INTEGRATED LETTER REPORT AND TIERED ENVIRONMENTAL ASSESSMENT

OF THE

OPERATIONAL ANALYSIS AND TARGETED WATER CONTROL PLAN UPDATES FOR THE APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN IN ALABAMA, FLORIDA, AND GEORGIA

EAXX-202-00-K5P-1727867613

December 2024

Table of Contents

1.0 Introduction i
1.1 Location and Background 1
1.2 Authority 2
1.3 Purpose and Need 4
1.4 Scope 4
2.0 Affected Environment 4
2.1 Water Resources 4
2.1.1 Water Quantity Affected Environment 4
2.1.2 Water Quality Affected Environment 5
2.2 Geology and Soils 7
2.3 Climate 8
2.4 Land Use 9
2.5 Biological Resources 9
2.5.1 Vegetation 9
2.5.2 Wildlife Resources Affected Environment 9
2.5.3 Fish and Aquatic Resources 11
2.5.4 Protected Species Affected Environment 13
2.5.5 Fish and Wildlife Management Facilities Affected Environment 16
2.6 Social and Economic Setting 16
2.6.1 Navigation 17
2.6.2 Power Generation 17
2.6.3 Flood Risk Management 18
2.6.4 Recreation 19
2.6.5 Population 20
2.6.6 Income 21
2.6.7 Employment 21
2.6.8 Environmental Justice Communities 22
2.6.9 Demographics Pertaining to Children 26
2.7 Aesthetic Resources 26
2.8 Air Quality and General Conformity 27
2.9 Noise 27
2.10 Traffic and Transportation (Nonnavigation and Nonrecreation) 27
2.11 Cultural Resources 27
2.12 Hazardous and Toxic Materials 28
3.0 Alternative Plans and Evaluation 28
3.1 Action Zones on ACF Basin 29
3.2 Alternatives 32

3.2.1 No Action Alternative (NAA) 32
3.2.2 Stay Agreement Alternative (SAA) 32
3.3 Alternative Comparison 32
3.4 Initial HEC-ResSim Results 35
4.0 Evaluation using 2016 EIS screening criteria 39
4.1 NAA Performance Relative to Authorized Purposes 39
4.1.1 Flood Risk Management 39
4.1.2 Hydroelectric Power Generation 40
4.1.3 Navigation 40
4.1.4 Fish and Wildlife Conservation 40
4.1.5 Recreation 41
4.1.6 Water Quality 41
4.1.7 Water Supply 41
4.2 SAA Performance Relative to Authorized Purposes 42
4.2.1 Flood Risk Management 42
4.2.2 Hydroelectric Power Generation 42
4.2.3 Navigation 43
4.2.4 Fish and Wildlife Conservation 44
4.2.5 Recreation 44
4.2.6 Water Quality 45
4.2.7 Water Supply 45
5.0 Environmental Consequences 46
5.1 Water Quantity 47
5.2 Water Quality 47
5.3 Climate 47
5.3.1 Climate Change 47
5.3.2 Greenhouse Gases 48
5.4 Federally Protected Species 48
5.5 Air Quality 48
5.6 Navigation 48
5.7 Flood Risk Management 48
5.8 Recreation 48
5.9 Population and Income 49
5.10 Cultural Resources 49
5.11 Cumulative Effects 50
5.12 Other NEPA Considerations 50
5.12.1 Environmental Justice 50
5.12.2 Protection of Children 50
5.12.3 Irreversible or Irretrievable Commitments 51

5.12.4 Short-Term Uses of the Human Environment and Maintenance of Long-Term Productivity.. 51
6.0 Environmental Coordination 51
7.0 Recommendation 53
8.0 References 54

Tables

Table 1: Georgia Designated Uses and Instream Water Quality Standards 5
Table 2: Sampling of birds throughout habitats across the ACF Basin 10
Table 3: Flood Damages Prevented by ACF Projects, Fiscal Years 2016-2023 (July 2024 [FY2024] Price Levels) 18
Table 4: ACF 500-year Floodplain Value Data 18
Table 5: Visitation at ACF Projects, Fiscal Years 2016-2022 19
Table 6: Annual Visitation at Chattahoochee River National Recreation Area, Years 2016-2021 20
Table 7: Population Estimates in ACF River Basin 20
Table 8: Population Annual Growth Rates in ACF River Basin 20
Table 9: Housing Units in ACF River Basin 20
Table 10: ACF River Basin Income per Capita 1969-2022 21
Table 11: 2022 Employment Statistics in ACF River Basin 21
Table 12: 2022 Employment by Occupation in ACF River Basin 22
Table 13: ACF Basin Demographics (Percent Distribution) 25
Table 14: ACF Basin Poverty Status 25
Table 15: Authorized Project Purposes 28
Table 16: Percent of Time Flow Objective 1 Achieved 35
Table 17: HEC-ResSim operational details on Flow Objective 1 35
Table 18: Percent of Time Flow Objective 2 Achieved 36
Table 19: HEC-ResSim operational details on Flow Objective 2 36
Table 20: HEC-ResSim operational details on Flow Objective 3 37
Table 21: Percent of Time Jim Woodruff Pool Elevation Exceeded 39
Table 22: Average Annual Energy Generation Impacts by Month showing MWh and currency ($50/MWh) 43
Table 23: Listed Species Performance Measures for SAA Compared to the NAA 44
Table 24: Changes in Operations to meet Recreation Authorized Project Purpose under the SAA 45
Table 25: Operational Changes to Meet Water Supply Authorized Project Purpose under SAA 46
Table 26: Analysis Conclusions on Authorized Project Purposes 53

Figures

Figure 1: Apalachicola, Chattahoochee, and Flint Rivers Basin Map 3
Figure 2: Disadvantaged Communities within the ACF River Basin 24
Figure 3: Buford Action Zones 30
Figure 4: West Point Lake Action Zones 30
Figure 5: Walter F. George Lake Action Zones 31
Figure 6: ACF River Basin Composite Conservation Storage 31
Figure 7: Percent of Time in Composite Zone 33
Figure 8: Buford NAA and SAA Elevation Percent of Exceedance 34
Figure 9: West Point NAA and SAA Elevation Percent of Exceedance 34
Figure 10: WFG NAA and SAA Elevation Percent of Exceedance 35
Figure 11: Columbus flow duration curve for both alternatives 36
Figure 12: Georgia Andrews (Columbia) flow duration curve for both alternatives 37
Figure 13: Number of Times Columbus Flow Target Trigged a Release 38
Figure 14: Number of Times Columbia Flow Target Trigged a Release 38
Figure 15: Jim Woodruff pool elevation duration curve for both alternatives 39

Appendices

Appendix A: Stay Agreement
Appendix B: HEC-ResSim Report
Appendix C: Master Water Control Plan Update
Appendix D: West Point Water Control Plan Update
Appendix E: Walter F. George Water Control Plan Update
Appendix F: George W. Andrews Water Control Plan Update
Appendix G: Drought Contingency Plan Update
Appendix H: Hydropower Analysis Center Memorandum for Record
Appendix I: Climate Change Analysis
Appendix J: Public Comments

List of Acronyms

ADEM ..... Alabama Department of Environmental Management
APE ..... Area of Potential Effect
ASSF ..... Alabama State Site File
BGEPA ..... Bald and Golden Eagle Protection Act
CAA ..... Clean Air Act
CAP ..... Continuing Authorities Program
CWA ..... Clean Water Act
District ..... United States Army Corps of Engineers, Mobile District
EA ..... Environmental Assessment
ESA ..... Endangered Species Act
FEMA ..... Federal Emergency Management Agency
FONSI ..... Finding of No Significant Impact
HTRW ..... Hazardous, Toxic, and Radioactive Waste
LERRD ..... Lands, Easements, Rights-of-way, Relocations, and Disposal Areas
MBTA ..... Migratory Bird Treaty Act
NAA ..... No Action Alternative
NAAQS ..... National Ambient Air Quality Standards
NED ..... National Economic Development
NFS ..... Non-Federal Sponsor
NPDES ..... National Pollutant Discharge Elimination System
NRHP ..... National Register of Historic Places
O&M ..... Operations and Maintenance
PDT ..... Project Delivery Team
PM ..... Particulate Matter
SHPO ..... State Historic Preservation Officer
T&E ..... Threatened and Endangered
TMDL ..... Total Maximum Daily Load
TSP ..... Tentatively Selected Plan
USACE ..... United States Army Corps of Engineers
USEPA ..... United States Environmental Protection Agency
USFS ..... United States Forest Service
USFWS ..... United States Fish and Wildlife Service

Executive Summary

After the 2016 Environmental Impact Statement (EIS) and 2017 Water Control Manual (WCM) update were completed, the state of Alabama and multiple parties in the state of Florida brought litigation challenging the action. Multiple parties in Georgia were brought into the litigation as intervenors. During mediation at the appellate stage, the Alabama and Georgia parties to the lawsuit entered into an agreement with the Corps that would stay the litigation until an analysis of a proposed flow regime was complete in pursuit of a settlement of Alabama's portion of the litigation. This agreement is documented in the Stay Agreement entered into by the State of Alabama; the Federal Defendants; the Atlanta Regional Commission, City of Atlanta, Georgia, Cobb County-Marietta Water Authority, DeKalb County, Forsyth County, Fulton County, City of Gainesville, Georgia, and Gwinnett County; and the State of Georgia for the case captioned *State of Alabama et al. v. U.S. Army Corps of Engineers, et al.*, Nos. 21-13104 and 21-13444 (11th Cir.).

This integrated report presents the evaluation of the stay agreement. This report also integrates the environmental assessment in compliance with the National Environmental Act (NEPA) of 1969. The proposed flow objectives listed below, are combined and evaluated as a full alternative plan (Stay Agreement Alternative):

> "(1) an objective to maintain a minimum average daily flow of 1,350 cfs over any 7- day period at the gage located on the Chattahoochee River at 14th Street at Columbus, Georgia (Gage No. 02341460) when the ACF Basin is not in "Drought Zone Operations" as that term is defined in the 2017 ACF Master Manual;
>
> (2) an objective to maintain a minimum average weekday flow of 2,000 cfs at the gage located on the Chattahoochee River near Columbia, Alabama (Gage No. 02343801) when the ACF Basin is not in "Drought Zone Operations" as that term is defined in the 2017 ACF Master Manual;
>
> (3) an objective to maintain the minimum average flows at Columbus, Georgia and Columbia, Alabama described in items (1) and (2) above, on two days each calendar week starting each Monday when the ACF Basin is in "Drought Zone Operations" as that term is defined in the 2017 ACF Master Manual; and
>
> (4) an objective to maintain Lake Seminole at or above fill elevation of 76 feet NVGD in the same manner and to the same extent as provided in the 2017 ACF Master Manual, and in particular the following paragraphs from Appendix A, the Water Control Manual for Jim Woodruff Lock and Dam and Lake Seminole: Chapter III, subparagraph 3-03; Chapter VII, paragraphs 7-03, 7-05(a), 7-10, and 7-11; and Chapter VIII, Paragraph 8-11 b."

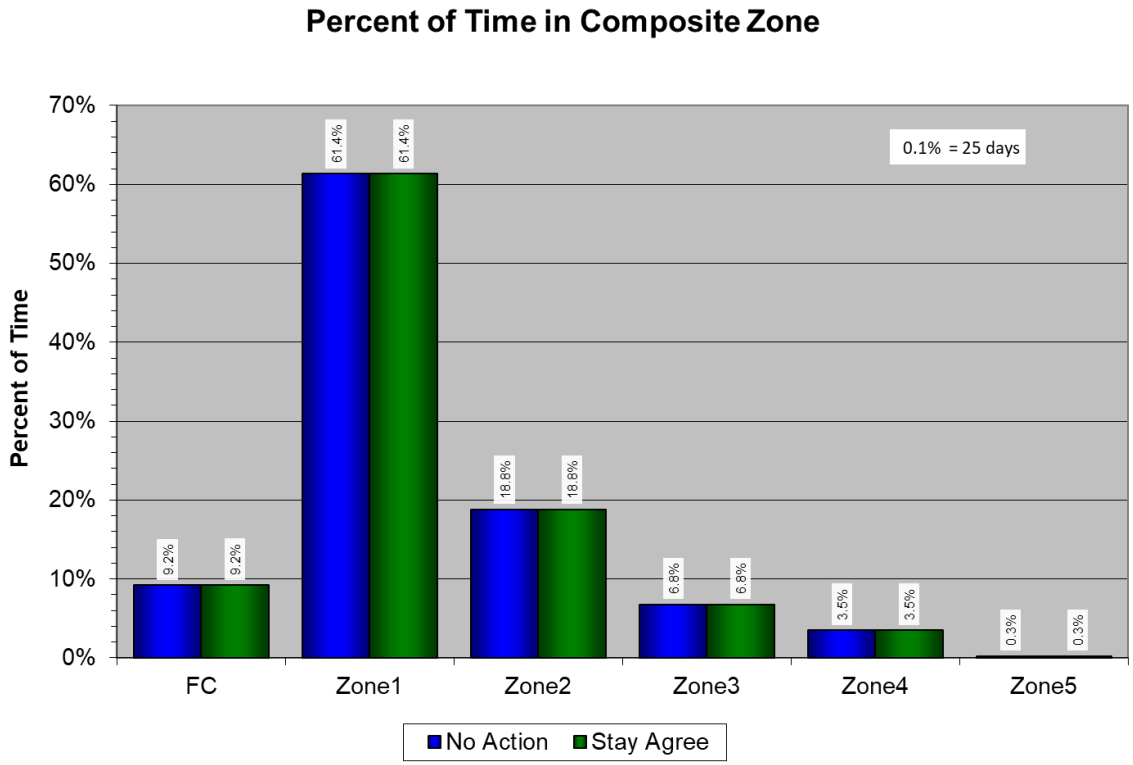
This integrated letter report and tiered environmental assessment (ILR/TEA) evaluates the Stay Agreement Alternative (SAA) against the No Action Alternative (NAA), i.e. current operations as recommended and approved action alternative in the 2016 EIS and approved in the subsequent Record of Decision signed by the acting Assistant Secretary of the Army for Civil Works dated March 30, 2017 (2017 ROD). The ACF River Basin comprises approximately 19,600 square miles in Georgia, Alabama, and Florida and consists of the following five reservoir projects operated and managed by USACE as a system:

- Buford Dam and Lake Lanier
- West Point Dam and Lake
- Walter F. George Lock and Dam and Lake Eufaula
- George W. Andrews Lock and Dam and Lake George W. Andrews
- Jim Woodruff Lock and Dam and Lake Seminole.

HEC-ResSim modeling was conducted to compare operation of the ACF system under the SAA and NAA over a 73-year period of record. The HEC-ResSim results are analyzed and summarized in two ways: Comparison of Alternatives by (1) Composite Zones (by Authorized Purposes) and (2) Flow Objective.

Comparison of Alternatives by Composite Zones (by Authorized Purposes)

The projects on the ACF River Basin were constructed and are operated as a system to meet authorized purposes. Investigating changes to authorized project purposes between the SAA and NAA forms the basis for plan comparison in accordance with the Planning Policy for Conducting Civil Works Planning Studies (ER 1105-2-103). It states that the impacts of a formulated alternative on other project purposes must be calculated (Section 9-3). The SAA is expected to operate in Zone 1, where all project purposes are met, and other zones for the same percentage of time as in the NAA.



Comparison of Alternatives by Flow Objective

HEC-ResSim modeling shows a *de minimis* change from the NAA to the SAA when all four objectives are run simultaneously as a complete package. The percent of time each rule is activated under the SAA is listed below:

- Flow Objective 1 results in a delta of 0.030%,
- Flow Objective 2 results in a delta of 0.038%,
- Flow Objective 3 results in a delta of 0.019% for the 1,350 cfs flow target and 0.026% for the 2,000 cfs flow target, and
- Flow Objective 4 results in a delta of 0.000%.

The analyses presented throughout the ILR/TEA determine that there is *de minimis* difference on environmental, engineering, operational, and economic considerations between the NAA and SAA. The analyses conclude that the implementation of the SAA would meet the authorized purposes in the same manner as the NAA. In order to implement the SAA, the 2017 WCM for each project will be updated to reflect the operational targets outlined in the Stay Agreement.

Summary of Environmental & Project Purposes Affects

The analysis assessed both impacts to project purposes and environmental resources. The impacts of the SAA compared to the NAA are summarized in Table ES-1.

Table ES-1: Summary of Impacts

Resource/Project Purpose	Effects
Navigation	De minimis effects
Recreation	De minimis effects
Water Supply Storage	De minimis effects
Flood Risk Management	De minimis effects
Hydropower Generation	De minimis effects
Water Quantity	No significant impacts
Water Quality	No adverse impacts
Climate Change	No effect
Greenhouse Gases	No effect
Federally Protected Species	No effect
Air Quality	No significant impacts
Population and Income	No significant impacts
Cultural Resources	No significant impacts

Summary of Public and Agency Comment

During the public and agency comment period, which ran from 18 October to 19 November 2024, a total of 11 commentor provided input on the documentation. Those comments requested clarification on climate change, clarification on the stay agreement alternative analysis and results, providing minor editorial changes, and voicing support for the recommendation within the ILR/TEA. All comments were addressed and no significant changes to the report or additional analysis were required.

1.0 Introduction

This Integrated Letter Report and Tiered Environmental Assessment (ILR/TEA) (unique identification number: EAXX-202-00-K5P-1727867613) evaluates the operational changes on the Apalachicola, Chattahoochee, and Flint (ACF) River Basin and facilitates proposed updates of the Water Control Plans within the Master Water Control Manual for the ACF River Basin, Alabama, Florida, and Georgia. In accordance with 40 (Code of Federal Regulations) C.F.R. § 1501.11(b), the U.S. Army Corps of Engineers, Mobile District (USACE) is tiering the ILR/TEA off of the *Final 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*, dated December 2016 (2016 EIS), which can be found at https://www.sam.usace.army.mil/Missions/Planning-Environmental/ACF-Master-Water-Control-Manual-Update/ACF-Document-Library/ under "ACF Final Environmental Impact Statement – Vol. 1" link. This effort comes in response to settlement negotiations in the pending appeal challenging USACE's operations of the ACF River Basin as evaluated by the 2016 EIS and approved in the subsequent Record of Decision signed by the acting Assistant Secretary of the Army for Civil Works dated March 30, 2017 (2017 ROD). The parties to that suit, the State of Alabama; the Federal Defendants; the Atlanta Regional Commission, City of Atlanta, Georgia, Cobb County-Marietta Water Authority, DeKalb County, Forsyth County, Fulton County, City of Gainesville, Georgia, and Gwinnett County; and the State of Georgia entered into an agreement to stay the appeal captioned *State of Alabama et al. v. U.S. Army Corps of Engineers, et al.*, Nos. 21-13104 and 21-13444 (11th Cir.) (Stay Agreement) (Appendix A) pending review of the proposed flow objective alternatives for the ACF River System described therein. This ILR/TEA documents the agency decision making process and serves as compliance with the National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. § 4321 *et seq*, the Council on Environmental Quality's (CEQ's) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, Title 40 of the C.F.R. § 1500–1508 as amended; and Engineer Regulation (ER) 200-2-2, Environmental Quality—Procedures for Implementing NEPA (also published as 33 C.F.R. § 230).

1.1 Location and Background

The ACF River Basin comprises 19,573 square miles in Alabama, Florida, and Georgia (**Figure 1**). USACE operates five reservoir projects in the ACF River Basin:

- Buford Dam and Lake Lanier
- West Point Dam and Lake
- Walter F. George Lock and Dam and Lake
- George W. Andrews Lock and Dam and Lake George W. Andrews
- Jim Woodruff Lock and Dam and Lake Seminole

USACE operates and manages those projects as a system to meet their authorized purposes, which include flood risk management, hydropower, navigation, fish and wildlife conservation, recreation, water quality, and water supply.

Each USACE Dam has a unique design and operates using hydraulic, mechanical, and electrical power to generate electricity:

- Buford Dam is 50 miles northeast of central Atlanta, Georgia, on the Chattahoochee River at river mile 348.3 (above mouth of Chattahoochee River). The project consists of a rolled earth fill dam 1,630 feet long that rises approximately 192 feet above the streambed. Power installation consists of two, 60-megawatt (MW) generators and a 7-MW service unit. Buford Dam is further described in Appendix B to the Master Water Control Manual.

- West Point Dam is located on the Chattahoochee River at river mile 201.4 (above mouth of Chattahoochee River), approximately three miles north of West Point, Georgia, 147 river miles below Buford Dam, and 126 miles above Walter F. George Lock and Dam. The project consists of a gravity type concrete dam 896 feet long with earth embankments at either end. The embankment on the east end is 1,111 feet long, and the west embankment is 5,243 feet long. Power installation

consists of two, 42-MW generators and a 3-MW service unit. West Point Dam is further described in Appendix E to the Master Water Control Manual.

- Walter F. George Lock and Dam is on the Chattahoochee River at river mile 75.0 (above mouth of Chattahoochee River), approximately one mile north of Fort Gaines, Georgia, and approximately 1.6 miles upstream from the Georgia State Highway 37 Bridge. The dam crosses the Alabama-Georgia state line with the earth dike on the west bank entirely in Henry County, Alabama. The earth dike on the east is entirely in Clay County, Georgia. The project consists of a concrete dam, gated spillway, and a single-lift lock. Earth dikes extend approximately 6,000 feet from each end. Power installation consists of four, 42-MW generators. Walter F. George Lock and Dam is further described in Appendix C to the Master Water Control Manual.

- George W. Andrews Lock and Dam is located on the Chattahoochee River and sits on the Alabama-Georgia state line. The west abutment of the Andrews Lock and Dam is in Houston County, Alabama, and the east abutment is in Early County, Georgia, on the Chattahoochee River at river mile 46.5 (above mouth of Chattahoochee River), two miles south of Columbia, Alabama, and about 17 miles east of Dothan, Alabama. The project consists of a concrete fixed-crest spillway 340 feet long extending into the right bank with a crest elevation of 102.0 feet NGVD29, a concrete gated spillway and a single-lift lock. George W. Andrews Lock and Dam is further described in Appendix D to the Master Water Control Manual.

- Jim Woodruff Lock and Dam is about 1,000 feet downstream from the point where the Chattahoochee and Flint Rivers meet to form the Apalachicola River. The dam crosses the Georgia-Florida state line on the left bank. About 1,500 feet of the overflow dike is in Decatur County, Georgia. The remainder of the structure is in Gadsden County, Florida, on the left bank and Jackson County, Florida, on the right bank. The project consists of a concrete open-crested spillway 1,634 feet long, a single-lift lock, a gated spillway 766 feet long, a powerhouse, an overflow dike 2,130 feet long extending from the left abutment to a 690 feet long transition section which connects the dike with the switchyard and parking area at elevation 107.0 feet NGVD29. Power installation consists of three 14.45-MW generators. Jim Woodruff Lock and Dam is further described in Appendix A to the Master Water Control Manual.

1.2 Authority

Federal legislation authorizing project purposes in the ACF River Basin was originally enacted in the 1800s with navigational improvements authorized under the River and Harbors Act (RHA) of 1874. Section 2 of the RHA of 1945 (Public Law [P.L.] 79-14) approved the plan for developing flood control, hydroelectric power generation, water supply, and navigation on the ACF River Basin in Florida and Georgia. Those purposes are often referred to as “expressly authorized project purposes.” A modification to the 1945 general plan was authorized by Section 1 of the RHA of 1946 (P.L. 79-525) to include Buford multipurpose reservoir (Lake Lanier), the Fort Benning Lock and Dam, and the Upper Columbia and Jim Woodruff multipurpose developments. The project’s navigation feature was to be provided by dredging, channel contraction works, construction of a series of locks and dams, and flow regulation by the upstream reservoirs. The 1946 amendment provided that, in the Apalachicola River portion of the project, “…local interests furnish free of cost to the U.S., as and when required, all rights-of-way, spoil-disposal areas, easements and other lands required for the provision and maintenance of a navigation channel in the Apalachicola River…”. Water Supply has also been recognized as an originally authorized project purpose for Buford Dam. *See In re MDL-1824 Tri-State Water Rights Litig.*, 644 F.3d 1160, 1188–89 (11th Cir. 2011).

Other operational objectives derive from authorities that generally apply to all USACE reservoirs such as fish and wildlife conservation (Fish and Wildlife Coordination Act [FWCA] of 1958 [P.L. 85-624] and Endangered Species Act [ESA] of 1973 [P.L. 93-205]), recreation (Flood Control Act of 1944 [P.L. 78-534]), water quality (Water Pollution Control Act Amendments of 1972 [P.L. 92-500]), and water supply (Water Supply Act [WSA] of 1958 [P.L. 85-500]). Thus, USACE operates and manages the ACF River Basin projects as one system to meet the following authorized purposes: flood risk management, hydropower, navigation, fish and wildlife conservation, recreation, water quality, and water supply.

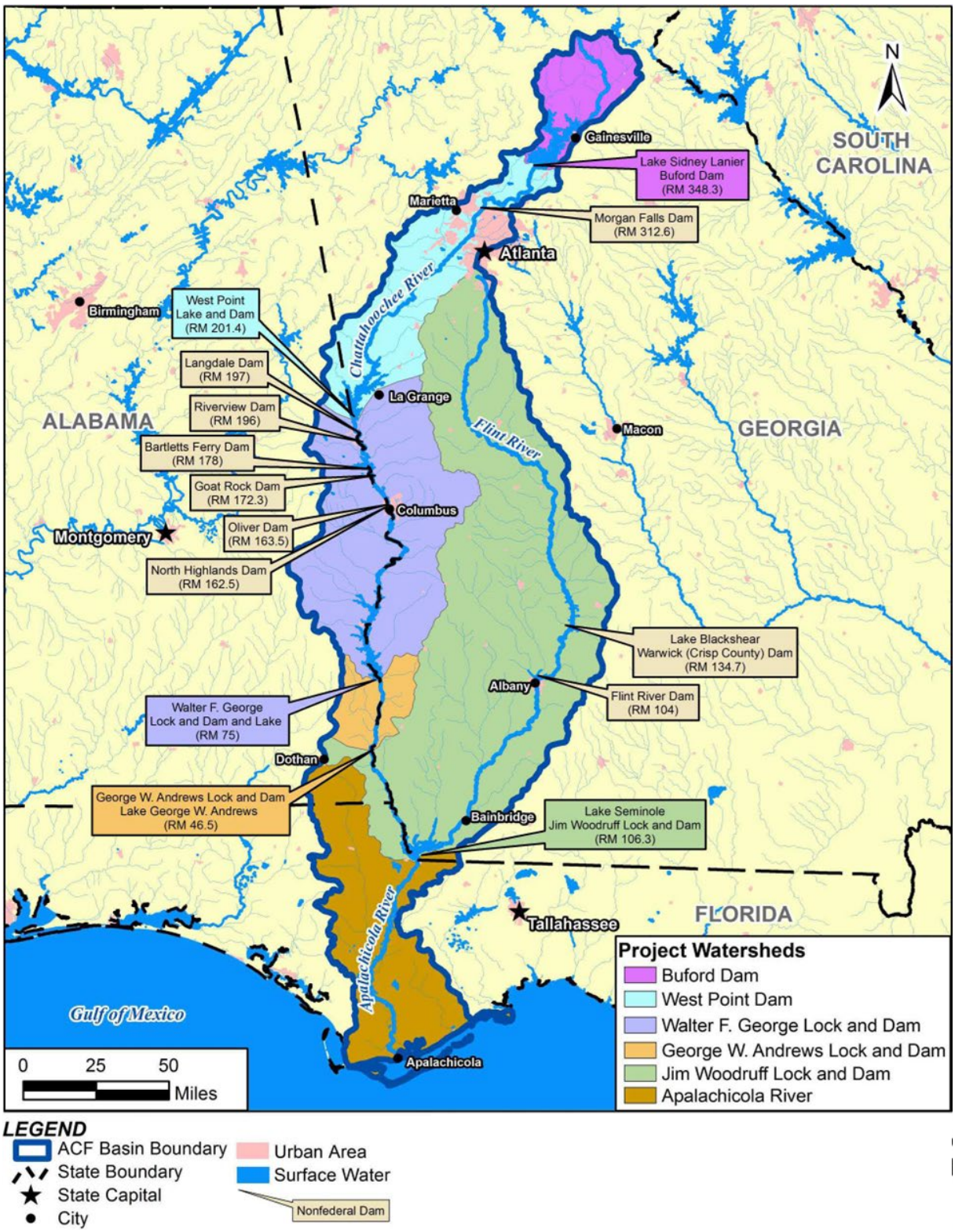


Figure 1: Apalachicola, Chattahoochee, and Flint Rivers Basin Map

1.3 Purpose and Need

The purpose of this ILR/TEA is to assess the environmental impacts of the Flow Objectives stated in the Stay Agreement (described in **Section 3.2.2**) and to evaluate whether or not they can be implemented by USACE consistently with the authorized purposes of the ACF system.

1.4 Scope

The scope of this action is dictated by the Stay Agreement. The evaluation in this operational analysis focuses on two alternatives. As previously stated, there are four flow objectives developed during mediation between the state of Alabama and USACE. These flow objectives combine to form the first alternative referred to as the Stay Agreement Alternative (SAA), or Proposed Action. The SAA also includes updating Chapters 3, 7, and 8 of the Water Control Plans for the Master, West Point, Walter F. George, and George W. Andrews, as well as the Drought Contingency Plan if the Proposed Action is selected. The second alternative is the No Action Alternative (NAA) which consists of current operations consistent with the recommended action alternative in the 2016 EIS and adopted by the 2017 ROD.

The period of analysis in this effort is the period of hydrologic record (POR) in the Hydrologic Engineering Center-Reservoir System Simulation (HEC-ReSSim) of 73 years. The decision making framework focuses the evaluation on any impacts to the authorized purposes along the ACF River Basin.

2.0 Affected Environment

No appreciable changes to the affected environment have occurred since the 2016 EIS with the exception of water quality, federally listed threatened and endangered species, flood risk management, recreation, population, income, employment, children demographics, and air quality. Recent Executive Orders (EOs) pertaining to greenhouse gas (GHG) and environmental justice considerations were issued after the 2016 EIS and are listed in **Sections 2.3** and **2.6.8**, therefore this ILR/TEA will characterize these settings in accordance with those EOs. All other resources in the 2016 EIS are incorporated by reference and/or briefly summarized herein.

2.1 Water Resources

2.1.1 Water Quantity Affected Environment

Water quantity for the ACF River Basin is driven by various factors such as precipitation, runoff, land use, geology, and man-made structures which is transported through rivers and tributaries, some of which is stored in reservoirs. Factors such as runoff, geology, and land use remain largely unchanged since the 2016 EIS and contribute to water quantity in the same way as described in that 2016 EIS Sections 2.1.1.1.2 through 2.1.1.1.4. No significant changes to the Chattahoochee, Flint, and Apalachicola Rivers have occurred since the 2016 EIS that would influence their relationship with water quantity. For more information about their characteristics see Section 2.1.1.1.5 of the 2016 EIS. Reservoirs within the system are listed here for reference; however, see Section 2.1.1.1.6 of the 2016 EIS and its subsections for more information on each impoundment.

1. Lake Lanier and Buford Dam
2. Bull Sluice Lake and Morgan Falls Dam
3. West Point Dam and Lake
4. Nonfederal Dams between West Point Dam (RM 201) and Water F. George Lake Headwaters (River Mile (RM) 160)
5. Walter F. George Lock and Dam and Lake
6. George W. Andrews Lock and Dam and Lake George W. Andrews
7. Lake Seminole and Jim Woodruff Lock and Dam
8. Lake Blackshear and Warwick Dam
9. Lake Worth and Flint River Dam
10. Other Reservoirs in the ACF River Basin

No additional man-made impoundment structures have been constructed since the 2016 EIS.

For more information related to hydrologic characteristics of the ACF River Basin, see Section 2.1.1.1 of the 2016 EIS and its subsections.

The system is managed pursuant to the USACE ACF Water Control Plans which were developed to meet USACE's authorized purposes balanced with water withdrawals and consumptive use. The authorized purposes include flood risk management, hydroelectric power generation, navigation, fish and wildlife conservation, recreation, water supply, and water quality. For information related to water management and use in the ACF River Basin see Section 2.1.1.2 of the 2016 EIS and its subsections.

Management for the ACF River Basin is conducted using several sources of water quantity data through monitoring stations installed by federal and state entities such as United States Geological Survey, National Oceanic and Atmospheric Administration, USACE, Georgia Environmental Protection Division (GAEPD), and Florida Department of Environmental Protection. For information related to monitoring water quantity for management see Section 2.1.1.3 of the 2016 EIS.

2.1.2 Water Quality Affected Environment

Water quality standards are determined by each State (Georgia, Alabama, and Florida) and are monitored routinely. A list of impaired waterbodies is provided every two years and updates for listed segments are discussed in **Sections 2.1.2.1** through **2.1.2.5**. All testing points of each reservoir fall within GAEPD jurisdiction. Since the 2016 EIS, GAEPD updated their water quality standards for more stringent bacteria testing requirements. The updated criteria referenced in the "Water Quality in Georgia 2024 Integrated 305b/303d Report" (approved by U.S. Environmental Protection Agency (USEPA) on September 3, 2024) are shown in **Table 1**.

Table 1: Georgia Designated Uses and Instream Water Quality Standards

Parameter	Specific Water Quality Criteria Defined in Rules and Regulations of Georgia | 391-3-6-.03(6)	Designated Uses[1]						
		Drinking Water	Recreation	Fishing	Wild River	Scenic River	Coastal Fishing	Specified Lakes[4]
DO	There shall be no alteration of natural water quality from any source				X	X		
	Trout Streams[2]| Daily Avg of 6.0 mg/L, Not < 5.0 mg/L	X	X	X				
	Warm Water Species| Daily Avg of 5.0 mg/L, Not < 4.0 mg/L	X	X	X				X
	Daily Avg of 5.0 mg/L, Not < 4.0 mg/L. If natural DO is less than these values, then 0.1 mg/L deficit from natural condition is allowable.						X	
pH	There shall be no alteration of natural water quality from any source				X	X		
	6.0-8.5	X	X	X			X	
	6.0-9.5							X
Temperature	There shall be no alteration of natural water quality from any source				X	X		
	Not to exceed 90°F	X	X	X			X	X
	Primary Trout Streams| No increase >0°F	X	X	X				
	Secondary Trout Streams| No increase >2°F	X	X	X				
	Warm Water Species - Freshwater| No increase >5°F above intake temp	X	X	X				X
	Warm Water Species - Estuarine| No increase >1.5°F above intake temp		X	X			X	
Bacteria	There shall be no alteration of natural water quality from any source				X	X		
	Freshwater: Geometric mean | ≥ 4 samples in 30 days | 126 counts/100 mL of *E. coli* STV | ≤10% excursion in 30-day period | 410 counts/100mL of *E. coli*		X					X

Parameter			Specific Water Quality Criteria Defined in Rules and Regulations of Georgia | 391-3-6-.03(6)	Designated Uses[1]						
				Drinking Water	Recreation	Fishing	Wild River	Scenic River	Coastal Fishing	Specified Lakes[4]
			Estuarine: Geometric mean | ≥ 4 samples in 30 days | 35 counts/100 mL of enterococci STV | ≤10% excursion in 30-day period | 130 counts/100mL of enterococci		X					
Freshwater	May - Oct.		Geometric mean | ≥ 4 samples in 30 days | 126 counts/100 mL of *E. coli* STV | ≤10% excursion in 30-day period | 410 counts/100mL of *E. coli*	X		X				
Freshwater	Nov. - April		Geometric mean | ≥ 4 samples in 30 days | 265 counts/100 mL of *E. coli* STV | ≤10% excursion in 30-day period | 861 counts/100mL of *E. coli*	X		X				
Estuarine	May - Oct.		Geometric mean | ≥ 4 samples in 30 days | 35 counts/100 mL of enterococci STV | ≤10% excursion in 30-day period | 130 counts/100mL of enterococci			X			X	
Estuarine	Nov. - April		Geometric mean | ≥ 4 samples in 30 days | 74 counts/100 mL of enterococci STV | ≤10% excursion in 30-day period | 273 counts/100mL of enterococci			X			X	
Estuarine			Waters designated as shellfish growing areas[3] by the Georgia DNR Coastal Resources Division | Criteria set in F.D.A. National Shellfish Sanitation Program Guide | geometric mean of 14 counts/100mL of Fecal coliform.			X			X	

1 Designated Uses for all of Georgia's waters are assigned in GA Rule 391-3-6-.03, paragraph 14.

2 Trout streams are assigned in GA Rule 391-3-6-.03, paragraph 15.

3 Waters generally supporting shellfish are assigned in GA Rule 391-3-6-.03, paragraph 16.

4 Specific Criteria for Lakes and Major Lake Tributaries, including Chlorophyll A, Total Nitrogen, and Total Phosphorus, can be found in GA Rule 391-3-6-.03, paragraph 17.

See Section 2.1.2 and its subsections of the 2016 EIS for more information related to historic water quality, additional reservoir water quality, minimum flow requirements, water quality monitoring, point sources, and nonpoint sources.

2.1.2.1 Lake Lanier Water Quality

Four of the five reaches in Lake Lanier are listed as not supporting their uses for drinking water, recreation, and fishing due to Chlorophyll a and fish tissue (polychlorinated biphenyls (PCBs): Browns Bridge Road (SR 369), Lanier Bridge Road (SR53), Flower Branch, Dam Pool, and Bolling Bridge. Total Maximum Daily Loads (TMDLs) were completed in 2018 for Chlorophyll a. These reaches are in categories 4a and 5. The Little River Branch reach is not supporting its fishing use due to fish tissue and is in category 5.

Category 4a means "Data indicate that at least one designated use is not being met, but TMDL(s) have been completed for the parameter(s) that are causing a water not to meet its use(s)."

Category 5 means "Data indicate that at least one designated use is not being met and TMDL(s) need to be completed for one or more pollutants."

Lake Lanier is considered a priority water according to the 2024 GAEPD integrated 305(b)/303(d) Report. It states:

Lake Lanier is composed of five segments. Only one of these segments (Lanier Lake – Browns Bridge Road (SR 369)) was on the 2012 303(d) list for chlorophyll a. However, the other four segments were added to the priority list and a TMDL for chlorophyll a was written for the entire lake. USEPA approved the Lake Lanier TMDL in 2017. The TMDL addressed nutrients, which are a National priority.

2.1.2.2 West Point Lake Water Quality

One reach is listed as not supporting its designated uses for drinking water, recreation, and fishing due to Total Phosphorus and Fish Tissue (PCBs): "West Point Lake". A TMDL was completed for Fish Tissue (PCBs) in 1998. The water is in Category 3 for fish tissue (Mercury) because the trophic weighted residue concentration is between 0.25-0.30 mg/kg.

Category 3 means, "There were insufficient data or other information to make a determination as to whether or not the designated use(s) is being met."

2.1.2.3 Walter F. George Lake Water Quality

Two reaches are listed as not supporting their designated uses for recreation and fishing due to Chlorophyll a: mid-lake (U.S. Highway 82) to Dam Forebay, and Dam Pool. TMDLs completed Fish Tissue (PCBs) in 1998. The reaches are in Category 5.

2.1.2.4 Lake George W. Andrews Water Quality

One reach is listed as not supporting the fishing use due to dissolved oxygen: two miles downstream Lake W.F. George Dam to Lake Andrews Dam. The water is in Category 5.

2.1.2.5 Lake Seminole Water Quality

Two reaches are listed for not supporting their designated fishing use due to pH: East of confluence with Fish Pond Drain, and West of confluence with Fish Pond Drain. TMDLs were completed for chlordane and fish tissue (PCBs) in 1998. The waters are supporting their recreation use, but not their fish use, and are in Category 5.

2.2 Geology and Soils

No appreciable changes to the affected resource. As stated in the 2016 EIS,

> "The ACF Basin is divided into four level III *ecoregions*, or areas with similar physical, chemical, and biological environmental attributes that are identifiable at a local scale such that specific environmental management strategies can be formulated…The four ecoregions in the ACF Basin are the Blue Ridge, Piedmont, Southeastern Plains, and Southern Coastal Plain…
>
> "…[t]he Blue Ridge ecoregion is limited to the northernmost portion of the basin and composes only about 1 percent of its area…The ecoregion is characterized by mountain ridges that range in altitude from 3,000 ft and to 3,500 ft (Chapman and Peck 1997a; USGS 1996). Relative to other ecoregions in the ACF River Basin, the soils are shallow and poorly developed…
>
> "The Piedmont ecoregion, also in the northern portion of the basin, is directly south of the Blue Ridge." "The Piedmont has a lower relief than the Blue Ridge and is dominated by highly dissected, rolling hills." "Both the Blue Ridge and Piedmont ecoregions are underlain by Precambrian and Paleozoic crystalline rocks, which include mica schist, felsic gneiss and schist, and granite and granite gneiss…
>
> "The northern boundary of the Southeastern Plain is marked by the Fall Line, which generally follows the contact between the crystalline rocks of the Piedmont and the unconsolidated sediments of the Southeastern Plains. The geology consists of the surficial sediments, which are predominantly sands of the Pliocene, Cretaceous, and Tertiary ages…

> "The Southern Coastal Plains are sandy and flat, and they slope toward the sea. The area was shaped mostly by wave and current activity during the Pleistocene era (Arthur and Rupert 1989). The land surface is characterized by ancient marine bars, spits and sand-dunes, and marine terraces. Soils in the area are generally hydric and have a high capacity to hold and store water…
>
> "The Piedmont ecoregion is dominated by ultisols, which generally lack the original topsoil due to erosion during intensive cotton farming beginning in the 18th century (USGS 1996). The soils of the Coastal Plain ecoregion are formed from marine sediments eroded from the Appalachian range and Piedmont. These soils are primarily ultisols with the exception of entisols immediately south of the Fall Line and along the lower Flint River Basin. The soils of the ACF Basin in the Southern Coastal Plain are dominated by ultisols to the west of the Apalachicola, spodosols to the east, and entisols near the coast (Collins 2009)."

Refer to Section 2.2 of the EIS and its subsections for more detail.

2.3 Climate

No appreciable change has occurred to the historical and current climate-related conditions as described in Section 2.3 of the 2016 EIS; therefore, this section will summarize those conditions for easy reference. For information related to the climate change analysis performed for this ILR/TEA, see **Section 5.3**.

As stated in Section 2.3.1 of the 2016 EIS,

> The climate of Alabama, North Florida, and Georgia, including all areas associated with the ACF Basin, is classified as humid subtropical and characterized by hot, humid summers and cool winters. Significant amounts of precipitation occur in all seasons in most areas. Winter rainfall (and sometimes snowfall) is associated with large storms steering from west to east. Most summer rainfall occurs during thunderstorms or an occasional tropical storm, hurricane, or tropical cyclone (Peet et al. 2007).

See Section 2.3.1 of the 2016 EIS for more information regarding existing climate within Alabama, Florida, and Georgia.

Since the 2016 EIS, new guidance was published to provide clarity on greenhouse gas (GHG) considerations in NEPA analysis:

- Council on Environmental Quality's (CEQ) Interim NEPA Guidance on Consideration of Greenhouse Gas Emissions and Climate Change;
- Executive Order (EO) 14057: Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability;
- EO 14072: Strengthening the Nation's Forests, Communities, and Local Economies;
- EO 14008: Tackling the Climate Crisis at Home and Abroad;
- EO 13990: Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis; and
- Interagency Working Group on Social Cost of Greenhouse Gas (SCGHG) Memorandum on Social Cost of Greenhouse Gas.

As stated in Section 2.3.2 of the 2016 EIS,

> According to the Kyoto Protocol and California Climate Action Registry, there are six GHGs: carbon dioxide (CO2), nitrous oxide (N2O), methane (CH4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6) (UNFCCC 2007; CARB 2007).
>
> Although the direct GHGs (i.e., CO2, CH4, and N2O) occur naturally in the atmosphere, human activities have increased their atmospheric concentrations. From the preindustrial era (ending about 1750) to 2004, concentrations of CO2 increased globally

> by 35 percent. Since 1900, the Earth's average surface air temperature has increased by about 1.2–1.4 ºF. The warmest global average temperatures on record have all occurred within the past 10 years. The warmest year was 2005 (USEPA 2007b).
>
> Within the U. S., fossil fuel combustion accounted for 94 percent of all CO2 emissions released in 2005. On a global scale, fossil fuel combustion added approximately 30 x109 tons (27 x109 metric tons) of CO2 to the atmosphere in 2004, of which the U.S. accounted for about 22 percent (USEPA 2007a). DOE's Energy Information Administration report indicates that CO2 emissions in the United States have grown by an average of 1.2 percent annually since 1990 and that energy-related CO2 emissions constitute as much as 83 percent of the total annual CO2 emissions (DOE EIA 2007).

See Section 2.3.2 of the 2016 EIS for historical background on GHG within the ACF River Basin.

2.4 Land Use

Though factors such as population and recreation have changed since the 2016 EIS, land use trends remain consistent with previous evaluations. No appreciable changes, such as large-scale conversions spanning multiple counties, to land use have occurred since the 2016 EIS. As stated in Section 2.4 of the 2016 EIS, "The major land cover uses are categorized as beaches/dunes/mud, water, developed, barren land, forested land, golf courses, pasture and row crops (i.e., agricultural), and wetlands." Refer to Section 2.4 of the 2016 EIS and its subsections for more detail.

2.5 Biological Resources

No appreciable changes to the affected resources have occurred since the 2016 EIS apart from federally protected species. All other subsections will briefly summarize information included in the 2016 EIS.

2.5.1 Vegetation

As stated in Section 2.5.1 of the 2016 EIS,

> "The ACF Basin contains a variety of native terrestrial vegetative communities, from the Appalachian oak forest in the Blue Ridge ecoregion to the oak-hickory and oak-hickory-pine forests of the Piedmont and the bottomland hardwood swamp along the Apalachicola River in Florida (Jordan, Jones, & Goulding, Inc. 2000; Martin et al. 1993). In addition, areas modified for agriculture, forestry, and development contain their own distinct vegetative assemblages."

Dominant terrestrial communities along the rivers include Appalachian Oak Forests, Oak-Hickory-Pine Forests, Rock Outcrop Communities, Grass-Dominated Communities, Longleaf Pine-Turkey Oak Sand Hill Community, Maritime Shrub Community, and Ruderal Communities. Refer to Section 2.5.1 of the 2016 EIS and its subsections for more detail.

As stated in Section 2.5.1.2 of the 2016 EIS,

> "Estimates of the wetland acreage in the ACF Basin as a whole vary because of differences in the methods used to classify and inventory wetlands.". . . "Because of hilly topography, wetlands in the Blue Ridge and Piedmont ecoregions are small and scattered. Most wetlands of significant size are in the Coastal Plain ecoregion, and most of the wetland area in the ACF Basin is represented by forested palustrine wetlands in the floodplains of rivers."

2.5.2 Wildlife Resources

As stated in the 2016 EIS,

> "As should be apparent, the diversity of potential habitats in the ACF Basin is substantial with elevations ranging 3,000–5,000 ft in the northern Blue Ridge and Piedmont to sea level in the lower Southern Coastal Plains. The substrate of rivers and streams ranges

from cobble, boulder, and bedrock in the north to sand and silt in the south. Along with the diversity of the vegetation communities that the basin supports, it is an appropriate setting for a diverse wildlife assemblage."

Wildlife resources and their assemblage are diverse and dependent on habitat characteristics. These resources include but are not limited to:

Birds:

Table 2: Sampling of birds throughout habitats across the ACF River Basin

Mature Forest	Riparian Hardwood	Forested Wetlands	Aquatic Areas	Bottomland Hardwoods	Coastal
yellow-billed cuckoos (*Coccyzus americanus*)	Mississippi swallow-tailed kite (*Ictinia mississippiensis*)	barred owls (*Strix varia*)	Wood storks (*Mycteria americana*)	Kentucky warbler (*Geothlypis formosa*)	least terns (*Sternula antillarum)*
Acadian flycatchers (*Empidonax virescens*)	American swallow-tailed kite (*Elanoides forficatus*)	red-shouldered hawks (*Buteo lineatus*)	purple gallinules (*Porphyrio martinicus*)	prothonotary warbler (*Protonotaria citrea*)	black skimmers (*Rynchops niger*)
tufted titmice (*Baeolophus bicolor*)	bald eagles (*Haliaeetus leucocephalus*)		moorhens (*Gallinula chloropus*)	Swainson's warbler (*Limnothlypis swainsonii*)	American oystercatchers (*Haematopus palliatus*)
Carolina wrens (*Thryothorus ludovicianus*)	ospreys (*Pandion haliaetus*)			Northern parula warbler (*Setophaga americana)*	
red-eyed vireos (*Vireo olivaceous*)				Hooded warbler (*Setophaga citrina*)	
Northern cardinals (*Cardinalis cardinalis*)					

Mammals:

As stated in Section 2.5.2.1.2 of the 2016 EIS,

"Fifty-nine species of mammals actually or potentially inhabit riparian and/or upland areas in the ACF Basin (USGS 2003) (appendix H, Table H-1). In addition to the larger species, such as black bear (*Ursus americana*), white-tailed deer (*Odocoileus virginianus*), coyote (*Canis latrans*), wild pig (*Sus scrofa*), red fox (*Vulpes vulpes*), and American beaver (*Castor canadensis*), there are several species each of bats, squirrels, shrews and voles, otters, skunks, and mice. The extent to which each of these species uses riparian habitat differs by specific life history traits, especially their requirements for food, cover, protection from natural enemies, and refuge from extreme weather events.

"Habitat features often present in riparian areas— such as ample forage, fruits, seeds, downed logs, debris, and stumps—have been found to be positively correlated to small mammal abundance and diversity, including for mice, rats, voles, and shrews (*Peromyscus* spp., Mus musculus, Microtus spp., *Napaeozapus insignis*, *Scalopus aquaticus*, *Sorex longirostris*, and others). The two species of squirrels, the eastern gray

squirrel (*Sciurus carolinensis*) and the eastern fox squirrel (*S. niger*), have a solid association with riparian woodlands (Dickson and Warren 1993). The tricoloured bat (*Perimyotis subflavus*)…occurs in the ACF Basin (USGS 2003) and has been documented as preferentially roosting in foliage…"

Reptiles:

As stated in Section 2.5.2.1.3 of the 2016 EIS,

> "The diversity of the reptile fauna known, or likely, to occur in the ACF Basin is reflected by 68 species (USGS 2003), including the American alligator (*Alligator mississippiensis*), common and alligator snapping turtles (*Chelydra serpentine* and *Macroclemys temmincki*, respectively), 16 other turtles and tortoises, 38 species of snakes (six of which are venomous), the green anole (*Anolis carolinensis*), six skinks, and four lizards (appendix H, Table H-2)."

Amphibians:

As stated in Section 2.5.2.1.4 of the 2016 EIS,

> "Slightly less diverse than reptiles, amphibians are represented by 58 species known, or likely, to occur in the *ACF Basin* (USGS 2003). Salamanders and frogs are the most diverse groups of amphibians in the basin. There are 23 species of salamanders representing eight genera (appendix H, Table H-3). Seven species of *Desmognathus*, five species of *Ambystoma*, and three species of *Eurycea* inhabit the area. These genera include species such as the Apalachicola dusky (*Desmognathus apalachicolae*), Ocoee (*D. ocoee*), blackbelly (*D. quadramaculatus*), flatwoods (*Ambystoma cingulatum*), marbled (*A. opacum*), tiger (*A. tigrinum*), southern 3-lined (*Eurycea guttolineata*), and dwarf salamanders (*E. quadridigitata)*. The 21 frog species are in the genera *Rana*, *Hyla*, *Pseudacris*, and *Acris*; other than the American bullfrog (*Rana calesbeiana*), this group includes species such as the southern leopard, wood, pickerel, and gopher frogs. There are six tree frogs of the genus *Hyla*—the bird-voiced, Cope's gray, green, pinewoods, barking, and squirrel. The five chorus frogs (*Pseudacris*) are the spring peeper, the little grass, and the upland, southern, and ornate chorus frogs. Other than the salamanders and frogs, there are six toads, three sirens, two newts, the two-toed amphiuma (*Amphiuma means*), the hellbender (*Cryptobranchus alleganiensis*), and the Alabama waterdog (*Necturus alabamensis*)."

Terrestrial Macroinvertebrates:

As stated in Section 2.5.2.1.6 of the 2016 EIS,

> "Nonaquatic insects are hyper-diverse and abundant in the humid, subtropical zone of the southeastern United States, and even more so in riparian areas owing to nutrient-rich soils, substantial vegetative growth and productivity, and complexity of habitat structure."

Refer to Section 2.5.2 of the 2016 EIS and its subsections for more detail.

2.5.3 Fish and Aquatic Resources

Habitat for these resources can be subdivided into rivers, reservoirs, and Apalachicola Bay/Estuary. Refer to Section 2.5.3 of the 2016 EIS and its subsections for more detail.

2.5.3.1 Rivers

As stated in Section 2.5.3.1 of the 2016 EIS

> "Riffle beetles (Elmidae) were represented by the genera *Ancyronyx*, *Optioservus*, *Promoresia*, and *Stenelmis*; and water pennies, by *Psephenus* (Psephenidae). Water

scavenger beetles (Hydrophilidae) were also recorded. Caddisflies (Insecta: Trichoptera), typically recognized as a favorite prey item of insectivorous fish, are represented by eight genera in four families. The web-spinning caddisflies (Hydropsychidae: *Hydropsyche*, *Cheumatopsyche*, *Ceratopsyche*, *Diplectrona*, and *Nectopsyche*) build silken nets on substrate that filter suspended organic particles as foodstuff. The microcaddisflies (Hydroptilidae: *Hydroptila*) build sand cases that are carried around and used for refuge from predators. Another group of aquatic insects heavily fed upon by fish are mayflies (Ephemeroptera), of which there were seven genera in six families. There are several other families of mites, crustaceans, and mollusks (limpets [Ancylidae: *Ferrissia*], fingernail clams [Sphaeriidae], and basket clams [Corbiculidae]). Although appendix H, Table H-4 is not an exhaustive list of benthic macroinvertebrates, it can be considered an example of what is present in the streams and rivers of the ACF Basin."

2.5.3.2 Reservoirs

As stated in Section 2.5.3.2 of the 2016 EIS,

> "Barkuloo et al. (1987) reviewed fishery resources in the ACF Basin, surveying local and regional fisheries to determine critical species, critical habitat-use guilds (e.g., littoral spawning, rearing) and their associated optimal reservoir levels, and to define acceptability levels for a range of water levels departing from the designated optima. Data were compiled for 10 of the 16 facilities; the remaining 6 were omitted because of their small size and limited storage capacity. Table 2.5-2 presents the critical species identified by the survey…"

Critical species identified in Table 2.5-2 of the 2016 EIS include crappie, largemouth bass, spotted bass, striped bass, walleye, white bass, gizzard shad, striped bass-white bass hybrid (hybrid bass), threadfin shad, bluegill, channel catfish, shad, sunfish, and redear sunfish throughout the ACF River Basin.

2.5.3.3 Apalachicola Bay and Estuary

As stated in Section 2.5.3.3 of the 2016 EIS,

> "The Apalachicola Bay estuary is one of the most productive estuaries in the northern hemisphere. It provides 90 percent of Florida's commercial oysters and over 10 percent of the total United States production. It is a major nursery for penaeid shrimp, blue crabs, and many fish species, including striped bass, Gulf sturgeon, grouper, red fish, speckled trout, and flounder. The harvest and sale of shrimp, crab, fish, and oysters is the driving economic force for Franklin County…
>
> "In terms of physical habitat, wetlands compose a major part of the Apalachicola Bay ecosystem…The biological resources of the Apalachicola Bay estuary are abundant and diverse and range from those inhabiting freshwater, nearshore habitats to open-water bay species, and from obligate resident to migratory taxa…
>
> "Fish are abundant and diverse in the Apalachicola Bay estuary (appendix H, Table H-7). There are more than 130 species of fish, including many commercially and recreationally important species, some state and/ or federally listed species, and several introduced or nonindigenous taxa within the boundaries of the bay. The fish species of the Apalachicola Bay include taxa as diverse as the obligate estuarine bay anchovy (*Anchoa mitchill*i) and migratory striped mullet (*Mugil cephalus*), flounder (*Paralichthys lethostigma*), speckled seatrout (*Cynoscion nebulosus*), red drum (*Sciaenops ocellatus*), croaker (*Micropogon undulates*), spot (*Leiostomus xanthurus*), and sand seatrout (*Cynoscion arenarius*), all of which use the estuary as nursery and/or feeding grounds during part of their life cycles. Anadromous taxa, which spend a portion of their lives in the estuary before migrating upstream from the ocean to spawn, include the Gulf sturgeon, striped bass (*Morone saxatilis*), Alabama shad (*Alosa alabamae*), and skipjack herring (*Alosa chrysochloris*). Several species for which the Apalachicola

Bay has essential fish habitat are covered under a fishery management plan, as required by the Magnuson-Stevens Fishery Conservation and Management Act. These species are the red drum (*S. ocellatus*), gray snapper (*Lutjanus griseus*), brown shrimp (*Penaeus aztecus*), white shrimp (*Penaeus setiferus*), pink shrimp (*P. duorarum*), and stone crab (*M. mercenaria).*

"The invertebrate fauna of the Apalachicola Bay estuary are numerous and too diverse to cover adequately in this review (appendix H, Table H-8). Many of these taxa, which play an integral part of the estuarine food web connecting plankton and detritus to higher consumers, rely on the estuary for all or part of their life cycles and may inhabit different parts of the estuary during different stages (appendix H, Table H-8). The invertebrate fauna include crustaceans (e.g., shrimp and crabs), insects, mollusks, annelids, isopods, amphipods, coelenterates, and echinoderms, among others. Many of these species are commercially important, especially the brown, white, and pink shrimp; the blue crab (*Callinectes sapidus*); and the American oyster (*Crassostrea virginica*)."

2.5.4 Protected Species

Pursuant to Section 7(a)(2) of the Endangered Species Act, 16 U.S.C. 1536(a)(2), USACE consulted with U.S. Fish and Wildlife Service (USFWS) regarding "federally protected species of the ACF Basin that would reasonably be expected to be affected by changes in water management" as explained in Section 2.5.4 of the 2016 EIS. Though federally listed species occur throughout the ACF River Basin, suitable habitat for ESA listed species in the Chattahoochee River segment is limited to tributaries and the USACE does not regulate the Flint River; therefore, consultation is focused on ESA listed species within the Apalachicola and Chipola Rivers and the USFWS Panama City Field Office assumes the lead for consultations related to ACF WCM updates.

Since the 2016 EIS, the USACE has been conducting Incidental Take Monitoring for Gulf sturgeon, fat threeridge, purple bankclimber, and Chipola slabshell in compliance with the 2016 Biological Opinion (BO). The USACE reconsulted when an individual oval pigtoe was discovered and received an amendment to the 2016 BO via letter dated June 25, 2018. The species was then incorporated into the established Incidental Take Monitoring Plan.

2.5.4.1 Protected Fish Species

2.5.4.1.1 Gulf sturgeon

Refer to Section 2.5.4.1.1 of the 2016 EIS for a description and history of the species. Since the 2016 EIS, USFWS and the National Marine Fisheries Service (NMFS) completed an updated 5-Year Review of the species. As stated in the February 2022 5-year review for Gulf Sturgeon (*Acipenser oxyrinchus desotoi*),

"Based on the information in the preceding sections, the Services believe the Gulf Sturgeon continues to meet the definition of a threatened species given the continuation or worsening of threatening factors and: 1) the highly variable abundance estimates limited to riverine populations in the east of the sub-species' range, coupled with the unknown status of smaller western populations; 2) results of population modeling that indicate slight increases in annual mortality would quickly shift trends from increasing to decreasing; 3) the unknown age-structure of all but two populations; 4) their longlived, slow growing and late maturing life history characteristics; 5) unknown population bottlenecks (i.e., limiting factors, for example-poor recruitment to the adult population due to elevated overwinter mortality of juvenile sturgeon); and 6) remaining gaps in the identification of focal habitats (e.g., spawning areas, summer holding areas) in occupied systems that prevent targeted efforts to monitor, protect, or restore these habitats." No change to its classification was recommended; however, USFWS updated its recovery priority number to 9C, which "pertains to a subspecies that has a moderate degree of threat and high recovery potential that may be in conflict with construction, development projects, or other economic activity." (USFWS 2022)

No updates to their critical habitat, including Primary Constituent Elements, have occurred.

2.5.4.2 Protected Mussel Species

2.5.4.2.1 Fat Threeridge

Since the 2016 EIS, extensive surveys have been conducted to evaluate fat threeridge habitat, distribution, and abundance. Kaeser et. al. published "Mapping and Modeling the Distribution, Abundance, and Habitat Associations of the Endangered Fat Threeridge in the Apalachicola River System" in the December 2019 Journal of Fish and Wildlife Management Volume 10 Issue 2, which identifies mesohabitats necessary for fat threeridge habitat suitability. The USFWS is proposing to delist the fat threeridge from the Federal List of Endangered and Threatened Wildlife and is seeking public comments under docket number FWS-R4-ES-2024-0051, which states:

> "Within its range in the ACF River Basin, fat threeridge is found in mainstem habitats in the Flint, Apalachicola, and Chipola rivers; there are no known collections from the Chattahoochee River (Service 2021, p. 26). At the time the fat threeridge was listed in 1998, there were very few existing records of the species, with the most seen at a site being 6 individuals (63 FR 12666). Current estimates in the middle Appalachicola alone are upwards of 7.7 million individuals (Service 2021, p. 47)." 89 Federal Register (FR) 85909, 85912

2.5.4.2.2 Chipola Slabshell

The USFWS is proposing to delist the Chipola slabsell from the Federal List of Endangered and Threatened Wildlife and is seeking public comments under docket number FWS-R4-ES-2024-0051, which states:

> "Currently, the Chipola slabshell is widespread within its range and common at some localities. A lack of consistent survey methods across observers and through time limits the discussion of abundance trends for Chipola slabshell, however historical data indicate approximately 32 records whereas current records (from 2005 onward) indicate approximately 138 (Service 2020, p. 62). The species' distribution is primarily continuous in one river system, including the Chipola River and its tributaries. The species inhabits silty sand substrates of large creeks and the main channel of the Chipola River, in slow to moderate current. Chipola slabshell appears to be more tolerant of soft sediments than other mussel species in the ACF River Basin. It co-occurs with more silt-tolerant species in stream bank habitats with slower currents, thus it has more available habitat than mid-channel-dwelling species (Service 2020, p. 15)." 89 FR 85909, 85912

2.5.4.2.3 Purple Bankclimber

Refer to Section 2.5.4.2.3 for species history and description. Since the 2016 EIS, the USFWS finalized an updated 5-Year Review of the species. In accordance with the May 1, 2020 5-year Review of the purple bankclimber,

> "The Service does not recommend a change to the listing classification or priority ranking of the purple bankclimber. The population recovery criteria have not been met and all threats have not been managed to the extent that the species will remain viable into the foreseeable future. Five populations appear stable with varying numbers of juveniles and/or sub-adults: Apalachicola, Chipola, Middle Flint, Lower Flint, and Lower Ochlockonee. However, evidence of natural recruitment is limited and the species is presumably relying on secondary host fish within most of its range. Despite a large estimated subpopulation in the upper reaches of the Apalachicola River, the species occurs sporadically and in low numbers in the rest of the river and in the Upper Flint and Chipola sub-basins."

No change to the species classification was recommended. (USFWS 2020a) No updates to their critical habitat, including Primary Constituent Elements, have occurred.

2.5.4.2.4 Oval Pigtoe

According to the USFWS,

> "The oval pigtoe is found in the Apalachicola-Chattahoochee-Flint, Ochlockonee, and Suwannee River and Econfina Creek basins. It is a small to medium-sized mussel that can grow to 2.4 inches. The shell is suboviform and compressed with a shiny smooth, yellow to dark brown, and rayless outer layer." (ECOS 2024)

At the time of the 2016 EIS, oval pigtoe (*Pleurobema pyriforme*) was believed to be extirpated in the Apalachicola and Chipola Rivers; however, one live individual was observed within the Chipola cutoff by members of the Florida Fish and Wildlife Conservation Commission. USACE and USFWS reconsulted to evaluate the WCM operations on the species and include Incidental Take Monitoring of the species. No further observations have occurred.

The species status is considered declining; however, according to the May 1, 2020 5-Year Review,

> "The Service does not recommend a change to the listing classification or priority ranking of the oval pigtoe. The population recovery criteria have not been met and all threats have not been managed to the extent that the species will remain viable into the foreseeable future. The Econfina, Lower Chattahoochee (Sawhatchee and Sheffield Mill Creeks), Middle Flint (Chokee Creek), Spring, and Chipola populations (i.e., sub-basins) have remained stable and/or have evidence of recruitment. The remaining sub-basins (e.g., Upper Flint, Kinchafoonee-Muckalee, Ichawaynochaway, Santa Fe, and Lower Suwannee) have minimal numbers of individuals and have no evidence of recruitment. In addition, the oval pigtoe is possibly extirpated from the Upper Ochlockonee sub-basin. Most sub-basins consist of localized, fragmented sites with generally small numbers of individuals. Three of the stable populations are restricted to short stream reaches and remain vulnerable to random natural or human-induced events such as droughts or spills. Overall, the species and its habitat continue to be impacted by excessive sediment, channel instability, reduced water quality, developmental activities, water withdrawal, drought, impoundments, and invasive species. The degree of threat to the persistence of this endangered species remains high, and the potential for recovery remains low. At this time, the oval pigtoe continues to meet the definition of an endangered species under the Act." (USFWS 2020b)

Critical habitat for the species was designated under 72 Fed. Reg. 64286, 64340 (November 15, 2007).

"In accordance with section 3(5)(A)(i) of the Act and the regulations at 50 CFR 424.12, in determining which areas occupied at the time of listing to designate as critical habitat, we consider those physical and biological features that are essential to the conservation of the species, and within areas occupied by the species at the time of listing, that may require special management considerations or protection. The physical and biological features essential to the conservation of the species are the primary constituent elements (PCEs) laid out in an appropriate quantity and spatial arrangement for recovery…

> "Based on our current knowledge of the life history, biology, and ecology of the seven mussels, and the habitat requirements for sustaining their essential life history functions, we have determined that the seven mussels require the PCEs described below.
>
> > "PCE 1. A geomorphically stable stream channel (a channel that maintains its lateral dimensions, longitudinal profile, and spatial pattern over time without a consistent aggrading or degrading bed elevation)…
> >
> > "PCE 2. A predominantly sand, gravel, and/or cobble stream substrate with low to moderate amounts of silt and clay.
> >
> > "PCE 3. Permanently flowing water.

> "PCE 4. Water quality (including temperature, turbidity, dissolved oxygen, and chemical constituents) that meets or exceeds the current aquatic life criteria established under the Clean Water Act (CWA) (33 U.S.C. 1251– 1387).
>
> "PCE 5. Fish hosts (such as largemouth bass, sailfin shiner, brown darter) that support the larval life stages of the seven mussels."

2.5.4.2.5 Southern Elktoe

The USACE is aware that the southern elktoe (*Alasmidonta triangulata*) is proposed for listing under the ESA. Southern elktoe are freshwater mussels endemic to the ACF River Basin. Incidental Take Monitoring conducted in accordance with the 2016 BO for the 2016 EIS resulted in observance of three southern elktoe individuals at one site within the Middle Reach of the Apalachicola River on September 4, 2024.

The USFWS also proposes to list approximately 578 river miles spanning 25 counties across Alabama, Georgia, and Florida as designated critical habitat which are divided into 5 units: Apalachicola River, Chipola River, Lower Flint River Complex, Upper Flint River Complex, and Middle Chattahoochee.

According to 88 Fed. Reg. 40160, 40174 (June 21, 2023), the USFWS "determined that the following physical or biological features are essential to the conservation of southern elktoe:

> (1) Adequate flows, or a hydrologic flow regime (magnitude, timing, frequency, duration, rate of change, and overall seasonality of discharge over time), necessary to maintain benthic habitats where the species is found and to maintain stream connectivity, specifically providing for the exchange of nutrients and sediment for maintenance of the mussel and fish host's habitat and food availability, maintenance of spawning habitat for native fishes that could serve as host fish, and the ability for newly transformed juveniles to settle and become established in their habitats.
>
> (2) Suitable substrates and connected instream habitats, characterized by geomorphically stable stream channels and banks (*i.e.,* channels that maintain lateral dimensions, longitudinal profiles, and sinuosity patterns over time without an aggrading or degrading bed elevation) with habitats that support the southern elktoe (*e.g.,* slightly depositional habitats consisting of mixtures of silty mud, sand, and gravel).
>
> (3) Water and sediment quality necessary to sustain natural physiological processes for normal behavior, growth, and viability of all life stages. Water and sediment quality needs include appropriate thermal and dissolved oxygen regimes (temperature generally not above 90 degrees Fahrenheit (°F) (32 degrees Celsius (°C)) and dissolved oxygen generally greater than 5.0 mg/L) that are also low in ammonia (generally not above 1.5 mg N/L), heavy metals, pharmaceutical concentrations, salinity (generally not above 4 parts per million), total suspended solids, and other pollutants.
>
> (4) The presence and abundance of fish hosts necessary for recruitment of the southern elktoe, specifically species of the sucker family, Catostomidae, including the genera *Moxostoma* (Apalachicola redhorse, greater jumprock, and blacktail redhorse) and *Erimyzon* (creek chubsucker and lake chubsucker)."

2.5.5 Fish and Wildlife Management Facilities Affected Environment

No appreciable management facilities have occurred since the 2016 EIS. Refer to Section 2.5.5 of the 2016 EIS and its subsections for more detail.

2.6 Social and Economic Setting

Though population changes have occurred since the 2016 EIS, the water supply storage reallocation request analyzed in the 2016 EIS anticipated an increased demand over a 30-year period for the Metro-Atlanta Region. This ILR/TEA assumes no appreciable changes to water withdrawals throughout the

remainder of the ACF River Basin. Therefore, see Section 2.6.1 of the 2016 EIS for more detail related to municipal and industrial water demands.

Additionally, this ILR/TEA assumes no appreciable changes have occurred to navigation, power generation, or agricultural water supply since the 2016 EIS; therefore, Sections 2.6.1 through 2.6.4 of the 2016 EIS are valid and incorporated by reference. However, since navigation and power generation also serve as an authorized project purpose, those sections will be summarized herein for easy reference.

2.6.1 Navigation

As stated in the 2016 EIS,

> "The federal navigation project for the ACF Rivers was originally authorized in Section 2 of the RHA of 1945, and it was further modified by the Water Resources Development Act of 1986 (P.L. 99-662). This legislation provides for a 9-ft by 100-ft navigation channel from Apalachicola, Florida, to the Phenix City, Alabama/Columbus, Georgia, area on the Chattahoochee River and to Bainbridge, Georgia, on the Flint River. Channel dimensions are provided by dredging, cutoffs, training works, or other open-river methods; a series of locks and dams; and flow regulation from upstream storage projects…
>
> "…Maintenance of the navigation channel in the Apalachicola River has not been performed since 2001, as discussed in Section 2.1.1.2.4.3 *[of the 2016 EIS]*. Additionally, USACE's infrastructure maintenance needs far exceed its available budget, and navigation funding is primarily distributed based on a river system's commercial traffic. As a river with little-to-no commercial traffic, dredging of the Apalachicola River has not received funding and is not well suited to compete for funding in the future."

For further information regarding the navigational history, Port Facilities, and commercial navigation see Section 2.6.2 of the 2016 EIS.

2.6.2 Power Generation

As stated in Section 2.6.3 of the 2016 EIS,

> "The ACF Basin is heavily developed for hydroelectric power generation. The power resources serve residential, commercial, agricultural, and industrial users. Some of the agricultural and industrial users are dependent on economic power sources for continued operations. Hydroelectric power generation facilities in the basin are operated by private power companies, municipalities, and USACE. The water withdrawals for thermoelectric power generation are presented in Section 2.1.1.2.5 *[of the 2016 EIS]*. GPC is the primary private operator in the ACF Basin…
>
> "The ACF Basin lies within the Southern subregion of the SERC Reliability Corporation (SERC) and the larger North American Electric Reliability Council…
>
> "Renewable power generation, which includes conventional hydroelectric, geothermal, wood, wood waste, municipal waste, landfill gas, other biomass, solar, and wind power, accounted for about 5 percent of generation in 2015…
>
> "USACE operates four dams with hydroelectric power capabilities in the ACF Basin: Buford Dam, West Point Dam, Walter F. George Lock and Dam, and Jim Woodruff Lock and Dam. The Buford, West Point, and Walter F. George projects are operated as peaking plants with an installed capacity of 382 MW, while Jim Woodruff Lock and Dam, near the confluence of the Chattahoochee and Flint rivers, is operated as a run-of-river plant with limited hydropower peaking operation and an installed capacity of 43.35 MW."

For more information regarding energy production and see Section 2.6.3 of the 2016 EIS.

2.6.3 Flood Risk Management

As stated in Section 2.6.5 of the 2016 EIS,

> "Flood risk management has long been an important focus of USACE and the reservoirs it operates. Within the ACF Basin, Lake Lanier and West Point Lake provide important flood risk management storage with spillway capacities sufficient to discharge floods with return intervals of 500 years. This information was included to provide details regarding the structure inventory and damages prevented in the ACF basin under the Flood Risk Management project purpose…
>
> "Construction of the Buford Dam began in March 1950 and was completed in June 1959. The project is described in Sections 3.1.1 and 2.1.1.1.6.1 *[of the 2016 EIS]*. At the maximum flood control pool elevation of 1,085 ft, the reservoir has an area of 48,176 ac and a gross capacity of 2,551,064 ac-ft, of which 602,151 ac-ft is reserved for flood storage at elevation 1,071 ft…
>
> "Construction of the West Point Lake Dam began in June 1966 and was completed in 1975. The project is described in Sections 3.1.1.2 and 2.1.1.1.6.3 *[of the 2016 EIS]*. At the maximum flood pool elevation of 641 ft, the reservoir has a total storage at maximum flood pool of 774,798 ac-ft, of which 170,271 ac-ft is reserved for flood storage between elevations 635 ft and 641 ft."

2.6.3.1 Flood Damages Prevented

Both Buford Reservoir and West Point Reservoir have provided millions of dollars in flood risk management benefits over the decades. **Table 3** presents the flood risk management benefits the projects have provided over the last 8 fiscal years. The total flood risk management benefits provided for both reservoirs for FY16-23 were valued at $283 million.

Table 3: Flood Damages Prevented by ACF Projects, Fiscal Years 2016-2023 (July 2024 [FY2024] Price Levels)

Reservoir	*FY16*	*FY17*	*FY18*	*FY19*	*FY20*	*FY21*	*FY22*	*FY23*
Buford	$10,998,100	$14,349,900	$16,693,100	$78,278,400	$71,989,800	$182,700	$9,243,000	$61,675,900
West Point	$9,317,900	$284,359	$0	$587,232	$2,414,800	$0	$202,000	$6,500,300

2.6.3.2 Floodplain Characteristics

This section provides a summary of the ACF floodplain structure data. Structure and content values are taken from the National Structure Inventory (NSI) for all structures within the ACF 500-year floodplain. **Table 4** shows the estimated structure and content values in fiscal year 2024 dollars for all structures within the ACF River Basin 500-year floodplain. There are 33,317 total structures within the floodplain. Of that, 27,702 are residential structures, 1,178 are public structures, 3,734 are commercial structures and 703 are industrial structures. The total structure values are $13,457,851,000 and the total content values are $10,426,602,000. Residential and commercial structures make up the majority of structure values (83.5% combined) and content values (74.3% combined).

Table 4: ACF 500-year Floodplain Value Data

Structure Type	Structure ($)	Content ($)
Residential	6,843,705,000	3,421,852,000
Public	1,261,728,000	1,314,955,000

Structure Type	Structure ($)	Content ($)
Commercial	4,391,982,000	4,329,455,000
Industrial	960,437,000	1,360,340,000
Total	**13,457,851,000**	**10,426,602,000**

2.6.4 Recreation

No appreciable changes to recreation components at federal parks including number of campsites, marinas, etc. have occurred since the 2016 EIS. See Sections 2.6.6.1 through 2.6.6.3 of the EIS for location specific detail. This section includes updates to the current recreation visitation throughout USACE Projects within the ACF River Basin.

USACE projects within the ACF River Basin provide many opportunities for recreation. Peak recreation within the ACF River Basin occurred in fiscal year 2022, when total visits reached 19.1 million. The majority of visits in the ACF River Basin are to Lake Lanier, which has seen significant visitation growth since fiscal year 2012, where visitation was 6.5 million. **Table 5** displays visitation by project from Fiscal Year 2016 and Fiscal Year 2018-2022. Visitation includes visits at both private and public facilities.

Table 5: Visitation at ACF Projects, Fiscal Years 2016-2022

	FY2016	FY2018	FY2019	FY2020	FY2021	FY2022
Buford Dam - Lake Sidney Lanier	11,796,348	11,731,178	12,167,280	12,803,892	11,860,758	**12,335,706**
George W. Andrews L&D — Lake George W. Andrews	177,660	124,955	159,283	191,143	179,455	**140,922**
Jim Woodruff L&D-Lake Seminole	1,748,340	1,900,261	2,005,695	1,868,701	2,065,877	**2,025,973**
Walter F. George L&D/Walter F. George Lake	2,415,359	2,145,706	2,547,985	2,185,922	2,278,180	**2,311,049**
West Point Lake	1,478,511	1,890,818	1,941,578	2,174,418	1,892,058	**2,254,262**
Grand Total	**17,616,218**	**17,792,918**	**18,821,821**	**19,224,076**	**18,276,328**	**19,067,912**

The Chattahoochee River National Recreation Area (CRNRA) preserves a series of sites between Atlanta and Lake Sidney Lanier along the Chattahoochee River. The 48-mi stretch of the river affords public recreation opportunities and access to historic sites.

The National Recreation Area, a National Park Service unit, was established on August 15, 1978, by President Jimmy Carter. Recreational opportunities include rafting, canoeing, wade and tube fishing, small boat fishing, hiking, and picnicking.

Table 6 provides the 6 most recent years of available project visitation data. Project visitation has slightly increased over the last few years with an average of just over 3 million visitors.

Table 6: Annual Visitation at Chattahoochee River National Recreation Area, Years 2016-2021

2016	2017	2018	2019	2020	2021	Average
2,736,385	2,768,499	2,873,866	3,393,133	3,066,877	3,256,151	3,015,819

2.6.5 Population

Demographic data in this report comes from the American Community Survey (ACS) 5-year estimate (2018-2022). Demographic data is derived based on county-level data. Despite some overlap with adjacent drainage basins for some counties, the data is considered representative of the ACF River Basin. The 2022 population in the ACF River Basin is 7,655,317 people, which has more than doubled over the last 52 years. **Table 7** shows the population estimates for the ACF River Basin from 1970-2022. About 89% of the population in the ACF River Basin resides in Georgia, with the remainder residing in Alabama and Florida.

Table 7: Population Estimates in ACF River Basin

Location	2022	2012	2000	1990	1980	1970
ACF (AL)	496,138	456,912	419,766	372,502	359,273	312,309
ACF (FL)	346,254	340,381	305,561	263,444	224,950	188,518
ACF (GA)	6,812,925	6,051,118	5,036,182	3,790,659	3,056,484	2,526,697
ACF River Basin	7,655,317	6,848,411	5,761,509	4,426,605	3,640,707	3,027,524

Table 8 shows the annual growth rate of the ACF River Basin, which shows an average annual growth rate of 1.80% for 1970-2022. In 2012-2022, annual growth declined to 1.12%, but still shows a steady growth in the area.

Table 8: Population Annual Growth Rates in ACF River Basin

Location	Total	1970-1980	1980-1990	1990-2000	2000-2012	2012-2022
ACF (AL)	0.89%	1.41%	0.36%	1.20%	0.71%	0.83%
ACF (FL)	1.18%	1.78%	1.59%	1.49%	0.90%	0.17%
ACF (GA)	1.93%	1.92%	2.18%	2.88%	1.54%	1.19%
ACF River Basin	1.80%	1.86%	1.97%	2.67%	1.45%	1.12%

Table 9 shows the number of housing units in the ACF River Basin for the years 1970-2012. Housing counts include single-family residential, mobile homes, and multi-family residential. In 2022, there were a total of 3,161,926 housing units in the ACF River Basin, with Georgia accounting for 87% of the total housing units in the area. The Georgia portion of the ACF River Basin accounts for the highest annual growth rate in housing units at 2.38%, compared to 2.01% for the Florida portion and 1.57% for the Alabama portion.

Table 9: Housing Units in ACF River Basin

Location	2022	2012	2000	1990	1980	1970
ACF (AL)	228,513	210,049	187,517	155,556	136,405	101,797
ACF (FL)	180,467	177,712	148,804	123,736	91,681	64,063

Location	2022	2012	2000	1990	1980	1970
ACF (GA)	2,752,946	2,487,670	1,976,786	1,552,261	1,138,693	809,632
ACF River Basin	3,161,926	2,875,431	2,313,107	1,831,553	1,366,779	975,492

2.6.6 Income

Per capita income statistics were gathered for the ACF River Basin over the last 53 years. 2022 per capita income in the overall ACF River Basin was $30,209, $31,200 for the Georgia portion, $26,581 for the Florida portion, and $26,949 for the Alabama portion. **Table 10** shows the per capita income and annualized growth rates of per capita income from 1969-2022.

The per capita income values displayed in **Table 10** do not reflect the variability in income values in counties across the ACF River Basin. The counties in the upper Chattahoochee River basin and upper Flint River basin in Georgia, generally associated with the Metro Atlanta area, have considerably higher average per capita incomes than the more rural areas of the lower Flint River basin in Georgia, the middle to lower Chattahoochee River basin in Georgia and Alabama, and the Apalachicola River basin in Florida, including the communities of Apalachicola and East Point on Apalachicola Bay. The principal exceptions to this general characterization of per capita income variability in the ACF River Basin are the urban areas of Columbus, Georgia / Phenix City, Alabama along the middle Chattahoochee River and Albany, Georgia along the lower Flint River. Within the ACF River Basin, per capita incomes range from a low of about $18,000 up to a high of about $58,000 per year in Metro Atlanta.

Table 10: ACF River Basin Income per Capita 1969-2022

	Personal Income per Capita							Annual Growth Rate				
Location	2022	2012	1999	1989	1979	1969	1969-2022	2012-2022	1999-2012	1989-1999	1979-1989	1969-1979
ACF (AL)	$26,949	$19,667	$14,672	$9,594	$8,230	$5,972	2.81%	3.20%	2.28%	4.34%	1.55%	3.26%
ACF (FL)	$26,851	$18,615	$15,285	$9,952	$8,035	$5,825	2.74%	3.73%	1.53%	4.38%	2.16%	3.27%
ACF (GA)	$31,200	$21,148	$17,710	$11,100	$9,159	$6,646	2.73%	3.97%	1.37%	4.78%	1.94%	3.26%
ACF River Basin	$30,209	$20,699	$17,071	$10,789	$8,925	$6,475	2.74%	3.85%	1.49%	4.70%	1.92%	3.26%

2.6.7 Employment

Employment statistics for the year 2022 come from the 2022 5-year American Community Survey. In 2022, there were 3,907,704 people in the labor force in the ACF River Basin, with over 90% of this coming from the Georgia portion. In the ACF River Basin, 35.2% of the population 16 and older were considered not in the workforce. The average unemployment for the area was 2.8%. This is a strong decline from the 2012 6.6% unemployment rate reported in the 2017 ACF EIS. **Table 11** provides a summary of employment in the ACF River Basin.

Table 11: 2022 Employment Statistics in ACF River Basin

	Civilian Labor Force					
Location	Total	Employed	Unemployed	Percent Unemployed	Armed Forces	Percent not in Labor Force
ACF (AL)	221,416	210,876	10,540	2.7	2,572	44.2

Location	Civilian Labor Force				Armed Forces	Percent not in Labor Force
	Total	Employed	Unemployed	Percent Unemployed		
ACF (FL)	149,354	142,756	6,598	2.7	3,036	46.4
ACF (GA)	3,536,934	3,355,668	181,266	2.8	23,092	33.9
ACF River Basin	3,907,704	3,709,300	198,404	2.8	28,700	35.2

Table 12 provides a breakdown of employment percentages by general occupations in the ACF River Basin. The largest sources of employment are management/professional and sales and office occupations, which account for the majority of the overall employment in the ACF River Basin. Government employment only accounts for 7.1% of overall employment in the ACF River Basin, though it accounts for 12.9% of employment in the Florida portion of the basin. Manufacturing accounts for 12.4% of the employment in the ACF River Basin, but accounts for 18.4% of employment in Alabama.

Table 12: 2022 Employment by Occupation in ACF River Basin

		ACF (Alabama)	ACF (Florida)	ACF (Georgia)	ACF River Basin
Percent distribution by occupation	Management, professional, and related occupations	30.8	30.5	33.1	32.5
	Service occupations	17.9	22.4	17.2	17.8
	Sales and office occupations	18.9	21.0	20.5	20.3
	Construction, extraction, and maintenance occupations	10.8	14.4	11.1	11.4
	Production, transportation, and material moving occupations	21.6	11.7	18.2	17.9
Percent in selected industries	Agriculture, forestry, fishing, and hunting	2.4	3.5	3.3	3.2
	Manufacturing	18.4	4.6	12.4	12.4
Percent of government workers (local, state, or federal)		5.7	12.9	6.6	7.1

2.6.8 Environmental Justice Communities

On February 11, 1994, President Clinton issued executive order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*. The order requires that federal agencies identify and address, as appropriate, disproportionately high and adverse human-health or environmental effects of its programs, policies, and activities on minority and low-income populations. By the memorandum of February 11, 1994, the President directed EPA to ensure that agencies analyze

environmental effects on minority and low-income communities, including human-health, social, and economic effects.

The term *minority population* includes people who identify themselves in the census as African American, Asian, Pacific Islander, Native American or Alaska Native, or Hispanic. A minority population exists if the percentage of minorities in an affected area either exceeds 50 percent or is meaningfully greater than in the general population of the larger surrounding area (CEQ 1997). A minority community can be a geographically dispersed/transient set of individuals (such as migrant workers or Native Americans). Either type of group experiences common conditions of environmental exposure or effect. A selected appropriate unit of geographic analysis might be a governing body's jurisdiction, a neighborhood, a census tract, or another similar unit with no artificial dilution or inflation of the affected minority population. A minority population also exists if there is more than one minority group, and the aggregate minority percentage meets one of the above-stated thresholds.

Additional EOs require all federal agencies to determine whether a "proposed action" would have a disproportionately high and adverse impact on minority and/or low-income populations. These are:

- Executive Order 13985 of January 20, 2021: Advancing Racial Equity and Support for Underserved Communities Through the Federal Government;
- Executive Order 13990 of January 20, 2021: Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis;
- Executive Order 14008 of January 27, 2021: Tackling the Climate Crisis at Home and Abroad; and
- Executive Order 14096 of April 21, 2023: Revitalizing Our Nation's Commitment to Environmental Justice for All.

In accordance with recent EOs, the USACE utilized the Climate and Economic Justice Screening Tool to disclose the environmental justice communities throughout the ACF River Basin (**Figure 2**).

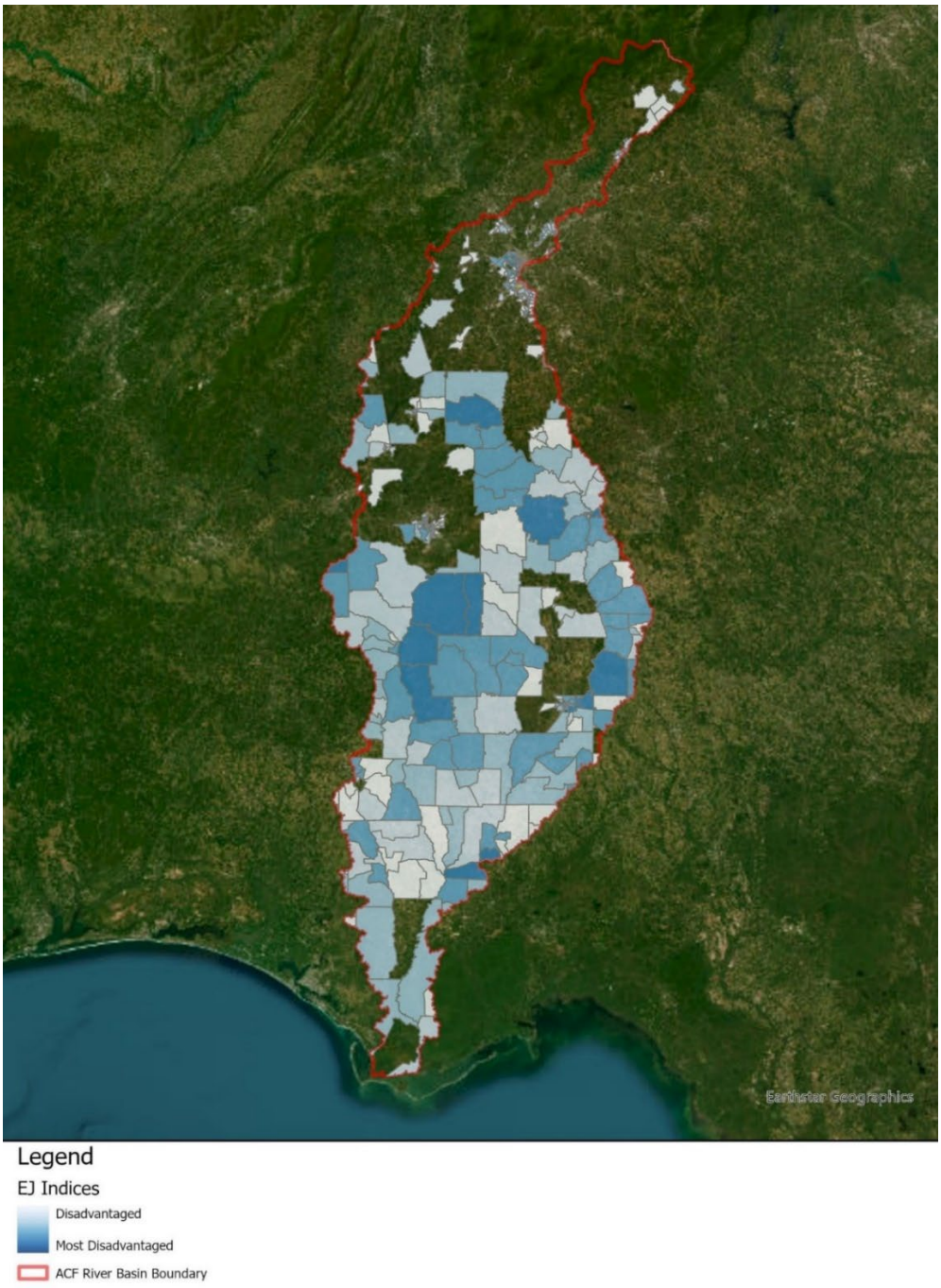


Figure 2: Disadvantaged Communities within the ACF River Basin

Table 13 shows the demographic characteristics of the ACF River Basin. The ACF River Basin has a population that is approximately 58.4% white. The next largest ethnic group is African Americans, comprising 32.7% of the ACF River Basin population. The ACF River Basin has a sizable minority population, representing 42.6% of the population. This is an increase since the 2012 data reported in the 2016 EIS where the minority population was 34.8% of the ACF River Basin.

Table 13: ACF River Basin Demographics (Percent Distribution)

Location	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Two or More Races	Hispanic or Latino (of any race)
Alabama	66.2	26.4	0.4	1.4	0.0	1.9	3.7	4.6
Georgia	54.3	31.5	0.4	4.3	0.1	3.5	6.0	10.1
Florida	63.8	15.5	0.3	2.8	0.1	4.8	12.7	26.5
ACF (AL)	55.5	38.4	0.2	0.9	0.0	1.8	3.2	4.3
ACF (GA)	57.2	33.4	0.3	2.1	0.1	2.6	4.3	7.1
ACF (FL)	71.1	19.8	0.8	0.6	0.0	2.2	5.4	6.4
ACF River Basin	58.4	32.7	0.3	1.8	0.1	2.5	4.3	6.6

Table 14 shows the 2022 poverty levels for the ACF River Basin. The Alabama portion of the ACF River Basin has a poverty level of 21.0%, compared to 16.2% for the entire state of Alabama. Similarly, the Florida portion of the ACF has a poverty level of 19.4%, compared to 12.7% for the entire state of Florida and the Georgia portion of the ACF has a poverty level of 17.3%, compared to 13.5% for the entire state of Georgia. Poverty levels for the ACF River Basin overall are 18.0%. In general, the poverty rates vary considerably among the counties in the ACF River Basin and tend to be higher in rural areas of the lower portion of the ACF River Basin in all three states and concentrated in the city of Atlanta and other larger urban centers in the basin. These higher rates are particularly common in the smaller communities along the lower Flint, lower Chattahoochee, and Apalachicola rivers, including Apalachicola and East Point on Apalachicola Bay at the mouth of the Apalachicola River.

Table 14: ACF River Basin Poverty Status

Geographic Area	Population for whom poverty status is determined								
	Total	Income in 2022 Below Poverty Level							
		All ages		Related Children				Population 65 and over	
				Under 18 yrs of age		5-17 yrs of age			
		Number	%	Number	%	Number	%	Number	%
Alabama	4,929,195	800,395	16.2	240,009	22.0	168,436	20.7	106,403	12.0
Florida	21,764,366	2,762,679	12.7	722,996	17.1	512,850	16.3	562,458	12.0
Georgia	10,462,430	1,415,573	13.5	467,018	18.9	339,763	18.4	155,425	10.3

Geographic Area	Population for whom poverty status is determined									
	Total	Income in 2022 Below Poverty Level								
		All ages		Related Children				Population 65 and over		
				Under 18 yrs of age		5-17 yrs of age				
		Number	%	Number	%	Number	%	Number	%	
ACF (AL)	478,241	93,236	21.0	26,327	29.6	18,223	28.2	9,826	13.9	
ACF (FL)	323,319	52,644	19.4	16,936	30.2	12,305	29.0	6,499	11.3	
ACF (GA)	6,685,272	801,869	17.3	267,207	24.0	196,326	23.7	86,498	12.9	
ACF River Basin	7,486,832	947,749	18.0	310,470	25.3	226,854	24.8	102,823	12.9	

In addition to examining the demographics of the ACF River Basin, the Climate and Economic Justice Screening Tool (CEJST) was also used to identify disadvantaged communities within the basin. The CEJST identifies census tracts as disadvantaged based on 8 metrics: climate change, energy, health, housing, legacy pollution, transportation, waste and wastewater, and workforce development metrics in combination with socioeconomic metrics. The CEJST identifies 400 of the 964 census tracts within the ACF River Basin as disadvantaged. **Figure 2** shows a map of all of the census tracts identified as disadvantaged by the CEJST. The communities in the darker blue shades are identified as the most disadvantaged communities in the ACF River Basin based on the fact that they meet the definition of a disadvantaged community for a higher number of the above 8 metrics.

2.6.9 Demographics Pertaining to Children

On April 21, 1997, President Clinton issued EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, which recognizes that a growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health and safety risks. This order requires federal agencies, to the extent permitted by law and mission, to identify and assess such environmental health and safety risks.

While the EO does not provide guidance on the age to which children should be protected, the Federal Interagency Forum on Child and Family Statistics, which was founded in 1994 and formally established by the order, focuses on those aged 17 and under (FIFCFS 1997). In the ACF River Basin, 1,795,243 children 17 and under were identified in the 2022 American Community 5-Year Survey. This represents 23.5 percent of the population in the ACF River Basin, which is a lower percentage than what was reported in the 2016 EIS (25.6%). More than 90 percent of the children in the basin were residents of Georgia (1,618,785). The Alabama portion of the ACF River Basin had 106,829 children (6.0 percent). The Florida portion of the ACF River Basin had 69,629 children (3.9 percent) (U.S. Census Bureau 2024).

2.7 Aesthetic Resources

No appreciable changes to this resource have occurred since the 2016 EIS. As stated in Section 2.7 of the 2016 EIS,

> "Scenic views and vistas within the river and stream corridors of the ACF Basin encompass a wide range of river, stream, and reservoir settings, including cascading streams rising from the upper reaches of the Chattahoochee River watershed in the mountains and foothills of the Southern Appalachian highlands; rivers and streams in the Piedmont province and along the Fall Line in the middle Chattahoochee River and upper Flint River watersheds; and the larger meandering lower Flint, lower

> Chattahoochee, and Apalachicola rivers flowing through the Coastal Plain toward Apalachicola Bay and Gulf of Mexico."

Refer to Section 2.7 of the EIS and its subsections for more detail.

2.8 Air Quality and General Conformity

EPA Region 4 and ADEM regulate air quality in Alabama; EPA Region 4 and the Florida DEP regulate air quality in Florida; and EPA Region 4 and the GADNR regulate air quality in Georgia.

The Clean Air Act (42 U.S.C. 7401-7671q), as amended, gives EPA the responsibility to establish the primary and secondary National Ambient Air Quality Standards (NAAQS) (Title 40 *Code of Federal Regulations* [CFR] Part 50) that set acceptable concentration levels for six criteria pollutants: particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen oxides (NO_x), ozone (O_3), and lead. Short-term NAAQS (i.e., 1-, 8-, and 24-hour periods) have been established for pollutants contributing to acute health impacts, while long-term NAAQS (i.e., annual averages) have been established for pollutants contributing to chronic health impacts. Each state has the authority to adopt standards stricter than those established under the federal program; however, Alabama, Florida, and Georgia all have adopted the federal standards.

At the time of the 2016 EIS, 16 of the 81 counties in the ACF River Basin were designated as nonattainment; however, according to EPA as of July 31, 2024, all 81 counties within the ACF Basin are in attainment (EPA 2024).

2.9 Noise

No appreciable changes to this resource have occurred since the 2016 EIS.

As stated in Section 2.9 of the 2016 EIS,

> Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise intrusive.

Refer to Section 2.9 of the EIS and its subsections for more detail.

2.10 Traffic and Transportation (Non-navigation and Non-recreation)

No appreciable changes to this resource have occurred since the 2016 EIS. As stated in the EIS,

> "Transportation infrastructure along the ACF Basin is highly variable. It supports a wide range of conditions and needs, including dense residential and second home development around lakes; highly urbanized development around Atlanta and Columbus; and remote and rural areas in southern Alabama and Georgia, and northern Florida. It provides direct access to the water's edge throughout the system to support public recreation, commercial navigation, project operations activities, and other water-related activities. In general, the existing land base transportation network around the ACF Basin is adequate for its current use."

Refer to Section 2.10 of the EIS and its subsections for more detail.

2.11 Cultural Resources

No appreciable changes to cultural resources have occurred since the 2016 EIS. Refer to Section 2.11 of the EIS and its subsections for more detail.

The 19,573 square-mile ACF River Basin includes Buford Dam and Lake Lanier, West Point Dam and lake, Walter F. George Lock, Dam, and Lake, George W. Andrews Lock and Dam and Lake, and Jim Woodruff Lock, Dam and Lake.

Between the late 1940s and early 1970s the National Park Service conducted systematic surveys of the USACE reservoir project within the ACF River Basin prior to construction and recorded numerous historic properties. Subsequent inventory surveys, site assessments, and data recovery investigations have been conducted of USACE owned lands in the ACF River Basin for planning and management purposes. These resulted in the identification on additional historic properties and assessed and collected data from previously identified resources within ACF River Basin reservoir projects. To comply Section 110 of the National Historic Preservation Act (NHPA) and effectively manage historic properties at ACF reservoir projects, the USACE, Mobile District prepared project specific Integrated Cultural Resources Management Plans (ICRMP) or Historic Properties Management Plans (HPMP). Mobile District Archaeologists also conduct annual site inspections at these reservoir projects and work closely with project rangers and managers to monitor the conditions of historic properties. The ICRMPs and HPMPs maintain lists of historic properties and site descriptions that are updated periodically to document changes to sites resulting from operations of the reservoirs, construction projects, and environmentally induced changes. This is especially important for historic properties located within the drawdown, or fluctuation zone of reservoirs as significant changes in reservoir operations and established lake levels could result in adverse impacts to historic properties.

2.12 Hazardous and Toxic Materials

No appreciable changes to this resource have occurred since the 2016 EIS. As stated in the EIS,

> "Operating and maintaining USACE projects typically requires the use of hazardous and toxic materials…The handling, use, storage, and disposal of these materials must be in accordance with label recommendations; USACE regulations; and local, state, and federal regulatory guidelines."

Refer to Section 2.12 of the EIS and its subsections for more detail.

3.0 Alternative Plans and Evaluation

The future without project (FWOP) conditions, which are the same as existing conditions for this operational analysis, are those which the Proposed Action is compared against. As previously stated, the scope of plan evaluation in this effort is focused on comparing changes of the Proposed Action on the authorized projects' purposes. The existing conditions for the authorized projects' purposes are described in the preceding **Section 2.0 Affected Environment** under **Sections 2.1**, **2.5.3**, **2.5.5** and **2.6.**

The projects on the ACF River Basin were constructed and are operated as a system to meet authorized purposes. The authorized purposes on the ACF River Basin are summarized in **Table 15** with the corresponding authorities. More detailed description of the authorities, including those which authorized agreements with local State entities, can be found in Section 2.1.1.2 of the 2016 EIS.

If proposed operational or structural changes to any reservoir on the ACF River Basin affect other authorized projects, such changes are to be considered. The Planning Policy for Conducting Civil Works Planning Studies (ER 1105-2-103), states that the impacts of a formulated alternative on other project purposes must be calculated (p. 73). This is the basis for the decision-making framework for this operational analysis. The following subsection discusses how the ACF River Basin is managed as a system to meet the authorized purposes in varying reservoir conditions under the Proposed Action Alternative (Alternative 7K) from the 2016 EIS, which is also the No Action Alternative in this analysis.

Table 15: Authorized Purposes

Authorized Purpose	Project Site on ACF River Basin	Authority
Flood Risk Management	Buford Multi-purpose Reservoir	Section 1, River and Harbor Act (RHA) 1946 (PL 79-525)
	West Point Lake	Flood Control Act (FCA) 1962
	Buford Dam	Section 1,RHA 1946 (PL 79-525)

Authorized Purpose	Project Site on ACF River Basin	Authority
Navigation	West Point Lake	Flood Control Act (FCA) 1962
	Walter F George Lock and Dam	House Committee Public Works Resolution, May 19, 1953
	George W Andrews Lock and Dam	House Committee Public Works Resolution, May 19, 1953
	Jim Woodruff Lock and Dam	Section 1,RHA 1946 (PL 79-525)
Hydroelectric Power	Buford Dam	Section 5 of FCA 1944 (P.L. 78-534)
	West Point Dam	
	Walter F George Lock and Dam	
	Jim Woodruff Lock and Dam	
Recreation	All USACE ACF Projects	FCA of 1944 (P.L. 78-534)
Fish and Wildlife Conservation	All USACE ACF Projects	FWCA of 1958 (P.L. 85-624) ESA of 1973 (P.L 93-205)
Water Supply	All USACE ACF Projects	WSA of 1958 (P.L. 85-500
Water Quality	All USACE ACF Projects	Water Pollution Control Act Amendments of 1972 (P.L. 92-500)

3.1 Action Zones on ACF River Basin

The guide curves for Lake Sidney Lanier, West Point Lake, and Walter F. George Lake (**Figure 3** through **Figure 5**) define the top of conservation storage water surface elevation. 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 in each lake, defines a reservoir condition where all authorized purposes can be met. As lake levels decline, Zones 2 through 4 define increasingly critical system status where purposes can no longer fully be met. The action zones also provide guidance on meeting minimum hydroelectric power needs at each project. Typical peaking hours of hydropower operation change according to each action zone for each project. The storage projects are operated to concurrently maintain their lake levels in the same zones. George W. Andrews and Lake Seminole (Jim Woodruff Lock and Dam) do not have action zones because they are not operated as storage projects.

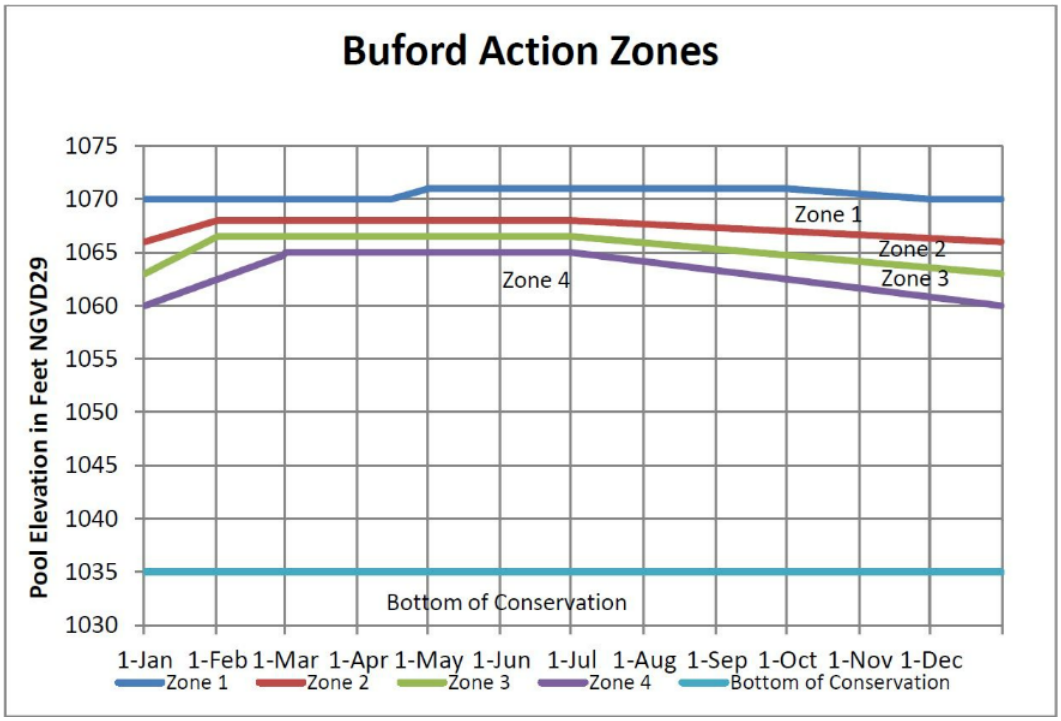


Figure 3: Buford Action Zones

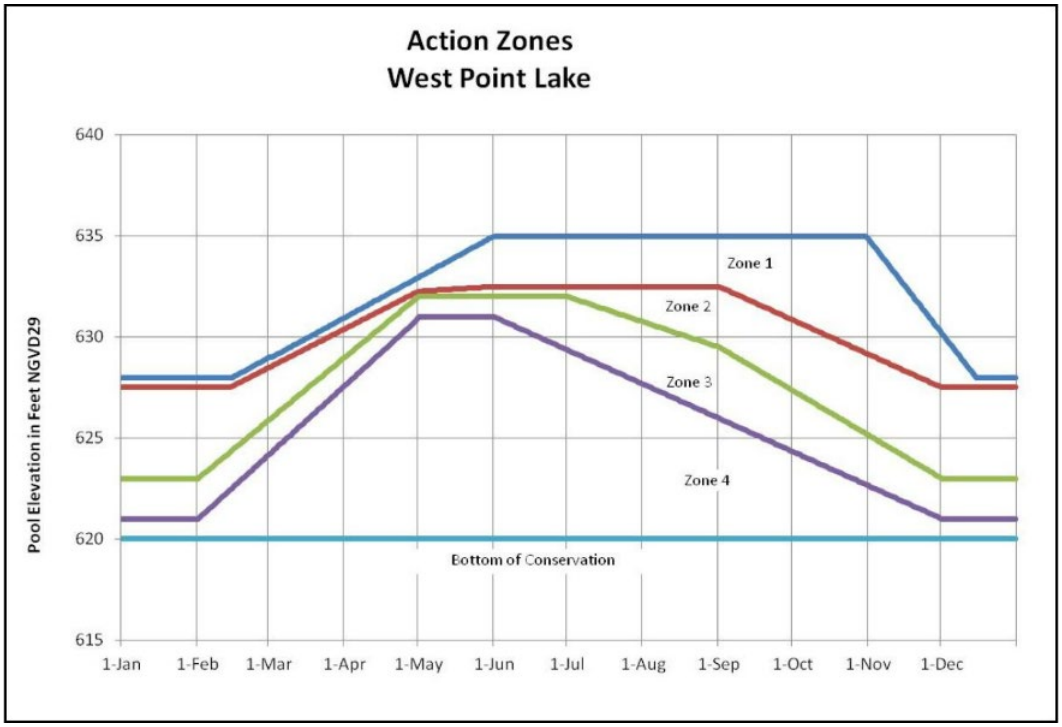


Figure 4: West Point Lake Action Zones

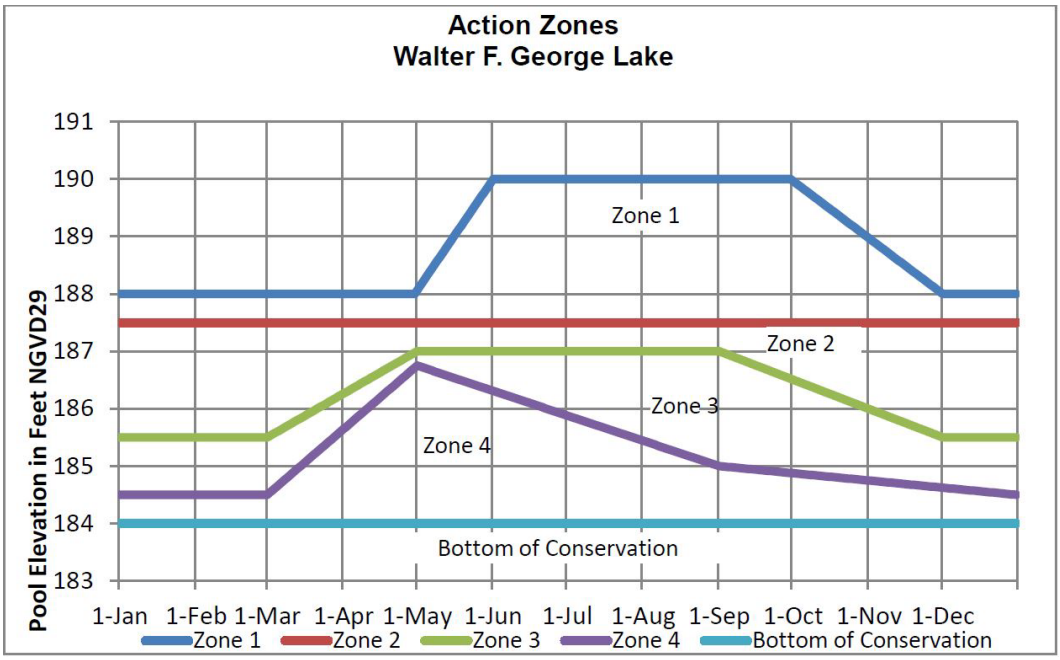


Figure 5: Walter F. George Lake Action Zones

Composite conservation storage (**Figure 6**) is calculated by combining the conservation storage of Lake Sidney Lanier, West Point Lake, and Walter F. George Lake. Each of the individual storage reservoirs consists of four action zones.

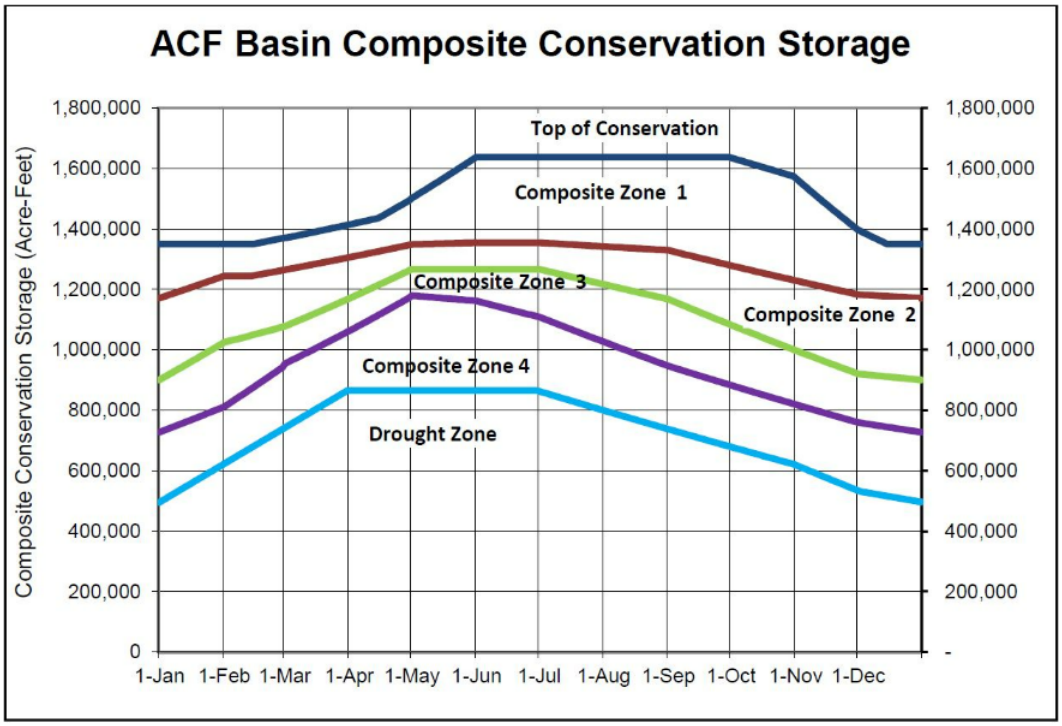


Figure 6: ACF River Basin Composite Conservation Storage

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, drought contingency operations are triggered, hydropower is supported at a reduced level, and water supply and water quality releases are met. When composite conservation storage is in Zone 4, severe drought conditions exist, navigation is not supported, and hydropower is likely to be generated only during concurrent uses.

The Drought Zone delineates a volume of water roughly equivalent to the inactive storage in Lake Sidney Lanier, West Point Lake, and Walter F. George Lake plus Zone 4 storage in Lake Sidney Lanier. The Drought Zone line has been adjusted to include a smaller volume of water at the beginning and end of the calendar year. 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 Lock and Dam to 4,500 cubic feet per second (cfs).

3.2 Alternatives

The alternatives considered for this effort are limited to the No Action Alternative (NAA) and the Stay Agreement Alternative (SAA) since the one proposed action in this study is the product of settlement negotiations. No additional alternatives were considered.

3.2.1 No Action Alternative (NAA)

The NAA, which is the same as the existing and FWOP conditions, would be the continued operation of the ACF Master Manual, defined as the Proposed Action Alternative (Alternative 7K) in the 2016 EIS. The preceding discussion of the Action Zones provides an elaborative description of the NAA.

3.2.2 Stay Agreement Alternative (SAA)

The SAA is the Proposed Action for this ILR/TEA and is described in paragraph 1.2 of the Stay agreement,

> "The "Flow Objective Alternative", referred to as the Stay Agreement Alternative, refers to the following four water management objectives, considered as a package:
>
> "(1) an objective to maintain a minimum average daily flow of 1,350 cfs over any 7- day period at the gage located on the Chattahoochee River at 14th Street at Columbus, Georgia (Gage No. 02341460) when the ACF Basin is not in "Drought Zone Operations" as that term is defined in the 2017 ACF Master Manual;
>
> "(2) an objective to maintain a minimum average weekday flow of 2,000 cfs at the gage located on the Chattahoochee River near Columbia, Alabama (Gage No. 02343801) when the ACF Basin is not in "Drought Zone Operations" as that term is defined in the 2017 ACF Master Manual;
>
> "(3) an objective to maintain the minimum average flows at Columbus, Georgia and Columbia, Alabama described in items (1) and (2) above, on two days each calendar week starting each Monday when the ACF Basin is in "Drought Zone Operations" as that term is defined in the 2017 ACF Master Manual; and
>
> "(4) an objective to maintain Lake Seminole at or above fill elevation of 76 feet NVGD in the same manner and to the same extent as provided in the 2017 ACF Master Manual, and in particular the following paragraphs from Appendix A, the Water Control Manual for Jim Woodruff Lock and Dam and Lake Seminole: Chapter III, subparagraph 3-03; Chapter VII, paragraphs 7-03, 7-05(a), 7-10, and 7-11; and Chapter VIII, Paragraph 8-11 b."

3.3 Alternative Comparison

The operation of the ACF River Basin consists of action zones within the conservation storage as discussed in **Section 3.1** The zones which define the conditions for meeting authorized purposes are triggered dependent on the water surface elevation. Recall that **Figure 6** shows the annual composite conservation

storage for the ACF consisting of Zone 1 through 4. Changes in the percent of time the two alternatives are in each composite zone are shown in **Figure 7**. The percent of time the NAA and SAA are in each zone is the same. There are no changes in performance between the alternatives.

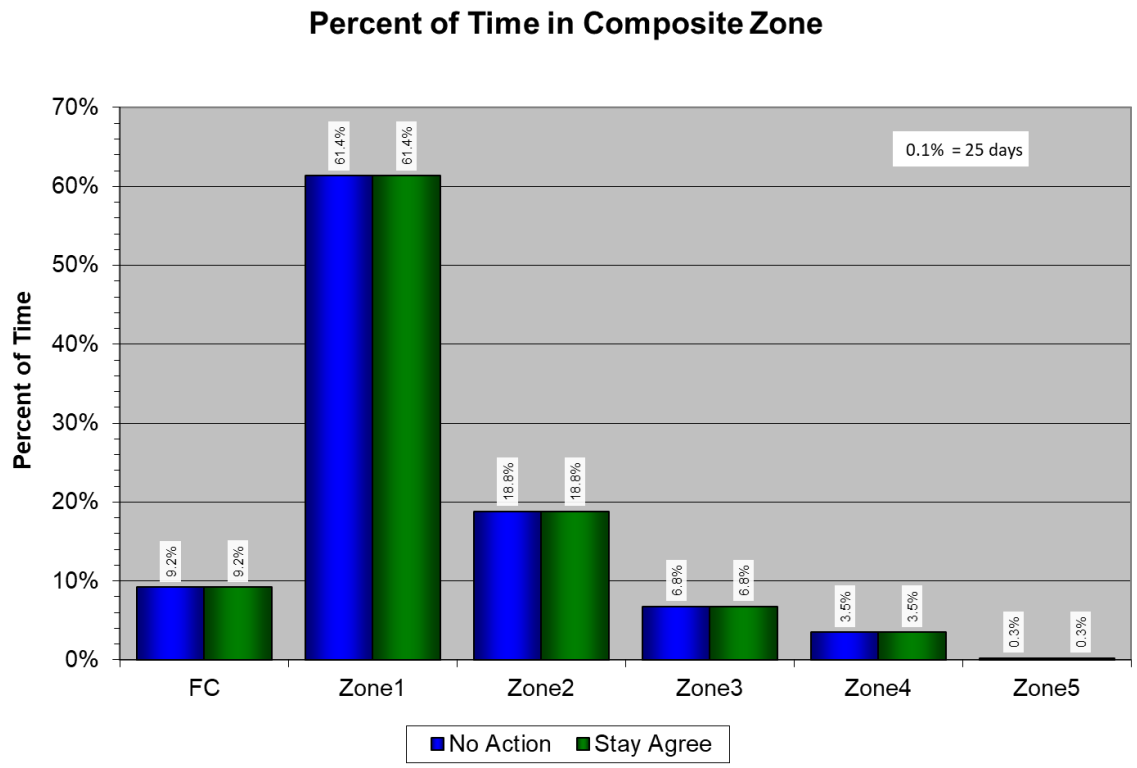


Figure 7: Percent of Time in Composite Zone

Stated another way, the SAA is expected to be operating in Zone 1, which defines reservoir conditions where all project purposes are met, for the same amount of time as in the NAA. Similarly, the number of months represented as the percent of time when drought operations (Zone 4) are triggered are the same between alternatives. It must be noted that the HEC-ResSim model accounted for FC- flood conservation elevation and Zone 5: Extreme Drought Operations (EDO).

A comparison of the annual pool elevation under the two alternatives for Buford, West Point and Walter F. George projects was also conducted. The basis for the comparison at these three water storage projects is to assess whether the SAA would significantly change the annual pool elevation compared to the NAA. The percentage of days in which the water elevation was exceeded for each of the impact levels at Buford Dam is shown in **Figure 8**. The figure shows an indistinguishable difference between the NAA and SAA. HEC-ResSim results for West Point (**Figure 9**) and Walter F. George (**Figure 10**) projects show similar results.

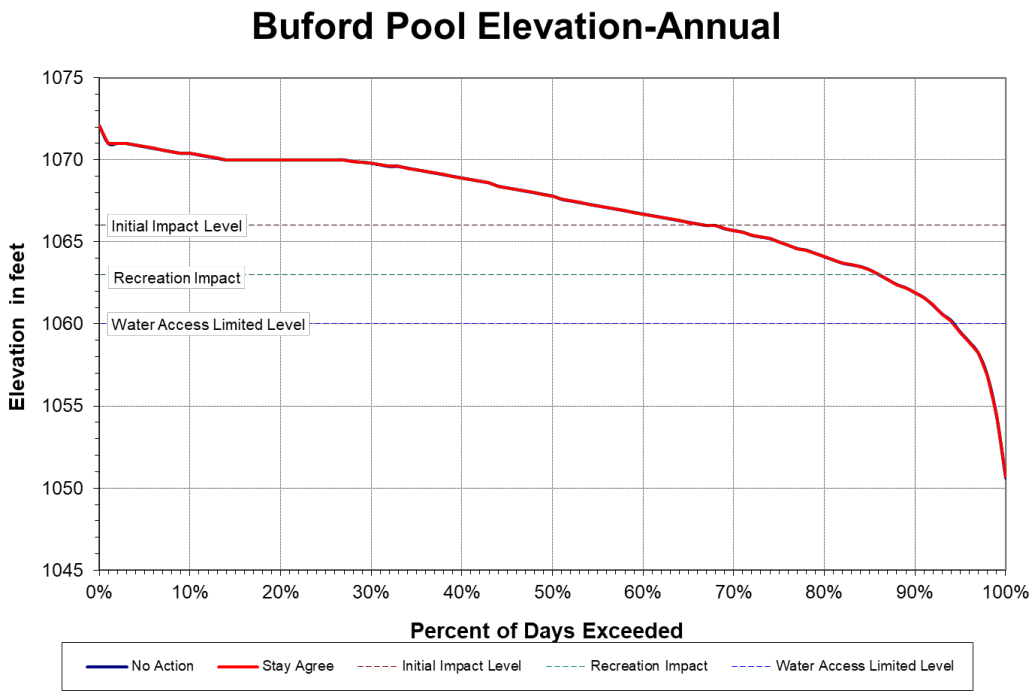


Figure 8: Buford NAA and SAA Elevation Percent of Exceedance

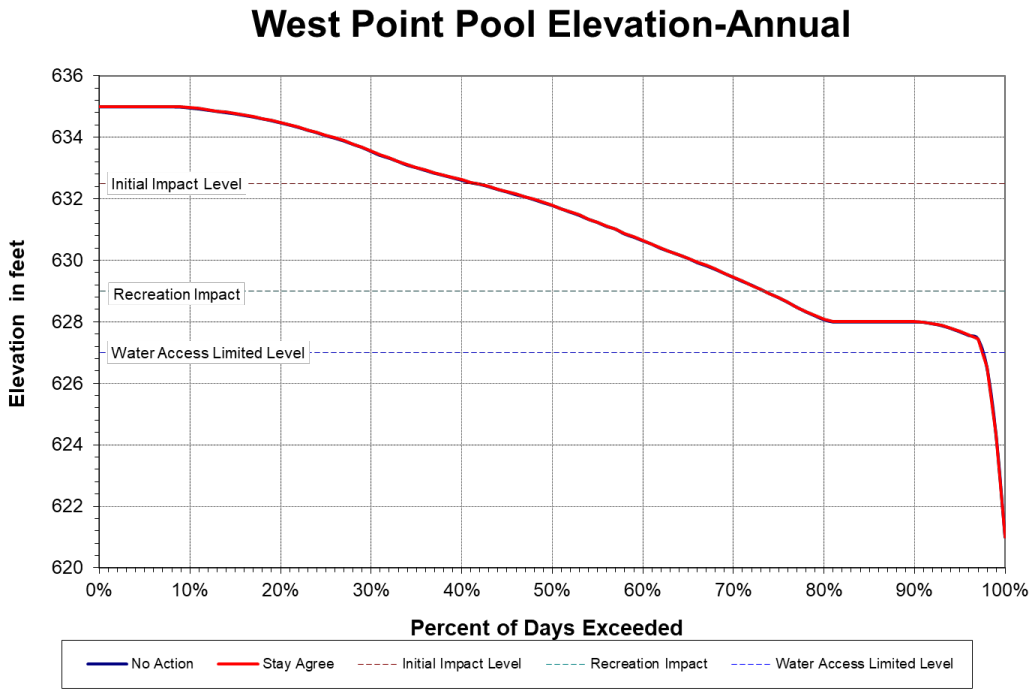


Figure 9: West Point NAA and SAA Elevation Percent of Exceedance

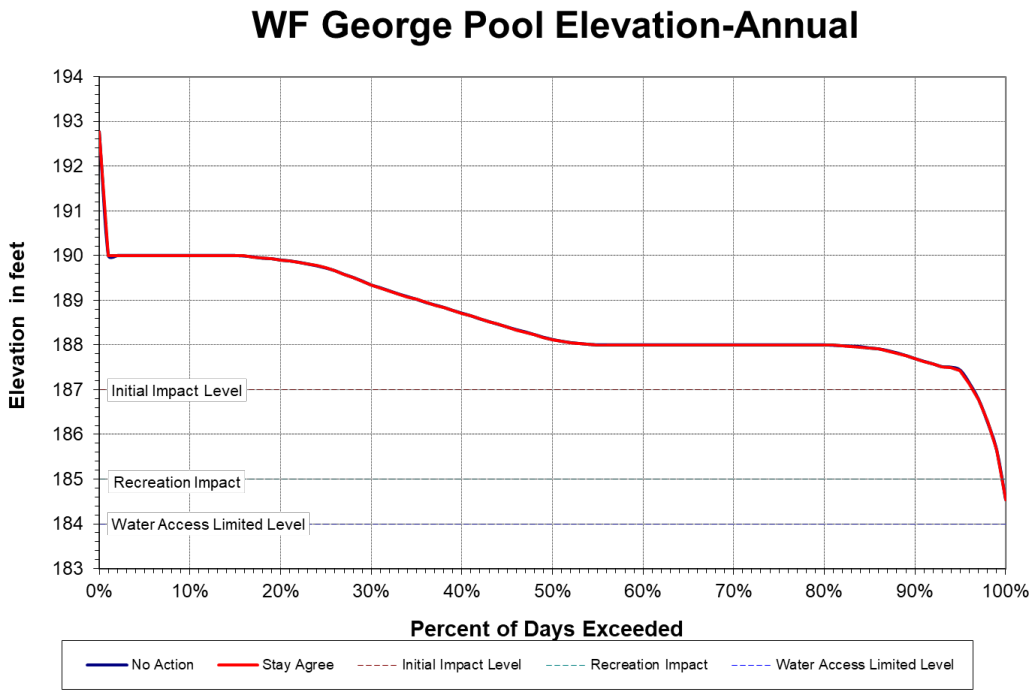


Figure 10: WFG NAA and SAA Elevation Percent of Exceedance

3.4 Initial HEC-ResSim Results

HEC-ResSim modeling shows a *de minimis* change from the NAA to the SAA when all four objectives are run simultaneously as a complete package. The results of operating to meet each of the flow objectives are detailed below.

Flow Objective 1: Maintain a minimum average daily flow of 1,350 cfs over any 7-day period at the gage located on the Chattahoochee River at 14th Street at Columbus, Georgia (Gage No. 02341460) when the ACF River Basin is not in "Drought Zone Operations". **Table 16** shows the flow objective is met 99.9 % of time for the NAA and 100% for the SAA. **Table 17** shows the operational rule to meet the objective is triggered only 8 days during the 73-year simulation or 0.03 % of the time. **Figure 11** indicates the annual Columbus flow duration for both alternatives are identical.

Table 16: Percent of Time Flow Objective 1 Achieved

Flow Value	NAA	SAA
1350 cfs over any 7-day period	99.9%	100.0%

Table 17: HEC-ResSim operational details on Flow Objective 1

Flow Target	% Percent of time rule active*	Number of Days	Number of Consecutive days	Number of Events
1350 cfs over any 7-day period	0.030%	8	4	3

*73-year simulation with total of 26,654 day

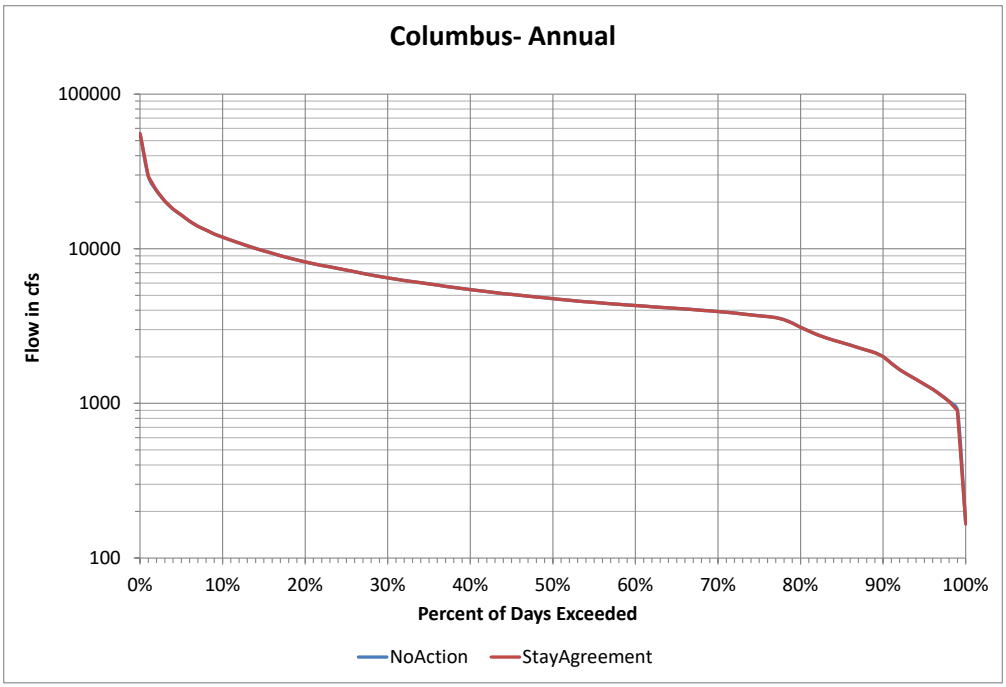


Figure 11: Columbus flow duration curve for both alternatives

Flow Objective 2: Maintain a minimum average weekday flow of 2,000 cfs at the gage located on the Chattahoochee River near Columbia, Alabama (Gage No. 02343801) when the ACF River Basin is not in "Drought Zone Operations". **Table 18** shows the flow objective is met 99.9 % of time for the NAA and 100% for the SAA. **Table 19** shows the operational rule to meet the objective is triggered only 10 days during the 73-year simulation or 0.038 % of the time. **Figure 12** indicates the annual Columbia flow duration for both alternatives are identical.

Table 18: Percent of Time Flow Objective 2 Achieved

Flow Value	NAA	SAA
2,000 cfs Monday - Friday	99.9%	100.0%

Table 19: HEC-ResSim operational details on Flow Objective 2

Flow Target	% Percent of time rule active*	Number of Days	Number of Consecutive days	Number of Events
2,000 cfs Monday - Friday	0.038%	10	3	5

*73-year simulation with total of 26,654 day

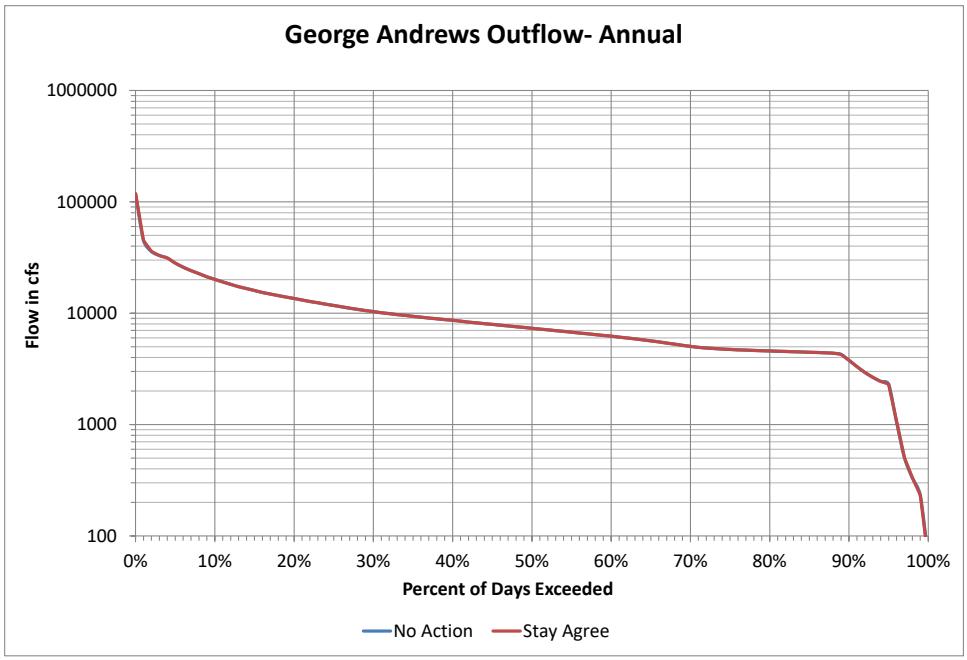


Figure 12: Georgia Andrews (Columbia) flow duration curve for both alternatives

Flow Objective 3: Maintain the minimum average flows at Columbus, Georgia and Columbia, Alabama described in items (1) and (2) above, on two days each calendar week starting each Monday when the ACF River Basin is in "Drought Zone Operations". **Table 20** and **Figure 13** show the operational rule to meet the Columbus objective is triggered only 5 days during the 73-year simulation or 0.019 % of the time. **Figure 14** shows the Columbia objective is triggered only 7 days during the 73-year simulation or 0.026 % of the time.

Table 20: HEC-ResSim operational details on Flow Objective 3

Flow Target	% Percent of time rule active*	Number of Days	Number of Consecutive days	Number of Events
Columbus--1350 cfs 2 days a week during EDO	0.019%	5	2	4
Columbia-- 2000 cfs 2 days a week during EDO	0.026%	7	2	4
Total	0.045%	12		

*73-year simulation with total of 26,654 day

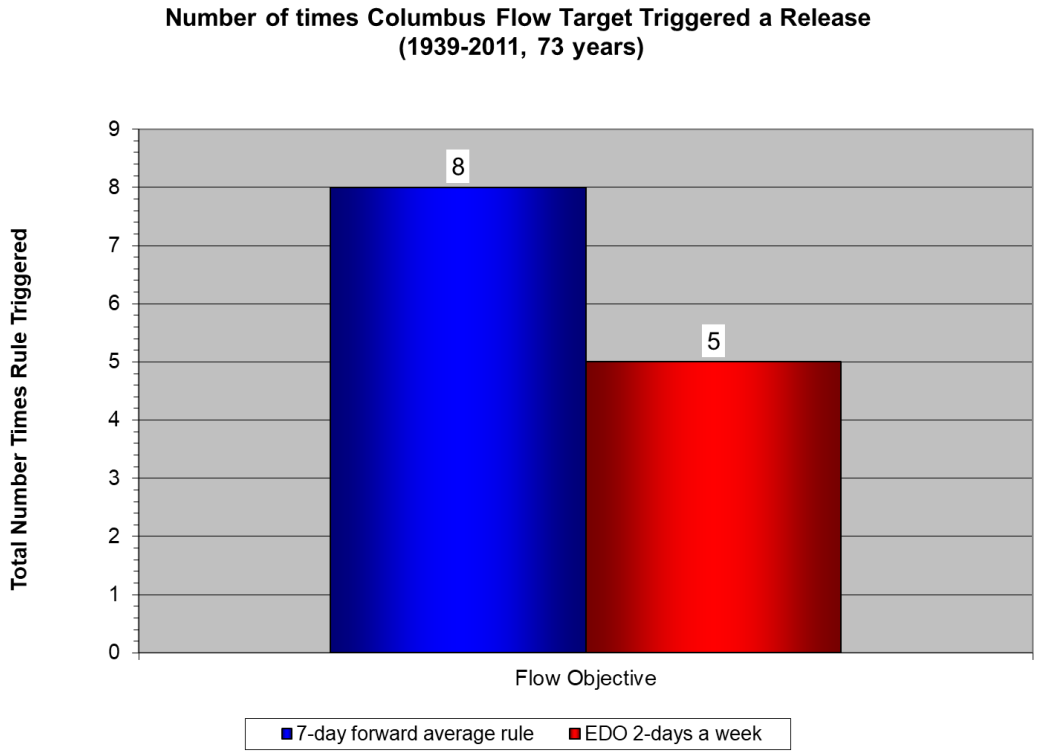


Figure 13: Number of Times Columbus Flow Target Trigged a Release

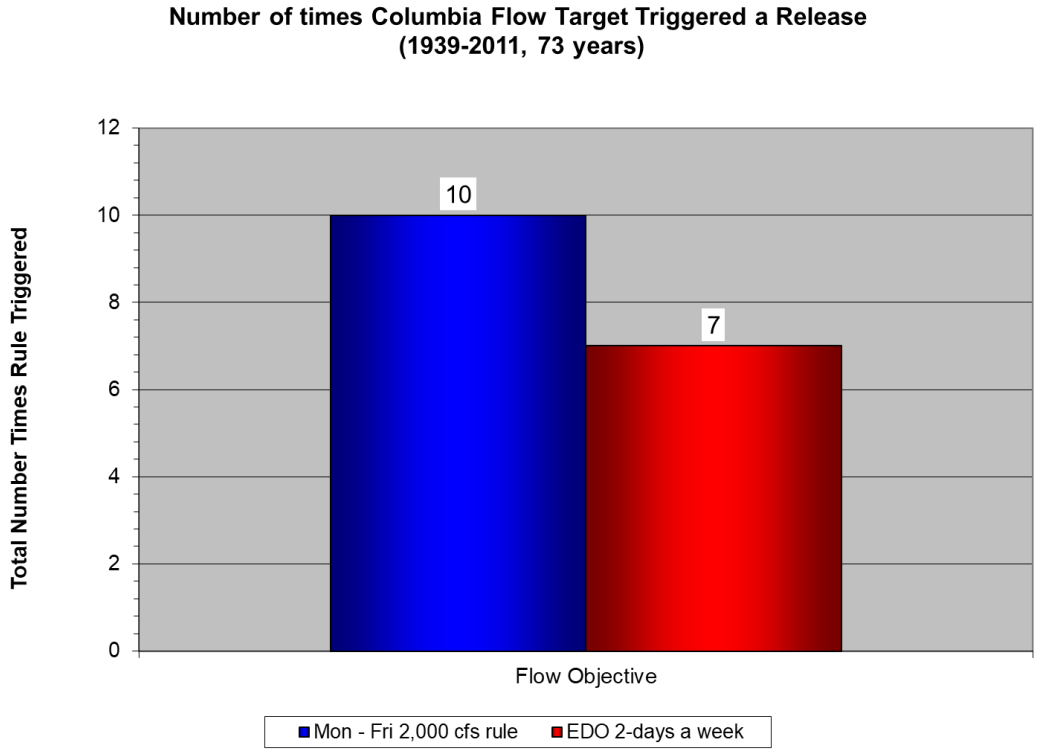


Figure 14: Number of Times Columbia Flow Target Trigged a Release

Flow Objective 4: Maintain Lake Seminole at or above an elevation of 76 feet NVGD in the same manner and to the same extent as provided in the 2017 ACF Master Manual. This flow objective is a component of both the NAA and SAA. The objective is met the same percent of time for each alternative and shown in **Table 21**. **Figure 15** shows the annual Jim Woodruff pool elevation duration for both alternatives, which are identical.

Table 21: Percent of Time Jim Woodruff Pool Elevation Exceeded

Elevation Value	NAA	SAA
76.0	98.89%	98.89%

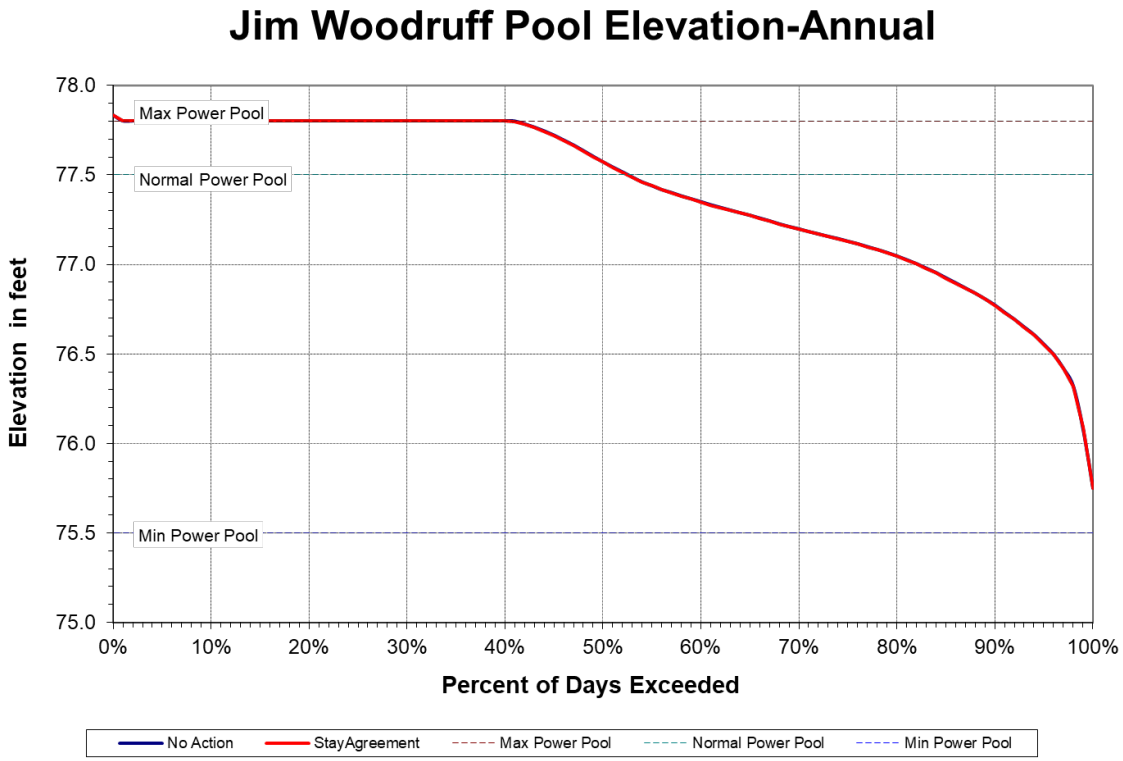


Figure 15: Jim Woodruff pool elevation duration curve for both alternatives

4.0 Evaluation using 2016 EIS screening criteria

Using the detailed criteria stated in the 2016 EIS for evaluating alternative performance relative to authorized purposes, this section identifies the changes (or delta) of the SAA compared to the NAA.

4.1 NAA Performance Relative to Authorized Purposes

Since the NAA under this ILR/TEA is the Proposed Water Management Alternative 7 combined with the water supply option K identified in the 2016 EIS, this section will characterize the performance consistent with descriptions stated within Sections 4.3 and 5.2.8 of the 2016 EIS, respectively.

4.1.1 Flood Risk Management

As stated in Section 4.3.1 of the 2016 EIS,

> "…any proposed measure (or alternative) considered in the update process for the Master WCM should maintain at least the current level of flood risk management."

Under the NAA, flood risk management operations would continue as prescribed under the Master WCM.

4.1.2 Hydroelectric Power Generation

As stated in Section 4.3.2 of the 2016 EIS,

> "System performance of each water management alternative in achieving the hydropower purpose was ranked on annual hydropower generation and annual weekday hydropower generation."

Under the NAA, hydroelectric power generation would be consistent as described in Section 5.2.8.2.2 of the 2016 EIS, which states:

> "… typical hydroelectric power generation schedule would be the same as shown in Table 4.1-6. Project operations under this alternative would produce system annual generation of 1,014,054 MWh and system annual weekday generation of 752,138 MWh."

4.1.3 Navigation

As stated in Section 4.3.3 of the 2016 EIS,

> "System performance…in providing for navigation was ranked on two criteria:
>
> - Percent of time a 9-ft navigation channel would be available (January–May) in the Apalachicola River based on exceeding a flow of 20,600 cfs at Blountstown; and
> - Percent of time a 7-ft navigation channel would be available (January–May) in the Apalachicola River based on exceeding a flow of 16,200 cfs at Blountstown"

Under the NAA, navigation would be consistent as described in Section 4.1.2.6.4 of the 2016 EIS which provides a 7-foot channel during navigation season up to 5 months when hydrologic conditions allow:

> "Assuming basin hydrologic conditions allow, a typical navigation season would begin in January of each year and continue for 4 to 5 consecutive months (i.e., January–April or May). During the navigation season, the flows (16,200 cfs) at the Blountstown, Florida, USGS gage should be adequate to provide at least a 7-ft channel. 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.
>
> "The ability to support a navigation season will depend on actual and projected systemwide conditions in the ACF Basin before and during January, February, March, April, and May…
>
> "Though special releases will not be standard practice, they can occur for a short duration to assist navigation during the navigation season. For instance, releases can be requested to achieve up to a 9-ft channel. Those will be evaluated case by case, subject to applicable laws and regulations and the conditions above."

4.1.4 Fish and Wildlife Conservation

As stated in Section 4.3.4 of the 2016 EIS,

> "The degree to which a[n]…alternative satisfied the fish and wildlife conservation project purpose was determined based on examination of the following six indicators:
>
> - Percent of years with days < flow;
> - Median number of days per year < flow;
> - Median consecutive days per year < flow;
> - Annual maximum 30-day growing season floodplain connectivity (ac);
> - Median fall rates; and

- Maximum fall rate."

Under the NAA, fish and wildlife conservation would be consistent as described in Section 5.2.8.2.4 of the 2016 EIS, which states:

> "Operations to support fish spawning in reservoirs and rivers, consistent with other project purposes, and lockages to promote fish passage at Jim Woodruff Lock and Dam would continue as practiced. Additionally, operations defined in Mobile District SOPs, which were established in 1988 and updated in 1993 to address conditions at the Walter F. George project when low DO values are observed in the tailrace, would continue to be implemented (USACE, Mobile District 1993a). Management of the Eufaula NWR and USACE-owned project lands around the ACF reservoirs for the benefit of fish and wildlife resources consistent with other project purposes also would continue as currently practiced. Operations for listed species under this alternative would be conducted in accordance with the provisions of the 2012 RIOP, as described in section 2.1.1.2.4.4."

4.1.5 Recreation

As stated in Section 4.3.5 of the 2016 EIS,

> "System performance of each water management alternative in achieving the recreation purpose was based on several measures at Lake Lanier, West Point Lake, and Walter F. George Lake as follows:
>
> - Number of weeks below [Initial Impact Level (IIL)] during the recreation season during period of record;
> - Number of weeks below [Recreation Impact Level (RIL)] during the recreation season during period of record;
> - Number of days below [Water Access Level (WAL)] during the recreation season during period of record;
> - Percent of time below IIL during the recreation season;
> - Percent of time below RIL during the recreation season; and
> - Percent of time below WAL during the recreation season."

Under the NAA, recreation would be consistent as described in Section 5.2.8.2.5 of the 2016 EIS which is driven by lake elevations.

4.1.6 Water Quality

The Executive Summary of the 2016 EIS states,

> "USACE recognizes existing minimum flow requirements in the system but is not authorized to operate its projects to meet requirements for which others parties are responsible. Setting minimum flow targets to ensure compliance with water quality standards is the responsibility of states, not USACE."

Under the NAA, operational performance relative to water quality would be consistent as described in Section 5.2.8.2.6 of the 2016 EIS. Buford Dam, West Point Dam, and Jim Woodruff Lock and Dam would continue to provide continuous minimum releases which, in addition to meeting other project purposes and providing associated benefits, also would address downstream water quality.

4.1.7 Water Supply

As stated in Section 4.3.6 of the 2016 EIS,

> "The ability of a water management alternative to satisfy the water supply purpose was based on examining six parameters reflecting the adequacy of the conservation storage of Lake Lanier to provide the 20 million gallons per day (mgd) the relocation contracts and 277 mgd downstream withdrawals as follows:

- Buford project minimum pool elevation (ft);
- Buford project percent time Storage >/= Zone 1 (%);
- Buford project years in or below Zone 3 by December 1;
- Percent time refill from Zone 3 to Zone 1 by May 1 the next year;
- Buford project percent time at full pool by May 1 (1,071 ft); and
- Percent time Buford project pool elevation > 1,066 ft during period of record."

Under the NAA, water supply would be consistent as described in Section 5.2.8.2.7 of the 2016 EIS, which states:

> "releases from Buford Dam would be sufficient to provide for the 2050 need for downstream withdrawals of 379 mgd by Atlanta and withdrawals from Lake Lanier amounting to 242 mgd for the relocation contracts and the 2050 need for communities withdrawing from the reservoir. The minimum reservoir elevation under this alternative would be 1,050.7 ft... Lake Lanier would be in Zone 1 58 percent of the time..."

4.2 SAA Performance Relative to Authorized Purposes

4.2.1 Flood Risk Management

Consistent with Section 1.4.4 of the 2016 EIS, any proposed alternative considered in the ACF WCP update process should maintain at least the current level of flood risk management. The SAA would not change the level of flood risk management provided by the ACF projects.

4.2.2 Hydroelectric Power Generation

USACE generated HEC-ResSim outputs showing energy generation for both alternatives. The data that was then provided to the USACE Hydropower Analysis Center (HAC) was the result of HEC-ResSim simulations of each scenario, covering a hydrologic period from 1939 – 2011. Nine hydropower dams altogether were represented – four federal projects and five nonfederal projects. The simulation results included daily values of pool elevation, outflow, power plant capability, hydropower head, and energy (megawatt hour ((MWh)) generated.

HAC performed an evaluation based on the HEC-ResSim outputs of the SAA compared to the NAA to determine whether a comprehensive hydropower impact analysis would be warranted. The results show that the difference in NAA and SAA is negligible/not distinguishable as summarized in an internal Memorandum for Record (MFR) from HAC:

> "In short, the differences between these two simulations, at least from a hydropower perspective, is negligible. Across the 1939 – 2011 hydrologic period and across the entire ACF system, the average net impact to power generation amounts to about 17 MWh per year, which at an average market price of $50/MWh[1] would be valued at about $850. On an annual systemwide basis, this is a less than 0.001% impact relative to the No-Action alternative…Though these energy-specific impacts do not directly reflect the dependable capacity impacts of the proposed alternative, the very small and infrequent changes to generation suggest similarly insignificant capacity implications."

Table 22 shows the SAA monthly and annual changes compared to the NAA at each facility where a negative value is a loss of power generation and a positive value is a gain. Although we see a slightly negative effect to power generation in the model, this estimated reduction is only 17 MWh compared to the average annual energy generation of 1,014,054 MWh for the NAA discussed in **Section 4.1.2**. Therefore, the impacts of the SAA on hydropower generation is negligible.

[1] $50 per MWh is intended only for rough order of magnitude illustration purposes. Actual energy prices vary by time of day, time of the year, and other factors that were not considered here.

Table 22: Average Annual Energy Generation Impacts by Month showing MWh and currency ($50/MWh)

Month	Buford	Morgan Falls	West Point	Bartletts Ferry	Goat Rock	Oliver	North Highlands	Walter F. George	Woodruff	System
1	0.01	0.00	0.00	-0.01	0.00	0.00	0.00	-0.01	-0.08	**-0.10**
	$0.50	$0.00	$0.00	-$0.50	$0.00	$0.00	$0.00	-$0.50	-$4.00	**-$5.00**
2	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.02**
	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$1.00**
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**
4	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**
	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.50**
5	-1.16	-0.24	0.06	0.10	0.05	0.06	0.03	0.12	0.00	**-0.96**
	-$58.00	-$12.00	$3.00	$5.00	$2.50	$3.00	$1.50	$6.00	$0.00	**-$48.00**
6	1.79	0.39	4.32	7.08	3.75	4.12	2.43	1.39	0.03	**25.31**
	$89.50	$19.500	$216.00	$354.00	$187.50	$206.00	$121.50	$69.50	$1.50	**$1,265.50**
7	0.02	0.00	-0.04	0.24	0.11	0.14	0.08	-0.23	0.14	**0.47**
	$1.00	$0.00	-$2.00	$12.00	$5.50	$7.00	$4.00	-$11.50	$7.00	**$23.50**
8	0.03	0.00	-2.42	-3.76	-1.94	-2.18	-1.28	-0.46	0.12	**-11.90**
	$1.50	$0.00	-$121.00	-$188.00	-$97.00	-$109.00	-$64.00	-$23.00	$6.00	**-$595.00**
9	0.03	0.00	-1.11	-2.03	-1.04	-1.17	-0.67	0.85	-0.03	**-5.16**
	$1.50	$0.00	-$55.50	-$101.50	-$52.00	-$58.50	-$33.50	$42.50	-$1.50	**-$258.00**
10	-2.33	-0.77	-1.95	-3.40	-1.83	-1.99	-1.23	0.16	0.19	**-13.16**
	-$116.50	-$38.50	-$97.50	-$170.00	-$91.50	-$99.50	-$61.50	$8.00	$9.50	**-$658.00**
11	2.19	0.19	0.44	1.05	0.58	0.63	0.36	-14.75	-0.16	**-9.47**
	$109.50	$9.50	$22.00	$52.50	$29.00	$31.50	$18.00	-$737.50	-$8.00	**-$473.50**
12	0.01	0.00	0.08	0.12	0.07	0.07	0.04	-1.98	-0.28	**-1.85**
	$0.50	$0.00	$4.00	$6.00	$3.50	$3.50	$2.00	-$99.00	-$14.00	**-$92.50**
Annual	**0.61**	**-0.43**	**-0.61**	**-0.61**	**-0.24**	**-0.32**	**-0.24**	**-14.91**	**-0.06**	**-16.80**
	$30.50	**-$21.50**	**-$30.50**	**-$30.50**	**-$12.00**	**-$16.00**	**-$12.00**	**-$745.50**	**-$3.00**	**-$840.00**

4.2.3 Navigation

As stated in Section 4.3.3 of the 2016 EIS,

> System performance in providing for navigation was ranked on two criteria:
>
> - Percent of time a 9-ft navigation channel would be available (January–May) in the Apalachicola River based on exceeding a flow of 20,600 cfs at Blountstown; and
> - Percent of time a 7-ft navigation channel would be available (January–May) in the Apalachicola River based on exceeding a flow of 16,200 cfs at Blountstown.

Table 23 shows no change from the NAA to the SAA in relation to navigation performance.

Table 23: Navigation performance comparison of alternatives

Alternative	% of time with 9-ft channel	% of time with 7-ft channel
NAA	2.7	42
SAA	2.7	42

4.2.4 Fish and Wildlife Conservation

The SAA would not affect the ability to conduct fish spawn operations at Lake Lanier, West Point Lake, Walter F. George Lake, or Lake Seminole.

As stated in Section 4.3.4 of the 2016 EIS,

> The degree to which a[n]…alternative satisfied the fish and wildlife conservation project purpose was determined based on examination of the following six indicators:
>
> - Percent of years with days < flow;
> - Median number of days per year < flow;
> - Median consecutive days per year < flow;
> - Annual maximum 30-day growing season floodplain connectivity (ac);
> - Median fall rates; and
> - Maximum fall rate.

There is no discernable difference between the NAA and the SAA. Both alternatives have an equal "annual maximum growing season (i.e., April–October) floodplain connectivity to the main channel for 30 consecutive days" of 18,056 ac, the median fall rate is 0.12 ft/day, and the maximum fall rate is 2.08 ft/day. Other performance measures associated with this alternative are shown in **Table 24**. Under the SAA, flows in the Apalachicola River would be less than 5,000 cfs 2.7 percent of the time (compared to 3% under the NAA), and the system would be in drought operations 17.6 percent of the time for both alternatives. Drought zone operations would be triggered equally, 1 time each, between the NAA and SAA for a period of 3 months.

Table 24: Listed Species Performance Measures for SAA Compared to the NAA

Flow	**% of yrs with flow less than**		**Median number of days/yr flow less than**		**Median number of consecutive days/yr flow less than**	
	NAA	**SAA**	**NAA**	**SAA**	**NAA**	**SAA**
< 5,000	3	3	0	0	0	0
< 6,000	36	36	0	0	0	0
< 7,000	51	51	1	1	1	1
< 8,000	64	64	8	8	7	7
< 9,000	81	81	43	43	12	12
< 10,000	92	92	64	64	28	28

4.2.5 Recreation

As stated in Section 4.3.5 of the 2016 EIS,

System performance of each water management alternative in achieving the recreation purpose was based on several measures at Lake Lanier, West Point Lake, and Walter F. George Lake as follows:

- Number of weeks below IIL during the recreation season during period of record;
- Number of weeks below RIL during the recreation season during period of record;
- Number of days below WAL during the recreation season during period of record;
- Percent of time below IIL during the recreation season;
- Percent of time below RIL during the recreation season; and
- Percent of time below WAL during the recreation season.

Table 25 lists the 2016 EIS criteria against the HEC-ResSim outputs and shows that over the 73-year record the operational change is negligible. Of all the criteria used to evaluate recreation performance at Lanier, West Point, and Walter F. George projects, the largest difference occurs at West Point in relation to the number of days and percent of time below the WAL, which improves under the SAA. Although, this improvement is an insignificant amount when compared to the 73-year period of analysis.

Table 25: Changes in Operations to meet Recreation Authorized Project Purpose under the SAA

Criteria	Lanier		West Point		Walter F. George	
	NAA	SAA	NAA	SAA	NAA	SAA
Number of weeks below IIL	416	416	320	319	69	69
Number of weeks below RIL	139	139	32	32	3	3
Number of days below WAL	376	376	84	84	0	0
Percent of time below IIL	26.6%	26.6%	21.8%	21.8%	4.5%	4.5%
Percent of time below RIL	9%	9%	2.2%	2.2%	0.2%	0.2%
Percent of time below WAL	3.4%	3.4%	0.8%	0.4%	0.0%	0.0%

4.2.6 Water Quality

The Executive Summary of the 2016 EIS states,

> USACE recognizes existing minimum flow requirements in the system but is not authorized to operate its projects to meet requirements for which others parties are responsible. Setting minimum flow targets to ensure compliance with water quality standards is the responsibility of states, not USACE.

As stated in Section 5.4.8 of the 2016 EIS, "…Buford, West Point, and Jim Woodruff projects would provide continuous minimum flow releases that would benefit the water quality immediately downstream of the dams." See Section 5.4.8 of the 2016 EIS for more detail.

HEC-ResSim outputs show no discernable difference of the SAA compared to the NAA. Under the SAA, Buford Dam, West Point Dam, and Jim Woodruff Lock and Dam would continue to provide continuous minimum releases, in addition to meeting other project purposes and providing associated benefits. Refer to Section 5.4.8 of the 2016 EIS for more detail.

4.2.7 Water Supply

As stated in Section 4.3.6 of the 2016 EIS,

The ability of a water management alternative to satisfy the water supply purpose was based on examining six parameters reflecting the adequacy of the conservation storage of Lake Lanier to provide the 20 mgd the relocation contracts and 277 mgd downstream withdrawals as follows:

- Buford project minimum pool elevation (ft);
- Buford project percent time Storage >/= Zone 1 (%);
- Buford project years in or below Zone 3 by December 1;
- Percent time refill from Zone 3 to Zone 1 by May 1 the next year;
- Buford project percent time at full pool by May 1 (1,071 ft); and
- Percent time Buford project pool elevation > 1,066 ft during period of record.

Table 26 shows no discernable difference under the SAA using criteria to evaluate changes to water supply performance.

Table 26: Operational Changes to Meet Water Supply Authorized Project Purpose under SAA

Alternative	Buford project minimum pool elevation (ft)	Buford project percent time Storage >/= Zone 1 (%)	Buford project years in or below Zone 3 by December 1	Percent time refill from Zone 3 to Zone 1 by May 1 the next year	Buford project percent time at full pool by May 1 (1,071 ft)	Percent time Buford project pool elevation > 1,066 ft during period of record
NAA	1050.62	53%	17	31%	60%	68%
SAA	1050.67	53%	17	31%	60%	68%

5.0 Environmental Consequences

Pursuant to 40 C.F.R. § 1502.16, the Environmental Consequences section forms the scientific and analytic basis for the comparisons of alternatives, including the No Action Alternative (as defined by NEPA and described in Section 2) and the *Proposed Action* (as defined by NEPA and identified as the SAA).

A qualitative assessment of the alternatives was conducted to analyze and consider environmental impacts to resources within the ACF Bain. The NAA is consistent with FWOP conditions, which is the baseline from which to compare all alternatives.

Pursuant to NEPA, this chapter addresses the impacts in proportion to their significance 40 C.F.R. § 1502.2(b). Significance requires consideration of context and intensity. 40 C.F.R. § 1501.3(d). The depth of analysis of the alternatives corresponds to the scope and magnitude of the potential environmental impact. Impacts are considered to be any adverse or beneficial consequences on the human or natural environment caused by the implementation of an action and include any irreversible or irretrievable commitments of resources should the action be implemented. In addition, impacts on the human and natural environment can be considered to be direct or indirect. Direct impacts are those that are caused by the action and occur at the same time and place. 40 C.F.R. § 1508.1(i)(2). Indirect impacts are those that are caused by the action and are later in time or further removed in distance but are still reasonably foreseeable. 40 C.F.R. § 1508.1(i)(2). The NEPA requires a federal agency to consider not only the direct and indirect impacts of a proposed action, but also the cumulative impacts of the action.

For the purposes of this analysis, the magnitude of impacts is classified as *de minimis*, minor, moderate, or significant and defined as the following:

- *De minimis*: A resource was not affected, or the effects were at or below the level of detection; changes were not of any measurable or perceptible consequence.

- Minor: Effects on a resource were detectable, although the effects were localized, small, and of little consequence to the sustainability of the resource.
- Moderate: Effects on a resource were readily detectable, long-term, localized, and measurable.
- Significant – a substantial, or potentially substantial, change to a resource at a degree which the majority of the resource will either be eliminated or unable to stabilize and continue to decline.

As described in **Section 3.4**, HEC-ResSim modeling shows a *de minimis* change from the NAA to the SAA when all four objectives are run simultaneously as a complete package. The percent of time each rule is activated under the SAA is listed below:

- Flow Objective 1 results in a delta of 0.030%,
- Flow Objective 2 results in a delta of 0.038%,
- Flow Objective 3 results in a delta of 0.019% for the 1,350 cfs flow target and 0.026% for the 2,000 cfs flow target, and
- Flow Objective 4 results in a delta of 0.000%.

No significant impacts to reservoir or river elevations would occur as a result of the Proposed Action and no changes would occur that would alter previously established targeted flow objectives, including ramping rates and minimum flow requirements at Jim Woodruff Lock and Dam. Therefore, the environmental impacts evaluated in the 2016 EIS for resources with no appreciable change is valid for the SAA and incorporated by reference. This section will focus on evaluating impacts to resources that either have had an appreciable change to the existing setting, were updated with the new NEPA regulations, or are of significant importance to stakeholders.

5.1 Water Quantity

As explained in **Section 4.2.7**, the SAA would continue to meet water supply demands. HEC-ResSim outputs show an imperceptible change to reservoir elevations over the 73-year period of record. The climate change analysis (summarized in **Section 5.3.1** and included as Appendix I) shows vulnerability to low-flow conditions in the latter period of the 60-year analysis for both alternatives; however, regularly occurring 5-year reviews for WCM updates enable USACE to adapt to long-term trends. Therefore, no significant direct or indirect impacts to water quantity would occur under the NAA or SAA.

5.2 Water Quality

Though there are more 303(d) listed waterbody segments today than what was evaluated in the 2016 EIS, it is not within USACE authority and responsibilities to improve water quality conditions; however, in accordance with NEPA the USACE must evaluate how proposed operational changes (e.g. Water Control Manual updates) would impact water quality within the ACF River Basin.

As explained in **Section 4.2.6**, HEC-ResSim model outputs shows no discernable difference of the SAA compared to the NAA. The USACE would continue to provide continuous minimum flow releases. Therefore, implementation of the SAA would be consistent with baseline conditions and would not adversely impact water quality directly or indirectly within the ACF River Basin.

5.3 Climate

5.3.1 Climate Change

A Climate Change Analysis (Appendix I) was performed to evaluate generalized future conditions of locations referenced in the Stay Agreement. Since there are no distinguishable differences between the NAA and SAA, both alternatives would have equal vulnerability to low-flow conditions and that the vulnerability of these low-flow conditions increases during the latter years of the period of analysis (approximately 60 years). Therefore, the SAA may have more occurrences of enacting operations necessary to meet minimum flow targets stated within the Flow Objectives. However, since USACE is required to review WCM for potential updates every five years this provides the opportunity to adapt the system in response to long-term trends. As such, climate conditions would not affect implementation of the SAA.

5.3.2 Greenhouse Gases

As stated in the 2016 EIS,

> "Other than minor emissions associated with vehicle and equipment use to conduct routine operation and maintenance activities around the reservoir projects, the projects do not serve as a source of greenhouse gas emissions. Rather, the projects produce substantial hydroelectric power which serves as a clean alternative source of energy to fossil fuels."

As stated in **Section 1.1**, USACE Dams within the ACF River Basin operates using hydraulic, mechanical, and electrical power to generate electricity. Refer to **Section 1.1** for a design description of each dam. HEC-ResSim model results show the SAA would increase discharges to meet minimum flow targets approximately 0.030% more for Flow Objective 1, 0.038% more for Flow Objective 2, 0.019% more for 1,350 cfs flow target and 0.026% for the 2,000 cfs flow target for Flow Objective 3, and 0.000% for Flow Objective 4. Spillway gates are operated via hydraulic and/or mechanical power, whereas each powerhouse is operated through electricity generated on-site, and the remaining energy is sold to the Southeastern Power Administration and Gulf Power Company. Backup diesel generators are strictly used for restarting dams in the event of power outages, which would not increase due to the SAA. No construction would occur in either NAA or SAA. The SAA would not result in an increased need for routine maintenance compared to the NAA. Neither alternative would result in increased travel to/from project sites since personnel would remain staffed. Therefore, no short term or long term direct or indirect increases in emissions would occur in either the NAA or SAA, and neither the NAA nor SAA prevent the Federal 2050 GHG Net Zero Goal from being met.

5.4 Federally Protected Species

Minimum flow and ramping rate requirements were created to minimize adverse impacts to federally listed ESA species of concern within the Apalachicola and Chipola Rivers by allowing time for species to adjust to lowering flow conditions. Because there is no change from the SAA compared to the NAA regarding the ability to meet minimum flow and ramping rate requirements at Jim Woodruff Lock and Dam and other conditions of the 2016 BO as amended, no operational changes at Jim Woodruff Lock and Dam would occur. Therefore, USACE determined that the SAA would have **No Effect** on the Gulf sturgeon, purple bankclimber, fat threeridge, Chipola slabshell, and oval pigtoe. Furthermore, the SAA would not threaten the existence of the southern elktoe, therefore a Conference Opinion is not needed for this project.

5.5 Air Quality

As explained in **Section 5.3**, neither the NAA nor SAA would result in increased GHG emissions. The project sites are operated via hydraulic, mechanical, and/or electrical power with backup generators for emergencies; therefore, no significant emissions would occur. The ACF River Basin is operated to produce clean energy and the entire ACF River Basin is in attainment (EPD 2024); therefore, neither the NAA nor SAA would result in decreased air quality whether directly or indirectly.

5.6 Navigation

As explained in **Section 4.2.3**, the NAA and SAA would provide navigation availabilities equally; therefore, no significant direct or indirect impacts to navigation are anticipated.

5.7 Flood Risk Management

As stated in **Section 4.2.1** USACE would continue to operate for flood risk management; therefore, no direct or indirect impacts to flood damages prevented or floodplain characteristics would occur.

5.8 Recreation

As explained in **Section 4.2.5**, there is no distinguishable difference in the SAA from the NAA. Though recreational visitation has increased throughout the ACF since the 2016 BO, recreationists would be faced

with equal opportunities under the SAA compared to the NAA; therefore, no significant direct or indirect impacts to recreation are anticipated.

5.9 Population and Income

Though population and income are increasing throughout the ACF, under the SAA the public would be faced with conditions consistent with the NAA since there is no discernable difference in operational changes; therefore, no significant direct or indirect impacts these resources are anticipated.

5.10 Cultural Resources

Section 106 of the NHPA and its implementing regulations in 36 C.F.R. § 800 define the process federal agencies follow to consider the effects of their undertakings could have on historic properties. According to 36 C.F.R § 800.16(l)(1), a historic property is any prehistoric or historic district, site, building, structure, or object that is has been listed or eligible for listing in the National Register of Historic Places. This ILR/TEA evaluates proposed updates to Water Control Plans within the Master WCM fort the ACF River Basin.

Early archaeological investigations of reservoir inundation impacts determined that the effects of freshwater inundation were overwhelmingly negative (Lenihan et al. 1981). It was also determined early on that some historic properties within reservoirs were more susceptible to negative impacts than others, that in-situ preservation of site was only possible in limited cases, and that archaeological mitigation plans should be incorporated in construction or reservoirs early in the planning process. Through subsequent studies of historic properties within the reservoir context, the effects of inundation and general operations of reservoirs on archaeological sites has been well documented. Especially for properties situated within drawdown zones at USACE reservoirs. Mechanical, Biochemical, and human induced consequences were identified as three general impact categories that impact sites within the drawdown zone of reservoirs (Dunn 1996). Mechanical processes include physical erosion from wave action and slumping from the saturation of archaeological deposits. Biochemical processes impact archaeological artifacts and materials through differential preservation within inundated cultural properties. Human activities that impact sites in the drawdown zone include looting, vandalism, dam construction, recreational activities, and other land use changes.

Since construction of the reservoirs in the ACF River Basin, various historic properties within the drawdown zone of the basin's reservoir projects have been impacted by these general processes. During initial reservoir flooding, mechanical processes such as shoreline erosion dominated. Once the initial flooding of the reservoirs was complete, biochemical processes became the dominant processes, especially at permanently submerged sites in the conservation pool of reservoirs below the drawdown zone. Within the drawdown zone where sites are periodically exposed and inundated, mechanical processes, such as wave action, will dominate throughout the life of the reservoir. However, biochemical processes form wetting and drying, and human processes will also continue to significantly impact resources (Dunn 1996). Since the completion of reservoir construction in the ACF and initial inundation throughout USACE reservoirs, the processes impacting historic properties have functioned relatively consistently during normal operations. Changes in reservoir operations such as WCM updates, however, can result in significant modifications to shoreline fluctuation patterns during annual drawdown and summer flood pool periods. These changes in shoreline fluctuations can increase or decrease impacts from mechanical, biochemical, or human induced processes at sites within the drawdown zones of reservoirs depending on a site's environmental and geophysical conditions. It is therefore important to consider the effects of proposed operational changes to reservoirs upon historic properties.

A subsample of 15 historic properties at the various reservoir projects within the ACF River Basin were evaluated for potential impacts in the 2016 EIS. This assessment in the 2016 EIS found no significant differences between the baseline and the Proposed Action Alternative (Alternative 7K) and determined that through proper monitoring and management using GIS tools, site mitigation measures could be recommended as adverse effects were observed through time (Tetra Tech 2016:6-382).

As there are no discernable changes between the SAA and NAA and current conditions are consistent with those described in the 2016 EIS, no significant or discernable impacts to historic properties are expected under the SAA.

5.11 Cumulative Effects

Since the SAA results in an indiscernible change from the NAA and no significant impacts would occur to resources exhibiting appreciable changes in the existing setting, the analysis for cumulative effects would be consistent with the 2016 EIS. Refer to Section 6.9 of the 2016 EIS for more information.

5.12 Other NEPA Considerations

5.12.1 Environmental Justice

In accordance with recent EOs, the USACE utilized the CEJST to disclose the environmental justice communities throughout the ACF River Basin and scaled the review based on the operational changes from the NAA to the SAA.

As stated in Section 6.5.8 of the 2016 EIS,

> "Access and use of the USACE reservoirs in the basin by minority and low-income populations would most likely focus on shoreline access activities like picnicking, wading/swimming, and recreational and subsistence fishing, primarily from the bank or public docks/piers, rather than on boating-related activities that would tend to be somewhat less dependent on high lake levels. Low water levels in the lakes would tend to affect the shoreline access activities slightly more than boating-related activities. Therefore, the access and usability of the lake resources for all visitors could be negatively affected by low lake levels but are likely to be marginally higher for low-income and minority visitors."

As stated in Section 6.5.8.8 of the 2016 EIS,

> "Seasonal fluctuations in the water surface elevations under the [NAA], even with relatively normal rainfall conditions in the basin, could create minor inconveniences for local residents, including low-income and minority populations, who use the USACE reservoirs for fishing and other forms of recreation. Those uses might be more constrained during extreme drought years, but those constraints and their associated effects are not likely to be disproportionately higher for low-income and minority populations. All lake users could be affected under those conditions, which might last for months at a time but are temporary. USACE resource managers at the lakes work closely with the public under such circumstances and pursue reasonable temporary measures to maintain at least a minimum level of access to the lakes until the extreme conditions improve.
>
> "There are no expected impacts to anglers downstream of reservoirs caused by minimal change in flows in comparison to the NAA."

The HEC-ResSim post processing results show that operational changes are rarely seen with the implementation of the SAA and that the SAA would not affect USACE's ability to meet the authorized purposes, which include factors pertaining to environmental justice concerns such as recreation (**Section 4.2.5**), water quality (**Section 4.2.6**), water supply (**Section 4.2.7**), and fish and wildlife (**Section 4.2.4**). Furthermore, lake elevations would not be appreciably changed. Therefore, the Proposed Action would not disproportionately affect disadvantaged communities in the ACF River Basin neither directly nor indirectly.

5.12.2 Protection of Children

On April 21, 1997, President Clinton issued EO 13045, Protection of Children from Environmental Health Risks and Safety Risks, which recognizes that a growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health and safety risks. This order requires federal agencies, to the extent permitted by law and mission, to identify and assess such environmental health and safety risks.

The 2016 EIS evaluated protection of children for the ILR/TEA NAA under Section 6.5.9.8. The existing setting of this ILR/TEA, although slightly less proportionally to the entire ACF population than the conditions described in the 2016 EIS, it is not significantly different and there is no discernable change from the NAA to the SAA; therefore, the analysis discussed in the 2016 EIS is valid for this consideration and incorporated by reference. The Proposed Action would not significantly impact children neither directly nor indirectly.

5.12.3 Irreversible or Irretrievable Commitments

The Proposed Action would neither result in a physical alteration of the environment nor result in significant impacts that would lead to irreversible and/or irretrievable commitments to Federal resources upon implementation.

5.12.4 Short-Term Uses of the Human Environment and Maintenance of Long-Term Productivity

Since the SAA results in a *de minimis* delta from the NAA, the analysis in Section 6.11.2 of the 2016 EIS related to this consideration is valid and incorporated by reference.

6.0 Environmental Compliance

The draft ILR/TEA was made available to the public and agencies (listed in **Table 27**) on the USACE Mobile District webpage at https://www.sam.usace.army.mil/Missions/Planning-Environmental/Environmental-Assessments/ for a period of 30 days which ended November 19, 2024. A total of 11 comments were received and are addressed in Appendix J. Overall, the comments were generally supportive with requests for clarification and/or minor data reevaluation; however, two comments were outside the scope of this action. As a result, no substantial changes to the ILR/TEA were made.

A public meeting was held December 6, 2024, in Columbus, Georgia from 4:00-7:00 Eastern Standard Time to inform the constituents of the proposed updates to the Water Control Plans.

Table 27: Distribution List

Agency	Agency	Agency
Alabama–Coushatta Tribe of Texas	Florida Department of Environmental Protection	Serodino, Inc.
Alabama Department of Economic and Community Affairs	Georgia Department of Natural Resources	Southern Company
Alabama Department of Environmental Management	Hand Arendall Harrison Sale	Tetra Tech
Cobb County	INTERA	The Nature Conservancy
Crisp County Power	National Oceanic and Atmospheric Administration	Tennessee Valley Authority
Eastern Shawnee Tribe of Oklahoma	PEW Trusts	U.S. Department of Agriculture
Environmental Protection Agency	Seminole Tribe	U.S. Geological Society
		USFWS

This ILR/TEA is in compliance with the applicable laws and EOs that were addressed in the 2016 EIS and stated in Table 3.6-1. **Table 28** includes the additional EOs that were addressed as part of this ILR/TEA.

Table 28: Compliance Status with Environmental Laws and Regulations

STATUS	PUBLIC LAW (US CODE) / EXECUTIVE ORDER
C	Executive Order 13985 of January 20, 2021: Advancing Racial Equity and Support for Underserved Communities Through the Federal Government;
C	Executive Order 13990: Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis; and
C	Executive Order 14008: Tackling the Climate Crisis at Home and Abroad;
C	Executive Order 14057: Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability;
C	Executive Order 14072: Strengthening the Nation's Forests, Communities, and Local Economies;
C	Executive Order 14096 of April 21, 2023: Revitalizing Our Nation's Commitment to Environmental Justice for All.

7.0 Recommendation

The analyses presented throughout the ILR/TEA determine that there is *de minimis* difference on environmental, engineering, operational and economic considerations between the NAA and SAA. The analyses conclude that the implementation of the SAA would meet the authorized purposes in the same manner as the NAA. **Table 29** presents the effects of adopting the SAA on the authorized purposes.

Table 29: Analysis Conclusions on Authorized Purposes

Authorized Purpose	**Project Site on ACF River Basin**	**Comparison Between NAA and SAA**
Flood Risk Management	Buford Multi-purpose Reservoir	*De minimis* Change
	West Point Lake	*De minimis* Change
Navigation	Buford Dam	*De minimis* Change
	West Point Lake	*De minimis* Change
	Walter F George Lock and Dam	*De minimis* Change
	George W Andrews Lock and Dam	*De minimis* Change
	Jim Woodruff Lock and Dam	*De minimis* Change
Hydroelectric Power	Buford Dam	*De minimis* Change
	West Point Dam	*De minimis* Change
	Walter F George Lock and Dam	*De minimis* Change
	Jim Woodruff Lock and Dam	*De minimis* Change
Recreation	All USACE ACF Projects	*De minimis* Change
Fish and Wildlife Conservation	All USACE ACF Projects	*De minimis* Change
Water Supply	All USACE ACF Projects	*De minimis* Change
Water Quality	All USACE ACF Projects	*De minimis* Change

It is recommended that the Stay Agreement Alternative is adopted and the appropriate corresponding updates to the water control manuals are conducted.

Digitally signed by CHAPMAN.JEREMY.JIGGS.1187181077
Date: 2025.01.07 10:21:50 -06'00'

Jeremy J. Chapman, P.E.
Colonel, U.S. Army
District Commander

January 7, 2025

Date

8.0 References

Council on Environmental Quality. 2024. Climate and Economic Justice Screening Tool. Accessed August 2024. https://screeningtool.geoplatform.gov/en/

Dunn, Robert A. 1996 Impacts to the Historic Properties in Drawdown Zones at Corps of Engineers Reservoirs; Technical Report EL-96-7. Prepared for the Headquarters, U.S. Army Corps of Engineers. U.S. Army Corps of Engineers, Waterways Experimentation Station, 3909 Halls Ferry Road, Vicksburg, MS 39180-6199.

Environmental Protection Agency. (2024a, August 31). Alabama Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants. EPA. https://www3.epa.gov/airquality/greenbook/anayo_al.html

Environmental Protection Agency. (2024b, August 31). Florida Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants. EPA. https://www3.epa.gov/airquality/greenbook/anayo_fl.html

Environmental Protection Agency. (2024c, August 31). Georgia Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants. EPA. https://www3.epa.gov/airquality/greenbook/anayo_ga.html

Fish and Wildlife Service (2024). Retrieved from https://www.federalregister.gov/documents/2024/10/29/2024-23929/endangered-and-threatened-wildlife-and-plants-removing-chipola-slabshell-and-fat-threeridge-from-the. 89 FR 85909

GAEPD (Georgia Environmental Protection Division). 2024. Water Quality in Georgia, 2022-2023. Georgia Department of Natural Resources, Environmental Protection Division, Atlanta.

Kaeser AJ, Smit R, Gangloff M. 2019. Mapping and modeling the distribution, abundance, and habitat associations of the endangered fat threeridge in the Apalachicola River system. Journal of Fish and Wildlife Management 10(2):653-675; e1944-687X. https://doi.org/10.3996/10.3996/032019-JFWM-021.

Lenihan, Daniel J., Toni L. Carrell, Stephen Fosberg, Larry Murphy, Sandra L. Rayl, and John A. Ware 1981 The Final Report of the National Reservoir Inundation Study, Volume I. Final report resulting from the National Reservoir Inundation Study. Funded by the Bureau of Reclamation, U.S. Army Corps of Engineers, National Park Service, and Conservation Service. United States Department of the Interior, National Park Service, and Soil Conservation Service.

National Parks Service. 2024. NPS Stats: Chattahoochee River NRA (CHAT) Annual Park Recreation Visits. Accessed August 2024. https://irma.nps.gov/Stats/Reports/Park/CHAThttps://irma.nps.gov/Stats/Reports/Park/CHAT

Oval pigtoe (Pleurobema pyriforme). ECOS. (n.d.). https://ecos.fws.gov/ecp/species/4132

Tetra Tech 2016 Final 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 (Contract No. W91278-10-D-0014-0036). Prepared for the U.S. Army Corps of Engineers, Mobile District, P.O. Box 2288, Mobile Alabama. Prepared by Tetra Tech, 61 St. Joseph Street, Mobile, AL 36602.

U.S. Census Bureau. 2024. Explore Census Data: 2022 American Community 5 yr (2018-2022) Survey. Accessed August 2024. https://data.census.gov/tablehttps://data.census.gov/table