



**US Army Corps  
of Engineers®**  
Savannah District

# Glades Reservoir Draft Environmental Impact Statement

## Executive Summary

October 2015



# EXECUTIVE SUMMARY

## INTRODUCTION

This draft Environmental Impact Statement (DEIS) presents the direct, indirect, and cumulative impacts of the proposed Glades Reservoir water supply project (the Proposed Project) on the human and natural environment. The Savannah District of the U.S. Army Corps of Engineers (the Corps), has prepared this DEIS to satisfy its National Environmental Policy Act (NEPA) (42 U.S.C. 4321 to 4370[f]) obligation in its consideration of an application for a Department of the Army Permit pursuant to Section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344) for a proposed water supply reservoir to be located in Hall County, Georgia (Permit Application Number SAS-2007-00388). The Corps administers the permitting program under Section 404 of the CWA, which regulates the discharge of dredged or fill material into waters of the United States (WOUS). Hall County Board of Commissioners, Hall County, Georgia (the Applicant) submitted its Section 404 permit application on June 10, 2011. The Applicant proposes to construct a water supply reservoir (Glades Reservoir) on Flat Creek, a tributary of Chattahoochee River upstream of Lake Lanier. The proposed Glades Reservoir would impound approximately 850 acres and provide a total storage volume of 11.7 billion gallons (BG) and an annual average water supply of 50 million gallons per day (mgd) to meet Hall County's demand through the year 2060. The Proposed Project would be operated as a pumped-storage reservoir to store water pumped from the Chattahoochee River (**Figure ES-1**).

The Corps determined, based on the Council on Environmental Quality's (CEQ) regulations for implementing the procedural provisions of the NEPA (40 C.F.R., Part 1500), and the Corps' procedures for implementing NEPA (33 C.F.R. Part 230), that an Environmental Impact Statement (EIS) is needed to comply with the requirements of the NEPA. The information presented in this DEIS and the comments expected to be received from the public and other federal, state, and local agencies during the public comment period will aid the Corps in its decision-making process. After conducting a public hearing and reviewing public and agency comments on the DEIS, the Corps will determine whether additional evaluation of the Proposed Project and its alternatives, and further public participation, is necessary prior to issuing a Final Environmental Impact Statement (FEIS). The FEIS will revise and/or supplement the DEIS as necessary, provide any additional information relating to the DEIS analyses, and respond to all written and verbal comments received on the DEIS. The FEIS will be circulated for a 30-day review period prior to concluding the EIS coordination phase of the NEPA process. After the FEIS review period is complete, the Corps will prepare a Record of Decision (ROD) which will identify the Least Environmentally Damaging Practicable Alternative (LEDPA) and summarize the results of the EIS coordination process. The LEDPA is the only alternative the Corps is authorized to permit. Any conditions and mitigation associated with permitting the LEDPA will be described in the ROD. The ROD represents final agency action and will be published in the Federal Register, posted as a link on the Corps Savannah District website, Glades Reservoir EIS website, and will be made available to local media.

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Figure ES-1 Proposed Project



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### **Cooperating Agencies**

The Corps requested that the U.S. Environmental Protection Agency (EPA) and the Georgia Environmental Protection Division (EPD) participate in the NEPA process as cooperating agencies (40 CFR 1501.6, 1508.5). Formal cooperating agency agreements have been executed between the Corps and these two agencies. The EPA and Georgia EPD advised the Corps in their areas of technical and regulatory expertise. The Georgia EPD has authority over the issuance of State of Georgia permits required prior to the construction of the proposed reservoir or any reservoir alternative, most notably, the State permit to withdraw water and the State's water quality certification authority delegated under Section 401 of the CWA. The Corps held several coordination meetings and workshops with the cooperating agencies; the cooperating agencies provided comments and guidance on preliminary draft during development of this DEIS.

The U.S. Fish and Wildlife Services (USFWS) declined to be a cooperating agency for this DEIS due to funding constraints but will execute its review responsibility with respect to the Fish and Wildlife Coordination Act (16 U.S.C. 661-667[e]). The Corps initiated informal consultation pursuant to Section 7 of the Endangered Species Act (ESA) (16 U.S.C. 1536) during development of this DEIS and continues to consult with USFWS throughout this process.

### **Public and Agency Participation**

The Corps solicited public comments on the proposed Glades Reservoir project during a series of three public scoping meetings held in March 2012 in Georgia, Alabama, and Florida. The Corps also met with agency representatives from the three states during this time to discuss the EIS process and the Proposed Project. The 60-day public scoping period started with the publication of the Notice of Intent in the Federal Register on February 17 and ended on April 17, 2012. The Corps received 592 individual comments as a result of the scoping comment period. All of the comments were reviewed and considered in the development of the scope of work and the analyses performed for this DEIS.

### **Relationship to Other Programs and Processes**

#### ***ACF Basin WCM Update DEIS***

The Corps Mobile District prepared a DEIS for the update of its Apalachicola-Chattahoochee-Flint (ACF) River Basin Water Control Manual (WCM) concurrently as the Savannah District prepared the Glades Reservoir DEIS. The ACF WCM Update DEIS, published in the Federal Register on October 2, 2015, evaluates potential effects from changes in the operations of the Corps' facilities in the ACF Basin that may result from the water supply request submitted by the State of Georgia in January 2013. The State of Georgia submitted a request to the Assistant Secretary of the Army for Civil Works to allow withdrawal of 297 mgd from Lake Lanier and 408 mgd from the Chattahoochee River below Lake Lanier (total of 705 mgd), to meet Georgia's projected water supply need through the year 2040.

Lake Lanier serves as the primary water supply source for Hall County. The City of Gainesville (Gainesville) Public Utility Department currently operates and maintains the water treatment and

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distribution system that serves all of Hall County via a 2006 intergovernmental agreement with Hall County. Gainesville is currently authorized to withdraw 18 mgd on an annual average basis from Lake Lanier (as long as it returns 10 mgd of treated effluent to the lake).

To meet the estimated 2040 water supply need of the metro Atlanta, the Proposed Action Alternative included the ACF WCM Update DEIS if for: (1) gross water supply withdrawals of 185 mgd from Lake Lanier and 40 mgd from Glades Reservoir (225 mgd total from the Chattahoochee River upstream of Buford Dam); and (2) gross water supply withdrawals of 408 mgd from the Chattahoochee River downstream of Buford Dam. However, not until the update of the WCM is complete and adopted (with the publication of an FEIS and ROD) will information be finalized regarding the potential for additional water withdrawals from Lake Lanier or the Chattahoochee River to meet future water demands of metro Atlanta counties, which includes Hall County. Therefore, due to the uncertainty regarding the potential for Hall County to be granted additional water supply withdrawals from Lake Lanier, the Glades Reservoir DEIS considers a range of possible Lake Lanier allocations in various alternatives. The alternatives analysis for the Glades Reservoir DEIS will be reviewed and possibly be refined during the preparation of a Glades Reservoir FEIS.

### ***Updated Population and Demand Forecasts***

In the initial 404 permit application (June 2011), the Applicant stated that the projected 2060 population for Hall County would be 833,333. This was based on a set of 2030 population projections published by the State of Georgia Office of Planning and Budget (OPB) in March 2010 and the projected 2050 population prepared for Georgia's regional water planning process. The Georgia OPB releases updated population projections periodically for state budgeting and planning purposes. In January 2013, the OPB released updated population projections through 2030 based on the 2010 Census data (referred to as the 2012 OPB projections). In April 2013, the Applicant provided the Corps a revised 2060 population projection of 644,383 to the Corps based on the 2012 OPB projections.

In July 2015, the Corps provided a preliminary Glades Reservoir DEIS to Georgia EPD and EPA for review. On August 26, 2015, the Metropolitan North Georgia Water Planning District (MNGWPD), which the Applicant is a member of, released a set of draft water demand forecasts based on population projections prepared by OPB and the Atlanta Regional Commission (ARC) in 2015. These draft forecasts are to be used for the MNGWPD to update its Water Resources Management Plans (to be completed and scheduled to be adopted in November 2016).

The Corps has reviewed the MNGWPD's draft population projections and water demand forecasts, which are significantly lower than the previous forecast published by OPB and the forecast in the District's 2008 Water Supply and Conservation Development Plan. The Corps has informed the Applicant of the updated 2015 OPB population projections, and that this new information will be considered in the FEIS. The Applicant has requested the opportunity to review the updated OPB 2050 projections and to use this information as a basis to update the 2060 population projection for Hall County. The Applicant will coordinate their revised 2060 population projection with Georgia EPD for verification. The Corps will consider this updated population projection information in the Glades Reservoir FEIS.

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The Corps is also considering alternative approaches to permitting to address future fluctuations in population, water demands and economic cycles. One alternative being considered would be to add a special condition to the permit, if issued, to address the future timing of construction of the various system components. This special conditional permit would require the Permittee to submit documentation to the Corps confirming that water demands within Hall County would exceed existing raw water supplies during the next five to six years. Required documentation would include water use records, a projection of county water demand for the next 10-year period, and any other documentation necessary to confirm that reservoir construction is needed to meet county water demands. The Permittee would not begin construction of any part of the authorized project until receipt of a written notice to proceed from the Corps. The draft permit would also include a similar special condition to address timing for construction of a pumping station on the Chattahoochee River and associated water transmission mains and facilities (see Chapter 2 for more details). Discussions of these types of potential permit conditions are included in Chapter 2 of the DEIS.

### ***Endangered Species Act: Section 7 Consultation***

Under Section 7 of the ESA, federal agencies must consult with the USFWS when any action that the agency authorizes, funds, or carries out (such as through a permit) to ensure that the proposed activity is “not likely to jeopardize the continued existence” of any listed species, or will not “result in the destruction or adverse modification” of the designated critical habitat of a listed species (ESA Section 7(a)(2), 16 U.S.C. 1536(a)(2)). During preparation of this DEIS, the northern long-eared bat was listed as a federally threatened species (May 2015). The Corps has coordinated with the USFWS and has initiated informal consultation on this listed species; Section 7 consultation continues after publishing of this DEIS and will be completed prior to the Corps issuing an FEIS and ROD.

### ***National Historic Preservation Act: Section 106 Consultation***

Pursuant to Section 106 of the National Historic Preservation Act (NHPA) (16 U.S.C. § 470f), the Corps is consulting with the Georgia Department of Natural Resources, Historic Preservation Division (HPD) with regard to the potential for the Proposed Project to adversely impact cultural resources. The Corps has prepared a draft Programmatic Agreement for this project and is coordinating with HPD and the Advisory Council for Historic Preservation. Section 106 consultation continues after publishing of this DEIS and will be completed prior to the Corps issuing an FEIS and ROD.

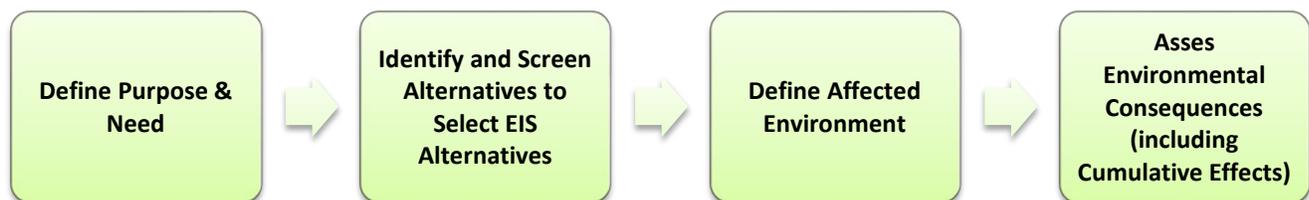
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### DEIS Preparation Process

The development of this EIS proceeded generally in order of the following steps (**Figure ES-2**); each of which is presented in following sections:

1. Purpose and Need
2. Alternatives Analysis (including the Proposed Project, other “Action” Alternatives and the No-Action Alternative)
3. Affected Environment and Environmental Consequences (12 major categories and 13 subcategories guided by the public and agency scoping comments)
4. Cumulative Effects Assessment

Figure ES-2 DEIS Preparation Process



### Purpose and Need

In the 404 permit application (2011) and other supporting documents, the Applicant has stated that its project purpose is, “to provide a reliable source of public water supply capable of satisfying the projected unmet water demand in the Service Area of Hall County during drought conditions for the projected population growth through the year 2060” (Alternatives Analysis, 404 permit application). The Applicant defined the project service area as all of Hall County, including jurisdictions and areas currently served by other municipal or private entities. The Applicant has projected the future Hall County water needs to be 77.3 million gallons per day (mgd) based on a projected 2060 population of 644,383 and anticipates their unmet need to be 49.8 mgd by 2060.

The Applicant states that it must move forward now to secure an adequate water supply source using best available information. The Applicant has indicated concern that Lake Lanier reallocation and contracting issues, as well as pending litigation may take many years to resolve; thus, Hall County cannot wait for an uncertain period of time to secure the water supply to meet future needs. The Applicant has stated that Hall County needs a reliable water supply source during drought conditions and a reservoir is a necessary to satisfy this need. The Applicant asserts that a reservoir would be the most practical, cost effective, long-term water supply source for the county. The Applicant believes that a secure, locally managed and controlled, long-term water supply source is essential to support the community.

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The Corps has determined that the basic project purpose is to provide a reliable water supply for the residents and businesses of Hall County, Georgia. The Corps' has determined that the overall purpose of Applicant's Proposed Project is to provide a reliable source of public water supply capable of satisfying the projected unmet water demand in Hall County during drought conditions for the projected population growth through the year 2060.

The Corps has reviewed information provided by the Applicant and which was verified as accurate by the Georgia EPD (April 2013), and has performed an independent analysis to determine the need for the Proposed Project. Based on information available at the time of completion of this DEIS (July 2015), the Corps determined Hall County's projected 2060 demand to be 72.9 mgd, with an unmet need of approximately 45.5 mgd by 2060. The majority of this unmet water demand would need to be provided through the construction of a new water supply reservoir, and is the basis for Hall County's 404 permit application.

## ALTERNATIVES ANALYSIS

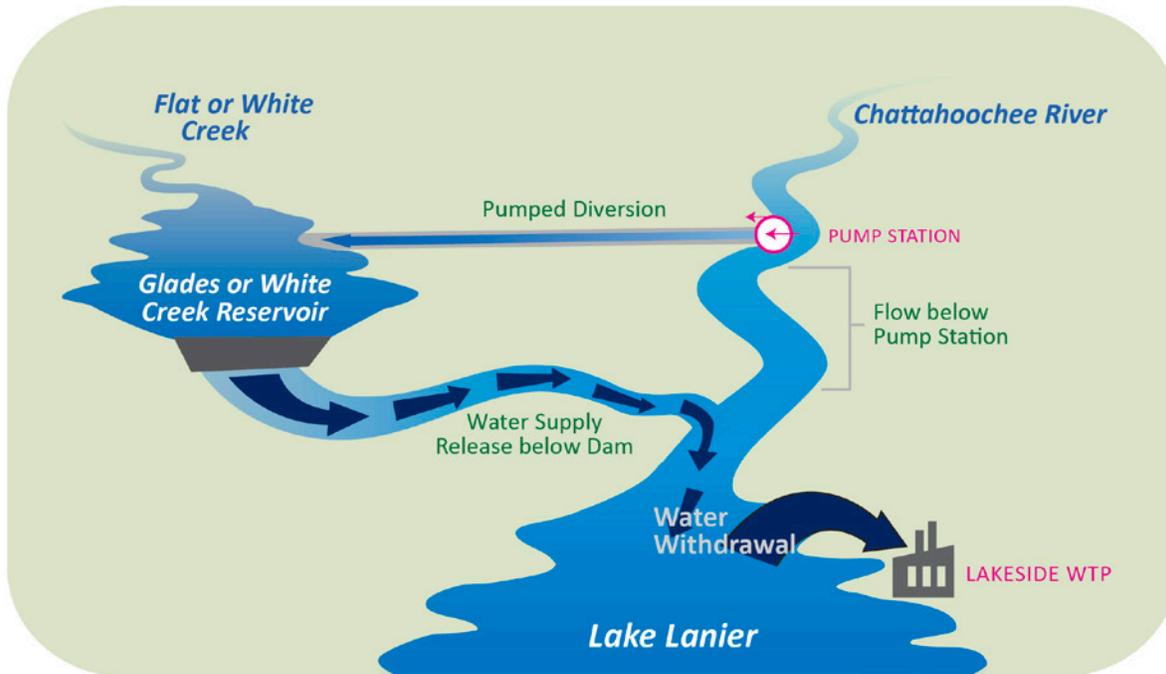
A wide range of water supply sources and infrastructure components were identified and screened through a two-phase process using appropriate environmental factors and criteria. The Corps conducted the identification, verification, evaluation, and screening of water supply infrastructure components and the formulation of alternatives using screened components, with review and input from the cooperating agencies. In Phase 1, 56 water supply sources and infrastructure components were identified and screened, resulting in 15 components that were carried forward to formulate alternatives. In Phase 2, twenty-two water supply alternatives were formulated and screened, resulting in 13 alternatives that were carried forward for detailed evaluation of environmental consequences (Chapter 4). The 13 alternatives include the Proposed Project, 11 action alternatives, and a No Action Alternative.

## Proposed Project

The Applicant's Proposed Project includes construction of the 11.7 BG Glades Reservoir along Flat Creek, which would provide a safe yield of 50 mgd on an annual average daily basis. The proposed reservoir would have a usable storage of 9.4 BG and a water surface area of approximately 866 acres at its proposed normal pool elevation of 1180 feet above mean sea level. The proposed dam would have a height of 140 feet. The reservoir would be operated as a pumped-storage reservoir. Water from the Chattahoochee River would be pumped from a 37-mgd water intake and pump station via a 21,500-foot water main to the proposed Glades Reservoir. Water would only be pumped from the river when there is a need to fill or refill the reservoir, and when the instream flow protection thresholds (IFPTs) could be maintained in the river below the pump station. Water would be released from the reservoir into Flat Creek and would flow into the headwaters of Lake Lanier. The same quantity of water released from the reservoir would be withdrawn from Lake Lanier via the raw water intake at the existing Lakeside water treatment plant (WTP), which is operated by Gainesville (**Figure ES-3**).

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Figure ES-3 Proposed Project with Water Supply Passing through Lake Lanier



## Action Alternatives

Eleven action alternatives were formulated from various water supply components. All alternatives include the common components below:

- Water Supply from Cedar Creek Reservoir: 4.3 mgd (revised safe yield based on updated drought data)
- Additional Groundwater: a total of 4.7 mgd, including existing permitted groundwater withdrawals of 3.4 mgd plus development of additional groundwater supplies estimated at 1.3 mgd
- Additional Conservation: estimated savings of 2.3 mgd resulted from proposed implementation of more aggressive water conservation and water loss reduction programs
- Water Purchase: 1.2 mgd from Jackson County

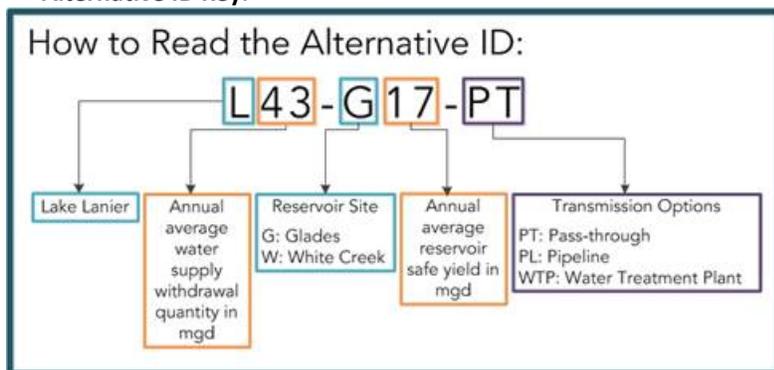
The action alternatives were formulated into three groups based on Lake Lanier total water supply allocation of 18, 30, or 43 mgd for Hall County use. The additional water supply components for each action alternative depend on the Lake Lanier allocation and include a new reservoir location (either Glades Reservoir or White Creek Reservoir) and a river water transmission system to the reservoir. Subsets of these alternatives derive from two methods of conveying water to the Lakeside WTP or a new WTP. The Lakeside WTP currently has a maximum daily treatment capacity of 10 mgd and was originally designed for expansion up to 46 mgd. There is space on the existing site to expand the WTP to 100 mgd. **Table ES-1** provides a summary of the EIS action alternatives.

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**Table ES-1 Summary of Action Alternatives**

Alternative #	Alternative ID	Lake Lanier Allocation (mgd)	Reservoir Site	Reservoir Safe Yield (mgd)	River Water Transmission System (to reservoir)	Reservoir Water Transmission System (to Lakeside WTP)	Reservoir Water Transmission System (to New WTP)
1	L18-G42-PT	18	Glades	42	X		
2	L18-G42-PL	18		42	X	X	
3	L18-G42-WTP	18		42	X		X
4	L30-G30-PT	30	Glades	30	X		
5	L30-G30-PL	30		30	X	X	
6	L30-G30-WTP	30		30	X		X
7	L43-G17-PT	43	Glades	17	X		
8	L43-G17-PL	43		17	X	X	
9	L43-G17-WTP	43		17	X		X
10	L43-W17-PT	43	White	17	X		
11	L43-W17-PL	43		17	X	X	

**Alternative ID Key:**



**No Action Alternative**

In this EIS, “no action” means no proposed Glades Reservoir project *or* no permit action from the Corps for the Proposed Project. For this EIS, the “No Action Alternative” considers what Hall County would do to meet its water supply needs if it does not obtain a Section 404 permit for the proposed Glades Reservoir Project. The environmental effects resulting from taking no action are compared with the effects of permitting the Proposed Project and action alternatives.

To define the No Action Alternative, the Corps sought clarification from Hall County on what they would do in the event that a Section 404 permit for the proposed Glades project is not issued. Hall County stated in a letter dated September 24, 2015, that if the Corps does not issue a permit for Glades Reservoir, Hall County would request that the State of Georgia allocate enough water from Lake Lanier to the City of Gainesville to meet the entire 2060 needs of Gainesville and Hall County. Additional

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sources of water supply such as conservation, water purchase, and groundwater will still be sought, leaving a remaining need of 42 mgd to be requested from Lake Lanier. If less than 42 mgd of additional water supply is allocated from Lake Lanier to Gainesville/Hall County, then the new 2060 shortfall would be 42 mgd minus the amount allocated. Hall County would then begin a new water supply planning to find the most cost effective alternative source(s) of water supply to meet this new 2060 shortfall (see Appendix L). Basically, Hall County indicated that there are only two alternatives available to the county for additional water supply (after considering additional conservation and groundwater development): (1) the construction of a new water supply reservoir; or (2) allocation of additional water from Lake Lanier.

Based on this input, components of the “No Action Alternative” include:

- Additional conservation to reduce water demand (additional demand reduction of 2.3 mgd)
- Additional 42 mgd of Lake Lanier allocation (for a total annual average allocation of 60 mgd). Gainesville would not be able to exceed the current allowed withdrawal level of 18 mgd without changes to its existing storage contract agreement.
- Cedar Creek Reservoir (4.3 mgd of safe yield on an annual average basis)
- Additional groundwater supply to reach a total of 4.7 mgd
- Water purchase from Jackson County (1.2 mgd)

## AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Potential effects of the Proposed Project, each action alternative, and the No Action Alternative were evaluated for issues identified during the scoping process. The following is a summary of the results.

### Surface Water

Because the additional water supply to be developed by the Proposed Project is considered a part of the original 2013 total water supply request from the State of Georgia (297 mgd from Lake Lanier and 705 mgd total from the upper Chattahoochee Basin), the effect comparisons were conducted in two steps: (1) comparison of Baseline Conditions (2011) with the No Action Alternative (no reservoir and 2060 conditions), which shows the impact of overall system demand increases from the Metro Atlanta area from baseline to 2060 and (2) comparison of action alternatives (with reservoir) with the No Action Alternative (without reservoir), both under 2060 demand conditions, which isolates the effects caused by construction of the proposed reservoir.

#### ***Impacts of adding a reservoir to the Apalachicola-Chattahoochee-Flint (ACF) system***

Modeling of the operations of the Corps’ ACF reservoir operations indicates that the addition of water supply storage within the Proposed Project and the action alternatives does not adversely affect the Corps’ operation of the ACF system under the rules defined in the existing water control manual. The analyses show that shifting a portion of Hall County’s demand from Lake Lanier to the proposed Glades

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Reservoir or White Creek Reservoir would not significantly impact lake levels, downstream flows, drought operation, recreation, or hydropower production (as compared to the No Action Alternative that meets identical demands without an additional reservoir). Adding storage is slightly beneficial to the system operation under these assumptions because it increases the Lake Lanier water level and does not affect operation downstream of Buford Dam. The slightly higher average daily lake levels at Lake Lanier reduces the time the lake is below the its designated recreation impact levels (comparing action alternatives to the No Action Alternative). However, Lake Lanier would see an average of one-foot pool level decrease when the overall system demand increases from Baseline to 2060 conditions.

Glades Reservoir Alternatives 1 through 6 have a larger safe yield (42 mgd or 30 mgd, respectively) than Glades Reservoir Alternatives 7 through 9 (17 mgd) and provide a slightly greater benefit to the ACF system. White Creek Reservoir (Alternatives 10, 11) provides less benefit to the system; it is a smaller site with less usable water supply storage and a maximum safe yield lower than that of Glades Reservoir.

### ***Impact to the Chattahoochee Streamflow upstream of Lake Lanier***

The Proposed Project and action alternatives would adversely impact the streamflow by reducing the average daily flow in the 7-mile reach of Chattahoochee River below the proposed intake; average daily flow decrease is estimated to be between 0.3% and 5.9%. The Proposed Project (Glades Reservoir 50-mgd yield) requires higher pumping capacity from the Chattahoochee River and would result in a 5.9% reduction of streamflow below the intake. Alternatives 7 through 11 (Glades Reservoir and White Creek Reservoir 17-mgd yield) require the least pumping and would result in the lowest flow reduction (0.3% for Alternative 7).

### ***Impact to Flat Creek or White Creek***

How water is conveyed from the reservoir to a WTP greatly impacts the average flow below the dam. When the water supply is released below the dam to Lake Lanier via the Chattahoochee River and is withdrawn at Gainesville's Lakeside WTP (pass-through alternatives: Proposed Project, 1, 4, 7, 10), the estimated average daily flow in Flat Creek or White Creek increases from 8.1% to 192.6%. When the water supply quantity is pumped from the reservoir to Lakeside WTP (pipeline alternatives: 2, 5, 8, 11) or a new WTP (WTP alternatives: 3, 6, 9), the estimated average daily flow below the dam is reduced by 56.7% to 76.8% because these alternatives only release the minimum instream protection threshold (i.e. minimum instream flow) to protect the aquatic species and downstream users.

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### ***Impact to Inflows to Lake Lanier and Other Downstream Effects***

The average daily flow into Lake Lanier will not change for the Proposed Project and Alternatives 1, 4, 7, and 10, which release the water supply from Glades Reservoir to Lake Lanier via the Chattahoochee River. When the water supply is pumped from the reservoir to Lakeside WTP (Alternatives 2, 5, 8, 11) or a new WTP near Glades Reservoir (Alternatives 3, 6, 9), the average flows into Lake Lanier will be reduced by 1.3% to 3.2%.

The Proposed Project and action alternatives would not adversely affect pool elevations and other authorized purposes in the reservoirs downstream of Lake Lanier because the existing WCM was designed to balance the system-wide storage in the ACF Basin.

## **Water Quality**

The Upper Chattahoochee River currently meets the state water quality criteria for pH, dissolved oxygen (DO), and temperature. The compliance status for these parameters is expected to remain “supporting” after the operation of the Proposed Project and action alternatives under any proposed IFPT.

The watershed of the proposed White Creek Reservoir (Alternatives 10 and 11) has a larger proportion of agricultural land compared to the watershed for the proposed Glades Reservoir (Proposed Project and Alternatives 1-9). This results in higher predicted phosphorus loadings entering from the watershed to the proposed White Creek Reservoir. This increased phosphorus load is predicted to fuel substantial algal growth in the proposed White Creek Reservoir with potentially frequent summer algal blooms. Under current watershed conditions after filling, Glades Reservoir would exhibit low to moderate productivity (lower potential for algal growth). Moderate productivity (algal growth) is anticipated for the future 2060 conditions.

The proposed reservoir would allow a portion of the nutrients and sediments to settle in the reservoir, whether the nutrients or sediments are from the Chattahoochee River or from the reservoir watershed. There would be a net effect of slightly lower loads of nutrients and sediment to Lake Lanier than is occurring currently. The overall system demand increase of the Metro Atlanta area would contribute to the majority of potential water quality impacts in Lake Lanier and in other Corps reservoirs based on the hydrological modeling results of the ACF Basin. The construction of the Glades Reservoir is shown to have a slight benefit to Lake Lanier water quality, as it slightly increases the volume of water available for waste assimilation in Lake Lanier during both average conditions and critical drought conditions.

Georgia Rules for Environmental Planning Criteria establish guidelines for protection of Water Supply Watersheds. The criteria are different for large water supply watersheds (100 square miles or more) and small water supply watersheds (less than 100 square miles). Small water supply watersheds have increased buffer projections for stream corridors including a 100' protected vegetative buffer and a 150-impervious surface setback, and would apply to alternatives where water is directly piped to a WTP.

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### **Soils and Geology**

The construction of the dam and reservoir for the Proposed Project and action alternatives would result in an unavoidable loss of geologic resources (sand, gravel, clay, and bedrock). There would likely be loss of soil from accelerated erosion due to construction activities, as well as excavating and filling the dam footprint area and filling the reservoir.

No active or former mine sites have been identified in the affected area; therefore no impacts are anticipated to mining or mineral needs from the construction of the Proposed Project or action alternatives. Mitigation measures should be applied to minimize impacts from erosion during construction.

The reservoir construction would result in the conversion of potentially prime farmland or farmland of statewide importance to flooded areas (non-agricultural use). Construction of pipelines and pump stations, while not directly impacting the underlying soils, will restrict the future use of potential prime farmland.

### **Land Use**

The land use of the potential affected areas, presented in the Georgia Land Use Trends 2008 and 2050 land use data, defines the pre-construction and post-construction land use for the DEIS alternatives.

The Glades Reservoir alternatives would disturb a range of 1018 acres (Proposed Project and Alternatives 1, 4, 7) to 1061 acres (Alternative 3). Along with a mixture of evergreen forest, mixed forest, and row crop/pasture lands, the baseline land use consists of deciduous forest: 49% (Alternatives 3, 6, 8); 53% (Proposed Project and Alternatives 1, 2, 4, 9); and 54% (Alternative 5). The post-construction land transforms into a range of 89% to 98% open water (reservoirs); 2 to 44 acres high intensity urban (pump station and WTP); and between 2-11% utility swaths (transmission mains), depending on whether the alternative includes a transmission system from the reservoir to Lakeside WTP.

The White Creek Reservoir Alternatives 10 and 11 would disturb 667 and 785 acres, respectively. The baseline land use consists of deciduous forest - 53% (Alternative 10) and 47% (Alternative 11), and a mixture of evergreen forest, mixed forest, and row crop/pasture lands. For Alternative 10, the post-construction land transforms into 99% open water (reservoir); 2 acres high intensity urban (pump station); and 1% utility swaths (transmission main). For Alternative 11, the post-construction land transforms into 83% open water (reservoir); 7 acres high intensity urban (pump station and booster station); and 16% utility swaths (transmission system from the reservoir to Lakeside WTP).

The construction of a reservoir would impact current roads through areas that will be flooded. For Glades Reservoir, approximately 28 acres will be impacted due to new road construction and relocation. For White Creek Reservoir, approximately 21 acres will be impacted.

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## **Climate/Greenhouse Gases**

In this DEIS, the impacts on greenhouse gases (GHG) are estimated based on the loss of forestland from construction of the Proposed Project alternatives and emissions from electricity consumption for pumping. The Glades Reservoir and White Creek Reservoir alternatives would contribute to carbon dioxide (CO<sub>2</sub>) emissions, and project implementation would impact forested lands, causing a potential reduction of CO<sub>2</sub> sequestration and less GHG being removed from the environment. The impacts to forested lands that would occur from components of the alternatives are minor. The reductions of CO<sub>2</sub> sequestration would be considered long-term impacts due to the permanent removal of forest. Increased emissions due to pumping are relative to natural growth of the county, and would also be considered minor.

## **Biological Resources**

### ***Upland Vegetation***

The construction of all alternatives would directly impact and result in permanent loss of all upland vegetative communities below the normal maximum water levels of the reservoir and within water transmission main easements if not effectively restored, and other infrastructure (pump stations, new WTP, and road relocation). Approximately 898 acres of vegetated areas are located within the Glades Reservoir alternatives (Alternatives 1 through 9). Approximately 74% of the river and reservoir water transmission systems for the Glades Reservoir would occur in vegetated areas. Approximately 617 acres of vegetated areas are located within the White Creek alternatives (Alternatives 10 and 11). Approximately 50% of the river and reservoir water transmission systems for White Creek Reservoir would occur in vegetated areas.

### ***Wetlands, Streams, and Other Waters***

All action alternatives would result in similar types of temporary and permanent impacts to WOUS. Impacts to Corps-verified wetlands and streams for all alternatives are summarized in **Table ES-2**.

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**Table ES-2 Wetland and Stream Impacts**

Alternative #	Alternative ID	Wetland Impacts (acres)	Stream Impacts (linear feet)
Applicant	L18-G50-PT	39	94,260
1	L18-G42-PT	39	94,260
2	L18-G42-PL	40	96,010
3	L18-G42-WTP	39	94,260
4	L30-G30-PT	39	94,260
5	L30-G30-PL	40	96,010
6	L30-G30-WTP	39	94,260
7	L43-G17-PT	39	94,260
8	L43-G17-PL	40	96,010
9	L43-G17-WTP	39	94,260
10	L43-W17-PT	41	59,738
11	L43-W17-PL	42	61,908
No Action	L60	0	0

Unavoidable adverse impacts would occur to streams and wetlands, as outlined in the **Table ES-2**. Seasonally saturated or flooded wetlands and streams would be permanently inundated.

**Wildlife**

Alterations to biological characteristics including aquatic and semi-aquatic species, as well as any wetland or riparian corridors that provide preferred habitat for those species. In spite of these unavoidable adverse impacts, new habitats would be created for reservoir species, as well as potential development of fringe wetlands that may be established along the edge of the reservoir.

Direct impacts to small and large mammals in the Piedmont ecoregion would be similar for the Proposed Project and the action alternatives. Snakes, turtles, lizards, frogs, toads, and salamanders are found within the potential reservoir sites. Both the proposed Glades Reservoir and the White Creek Reservoir could provide additional breeding and foraging habitats for eagles, as well as ospreys, which might be in the area. Suitable habitat for 14 migratory birds has been identified by USFWS for Hall County, including the proposed Glades Reservoir alternatives. Suitable habitat for 16 migratory bird species has been identified for White County, including the proposed White Creek Reservoir alternatives. All perennial streams potentially impacted by any of the reservoir alternatives are warm water streams unsuitable for supporting stocked or natural trout populations. None of the streams within any of the alternatives are listed as High Priority Waters, nor do they contain High Priority aquatic species. The portions of the Chattahoochee River potentially affected by the reservoir alternatives, as well as the confluences of respective perennial streams, are considered popular recreational fishing areas.

A field summer habitat assessment, conducted by Eco-Tech on June 9, 2015, found approximately 38% of the study area is a hardwood forest, which provides the most suitable habitat for bats. These wooded areas are suitable for roosting and foraging of the federally endangered Indiana bat (*Myotis sodalis*) and the federally threatened northern long-eared bat (*M. septentrionalis*). Existing forested habitat and

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streams within the project study area may provide suitable foraging and/or flying corridors for Indiana bats and northern long-eared bats. No federally listed species were captured during the survey. However, suspected calls of the federally listed Indiana bat, federally listed gray bat, and federally listed northern long-eared bat were recorded with ultrasonic bat detectors, although species-level classifications could not be determined by manual analysis.

## **Socioeconomic Conditions**

### ***Housing, Communities, and Transportation***

No homes or existing communities would be displaced by the construction of the Glades Reservoir project and no structures would be impacted as a result of associated new roads. Although the rural setting of the area would be retained, the setting would be converted from wooded areas to impounded water. The White Creek Reservoir and associated roads would result in displacement of 42 structures and thirteen existing roads would be impacted by construction of that new reservoir.

Impacts to the surrounding environment, roadways, businesses, and residences during construction of water transmission systems for Glades Reservoir or White Creek Reservoir are expected to be minimal and temporary. No structural or roadway displacements are expected.

Impacts from construction of a new Glades WTP (Alternatives 3, 6, 9) due to construction traffic and land disturbing activities are expected to be minimal and temporary; no structural or roadway displacements are expected.

Dam construction is expected to last three years and would lead to increases in local traffic. However, construction of the reservoir sites, transmission systems (river and reservoir), and roadways will occur in phases; therefore, the impacts due to construction traffic are partially mitigated by not occurring all at once.

### ***Demographics and Environmental Justice***

The environmental justice assessment for all alternatives consisted of two parts: (1) the identification of minority and/or low-income populations using U.S. Census data, and (2) the review of existing affordable public housing options and how they may be impacted.

Some of the proposed alternatives are within block groups that are identified as either low-income or minority and would be described as containing environmental justice populations. However, no disproportionate adverse impacts would occur to these communities as a result of the implementation of any alternative.

In addition, no public housing facilities within the immediate vicinity of the proposed Glades Reservoir and White Creek Reservoir alternatives would be impacted by construction of the reservoirs.

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### ***Recreation***

No state parks or recreational areas would be directly impacted by any alternative, although several parks are located along the Chattahoochee River in the vicinity of the projects. The overall system demand increase from 2011 to 2060 conditions would have an adverse (cumulative) impact on recreation at Lake Lanier, as well as at other downstream Corps Lakes. The Proposed Project would increase the overall storage capacity of the ACF system and would result in slightly higher water surface elevation in Lake Lanier during low flow and drought periods (when compared to the No Action Alternative under 2060 conditions). This would be beneficial to the recreational activities of Lake Lanier. White Creek Reservoir alternatives, with smaller storage capacity, would not provide the same beneficial impact on Lake Lanier recreational activities when compared to No Action Alternative. The Proposed Project and alternatives would have no recreational impacts on the Corps lakes downstream of Lake Lanier, when compared to No Action Alternative under 2060 conditions.

With regard to the seven mile section for the Chattahoochee River below the proposed pump station, recreational fishing and the availability of fish during spring spawning season would not be affected by any of the alternatives as compared to the baseline conditions. Recreational kayakers/canoers would not experience changes in frequency to the minimal thresholds established for these activities as compared to the baseline conditions. Recreational motorboats would be expected to experience an increased frequency of lower flows, which could affect maneuverability along the river during the months from June to January compared to baseline conditions.

Temporary impacts due to transmission main construction activities crossing the Chattahoochee River would occur and could limit fishing, canoes, kayaks, and motorboats during the construction timeframe (a minimum of two weeks assuming no blasting of river bedrock is necessary). New opportunities for passive recreational activities (such as picnicking, hiking and fishing) along the new reservoirs would be provided after construction. Flat Creek and White Creek would retain fishing opportunities; however, the fish composition is subject to change under different alternatives.

### ***Economics***

The Proposed Project and all action alternatives could contribute to the local economy by providing temporary jobs from construction activities and permanent jobs from the operation and maintenance (O&M) of the facilities. The increased number of construction jobs is considered a short-term beneficial effect limited to the timeframe of project construction. In addition, as the construction of the infrastructure component would be phased, there would be repeated short-term benefits based on the level of construction activities. The major long-term economic benefit of the Proposed Project is to provide a secure water supply source that will support the future development plans of the county that will also benefit the North Georgia region.

This DEIS includes a planning level capital cost estimates for the EIS alternatives based on best available information. One key unknown cost for all alternatives evaluated (including the No Action Alternative) are fees that may be charged to the State of Georgia under the future Lake Lanier storage contract

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agreement between the Mobile Corps and the state. The Corps Mobile District is developing the details of the future storage contract and revised cost and therefore the cost of future Lake Lanier water supply withdrawal is not included in the estimated “capital costs” presented in this DEIS. The capital cost estimates for this DEIS include the construction cost of all water supply infrastructure for withdrawing, delivering, and treating raw water supply (including intake and pump station, pipeline, reservoir, expansion of an existing WTP, or construction of a new WTP). The capital cost estimates exclude the cost of mitigation and the cost to expand future distribution system to deliver treated water to customers. The distribution system would need to be expanded for all alternatives to provide future services that meet operation (for example, water pressure and fire protection) and regulatory (water quality) standards. The actual need for expansion and improvements would depend on whether water is treated at the Lakeside WTP or at a new WTP near Glades Reservoir, and where future population and demand are to be located, and thus, is beyond the scope of this DEIS.

The estimated capital cost would range from approximately \$64 million dollars for the No Action Alternative (cost for expansion of existing WTP; no reservoir construction) to the highest of \$344 million for Alternative 2 (42-mgd Glades Reservoir with a pipeline and booster pump station to Lakeside WTP). The Proposed Project is estimated to cost approximately \$166 million. In general, the “pass through” alternatives (1, 4, 7, and 10) have cost advantage over other alternatives where water would be pumped to either Lakeside or a new WTP for treatment.

## Visual and Aesthetic Resources

Visual and aesthetic resource impacts are anticipated to be experienced by a limited number of people in the areas of the Glades Reservoir and White Creek Reservoir, with the views changing from a rolling terrain to an open water vista. Visual and aesthetic resource impacts in the areas of the proposed pump stations for either Glades Reservoir or White Creek Reservoir are likely to be experienced mostly by Chattahoochee River recreationalists who would see the pump stations during their boating or fishing activities along the river.

The new Glades WTP would be a visual impact to local motorists along Glade Farm Road, but this impact could be mitigated by the inclusion of a vegetation buffer. The transmission systems would be buried underground and would not result in permanent visual impacts, since the majority of the transmission systems are proposed along existing disturbed road rights of way. The construction of the transmission systems, including the burying of the pipeline crossing of the Chattahoochee River, would result in temporary visual and aesthetic impacts that would return to existing conditions upon the completion of construction.

## Air Quality

Construction of the infrastructure required for the Proposed Project and action alternatives - such as the dam, pump stations, and river and reservoir transmission systems - is a source of air quality emissions. These emissions would be temporary and have a short-term, insignificant effect on local ambient air quality. The project components would necessarily be built through a phased construction plan, and the de minimis thresholds for the majority of pollutants would not be exceeded in any given year.

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Conformity with the air quality standards is presumed if the project emits less than the general conformity de minimis thresholds, and all alternatives would be in conformity. Hall County is designated as part of a non-attainment area for particulate matter 2.5 (PM 2.5). Hall County has previously been included in areas designated as non-attainment for the 8-hour Ozone standard. However, currently the county is part of an 8-hour ozone maintenance area. No exceedances of the 8-hour ozone maintenance or PM 2.5 non-attainment areas would occur. Mitigation measures would be implemented for fugitive dust emissions.

### **Noise**

Implementation of all reservoir alternatives would have both short- and long-term effects on the noise environment. Short-term, minor adverse effects would result from the temporary use of heavy equipment during land clearing and construction associated with the dam and river and reservoir transmission systems. Long-term effects would likely be a mix of adverse and beneficial effects.

While most existing sources of noise within the reservoir footprint such as agricultural activities, automobile traffic, and lawn maintenance equipment would end, there is likely to be long-term noise associated with local roads relocated near residents and new recreational road traffic in the vicinity of the reservoir, pump stations, and WTP (if Alternative 3, 6, or 9 is selected, which includes a new WTP at Glades Reservoir). Increases in noise would not create areas of incompatible land use or violate any federal, state, or local noise ordinance.

### **Cultural Resources**

Cultural resources including historic and archaeological resources were evaluated using a combination of database research, previous studies, and field survey. Glades Reservoir footprint impacts would result in the adverse visual effect of two National Register of Historic Places (NRHP)-eligible properties: Glade Farm House and the Mose Gordon Lumber Company Mess Hall. Neither NRHP-eligible resource would be adversely affected physically by the Glades Reservoir alternatives. Visual adverse effects for both properties would be mitigated through the use of photo-documentation, archival quality photographs with a brief narrative history, and the distribution of a copy of these materials to the Hall County Historical Society.

For the Glades Reservoir footprint, two prehistoric archaeological sites identified of unknown NRHP eligibility would require additional Phase II testing. Four isolated finds identified in the Glades Reservoir footprint would require additional testing. No NRHP sites were identified within the White Creek Reservoir footprint.

### **Hazardous Materials**

No hazardous waste or hazardous materials and no known hazardous waste sites were identified within a 500-foot search radius of the Glades Reservoir, White Creek Reservoir, or river transmission systems. Within 500-feet of the reservoir transmission system to Lakeside WTP, four Resource Conservation Recovery Act (RCRA) reporting facilities were identified; however, these facilities should not be

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considered a hazard to the transmission systems, as they have no recent violation (within 2 years) and are not in any state or federal remediation programs.

## CUMULATIVE EFFECTS

This DEIS evaluated the aggregate impacts of past, present, and reasonably foreseeable water-based or land-based actions that, when combined with one of the action alternatives, may affect the environment cumulatively. Cumulative effects analyses were conducted for all resources. However, a focus of the analysis, based on ongoing ACF Basin water management controversy and public scoping comments, was on surface water hydrology and management. The complete cumulative effects analysis is presented in Chapter 4 of the DEIS.

Both land-based and water-based actions were considered for the cumulative effects analysis. A total of 48 land-based actions have been identified based on best available information. The land-based actions include residential and non-residential developments that have had a permit application submitted to Hall County or other jurisdictions within Hall County, and transportation projects that were identified from Gainesville-Hall County's 2040 Transportation Plans.

Water-based actions were identified as projects that submitted water supply requests, permit applications (such as 404 permits) to the Corps, or have recently obtained permits. The reasonably foreseeable water-based actions include: Georgia's Water Supply Request (filed in January 2013); the Corps Mobile District's ongoing update and DEIS for ACF Basin's Water Control Manual; and wetlands and stream impacts identified in the Corps permit database. The Corps' permit database is available and organized by Hydrologic Unit Code (HUC); therefore, the geographical boundary of the cumulative impacts analysis for water-based actions is also bounded by the HUC8 watershed for the Upper Chattahoochee River (03130001).

Hall County was the focus of the geographic area for the cumulative effects analysis of land-based actions. Hall County is the water service area for the Proposed Project, and the Purpose and Need of the Proposed Project is to meet and support the future needs of Hall County. Land-based actions were identified by reviewing various city and county permitting records and master plans, the GHCCP (GHCCP, 2005), and the Gainesville-Hall MPO 2040 Metropolitan Transportation Plan (August 2011). Some Alternatives include the White Creek Reservoir, which is located in White County. Research into land-based actions in White County, identified only 4 future development projects with a total associated land disturbance of less than 300 acres. Given that the scale of land-based actions in White County are considerably smaller than those in Hall County, and that the water from the White Creek reservoir would be used to support Hall County development, Hall County was maintained as the geographic area for cumulative impacts for all Alternatives.

The modeling results indicated that the direct, indirect, and cumulative impacts of the Proposed Project or action alternatives on the Corps reservoirs and downstream flows in the ACF Basin would occur

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mostly above Buford Dam. The majority of impacts would occur below proposed intake locations in the Chattahoochee River above Lake Lanier and in Lake Lanier (above Buford Dam).

### Surface Water Management

Overall, the water management modeling indicates that the increase in projected system-wide demand from 2011 to 2060 would result in some adverse impacts and most of the adverse impacts would be felt in the upper Chattahoochee Basin above Buford Dam (upper Chattahoochee River and Lake Lanier). This is due to (1) the increase in net consumptive use in the Metro Atlanta area, and (2) because the existing rules operate the Corps' ACF basin reservoirs to maintain certain flows downstream of Buford Dam. In summary, the increase in overall system demand from 2011 to 2060 is predicted to have the following cumulative effects (comparing the No Action Alternative (L60) to the Baseline (2011) based on water management modeling using 73 years of simulated and observed streamflow data):

- An estimated 4.1% decrease in average daily streamflow into Lake Lanier
- An estimated 0.7% decrease in average daily streamflow at the Georgia/Florida State Line
- On average, an estimated 1-foot decrease for daily pool level at Lake Lanier and a 0.05-foot decrease in daily pool level at West Point Lake
- No effects are expected on pool levels for the reservoirs downstream of West Point Lake (W.F. George and Woodruff) based on the system's existing operation rules
- A decrease of approximately 5.5 feet for Lake Lanier minimum daily pool level during a critical drought period similar to the 2007-2009 drought
- An estimated 0.7% decrease in average daily discharge below Buford Dam (the impact reduces downstream to an estimated 0.1% decrease in average daily discharge below Walter F. George and Jim Woodruff dams)
- An overall reduction of 1.5% in the combined average annual hydropower energy production for the four federal reservoirs (most of this can be attributed to a 6.3% reduction in average daily energy generation production at Buford Dam)
- An estimated 0.7% reduction of average daily power capacity at Buford Dam (no impacts on average daily power capacity downstream of Buford Dam)
- An increase in adverse recreational impact at Lanier due to lower lake levels during drought periods. Lake Lanier will fall below the Recreational Impact Level at Lake Lanier (1063 ft. MSL) 8% more of the time under Future Demands (2060) than under Baseline (2011) conditions. Very minimal to no effects on recreational impact for the reservoirs downstream of Lanier (only 0.2% increase in time below RIL at W.F. George; no effect on West Point or Jim Woodruff) based on the system's existing operation rules.
- An increase in the number of times drought operations are triggered at Jim Woodruff (from 3 in 2011 to 5 in 2060). The increase in total system demand would increase the percentage of time that the system is under "drought operation" (10.8% under 2060 conditions) when compared to the baseline (6.1% at 2011 conditions).

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Cumulative effects analyses for the remaining resources are described in Chapter 4 of this DEIS. Potential cumulative effects from present and future foreseeable actions could range from short-term effects during construction of infrastructure to long-term effects associated with increased water consumption and changes in water management including changed streamflows and reservoir levels, and long-term operation and management of the new water supply infrastructure once constructed.