7	5	8	67,640	69,470	71,250	72,990	74,690	76,350	77,970	79,560	81,120	82,650	84,150	85,630	87,080	88,510	89,910	91,290	92,660	94,000	95,320	96,630	97,920	99,190
48	---------		6	8	70,500	72,420	74,300	76,120	77,910	79,650	81,360	83,030	84,670	86,270	87,850	89,400	90,920	92,420	93,900	95,350	96,780	98,190	99,580	100,950	102,300	103,630
49	1	9	5	8	72,280	74,270	76,210	78,100	79,950	81,750	83,510	85,240	86,940	88,600	90,230	91,830	93,400	94,950	96,480	97,970	99,450	100,910	102,340	103,760	105,150	106,530
50	2	9	4	8	74,070	76,130	78,130	80,080	81,990	83,850	85,670	87,460	89,210	90,920	92,610	94,260	95,880	97,480	99,050	100,600	102,120	103,630	105,110	106,570	108,010	109,430
51	3	9	3	8	75,850	77,980	80,040	82,060	84,030	85,950	87,830	89,670	91,480	93,250	94,980	96,690	98,360	100,010	101,630	103,230	104,800	106,340	107,870	109,370	110,860	112,320
52	4	9	2	8	77,640	79,830	81,960	84,040	86,070	88,050	89,990	91,890	93,750	95,570	97,360	99,120	100,840	102,540	104,210	105,850	107,470	109,060	110,630	112,180	113,710	115,220
53	5	9	1	8	79,420	81,680	83,880	86,020	88,110	90,150	92,150	94,100	96,020	97,890	99,740	101,540	103,320	105,070	106,790	108,480	110,140	111,780	113,400	114,990	116,560	118,110
54	6	9	---------		81,200	83,530	85,790	88,000	90,150	92,250	94,310	96,320	98,290	100,220	102,110	103,970	105,800	107,600	109,360	111,100	112,810	114,500	116,160	117,800	119,420	121,010
55	5	9	1	10	82,940	85,340	87,680	89,950	92,170	94,340	96,450	98,520	100,550	102,540	104,490	106,410	108,290	110,140	111,960	113,750	115,510	117,240	118,950	120,640	122,300	123,940
56	4	9	2	10	84,680	87,160	89,560	91,900	94,190	96,420	98,600	100,730	102,820	104,870	106,870	108,840	110,780	112,680	114,550	116,390	118,200	119,990	121,750	123,480	125,190	126,880
57	3	9	3	10	86,420	88,970	91,440	93,860	96,210	98,500	100,740	102,940	105,080	107,190	109,250	111,280	113,270	115,220	117,150	119,040	120,900	122,730	124,540	126,320	128,080	129,810
58	2	9	4	10	88,180	90,780	93,330	95,810	98,220	100,580	102,890	105,140	107,350	109,510	111,630	113,710	115,760	117,760	119,740	121,680	123,590	125,480	127,330	129,160	130,960	132,740
59	1	9	5	10	89,900	92,590	95,210	97,760	100,240	102,670	105,030	107,350	109,610	111,840	114,010	116,150	118,250	120,310	122,330	124,330	126,290	128,220	130,120	132,000	133,850	135,670
60	---------		6	10	91,640	94,410	97,100	99,710	102,260	104,750	107,180	109,550	111,880	114,160	116,390	118,580	120,730	122,850	124,930	126,970	128,980	130,960	132,920	134,840	136,730	138,610



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APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

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WEST POINT DAM AND LAKE

GATED SPILLWAY SCHEDULE
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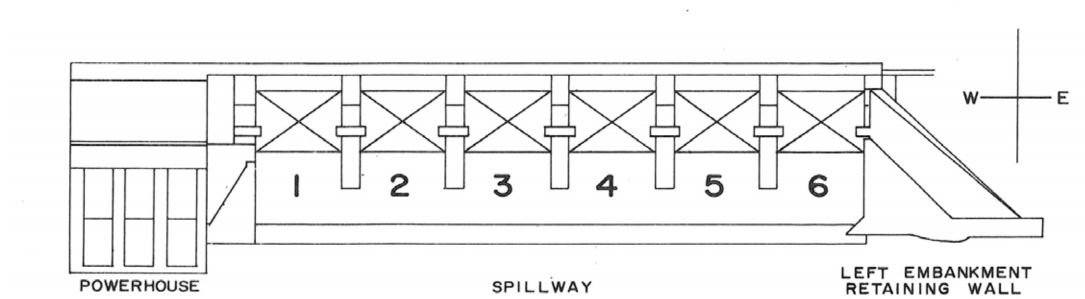
GATED SPILLWAY RATING
WITHOUT POWERHOUSE FLOW

STEP NO	NO. OF GATES	RATCHET OPENING	NO. OF GATES	RATCHET OPENING	POOL ELEVATION FEET-NGVD29 620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641
					DISCHARGE IN CUBIC FEET PER SECOND																					
61	1	11	5	10	93290	96140	98910	101600	104220	106770	109270	111710	114100	116440	118730	120980	123190	125360	127490	129590	131650	133690	135690	137660	139610	141520
62	2	11	4	10	94950	97880	100720	103480	106170	108800	111360	113860	116320	118720	121070	123380	125640	127870	130060	132210	134320	136410	138460	140480	142480	144440
63	3	11	3	10	96600	99610	102530	105360	108130	110820	113450	116020	118530	121000	123410	125770	128100	130380	132620	134830	136990	139130	141230	143310	145350	147360
64	4	11	2	10	98260	101350	104340	107250	110080	112840	115540	118170	120750	123270	125750	128170	130550	132890	135190	137440	139670	141850	144010	146130	148220	150280
65	5	11	1	10	99920	103080	106150	109130	112040	114870	117630	120330	122970	125550	128090	130570	133010	135400	137750	140060	142340	144570	146780	148950	151090	153200
66	6	11	---------		101570	104810	107960	111020	113990	116890	119720	122480	125190	127830	130420	132970	135460	137910	140310	142680	145010	147300	149550	151770	153960	156120
67	5	11	1	12	104610	108030	111350	114570	117710	120760	123740	126640	129480	132260	134990	137660	140270	142840	145370	147850	150290	152690	155060	157390	159680	161940
68	4	11	2	12	107650	111250	114740	118130	121420	124630	127750	130800	133780	136690	139550	142340	145090	147780	150420	153020	155570	158090	160560	163000	165400	167760
69	3	11	3	12	110690	114470	118140	121690	125140	128490	131770	134980	138080	141130	144110	147030	149900	152710	155480	158190	160860	163480	166070	168610	171110	173580
70	2	11	4	12	113730	117690	121530	125240	128850	132360	135780	139120	142370	145560	148670	151720	154710	157650	160530	163360	166140	168880	171570	174220	176830	179400
71	1	11	5	12	116770	120910	124920	128800	132570	136230	139800	143270	146670	149990	153230	156410	159530	162580	165580	168530	171430	174270	177070	179830	182550	185230
72	---------		6	12	119810	124130	128310	132360	136280	140100	143810	147430	150970	154420	157800	161100	164340	167520	170640	173700	176710	179670	182580	185440	188270	191050
73	1	13	5	12	120180	125610	130590	135630	140360	144400	148320	152140	155870	159520	163080	166560	169980	173320	176610	179830	182990	186110	189170	192180	195140	198060
74	2	13	4	12	120540	127090	132870	138900	144440	148690	152830	156860	160780	164620	168360	172020	175610	179130	182570	185960	189280	192540	195750	198910	202020	205080
75	3	13	3	12	120910	128570	135160	142180	148520	152990	157340	161570	165690	169720	173640	177490	181250	184930	188540	192080	195560	198980	202340	205650	208900	212100
76	4	13	2	12	121270	130040	137440	145450	152600	157290	161850	166290	170600	174820	178930	182950	186880	190730	194510	198210	201850	205420	208930	212380	215780	219120
77	5	13	1	12	121640	131520	139720	148730	156680	161590	166360	171000	175510	179910	184210	188410	192510	196530	200470	204340	208130	211850	215510	219110	222650	226140
78	6	13	---------		122000	133000	142000	152000	160750	165890	170870	175710	180420	185010	189490	193870	198150	202340	206440	210470	214410	218290	222100	225850	229530	233160
79	5	13	1	14					160960	166910	172730	178430	184190	189710	194410	198990	203470	207860	212150	216360	220490	224540	228520	232430	236280	240060
80	4	13	2	14					161170	167930	174580	181140	187950	194410	199320	204110	208800	213370	217860	222250	226560	230780	234940	239010	243020	246970
81	3	13	3	14					161380	168950	176440	183860	191710	199110	204230	209230	214120	218890	223570	228140	232630	237030	241350	245600	249770	253880
82	2	13	4	14					161580	169960	178290	186570	195470	203800	209150	214360	219440	224410	229270	234040	238700	243280	247770	252180	256520	260780
83	1	13	5	14					161790	170980	180150	189290	199240	208500	214060	219480	224770	229930	234980	239930	244770	249530	254190	258770	263270	267690
84	---------		6	14					162000	172000	182000	192000	203000	213200	218970	224600	230090	235450	240690	245820	250850	255770	260610	265350	270010	274600
85	1	15	5	14										213330	219980	226670	233070	239370	245110	250410	255600	260690	265670	270570	275380	280110
86	2	15	4	14										213470	220980	228730	236060	243300	249530	255000	260350	265600	270740	275790	280750	285620
87	3	15	3	14										213600	221990	230800	239040	247220	253940	259580	265100	270510	275810	281010	286120	291130
88	4	15	2	14										213730	222990	232870	242030	251150	258360	264170	269850	275420	280880	286230	291490	296650
89	5	15	1	14										213870	224000	234930	245010	255070	262780	268780	274610	280330	285950	291450	296850	302160
90	6	15	---------											214000	225000	237000	248000	259000	267200	273340	279360	285250	291010	296670	302220	307670



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APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

GATED SPILLWAY SCHEDULE
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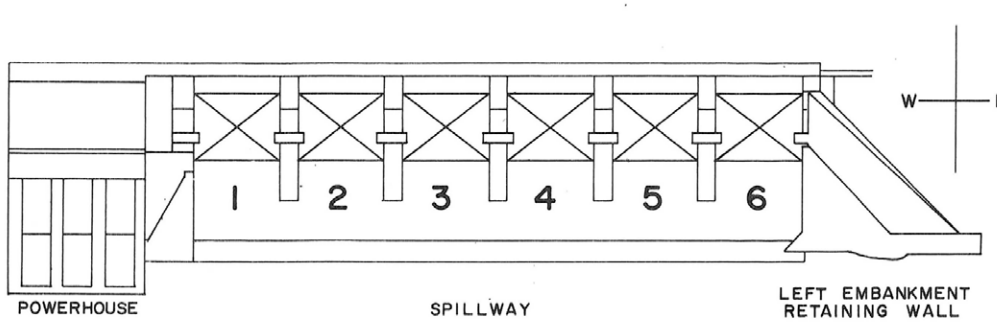
GATED SPILLWAY RATING
WITHOUT POWERHOUSE FLOW

STEP NO	NO. OF GATES	RATCHET OPENING	NO. OF GATES	RATCHET OPENING	POOL ELEVATION FEET-NGVD29 635	636	637	638	639	640	641
					DISCHARGE IN CUBIC FEET PER SECOND						
91	5	15	1	16	274950	281800	288710	294700	300490	306160	311720
92	4	15	2	16	276560	284240	292160	298400	304300	310090	315780
93	3	15	3	16	278170	286680	295620	302090	308110	314030	319830
94	2	15	4	16	279780	289120	299080	305780	311930	317960	323880
95	1	15	5	16	281390	291560	302540	309470	315740	321900	327940
96	---------		6	16	283000	294000	306000	313160	319560	325830	331990
97	1	17	5	16				313960	321460	328690	336130
98	2	17	4	16				314770	323370	331550	340270
99	3	17	3	16				315580	325280	334420	344410
100	4	17	2	16				316390	327190	337280	348550
101	5	17	1	16				317190	329090	340140	352690
102	6	17	---------					318000	331000	343000	356830



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APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

GATED SPILLWAY SCHEDULE
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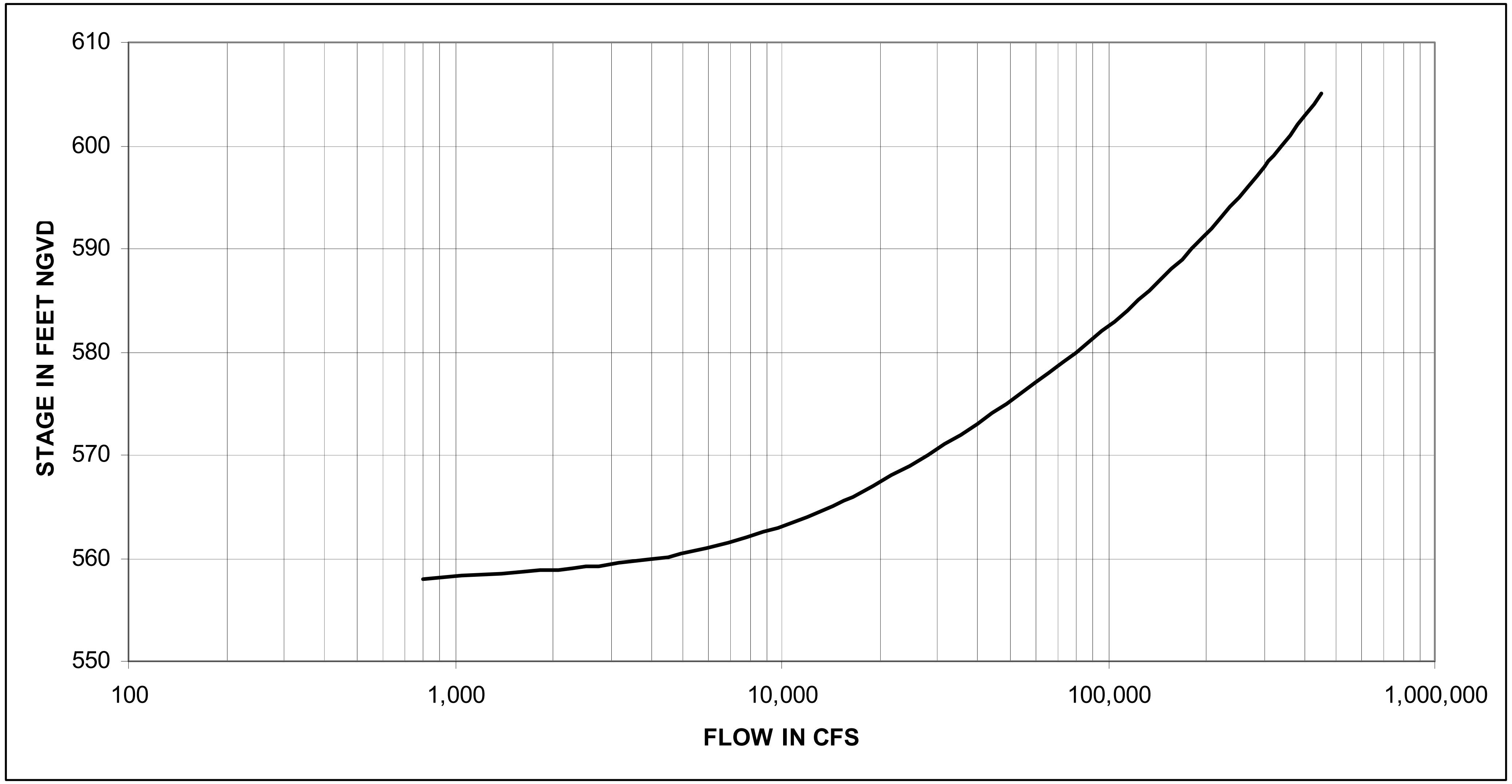

West Point tailwater rating

Stage (feet NGVD)	Flow (cfs)		Stage (feet NGVD)	Flow (cfs)
558	800		582	95,900
559	2,300		583	104,600
560	4,000		584	113,800
561	5,900		585	123,500
562	7,800		586	133,700
563	9,800		587	144,400
564	12,000		588	155,700
565	14,300		589	167,600
566	16,600		590	180,100
567	19,000		591	193,200
568	21,700		592	206,900
569	24,700		593	221,200
570	28,000		594	236,100
571	31,600		595	251,600
572	35,500		596	267,800
573	39,700		597	284,700
574	44,200		598	302,300
575	49,000		599	320,600
576	54,200		600	339,600
577	59,900		601	359,600
578	66,100		602	380,400
579	72,800		603	402,000
580	80,000		604	424,400
581	87,700		605	447,600

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

TAILWATER RATING
DRAINAGE AREA 3,440 SQUARE MILES
GAGE ZERO 0.0 FEET NGVD

Head (feet)

Generation (MW)	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58
							Discharge (cfs)								
6	4,472	4,429	4,387	4,346	4,307	4,268	4,232	4,196	4,162	4,128	4,095	4,063	4,033		
7	4,662	4,613	4,566	4,521	4,477	4,434	4,393	4,354	4,315	4,278	4,242	4,207	4,173	4,140	4,108
8	4,851	4,798	4,745	4,695	4,647	4,600	4,555	4,511	4,469	4,428	4,389	4,350	4,313	4,277	4,241
9	5,037	4,982	4,925	4,870	4,817	4,766	4,717	4,669	4,623	4,579	4,535	4,493	4,453	4,413	4,375
10	5,210	5,152	5,096	5,041	4,987	4,932	4,878	4,827	4,777	4,729	4,682	4,637	4,593	4,550	4,509
11	5,383	5,321	5,260	5,202	5,145	5,090	5,037	4,985	4,931	4,879	4,829	4,780	4,733	4,687	4,643
12	5,556	5,490	5,425	5,363	5,303	5,244	5,187	5,133	5,079	5,027	4,975	4,923	4,873	4,824	4,777
13	5,729	5,658	5,590	5,523	5,460	5,397	5,337	5,279	5,223	5,168	5,114	5,063	5,012	4,961	4,911
14	5,902	5,827	5,754	5,684	5,617	5,551	5,487	5,426	5,367	5,309	5,252	5,198	5,145	5,093	5,042
15	6,067	5,996	5,919	5,845	5,774	5,704	5,638	5,573	5,510	5,449	5,390	5,333	5,277	5,222	5,169
16	6,222	6,149	6,076	6,005	5,931	5,858	5,788	5,720	5,654	5,590	5,528	5,468	5,409	5,352	5,297
17	6,377	6,301	6,227	6,153	6,082	6,011	5,938	5,866	5,798	5,731	5,666	5,603	5,541	5,482	5,424
18	6,532	6,454	6,377	6,302	6,228	6,155	6,083	6,013	5,941	5,871	5,803	5,738	5,674	5,611	5,551
19	6,688	6,607	6,527	6,450	6,374	6,299	6,225	6,153	6,082	6,012	5,941	5,873	5,806	5,741	5,678
20	6,843	6,759	6,678	6,598	6,520	6,443	6,368	6,293	6,220	6,149	6,078	6,008	5,938	5,871	5,805
21	6,998	6,912	6,828	6,746	6,666	6,587	6,510	6,434	6,359	6,285	6,213	6,141	6,071	6,001	5,932
22	7,169	7,071	6,978	6,894	6,812	6,731	6,652	6,574	6,497	6,422	6,348	6,275	6,203	6,131	6,061
23	7,340	7,240	7,143	7,047	6,958	6,875	6,794	6,714	6,636	6,559	6,483	6,409	6,335	6,262	6,190
24	7,512	7,409	7,309	7,211	7,115	7,021	6,936	6,855	6,775	6,696	6,619	6,543	6,467	6,393	6,320
25	7,683	7,578	7,476	7,375	7,277	7,181	7,087	6,995	6,913	6,833	6,754	6,676	6,600	6,524	6,449
26	7,854	7,747	7,642	7,540	7,440	7,341	7,245	7,151	7,058	6,970	6,889	6,810	6,732	6,655	6,579
27	8,455	7,916	7,809	7,704	7,602	7,502	7,403	7,307	7,212	7,119	7,028	6,944	6,864	6,786	6,709
28		8,217	7,975	7,868	7,764	7,662	7,562	7,463	7,367	7,272	7,079	7,087	6,997	6,917	6,838
29			8,098	8,076	7,926	7,822	7,720	7,620	7,522	7,425	7,330	8,237	7,145	7,054	6,968
30				8,762	8,199	7,982	7,878	7,776	7,676	7,578	7,482	7,387	7,293	7,201	7,110
31					8,903	8,350	8,077	7,932	7,831	7,731	7,633	7,537	7,442	7,348	7,256
32							8,564	8,091	7,986	7,884	7,785	7,687	7,590	7,496	7,402
33								9,656	8,298	8,073	7,936	7,837	7,739	7,643	7,548
34									9,034	8,400	8,297	7,987	7,888	7,790	7,693
35										9,061	8,757	8,256	8,065	7,937	7,839
36										9,400	9,091	8,673	8,341	8,139	7,985
37											9,490	9,128	8,787	8,420	8,220
38												9,690	9,173	8,891	8,508
39														9,298	8,964
40															9,470

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

RATING TABLE FOR MAIN
TURBOGENERATOR UNIT

PAGE 1 OF 2

Head (feet)

Generation (MW)	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
								Discharge (cfs)							
7	4,082	4,070	4,046	4,008	3,984	3,951	3,933	3,917	3,894	3,873	3,853	3,830	3,811	3,789	3,770
8	4,214	4,198	4,171	4,133	4,108	4,083	4,058	4,034	4,010	3,987	3,965	3,941	3,920	3,897	3,876
9	4,345	4,325	4,297	4,258	4,231	4,204	4,177	4,151	4,126	4,101	4,077	4,052	4,029	4,005	3,982
10	4,477	4,453	4,422	4,383	4,354	4,325	4,297	4,269	4,241	4,215	4,189	4,163	4,138	4,113	4,088
11	4,608	4,580	4,547	4,509	4,477	4,446	4,416	4,386	4,357	4,328	4,301	4,273	4,246	4,220	4,194
12	4,740	4,708	4,673	4,634	4,600	4,567	4,535	4,503	4,472	4,442	4,413	4,384	4,355	4,327	4,300
13	4,871	4,835	4,798	4,759	4,723	4,688	4,654	4,621	4,588	4,556	4,525	4,494	4,464	4,435	4,406
14	5,003	4,963	4,924	4,884	4,846	4,809	4,773	4,738	4,703	4,670	4,637	4,605	4,573	4,542	4,511
15	5,128	5,088	5,048	5,008	4,969	4,930	4,892	4,855	4,819	4,783	4,749	4,715	4,682	4,649	4,617
16	5,254	5,212	5,171	5,130	5,090	5,050	5,011	4,972	4,934	4,897	4,861	4,825	4,790	4,756	4,723
17	5,380	5,336	5,294	5,252	5,210	5,169	5,129	5,089	5,050	5,011	4,973	4,936	4,899	4,864	4,829
18	5,505	5,460	5,417	5,373	5,331	5,288	5,247	5,206	5,166	5,126	5,086	5,047	5,008	4,971	4,934
19	5,631	5,585	5,539	5,495	5,451	5,408	5,365	5,323	5,281	5,240	5,200	5,160	5,120	5,081	5,042
20	5,757	5,709	5,662	5,616	5,571	5,527	5,483	5,440	5,397	5,355	5,313	5,272	5,232	5,192	5,152
21	5,882	5,833	5,785	5,738	5,692	5,646	5,601	5,556	5,513	5,470	5,427	5,385	5,343	5,302	5,262
22	6,008	5,958	5,908	5,859	5,812	5,765	5,719	5,673	5,628	5,584	5,541	5,498	5,455	5,413	5,372
23	6,135	6,082	6,031	5,981	5,932	5,884	5,837	5,790	5,744	5,699	5,654	5,610	5,567	5,524	5,482
24	6,263	6,208	6,154	6,102	6,052	6,003	5,855	5,907	5,860	5,813	5,768	5,723	5,678	5,635	5,591
25	6,390	6,333	6,277	6,223	6,171	6,120	6,071	6,023	5,976	5,928	5,881	5,836	5,790	5,746	5,701
26	6,517	6,458	6,400	6,344	6,290	6,237	6,186	6,136	6,088	6,041	5,995	5,948	5,902	5,856	5,811
27	6,645	6,583	6,523	6,465	6,409	6,354	6,302	6,250	6,200	6,151	6,104	6,058	6,013	5,967	5,921
28	6,772	6,708	6,646	6,586	6,528	6,472	6,417	6,363	6,312	6,261	6,212	6,164	6,118	6,073	6,029
29	6,900	6,834	6,769	6,707	6,647	6,589	6,532	6,477	6,424	6,371	6,321	6,271	6,223	6,177	6,131
30	7,030	6,959	6,892	6,828	6,766	6,706	6,647	6,590	6,535	6,481	6,429	6,378	6,329	6,281	6,234
31	7,174	7,095	7,018	6,950	6,885	6,923	6,763	6,704	6,647	6,591	6,538	6,485	6,434	6,384	6,336
32	7,318	7,237	7,157	7,080	7,005	6,940	6,878	6,817	6,759	6,701	6,646	6,592	6,539	6,488	6,438
33	7,461	7,378	7,297	7,218	7,140	7,066	6,993	6,931	6,871	6,812	6,754	6,699	6,645	6,592	6,541
34	7,605	7,520	7,436	7,355	7,276	7,201	7,124	7,051	6,982	6,922	6,863	6,806	6,750	6,696	6,643
35	7,749	7,661	7,576	7,492	7,411	7,336	7,256	7,181	7,108	7,037	6,971	6,912	6,855	6,800	6,745
36	7,893	7,803	7,715	7,630	7,547	7,471	7,388	7,311	7,236	7,163	7,092	7,022	6,961	6,904	6,848
37	8,099	7,944	7,855	7,767	7,682	7,606	7,520	7,441	7,365	7,290	7,217	7,146	7,076	7,009	6,950
38	8,305	8,141	7,994	7,904	7,818	7,741	7,651	7,571	7,493	7,416	7,342	7,269	7,198	7,129	7,061
39	8,623	8,385	8,219	8,068	7,953	7,875	7,783	7,701	9,621	7,543	7,467	7,392	7,320	7,549	7,180
40	9,069	8,745	8,487	8,297	8,142	8,002	7,915	7,831	7,749	7,670	7,592	7,516	7,442	7,370	7,299
41	9,601	9,154	8,870	8,590	6,372	8,214	8,073	7,961	7,877	7,796	7,771	7,639	7,564	7,490	7,418
42		9,752	9,276	9,000	8,695	8,464	8,288	8,142	8,009	7,923	7,842	7,762	7,685	7,610	7,537
43			9,882	9,418	9,081	8,796	8,561	8,359	8,208	8,076	7,967	7,886	7,807	7,731	7,655
44				9,982	9,522	9,158	8,906	8,655	8,440	8,277	8,139	8,014	7,929	7,851	7,774
45					10,094	9,619	9,253	9,007	8,744	8,531	9,345	8,200	8,076	7,971	7,893
46							9,718	9,356	9,081	8,831	8,619	8,495	8,266	8,136	8,019
47								9,808	9,443	9,153	8,921	8,698	8,501	8,331	8,192
48									9,890	9,521	9,230	9,004	8,772	8,587	8,385
49										9,957	9,592	9,305	9,074	8,850	8,652
50											10,020	9,662	9,374	9,140	8,917
51													9,731	9,436	9,198

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

RATING TABLE FOR MAIN
TURBOGENERATOR UNIT

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Generation (MW)	Head (feet) 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
	Discharge (cfs)																			
0.8	416	412	408	405	401	398	394	390	387	383	344	341	338	335	333	330	327	325	322	319
0.9	432	428	424	420	417	413	409	406	402	398	357	354	351	348	346	343	340	338	335	332
1	448	444	440	436	432	429	425	421	417	413	371	368	365	362	359	357	354	351	348	345
1.1	464	460	456	452	448	444	440	436	432	428	385	382	379	376	373	370	367	364	361	358
1.2	480	475	471	467	463	459	455	451	447	443	398	395	392	389	386	383	380	377	374	371
1.3	497	492	488	484	479	475	471	466	462	458	411	407	404	401	398	395	392	389	386	383
1.4	513	508	504	499	495	491	486	482	477	473	425	421	418	414	411	408	404	401	397	394
1.5	529	524	519	515	510	506	501	496	492	487	437	433	430	426	423	420	416	413	409	406
1.6	546	541	536	531	526	522	517	512	507	502	450	446	442	439	435	432	428	424	421	417
1.7	563	557	552	547	542	537	532	527	522	517	462	458	454	451	447	444	440	436	433	429
1.8	579	573	568	563	558	553	547	542	537	532	474	470	466	462	459	455	451	448	444	440
1.9	595	589	584	578	573	568	562	557	551	546	487	483	479	475	471	468	464	460	456	452
2	611	605	599	594	588	583	577	571	566	560	499	495	491	487	483	480	476	472	468	464
2.1	626	620	614	608	603	597	591	586	580	574	512	508	504	500	496	492	488	484	480	476
2.2	642	636	630	624	618	612	606	600	594	588	525	521	517	513	509	505	501	497	493	489
2.3	657	651	645	639	633	627	621	615	609	603	537	533	529	525	521	517	513	509	505	501
2.4	673	666	660	654	648	642	635	629	623	617	548	544	540	536	532	528	524	520	516	512
2.5	688	681	675	668	662	656	649	643	636	630	560	555	551	547	543	539	535	531	527	523
2.6	704	697	690	684	677	671	664	657	651	644	572	567	563	559	555	551	546	542	538	534
2.7	719	712	705	698	692	685	678	672	665	658	585	580	576	571	567	563	558	554	549	545
2.8	740	732	725	718	711	704	697	690	683	676	598	593	588	583	579	574	569	565	560	555
2.9	777	768	760	752	743	735	727	718	710	702	610	605	600	595	590	585	580	575	570	565
3	815	805	795	786	776	767	757	747	738	728	623	617	612	607	602	597	592	587	582	577
3.1											634	628	623	618	613	608	603	598	593	588
3.2											646	640	635	630	624	619	614	608	603	598
3.3											658	652	647	641	636	631	625	620	614	609
3.4											671	665	659	654	648	643	637	631	626	620
3.5											686	680	674	668	662	656	650	644	638	632
3.6											710	702	695	688	680	673	666	658	651	644
3.7											739	730	721	712	703	694	685	676	667	658
3.8											781	768	765	744	732	720	708	696	684	672
3.9											828	812	797	781	766	750	735	719	704	688
4											864	846	828	810	792	775	757	739	721	703
4.1											906	885	864	843	823	802	781	761	740	719

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

RATING TABLE FOR SMALL TURBOGENERATOR UNIT

MONTHLY HYDROPOWER PRODUCTION AT WEST POINT (MWH)																
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**		**Min**	**Max**	**Total**
1975						16357	15524	19405	12897	22247	21499	18664		12,897	22,247	126,593
1976	27,436	25,887	39,876	29,657	28,981	25,647	20,151	11,543	9,385	6,466	10,684	20,685		6,466	39,876	256,398
1977	17,636	9,694	31,541	41,391	15,984	11,545	13,415	14,048	8,046	9,897	28,853	16,499		8,046	41,391	218,549
1978	34,090	26,818	19,800	8,763	25,265	12,632	13,072	18,138	14,564	12,464	8,969	8,363		8,363	34,090	202,938
1979	18,481	16,201	26,280	49,033	25,600	19,028	12,992	16,285	13,570	17,265	26,014	13,258		12,992	49,033	254,007
1980	21,971	23,299	50,231	41,906	34,746	18,070	15,509	17,544	10,354	8,911	5,425	8,080		5,425	50,231	256,046
1981	7,262	17,484	8,210	11,211	8,697	10,111	13,196	14,227	8,659	7,437	6,760	4,760		4,760	17,484	118,014
1982	18,043	30,559	12,229	20,701	11,085	11,831	11,768	15,729	12,945	8,270	13,503	34,246		8,270	34,246	200,909
1983	22,890	24,349	33,644	43,772	19,071	16,551	16,392	17,097	7,573	12,073	12,276	42,105		7,573	43,772	267,793
1984	29,328	23,630	31,281	27,100	33,774	17,933	15,439	32,743	18,248	8,402	13,441	14,405		8,402	33,774	265,724
1985	9,320	19,146	10,364	11,096	5,336	13,075	11,557	17,016	18,073	17,065	6,644	11,334		5,336	19,146	150,026
1986	6,576	9,335	7,815	8,377	9,900	8,763	9,645	4,103	4,527	4,984	10,189	14,810		4,103	14,810	99,024
1987	21,059	15,790	24,358	13,289	5,785	14,798	16,043	15,570	14,070	8,998	7,966	6,738		5,785	24,358	164,464
1988	11,850	14,583	5,424	5,682	8,315	10,403	5,120	4,988	7,863	10,949	11,929	9,477		4,988	14,583	106,583
1989	7,071	7,304	10,081	15,767	8,794	19,605	22,176	18,909	17,114	23,971	21,205	28,031		7,071	28,031	200,028
1990	33,985	48,112	48,561	23,722	17,823	13,809	14,849	14,593	11,233	12,459	13,013	10,191		10,191	48,561	262,350
1991	10,568	13,321	15,602	13,284	36,224	20,335	19,777	17,669	22,064	23,141	12,740	15,302		10,568	36,224	220,027
1992	14,675	19,071	17,826	15,525	13,253	10,690	17,038	14,479	15,895	17,178	29,866	46,283		10,690	46,283	231,779
1993	33,192	32,078	33,815	26,265	23,600	16,787	15,799	14,013	8,453	7,717	7,665	8,627		7,665	33,815	228,011
1994	15,320	16,664	18,599	16,230	12,072	12,989	30,872	26,776	25,199	16,853	16,238	27,928		12,072	30,872	235,740
1995	16,630	35,590	37,267	10,311	16,773	7,471	12,554	12,293	10,959	12,840	25,344	17,036		7,471	37,267	215,068

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

HISTORICAL HYDROPOWER PRODUCTION

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MONTHLY HYDROPOWER PRODUCTION AT WEST POINT (MWH)															
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Min	Max	Total
1996	27,446	41,025	40,945	18,021	18,101	11,431	12,836	11,194	8,550	7,393	11,550	14,107	7,393	41,025	222,599
1997	19,626	26,139	30,518	15,331	18,199	22,358	18,166	13,345	17,984	12,878	18,789	21,853	12,878	30,518	235,186
1998	32,628	43,295	45,027	34,285	25,754	16,869	16,035	14,072	11,491	4,870	10,627	10,470	4,870	45,027	265,423
1999	9,317	10,117	6,174	4,585	1,576	12,040	7,994	12,451	9,412	5,494	5,478	6,715	1,576	12,451	91,353
2000	7,401	11,191	9,661	13,262	9,429	9,788	7,584	9,518	6,713	6,929	8,414	9,211	6,713	13,262	109,101
2001	13,126	9,086	24,123	13,271	9,070	16,272	10,928	11,738	5,646	6,359	7,993	5,885	5,646	24,123	133,497
2002	11,820	10,061	8,490	10,977	11,050	6,524	7,069	6,934	6,254	7,244	16,849	23,287	6,254	23,287	126,559
2003	11,552	14,829	24,242	16,475	28,667	8,947	14,630	1,859	2,451	2,528	2,464	11,811	1,859	28,667	140,455
2004	15,636	22,118	10,204	9,781	6,060	7,516	13,031	9,734	20,166	10,624	18,252	15,156	6,060	22,118	158,278
2005	9,855	19,191	23,677	23,317	10,471	19,378	24,973	25,074	14,375	7,341	3,242	2,301	2,301	25,074	183,195
2006	2,861	2,097	2,384	2,325	2,362	2,199	3,737	6,039	7,016	7,920	10,375	7,566	2,097	10,375	56,881
2007	14,243	6,098	9,814	4,368	8,914	8,525	6,846	8,424	7,532	7,276	7,465	4,021	4,021	14,243	93,526
2008	3,429	11,004	11,276	8,154	8,402	4,888	4,456	7,799	4,160	5,146	9,451	14,565	3,429	14,565	92,730
2009	12,016	5,213	22,827	19,273	11,605	6,373	5,919	6,190	24,031	31413	35113	57792	5,213	57,792	237,765
2010	30,728	37,387	35,354	12,940	27,207	13,016	9,886	9,973	5,617	7768	10040	14224	5,617	37,387	214,140
2011	7,786	12,272	20,006	24,819	12,473	10,515	7,503	7,560	8,818	8769	8094	5763	5,763	24,819	134,378
2012	12,188	6,306	16,181	9,974	6,620	5,542	8,218	4,701	5,172	7117	8659	5579	4,701	16,181	96,257
2013	10,886	21,780	17,450	16,023	32,825	22,231	34,459	23,184	12,813	11126	12049	36411	10,886	36,411	251,237
Average	16,577	19,424	22,136	18,165	16,049	13,150	13,773	13,512	11,536	10,969	13,208	16,501	6,831	30190	182,632
Max	34,090	48,112	50,231	49,033	36,224	25,647	34,459	32,743	25,199	31,413	35,113	57,792	12,992	57792	267,793
Min	2,861	2,097	2,384	2,325	1,576	2,199	3,737	1,859	2,451	2,528	2,464	2,301	1576	10375	56,881

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

HISTORICAL HYDROPOWER PRODUCTION

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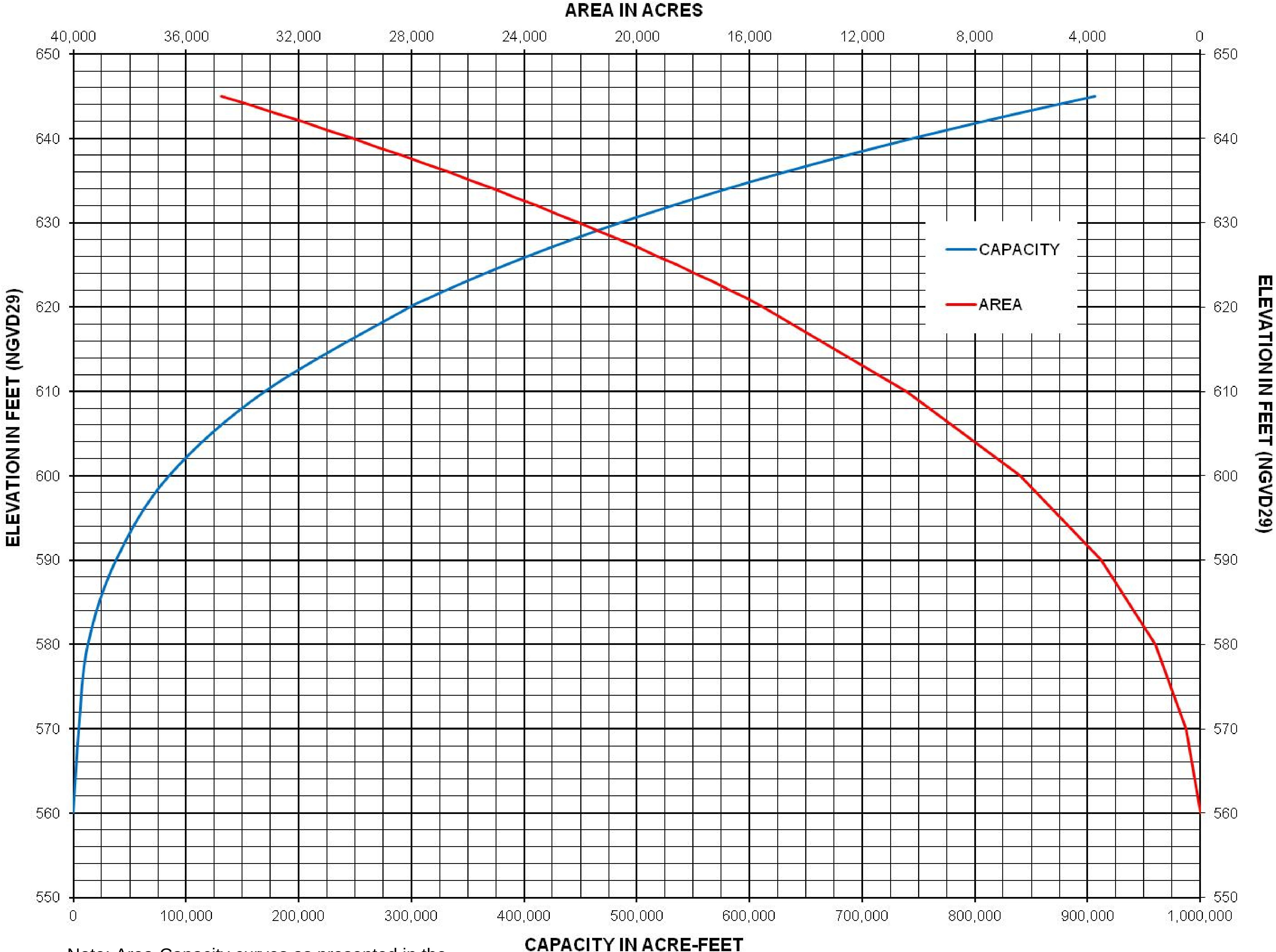


Note: Area-Capacity curves as presented in the June 1975 West Point water control manual.

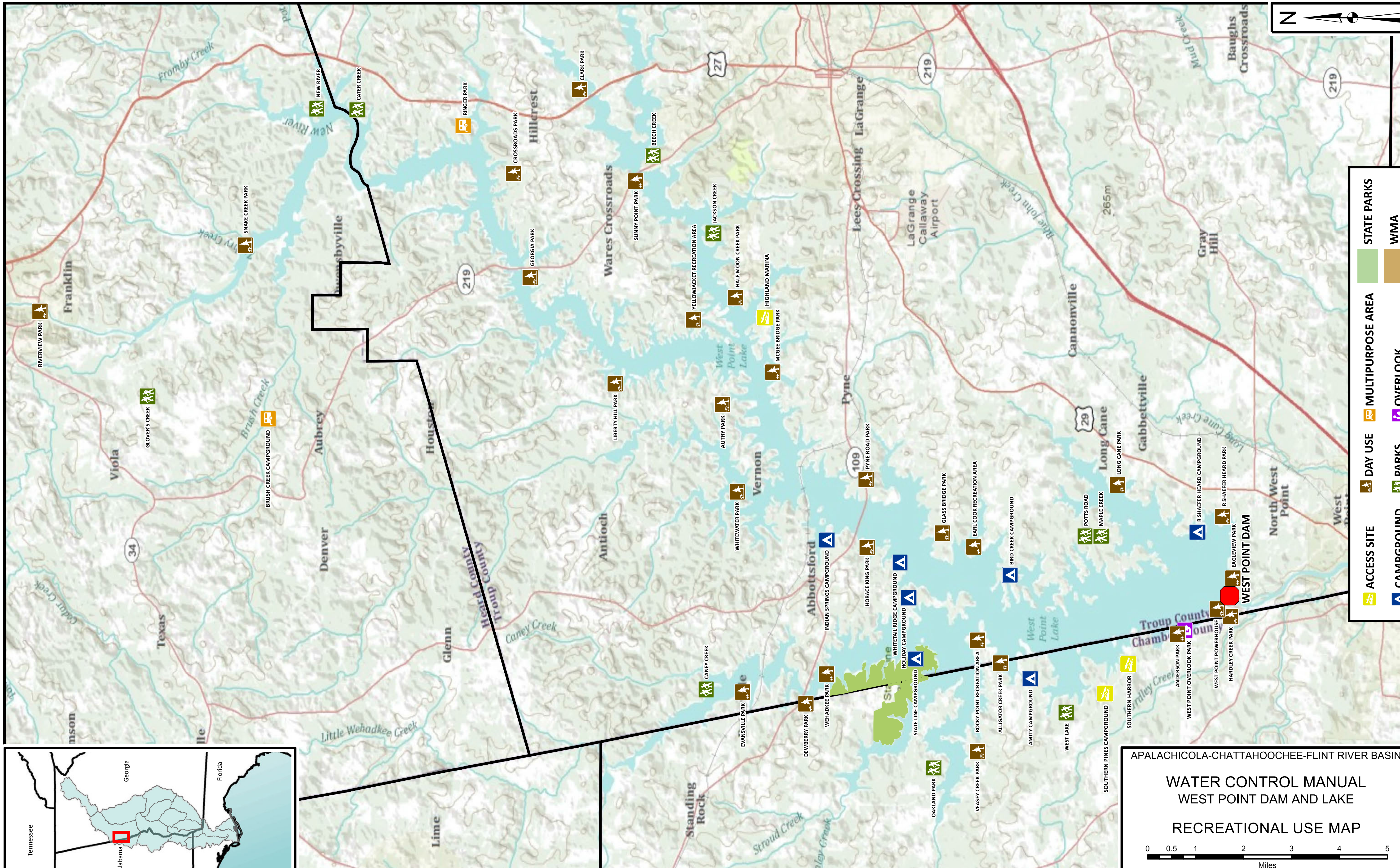
Area-Capacity Table

Elevation (feet, NGVD29)	Area (acres)	Capacity (acre-feet)
560	0	0
570	500	5,000
580	1,600	13,000
590	3,500	38,000
600	6,400	85,000
610	10,400	170,000
620	15,512	298,396
621	16,100	314,202
622	16,702	330,602
623	17,318	347,612
624	17,949	365,245
625	18,593	383,515
626	19,252	402,437
627	19,926	422,025
628	20,615	442,295
629	21,318	463,260
630	22,037	484,937
631	22,771	507,340
632	23,520	530,485
633	24,286	554,387
634	25,067	579,062
635	25,864	604,527
636	26,677	630,796
637	27,507	657,887
638	28,353	685,816
639	29,216	714,600
640	30,096	744,254
641	30,993	774,798
642	31,907	806,246
643	32,838	838,618
644	33,788	871,930
645	34,755	906,200

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

AREA AND CAPACITY



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

RECREATIONAL USE MAP

0 0.5 1 2 3 4 5
Miles

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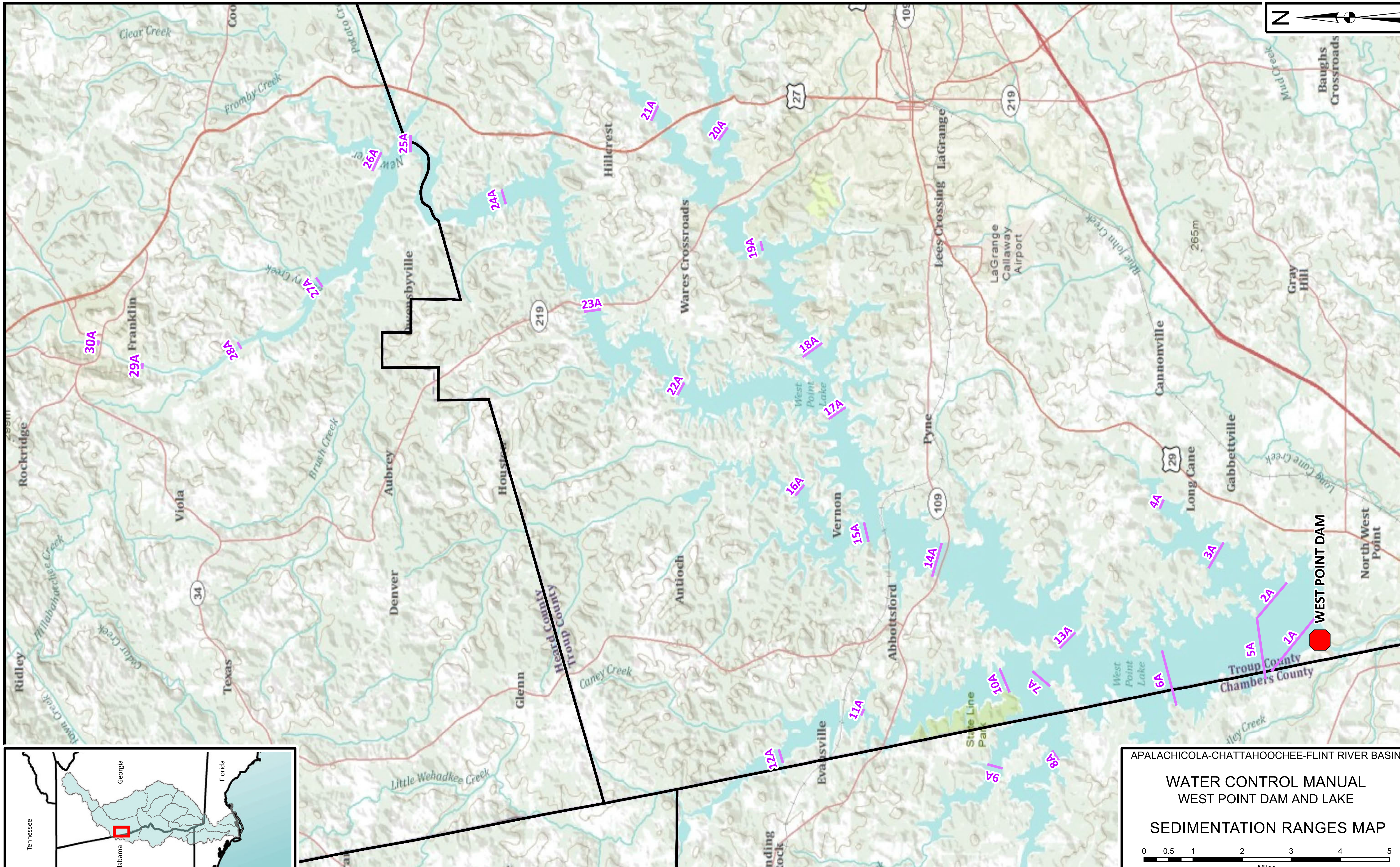

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL

WEST POINT DAM AND LAKE

SEDIMENTATION RANGES MAP

0 0.5 1 2 3 4 5

Miles

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APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

RETROGRESSION RANGES

CHATTAHOOCHEE RIVER AT WEST POINT DAM MEAN MONTHLY AND ANNUAL FLOWS (cfs)																	
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**	**Max Monthly**	**Min Monthly**	**Max Daily**	**Min Daily**
1896	------	------	------	------	------	------	------	2,854	1,469	1,624	5,074	3,114					
1897	4,270	8,532	14,392	9,518	3,788	2,647	5,140	4,253	1,138	1,290	1,474	3,536	4,998	14,392	1,138	38,490	900
1898	3,321	2,304	2,785	6,931	2,235	1,491	4,262	8,615	11,080	9,511	5,904	5,272	5,309	11,080	1,491	57,350	845
1899	7,483	12,903	15,696	10,157	4,716	3,625	3,419	2,819	1,971	2,085	2,303	4,685	5,989	15,696	1,971	43,600	930
1900	4,554	14,652	8,941	9,563	5,026	13,983	9,277	4,418	6,212	4,094	4,054	6,571	7,612	14,652	4,054	63,600	2,380
1901	11,748	10,015	7,952	11,022	10,814	8,487	4,964	12,982	7,145	3,883	2,835	12,116	8,664	12,982	2,835	88,600	2,530
1902	9,585	13,852	21,982	8,231	4,791	2,962	2,988	2,061	2,963	2,603	3,460	7,187	6,889	21,982	2,061	65,630	1,000
1903	4,708	21,593	19,626	12,345	7,896	9,976	4,782	4,203	2,825	1,988	2,485	2,463	7,908	21,593	1,988	66,100	1,720
1904	3,520	5,447	4,858	3,107	2,285	1,695	1,705	7,515	1,484	913	1,375	2,294	3,017	7,515	913	29,300	800
1905	5,363	8,915	3,733	2,930	3,869	2,257	5,724	3,743	1,505	2,032	1,923	10,380	4,365	10,380	1,505	29,300	1,090
1906	11,700	4,660	14,200	5,880	4,270	4,840	7,660	8,110	8,540	8,840	4,700	5,360	7,397	14,200	4,270	50,800	2,530
1907	6,170	8,350	7,680	6,790	5,990	3,600	3,280	2,550	2,660	1,910	4,980	7,310	5,106	8,350	1,910	28,800	1,490
1908	7,848	13,100	8,520	10,400	6,620	4,170	3,460	4,190	2,620	2,290	2,850	6,450	6,043	13,100	2,290	40,500	1,490
1909	5,280	14,100	18,200	7,760	9,290	7,910	5,430	7,730	3,610	3,310	2,870	5,080	7,548	18,200	2,870	51,200	2,100
1910	4,630	6,440	5,360	4,530	6,450	5,030	6,530	4,100	3,040	2,480	1,990	3,300	4,490	6,530	1,990	22,800	1,740
1911	5,180	4,260	3,450	7,850	3,330	2,190	3,850	3,090	2,000	3,020	4,540	5,810	4,048	7,850	2,000	20,700	730
1912	8,280	11,000	19,000	13,100	6,630	11,400	7,020	4,330	3,270	4,270	3,000	4,010	7,943	19,000	3,000	72,200	1,700
1913	7,810	7,940	15,800	5,820	4,180	3,920	3,820	3,190	2,040	2,570	1,950	2,980	5,168	15,800	1,950	45,000	1,560
1914	3,050	3,750	3,180	5,940	2,150	2,130	2,070	3,210	1,680	3,570	3,100	8,900	3,561	8,900	1,680	23,500	1,200
1915	10,400	9,460	6,300	3,870	5,900	4,410	6,000	2,590	2,360	800	2,820	11,800	5,559	11,800	800	62,800	1,460
1916	7,990	7,210	5,310	3,480	3,180	3,230	19,500	6,180	3,790	2,790	2,960	4,940	5,880	19,500	2,790	63,400	1,670
1917	7,960	11,600	18,100	11,400	5,060	4,150	3,660	5,060	6,520	3,520	2,650	2,520	6,850	18,100	2,520	51,000	1,470
1918	9,560	6,890	3,430	6,580	4,550	2,770	3,130	3,700	2,290	3,280	6,390	14,600	5,598	14,600	2,290	63,700	1,200
1919	10,509	10,500	13,700	6,680	5,010	4,240	5,800	4,210	2,290	3,340	2,980	17,500	7,230	17,500	2,290	134,000	1,540
1920	10,700	10,300	17,600	16,600	12,600	6,580	7,460	10,200	4,600	2,570	3,900	8,280	9,283	17,600	2,570	52,400	1,070
1921	6,640	15,500	5,730	5,700	4,340	2,510	3,880	3,750	1,590	2,380	4,000	3,720	4,978	15,500	1,590	31,600	720
1922	7,440	11,500	17,800	9,820	9,410	9,700	6,250	3,760	2,090	2,690	2,000	5,740	7,350	17,800	2,000	54,200	1,150
1923	6,090	10,600	9,380	6,340	10,200	6,910	3,800	4,990	2,330	1,630	3,220	7,090	6,048	10,600	1,630	37,100	1,120
1924	8,560	5,870	5,940	8,980	7,090	4,910	3,970	2,390	3,410	2,200	1,860	4,470	4,971	8,980	1,860	25,400	1,280
1925	23,100	5,900	6,010	3,950	3,020	1,730	1,700	578	333	2,060	3,990	3,260	4,636	23,100	333	85,000	224

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

MONTHLY FLOWS
AVERAGE - MAXIMUM – MINIMUM
PRIOR TO WEST POINT DAM

CHATTAHOOCHEE RIVER AT WEST POINT DAM MEAN MONTHLY AND ANNUAL FLOWS (cfs)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Max Monthly	Min Monthly	Max Daily	Min Daily
1926	5,850	7,830	7,060	6,250	2,760	2,800	2,860	6,289	2,120	1,270	2,930	5,850	4,489	7,830	1,270	26,440	1,020
1927	3,490	7,530	6,830	4,410	2,430	3,540	4,530	2,420	1,330	1,890	1,510	5,650	3,797	7,530	1,330	22,100	660
1928	3,060	5,310	6,980	9,930	8,170	6,450	8,070	7,210	5,930	3,200	2,710	2,720	5,812	9,930	2,710	27,000	2,420
1929	4,420	11,100	32,700	8,580	12,200	7,050	5,380	4,270	8,300	6,550	11,200	6,260	9,834	32,700	4,270	75,500	2,510
1930	7,030	6,730	8,270	5,110	5,630	2,780	2,460	1,620	3,840	1,600	6,170	3,830	4,589	8,270	1,600	29,500	771
1931	4,520	3,720	3,910	5,620	4,400	1,920	2,070	1,543	691	488	1,134	9,990	3,334	9,990	488	23,600	272
1932	8,630	11,000	6,540	6,620	4,370	4,340	4,010	3,750	2,150	4,820	5,480	18,600	6,693	18,600	2,150	58,000	942
1933	10,400	11,300	8,020	6,900	5,610	3,200	3,410	2,500	2,200	1,695	1,642	2,097	4,915	11,300	1,642	42,400	1,110
1934	2,995	4,139	9,131	4,007	4,174	7,099	3,418	4,132	1,961	6,731	2,237	3,365	4,449	9,131	1,961	32,900	1,320
1935	4,587	4,628	7,964	6,338	4,205	2,704	2,971	3,179	1,918	1,132	4,395	2,735	3,896	7,964	1,132	21,900	842
1936	19,460	15,670	7,347	21,840	4,392	3,134	3,021	4,157	2,732	5,933	2,326	7,136	8,096	21,840	2,326	70,600	1,420
1937	16,600	10,020	6,880	9,811	7,933	3,385	3,277	4,452	3,069	4,809	2,893	2,958	6,341	16,600	2,893	48,700	1,810
1938	3,243	2,879	6,226	15,250	3,909	4,393	5,457	3,555	1,900	1,089	2,238	2,293	4,369	15,250	1,089	57,300	950
1939	4,373	12,260	11,630	6,174	5,114	5,256	2,856	6,035	2,223	1,406	1,452	1,964	5,062	12,260	1,406	41,800	1,200
1940	4,532	5,813	7,098	5,536	2,950	2,704	7,046	4,453	2,464	1,234	2,158	3,789	4,148	7,098	1,234	25,700	1,140
1941	3,954	3,187	4,954	3,853	1,917	1,578	5,574	3,031	1,103	651	1,298	4,993	3,008	5,574	651	20,300	540
1942	3,517	7,032	13,600	4,950	3,766	3,621	2,791	3,703	3,006	2,697	2,363	6,184	4,769	13,600	2,363	61,200	1,300
1943	11,470	6,555	13,290	8,532	5,488	3,550	5,311	3,472	2,287	1,817	2,418	2,526	5,560	13,290	1,817	59,700	1,250
1944	5,319	10,070	12,370	14,840	6,153	4,068	2,738	2,475	2,648	1,737	2,105	3,332	5,655	14,840	1,737	39,600	1,370
1945	4,195	8,995	6,342	9,366	6,046	3,167	3,611	3,207	3,475	3,130	3,540	7,832	5,242	9,366	3,130	59,700	1,370
1946	17,780	14,170	13,750	9,926	8,525	5,109	4,397	2,433	2,252	2,471	2,526	2,536	7,156	17,780	2,252	5,660	1,490
1947	12,670	5,530	9,284	7,337	4,619	4,461	2,431	2,344	1,385	1,456	6,226	5,128	5,239	12,670	1,385	46,300	799
1948	4,027	11,600	12,080	9,693	4,618	3,788	8,982	5,628	2,885	2,085	15,260	11,130	7,648	15,260	2,085	60,700	1,880
1949	10,210	11,910	8,300	9,966	8,387	6,473	7,403	5,285	6,313	3,742	3,885	4,141	7,168	11,910	3,742	38,000	2,950
1950	5,011	5,818	7,441	4,720	3,894	4,897	3,772	2,776	4,195	3,056	2,318	3,308	4,267	7,441	2,318	15,200	1,740
1951	3,289	3,931	5,827	7,846	3,440	2,789	2,959	1,307	1,815	1,496	2,923	9,970	3,966	9,970	1,307	15,800	630
1952	6,129	6,341	19,270	7,525	5,096	3,639	1,739	2,603	2,120	1,305	1,860	3,513	5,095	19,270	1,305	39,200	1,010
1953	9,628	9,255	8,010	6,492	9,693	3,683	5,044	2,209	2,804	1,929	1,960	7,450	5,680	9,693	1,929	25,500	1,060
1954	9,525	6,011	6,369	5,550	3,611	2,921	1,781	1,154	629	510	1,141	2,173	3,448	9,525	510	24,600	364
1955	4,535	7,462	4,442	6,357	3,535	2,188	2,819	1,779	832	948	1,601	1,592	3,174	7,462	832	23,100	532

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

MONTHLY FLOWS
AVERAGE - MAXIMUM – MINIMUM
PRIOR TO WEST POINT DAM

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CHATTAHOOCHEE RIVER AT WEST POINT DAM MEAN MONTHLY AND ANNUAL FLOWS (cfs)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Max Monthly	Min Monthly	Max Daily	Min Daily
1956	1,574	4,848	7,164	6,608	3,812	2,047	2,368	1,068	2,764	1,580	1,707	3,521	3,255	7,164	1,068	40,000	660
1957	3,938	3,697	5,565	10,700	3,368	2,174	1,726	1,561	1,786	2,288	4,225	4,326	3,780	10,700	1,561	45,800	564
1958	3,614	7,233	7,162	7,127	3,476	2,939	4,842	3,621	3,585	2,912	2,444	2,916	4,323	7,233	2,444	32,000	1,660
1959	5,214	5,009	5,628	4,012	3,589	7,334	3,988	3,798	3,072	3,355	2,876	3,823	4,308	7,334	2,876	25,800	1,150
1960	6,981	10,830	8,978	10,700	4,410	3,684	3,410	4,052	4,228	3,048	3,331	3,441	5,591	10,830	3,048	27,300	1,540
1961	3,299	17,120	8,526	11,520	5,771	5,360	4,839	4,426	3,317	2,535	3,225	13,340	6,940	17,120	2,535	80,000	1,520
1962	8,829	8,388	10,680	11,720	4,404	4,331	3,428	2,944	2,879	3,126	7,967	3,128	5,985	11,720	2,879	3,360	1,520
1963	5,832	4,974	9,032	5,757	9,224	5,831	6,695	4,301	2,610	2,510	3,675	4,724	5,430	9,224	2,510	33,600	1,520
1964	8,871	8,193	15,320	19,940	13,000	4,438	4,252	3,948	2,671	6,141	5,652	7,855	8,357	19,940	2,671	53,500	1,620
1965	7,553	7,525	9,394	8,535	5,168	5,763	4,118	3,103	3,004	3,960	2,713	2,828	5,305	9,394	2,713	35,700	1,910
1966	5,744	10,830	11,000	6,538	8,561	5,227	3,413	3,595	3,217	5,047	5,256	4,195	6,052	11,000	3,217	40,300	1,740
1967	7,413	6,528	6,104	4,213	5,320	5,906	6,512	7,441	6,369	4,406	6,524	9,870	6,384	9,870	4,213	27,600	1,980
1968	10,540	5,410	8,148	8,367	6,891	3,998	3,917	3,923	3,765	2,725	3,873	4,303	5,488	10,540	2,725	27,100	1,630
1969	4,679	5,014	5,466	10,420	8,766	3,698	4,129	3,528	4,221	2,270	4,764	4,041	5,083	10,420	2,270	41,900	1,590
1970	3,532	3,964	8,080	4,022	3,115	4,498	4,238	4,376	3,473	5,545	3,724	3,296	4,322	8,080	3,115	45,000	1,460
1971	5,363	7,529	13,440	6,293	5,213	3,373	5,036	7,833	4,613	4,014	4,308	4,931	5,996	13,440	3,373	53,200	2,180
1972	14,930	9,424	7,751	5,358	6,677	4,637	3,777	3,881	4,469	4,095	3,222	7,420	6,303	14,930	3,222	56,100	1,700
1973	9,284	10,820	10,890	14,710	11,320	10,250	6,098	4,698	4,102				9,130	14,710	4,102		
MIN	1,574	2,304	2,785	2,930	1,917	1,491	1,700	578	333	488	1,134	1,592	3,008				
MAX	23,100	21,593	32,700	21,840	13,000	13,983	19,500	12,982	11,080	9,511	15,260	18,600	9,834				
AVERAGE	7,209	8,471	9,674	8,067	5,634	4,489	4,539	4,057	3,123	2,883	3,494	5,633	5,628				

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

MONTHLY FLOWS
AVERAGE - MAXIMUM – MINIMUM
PRIOR TO WEST POINT DAM

West Point Average Monthly Inflow Period of Record (cfs)																
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		Min	Max	Avg
1975						5,117	4,541	4,882	3,970	6,491	5,003	5,767		3,970	6,491	5,110
1976	10,135	6,392	13,635	10,639	8,551	7,021	5,242	3,459	2,933	2,601	3,091	4,332		2,601	13,635	6,502
1977	5,401	3,645	11,461	11,983	4,279	2,824	3,126	3,582	3,121	3,418	5,984	4,540		2,824	11,983	5,280
1978	11,903	6,246	5,810	4,790	6,893	3,122	2,647	4,033	2,465	2,759	3,235	2,756		2,465	11,903	4,722
1979	4,518	7,521	6,194	18,314	7,447	4,804	3,549	3,239	4,996	3,996	5,284	3,275		3,239	18,314	6,095
1980	7,614	6,157	16,762	12,603	9,809	5,131	3,369	2,879	2,804	3,312	2,482	2,389		2,389	16,762	6,276
1981	2,035	7,221	4,068	3,974	3,153	2,157	1,740	2,513	2,240	2,623	2,503	3,217		1,740	7,221	3,120
1982	5,697	10,241	4,401	7,825	3,678	3,187	3,421	3,113	2,467	3,491	3,202	9,129		2,467	10,241	4,988
1983	6,363	8,677	10,606	12,380	6,436	4,500	4,477	3,349	3,805	2,372	5,976	10,840		2,372	12,380	6,648
1984	7,327	7,971	8,692	9,107	9,495	3,907	4,889	7,844	3,039	2,973	3,078	3,588		2,973	9,495	5,992
1985	2,948	7,424	3,789	3,230	4,021	2,792	4,644	4,159	2,770	2,880	3,312	4,044		2,770	7,424	3,834
1986	2,735	3,121	4,420	2,169	2,230	1,516	2,135	1,831	1,846	2,559	3,803	3,725		1,516	4,420	2,674
1987	6,665	5,218	6,444	4,406	3,251	4,189	3,613	3,778	2,926	2,056	2,226	2,510		2,056	6,665	3,940
1988	4,537	4,402	2,694	3,785	1,780	1,034	1,828	1,459	3,786	1,957	2,491	1,810		1,034	4,537	2,630
1989	2,906	3,179	4,594	5,035	2,911	6,567	6,346	4,140	5,016	8,331	4,843	6,142		2,906	8,331	5,001
1990	11,985	17,748	18,835	8,295	4,895	3,038	3,094	3,725	3,035	3,546	2,544	3,397		2,544	18,835	7,011
1991	4,534	4,969	6,216	5,158	10,216	5,414	5,375	4,683	5,071	4,390	4,272	3,366		3,366	10,216	5,305
1992	5,556	6,590	5,815	4,985	3,526	3,194	4,332	4,517	3,341	3,780	11,532	12,042		3,194	12,042	5,767
1993	12,560	9,283	9,684	8,286	5,814	4,138	3,143	2,752	1,783	2,572	3,097	3,104		1,783	12,560	5,518
1994	4,083	5,077	6,583	5,231	2,572	4,057	9,579	6,937	6,932	4,251	3,844	4,784		2,572	9,579	5,327
1995	5,503	11,572	10,698	4,110	2,940	3,065	2,394	2,727	2,668	7,077	6,126	4,710		2,394	11,572	5,299

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

MONTHLY FLOWS
AVERAGE - MAXIMUM – MINIMUM
INFLOWS AT DAM

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West Point Average Monthly Inflow Period of Record (cfs)															
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Min**	**Max**	**Avg**
1996	10,364	13,611	13,954	5,863	4,744	3,336	2,435	3,632	3,068	2,115	2,699	3,785	2,115	13,954	5,801
1997	6,313	7,922	10,390	5,623	6,610	5,783	3,993	2,810	4,378	4,138	3,786	5,834	2,810	10,390	5,631
1998	8,367	14,414	15,545	10,345	7,474	4,179	3,509	3,371	2,132	1,860	2,304	2,182	1,860	15,545	6,307
1999	3,432	3,899	3,446	2,217	2,335	3,168	3,153	1,163	1,211	1,872	2,070	2,103	1,163	3,899	2,506
2000	3,448	2,655	3,583	3,859	1,430	1,640	1,794	2,298	3,198	1,178	2,923	2,430	1,178	3,859	2,536
2001	3,257	4,079	9,794	4,689	2,494	4,255	2,641	2,086	1,588	998	1,118	1,700	998	9,794	3,225
2002	3,737	2,966	3,656	2,735	2,875	1,282	1,275	823	2,424	2,724	4,264	5,531	823	5,531	2,858
2003	3,086	5,462	9,586	5,659	17,050	12,602	9,695	4,905	2,923	2,892	4,856	5,543	2,892	17,050	7,022
2004	5,996	6,341	3,146	2,917	2,344	2,922	2,936	2,147	8,624	4,219	6,518	8,015	2,147	8,624	4,677
2005	4,695	7,144	10,160	9,434	4,713	5,381	14,037	7,457	2,773	2,352	2,447	4,926	2,352	14,037	6,293
2006	7,302	7,246	5,177	4,413	3,705	2,648	1,448	1,952	2,159	1,827	3,336	2,048	1,448	7,302	3,605
2007	4,597	3,239	3,148	2,276	1,205	1,730	1,911	1,169	1,586	1,838	2,367	2,279	1,169	4,597	2,279
2008	2,290	4,063	3,663	2,690	2,307	1,084	1,404	2,146	911	1,311	1,117	3,288	911	4,063	2,190
2009	3,037	2,550	7,255	4,777	4,752	1,561	1,531	1,884	11127	7621	10726	13997	1,531	13,997	5,902
2010	9,003	12,134	10,348	4,689	7,245	3,162	2,429	2,264	1414	1706	2174	2261	1,414	12,134	4,902
2011	2,589	4,543	8,780	6,322	3,876	2,351	1,793	846	2085	1954	2394	3324	846	8,780	3,405
2012	3,695	2,695	4,001	2,205	1,901	1,274	1,552	1,402	953	1351	2813	3517	953	4,001	2,280
2013	3,269	7,547	4,496	5,274	8,623	6,029	8,533	5,747	3222	2521	2274	8186	2,274	8,623	5,477
Min	2,035	2,550	2,694	2,169	1,205	1,034	1,275	823	911	998	1,117	1,700			
Max	12,560	17,748	18,835	18,314	17,050	12,602	14,037	7,844	11,127	8,331	11,532	13,997			
Avg	5,618	6,715	7,672	6,113	4,989	3,722	3,835	3,274	3,251	3,126	3,798	4,626			

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

MONTHLY FLOWS
AVERAGE - MAXIMUM – MINIMUM
INFLOWS AT DAM

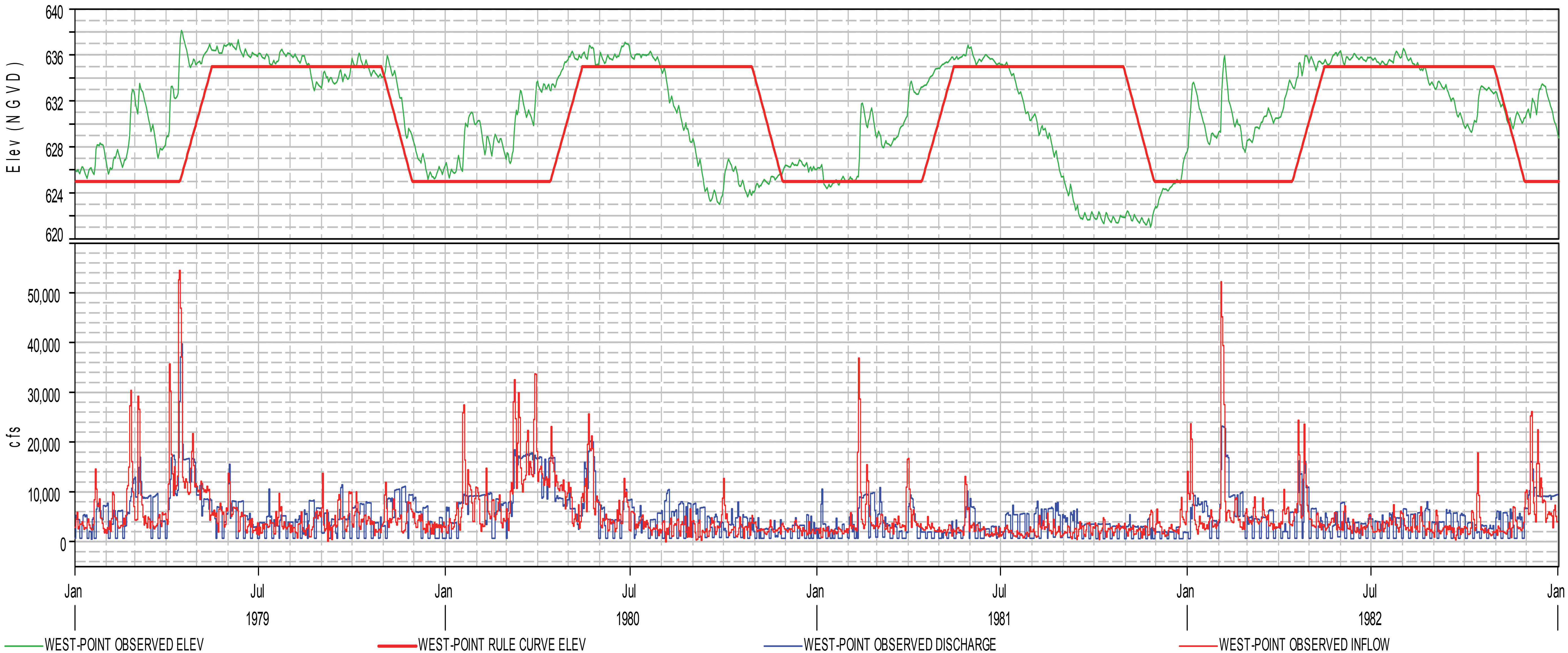
PAGE 2 OF 2

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

POOL ELEVAITON-INFLOW-
DISCHARGE HYDROGRAPHS

PAGE 1 OF 10



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

POOL ELEVAITON-INFLOW-DISCHARGE HYDROGRAPHS

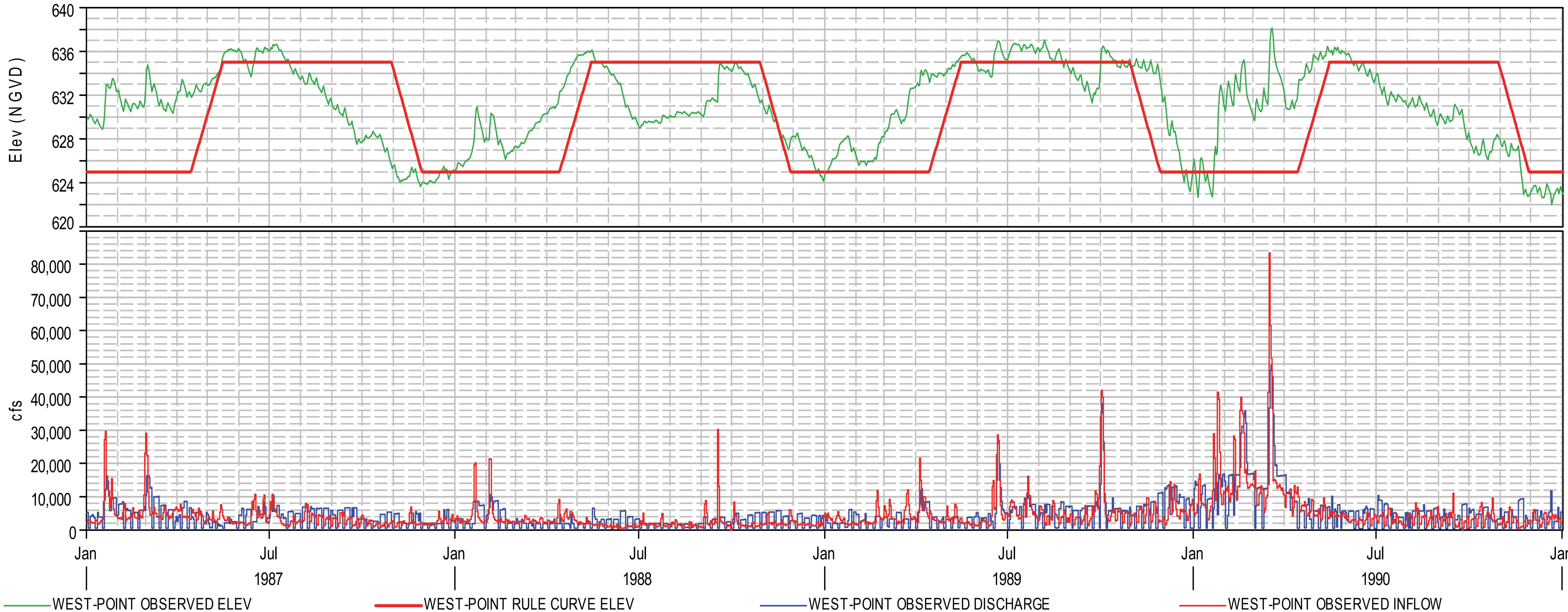
PAGE 2 OF 10

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

POOL ELEVAITON-INFLOW-
DISCHARGE HYDROGRAPHS

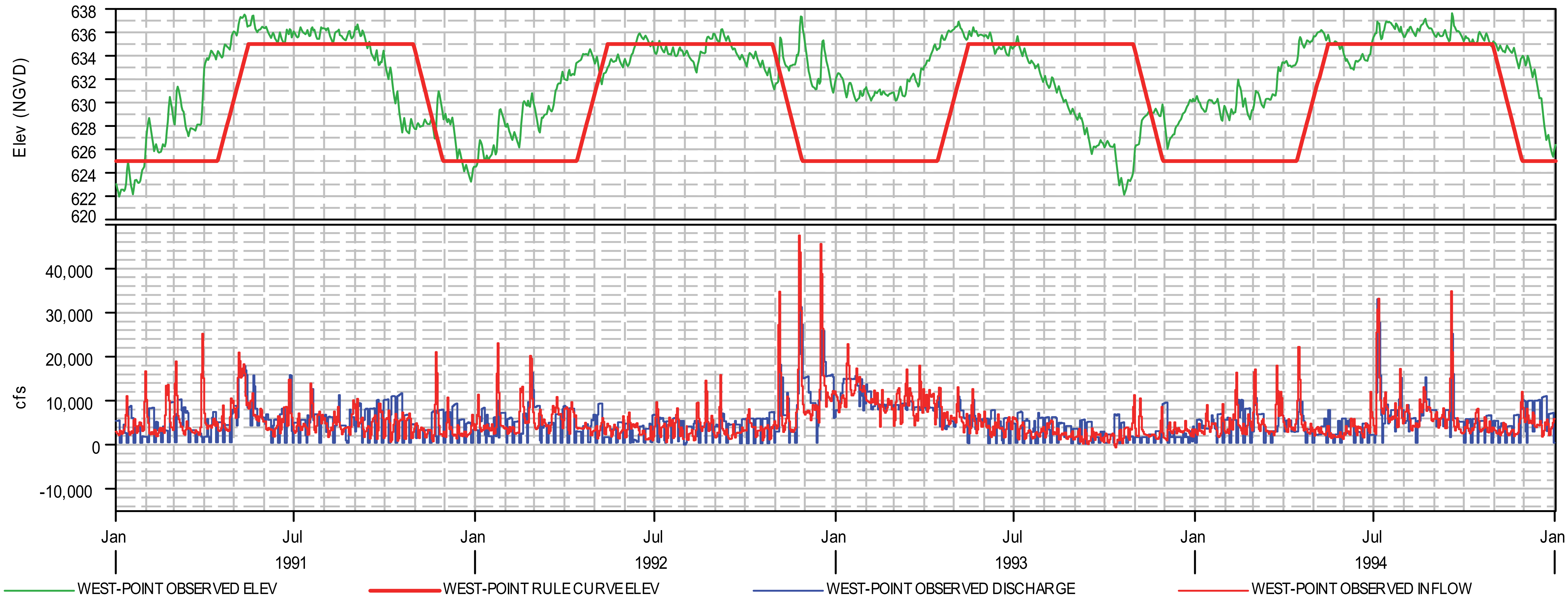
PAGE 3 OF 10



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

POOL ELEVAITON-INFLOW-
DISCHARGE HYDROGRAPHS
PAGE 4 OF 10



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

POOL ELEVAITON-INFLOW-
DISCHARGE HYDROGRAPHS

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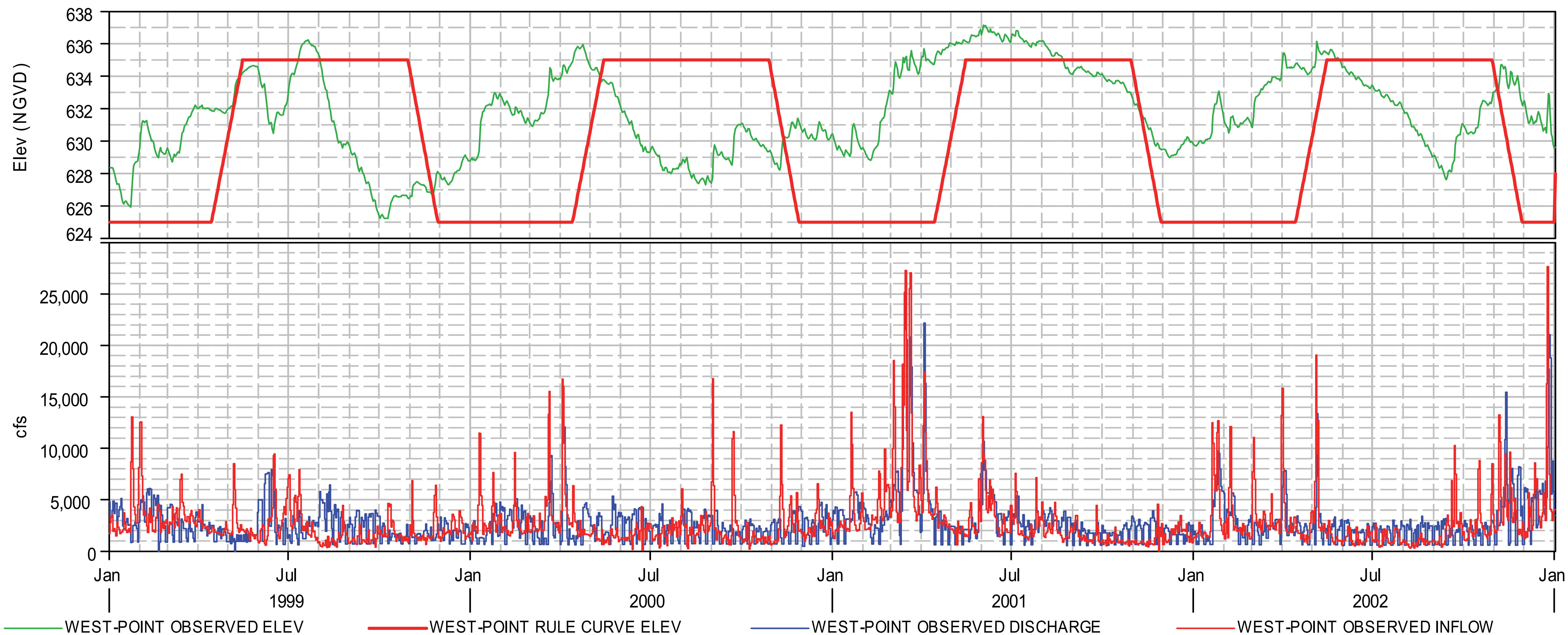
APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

POOL ELEVAITON-INFLOW-
DISCHARGE HYDROGRAPHS

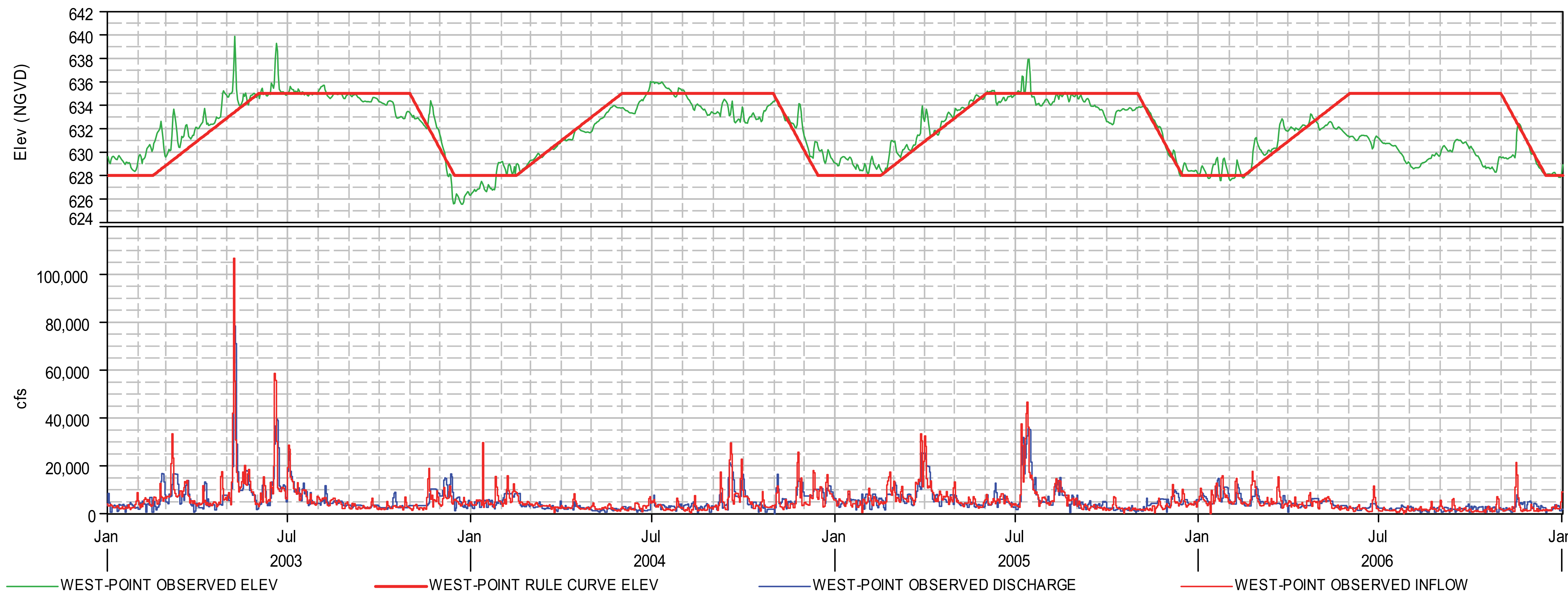


APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

POOL ELEVAITON-INFLOW-
DISCHARGE HYDROGRAPHS

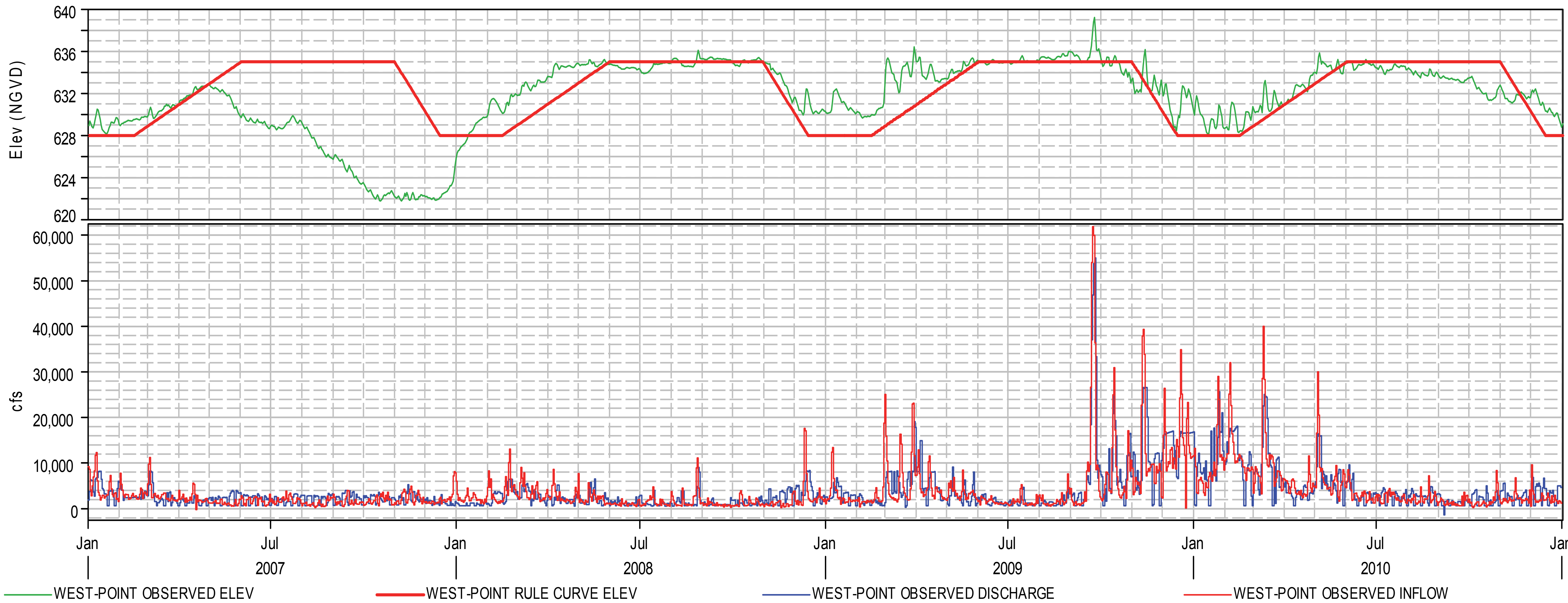
PAGE 7 OF 10



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

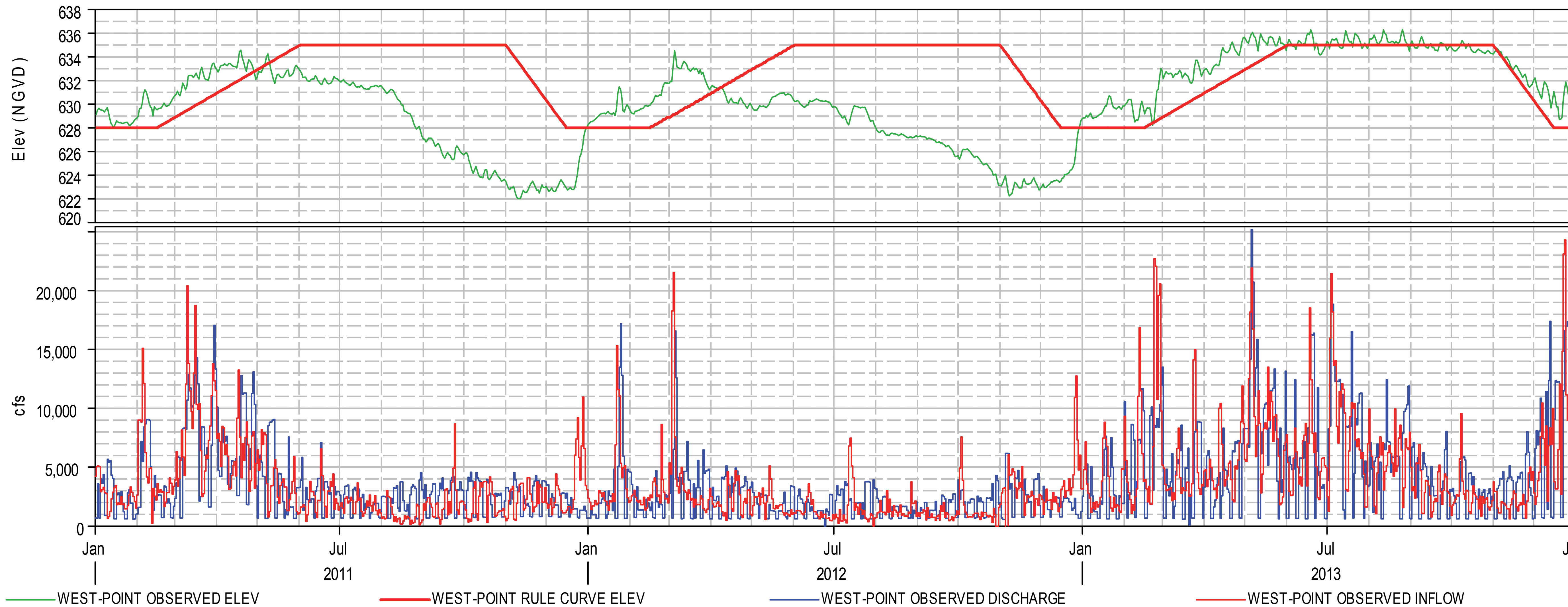
POOL ELEVAITON-INFLOW-
DISCHARGE HYDROGRAPHS



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

POOL ELEVAITON-INFLOW-
DISCHARGE HYDROGRAPHS

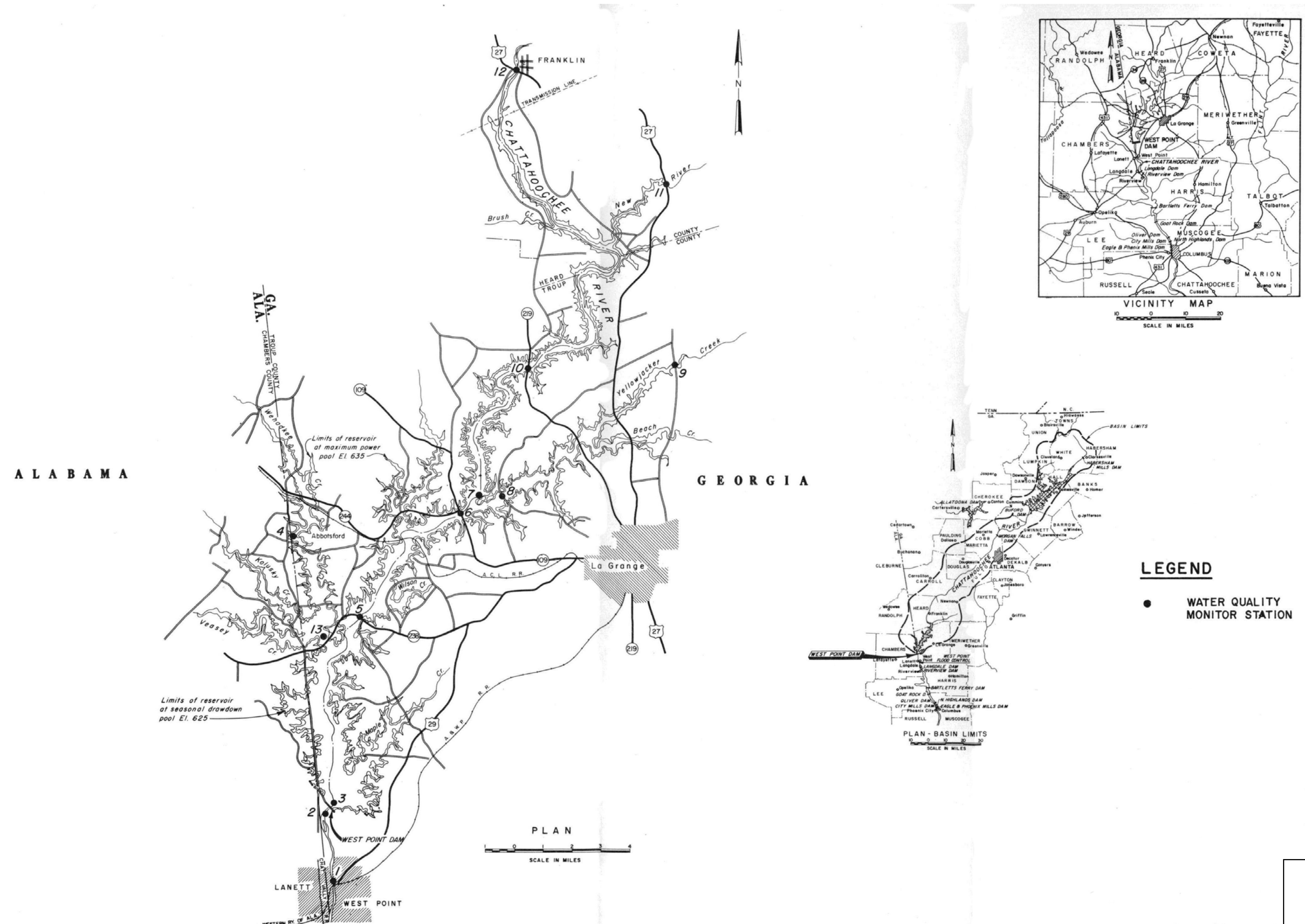


APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

RESERVOIR REGULATION MANUAL
WEST POINT RESERVOIR

POOL ELEVAITON-INFLOW-DISCHARGE HYDROGRAPHS

PAGE 10 OF 10

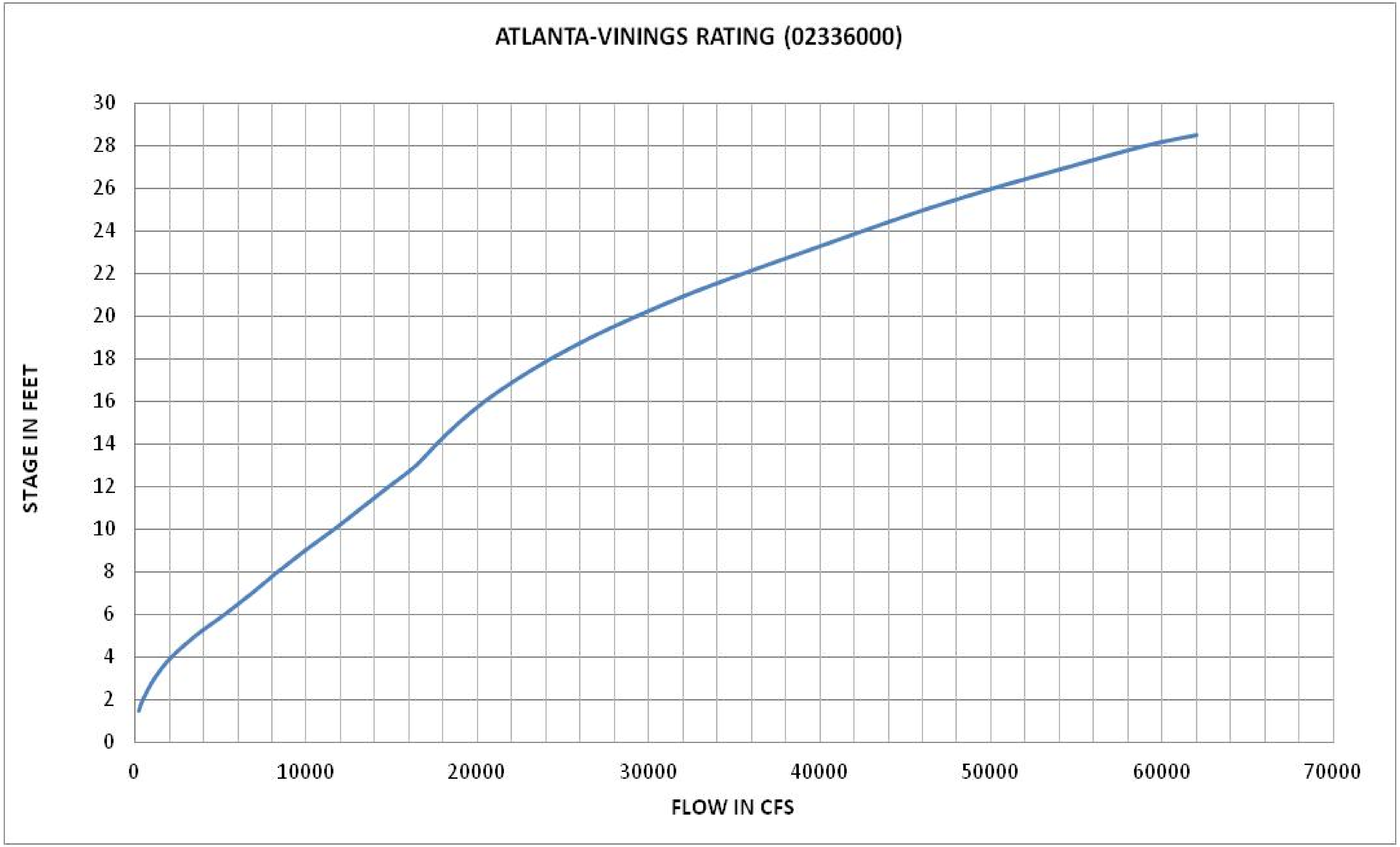


APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

LOCATION OF WATER QUALITY STATIONS


APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN
WATER CONTROL MANUAL
WEST POINT DAM AND LAKE
RIVER STAGE & RAINFALL GAUGE MAP
0 5 10 20 30 40
Miles
DAMS
RAIN GAUGE
RIVER GAUGE
RAIN AND RIVER GAUGE
Buford (Lake Lanier)
BUFORD DAM
Buford (Lanier Tailwater)
Cumming 2N, GA
Big Creek
Norcross
Roswell
Morgan Falls (Pool)
Morgan Falls (Tailwater)
Sope Creek
US 41
Atlanta 9NW, GA
Vinnings (Atlanta)
Peachtree Creek
Sweetwater Creek
Fairburn
Atlanta Hartsfield AP, GA
Snake Creek
Whitesburg
Newnan 5N, GA
Franklin
Yellowjacket Creek
Rock Mills, AL
LaGrange 1N, GA
West Point Lake
WEST POINT DAM
West Point (Tailwater)
West Point
West Point, GA
Lafayette 2W, AL
Opelika, AL
Columbus
Columbus Metro AP, GA
Hurtsboro, AL
Chattahoochee River
Flint River
N
Mississippi
Alabama
Georgia
South Carolina
Florida

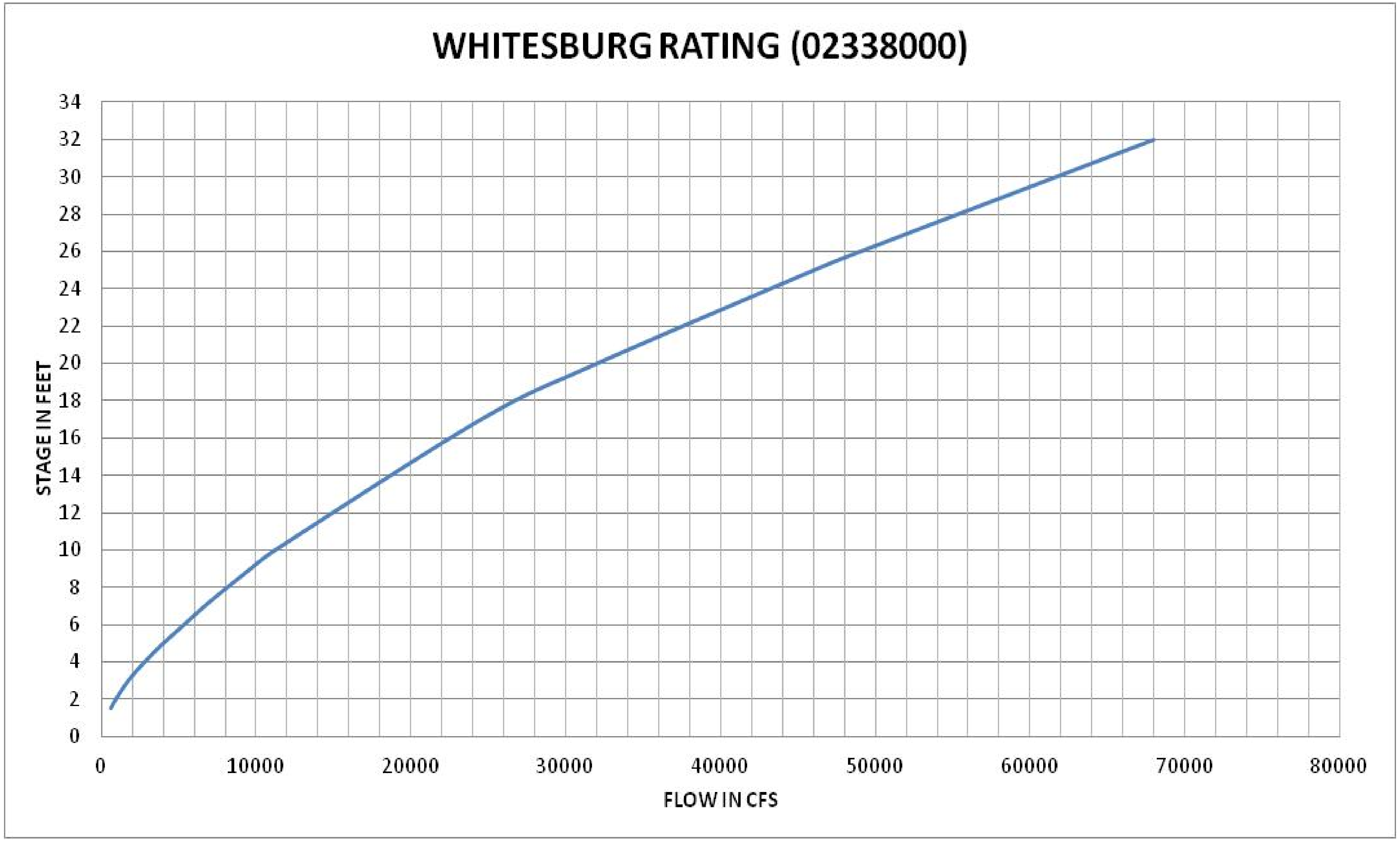


Atlanta-Vinings rating	
Stage (in feet)	Flow (in cfs)
2	450
3	1120
4	2100
5	3500
6	5200
7	6800
8	8300
9	9900
10	11600
11	13200
12	14800
13	16400
14	17600
15	18900
16	20400
17	22200
18	24260
19	26600
20	29280
21	32200
22	35500
23	39000
24	42500
25	46100
26	50100
27	54500
28	59000
28.5	62000

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

ATLANTA-VININGS RATING
CHATTAHOOCHEE RIVER
USGS # 02336000
RATING #6.1
DRAINAGE AREA 1,450 SQUARE MILES
GAGE ZERO 750.10 FEET NGVD29

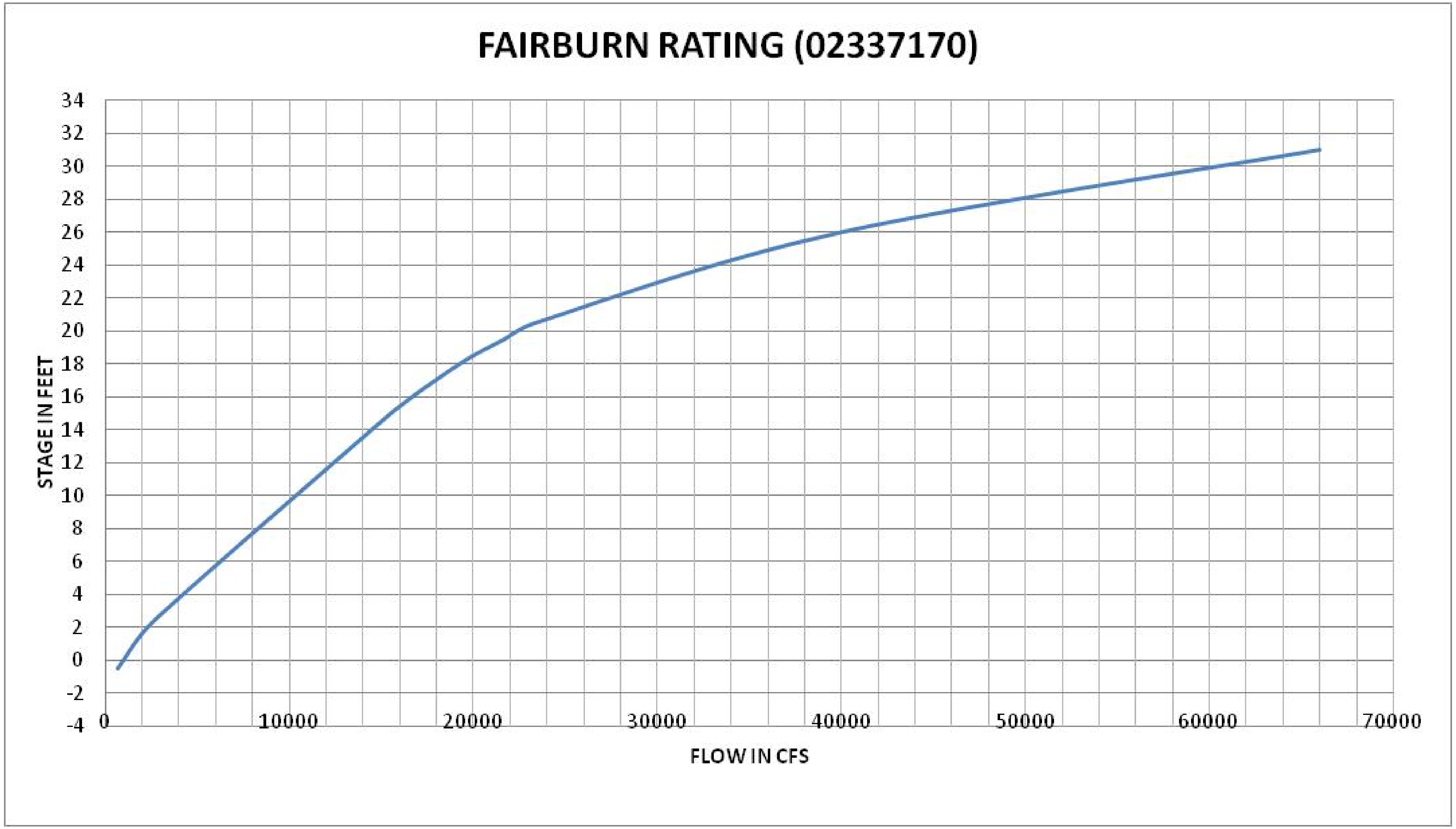


Whitesburg rating	
Stage (in feet)	Flow (in cfs)
1.52	585
1.7	700
2	900
3	1710
4	2760
5	3960
6	5310
7	6640
8	8100
9	9610
10	11200
17	24500
20	32000
25	46000
26	49000
32	68000

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

WHITESBURG RATING
CHATTAHOOCHEE RIVER
USGS # 02338000
RATING #8.2
DRAINAGE AREA 2,430 SQUARE MILES
GAGE ZERO 682.2 FEET NAVD 88

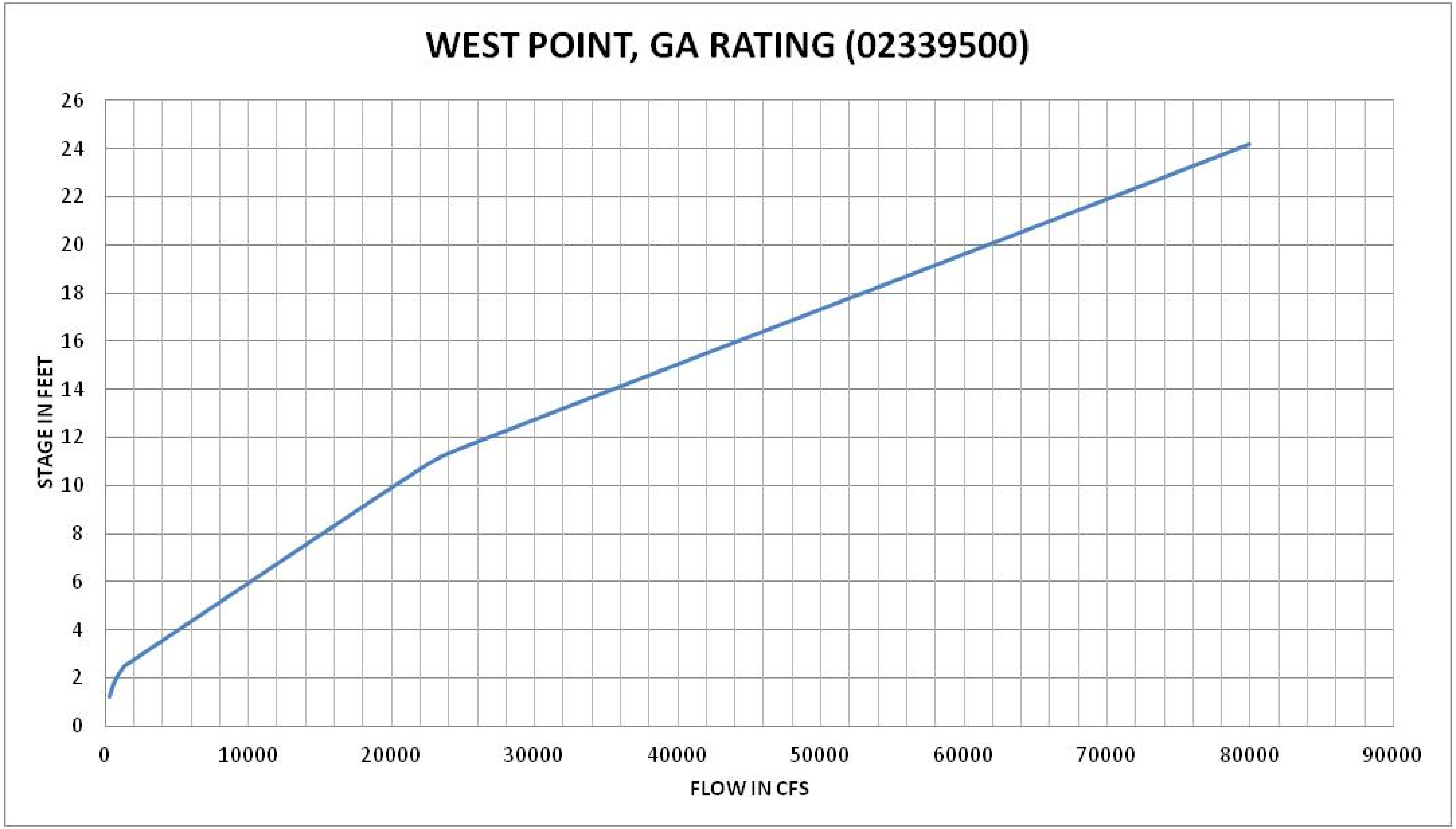


Fairburn rating	
Stage (in feet)	Flow (in cfs)
-0.5	700
0	1000
2.5	2750
14.5	15000
15.5	16100
16.5	17300
17.5	18600
18.5	20000
19.5	21700
20.5	23400
26	40000
31	66000

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

FAIRBURN RATING
CHATTAHOOCHEE RIVER
USGS # 02337170
RATING #11.1
DRAINAGE AREA 2,060 SQUARE MILES
GAGE ZERO 718.3 FEET NAVD88

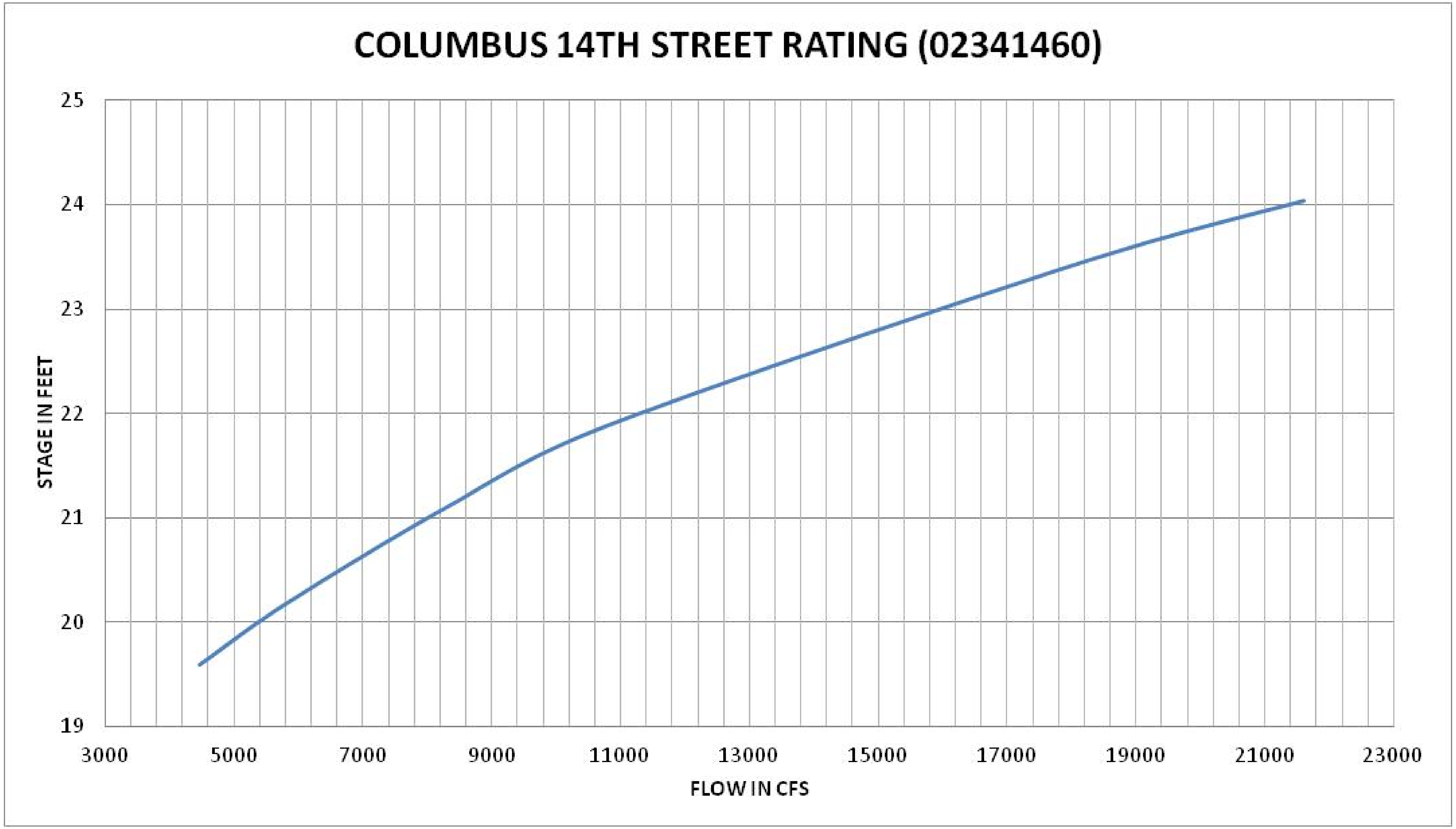


West Point, GA rating	
Stage (in feet)	Flow (in cfs)
1.2	270
1.3	310
1.4	355
1.5	405
1.6	460
1.7	520
1.8	590
1.9	665
2	750
2.1	845
2.2	950
2.3	1065
2.4	1190
2.5	1330
10.5	21500
11.5	24600
24.2	80000

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

WEST POINT GAGE RATING
CHATTAHOOCHEE RIVER
USGS # 02339500
RATING #15.1
DRAINAGE AREA 3,550 SQUARE MILES
GAGE ZERO 551.67 FEET NGVD29

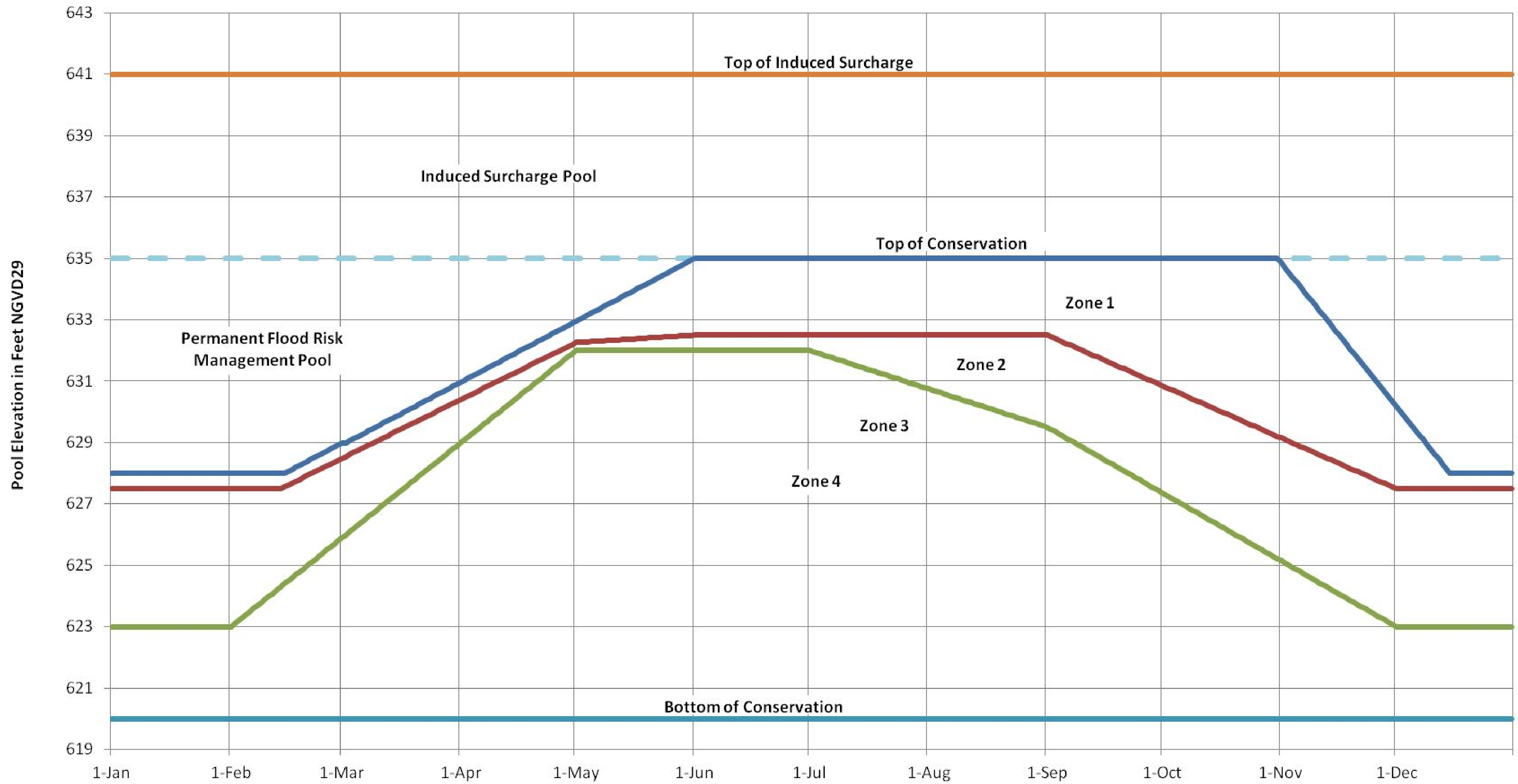


Columbus 14th St. Rating	
Stage (feet)	Flow (cfs)
2	455
2.5	690
2.8	850
8	6050
8.5	6800
9	7600
10	9250
18	22680
46	103000

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

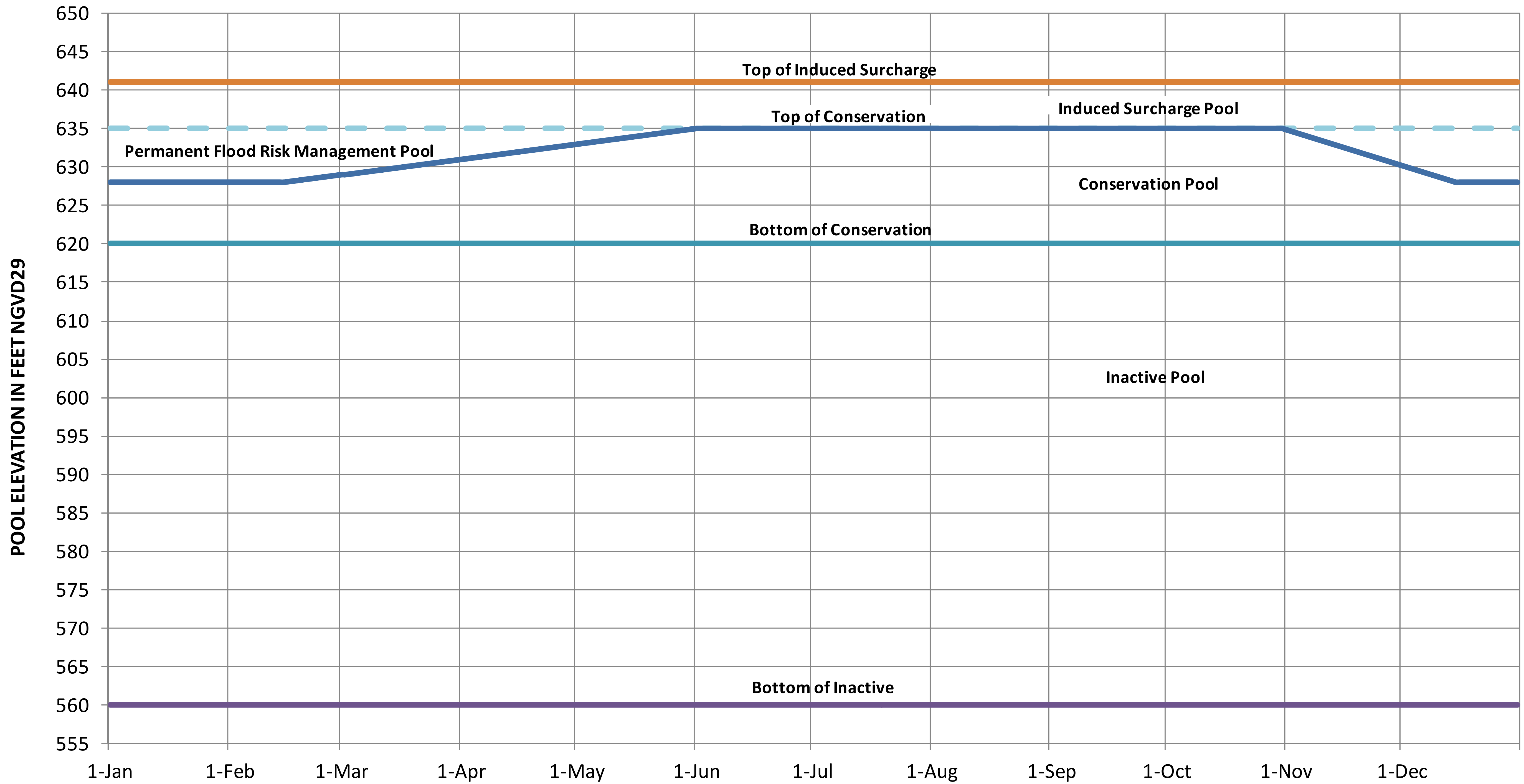
COLUMBUS 14TH STREET RATING
CHATTAHOOCHEE RIVER
USGS # 02353000
RATING #1.0
DRAINAGE AREA 4,630 SQUARE MILES
GAGE ZERO 190.0 FEET NAVD88



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

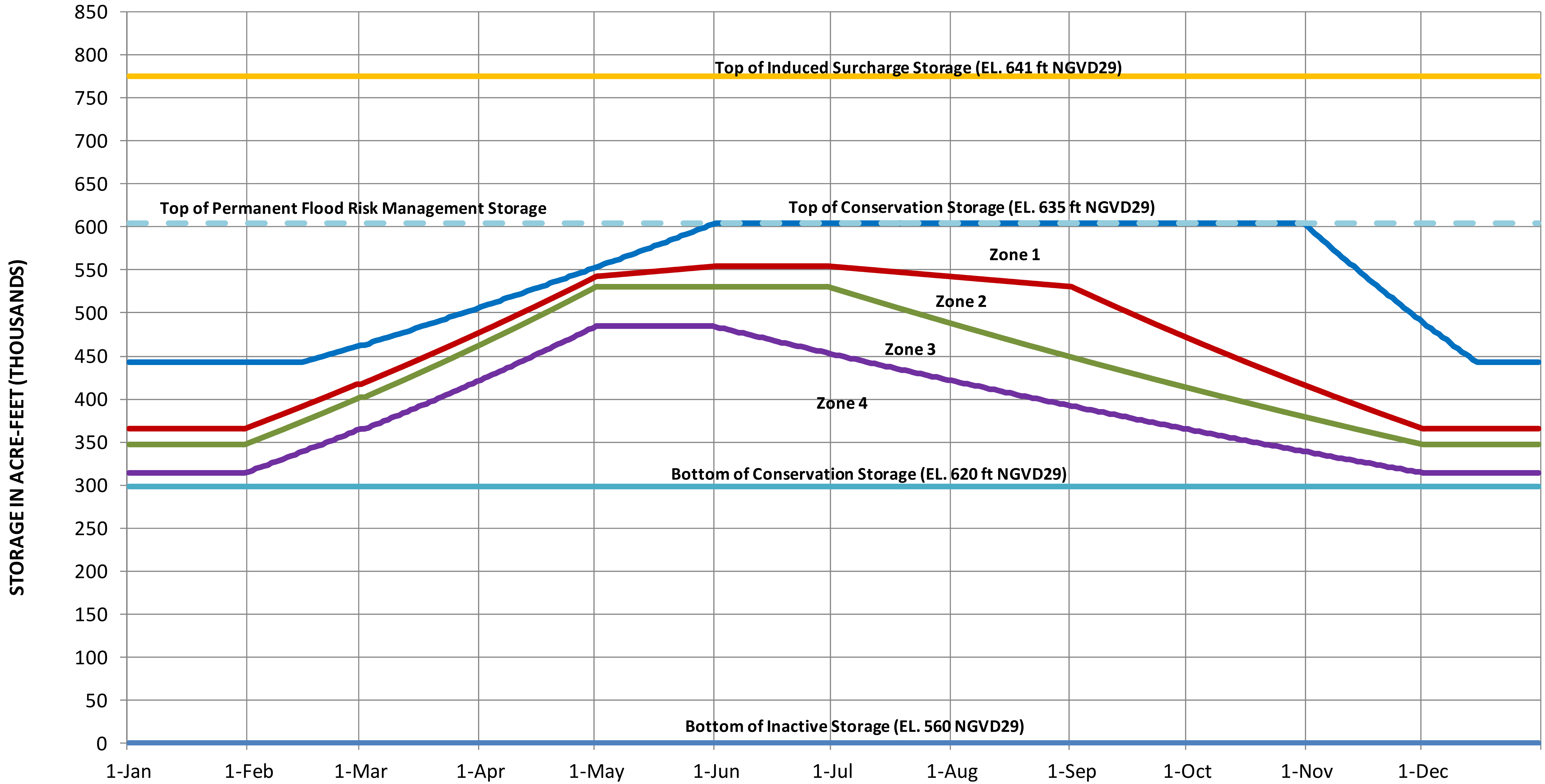
ACTION ZONES



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

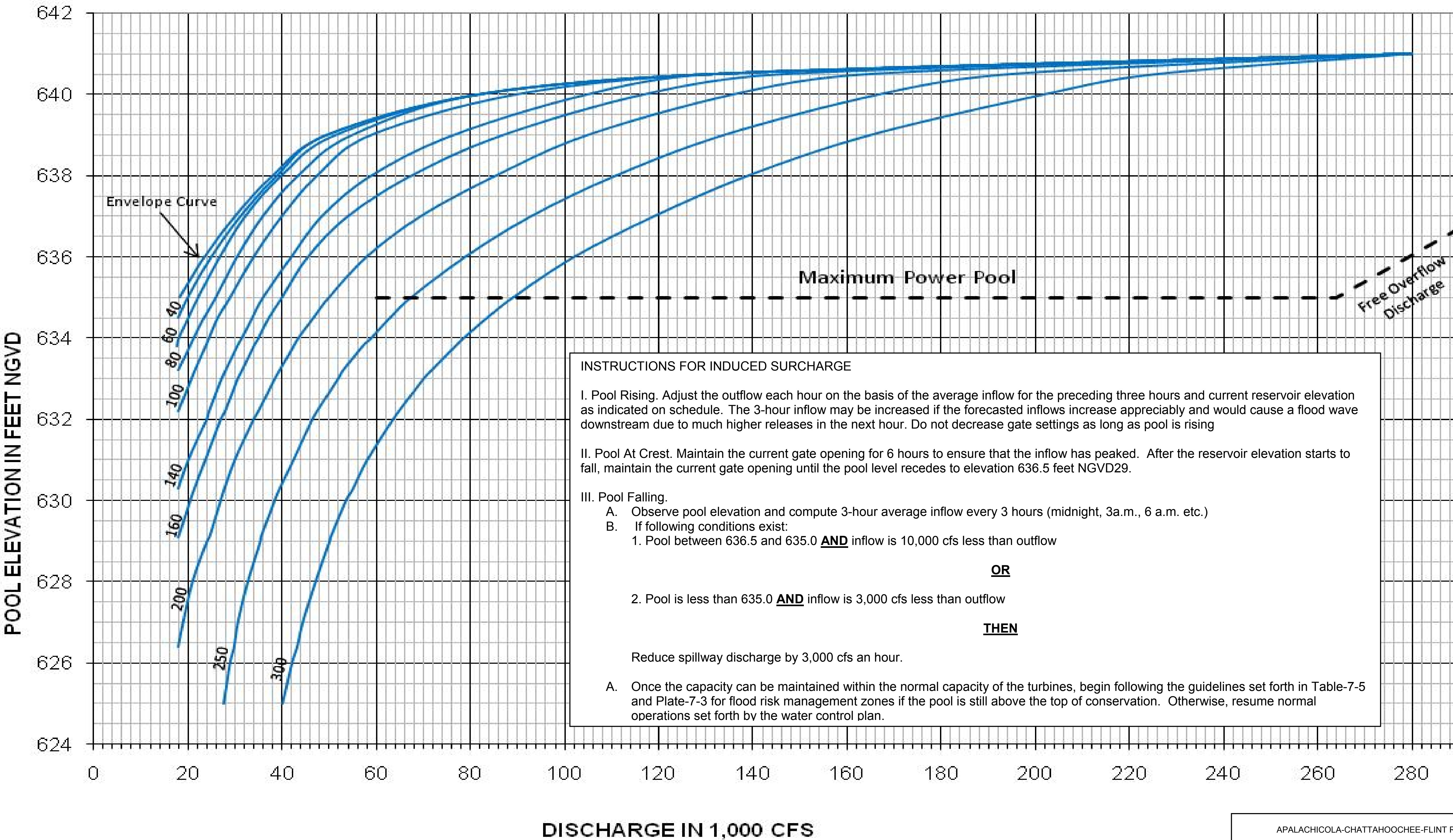
RESERVOIR STORAGE ZONES IN FEET NGVD29



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

RESERVOIR STORAGE ZONES
BY VOLUME



INSTRUCTIONS FOR INDUCED SURCHARGE

I. Pool Rising. Adjust the outflow each hour on the basis of the average inflow for the preceding three hours and current reservoir elevation as indicated on schedule. 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

II. Pool At Crest. Maintain the current gate opening for 6 hours to ensure that the inflow has peaked. After the reservoir elevation starts to fall, maintain the current gate opening until the pool level recedes to elevation 636.5 feet NGVD29.

III. Pool Falling.

A. Observe pool elevation and compute 3-hour average inflow every 3 hours (midnight, 3a.m., 6 a.m. etc.)

B. If following conditions exist:

1. Pool between 636.5 and 635.0 **AND** inflow is 10,000 cfs less than outflow

OR

2. Pool is less than 635.0 **AND** inflow is 3,000 cfs less than outflow

THEN

Reduce spillway discharge by 3,000 cfs an hour.

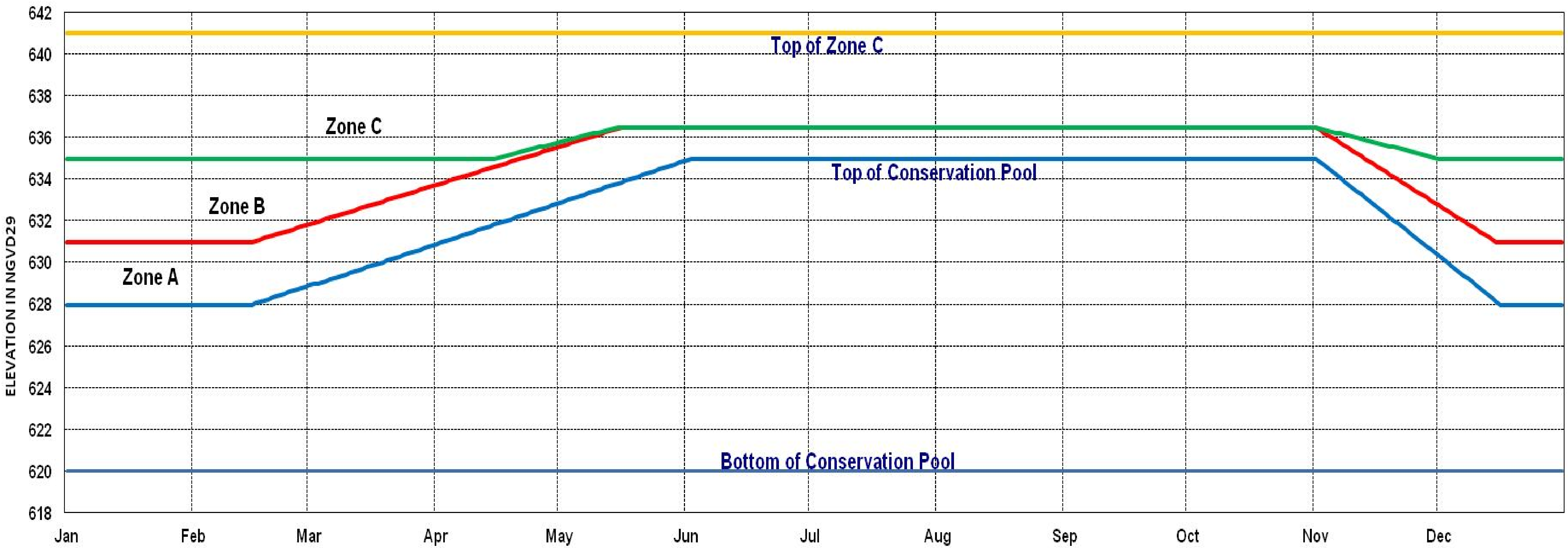
A. Once the capacity can be maintained within the normal capacity of the turbines, begin following the guidelines set forth in Table-7-5 and Plate-7-3 for flood risk management zones if the pool is still above the top of conservation. Otherwise, resume normal operations set forth by the water control plan.

Note: 1) Numbers located at the bottom of each curve represent inflow in 1000 cfs.
2) Release from the dam should not exceed 40,000 cfs at any time until larger releases are called for based on this chart

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

INDUCED SURCHARGE SCHEDULE



Guidelines for releases for floodwater management and evacuation based on flood zones. Water Management Section may issue other instructions based on observed conditions or forecasts. (All releases will be through the turbines when possible.)

Note: If the pool elevation and 3 hour average inflow call for an induced surcharge release, follow the induced surcharge schedule depicted in Plate 7-2. Otherwise, maintain discharge below the bankfull capacity of 40,000 cfs or the 3 hour average inflow, whichever is less. Once the pool begins to fall, follow the emptying instructions listed in table 7-3. Once the discharge is within the normal turbine capacity of 17,500 cfs, follow the guidelines described below for each flood zone.

ZONE A Schedule sufficient releases to lower pool elevation ½ distance to bottom of Zone A within one week. In the event of forecasted drought conditions, water may be stored in zone A indefinitely.

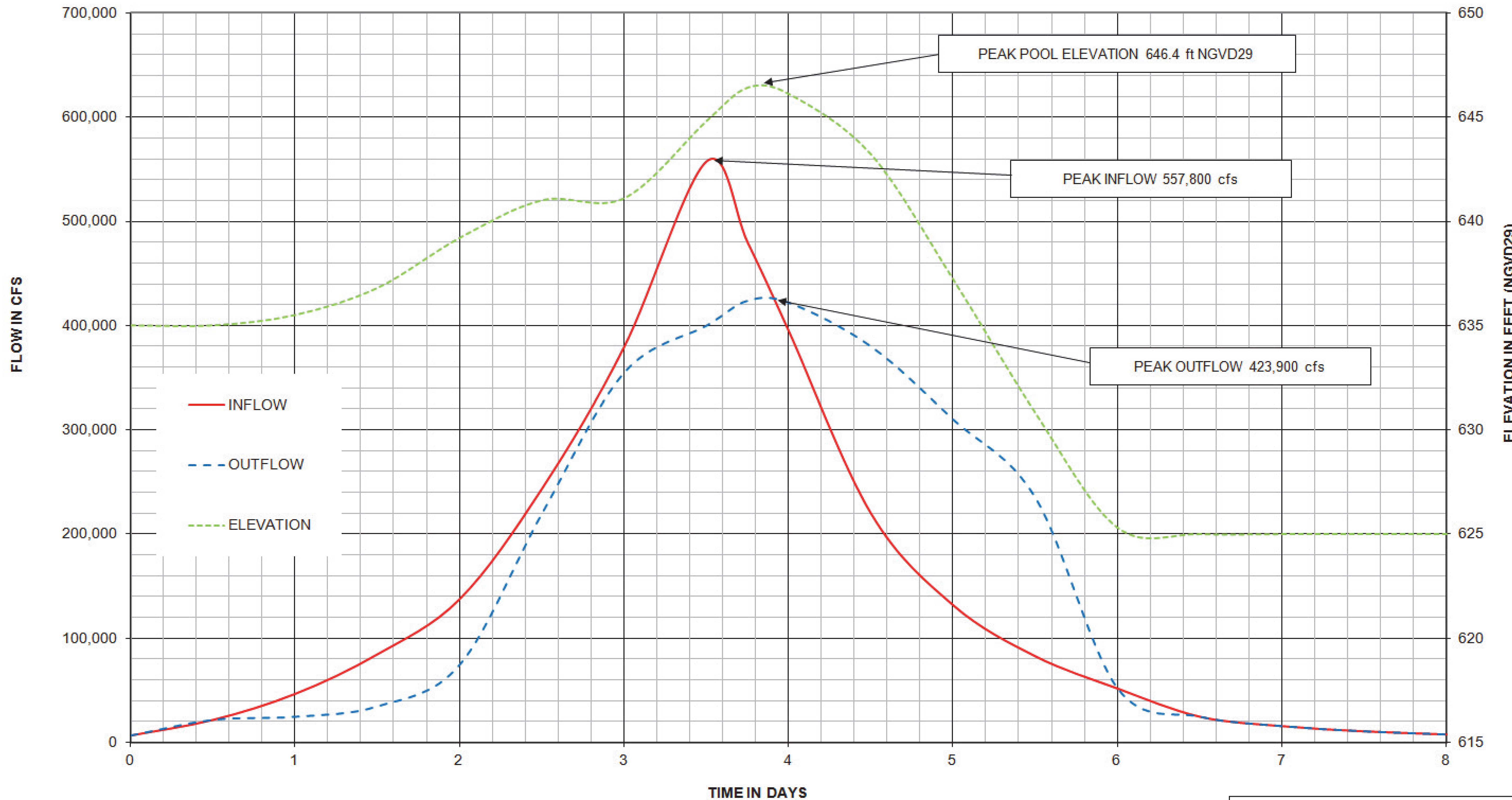
ZONE B Schedule sufficient releases to lower pool elevation two feet or into Zone A within 5 days. Releases may be limited to the equivalent of 16 hours of full generation with all units each day. If significant rain is forecasted, schedule 24 hours of continuous generation until the pool reaches zone A. The spillway may also be used up to a total discharge of 25,000 cfs to return the pool to zone A.

ZONE C Schedule sufficient releases of 16 to 24 hours of full generation with all units each day until the pool elevation enters Zone B. If significant rain is forecasted the spillway may be used up to a total discharge of 25,000 cfs to return the pool to zone B.

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

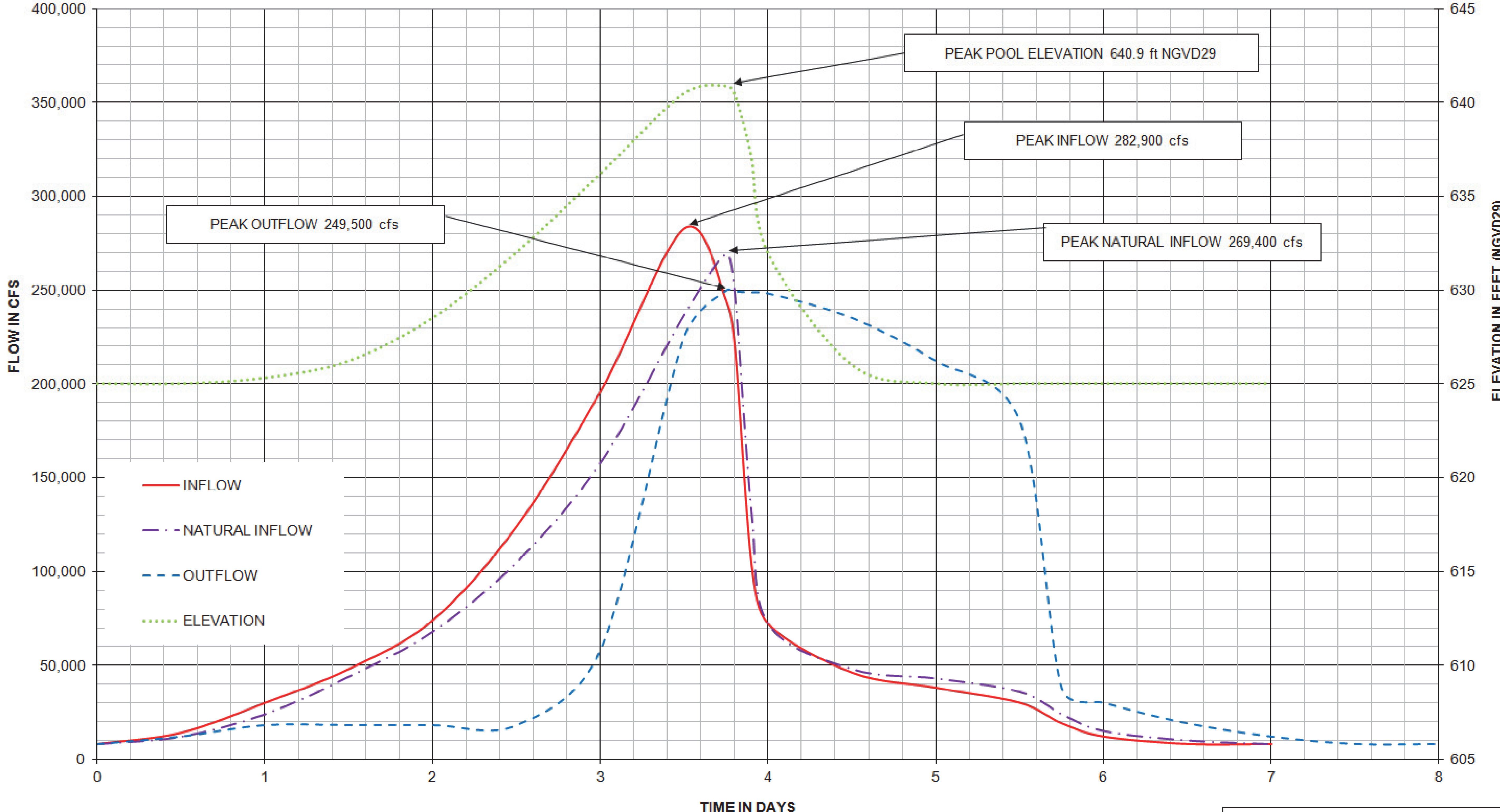
FLOOD RISK MANAGEMENT ZONES AND OPERATING INSTRUCTIONS FOR MANAGEMENT AND EVACUATION OF STORED FLOODWATERS



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

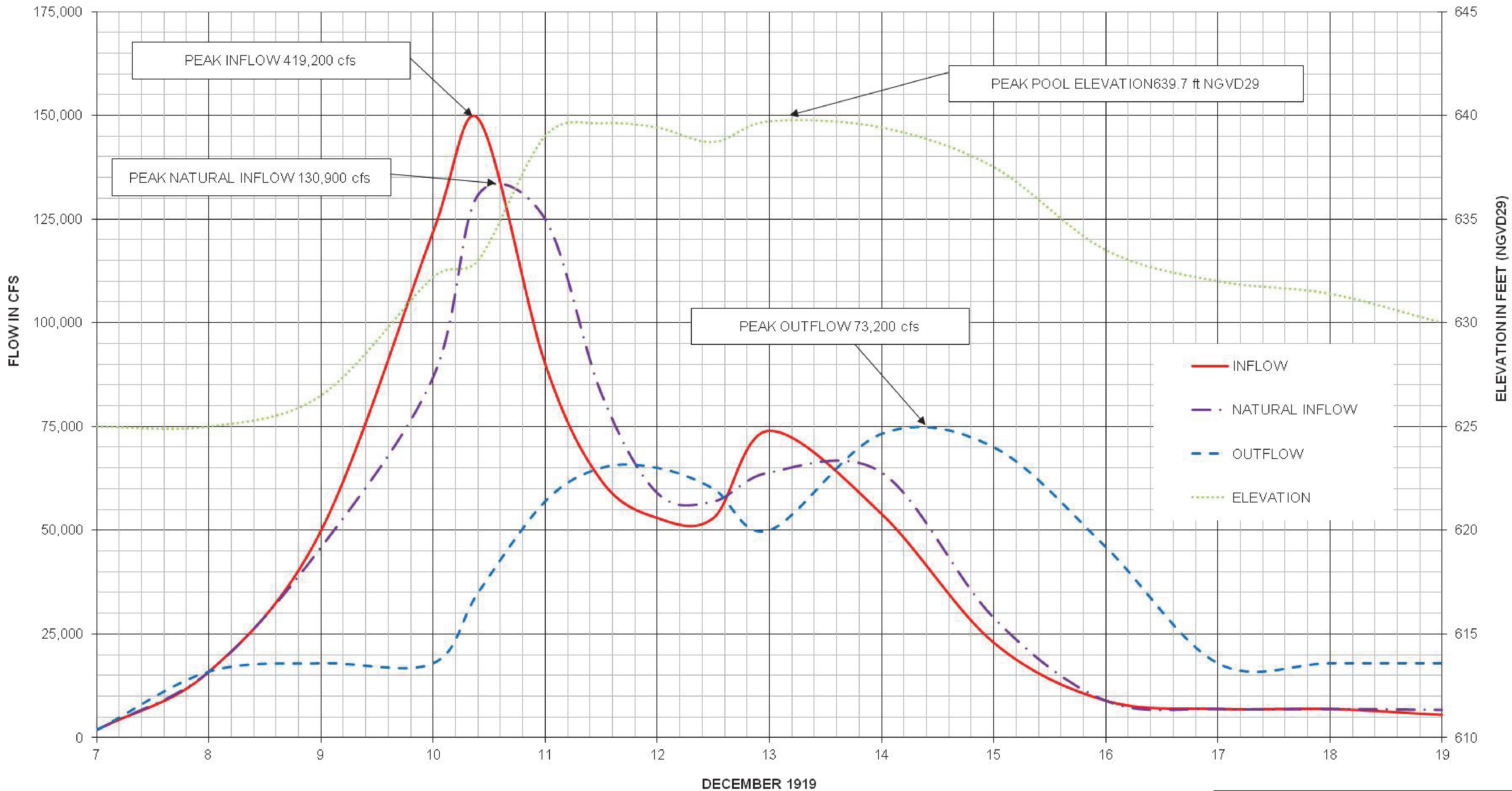
SPILLWAY DESIGN FLOOD



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

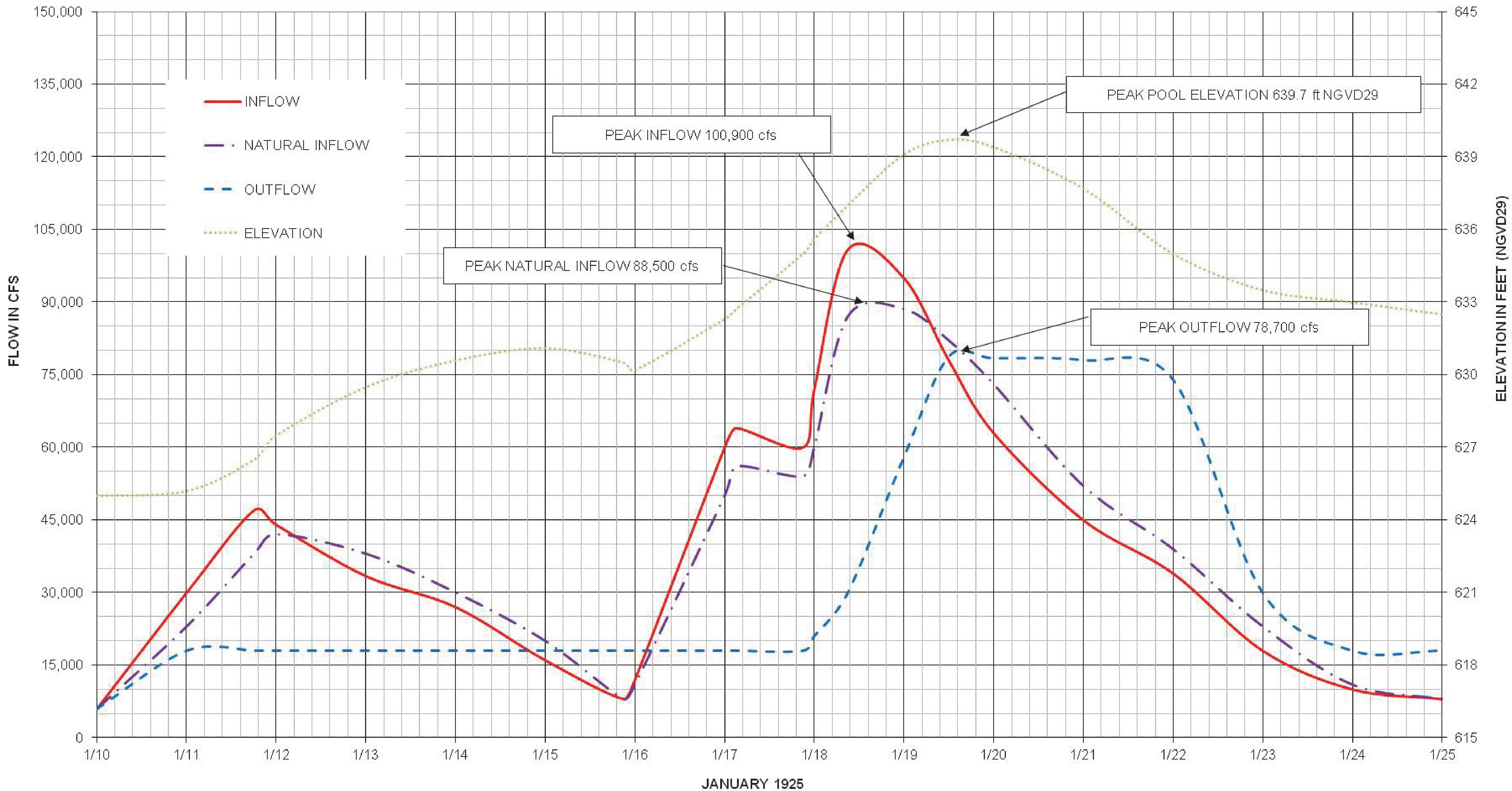
STANDARD PROJECT FLOOD



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

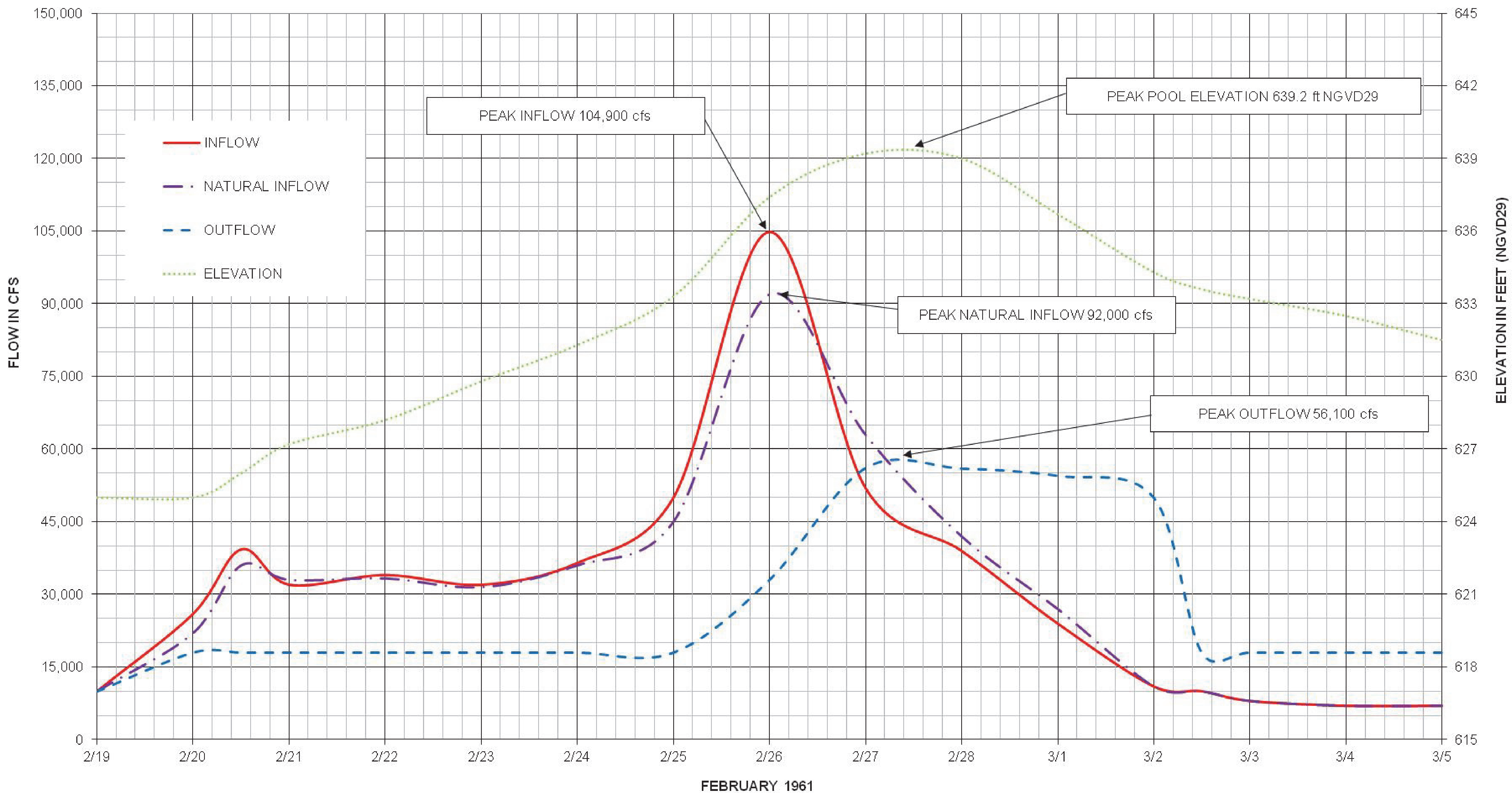
FLOOD OF DECEMBER 1919



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

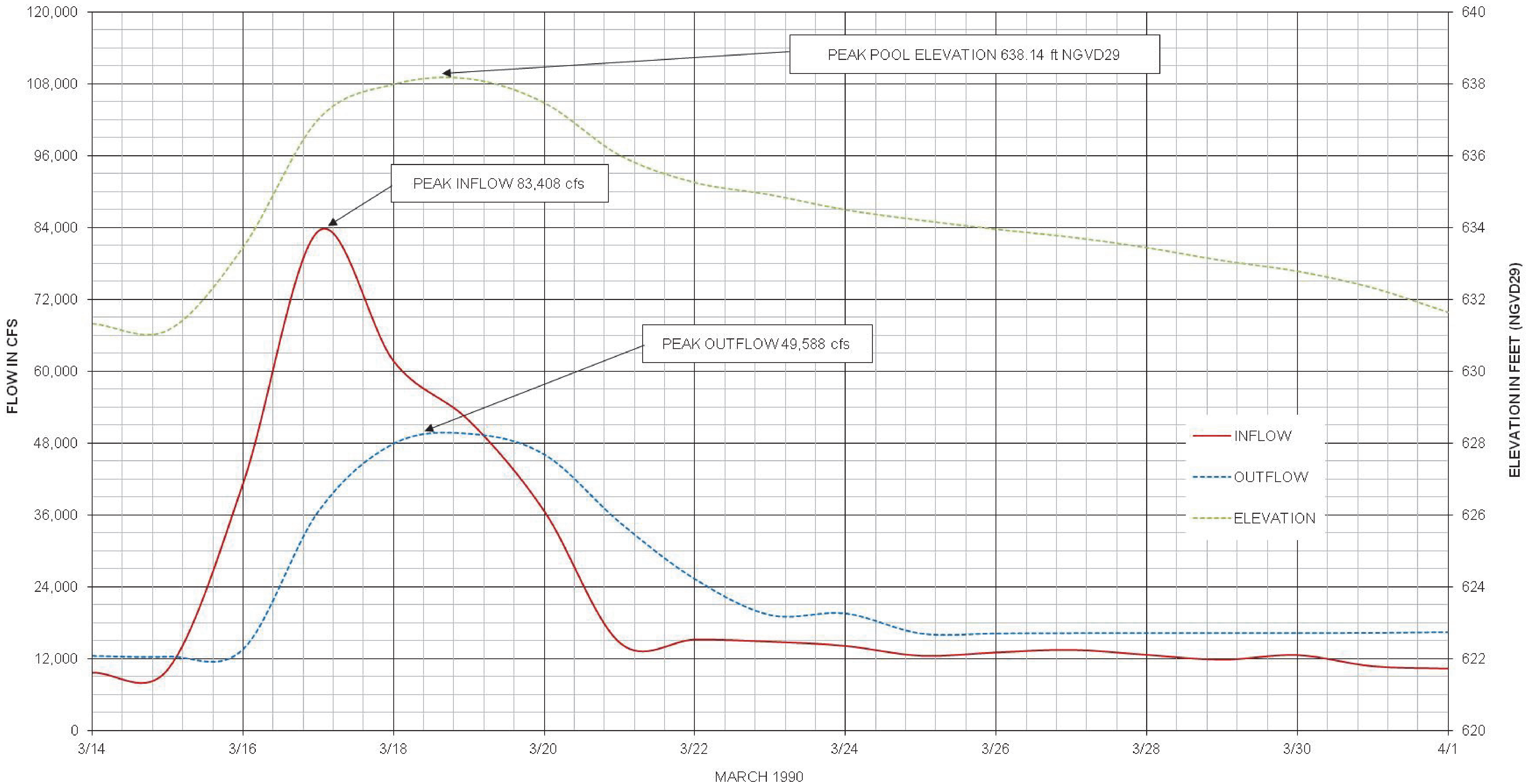
FLOOD OF JANUARY 1925



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

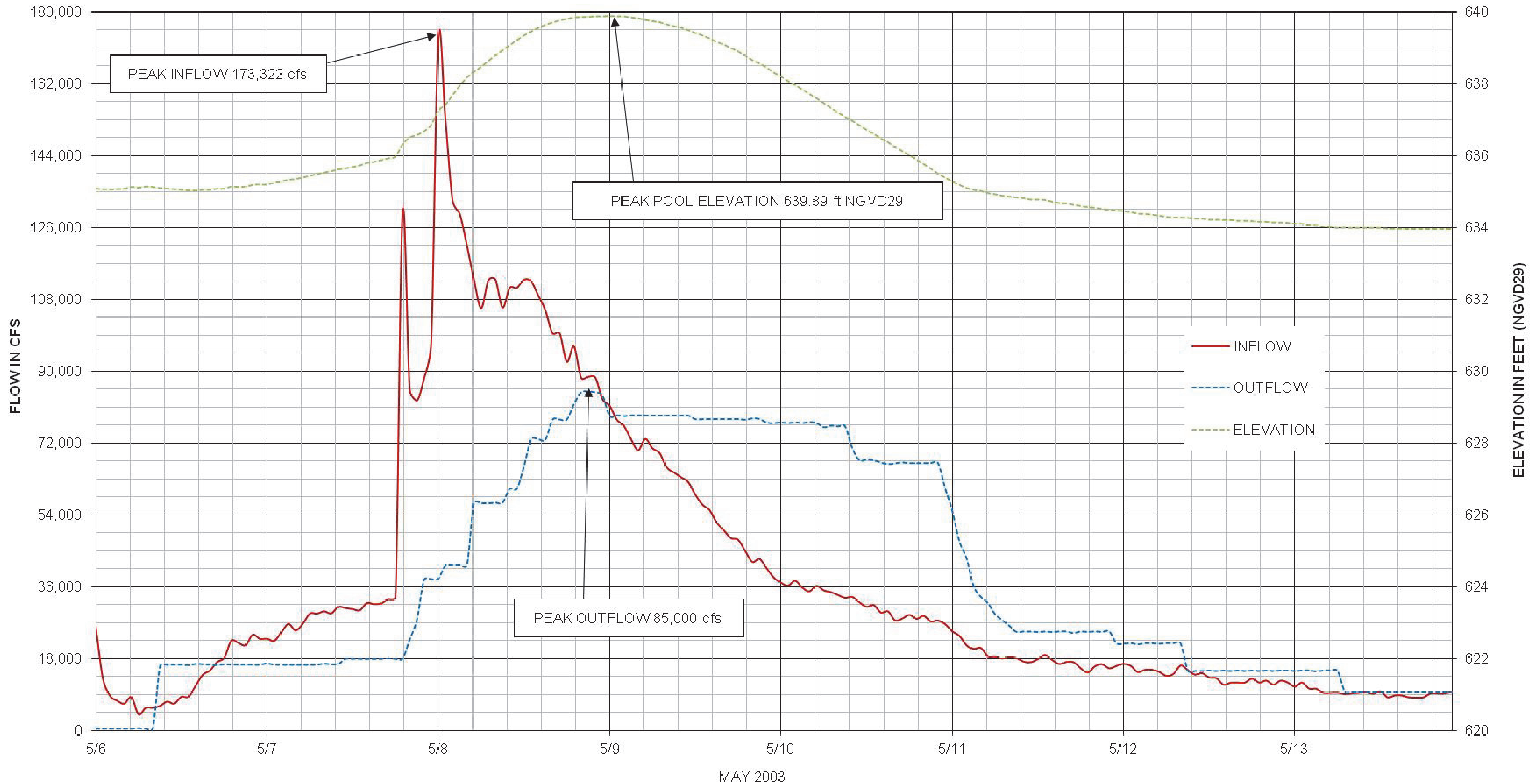
FLOOD OF FEBRUARY 1961



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

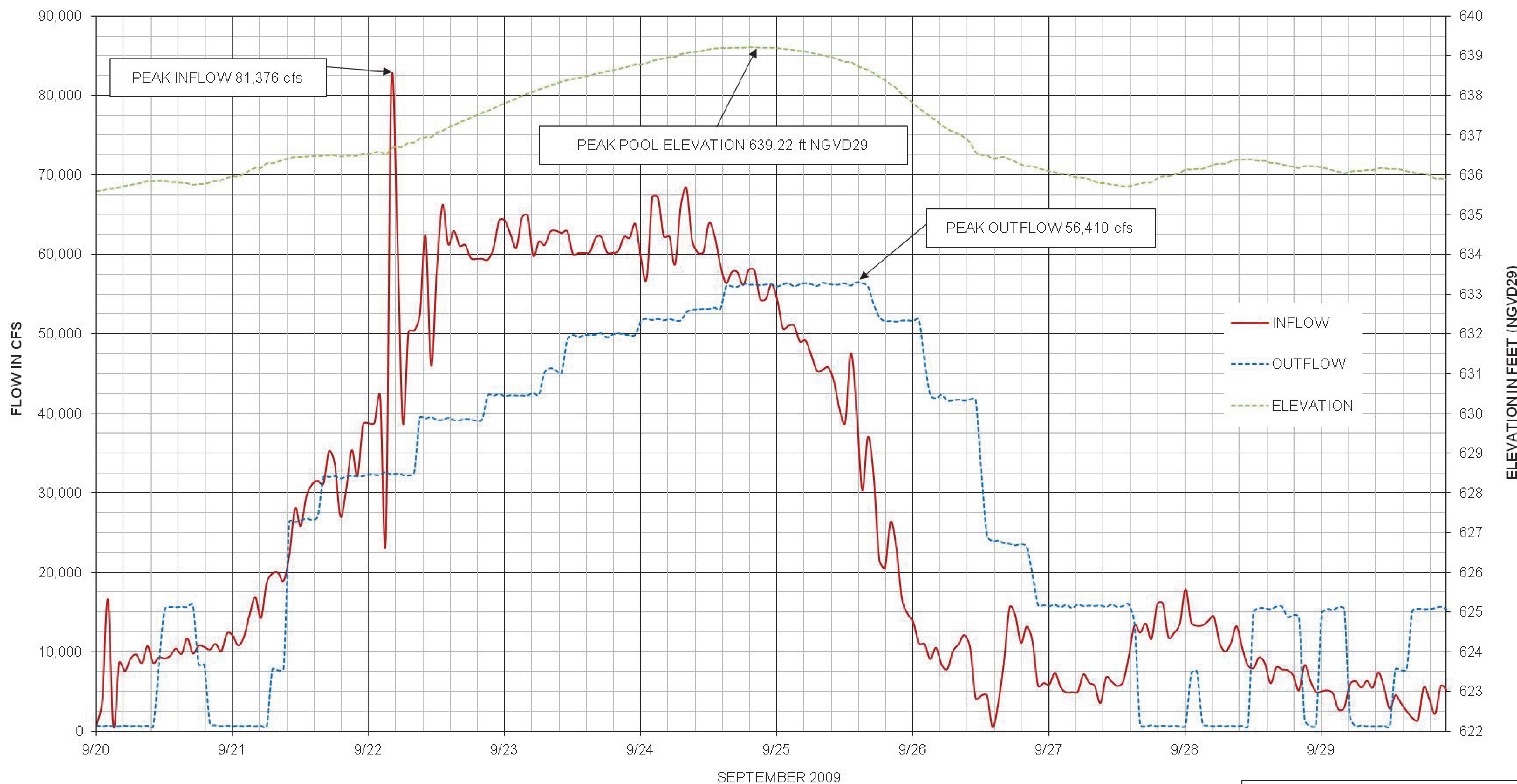
FLOOD OF FEBRUARY 1990



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

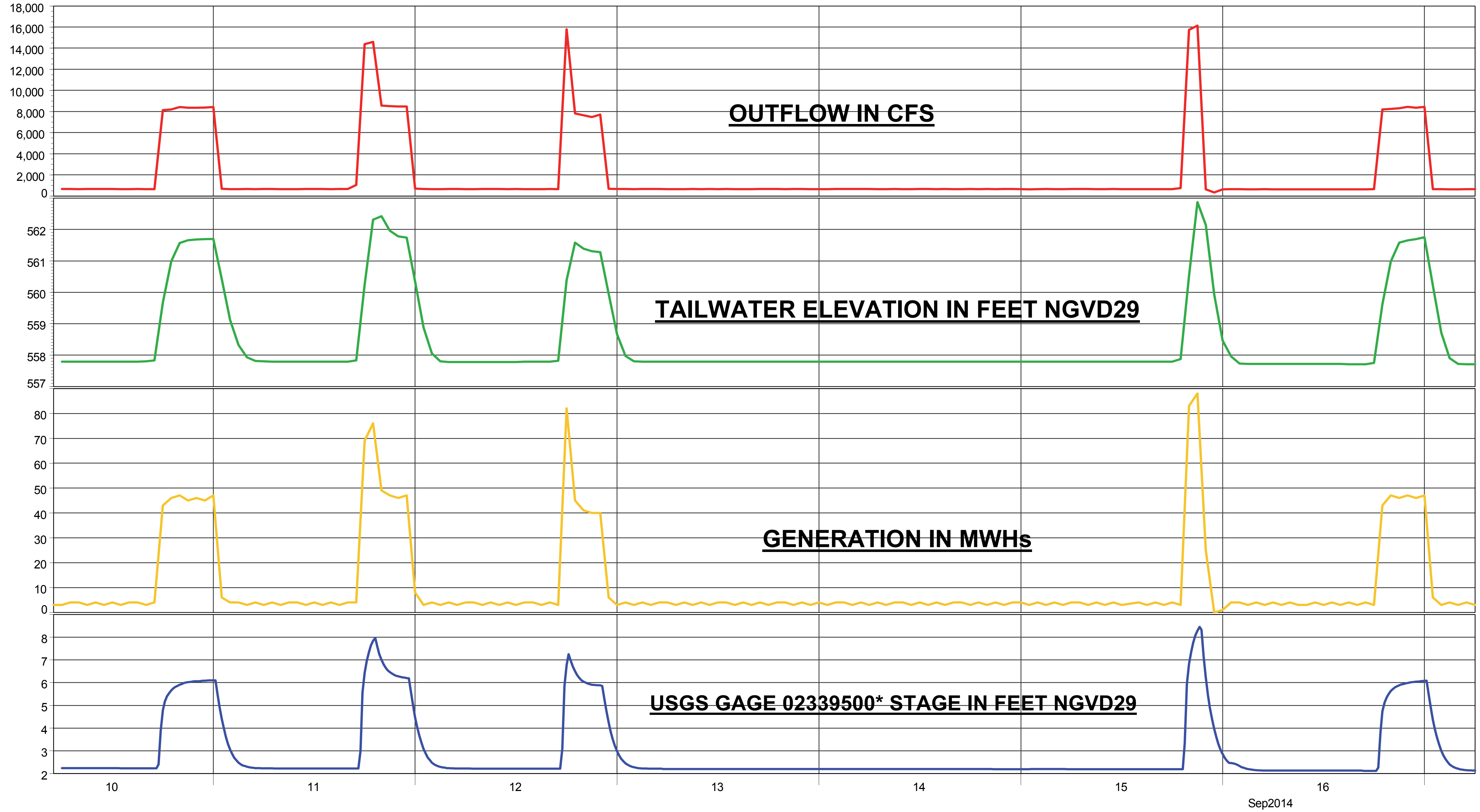
FLOOD OF MAY 2003



APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

FLOOD OF SEPTEMBER 2009

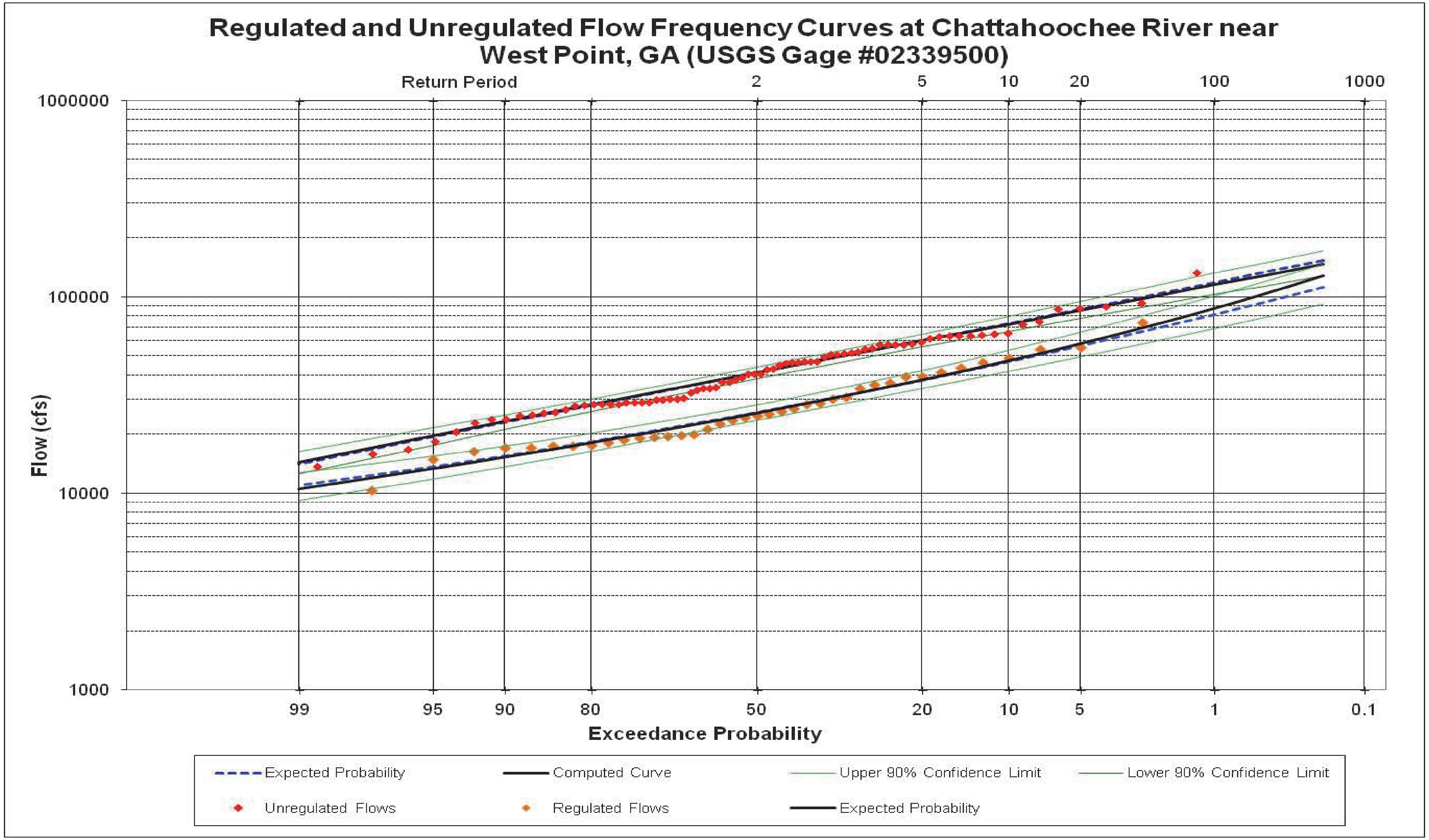


*USGS GAGE 02339500: Chattahoochee River at West Point, GA located 2.5 miles downstream from West Point Dam.

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

DOWNSTREAM EFFECTS OF
RESERVOIR RELEASES
SEPT 2014



Unregulated period: 1897 -1974
Regulated period: 1974 – 2013

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

WATER CONTROL MANUAL
WEST POINT DAM AND LAKE

Regulated Flow-Frequency
at West Point, GA (1975-2013)