







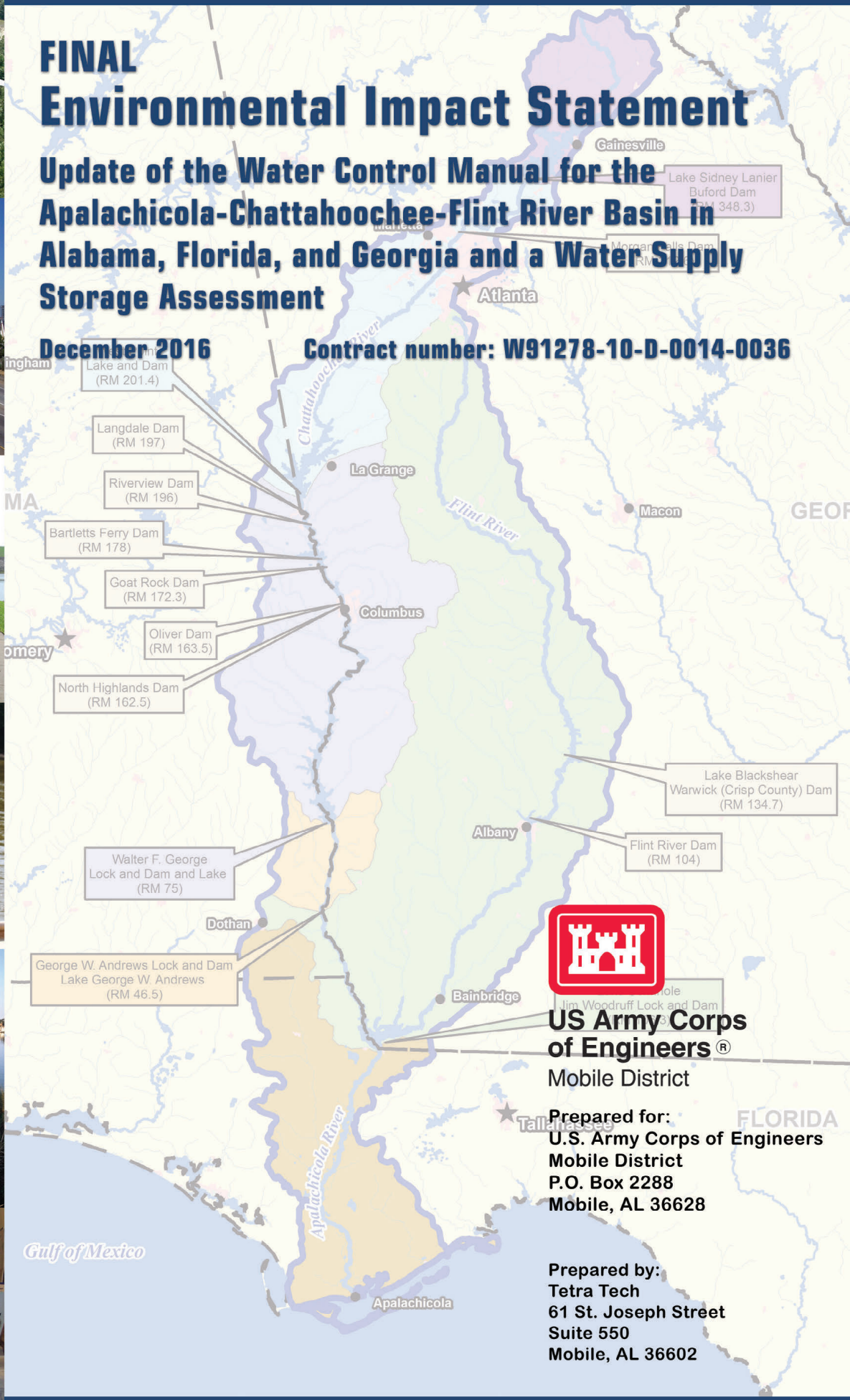




FINAL
Environmental Impact Statement

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

December 2016 **Contract number: W91278-10-D-0014-0036**



US Army Corps of Engineers®
Mobile District

Prepared for:
U.S. Army Corps of Engineers
Mobile District
P.O. Box 2288
Mobile, AL 36628

Prepared by:
Tetra Tech
61 St. Joseph Street
Suite 550
Mobile, AL 36602

From: Leonardo Inghilleri
Sent: Tuesday, February 02, 2016 8:50 AM
To: ACF-WCM
Cc: lakeinfo@lakelanier.org
Subject: [EXTERNAL] Comments regarding update of ACF Water Control Manual

Dear Colonel Chytka,

I am a new resident of Lake Lanier and I wish to thank you for all your efforts in preserving the beauty and functionality of our wonderful lake. Having lived in the Atlanta area for the past 22 years, my family has had many opportunities to enjoy the wonderful amenities of the lake for so long and we are now very excited to be here permanently.

Through my LLA membership I was made aware of the planned changes to the ACF Water Control Manual for Lake Lanier. I do realize that I am a few days late in submitting my comments as I missed the deadline of January 30, 2016. However, I hope that you will still take into considerations my contribution, provided in the spirit of collaboration and support of the Corp and of civic responsibility.

Based upon the information about the update of the manual I recently received, I would like to suggest the following action:

1. Consider revising the navigation plan to minimize or prevent the impact the proposed plan will have on Lake Lanier's water levels. A
2. Develop a process to incorporate rigorous drought prediction that will trigger changes in reservoir operations to preserve lake levels during drought. This is a great concern as I believe that prevention and scientific methods are the best options to handle unforeseeable situations. B
3. Revise the management practices of the reservoirs to retain maximum storage levels in the reservoirs so that drought conditions will not have the adverse impact that was experienced in December 2007. This is a great concern for all of us who have experienced that event and we cringe at the idea of a 2006-2009 redux. C
4. Modeling and planning for raising Lake Lanier's full pool level to a higher level, possibly 1073, jointly with continuous efforts to prevent soil erosion. D

Dear Colonel Chytka, I wish to thank you for your consideration and I wish you a successful 2016, full of joy, health and success.

Respectfully submitted,

Leonardo Inghilleri

Response to ACF220 – Leonardo Inghilleri

A. As shown in Figure 6.1-6 of the EIS, the PAA would likely result in lake levels at Lake Lanier ranging from about 2 to 4 ft lower than those for the NAA. That condition would be expected to occur less than 2 percent of the days over the entire modeled period of record (73 years) during the worst drought conditions for that period. The differences would be attributable largely to increased water supply withdrawals from the lake as well as increased releases from Buford Dam to meet future water supply demands for Metro Atlanta users (i.e., Cobb, Fulton, and DeKalb counties and the City of Atlanta). It should be noted that navigation is not supported when drought operations are in effect.

B. USACE regulations do not allow use of forecasts in real-time project operations. Forecasted conditions may be used for planning future operations, but releases will follow the water control operations plan based on observed conditions within the watershed to the extent practicable. The Drought Contingency Plan (DCP) sections 3-02 and 3-03 contained as an exhibit in the WCMs in appendix A of the EIS includes discussion of drought identification and National Integrated Drought Information System (NIDIS). An NIDIS pilot program has been established for the ACF River Basin with the goal of developing a regional Drought Early Warning Information System. The system will use key indicators of drought to make timely drought forecast. USACE is a contributor and user of the NIDIS pilot project tools.

C. Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008.

D. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management. Accordingly, raising the conservation pool at Lake Lanier by 2 ft would not meet this criterion and was not carried forward.

CB&T
COLUMBUS BANK AND TRUST®

DR
DS

Billy Blanchard
President and CEO

January 27, 2016

Commander, U.S. Army Corps of Engineers
Mobile District
P. O. Box 2288
Mobile, AL 36628

Attn: PD-EI (ACF0DEIS)

Dear Col. Chytka:

The Corps' efforts in compiling the draft Environmental Impact Statement associated with the revised Apalachicola-Chattahoochee-Flint (ACF) Water Control Manual are significant and appreciated. Also, your acceptance of public comments is appreciated.

I recognize the tremendous influence that Corps exerts in the entire ACF basin and the accompanying challenges in balancing water needs within the framework of federal authorizations.

However, I believe that the Corps has not met its responsibility in protecting the water needs of the Columbus/Phenix City/ Ft Benning region. Our area needs a reliable and sustainable river flow to meet our current and future water needs for recreation; municipal and industrial water supply; and water quality for wastewater assimilation and health of the aquatic environment. A

To remedy this oversight, I recommend that the Corps include in its Water Control Manual a flow control node for Columbus, with the minimum flows of 800 cfs (instantaneous), 1350 cfs (daily) and 1850 cfs (weekly).

I understand that this is not a request for additional water allocation, but a confirmation of sustaining flows that have been achieved consistently since 1975.

Furthermore, these flows have a long history of widespread support throughout the basin (AL-FL-GA 2003 Compact, AL and GA scoping comments to the Corps, ACF Stakeholders' Sustainable Water Management Plan, numerous public and private entity comments).

It is also my understanding that the Corps has appropriate authorization under the Clean Water Act to release these minimum flows, such that the EPA delegated authority to the states can be fulfilled through issuance of NPDES permits with assurances of minimum flows to assimilate waste load allocations. B

Thank you again for your efforts. Our community is looking forward to a prosperous future with a sustainable supply of clean water and an ongoing cooperative relationship with the Corps.

Sincerely,

Billy Blanchard

William R. Blanchard

WRB:PCM

PO Box 120 • Columbus, GA 31902

a division of SYNOVUS BANK
MEMBER FDIC

Response to ACF221 – Columbus Bank and Trust

A. A node for Columbus, Georgia, was included in the HEC-ResSim model (see Figure 2 of appendix E) and HEC-5Q model (See Figure 2.1 of appendix K) of the draft EIS. The authorized purposes of the federal ACF system do not include a specific directive to meet flow targets at Columbus. Nonetheless, USACE's modelling of the PAA over the 73-year hydrologic period of record indicate that a daily average flow of 1,350 cfs at Columbus would be achieved on 94 percent of the days for the PAA compared to 95 percent under the NAA (refer to section 6.1.1.2.3.9). . Flows at Columbus for the various alternative considered are discussed in section 6.1.1.2.3 of the draft EIS and water quality is discussed in various portions of section 6.1.2 of the draft EIS.

B. The authorized purposes of the federal ACF system do not include a specific directive to meet flow targets at Columbus, Georgia. Flows at Columbus for the various alternatives considered are discussed in section 6.1.1.2.3 of the draft EIS and water quality is discussed in various portions of section 6.1.2 of the draft EIS. As described in section 6.1.1.2.3.9 of the EIS, model results over the 73-year hydrologic period of record indicate that a daily average flow of 1,350 cfs at Columbus would be achieved on 94 percent of the days for the PAA compared to 95 percent for the NAA (reflecting current operations).

Response to ACF221 – Columbus Bank and Trust

DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY MANEUVER CENTER OF EXCELLENCE
1 KARKER STREET
FORT BENNING, GEORGIA 31905-5000

REPLY TO ATTENTION OF

IMBE-PW

11 January 2016

MEMORANDUM FOR Commander, South Atlantic District, United States Army Corps of Engineers, 60 Forsyth Street SW, Room 10M15, Atlanta, GA 30303-8801

SUBJECT: Fort Benning River Flow and Water Requirement

1. I request your assistance in establishing sustainable river flows in the Chattahoochee River to meet the water needs of the Maneuver Center of Excellence and Fort Benning (MCoE). Although we requested it during the public comment period in 2013 for the update to the ACF Water Control Manual (WCM), a Columbus/Fort Benning flow control is not included in the Draft Environmental Impact Statement for the WCM released by Mobile District on 1 October 2015. This is a significant vulnerability that should be rectified by adding the node to the WCM. Fort Benning relies on the Chattahoochee River for high-quality drinking water, wastewater assimilations, and recreation. The Corps of Engineers' ongoing denial of a flow control node places these priorities at risk for the Fort Benning/Columbus region and increases our vulnerability in terms of sustainable, reliable, and continuous flow of Chattahoochee River water necessary for current and future essential water needs of the region.

C

2. I support Columbus Water Works' request for minimum flows at the requested Columbus node of 800cfs (continuous), 1350cfs (daily), and 1850cfs (weekly). Maintaining these flow rates will ensure no disruption to the Army's mission at Fort Benning. Additionally, these flows are supported by the Federal Energy Regulatory Commission's license issued to Georgia Power Company for the Middle Chattahoochee Hydro Project for the purpose of meeting flow for wastewater assimilation as mandated by the Clean Water Act.

3. The Corps of Engineers already has a solid track record of meeting these flow requirements the vast majority of the time. However, during the few times when the river does not meet these flows, we face the possibility of Clean Water Act violations and other risks. Therefore, I ask that our minimum requirements be ensured by the addition of a flow control node at Columbus/Fort Benning.

4. Point of contact is Mr. Taylor, Director, MCoE Directorate of Public Works, and may be reached via e-mail at donald.c.taylor50.civ@mail.mil or phone 706-545-2330.

AUSTIN S. MILLER
Major General, USA
Commanding

C. See response to ACF101

Responses to ACF222 - Tri-Rivers

From: Burns, Steven
Sent: Friday, January 29, 2016 4:49 PM
To: ACF-WCM
Cc: Billy Houston
Subject: [EXTERNAL] Comments of Tri Rivers . ACF WCM DEIS
Attachments: Comments of Tri Rivers . 1-29-2016.pdf

On behalf of Executive Director Billy Houston, please find attached the comments of Tri Rivers Waterway Development Association concerning the Draft Environmental Impact Statement for a proposed Water Control Manual for the Apalachicola-Chattahoochee-Flint River Basin.

I would greatly appreciate an acknowledgment of the timely receipt of the attached comments. Thank you in advance for that and for the Corps' consideration of these comments.

Sincerely,
Steven Burns

BALCH
& BINGHAM LLP

Steven A. Burns, Partner, Balch & Bingham LLP
1901 Sixth Avenue North • Suite 1500 • Birmingham, AL 35203-4642

CONFIDENTIALITY: This email and any attachments may be confidential and/or privileged and are therefore protected against copying, use, disclosure or distribution. If you are not the intended recipient, please notify us immediately by replying to the sender and double deleting this copy and the reply from your system.

TRI RIVERS
Waterway Development Association

ACF Water Control Manual and Draft Environmental Impact Statement: Summary of Tri Rivers Comments

January 29, 2015

1. **The Corps Should Establish Flow Targets of 1,350 cfs Daily and 1,850 cfs Weekly at Columbus, Georgia, and 2,000 cfs Daily at Columbia, Alabama. 3**
   a. Flow Targets Are Necessary for Equitable Distribution of Project Benefits. 3
   b. Downstream Communities Depend on Sufficient Flows. 4
   c. A Broad Range of Stakeholders Has Supported Flow Targets. 6
   d. The Corps' Operations Can Produce an Unnecessary "Artificial Drought." 8
   e. The Corps' Action Zones Keep Upstream Reservoirs at Elevations That Are Higher Than Needed for Water Supply at the Expense of Downstream Flows. 10
2. **The Corps Is Authorized to Provide Flow Support for the Middle and Lower Chattahoochee. 12**
   a. The Eleventh Circuit's Opinion Shows that Project Purposes Are Defined Broadly and Include Flow Support for the Middle and Lower Chattahoochee River. 12
   b. Navigation Remains an Authorized Project Purpose. 18
   c. Congress Did Not Intend Operations That Favor One Region Over Another. 20
3. **The Corps Should Enhance Its Consideration of Alternatives That Assume Channel Maintenance. 20**
   a. The Corps Has Failed to Request Adequate Funds For Navigation Maintenance 21
   b. The Past Failure to Obtain Florida DEP's Approval Is No Longer Relevant. 21
   c. If the Corps Abandons Navigation, State Water Quality Requirements Govern. 22
4. **Flaws in the NEPA Analysis. 23**
   a. The Corps Has Failed to Consider A Reasonable Alternative to the Proposed Action. 23
   b. The Corps Has Failed to Consider the Full Effect of Major Federal Actions 23
   c. The Corps Has Failed to Adequately Consider Socioeconomic Effects. 25
5. **The Corps' Efforts to Support Recreational Uses in the Middle Chattahoochee River Are Appreciated and Should Continue. 26**

List of Attachments 28

TRI RIVERS
Waterway Development Association
630 East Broad Street, Eufaula, Alabama 36027
334-688-1000 / 334-695-1878

January 29, 2016

VIA E-MAIL TO *ACF-WCM@USACE.ARMY.MIL*

Colonel Jon J. Chytka
Commander, Mobile District
U.S. Army Corps of Engineers
ATTN: PD-EI (ACF-DEIS)
P.O. Box 2288, Mobile, AL 36628

Re: Apalachicola-Chattahoochee-Flint River Basin:
Comments on Water Control Manual and Draft Environmental Impact Statement

Dear Colonel Chytka:

This letter provides the comments of Tri Rivers Waterway Development Association (Tri Rivers) regarding the Draft Environmental Impact Statement (DEIS) for a new Water Control Manual for the Apalachicola-Chattahoochee-Flint (ACF) River Basin. We are grateful to the U.S. Army Corps of Engineers (Corps) for this opportunity to provide our views.

About Tri Rivers

Tri Rivers comprises individuals, businesses, nonprofits, and local governments located along the ACF River System in Alabama, Florida, and Georgia. Tri Rivers' members share a common desire to enhance and utilize the ACF River System to improve the quality of life in our region.

Members of Tri Rivers include Bainbridge/Decatur Economic Development Council, Barbour County (AL) Commission, the Center for Water Resource Economics of Troy University, Clay County (GA) Economic Development Authority, the City of Columbus, Columbus Water Works, Dothan Chamber of Commerce, the City of Eufaula, Friends of Lake Eufaula, Greater Columbus Chamber of Commerce, Houston County (AL) Commission, Lake Seminole Association, the City of Phenix City, Phenix City Chamber of Commerce, Quitman County (GA) Commission, Russell County (AL) Commission, Uptown Columbus, Alabama Power Company, Georgia-Pacific Corporation, Southern Nuclear Operating Company, W.C. Bradley Company, and WestRock. Major industrial facilities associated with Tri Rivers' members include the Mahrt

Mill at Cottonton, Alabama, owned by WestRock; Georgia-Pacific's mill at Cedar Springs, Georgia; and the Farley Nuclear Plant near Dothan, Alabama, which is owned by Alabama Power and operated by Southern Nuclear Operating Company.

1. The Corps Should Establish Flow Targets of 1,350 cfs Daily and 1,850 cfs Weekly at Columbus, Georgia, and 2,000 cfs Daily at Columbia, Alabama.

Tri Rivers reiterates its support for mandatory flow targets of 1,350 cubic feet per second (cfs) daily and 1,850 cfs weekly at Columbus and 2,000 cfs daily at Columbia. These targets should carry the same weight and authority as the target for Peachtree Creek. Tri Rivers has consistently advocated in favor of these flow targets, including in our scoping comments submitted to the Corps previously on November 21, 2008; December 30, 2009; and January 11, 2013. A

There may be any number of ways to deliver flows at these volumes and locations. For example, the Corps could conceivably dedicate some specific amount of capacity in its storage reservoirs for Middle and Lower Chattahoochee flow support. We do not presume to know better than the Corps how to achieve this goal, but we would emphasize that flows must be supported by the entire system. For example, Walter F. George is the nearest storage reservoir to Columbia. However, with less than 15% of the system's total conservation storage, it cannot reasonably sustain a flow target without support from the other upstream reservoirs.

a. Flow Targets Are Necessary for Equitable Distribution of Project Benefits.

Under current practice as well as the proposed Water Control Manual, in times of scarcity in the basin, the Corps favors keeping upstream reservoirs as full as possible, with elevations at Lake Lanier higher than necessary for purposes of water supply. Meanwhile, the basic needs for municipal and industrial interests downstream are neglected. This is not a fair or reasonable distribution of the project's resources. Flow targets on the Middle and Lower Chattahoochee are necessary to ensure that the Corps strives to meet the needs and share burdens on a proportionate basis across the area served by the project.

We understand that the Corps cannot meet all flows and maintain all lake levels to the fullest extent sought by all ACF stakeholders at all times. Water management within a system is a zero-sum endeavor in the sense that when more water is held at one location, less is available elsewhere. The question is this: *When water resources are insufficient to meet all demands, how does the Corps effectively manage flows to distribute project benefits throughout the basin?* B

We assert that the only equitable method is to implement flow targets that carry equal operational authority across the engineered system. In times of shortage, or if an external legal source imposes a flow requirement deemed to be superior to the ACF-specific authorities—such as an Endangered Species Act flow at a particular location—then the Corps' operations should

Responses to ACF222 - Tri-Rivers

A. Whatever purported agreements were made between the governors of the states of Alabama, Georgia, and Florida in 2003 were never approved by the United States Congress; therefore, USACE has no authority to operate for these flow targets. The stated daily and weekly average flow targets at Columbus, Georgia, are established in the Federal Energy Regulatory Commission (FERC) license for Georgia Power Company projects downstream of West Point Lake (refer to section 6.1.1.2.1). Each of the FERC target flows include an important qualifier, e.g., "a daily average target minimum flow of 1,350 cfs, or inflow, whichever is less" (emphasis added). Model results over the 73-year hydrologic period of record indicate that a daily average flow of 1,350 cfs at Columbus would be achieved on 94 percent of the days for the PAA compared to 95 percent under the NAA (refer to section 6.1.1.2.3.9). The Alabama Office of Water Resources and the Southern Nuclear Operating Company have identified a daily average flow need of 2,000 cfs at Columbia, Alabama, to support continued operation of the Farley Nuclear Plant. Model results indicate that the daily average flow need at Columbia would be met 95 percent of the days over the period of record compared to 96 percent under the NAA.

   The authorized purposes of the federal ACF system do not include a specific directive to meet flow targets at Columbus, Georgia. Daily and weekly average flow targets at Columbus, are established in the 2004 Federal Energy Regulatory Commission (FERC) license for Georgia Power Company projects downstream of West Point Lake (refer to section 6.1.1.2.1). Each of the FERC target flows include an important qualifier, e.g., "a daily average target minimum flow of 1,350 cfs, *or inflow, whichever is less" (emphasis added)*. Model results over the 73-year hydrologic period of record indicate that a daily average daily flow of 1,350 cfs at Columbus would be achieved on 94 percent of the days for the PAA compared to 95 percent under the NAA (refer to section 6.1.1.2.3.9).

B. USACE proposed and evaluated water management measures and alternatives that balance across all authorized project purposes.

adapt in a manner that distributes any burdens across the regions served and affected by the Corps' operations on a proportionate basis.

The Corps has asserted that it manages upstream water resources conservatively due to the relative difficulty of refilling Lake Lanier, which has large storage capacity with a small drainage area. In the abstract, that position is not illogical. However, Lake Lanier refilled reasonably quickly after the drought of 2007 and 2008, rising to within a few feet of full pool by June 2009 and reaching full pool by the end of that year. In any event, as discussed further below (Part 4.a), the Corps has failed to identify and model an alternative that would strive to meet flow targets across the region on an equitable and proportionate basis. Therefore, the Corps also has failed to provide sufficient information to allow the public to consider whether such a flow regime would have unreasonable upstream effects.

b. Downstream Communities Depend on Sufficient Flows.

(1) Existing Communities and Economic Activity in the Middle and Lower Chattahoochee Region

The communities and businesses located along the Middle and Lower Chattahoochee River have invested substantially in public works projects, infrastructure, electric generating facilities, and major industrial facilities. They have done so in reliance upon the Corps' lawful operation of the ACF System and commitment to maintain flows sufficient to serve the Congressionally authorized project purposes.

Adequate flows are necessary for the survival of existing industrial facilities, such as the Mahrt and Cedar Springs facilities and the Farley nuclear plant, which depend on the Chattahoochee for industrial cooling and discharge assimilation. Low-flow conditions imperil the continued operation of these facilities; the preferred action alternative artificially creates low flow conditions, resulting in a higher and unnecessary risk to these industrial facilities. An assurance of steady flow is also essential for water supply, environmental protection, recreation, tourism, and fish habitat restoration generated by projects like the 2.5-mile urban whitewater course that is part of the $26 million Aquatic Ecosystem Restoration of the Chattahoochee River at Columbus, Georgia.

(2) Navigation-based Economic Prospects in the Middle and Lower Chattahoochee Region

C

Throughout its existence and continuing today, Tri Rivers has emphasized the importance of commercial navigation from Columbus and Phenix City to the Gulf of Mexico. Support for navigation has always included a flow component as well as a maintenance aspect.

C. Operating ACF Basin projects specifically to meet water supply needs of Alabama agriculture has not been authorized by Congress. As in past years during low-flow conditions, water users can notify USACE of their needs directly. When conditions allow an on balance with meeting other project purposes, USACE will work with water users to address extraordinary conditions (e.g., special releases) to assist with public health and safety issues throughout the basin.

In the past, ACF stakeholders shipped and received considerable quantities of commerce via commercial barges. As the DEIS documents, commercial traffic peaked at 1.2 million tons in 1985, and the Corps has accommodated special shipments since then by short-term manipulations of flow. (DEIS § 2.6.2.2)

Commercial navigation on the ACF River System has diminished in recent years. However, that is not a problem of demand; rather, it is a direct result of the Corps' failure to properly maintain the channel. Tonnage decreased when the Corps failed to maintain a navigable channel on a reliable basis. It is deeply disappointing that the economic opportunities made possible by the Mobile District's terrific efforts in the past are now stifled by the Corps' failure to keep the channel adequately clear. In any event, as discussed further below (see Part 3), the Corps should not use its own failure to fulfill its statutory duty to maintain the Apalachicola River as a basis for neglecting navigation flows.

We continue to receive inquiries indicating demand for river traffic on the ACF in volumes that approach or exceed historic highs. Recent examples include the following inquiries:

- Mineral Manufacturing: Barge 400,000 to 450,000 tpy of raw materials to Eufaula, Alabama, and barge out half-finished products, employing 40-50 employees plus 10-15 truck drivers.
- Alcoa: Barge 100,000 to 200,000 tpy of green petroleum coke from Catoosa, OK, and Baton Rouge to Eufaula.
- Continental Carbon Company: Barge 30,000 to 40,000 additional barrels of residual fuel oil for carbon black manufacturing to Phenix City, Alabama.
- Ergon, Inc., which supplies Florida with a special asphalt blend, is operating at half capacity in Bainbridge, Georgia. That company has indicated readiness to double capacity and expand jobs if barge service is restored.
- This past fall, US Commodities – AgMotion explored shipping cottonseed barges bound for Ottawa, Illinois, out of Bainbridge.

Other companies in our region work with higher-value products and components that are better suited to barge transportation due to their size and weight. The Corps is well aware of the example of Steward Machine in Bainbridge, Georgia. The Corps contracted with Steward Machine to build lock gates for the Corps' own facilities, but without barge service, those components were partially disassembled for shipment at additional cost. Southern Nuclear historically relied on barge transportation for periodic shipments of oversized components. The known difficulties associated with larger shipments present a continuing barrier to siting larger industrial and manufacturing facilities in the middle portion of the ACF. The lost opportunities

TRI RIVERS
Waterway Development Association

for economic development are substantial and are not captured by arbitrary thresholds developed to measure present-day tonnages or ton-miles shipped.

(3) Apart From Transportation-Related Considerations, Unreasonably Low Flows Threaten Existing Businesses and Prospects.

As demonstrated by the experience of 2009, described below beginning on page 8, the Corps' operations unreasonably curtail flows in the Middle and Lower Chattahoochee in times of shortage. This threatens existing users and also creates a serious impediment to the recruitment of new industrial facilities and expansions. Before making a serious investment of that nature, any business must be comfortable that adequate quantities of water will be provided on a reasonably reliable basis. If the Corps does not take action, it runs a substantial risk of creating a perception of unreasonable risk to water supply.

(4) Increased Flows Will Benefit Florida as Well.

Florida stakeholders have indicated that flow targets for the benefit of Florida species listed under the Endangered Species Act are not sufficient to meet the broader ecological and economic needs of the Apalachicola River region. The flow targets advocated by Tri Rivers can only help to improve conditions in the Florida portion of the basin.

c. A Broad Range of Stakeholders Has Supported Flow Targets.

The flow targets we seek have been recognized as protective of the Middle and Lower Chattahoochee by a broad range of stakeholders from all parts of the ACF River System. Even the State of Georgia, which has strongly opposed the positions of the State of Alabama and Middle and Lower Chattahoochee stakeholders as to the significant aspects of the operation of the Corps' reservoirs, has acknowledged that these flow targets are both workable and appropriate for the protection of the region.

The memorandum signed by the governors of Alabama, Florida, and Georgia on July 22, 2003 (Attachment A), included these flow targets (as well as targets at Peachtree Creek and the Apalachicola River) and stated as follows: "The following flow requirements will be included in the allocation formula, and are intended to be met by the combined actions of maintaining waters [sic] uses consistent with the allocation formula, and by the Corps operating the federal reservoirs consistent with the allocation formula." The governors were able to agree on these flow targets in the midst of ongoing litigation that was famously contentious and acrimonious. That result was possible only because of broad agreement that the flow targets are both workable and protective of the region.

D

In a separate proceeding (the relicensing of Georgia Power Company's Middle Chattahoochee project at the Federal Energy Regulatory Commission (FERC)), the Georgia Department of

D. The authorized purposes of the federal ACF system do not include a specific directive to meet flow targets at Columbus, Georgia.

Any purported agreements made between the governors of the states of Alabama, Georgia, and Florida in 2003 have never been approved by the U.S. Congress; therefore, USACE has no authority to operate to support those agreements.

Natural Resources expressed its support for the two flow targets at Columbus. The Department's letter dated August 9, 2002 (Attachment B), stated as follows:

> The Department supports flow scenarios S19 and S20. These scenarios use a daily average minimum flow of 1350 cfs and a weekly average minimum flow of 1850 cfs while minimizing reservoir level fluctuation. Either operating regime appears to meet the desired goal of flow at Columbus gage and stable reservoir levels within the project boundary.

The Department further explained the reasoning of the State of Georgia in a letter dated October 7, 2002 (Attachment C) (emphases added):

> A group of water users in Georgia and Alabama (including the Columbus Water Works, Mead Corporation,[1] Georgia Pacific Corporation, and Southern Nuclear, as well as the ACF Compact negotiators for the State of Alabama, have all advocated for these specific flow targets....
>
> The 1350 cfs average daily and 1850 cfs average weekly minimum flows at Columbus, Georgia are to *ensure adequate water supplies and flow regimes for Alabama and Georgia citizens, now and in the future*.
>
> *These flow rates were modeled rigorously by Georgia EPD prior to March 2002 using period of flow records from 1939 to 1993, and were determined to be feasible*. Georgia EPD has also done considerable modeling since then using the period of record from 1939 through 2001. While we are still evaluating how well the proposed formula works, we are confident that even with the 1998-2001 drought conditions included, the 1350 cfs daily and 1850 cfs weekly targets can be met a very high percentage of the time.
>
> *All three states and numerous other stakeholders support the flow rates.* To my knowledge no stakeholders to the ACF Compact process objected to these or expressed concerns, therefore, the flow rates were tentatively accepted as a consensus set of flow rates.

FERC's response to the letter of August 9, 2002 (also included within Attachment B) affirmed that these "minimum flow targets ... have been tentatively accepted as a *consensus* set of flow rates by the states of Alabama, Florida, and Georgia." FERC's response also indicated that Georgia Power would be allowed to release at the rate of inflow, if inflow was less than those targets. That was because, as FERC and other stakeholders recognized, the project operated on a run-of-river basis. In other words, the State of Georgia and other parties clearly presumed that

[1] Mead Corporation was a predecessor company of WestRock and owned the Mahrt Mill at the time.

TRI RIVERS
Waterway Development Association

flows protective of the region would be met, if at all, based substantially on outflow from the Corps' storage projects.

Finally, the State of Alabama has reaffirmed its support for all three flow targets in its scoping comments for this proceeding.[2]

d. The Corps' Operations Can Produce an Unnecessary "Artificial Drought."

(1) The Corps Deliberately Throttles Back Middle and Lower Chattahoochee Flows When It Can Do So and Still Meet Apalachicola Flow Targets.

The Corps' existing operations and the proposed Water Control Manual favor the Upper Chattahoochee over the Middle and Lower Chattahoochee by keeping lake elevations relatively high upstream with no provision for reasonable flow targets downstream. Flow targets for each region are necessary to be fair across the entire length of the Chattahoochee River.

The Chattahoochee and Flint Rivers both feed the Apalachicola River. In the past, the Corps has reduced flows in the Chattahoochee based on Flint River inflow. Specifically, if Flint River flows have been sufficient for the Corps to meet an applicable target for the Apalachicola River, the Corps has reduced flows from upstream Chattahoochee reservoirs accordingly. That allows the Corps to maintain its reservoirs at a higher elevation than otherwise, but at a cost—namely, lower flows for downstream communities. Based on our direct discussions, Mobile District leadership and staff have been clear and forthcoming that this is due to the absence of flow targets in the Middle and Lower Chattahoochee.

The DEIS itself says with respect to the Columbia flow target (at page 6-36, emphasis added): "This is a *nonmandatory* flow target with respect to USACE operations. However, USACE strongly considers this expressed need in conducting project operations in the basin." In other words, the Corps will meet this target whenever it happens to be convenient, but the Corps will do nothing on any sustained basis when the use of storage to augment flow is most critical and necessary.

(2) Specific Example: The "Artificial Drought" Of 2009.

An example of great concern is the Corps' creation of an "artificial drought" that affected the Middle and Lower Chattahoochee in 2009. That time period followed times of critical water shortages in 2007 and 2008, when the Southeast was afflicted with severe drought conditions.

[2] Letter from J. Brian Atkins, P.E., Division Director, Alabama Office of Water Resources, to Tetra Tech, Inc., at 4 (Jan. 14, 2013).

E

E. The Apalachicola River flow requirements described in Table 5.4-3 in section 5 of the EIS were developed through years of consultation with USFWS. There are provisions that provide opportunities to refill the federal storage reservoirs on the Chattahoochee River during periods when flow requirement can be met by Flint River flows. Refill of the reservoirs is a critical component of managing the system to fulfill authorized project purposes under various hydrologic conditions. During the refill period, USACE continues to manage releases from its reservoirs to fulfill authorized purposes. Drought operations occurred from October 01, 2007, to May 31, 2009, and normal operations resumed June 1, 2009. During the time period of June 20–August 20, 2009, normal generation operation occurred at West Point and Walter F. George. Both reservoirs were in Action Zone 1. Lake Lanier, however, was in Action Zone 4, the lowest zone. The three storage reservoirs are operated in a balanced manner. Since Lake Lanier was in an action zone lower than the other two reservoirs, the Buford project was operated to refill it to Action Zone 1. The West Point Dam average daily discharge for months June, July, and August 2009 was 1,605 cfs, 1,460 cfs, and 1,520 cfs, respectively. Consequently, the average daily release from West Point Dam exceeded the desired Columbus flow.

In 2009, the City of Columbus, Georgia, received 80.4 inches of rainfall, compared to an annual average of 46 inches. This was the highest annual rainfall in 130 years, the period of record. Rainfall was similarly abundant in the upper reaches of the Chattahoochee watershed. Drought conditions should have ended and did in the Upper Chattahoochee region. However, during the two-month period beginning on June 20 and ending on August 20, *daily average flows at Columbus dipped below 1350 cfs on 23 separate occasions*.[3]

Over the same time period, the reservoir level at Lake Lanier dipped from 1066.64 feet to 1064.67 feet. That change of two feet presented no reasonable threat to the Corps' ability to satisfy upstream purposes. As the Corps has noted, the city and county facilities for withdrawals directly from Lake Lanier have intakes as low as 1032 feet or lower.[4] That means summer lake elevations in 2009 were nowhere close to threatening water supply and, instead, represented primarily an incremental and temporary effect on summer recreation and aesthetics. Further, by September 21, the lake was back up to an elevation of 1067.31. It rose steadily from there until it surpassed 1071 feet in October, where it remained for the rest of the year.

Such a slight effect on upstream values does not reasonably justify the dire impacts to water quality and municipal and industrial water supply imposed on the Middle and Lower Chattahoochee, namely, daily average flows at Columbus falling repeatedly below 1350 cfs. Temperature is a critical water quality parameter, especially in the summer, and temperature increases as flow diminishes. For that reason, it is especially serious that the Corps constrained flows below protective levels for three weeks during a two-month summer period. The negative impact on water quality is a problem in its own right, and it also threatens industrial operations at any plant subject to temperature limits in its discharge permit.

Our region must be able to provide assurances to current and prospective business that a major new facility or expansion can expect the benefit of acceptable flows when water resources are reasonably available. Unfortunately, the "artificial drought" of 2009 was an unnecessary and unreasonable consequence of the Corps' actions. At a time when water was abundant, the Corps short-changed the Middle and Lower Chattahoochee. That was wrong, but under the proposed manuals, the same result will occur again in the future. The most effective remedy to address this situation without creating undue impacts elsewhere on the system is a flow regime that includes flow targets at Columbus and Columbia, which the Corps would strive to meet on the same basis as other flow targets.

[3] Daily average flow data are from the web site of the U.S. Geological Survey for the Chattahoochee River gage at 14th Street in Columbus, Georgia, site no. 02341460 (http://nwis.waterdata.usgs.gov/nwis/dv?site_no=02341460 (last visited Jan. 29, 2016)).

[4] Gwinnett County and the City of Gainesville have withdrawal intakes at 1025 feet, while the Cities of Cumming and Buford have intakes as low as 1032 feet. DEIS Appendix E, page 42.

TRI RIVERS
Waterway Development Association

e. The Corps' Action Zones Keep Upstream Reservoirs at Elevations That Are Higher Than Needed for Water Supply at the Expense of Downstream Flows.

The Corps' proposed Water Control Manual will produce an even more disparate and inequitable distribution of project benefits by increasing the priority for upstream lake elevations even as downstream flow needs go unmet. In essence, the Corps' proposal holds back even more water than before in upstream reservoirs during the dry months, when inflow is naturally at its lowest and flow augmentation is most critical, only to dump it in the wet months when it is no longer needed.

This is illustrated through a cursory examination of the Corps' proposed action zones. Action zones constitute "partitions of a reservoir's conservation storage, as defined in [a] reservoir water control plan, to guide reservoir managers in meeting project purposes during a wide variety of hydrologic conditions." (DEIS at 2-25) Each zone "has a set of specific operational rules or guidelines that govern water management operations for the reservoir when the pool elevation is within that zone." (DEIS at 2-25) Lake elevations are higher in Zone 1 and progressively lower down to Zone 4. By establishing action zones at all three storage reservoirs, the Corps signals how it will manage all of the reservoirs as a system in a coordinated fashion.

Because it provides approximately two thirds of the conservation storage available to the Corps in the ACF River System,[5] Lake Lanier is especially significant. Current and revised action zones for Lake Lanier are provided in Figure 4.1-7, which is reproduced below. The dashed lines represent guide curves for current operations, while the solid lines represent guide curves for proposed revisions. Under all the guide curves, lake elevations are flat for a time, followed by a downward slope, which represents the drop in lake elevation that corresponds to the dry time of year. That drop also indicates available space for flood control when rainfall increases in the winter and spring and elevations rise again.

[5] *See* DEIS at 2-24 (Table 2.1-3). This table shows conservation storage for Lanier, West Point, and Walter F. George as 1,087,600 acre-feet (66.39%), 306,131 acre-feet (18.69%), and 244,400 acre-feet (14.92%), respectively, in all cases based on summer elevations.

Responses to ACF222 - Tri-Rivers

F

F. The rationale for the revised action zones included in the PAA is presented in section 4.1.2.2.2.2 of the EIS. The action zones included in the PAA achieve a more equitable balance between action zone sizing based on the project's watershed size and the proportionately balanced drawdown among the projects when operating in Zone 1. As the action zones were refined, they were generally revised upward in the winter months at Lake Lanier and at West Point Lake and downward in the summer months at Walter F. George Lake. The revised action zones achieve the objectives of putting the greater burden of the system demands on the lower two reservoirs when in the upper action zones and on Lake Lanier when the system reaches drought operations.

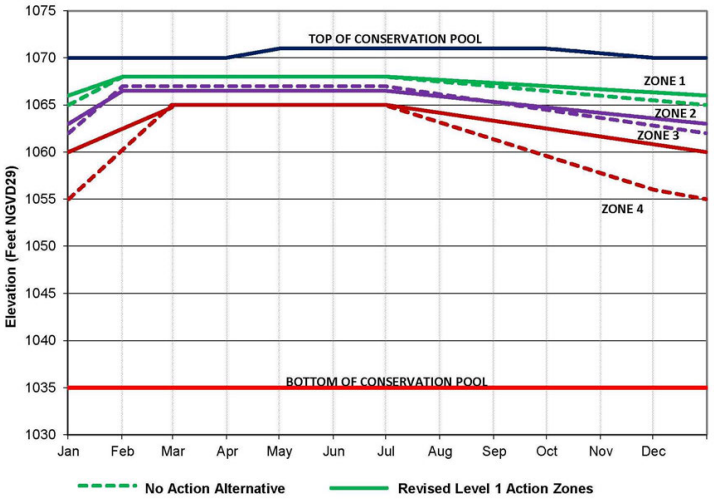


Figure 4.1-7. Lake Lanier Water Control Action Zones

Below Zone 1, in all cases, the Corps' proposal calls for higher lake elevations later in the year compared to current operations. All else being equal, controlling for inflow and other variables, the Corps achieves that result by decreasing outflow from the reservoir. In our view, based on the effects we have felt in our region, even the current guide curves keep elevations too high for too long. The proposed Water Control Manual exacerbates that problem by extending and flattening the guide curves in the dry months even more.

Further evaluation shows how the Corps picks favorites among project purposes and favors non-essential purposes upstream at the expense of critical needs downstream. Under the preferred alternative, navigation flow—which is a reasonable proxy for flow support for the Middle and Lower Chattahoochee—is partially supported (i.e., supported at less than the authorized depth, for limited times of year) in Zones 1 and 2 and abandoned in Zones 3 and 4. (DEIS at 5-32) However, at the bottom of Zone 2, Lake Lanier still has 84% of its conservation storage available to it at the beginning of July, 79% at the beginning of October, and 76% at the end of the year.[6]

[6] These percentage figures are based on conservation storage figures provided at DEIS Appendix F, ACF Basin Critical Yield Report, Table B-5, and elevations provided at the proposed Water Control Manual, Appendix B, Buford Dam and Lake Sidney Lanier, Table 7-1, at page 7-3. For example, according to Table 7-1, the bottom of Zone 2 (i.e., the top of Zone 3) at the beginning of July is at 1066.50 feet. Conservation storage is determined by taking total storage at any given elevation and subtracting 874,300 acre-feet, which is total storage at 1035 feet

TRI RIVERS
Waterway Development Association

That means that the Corps effectively abandons flow support for the Middle and Lower Chattahoochee region in the driest time of year, while the vast majority of conservation storage in its largest ACF reservoir remains readily available. Even as the lake moves into Zone 4, drought conditions—under which, again, the Corps suspends navigation support—the elevation of the lake can be as high as 1065 feet at the beginning of July (almost 80% of conservation storage remaining), progressing down to 1060 feet at the end of the year (more than 65% of conservation storage remaining). Even those lower elevations are far above the water level necessary to support local water withdrawals.[7]

2. The Corps Is Authorized to Provide Flow Support for the Middle and Lower Chattahoochee.

a. The Eleventh Circuit's Opinion Shows that Project Purposes Are Defined Broadly and Include Flow Support for the Middle and Lower Chattahoochee River.

(1) <u>According to the Eleventh Circuit, the Corps Was Wrong Previously to Define Project Purposes Narrowly.</u>

Before the Eleventh Circuit ruled in 2011,[8] the Corps and Tri Rivers shared a similar view as to the authorized purposes of the ACF projects. Specifically, we believed that the primary purposes of Lake Lanier under the authorizing documents[9] were navigation support, hydropower production, and flood control, while water supply constituted a lesser or "incidental" purpose.[10]

G

(bottom of the conservation pool). Conservation storage for 1066.50 feet is assumed to be midway between conservation storage at 1066 and 1067 feet (889,500 and 925,500 acre-feet, respectively). The percentage is conservation storage at 1066.5 feet divided by conservation storage at 1071 feet (1,074,600 acre-feet), which is the top of the conservation pool on that date.

[7] *See supra* note 4.

[8] *In re Tri-State Water Rights Litigation*, 644 F.3d 1160, 1188-89 (11th Cir. 2011).

[9] Congress authorized construction of the present-day ACF reservoirs in the Rivers and Harbors Act (RHA) of 1945 by authorizing the Corps to proceed based on a 1938 report from Col. R. Park, the Mobile District Engineer, as subsequently transmitted up the Corps' chain of command. Pub. L. No. 79-14, § 2, 59 Stat. 10, 11-12, (1945) (referencing H.R. Doc. No. 76-342 (1939)). Congress stated that the Corps was to proceed "in accordance with the plans in the respective reports hereinafter designated and subject to the conditions set forth therein." Congress subsequently modified the ACF authorization, which included additional reservoirs and a change in the location of the Atlanta-area reservoir, in the 1946 RHA, that time by referencing in a similar manner a 1946 report from Brig. Gen. James B. Newman, Jr., the South Atlantic Division Engineer. Pub. L. No. 79-525, § 1, 60 Stat. 634, 635 (1946) (referencing "the report of the Chief of Engineers, dated May 13, 1946," i.e., the report of Lt. Gen. R.A. Wheeler, which transmits the Newman report, both of which appear along with related documents in H.R. Doc. No. 80-300 (1948)). According to the Eleventh Circuit, the Park and Newman reports constitute "a part of the authorizing legislation" for the ACF reservoirs, because they were adopted by Congress. 644 F.3d at 1167, 1168. Tri Rivers' comments refer generally to the "authorizing documents," with citations to specific documents in footnotes.

[10] *E.g.*, Authority to Reallocate Storage for Municipal & Industrial Water Supply under the Water Supply Act of 1958, 43 U.S.C. § 390b, Memorandum from Earl H. Stockdale, Chief Counsel, U.S. Army Corps of Engineers, to the Chief of Engineers, at 3 (Jan. 9, 2009); Georgia Request for Water Supply from Lake Lanier, Memorandum

G. At West Point Dam, a small generating unit provides a continuous release of about 675 cfs. That flow provides low-flow augmentation to benefit water quality and public health in accordance with the project's authorizing document. If flow needs downstream of West Point Dam have increased over time, that does not imply an authorization or obligation for USACE to operate West Point to meet some greater flow need. Paragraph 114a of the West Point DM V general design memorandum states:

> "An analysis of water quality and quantity needs for West Point Georgia, area is contained in a letter report prepared by the U.S. Public Health Service dated 5 January 1965. As a basis for their report in intensive sampling program was conducted during 1964 along with independent economic study area. Water use requirements were computed for years 196 and 2015. Projected waste load, deoxygenation and recreation rates, and critical dissolved oxygen concentrations were also estimated. These studies substantiate the need for a continuous discharge of not less than 670 cfs with an initial dissolved oxygen concentration of not less than 4.0 ppm. The small generation unit provides a minimum continuous off-peak of 675 cfs."

Additionally, paragraph 114b states:

> "The Public Health Service report concluded that: Additional flow above the planned continuous base flow 675 cfs does not seem to be justified in terms of flow regulation for water quality control; the skimmer weir is satisfactory as a means of providing adequate dissolved oxygen concentrations through the high level drawoff discharges; and that if low level drawoff is permitted some means of reaeration of the deoxygenated discharge would be required."

We held that view primarily for two reasons: First, because the authorizing documents allocated costs and monetary benefits for the former three purposes and not for water supply; and second, because the authorizing documents stated that the Buford project would *"[i]ncidentally* ... ensure an adequate municipal and industrial water supply for the Atlanta area"[11]—that is, as a consequence of operations intended for a different purpose. However, despite that view as articulated consistently by the Corps in the authorizing documents themselves[12] and afterwards, the Eleventh Circuit held that water supply is "an authorized, rather than incidental, use of the water stored in Lake Lanier."[13]

(2) The Eleventh Circuit Opinion Provided a Method To Determine Project Purposes.

To reach its holding that water supply was an authorized purpose of an ACF reservoir, the court applied a particular method, which can be summarized as follows.

a) Examine the authorizing documents broadly in their entirety.

First, the court found that the Corps' engineering reports referenced by statute were authoritative, and the entirety of the authorizing documents must be examined to determine project purposes. The court observed that the applicable statute referenced the Chief of Engineers report, which in turn referenced the Newman report; therefore, "the statute *fully* incorporated the terms of the Newman Report."[14] The court's opinion provides no hint that this same principle would apply any differently with respect to other Corps reports incorporated by reference in a statute.

b) It is sufficient that the authorizing documents had a particular benefit or result in mind.

Second, the way to define an authorized project purpose is to determine whether the project "was designed with [that purpose] specifically in mind."[15] In other words, it is not necessary to find in

from Earl Stockdale, Deputy General Counsel, U.S. Army Corps of Engineers, to the Chief of Engineers, at 6 (Apr. 15, 2002) (hereinafter "Corps Legal Memorandum (2002)").

[11] Corps Legal Memorandum (2002) at 5 (emphasis in original; other emphases removed) (quoting H.R. Doc. No. 80-300 ¶ 100, at 39); *see id.* at 4-7 (providing additional discussion of project purposes). In addition, the City of Atlanta was offered the opportunity to provide partial funding for the construction of the Buford Dam, which would have entitled the city to reserve space for local water supply. Mayor Hartsfield specifically considered and refused that opportunity on the theory that local water supplies were abundant. *See In re Tri-State Water Rights Litigation,* 639 F. Supp. 2d 1308, 1315 (M.D. Fla. 2009), *rev'd on other grounds,* 644 F.3d 1160 (11th Cir. 2011).

[12] The Corps' authorship of the authorizing documents is explained above in note 9.

[13] *In re Tri-State Water Rights Litigation,* 644 F.3d 1160, 1188-89 (11th Cir. 2011). This specific holding was in reference to releases for Atlanta-area water supply rather than direct withdrawals from the lake.

[14] 644 F.3d at 1187 (emphasis added). The various Corps reports are explained above in note 9.

[15] *Id.*

the authorizing documents that the Corps intended to allocate storage space or change significantly how it would otherwise operate in order for a project *benefit* also to be an authorized project *purpose*. In the case of water supply, the Corps' report discussed the facts that (1) water flowing through hydropower turbines would be available for downstream purposes, including Atlanta-area water supply and wastewater assimilation, and (2) operations for the absolutely maximal hydropower efficiency would involve a complete cessation of hydropower flows at non-peak times, which would have downstream impacts disproportionate to any marginal loss of hydropower, and therefore should be avoided.[16] Hydropower operations that were modified in that "slight" manner thus would "meet the estimated present needs of the city, and [] prevent damage to fish, riparian owners and other interests."[17]

For decades, the Corps regarded that language (which the Corps itself wrote)[18] as an acknowledgement of the obvious consequences of its operations, rather than limiting or establishing authorized project purposes. However, according to the court, a description of that nature was sufficient to establish water supply as a Congressionally authorized project purpose.

c) As long as the authorized documents had a benefit or outcome in mind, it is an authorized project purpose, even if it occurs as a consequence of operations directed toward a different purpose.

Third, the fact that a purpose is characterized as being provided "incidentally" does not preclude that "incidental" purpose from being Congressionally authorized.[19] A purpose that is otherwise authorized does not suffer from inferior status solely because it is fulfilled through operations primarily intended to achieve other project purposes.

d) The authorizing documents need not attribute a specific cost for operations or monetary benefit to an authorized purpose.

Fourth, in determining which purposes are Congressionally authorized, it is not necessary for the authorizing documents to allocate storage or calculate a specific cost or benefit associated with a purpose.[20] An allocation of a cost or benefit may provide additional evidence of statutory intent, but it is not necessary in order to identify an authorized project purpose.

[16] *Id.* (quoting from the Newman Report, H.R. Doc. No. 80-300 ¶ 80, at 34).

[17] *Id.* (quoting from the Newman Report, H.R. Doc. No. 80-300 ¶ 80, at 34).

[18] The Corps' authorship of the authorizing documents is explained above in note 9.

[19] *Id.* at 1189-91.

[20] *Id.* at 1191-92.

(3) Applying the Eleventh Circuit's Methodology, Broad Flow Support for the Middle and Lower Chattahoochee Is a Congressionally Authorized Purpose.

Upon reviewing the authorizing documents and following the Eleventh Circuit's method, it is apparent that Congress intended for the upstream storage reservoirs in the ACF River System to provide broad-based flow support for the Middle and Lower Chattahoochee.

a) Relevant language from the authorizing documents

A review of the authorizing documents dating to 1946 and earlier yields the following statements as to Congressional intent:

- The upstream and downstream reservoirs are intended to operate together, on an integrated basis, to provide benefits throughout the region. A dam at the Buford site was found to "best combine with existing downstream plants and those proposed herein, as well as with other plants required for complete development of the river, to create an integrated and economical system."[21]

- The authorizing documents expressly intended for releases from Lake Lanier specifically for the benefit of downstream navigation and hydropower production. Commercial navigation was not contemplated above the fall line at Columbus, and yet Lake Lanier was regarded as "an *essential* adjunct to the navigation development below Columbus."[22] The Corps discussed support for the downstream powerhouses,[23] further indicating an expectation of flows serving the Middle and Lower Chattahoochee.

- The authorizing documents expressly intended for releases from Lake Lanier specifically for water quality downstream from the Atlanta area. The authorizing documents state that Lake Lanier "would ensure an adequate municipal and industrial water supply for the Atlanta area, would produce *large benefits in the way of recreation, fish and wildlife, conservation, and similar matters*," and would aid in downstream flood control.[24] In that list of purposes, the Corps was careful to use the phrase, "for the Atlanta area," only to modify water supply, but not the other purposes. Also, the phrase, "other similar matters," immediately follows recreation, fish and wildlife, and conservation, and so can be read as describing matters similar to those three, all of which include a water quality

[21] H.R. Doc. No. 80-300 at 27-28.

[22] *Id.* at 34 (emphasis added).

[23] *Id.* at 39.

[24] *Id.*

component. It is only reasonable, then, to conclude that the Corps (and therefore Congress) intended for downstream water quality to be among the authorized project purposes. Then and today, some of the greatest recurring water quality concerns in the Middle and Lower Chattahoochee are low dissolved oxygen and high temperature. The best remedy for those conditions is to increase flow from the Corps' storage reservoirs.

- As in the Atlanta area, Congress acknowledged industrial and agricultural activity in the Middle and Lower Chattahoochee. According to the authorizing documents, the Corps identified cotton gins, plants to process cotton seeds for oil and feed, peanut mills, sawmills and planning mills, fertilizer plants, and bauxite mines.[25] The documents identified the area below the fall line as "in a state of rapid development in agriculture and related activities."[26] Industrial activity remains important in the region today, including especially the plants operated by WestRock, Georgia-Pacific, and Southern Nuclear.[27]

- Congress anticipated benefits in the Middle and Lower Chattahoochee beyond the direct benefits of navigation. The division engineer "considers that water transportation would result in *increased land values and other collateral benefits*," to which the Corps attached a dollar figure ($50,000 annually).[28] "Collateral benefits" is an extraordinarily broad term that clearly indicates intent to provide regional support for a variety of purposes.

- The authorizing documents state that the projects will provide "direct benefits" in the form of "[i]ncreased commercial value of riparian lands," "[r]ecreational value," and "[v]alue as a source of industrial and municipal water supply," without specifically limiting benefits of those nature to the Atlanta metropolitan area.[29] Similarly, the authorizing documents anticipate "[t]he improvement of

[25] H.R. Doc. No. 80-300 at 19; *see also* H.R. Doc. No. 76-342 at 21. The Wheeler report adopted by the 1946 RHA makes clear that the Newman report "modified" but did not repeal or supplant the Park Report. H.R. Doc. No. 80-300 at 7. The various reports are explained above at note 9.

[26] H.R. Doc. No. 76-342 at 17; *see also id.* at 18 (noting the presence of "a larger *industrial* population engaged principally in the manufacture of cotton products" at cities including Columbus and Phenix City (emphasis added)).

[27] The fact that the precise industrial applications have changed over time does not change the essential nature of the authorized purpose. For example, the authorizing documents discuss in some detail the flow requirements for the Atkinson steam plant, a coal-fired electric generating plant that served the Atlanta area, as well as the flow improvements for that specific plant to be enabled by Lake Lanier. H.R. Doc. No. 80-300 at 34. However, the coal-fired units at that plant closed in 2011. We presume the Corps does not assert that its duty to support industrial water supply in the Atlanta area is diminished by the fact that the specific industrial application described in the authorizing documents has changed since 1946.

[28] H.R. Doc. No. 80-300 at 6 (emphasis added); *see also id.* at 35.

[29] H.R. Doc. No. 76-342 at 77; *see also id.* at 79-80.

social and economic conditions in the tributary area," from "the establishment of new industries in territory, … greater recreational facilities resulting in an increase in the tourist trade, and … new capital investments in the area."[30] This indicates Congressional intent to support a broad range of economic activity in the Middle and Lower Chattahoochee region, including industrial and municipal water supply, industrial development, property values, tourism, and recreation.

- Congress anticipated economic growth throughout the region, not just at Atlanta. "It is expected that the energy produced by the proposed developments will be used to supply the growing demand in the region designated by the Federal Power Commission [located mainly in] the States of Alabama, Georgia, and Florida...."[31]

Congress had the opportunity to revisit authorized purposes when it modified ACF authorizations in 1962, primarily to approve construction of the West Point reservoir. Congress could have clarified or limited previous authorizations as to upstream reservoir support for the region below that lake. Instead, and without qualifying its previous expressions of support for flows serving the Middle and Lower Chattahoochee, Congress reaffirmed its intent to provide flows that were protective of the region.[32] The authorizing documents stated primary project purposes as "flood control, hydroelectric power generation, additional regulation of stream flow for downstream navigation, general recreation and fish and wildlife development."[33] However, again following the method provided by the Eleventh Circuit Court of Appeals, additional language illustrates statutory intent.

According to the authorizing document, addressing and diluting pollution downstream from West Point was a major concern. The document stated that the dam would discharge sufficient flow "at all times to prevent a nuisance condition" resulting from preexisting industrial and domestic waste discharges from West Point, Lanett, Langdale, and Riverview.[34] The document further discusses pollution from the Columbus-Phenix City area that could be diluted "in some degree" by "flow regulations" at West Point.[35] The plan, therefore, called for minimum flows for "water supply and sewage dilution," while acknowledging that subsequent studies could reveal that "a larger flow may be needed."[36] Clearly, then, Congress intended to confirm broad intent to

[30] H.R. Doc. No. 76-342 at 82.

[31] H.R. Doc. No. 80-300 at 30.

[32] Pub. L. No. 87-874 § 203, 76 Stat. 1173, 1182 (1962). As in previous authorizations, the statute referred to a Corps document that had been reprinted by a Congressional committee, in this case as House of Representatives Document No. 87-570 (1962).

[33] DEIS at 2-58; *see also* H.R. Doc. No. 87-570 ¶ 2, at 1.

[34] H.R. Doc. No. 87-570 ¶ 73, at 31.

[35] *Id.* ¶ 74, at 31.

[36] *Id.* ¶ 85, at 37.

provide flows in support of water quality and wastewater assimilation in the Middle Chattahoochee.

b) Application of the Eleventh Circuit method

In consideration of the foregoing, it is clear that flow support for the Middle and Lower Chattahoochee is an authorized purpose of the Corps' ACF reservoirs, including the largest of those (Lake Lanier). A review of the authorizing documents in the manner required by the Eleventh Circuit's opinion demonstrates that Congress contemplated the operation of the ACF reservoirs as an integrated system that would provide, among other things, a broad range of benefits for the Middle and Lower Chattahoochee region. The documents show that Lake Lanier was intended to operate in coordination with other downstream reservoirs for the benefit of the entire inter-connected region. Beyond the obvious benefits of navigation and hydropower production, the authorizing documents show intent for the Corps to support industrial and municipal water supply, wastewater assimilation, property values, tourism, and recreation. Therefore, based on the test established by the Eleventh Circuit, the Corps is authorized and required to operate the ACF reservoirs to provide flow in broad-based support of those purposes in the Middle and Lower Chattahoochee.

b. Navigation Remains an Authorized Project Purpose.

According to the Corps' chief counsel—and Tri Rivers agrees—the Eleventh Circuit's holding in no way changes the long established fact that navigation is an important authorized purpose and, further, that the Corps' operation of Lake Lanier was intended to support navigation in the Middle and Lower Chattahoochee.[37] The authorizing documents provide for a channel 9 feet deep and 100 feet wide from Columbus and Bainbridge, Georgia, to the Gulf of Mexico.[38]

(1) The Corps' Proposal Effectively Abandons Navigation.

According to the Corps' regulations, "Water control plans will be developed for reservoirs, locks and dams, reregulation and major control structures and interrelated systems *to conform with objectives and specific provisions of authorizing legislation* and applicable Corps of Engineers reports."[39] With respect to navigation specifically, "Water control plans should be developed to attain *maximum* flood control or navigation benefits, consistent with other project requirements,

[37] *See also* Authority to Provide for Municipal and Industrial Water Supply from the Buford Dam/Lake Lanier Project, Georgia, Memorandum from Earl H. Stockdale, Chief Counsel, U.S. Army Corps of Engineers, to the Chief of Engineers, at 27 (June 25, 2012) (identifying navigation as among the purposes of the ACF projects as authorized by RHA 1946).

[38] H.R. Doc. No. 80-300 at 9, 22, 39.

[39] Engineer Regulation (ER) 1110-2-240 ¶ 6.a (1982) (emphasis added).

from the storage space provided for these purposes."[40] The "specific provisions of authorizing legislation" for the ACF require a channel that is 9 feet deep and 100 feet wide. By failing to use "the storage space provided for th[is] purpose[]," the Corps abandons navigation as authorized by Congress.

The Corps has considered "no navigation" and "7 foot depth" scenarios. (DEIS at 4-20 – 4-23) In so doing, the Corps essentially explains how it can carry out its navigational responsibilities contrary to Congressional intent. Further, the Corps indicates it does not intend to consider navigation scenarios that include an active dredging program. Specifically, "USACE explored several options to provide the most reliable navigation season possible within the constraints of water availability and a lack of dredging." (DEIS at 4-21) "In developing a navigation operation, USACE explored several options to provide the most reliable navigation season possible within the constraints of water availability *and limited dredging*." (DEIS at 4-35 (emphasis added)) However, the authorizing documents clearly anticipated a need for dredging, particularly in the Apalachicola, to maintain the availability of navigation.[41] By basing its navigation scenarios on conditions under which the Corps fails to dredge, the Corps locks in a program that is in direct conflict with the authorization provided by Congress.

Based on the discussion in the DEIS of navigation (DEIS at 4-21 – 4-22, 4-36 – 4-37, 4-41 – 4-42, 6-79 – 6-86), we understand that the preferred alternative provides for a navigation season of five months and seeks to improve the availability of a 7-foot channel. The proposal does nothing to increase the availability of a 9-foot channel compared to the no action alternative. While any effort to improve navigability is appreciated, this obviously fails to deliver navigation availability on the terms of the Congressional authorization. Moreover, we do not see any serious effort to examine realistic methods to provide for a 9-foot channel, which could include channel maintenance assumptions so as to avoid the more extreme flow scenarios.

(2) Partial Navigation Scenarios Do Not Remedy the Essential Abandonment of Navigation.

Despite our disappointment and concern with a water control manual that fails to provide for navigation to the full extent authorized by Congress, Tri Rivers also expresses its appreciation for the efforts of the Corps to quantify the extent to which navigation may be available under a variety of circumstances. We take the Corps' efforts as well intended and practical, and we understand the amount of effort that went into the Corps' work.

Tri Rivers, working in cooperation with Apalachicola Riverkeeper, also has previously sought to define performance metrics to evaluate model output relative to both the availability of the

[40] ER 1110-2-240 ¶ 10.e (emphasis added).

[41] *E.g.*, H.R. Doc. No. 80-300 at 5, 59, 74-75, 86, 88.

H

Responses to ACF222 - Tri-Rivers

H. The difficulties associated with operating and maintaining the ACF Basin project for navigation are well documented in section 2.1.1.2.4.3 of the draft EIS. The original design of the project documented that a discharge from Jim Woodruff Lock and Dam of 9,300 cfs together with dredging would provide a 9-ft channel. By the mid-1980s, the required discharge with dredging to provide a 9-ft channel was estimated to be 11,000 cfs. By 1995, the predredging flow requirement to provide a 9-ft navigation channel had increased to 16,000 cfs. Today, the predredging flow requirement for a 9-ft channel exceeds 20,000 cfs.

The PAA provides an opportunity for navigation to occur in the January through May timeframe each year. Given the physical and regulatory constraints on the ACF system, this opportunity is limited.

Navigation is one of several project purposes for which Congress authorized the ACF Basin project, and USACE considers it along with the other authorized purposes when making operational decisions.

commercial navigation channel and environmental flows in the Apalachicola River. The results of that effort were provided to the Corps previously in the form of a report entitled "An Evaluation of the Common Ground Between Environmental and Navigation Flows in the Apalachicola-Chattahoochee-Flint Basin," authored by Steve Leitman as a consultant to Riverkeeper and by Charles Stover and Stacey Graham, working on behalf of Alabama Power Company as consultants to Tri Rivers. As we indicated upon providing the report to the Corps, we will be pleased to continue efforts with the Corps to maximize any opportunities that may be available to restore and protect the navigational infrastructure and the necessary flows.

Nevertheless, we believe that an operational plan providing for anything less than the full extent of authorization is an abandonment of navigation and contrary to the intent of the statute.

c. Congress Did Not Intend Operations That Favor One Region Over Another.

Determining the Congressionally authorized purposes of the Corps' ACF projects has been the subject of extensive comment and litigation and may still be so. Nevertheless, whatever the authorized purposes of the ACF projects may be deemed to be, this much is obvious: *Congress did not intend for the Corps to operate the ACF River System in a manner that favored one region over another.*

Two basic premises as to the authorized purposes are obvious: First, Congress envisioned a system that provided benefits across the entire length of the Chattahoochee River; and second, the authorizing documents provide no indication of support for operations that favor one subregion over another. However, the artificial drought of 2009 shows how the Corps' operations do exactly that in times of scarcity. Specifically, the Corps constrained flows servicing the Middle and Lower Chattahoochee to a dangerously low level, that is, below the level that is necessary for protection of the region, according to a broad consensus of states and stakeholders. At the same time, in reserving water upstream, the Corps provided only marginal benefits for recreation and aesthetics, as the Corps' operations were not necessary for water supply or water quality. However the Corps may choose to define its authorized purposes or explain its operations, that outcome is not consistent with the authorizing documents' description of benefits across the ACF River System. I

3. The Corps Should Enhance Its Consideration of Alternatives That Assume Channel Maintenance.

Channel maintenance has a direct and indisputable relationship to reservoir operations: With proper maintenance, the Corps can provide the same channel depth with less flow. We acknowledge the lack of channel maintenance in recent years, but that is not some externality beyond the control of the Corps. Dredging and channel maintenance are also the responsibility of the Corps. The Corps should not assume away and fail to consider a reasonable program for maintaining the channel according to Congressionally authorized parameters in the context of J

I. USACE agrees with this statement and strives to balance all authorized purposes throughout the basin in compliance with all applicable laws and regulations.

J. The difficulties associated with operating and maintaining the ACF Basin project for navigation are well documented in section 2.1.1.2.4.3 of the EIS. The purpose of the EIS is to support the update of the water control plans and manuals for the ACF Basin, as directed by Secretary of the Army Pete Geren on January 30, 2008. Specifically, the purpose and need for the federal action is to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws, and to implement those operations through updated water control plans and manuals. Development of a navigation maintenance plan for dredging the Apalachicola River does not fall within the scope of the Master WCM update process as directed by the Secretary of the Army. Because navigation is one of the congressionally authorized purposes in the ACF Basin, however, USACE considered it in making operational decisions regarding water management. It is anticipated that little or no dredging of the navigation channel in the Apalachicola River will be possible in the immediate future. Accordingly, USACE has explored several options to provide the most reliable navigation season possible within the constraints of water availability and a lack of dredging. USACE used updated channel survey data, collected during 2009, for the Apalachicola River in developing management measures for navigation. The PAA includes actions that, when supported by ACF Basin hydrologic conditions, will increase the availability of a navigable 7-ft channel in the Apalachicola River for a portion of the year (January–April/May) by making additional releases. Augmenting flows at other times of the year would jeopardize the ACF Basin projects' abilities to fulfill other authorized project purposes.

modeling flow scenarios. If information that assumed a program of adequate channel maintenance were to show a substantial increase in the availability of navigation, that could enhance public and Congressional interest in restoring funding for the Mobile District.

The Corps documents its own failure to provide for navigation in considerable detail (DEIS, 2-65 – 2-68). As the Corps observes, this system requires some amount of maintenance for navigation to be available under reasonable flow scenarios. However, the primary bottlenecks are located within a stretch that comprises a total of approximately 10 miles in the Apalachicola, and even there, the choke points are discrete locations within that area. Keeping those limited stretches clear requires some effort, but it is no Herculean task. The Corps can and do more to restore a program of regular channel maintenance.

a. The Corps Has Failed to Request Adequate Funds For Navigation Maintenance.

We are aware that Congress recently has not provided funding specifically for dredging the Apalachicola River. We do not suggest that the amount of funds provided by Congress is within the control of the Corps. However, the Administration certainly can control how much funding it *requests* from Congress. *The Corps, through the Administration, has not even requested enough funding to maintain the channel appropriately.* As the Corps is well aware, Congress no longer uses the so-called "earmark" mechanism to increase funding above the Administration's requests. That has become a well-established practice over the course of the past several years, and there is no indication that Congress will change its approach in the foreseeable future. Accordingly, the Corps well knows it is unlikely to receive civil works funding it does not request. The Corps' failure to request adequate funding for ACF navigation maintenance is a disservice to itself and a disappointment to the region.

K

K. USACE budget requests have complied with Administration guidance regarding low-use commercial waterways.

b. The Past Failure to Obtain Florida DEP's Approval Is No Longer Relevant.

As a part of its discussion of its past failure to maintain the Apalachicola River, the Corps notes its past inability to obtain "a 5-year renewal of the section 401 water quality certification for maintenance dredging of the authorized navigation channel in the Apalachicola River" because of failed negotiations with the Florida Department of Environmental Protection (DEP) in 2004. (DEIS at 2-67) The Corps cites that consideration prominently. (DEIS at 4-21) However, the DEP no longer demonstrates hostility toward navigation maintenance, as the Corps has learned first-hand in its efforts to obtain a permit to desnag the Apalachicola River in 2012. (DEIS at 2-68)

Whatever the reason, the historic actions of the DEP in 2005 and earlier no longer provide a meaningful indication of the current position of the State of Florida and area stakeholders. To the contrary, a broader collection of voices in the Florida panhandle has openly embraced a program of navigation support that includes Apalachicola River dredging. We understand a number of those interests intend to provide the Corps comments to that effect in this proceeding.

Even if DEP maintained its opposition, no state can prevent the Corps from maintaining navigation on a jurisdictional water when the Corps is acting pursuant to direct Congressional authorization. As Tri Rivers has argued in the past to the Corps, the Corps has statutory authority to proceed with navigation maintenance, even if in conflict with state conditions offered pursuant to Clean Water Act 401(a), if the state's efforts impair the Corps' ability to maintain navigation. Section 404(t) of the act clearly provides that a state has no power to "affect[t] or impair[r] the authority of the [Corps] to maintain navigation."[42] Section 511(a) similarly states that the Clean Water Act "shall not be construed as," among other things, "affecting or impairing the authority of the Secretary of the Army . . . to maintain navigation."[43] The Corps is on record as being in agreement with the position of Tri Rivers, having forcefully argued the same point in the Delaware River case[44] and in a case now pending before the Eleventh Circuit.[45]

L

c. If the Corps Abandons Navigation, State Water Quality Requirements Govern.

Tri Rivers supports a vigorous effort by the Corps to maintain the ACF River System and the Apalachicola River specifically for navigation. As noted above, we believe the Corps has the authority to do so even in the face of state disapproval. However, if the Corps effectively abandons navigation, the factual predicate for the exercise of authority under §§ 404(t) and 511(a) disappears. Without that authority, the Corps must observe such water quality conditions as may be lawfully imposed by downstream states under Section 401(a) of the Act, including water quality conditions that mandate minimum flows.

M

[42] 33 U.S.C. § 1344(t).

[43] 33 U.S.C. § 1371(a).

[44] *Del. Dep't of Natural Res. and Envtl. Control v. U.S. Army Corps of Engineers*, 685 F.3d 259, 282 (3d Cir. 2012) ("The Corps contends it was relieved of Sections 313 and 404(t) of the Clean Water Act, which required it to obtain special Delaware permits, because it was entitled to a statutory exemption codified at Section 404(t). We . . . find [the Corps'] interpretation of the statute reasonable. We also find the Corps was neither arbitrary nor capricious in deciding to invoke Section 404(t)."); *see also* Memorandum from Steven L. Stockton, Corps Dir., of Civil Works, to Corps Commanders (Oct. 21 2015), *available at* http://planning.usace.army.mil/toolbox/library/MemosandLetters/15Oct-FederalStandardClarification.pdf (confirming "the Army's statutory authority to override the state's interference with navigation, by making use of CWA Subsection 511 (a)(2) and/or 404(t)").

[45] Response Brief for Federal Appellees at 24 (July 20, 2015), Florida Wildlife Federation, Inc. v. U.S. Army Corps of Engineers, No. 14-13392 (11th Cir. docketed July 28, 2014) (arguing, citing to § 511(a), that "Florida Wildlife Federation's claims are barred because the Clean Water Act precludes the application of state law in a manner that would "affect[] or impair[] the authority of the [Corps] . . . to maintain navigation").

Responses to ACF222 - Tri-Rivers

L. USACE has attempted to obtain water quality certification for the ACF Basin for over a decade, but Florida Department of Environmental Protection has denied USACE's request. Therefore, USACE has deferred dredging on the Apalachicola River reach of the ACF Basin.

M. USACE explored several options to provide the most reliable navigation season possible within the constraints of water availability and a lack of dredging. USACE used updated channel survey data collected during 2009 for the Apalachicola River in developing management measures for navigation. The PAA includes actions that, when supported by ACF Basin hydrologic conditions, will increase the availability of a navigable 7-ft channel in the Apalachicola River for a portion of the year (January–April/May) by making additional releases. Augmenting flows at other times of the year would jeopardize the ACF Basin projects' abilities to fulfill other authorized project purposes.

Navigation remains an authorized purpose of the ACF project, and USACE operates the system to balance all authorized purposes. At this time, USACE is not pursuing its discretionary authority pursuant to §§ 404(t) and 511(a).

TRI RIVERS
Waterway Development Association

4. Flaws in the NEPA Analysis

a. The Corps Has Failed to Consider A Reasonable Alternative to the Proposed Action.

The National Environmental Policy Act ("NEPA") requires a federal agency to consider the environmental and other effects of a major federal action as well as alternatives to the proposed action.[46] Tri Rivers and others have repeatedly urged the Corps to consider a flow regime that incorporates flow targets in the Middle and Lower Chattahoochee on the same basis as other flow targets in the system. Despite that repeated recommendation, and despite possessing the discretion and adequate legal authority to conduct its operations in that manner (as explained above), the Corps has failed to adequately consider a reasonable alternative that would incorporate Middle and Lower Chattahoochee flow targets. The Corps' failure to consider a reasonable alternative to the proposed action is a violation of NEPA.

N

b. The Corps Has Failed to Consider the Full Effect of Major Federal Actions.

The Corps has assumed into the baseline the massive increases in Atlanta-area consumption over the past 40 years. Those changes were made possible by the Corps' operation of Lake Lanier, via water-related agreements with water utilities and other actions. However, those federal actions, which are clearly major in their effect, have never been subjected to a complete review under NEPA. In NEPA terminology, the collection of Corps actions to facilitate ever-increasing withdrawals constitutes a major federal action, the effects of which the Corps has failed to consider in the manner NEPA requires.

NEPA requires federal agencies to determine a "No Action Alternative" (NAA) to serve as a "benchmark"[47] or baseline against which a proposed federal action can be evaluated.[48] Determination of an appropriate baseline is critical, as it forms the basis to measure the magnitude of any changes to be brought about by the proposed action. In this proceeding, the Corps has designated as the baseline its *current* operations under the 1989 draft ACF Basin

O

[46] *See* 42 U.S.C. § 4332; 40 C.F.R. § 1500.1(c) ("The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences . . ."); *id.* at § 1500.2 ("Federal agencies shall to the fullest extent possible . . . (e) Use the NEPA process to identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment.").

[47] *Friends of Southeast's Future v. Morrison*, 153 F.3d 1059, 1065-1066 (9th Cir. 1998) (finding that the NAA "is required within all NEPA analyses to provide a benchmark to compare outputs and effects, even though this alternative does not meet the purpose and need of the project"); *see also* Council on Environmental Quality, Memorandum to the Agencies Regarding Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, 46 Fed. Reg. 18,026 (Mar. 23, 1981) (question 3) (NAA "enable[s] decisionmakers to compare the magnitude of environmental effects of the action alternatives").

[48] 40 C.F.R. § 1502.14(d).

Responses to ACF222 - Tri-Rivers

N. Whatever purported agreements were made between the governors of the states of Alabama, Georgia, and Florida in 2003 were never approved by the United States Congress; therefore, USACE has no authority to operate for these flow targets. The stated daily and weekly average flow targets at Columbus, Georgia, are established in the Federal Energy Regulatory Commission (FERC) license for Georgia Power Company projects downstream of West Point Lake (refer to section 6.1.1.2.1). Each of the FERC target flows include an important qualifier, e.g., "a daily average target minimum flow of 1,350 cfs, or inflow, whichever is less" (emphasis added). Model results over the 73-year hydrologic period of record indicate that a daily average flow of 1,350 cfs at Columbus would be achieved on 94 percent of the days for the PAA compared to 95 percent under the NAA (refer to section 6.1.1.2.3.9). The Alabama Office of Water Resources and the Southern Nuclear Operating Company have identified a daily average flow need of 2,000 cfs at Columbia, Alabama, to support continued operation of the Farley Nuclear Plant. Model results indicate that the daily average flow need at Columbia would be met 95 percent of the days over the period of record compared to 96 percent under the NAA.

O. USACE does not prioritize project purposes. Instead, USACE has evaluated and proposed water management measures and alternatives that balance operations across all authorized project purposes throughout the basin while considering Georgia's water supply storage request, as directed by the 11th Circuit Court of Appeals.

Council on Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) require consideration of the No Action Alternative (NAA) (40 CFR section 1502.14). In the CEQ's memorandum of March 23, 1981, *Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations*, question no. 3 addresses how the NAA is defined depending on the nature of the specific federal action. The response to question no. 3 states, in part:

> The first situation might involve an action ... where ongoing programs initiated under existing legislation and regulations will continue, even as new plans are developed. In these cases, "no action" is "no change" from the current management direction or level of management intensity. To construct an alternative that is based on no management at all would be a useless academic exercise. Therefore, the "no action" alternative may be thought of in terms of continuing with the present course of action until that action is changed.

Consequently, for purposes of the Master WCM update process, the NAA reflects current reservoir operations as they have evolved over time in response to laws, regulations, policy, and new technical information. Basing the NAA for the ACF Basin on a pre-NEPA 1958 WCM or on a predam condition to assess the effects of alternative WCM update plans would neither accurately reflect current baseline operations nor be consistent with "no action" as defined in the referenced CEQ memorandum.

Water Control Plan, as further modified to accommodate Atlanta water supply and other interests, as the NAA for the ACF DEIS.[49] Obviously, to the extent some portion of a proposed federal action is assumed to occur already in the baseline, then the NEPA review of the proposal and its alternatives will fail to capture the full magnitude of the action's environmental impacts.

In this instance, the Corps attempts to avoid its obligation to study the effects of its actions to facilitate the massive increases in water withdrawals from the mid-1970s to the present time. That would not present a legal problem under NEPA if those withdrawals had undergone a lawful NEPA review in the past. However, that has not been the case. A comprehensive NEPA review of Corps operations at the Buford Dam has not been conducted since 1974,[50] and even that 1974 review could hardly be characterized as providing a reasonably thorough evaluation of the increases in water withdrawals in the subsequent four decades since that time (which, again, occurred only as a consequence of the Corps' actions).

The State of Alabama raised this very issue in its 1990 lawsuit, wherein it sought to enjoin the Corps from reallocating water from Lake Lanier before performing the required NEPA analyses and other relevant studies.[51] At that time, the Corps argued that it could not complete its NEPA obligations due to the litigation.[52] With that litigation having concluded, the Corps no longer has that excuse to avoid fulfilling its NEPA obligations. The Corps is required to review the environmental consequences of its actions.

---

[49] *See* DEIS at 1-3 ("USACE has continued to operate the ACF projects essentially in accordance with the status quo reflected in the 1989 manual update, making minor adjustments as additional experience and circumstances have dictated. In addition, USACE has continued to accommodate water supply withdrawals from Lake Lanier and from the Chattahoochee River downstream, although USACE, due to ensuing litigation, has never taken action to effect a formal reallocation of storage in Lake Lanier, nor to accommodate the future water supply needs that were anticipated in 1989."); *id.* at 4-44 ("Water Management Alternative 1 represents no change from the current management direction or level of management intensity. This alternative would represent continuation of the current water control operations at each of the federal projects in the ACF Basin. Basinwide management of all seven project purposes . . . is also considered in the alternative. . . . The CEQ regulations require detailed analysis of a No Action Alternative (40 CFR 1502.14); therefore, Water Management Alternative 1 was carried forward for further evaluation to serve as a basis of comparing performance among water management alternatives.").

[50] *See* Corps, *Final Environmental Statement - Buford Dam and Lake Sidney Lanier Georgia* (Dec. 1974); *Alabama v. U.S. Army Corps of Engineers*, 424 F.3d 1117, 1122-23 (11th Cir. 2005).

[51] *Alabama v. U.S. Army Corps of Engineers*, No. cv-90-H-01331-E (June 28, 1990).

[52] *See, e.g., In re MDL-1824 Tri-State Water Rights Litigation*, 644 F. 3d 1160, 1183-84 (11th Cir. 2011) ("The Corps states that 'every single day since 1990 the Corps was either operating under an agreement that barred it from formally taking any steps to reallocate storage, or was actively engaged in a process that could have led to a final agency action reallocating storage.'").

TRI RIVERS
Waterway Development Association

c. The Corps Has Failed to Adequately Consider Socioeconomic Effects.

NEPA requires federal agencies to take a "hard look at the environmental consequences of the proposed action."[53] Among other things, the agency is required to consider "the social and economic impacts of any proposed action.[54] Similarly, Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations (Feb. 11, 1994), requires the federal agencies to further "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."

While the Corps recognizes that portions of the ACF basin are disproportionately low income (DEIS at 2-242), the Corps' scant evaluation of income, employment, and environmental justice (DEIS §§ 2.68, 2.68, 2.70) falls well short of providing information that would be useful in analyzing impacts in the Middle and Lower Chattahoochee region. The Corps compares income and employment data for those parts of Alabama, Florida, and Georgia served by the ACF project area. Those groupings do not allow for meaningful consideration of effects in the Middle and Lower Chattahoochee area, which includes parts of both Alabama and Georgia. Further, income and employment figures are more meaningful when compared to other benchmarks, such as the same figures for a statewide and national basis. We believe, for example, that an analysis of that type could show that the Columbus, Georgia, area suffers from a higher poverty rate compared to the State of Georgia or the nation as a whole. That would be relevant information, but the Corps has failed to assemble enough of the pertinent data to make comparisons of that nature. P

The Corps also glosses over the potential economic impact of both deprioritizing navigation and failing to provide sufficient flows in the Middle and Lower Chattahoochee regions. As noted above, the failure to provide reliable flows is an impediment to business development and poses serious challenges even for existing businesses. We in the region understand how serious this is, but a more robust analysis would attempt to quantify the value of existing businesses and lost opportunities in terms of income and employment. Worse, the problems inherent in the Corps' baseline, as discussed above, create a false picture of the Corps using flow to improve economic conditions in the region when the opposite is true: The Corps' failure to provide adequate flow and navigation support are a significant threat to job growth and economic security in the region.

[53] *See, e.g., Druid Hills Civic Ass'n v. Fed. Highway Admin.*, 772 F. 2d 700, 709 (11th Cir. 1985).

[54] 40 C.F.R. 1508.8.

Responses to ACF222 - Tri-Rivers

P. Language has been added to section 2.6.8 of the EIS to discuss the disparity of incomes throughout the ACF Basin.

The PAA includes operations to ensure a predictable minimum navigable channel in the Apalachicola River for a continuous period that is sufficient for navigation use. Under the PAA, as shown in section 6.5.2 of the draft EIS, a 7-ft channel is available 42.5 percent of the time compared to 20.5 percent of the time under the NAA (current operation). USACE does not prioritize project purposes but strives to operate ACF Basin projects in a balanced manner to fulfill all authorized purposes. USACE does not operate for flow targets for the middle Chattahoochee River.

TRI RIVERS
Waterway Development Association

Responses to ACF222 - Tri-Rivers

5. The Corps' Efforts to Support Recreational Uses in the Middle Chattahoochee River Are Appreciated and Should Continue.

Q. Comment noted.

Recreational boating, fishing, and other in-stream and lakeshore activities are a part of life along the Middle Chattahoochee River, and they also provide an important source of economic activity in the region. The Corps' Mobile District has consistently shown interest in maintaining and enhancing recreational opportunities. Tri Rivers is grateful for the Corps' efforts in that regard.

Reservoir elevations are critical to maintaining recreational opportunities. Tri Rivers urges the Corps to strive to maintain lake elevations under normal conditions of 632.3 to 635 mean sea level (MSL) at West Point Lake; 187.5 to 190 MSL at Lake Eufaula (Walter F. George); and 76.5 to 77.5 MSL at Lake Seminole (Jim Woodruff) when possible. We also recommend that the Corps evaluate alternatives to the rule curves to allow higher elevations during the winter drawdown. As a practical matter, pool elevations have routinely been above the rule curve during the drawdown period. Entering the spring with a fuller pool reduces competition between reservoir refill and downstream needs such as navigation and spawning in the Apalachicola River.

Q

We also appreciate the Corps' support for other recreational projects, including especially the new whitewater course at Columbus, Georgia. We are optimistic that the outdoor recreation in and along this part of the Chattahoochee River will provide economic benefits for years to come.

Cities along the Middle Chattahoochee and Flint Rivers have pursued other significant projects that are primarily for recreation, but which would provide substantial economic benefits, including especially proposals to develop new marinas. We look forward to working with the Corps and other stakeholders on projects of that nature. However, a navigation channel to the Gulf of Mexico is necessary to maximize the potential benefits associated with recreational boating.

We appreciate this opportunity to comment. If we may provide additional information or assistance, please feel free to contact Billy Houston, the Executive Director of Tri Rivers, or any of our members.

Sincerely,

Billy V. Houston
Executive Director

Attachments

List of Attachments

A. Memorandum of Understanding Regarding Initial Allocation Formula for the ACF River Basin (2003).

B. Letter from Lonice C. Barrett, Commissioner, Georgia Department of Natural Resources, to Chris M. Hobson, Vice President, Environmental Affairs, Georgia Power Company (Aug. 9, 2002) and FERC responses (available from the FERC electronic library under Docket No. P-2177).

C. Letter from Nolton G. Johnson, P.E., Chief, Water Resources Branch, Georgia Department of Natural Resources, to Chris M. Hobson, Vice President, Environmental Affairs, Georgia Power Company (Oct. 7, 2002) (available from the FERC electronic library under Docket No. P-2177).

Memorandum of Understanding
Regarding Initial Allocation Formula for the
ACF River Basin

WHEREAS, the States of Alabama, Florida and Georgia, along with the United States of America, are signatories to the Apalachicola - Chattahoochee - Flint River Basin Compact, (ACF Compact);

WHEREAS, the ACF Compact authorizes the States of Alabama, Florida and Georgia to develop an allocation formula for equitably apportioning the surface waters of the ACF Basin among the States; and it is the intent of the states that this formula will be consistent with the ACF Compact;

WHEREAS, the States of Alabama, Florida and Georgia have reached substantial agreement in principle regarding many of the terms of an allocation formula;

WHEREAS, the ACF Compact and the Operating Guidelines of the ACF Commission require the input of the public through public hearings and written comments prior to the adoption by the ACF Commission of an initial allocation formula;

WHEREAS, the ACF Compact requires that the allocation formula is subject to review and concurrence by the federal commissioner, and it is desirable to facilitate that review in a timely manner; and

WHEREAS, the States of Alabama, Florida and Georgia desire to express and commemorate their preliminary agreement to certain concepts in advance of the issuance of a draft initial allocation formula for public comment and federal review.

NOW, THEREFORE, IN CONSIDERATION OF THE FOREGOING, the States of Alabama, Florida and Georgia hereby agree to the following principles of an allocation formula:

1. Performance under the allocation formula shall begin when authorization for allocation of storage in Lake Lanier for 705 mgd for water supply has occurred, and the Corps has issued contracts for such use. Until the date on which performance commences, the Corps will operate the federal reservoirs consistent with the principles of the allocation formula to the maximum extent practicable.

2. The signatory states will begin negotiations to extend or modify the allocation formula no later than December 31, 2035.

3. **Notice to terminate 2038**
   Expiration 2040

Effect after Termination
Neither the fact that the Signatory Parties have executed this Agreement nor the terms of this Agreement shall create any inference or presumption that such execution or terms would constitute an equitable apportionment of the surface waters of the ACF Basin after the expiration of this Agreement or termination of the ACF Compact.

4. The following flow requirements will be included in the allocation formula, and are intended to be met by the combined actions of maintaining waters uses consistent with the allocation formula, and by the Corps operating the federal reservoirs consistent with the allocation formula.

   a. On the Chattahoochee River above its confluence with Peachtree Creek, a flow of 750 cfs will be maintained on a daily basis, with the understanding that the State of Georgia is entitled to a variable flow regime that requires no less than 650 cfs in winters, and flows higher than 750 cfs in summers, provided that an annual average of 750 cfs is obtained from such a variable flow regime.

   b. On the Chattahoochee River at Columbus, Georgia, a flow of 1350 cfs will be maintained on a daily basis at all times, and a flow of 1850 cfs will be maintained on a weekly basis provided that the top of the storage pool in West Point Reservoir is above 621.6 feet.

   c. On the Chattahoochee River at Columbia, Alabama, a flow of 2000 cfs will be maintained on a daily basis.

   d. On the Apalachicola River at Chattahoochee, a minimum flow of 5000 cfs will be maintained on a weekly basis at all times. Monthly flows will be maintained at quantities that are determined by the composite storage levels in West Point Lake and Lake Walter F. George, and by a determination of whether drought relief is in effect. Table 1 sets the applicable minimum monthly flow requirements when drought relief is not in effect. Table 2 sets the applicable monthly flow requirements when drought relief is in effect. Table 3 lists the reservoir storage quantities which determine which set of monthly flow requirements at Chattahoochee is applicable. It is not the states' intent to over release to meet monthly flow requirements.

5. The formula will provide drought relief in any month when the following conditions exist:

   There is an indication of climatic drought, demonstrated by the following facts having existed in the prior month:

- The ACF Basin Weighted 12-Month Standard Precipitation Index was –1.26 or less;

AND

- The ACF Basin Weighted Hydrologic Palmer Index was -2.37 or less;

6. Georgia shall impose in the relief month the terms and conditions described in the published Georgia Drought Management Plan as appropriate for the existent level of drought.

7. The agreement shall consider and include the use of Lake Lanier as feasible and appropriate. West Point Lake, Lake Walter F. George and Lake Seminole shall be used to support all the flow requirements at Chattahoochee, FL.

8. The allocation formula will explicitly address future uses of water in the manner set forth below.

   a. The states will support authorization for allocation of storage in Lake Lanier for 705 mgd (annual average) for water supply. Consideration will be given to additional water supply in excess of 705 mgd.

   b. Of water withdrawn for municipal purposes within the Chattahoochee Basin above the Whitesburg gage and within the Corps jurisdictional boundary of Lake Lanier in Georgia, no less than 58% on an annual average basis shall be returned to the Chattahoochee River Basin and accounted for at Whitesburg.

   c. No water from the Chattahoochee River below Whitesburg may be exported for use above Whitesburg.

   d. All new water supply reservoirs with a storage capacity in excess of 500 acre feet shall be required to meet the instream flow requirements that are specified in the laws, regulations and policies of the state in which the reservoir is located.

   e. The states shall request and support raising the top of the conservation pools of Lake Lanier by 1 foot in all months and raising the top of the conservation pools of Lake Seminole to 78 feet above mean sea level. The states shall further request and support adjusting the top of the conservation pools of Lake Walter F. George and West Point Lake and zonal elevations of all four federal reservoirs to levels mutually agreed to by the states.

   f. There shall be no new transfers from the Flint River Basin to the Chattahoochee River Basin other than those that have state or federal permits as of the date of execution of this Memorandum of Understanding.

9. An adaptive management process will be established which will facilitate the implementation of the formula, and which will provide a foundation for potential changes to the formula. However, no changes to the formula resulting from a, b, c or d below shall be made except with the unanimous approval of the ACF Commission.

   a. The adaptive management process will include the following elements:
      - Comprehensive gathering of extant information on the water and water-dependent biologic resources of the ACF Basin;
      - Special studies of issues important to management of basin resources;
      - Analysis and interpretation of this information to establish cause-effect relationships and to identify conditions in which there is a need or opportunity to manage and use the resources more effectively; and,
      - Adaptation of basin management to accomplish this more effective resource management.

      The adaptive management process will make use of a Science Advisory Panel and of public participation.

   b. The formula will provide for using the Water Control Plan as one basis for implementing the terms of the formula.

   c. The formula will provide for development of a Drought Management Plan. Modifications to the Drought Management Plan will be accomplished through adaptive management.

   d. The agreement will provide for relief to a state in the event of unanticipated conditions.

10. The agreement shall include a provision governing the shared use of the surface water of the Chattahoochee River along the shared border between the states of Alabama and Georgia, including provisions regarding the issuance of permits for the withdrawal of surface water and discharge of treated wastewater by the state in which the person using the surface water or discharging the wastewater is located.

11. The agreement shall include a provision regarding commercial navigation in the Basin under such terms and conditions, as the states may deem reasonable and consistent with the remaining provisions of the agreement.

12. The States of Alabama, Florida and Georgia commit to work diligently to prepare a draft initial allocation formula agreement that incorporates the above concepts and such other terms upon which the States agree. Upon completion of the draft initial allocation formula, the ACF Commission Secretary shall provide copies of such draft initial allocation formula to the public, shall provide notice of a public comment period on the initial draft allocation formula, and shall establish dates for public hearings on the draft initial allocation formula in accordance with the ACF Commission Operating Guidelines.

ATTACHMENT A

13. The signatory states recognize the need to stay the litigation pending in Alabama, the District of Columbia and Georgia during the drafting of the agreement.

Approved and adopted this 22 day of July 2003.

Governor Bob Riley
State of Alabama
Date 7-22-03

Governor Jeb Bush
State of Florida
Date 7-22-03

Governor Sonny Perdue
State of Georgia
Date 7-22-03

5

1415053.1

ATTACHMENT B

Unofficial FERC-Generated PDF of 20021218-0462 Received by FERC OSEC 12/10/2002 in Docket#: P-2177-053

AUG 2002 RECEIVED

Georgia Department of Natural Resources
2 Martin Luther King, Jr., Drive, S.E., Suite 1252 East, Atlanta, Georgia 30334
Lonnie C. Barrett, Commissioner
404/656-3500

August 9, 2002

Mr. Chris M. Hobson
Vice President, Environmental Affairs
Georgia Power Company
241 Ralph McGill Boulevard, NE
Bin 10221
Atlanta, Georgia 30308

Attention: George Martin

Dear Mr. Hobson:

Thank you for the opportunity for the Georgia Department of Natural Resources (DNR) to review the Draft License Application, Preliminary Draft Environmental Assessment for the Middle Chattahoochee Project (FERC No. 2177). We have enjoyed working with the Georgia Power Company's (GPC's) staff on this project. The ease at which we moved through the process is a testimony to the professionalism and knowledge of your staff. We request that GPC address the following concerns. Please note that the three division directors of DNR (Environmental Protection Division Director Harold Reheis, Pollution Prevention Assistance Division Director Bob Kerr, and Wildlife Resources Division Director David Waller) all support these concerns for consideration by GPC for the Middle Chattahoochee River project. 1

Although it is outside of GPC's control, a recent development that could have implications on the flow regime downstream of the Middle Chattahoochee Project is the proposal to remove City Mills dam. Currently, City Mills dam impounds the North Highlands dam tailwater. Flow model evaluation of North Highlands development assumes there is a downstream impoundment. If City Mills dam is removed, DNR recommends that GPC conduct an instream flow study designed to evaluate the flow regime in the newly created riverine reach. This alternative instream flow study would evaluate the flow regime to optimize for native riverine aquatic community integrity and recreational opportunities, including but not limited to shoal bass. This study would not be necessary if the City Mills dam project is not removed. A specific reopener clause or adaptive management approach should be incorporated into the FERC license that would allow GPC and DNR to evaluate and adjust permitted instream flow requirements from the project if the area becomes riverine. Having a specific reopener clause incorporated in the new license would negate the need to implement the formal reopener process through the FERC L-3 (Article 15) document if the City Mills dam is removed. 2

The Department supports flow scenarios S19 and S20. These scenarios use a daily average minimum flow of 1350 cfs and a weekly average minimum flow of 1850 cfs while minimizing reservoir level fluctuation. Either operating regime appears to meet the desired goal of flow at Columbus gage and stable reservoir levels within the project boundary. 3

The recreational enhancements proposed by GPC will greatly improve public access to the water bodies on the project. Our foremost concern for all the proposed enhancements is to ensure that public access is adequate throughout the license period. Our comments relate only to those facilities to be constructed in Georgia. 4

The recreational improvements for the Goat Rock Lake Marina area, the only access site proposed on that lake, would greatly improve angler access to the lake. Your plan included two alternatives for development at this site. Detailed descriptions of the two alternatives were not provided. We suggest you indicate that plans will be developed in concert with our agency personnel. 5

1415053.1

Unofficial FERC-Generated PDF of 20021218-0462 Received by FERC OSEC 12/10/2002 in Docket#: P-2177-053

Georgia Power intends to make much needed improvements for public access to Lake Oliver. In earlier enhancement proposal drafts, a cantilevered fishing deck and nearby parking area was proposed for the tailwater area below Goat Rock. We suggest that you discuss this option in the plan and explain why it was not chosen for implementation. Our perception of City Marina is that it currently does not have adequate parking to meet the demand. We suggest that your plan include measures to alleviate this problem, particularly in light of your general plans to increase the fishing facilities at this location. Also, to meet current and future boating and fishing demands on this reservoir, an additional location on the reservoir that provides boating access and bank fishing may be needed on Lake Oliver. For example, the need for additional boating access further up the reservoir than City Marina may be necessary to accommodate the rapid growth of the greater Columbus area. 6

It is not clear to us from your proposal what facilities are to be provided on North Highland impoundment. We believe that bank fishing access could be easily provided to the impoundment by constructing a pier or fishing stations along the existing Columbus Riverwalk. The proposed fishing deck for the North Highland Dam area will certainly improve angler access below the North Highland Dam. 7

We concur with and applaud the proposal by Georgia Power to protect populations of Georgia rockcress and Nevius stonecrop near Goat Rock Dam by prohibiting disturbance of undeveloped river bluff habitats near the dam and expanding the project area to protect known occurrences of these rare plants. We agree that coordination with Mead-Westvaco to provide 100-foot buffers along Goat Rock impoundment, Wacoochee Creek, and Mulberry Creek will help protect aquatic and riparian habitats and associated species. We also strongly support the proposal to protect hardwood-dominated drains and promote hardwood regeneration in the project area. While a specific management plan for the shoals spiderlily population downstream of Oliver Dam is not warranted, this population should be mapped precisely and monitored to assess changes in extent and condition over time. Land management plans and dam maintenance activities in the project area should take into account the presence of this state-protected species. 8

Again, thank you for the opportunity to make comments on the Draft License Application, Preliminary Draft Environmental Assessment for the Middle Chattahoochee project. If you have any questions about our suggestions for the Middle Chattahoochee Project, please feel free to contact us. 9

Sincerely,

Lonice C. Barrett
Commissioner

LCB:pw

Unofficial FERC-Generated PDF of 20021218-0462 Received by FERC OSEC 12/10/2002 in Docket#: P-2177-053

Responses to Letter from Georgia Department of Natural Resources, Dated 9 August 2002

Response 1.

No Response necessary.

Response 2.

In the applicant-prepared environmental assessment (APEA) (section V.C.3, Appendix G), Georgia Power proposes to evaluate the instream flows below the Middle Chattahoochee Project, and whether the river conditions, aquatic habitat, or recreational features could be significantly enhanced by any modifications to project operations, following the removal of City Mills and Eagle-Phenix dams, should downstream dam removals occur in the future. The evaluation would be conducted jointly with the Georgia Department of Natural Resources (GDNR), based on the Relicensing Settlement Agreement reached with GDNR. This proposed license condition would avoid the need to implement a formal re-opener process through the Federal Energy Regulatory Commission's existing articles set forth in Form L-3 (October 1975) entitled "Terms and Conditions of License for Constructed Major Project Affecting Navigable Waters of the United States."

Response 3.

As evaluated in the APEA (sections V.C.2 and V.C.3), Georgia Power proposes to operate the Middle Chattahoochee Project in accordance with the minimum flow targets and reservoir fluctuation limits set forth in flow scenario S19. As recommended by GDNR and the Alabama Department of Economic and Community Affairs, Georgia Power has modified its operations proposal to incorporate the daily average and weekly average minimum flow targets for Columbus, Georgia, that have been tentatively accepted as a consensus set of flow rates by the states of Alabama, Florida, and Georgia in the Apalachicola-Chattahoochee-Flint River basin water allocation negotiations, with the understanding that the U.S. Army Corps of Engineers provides for such project inflows. Georgia Power proposes to operate the Middle Chattahoochee Project with an instantaneous target minimum flow release of 800 cfs, or inflow, whichever is less, downstream of each project dam; a daily average target minimum flow of 1,350 cfs, or inflow, whichever is less, downstream of the project; and a weekly average target minimum flow of 1,850 cfs, or inflow, whichever is less, downstream of the project.

Response 4.

No Response necessary.

Responses 5-7.

Georgia Power addressed the suggestions for recreational enhancements for Goat Rock, Oliver, and North Highlands in a letter to Mr. David Waller, GDNR, dated June 27, 2002. The APEA (section V.C.6) also evaluates these suggestions. Georgia Power proposes to develop plans for its proposed recreation enhancements in Georgia in consultation with GDNR.

Response 8.

Georgia Power proposes in the APEA (section V.C.4) to map and monitor the existing known occurrence of the shoals spiderlily downstream of Oliver Dam to assess changes in its extent and condition over time. Georgia Power would undertake these activities jointly and in

Unofficial FERC-Generated PDF of 20021218-0462 Received by FERC OSEC 12/10/2002 in Docket#: P-2177-053

consultation with GDNR. In addition, land management plans and dam maintenance activities in the area would take into account the presence of this state protected species.

Response 9.

No Response necessary.

Unofficial FERC-Generated PDF of 20021218-0462 Received by FERC OSEC 12/10/2002 in Docket#: P-2177-053

Georgia Department of Natural Resources
205 Butler Street, S.E., Suite 1058 East Tower, Atlanta, Georgia 30334-4100
Lonice C. Barrett, Commissioner
Harold F. Reheis, Director
(404) 656-3084

October 7, 2002



Mr. Chris M. Hobson
Vice President Environmental Affairs
Georgia Power – Bin 10221
241 Ralph McGill Blvd. N.E.
Atlanta, GA 30308-3374

RE: Middle Chattahoochee Hydro Relicensing FERC #2179

Dear Mr. Hobson:

This responds to your September 30, 2002 letter requesting additional information relating to the current draft ACF Water Allocation Formula minimum flow targets of 1350 cfs average daily and 1850 cfs average weekly. These target flow rates were also referenced in DNR Commissioner Barrett's May 15, 2002 letter on the subject of the referenced project FERC relicensing. Your current letter requests background information on the derivation of these flow rates.

Although I did not derive these numbers, I am more than pleased to attempt to share what information I have with you.

A group of water users in Georgia and Alabama (including the Columbus Water Works, Mead Corporation, Georgia Pacific Corporation, and Southern Nuclear), as well as the ACF Compact negotiators for the State of Alabama, have all advocated for those specific flow targets. In addition, on January 15, 2002, Mr. James M. Cambell, Alabama's Alternate Commissioner for the ACF Compact, provided comments to the other ACF Compact Commissioners. He followed up with a January 16, 2002 letter to Florida DEP Secretary David Struhs to document his comments in more detail.

The 1350 cfs average daily and 1850 cfs average weekly minimum flows at Columbus, Georgia are to ensure adequate water supplies and flow regimes for Alabama and Georgia citizens, now and in the future.

These flow rates were modeled rigorously by Georgia EPD prior to March 2002 using period of flow records from 1939 to 1993, and were determined to be feasible. Georgia EPD has also done considerable modeling since then using the period of record from 1939 through 2001. While we are still evaluating how well the proposed formula works, we are confident that even with the 1998-2001

ATTACHMENT C

Unofficial FERC-Generated PDF of 20021218-0462 Received by FERC OSEC 12/10/2002 in Docket#: P-2177-053

drought conditions included, the 1350 cfs daily and 1850 cfs weekly targets can be met a very high percentage of the time.

All three states, and numerous other stakeholders support the flow rates. To my knowledge no stakeholders to the ACF Compact process objected to these or expressed concerns, therefore, the flow rates were tentatively accepted as a consensus set of flow rates.

Sincerely,

Nolton G. Johnson, P.E., Chief
Water Resources Branch

NGJ:bb

Cc: Bob Kerr
Harold F. Reheis
Trey Glenn, III
Doug Barr

1415053.1

From: SJO
Sent: Sunday, January 31, 2016 7:31 PM
To: ACF-WCM
Cc: riverkeeper@apalachicolariverkeeper.org
Subject: [EXTERNAL] Apalachicola Bay

Dear Corp Members,

- **The health, productivity, and sustainability of the Apalachicola River and Bay are critical to the economy and cultural heritage of Florida and the entire Gulf Coast. We are asking you to give the same fair and equal consideration to fish and wildlife conservation in the Apalachicola River ecosystem as you do the other authorized purposes of the ACF river system.** A
- **It is imperative when you rewrite your manual it manages the flow of freshwater needed to maintain the extraordinary richness and productivity of the Apalachicola River, Floodplain, and Bay ecosystem.** B

Thank you for your time in considering our position.

Chris and Joani Chase

Response to ACF223 – Chris and Joani Chase

A. The PAA includes fish and wildlife conservation operations throughout the basin (e.g., the reservoir fish spawn operations, minimum flow provisions in the Apalachicola River, and fish passage at Jim Woodruff Lock and Dam). Section 5 of the EIS provides additional information on the PAA. The EIS considered and disclosed the expected impacts that the PAA could have on fish and wildlife resources in the Apalachicola River and Bay (or elsewhere in the system). If expected impacts to significant resources would be adverse as a result of revised operations, USACE must consider potential measures to mitigate those effects. The analysis presented in section 6 of the EIS indicates that the PAA would have a minimal effect on flow conditions in the Apalachicola River and into the Bay, compared to current reservoir operations under the NAA. Because flow and water quality changes in the Apalachicola River and Bay are not expected under the PAA, no anticipated incremental effect would be expected on fish and wildlife resources in the bay.

B. The authorized purposes of the federal ACF system do not include a specific directive to provide freshwater inflows to Apalachicola Bay to sustain the resources of the bay. USACE does make releases to limit adverse effects to threatened and endangered species downstream of Jim Woodruff Lock and Dam, including Apalachicola Bay. USACE consulted on the PAA and the results are presented in appendix J of the final EIS. In the biological opinion the USFWS concluded that effects to estuarine invertebrate production are insignificant because the PAA provides slightly beneficial effects from increasing the number of freshwater pulses and increasing the number of days greater than or equal to 16,200 cfs in the winter. USFWS also anticipate only minor changes in salinity regimes and estuarine habitat due to the WCM.

Response to ACF224 - Alabama Office of Water Resources

From: John Neiman
Sent: Friday, January 29, 2016 7:06 PM
To: ACF-WCM
Cc: Atkins, Brian
Subject: [EXTERNAL] PD-EI (ACF-DEIS) State of Alabama Comments on ACF Draft EIS and WCM (1 of 2)
Attachments: State of Alabama ACF DEIS comments.pdf; State of Alabama ACF Exhibit A & Exhibit A-1-A-20.pdf

To Whom It May Concern: Please find attached Alabama is submitting these comments on the draft ACF EIS and WCM. Because our attempt to send all three of our documents was bounced back as exceeding the Corps' email size limit, we are sending these documents in multiple emails. This first email includes Alabama's comments and Exhibit A, along with Exhibits A-1 through A-20. Exhibits B through T will follow in additional emails.

[Exhibit A is presented here. Due to size Exhibits B through T are not presented. Copies of Exhibits B through T will be provided upon request by emailing ACF-WCM@usace.army.mil.]

JOHN NEIMAN
Appellate Group Chair

Maynard Cooper Appellate Practice
1901 Sixth Ave. N. Suite 2400
Birmingham, AL 35203

MAYNARD
COOPER GALE

Confidentiality Notice - The information contained in this e-mail and any attachments to it is intended only for the named recipient and may be legally privileged and include confidential information. If you are not the intended recipient, be aware that any disclosure, distribution or copying of this e-mail or its attachments is prohibited. If you have received this e-mail in error, please notify the sender immediately of that fact by return e-mail and permanently delete the e-mail and any attachments to it. Thank you.

OFFICE OF THE GOVERNOR

ROBERT BENTLEY
GOVERNOR

STATE OF ALABAMA

ALABAMA DEPARTMENT OF ECONOMIC AND COMMUNITY AFFAIRS

JIM BYARD, JR.
DIRECTOR

January 29, 2016

Colonel Jon J. Chytka
Commander and District Engineer (acf-wcm@usace.army.mil)
Mobile District, U.S. Army Corps of Engineers
Attn: PD-EI (ACF-DEIS)
P.O. Box 2288
Mobile, AL 36628-0001
VIA EMAIL

Re: Draft Environmental Impact Statement
Update of Water Control Manual for Apalachicola-Chattahoochee-Flint Basin

Dear Colonel Chytka:

The State of Alabama, through its Office of Water Resources, submits these comments on the draft Master Water Control Manual and Environmental Impact Statement for the Apalachicola-Chattahoochee-Flint River Basin. The draft WCM and EIS are contrary to law and sensible public policy. The draft WCM elevates Atlanta's water-supply interests at the expense of Alabama's environment and economy, and the draft EIS obscures the harm the draft WCM would cause. The Corps must fix these problems before it issues a final WCM and EIS.

I. Alabama has substantial interests in the basin.

The Corps should consider Alabama's interests as it revises the WCM and EIS. Approximately 2,800 square miles of the ACF lie within Alabama's borders, and more than 300,000 people live in the Alabama counties there. The basin serves three major functions for Alabamians in this area.

A. Water supply and economic growth. The ACF serves important water-supply functions. A number of local governments, farms, and companies use the basin's water. Alabama Power Company's Farley Nuclear Plant in Columbia and WestRock's Mahrt Mill in Cottonton make significant industrial use of the Chattahoochee's water. Alabama's use of the basin's waters for agricultural purposes will likely increase in the years to come. And when less water flows through the ACF Basin, it becomes more difficult for these entities to make discharges without violating state and federal water-quality standards. As a result,

A

401 Adams • Suite 580 • P.O. Box 5690 • Montgomery, Alabama 36103-5690 • (334) 242-5100

Response to ACF224 - Alabama Office of Water Resources

A. USACE considered and addressed all comments submitted by the State of Alabama, Alabama state agencies, and other Alabama stakeholders in developing alternatives, including the PAA.

entities may incur increased costs when they treat water they withdraw and discharge.

B. Recreation. Alabama also has substantial recreational interests in the ACF. Lake G.W. Andrews, Walter F. George Lake, and West Point Lake provide tourism opportunities and economic benefits. Alabama maintains a significant park, Lakepoint Resort State Park, at Walter F. George. Decreased flows and water levels can negatively impact the park's revenues and adversely affect fisheries.

C. Navigation. Navigation has been an important ACF function historically. A 9-by-100 foot navigation channel runs through the Chattahoochee River from Phenix City to the Gulf Intracoastal Waterway in Florida. Alabama's government owns and maintains three dock and terminal facilities along this channel. Beginning in the 1990s, an absence of reliable flows caused substantial reductions in shipments at the docks. In addition, reduced flows pose navigation problems for the Farley Nuclear Plant, which sometimes needs critical equipment to be delivered by barge.

The Corps should not alter its operations in a way that sacrifices these interests for Georgia's sake. Unfortunately, as explained below and in the attached technical exhibits, it appears that the draft WCM would have that effect. *See* Exh. A (Glenn declaration and attached technical exhibits A-1–A-20).

II. The direct-withdrawal allocation violates the Water Supply Act.

The draft WCM's accommodation of Georgia's direct withdrawals from Lake Lanier is especially troubling. For years, Georgia governments have illegally taken water from Corps projects in the ACF and Alabama-Coosa-Tallapoosa basins. Even though the Corps has acknowledged in some instances that those governments were acting illegally, the Corps has maintained that it is helpless to enforce limits on them. *See* Exh. B (Correspondence regarding Lake Allatoona); Exh. G at 15-19 (committee hearing transcript). The Corps can ameliorate these problems by limiting withdrawals to congressionally approved levels and enforcing the limits in its contracts with Georgia. Yet without setting up any mechanism to curb Georgia's violations of its contracts, the draft WCM proposes to bypass Congress and to allocate at least 165 mgd in additional storage for Georgia's direct withdrawals. The draft WCM premises this proposal on the Water Supply Act of 1958, 43 U.S.C. §390b, but the WSA does not give the Corps authority to bypass Congress in that way. To the contrary, the WSA requires the Corps to obtain approval from Congress before it makes any allocation that would "seriously affect the purposes for which the project was authorized" or "involve major structural or operational changes." 43 U.S.C. §390b(e). The direct-withdrawal proposal would do both those things.

A. The PAA's direct-withdrawal allocation would involve major operational change and seriously affect the Buford Project's purposes.

The direct-withdrawal allocation involves major operational change under the Water Supply Act. The draft WCM and EIS purport to allocate 165 mgd for direct withdrawals. The storage space associated with an allocation of that magnitude would constitute 189,500 acre-feet and thus 17.4% of Lake Lanier's acre-foot conservation pool. *See* Exh. A-1 at 1-2. Alabama does not know of any reallocation the Corps has made of this magnitude without Congress's approval. Indeed, the Corps' engineer regulations state that even when the WSA otherwise would allow a reallocation, a reallocation from other project purposes can amount to no more than "15 percent of the total storage capacity allocated to all authorized project purposes or 50,000 acre feet, whichever is less." ER 1105-2-100, at 3-33. Storage capacity of 50,000 acre-feet corresponds to only 43.54 mgd, significantly less than the 165 mgd contemplated in the Proposed Action Alternative. *See* Exh. A-19 at 2. And the D.C. Circuit has stated that even a 9% allocation of conservation storage at Lake Lanier would qualify as major operational change for WSA purposes. *See Se. Fed. Power Customers v. Geren*, 514 F.3d 1316, 1324 (D.C. Cir. 2008).

The proposed allocation also would seriously affect the Buford Project's purposes by subverting hydropower generation for the sake of Atlanta's water supply. Proposed alternative 7B in the draft EIS reflects the Corps' projection of conditions in the system if it implemented the WCM's other proposed changes without allocating the 165 mgd for direct withdrawals. Under alternative 7B, the Buford Project would generate an average annual amount of 139,173 mwh. *See* Exh A-2 at 2-3. The PAA would generate only 119,593 mwh annually. The difference in these two values is 19,580, marking a 14.07% drop in Buford generation.

The D.C. Circuit properly found these sorts of considerations compelling when it held, in invalidating a secret settlement involving the Corps and Georgia, that the WSA required the Corps to obtain Congress's approval of a proposed allocation of 241,000 acre-feet at Lake Lanier for Georgia water supply. *See SeFPC*, 514 F.3d at 1324. Despite this ruling, the Corps has brushed aside these concerns on the theory that "operations or impacts at Lake Lanier alone" do not govern the WSA analysis. Exh. C at 39 (2012 Stockdale Memo). A memo the Corps' General Counsel issued in 2012 claims that to determine whether a direct-withdrawal allocation amounts to major operational change or seriously affects project purposes, the Corps must consider the allocation's impact on the ACF system *as a whole*. *See id.* at 38-39. As Alabama previously has explained in its ACF scoping comments, the Corps had not breezed past the inquiry in that way before, and the WSA's plain language will not allow the Corps to do so now. *See* Exh. D at 10 (Alabama ACF Scoping Comments). The statute's terms speak of the project, not

the system. The Act requires congressional authorization if a modification "of a reservoir *project*" would "seriously affect the purposes for which *the project* was authorized . . . or would involve major structural or operational changes." 43 U.S.C. §390b(e) (emphasis added). Thus, as the D.C. Circuit recognized, it is when a reallocation of storage for withdrawals involves major operational changes at the project in question, or affects the purposes of that particular project, that the Act requires the Corps to seek congressional approval. In light of the considerations discussed above, the PAA's allocation of direct withdrawals involves major operational change at the Buford Project and seriously affects its purposes.

B. The PAA's direct-withdrawal allocation would involve major operational change and seriously affect project purposes for the ACF system as a whole.

Even if the WSA allowed the Corps to look past the direct withdrawals' effects at Buford, the PAA still would require congressional approval, for it entails major operational change and seriously affects project purposes throughout the system. Assuming that the draft WCM's projected 40.4% return rate for Lanier direct withdrawals is not unrealistically high—an assumption that, as explained below, is dubious—the Corps' downstream projects will have 98.34 mgd less to work with. The annual equivalent storage space associated with the 98.34 mgd reduction, 109,948 acre-feet, would correspond with 36% of the West Point conservation pool and 45% of the Walter F. George conservation pool. *See* Exh. A-3 at 1. Those volumes, in turn, account for approximately 5 feet of elevation in the West Point's 15-foot conservation pool and 3 feet of elevation in Walter F. George's 6-foot conservation pool. *See id.* at 2. The Corps either would have to allow elevations in those two lakes to go down by those amounts or make fewer releases downstream. Either way, the alterations will involve major operational change.

B

Nor can the Corps write off the withdrawals' effects on system-wide hydropower. Even assuming the 40.4% return rate, direct withdrawals of 165 mgd would reduce system-wide hydropower generation by a substantial amount. As noted above in the comparison of Alternative 7H and Alternative 7B, average annual generation at Buford would drop by 14.07%, from 139,173 mwh to 119,593 mwh. Meanwhile, average annual West Point generation would drop by 3.16%, from 181,217 mwh to 175,491 mwh. Average annual generation at W.F. George would drop by 1.38%, from 472,882 mwh to 466,377 mwh. The total average annual loss at these projects would amount to 31,811 mwh. *See* Exh. A-2 at 2-3. The draft WCM and EIS cannot water down these changes by comparing them to the aggregate power generation in the entire ACF system. According to the results from Alternative 7B, facilities at Buford, West Point, and W.F. George traditionally produce approximately 793,000 mwh of generation annually. *Id.* at 3. Allowing Georgia 165 mgd in direct withdrawals, and decreasing total generation by 31,811 mwh annually, is tantamount to turning off hydropower generation at these three

Response to ACF224 - Alabama Office of Water Resources

B. USACE's legal opinion (Stockdale 2012) determined that the Agency has the authority under the River and Harbor Act of 1946 and the Water Supply Act of 1958 to accommodate Georgia's water supply storage request without causing a major operational change. The 2012 legal opinion is available on the USACE Web site.

projects for more than two weeks each year. *See id.* Flipping the switch in that way requires major operational change that seriously affects these projects' hydropower purposes.

C. The draft WCM understates the amount it is allocating for direct withdrawals.

While a 165 mgd allocation would be large enough to require congressional approval under the WSA for all the reasons given above, the draft WCM actually allows for even more direct withdrawals by Georgia. The PAA's effects on project operations and purposes thus will be even more pronounced, and the need to obtain congressional approval will be all the more imperative.

1. Baseline of authorized withdrawals. As an initial matter, the draft WCM effectively allocates an additional 10 mgd of Lanier storage for direct withdrawals because it overstates, by 10 mgd, the amount of direct withdrawals that currently are authorized from the Buford Project. The only currently authorized withdrawals arise from relocation contracts with the cities of Buford and Gainesville; the Fifth Amendment authorizes those contracts as compensation for the flooding of these cities' lands during Lanier's construction. The draft WCM and EIS assert that these contracts authorize 20 mgd in withdrawals, but the correct amount is 10 mgd. The Buford contract authorizes Buford to withdraw no more than 2 mgd from the lake, and the Gainesville contract authorizes Gainesville to withdraw no more than 8 mgd. *See* Exh. C at 14 n.45, 15 (2012 Stockdale Memo); *In re MDL-1824 Tri-State Water Rights Litig.*, 644 F.3d 1160, 1169 & nn.5-6 (11th Cir. 2011). The draft EIS and WCM double that figure to 20 mgd on the theory that the Gainesville relocation contract allowed it to withdraw 18 mgd if it returned 10 mgd. *See* DEIS 5-8 tbl. 5.1-2; DEIS 1-9 & n.2; DEIS 2-77 & n.1. But the Gainesville contract, by its terms, allowed the city to "remove" only 8 mgd. *See* Exh. E (Gainesville and Buford contracts); DEIS 2-77 n.1 It did not allow the city to remove an additional 10 mgd, especially in light of the Corps' nationwide policy not to provide credits for return flows. Although the Corps' General Counsel asserted in a 2012 memorandum that Corps has no policy precluding return-flow credits, the Commander of the Corps' South Atlantic Division, Brigadier General Donald Jackson, later testified under oath to a Senate committee that the Corps' nationwide policy is not to grant those credits. *See* Exh. F at 16 (Hearing Transcript). The draft WCM thus is effectively proposing to allocate an additional 10 mgd of Buford storage, on top of the 165 mgd discussed above, for Georgia's direct withdrawals.

C

2. Return flows. The draft WCM also understates the proposed allocation's effects by simply assuming that Georgia governments will return 40.4% of their withdrawals to the lake. The draft manual does not explain how the Corps can monitor those flows, guarantee any return amount, or enforce any return

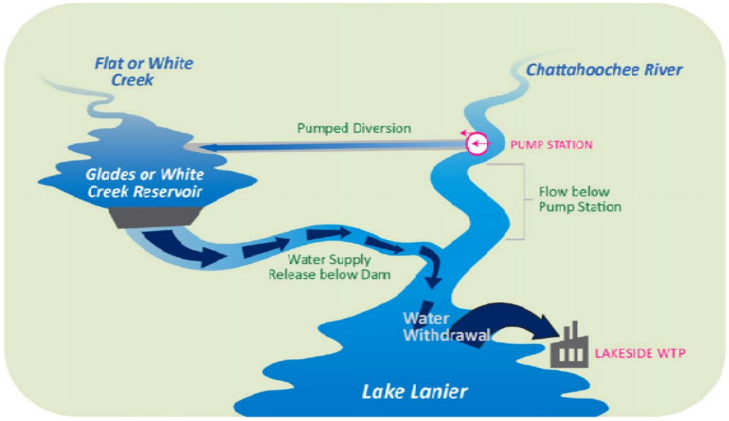
Response to ACF224 - Alabama Office of Water Resources

C. USACE reviewed the allocation amount as contained in the PAA and determined that the numbers are correct. The details associated with the City of Gainesville's relocation contract are explained in section 2.1.1.2.4.6 of the EIS (see footnote in section 2.1.1.2.4.6).

requirement. And the General Counsel conceded in the 2012 memo that, if Georgia failed to make its promised returns, Georgia's requested withdrawals could exhaust the reservoir's storage pool during periods of critical drought. *See* Exh. C at 40 n.172 (2012 Stockdale Memo). If the return-flow projections are not fully realized, then the effects on project operations and purposes will only be more significant.

3. Assumed adherence to water-supply contracts. The draft WCM further understates the proposed allocation's effects by arbitrarily assuming that Georgia will adhere to the limits placed on its withdrawals by its water-supply contracts. History shows that this assumption is irrational. The Corps has acknowledged that the Cobb-County Marietta Water Authority has repeatedly violated contractual limitations on withdrawals from Lake Allatoona in the ACT without suffering any consequence. *See* Exh. F at 15-19 (Hearing Transcript). Thus, for any WSA analysis associated with this WCM to be valid, the final WCM must establish an enforcement mechanism to ensure that Georgia adheres to contractually specified limitations on its withdrawals. The final WCM should require that for any direct-withdrawal contracts the Corps enters into with Georgia, the limitations will be enforceable by the Corps and other affected parties, including downstream states, through enforcement mechanisms that include actions for damages and revocation of Georgia's contracts. The final WCM also must set standards to guide the Corps' discretion when entering into and enforcing these contracts. And the final WCM should specify with whom the Corps intends to contract and how long any contracts will last.

4. Glades Reservoir. The draft WCM's treatment of the Glades Reservoir raises concern that the PAA is understating the proposed withdrawals at the Buford Project by an additional 40 mgd. The draft EIS assumes that Georgia will withdraw 40 mgd from Glades itself, such that the Corps need not reallocate that amount for direct withdrawals from Lake Lanier. But as the draft EIS acknowledges, "[a]s currently proposed by Hall County, reservoir operations to meet water supply demands would involve releases from Glades Reservoir to Lake Lanier, via Flat Creek, *for withdrawal (at the same rate of release) from Lake Lanier*." DEIS 2-51 (emphasis added). The draft EIS suggests that the Corps need not allocate this 40 mgd in Buford because Hall County has "a plan for the necessary infrastructure to transmit water from Glades Reservoir directly to existing water treatment facilities in lieu of moving water to those facilities via discharges to Lake Lanier." DEIS 2-52. But that does not appear to be Hall County's plan. The draft EIS for the Glades Reservoir, which the Corps issued in the same month as the draft ACF EIS, states that Hall County proposes that "[w]ater would be released from the reservoir into Flat Creek and would flow into the headwaters of Lake Lanier," where "[t]he same quantity of water released from the reservoir would be withdrawn from Lake Lanier." Exh. H at ES-7 (Glades EIS Executive Summary). The draft Glades EIS uses the following diagram to explain the proposal:



See id. at ES-8. If these withdrawals occur as the draft Glades EIS envisions, then the Corps is effectively allocating an additional 40 mgd for direct withdrawals at the Buford Project. A 165 mgd allocation is substantial enough to lead to major operational change and seriously affect project purposes, and an additional 40 mgd would only make matters worse.

* * *

In light of all these considerations, the WSA precludes the Corps from unilaterally allocating this amount of storage for direct withdrawals. To make an allocation of this magnitude, the Corps must first seek approval from Congress.

III. The PAA's other operational changes substantially reorder project purposes and thus require additional authorization from Congress.

Whereas the WSA blocks the Corps from implementing the proposed direct withdrawals, other legal constraints independently require the Corps to seek Congress's approval of the draft WCM more generally. The Corps long has recognized that it must obtain Congress's approval before making alterations that would involve substantial changes in the relative sizes of project purposes. Exh. I at 10-12 (Corps Memorandum, April 15, 2002); *accord* Exh. J at 2 (Corps Memorandum, January 21, 1969); *Envtl. Def. Fund v. Alexander*, 467 F. Supp. 885, 901 (N.D. Miss. 1979). The various changes proposed in the draft WCM, above and beyond the direct-withdrawal allocation, would have that effect. The draft would convert the Buford Project almost exclusively to use for Atlanta's water supply,

substantially diminishing hydropower generation and downstream navigation. The Corps must go to Congress before it can re-prioritize these purposes in this way.

A. The draft WCM's operational provisions elevate water supply over the Buford Project's other purposes.

The draft WCM's operational provisions make Georgia's water supply the paramount purpose of Buford in a number of ways.

1. Allocation for downstream withdrawals. As an initial matter, on top of the direct-withdrawal allocation for Georgia's water supply, the draft WCM would direct the Corps to release an additional 408 mgd from Lake Lanier for Georgia's downstream withdrawals. This proposal would require an additional allocation of 468,590 acre-feet, which is 43.1% of Lanier's 1,087,600 acre-foot conservation pool. *See* Exh. A-1 at 2. That amount of storage, combined with the storage associated with the proposed reallocation for direct withdrawals, is equivalent to more than 60% of Lanier's conservation pool. The Eleventh Circuit has held that the Rivers and Harbors Act of 1946 authorizes the Corps to make *some* releases to accommodate Atlanta's downstream withdrawals. *See In re MDL-1824 Tri-State Water Litig.*, 644 F.3d at 1166. But the Court did not hold that the Corps could, without first seeking Congress's approval, change Buford into a project that overwhelmingly focuses on water supply.

2. Action zones. The draft WCM's action zones reorder the project purposes in favor of water supply even further. The last approved WCM in 1958 did not have action zones, and even the zones proposed in the never-finalized 1989 draft WCM required the Corps to generate hydropower when a project was in the upper portion of the conservation pool. *See* Exh. K (1958 ACF Manual); Exh. L (excerpts from 1989 Draft Manual). Yet the current draft would give the Corps discretion to generate zero hydropower in all action zones at all times, even when reservoirs are in Zone 1 and relatively full. *See* DEIS 5-27; DWCM 7-2 to 7-5, 7-18 to 7-19. The draft thus allows the Corps to keep Lanier's elevation high for water-supply purposes in circumstances in which earlier manuals required the Corps to make releases and generate power.

These problems are exacerbated by the way the draft WCM raises the lowest zone, Zone 4, in which "[h]ydroelectric power demands will be met at a minimum level and might occur for concurrent uses only." DWCM 7-6. The draft increases the minimum level of Buford's Zone 4 from 49% to 64% of the conservation pool, and indeed raises Zone 4 in each month between July and February. *See* Exh. A-4 at 1. This means Zone 4 will encompass between 64% and 80% of Buford's conservation pool. *See id.* at 3; DWCM 7-3. In the aggregate, the draft WCM raises composite Zone 4 at the Corps' ACF projects by elevations that correspond to over 160,000 acre-feet at the beginning of the calendar year. *See* Exh. A-5 at 6. Like the other

operational provisions in the draft WCM, the action-zone changes will work in favor of Georgia water supply.

B. The draft WCM diminishes the importance of project purposes other than water supply.

The draft WCM's transformation of the Buford Project would come at a substantial cost. Hydropower generation would go down. The ACF system would be non-navigable most of the year. And downstream projects would suffer serious harm.

1. Hydropower effects. The draft EIS significantly understates the PAA's impact on hydropower at the Buford Project and on the ACF system as a whole.

The draft EIS understates the hydropower impacts at Buford because it references the wrong baseline for comparison. The draft EIS erroneously posits that Alternative 1A is the No Action Alternative. Alternative 1A, however, assumes direct withdrawals at Lanier of 128 mgd, above and beyond those authorized by the Buford and Gainesville relocation contracts. DEIS 5-8 tbl. 5.1-2. Congress has not authorized direct withdrawals from Lanier other than those provided by the relocation contracts, so the baseline for comparison cannot involve 128 mgd in direct withdrawals. The more appropriate baseline is Alternative 1B, which involves no direct withdrawals other than those associated with the relocation contracts. The Corps' data shows that the PAA involves a 14% decrease in hydropower generation at Buford compared to Alternative 1B. *See* Exh. A-2. The Corps' data also shows that the PAA will cause Lanier's conservation pool to drop out of Zone 1, where hydropower generation is likely at its highest, 15% more frequently than would Alternative 1B. *See* Exh. A-6 at 3-4.

Due to the same error, the draft EIS understates the PAA's impact on hydropower generation in the ACF system as a whole. In addition to the 14% drop in generation at Buford, the Corps' data shows that the PAA would cause a 3.14% drop at West Point. *See* Exh. A-2 at 3. The data also shows a 1.52% drop at W.F. George. *See id*. Thus, whereas the draft EIS asserts that the PAA will decrease system generation by 0.97%, the drop in generation from Alternative 1B is 3.14%. *See* Exh. A-7 at 3.

The draft EIS also glosses over the PAA's impact on hydropower by using long-term averages encompassing a period of 73 years. In individual years, the hydropower impacts are more pronounced. In 2000, for example, the PAA would have led to a 12.01% drop in generation over alternative 1B. *See* Exh. A-7 at 4. At individual projects, the effects would have been even more pronounced that year. As compared to Alternative 1B, the PAA would have reduced generation by 49.36% at Buford, by 13.84% at West Point, and by 7.50% at W.F. George. *See* Exh. A-2 at 4.

D

Response to ACF224 - Alabama Office of Water Resources

D. USACE's 2012 legal opinion, discussed in section 3.5.2.8.3 of the draft EIS, concluded that USACE has the legal authority under the River and Harbor Act of 1946 and the Water Supply Act of 1958 to meet Georgia's 2000 water supply request without additional congressional authorization. The 11th Circuit of Appeals accepted that legal opinion and remanded the case to USACE to update its Master WCM pursuant to the 11th Circuit's ruling.

The PAA recommends reallocating less water than the amount that the legal opinion determined was authorized.

For purposes of the Master WCM update process, the NAA reflects current reservoir operations as they have evolved over time in response to laws, regulations, policy, and new technical information. As specified in the Council on Environmental Quality's (CEQ's) memorandum of March 23, 1981, Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, basing the NAA for the ACF Basin on a 1958 WCM or a predam condition to assess the effects of alternative WCM update plans would neither accurately reflect current baseline operations nor be consistent with "no action" as defined in the referenced CEQ memorandum.

These numbers will be even greater if the projected Chattahoochee river returns—which the draft manual pegs at 94% without adequate justification, *see* DEIS 5-7—are not realized.

2. Abandonment of navigation. Far from improving navigation as compared to the last authorized manual, the draft WCM effectively abandons this purpose. The Newman Report envisioned that the Buford Project would provide year-long navigational benefits to the lower Chattahoochee, facilitating a 9-foot channel between Phenix City and the Gulf Intracoastal Waterway. *See* Exh. M at 11, 22, 28-29 (Newman Report). The last FEIS for the ACF system documented that this channel remained navigable. *See* Exh. N at 1-2 (FEIS). Yet in devoting more than 60% of Lanier's storage to water supply, the draft WCM envisions reducing the channel to 7 feet, providing no dredging, and effectively making the channel available only during relatively wet months. *See* DEIS 5-32 to 5-33. If these provisions amount to an improvement over current conditions, it is only because the Corps has informally, and unlawfully, abandoned navigation in recent years. The Corps cannot formalize and finalize that abandonment of this congressionally authorized project purpose without first seeking approval from Congress.

3. Downstream flows. The draft WCM's novel emphasis on Atlanta's water supply also undermines Congress's purpose of providing sufficient flows in the Middle Chattahoochee. The Newman Report contemplated that releases from Buford would ensure higher minimum flows downstream of Columbus. *See* Exh. M at 39 (Newman Report). As Alabama previously has noted in its scoping comments, the final WCM thus should include specific operational considerations regarding flow requirements at Columbus and Columbia.

The downstream effects are evident in the way the draft WCM addresses action zones at Walter F. George. Whereas the draft WCM generally raises action zones at Buford, the draft WCM substantially lowers them at Walter F. George. *See* Exh. A-4 at 1; Exh. A-8 at 1; DEIS 4-15 to 4-16. This means that even when the Corps keeps Lanier's elevations high for Georgia's water supply, it may simultaneously release water from Walter F. George to satisfy downstream needs. Under the No Action Alternative, the lake's elevation would have dropped below the initial impact level for recreational use in only 5 of the 73 years modeled by the Corps. *See* Exh. A-9 at 2; DEIS 6-28 tbl. 6.1-5. The Corps concedes that this number would have increased to 20 under the PAA. *See* DEIS 6-28 tbl. 6.1-5. In other words, the PAA increases the number of years Walter F. George fell below the initial impact level by a three-fold count, and the PAA would have placed the lake below that level in approximately one out of every four years. *See id.* Moreover, during certain times the PAA's effects on W.F. George's elevations are more significant when compared to Alternative 1B, in which Lanier withdrawals are limited to those authorized by the relocation contracts, rather than the NAA. *See* Exh. A-20.

The PAA raises similar concerns about flows at Columbus and Columbia. By the Corps' reckoning, the PAA would substantially decrease flows at Columbus as

compared to the Corps' proposed NAA, including by up to 33% at certain times. *See* Exh. A-10 at 2-3. Meanwhile, the PAA would result in a substantial increase in the number of days, by 33%, that flows at Columbia will not exceed 2000 cfs. *See* Exh. A-11 at 2.

Previous experience shows how the Corps can cause substantial harm to downstream flows and elevations when it emphasizes Georgia water supply. In 2009, even though the ACF was not in natural drought conditions, flows in the Middle Chattahoochee below West Point Lake fell precipitously. *See* Exh. O (Riley Letter); Exh. P (Glenn Letter). On repeated occasions, the daily flow at Columbus fell below 1350 cfs, the minimum level needed to support water quality in the area. It became clear that the Corps was overfilling West Point Lake to protect elevations at Lanier and preserve Atlanta's ability to make withdrawals for water supply. *See* Exh. O (Riley Letter). Now, the draft WCM is proposing to increase the number of times daily flow at Columbus falls below 1350 cfs. *See* Exh. A-18 at 1.

The draft WCM raises similar concerns through its drought-operations provisions. The draft EIS concedes that the PAA would trigger drought operations 2100% more often than Alternative 1B, and 633% more often than Alternative 1A. *See* Exh. A-12 at 1. When projects go into drought operations, the Corps is allowed to curtail releases, further harming downstream interests and favoring Georgia's water supply. *See* DEIS 5-39 to 5-31.

* * *

No court has held, and no court could possibly hold, that the Corps can unilaterally transform Buford and the ACF into a system whose predominant purpose is to provide water supply to Atlanta. The WCM's various operational provisions would have that effect. If the Corps wishes to make that transformation, it must first seek approval from Congress.

IV. The draft manual violates the Clean Water Act and Corps regulations.

As was true of the ACT manual, the draft ACF manual proposes to violate the Corps' obligation to maintain and ensure water quality in two ways: by failing to account for the PAA's adverse water-quality impacts and by shifting the burden of dealing with those impacts on other parties.

A. The draft WCM will cause water-quality violations.

The draft WCM would violate provisions in the Clean Water Act and regulations requiring the Corps to consider adverse impacts of its operations on water quality. The Corps has adopted a "policy to develop and implement a holistic, environmentally sound water quality management strategy for each project." ER 1110-2-8154 at 2. The Corps must "[e]nsure that water quality, as affected by the project and its operation, is suitable for project purposes, existing water uses, and public health and safety and is in compliance with applicable Federal and state water quality standards." *Id*. at 3. The Corps must maintain "the existing instream water uses and the water quality necessary to protect them" and must implement water-quality management plans that are "scoped to include all areas influencing and influenced by the project." *Id*. at 2, 3. The Corps also must "[e]nsure that the project and its operation offer the lowest stress possible to the aquatic environment." *Id*. at 4; *see also* 33 C.F.R. §222.5(f). The draft EIS runs contrary to these statutory and regulatory commands. The draft EIS acknowledges that under the PAA, "substantially adverse effects" are to "be expected downstream of West Point Lake to the headwaters of Walter F. George Lake" in Alabama. DEIS ES-33. The draft EIS also acknowledges an adverse effect on downstream levels of dissolved oxygen, phosphorous, nitrogen, and chlorophyll *a*. *See* DEIS 6-118 to 6-154.

B. The draft WCM unlawfully passes on responsibility for the water-quality violations.

To make matters worse, the draft EIS shirks any responsibility for these problems. Rather than assessing measures the Corps can take to mitigate these consequences, the draft EIS suggests that compliance with water-quality standards will fall on "state water quality regulating agencies—ADEM, Florida DEP, and Georgia EDP." DEIS 6-212; *see also, e.g.*, DEIS ES-33 to ES-34. The Clean Water Act and the Corps' regulations and guidance do not allow the Corps to transfer the burdens in that way. Corps regulations provide that the Corps must "manage its projects in accordance with all applicable Federal and state environmental laws, criteria, and standards." ER 1110-2-8154 at 2. The Corps also must "protect all existing and future uses including assimilative capacity, aquatic life, water supply, recreation, industrial use, hydropower, etc." *Id*. These "management responsibilities extend throughout the area influenced by" the Corps' operations. *Id.*

EPA previously criticized the Corps for making the same mistake in the ACT Basin. In comments on the final ACT manual, EPA stated that it "disagree[d]" with the Corps' attempt to shift "responsibility" for the adverse water-quality conditions caused by its operations in that basin to "the respective states that manage the NPDES program." Exh. Q at 2 (EPA ACT comments). EPA informed the Corps that "[p]ursuant to the CWA and the USACE's guidance regulations at ER1110-2-8154,

Response to ACF224 - Alabama Office of Water Resources

E

E. The EIS appropriately documents the impacts to the human environment for the alternatives. The WCMs comply with all applicable laws and regulations. Violations of state water quality standards for total phosphorus by the PAA are documented in the EIS. Comparisons between water management alternatives Alt1 and Alt7 in Table 6.1-16 illustrate differences that represent potential violations attributable to projected increases in wastewater returns downstream of Buford Dam by wastewater dischargers. Evaluation by the appropriately delegated state agencies to determine the appropriate discharge provisions of National Pollutant Discharge and Elimination System (NPDES) permits is needed. GAEPD has stated in their comments on the draft EIS and in their 2013 triennial review that they intend to ensure that water quality standards are met at all flows (GAEPD 2014).

Response to ACF224 - Alabama Office of Water Resources

compliance with water quality standards means that the existing instream water uses and the water quality necessary to protect them will be maintained." *Id.* EPA concluded that "the USACE cannot, through its operational decisions, create conditions (e.g., decreased flow) that cause permittees to fall out of compliance." *Id.* The final ACF manual should not commit the same error.

V. *The draft EIS is contrary to NEPA.*

Finally, the Corps must bring the draft EIS in line with the National Environmental Protection Act. The draft EIS does not accurately portray the environmental impacts the draft WCM would cause. In purporting to comply with NEPA's requirement of setting out a No Action Alternative against which the government and public can evaluate the PAA's environmental impacts, the draft EIS repeats two errors similar to the ones that permeate the final EIS for the ACT Basin.

A. The draft EIS fails to use the 1958 baseline.

The draft EIS takes the wrong approach when determining the NAA. The NAA in the draft EIS erroneously references current operations, rather than the last set of operations subjected to NEPA analysis. For most of the Corps' operations in the ACF Basin, the most recent NEPA review occurred contemporaneously with NEPA's enactment in the 1970s. Alabama understands that the Corps produced final environmental impact statements for Lake Lanier and the Buford Dam in 1974, for Lake Seminole, the Woodruff Dam, and the ACF system generally in 1976, and for Walter F. George in 1979. Each of those FEISs corresponded to the Corps' operations under the water-control manual issued in 1958. *See* Exh. R (Buford EIS); Exh. S (Woodruff EIS); Exh. T (Walter F. George EIS); Exh. N (ACF FEIS).

Rather than referencing an NAA that incorporates the last operations that the Corps subjected to NEPA, the draft EIS relies on different operations. The draft EIS explains that "Water Management Alternative 1," which it designates as the NAA, consists of, among other things, "[c]urrent guide curves" and "[c]urrent action zones." DEIS 4-43 to 4-44. That approach is problematic because, as the draft EIS concedes, the Corps' current operations are based on draft manuals the Corps proposed in 1989. *See* DEIS ES-11. Although the Corps currently is operating under those manuals, it is doing so illegally, for it has never subjected them to final NEPA review. Indeed, in obtaining the dismissal of the lawsuit Alabama filed challenging the 1989 draft manual, the Corps successfully argued that the manual did not constitute "final agency action" subject to judicial review because the Corps "ha[d] not performed the cost analyses or prepared the written reports required by the WSA, the Corps' internal guidelines, and the National Environmental Policy Act to

make permanent reallocations." *In re MDL-1824 Tri-State Water Rights Litig.*, 644 F.3d at 1181.

As Alabama has explained in its comments on the ACT manual, NEPA does not allow the Corps to adopt non-NEPA-approved operations into the NAA. That is so even when the Corps has been illegally implementing those operations for decades. *See, e.g.*, *N.C. Wildlife Fed'n v. N.C. Dep't of Transp.*, 677 F.3d 596, 603 (4th Cir. 2012); *Friends of Yosemite Valley v. Kempthorne*, 520 F.3d 1024, 1037-38 (9th Cir. 2008). If the rule were otherwise, the Corps could evade accountability for the environmental effects of elements in the 1989 draft plan. That would encourage federal agencies to illegally implement operations on a provisional basis and then, when later proposing final agency action, to claim that the illegally implemented operations are not subject to NEPA review. That cannot be the law. Instead of using the 1989 draft manual's operations as the NAA, the Corps must use the operations from the Corps' last final EIS in the 1970s.

B. The draft EIS's portrayal of current operations conflicts with historical observations.

Even if it were appropriate to reference current operations as the baseline for comparison to the PAA, the draft EIS's calculation of the NAA still is flawed. Due to modeling and methodological errors, the draft EIS's NAA does not even accurately reflect current water-control operations in several ways.

First, the Corps' proffered NAA does not line up with historical flows at Columbus or Columbia. For example, the Columbia flows reported by the NAA between May and October 2007 were 13% lower than the flows actually observed during that time. *See* Exh. A-13 at 2-3. Likewise, the Columbus flows reported by the NAA for June through November 2007 were 17% lower than observed flows at that location. *See* Exh. A-14 at 3.

Second, the NAA is equally problematic when compared to historic elevations at the Corps' projects. At Lanier, the NAA portrays elevations that are at times higher than what actually occurred. *See* Exh. A-15 at 2. At West Point, the NAA portrays elevations that are at times lower than what actually occurred. *See* Exh. A-16 at 2. Meanwhile, at Walter F. George, the NAA portrays elevations that are at times higher and more stable than what history shows. *See* Exh. A-17 at 2.

Thus, to the extent that the Corps is endeavoring to reflect current operations in its NAA, the draft EIS has failed in that task. But because the Corps' current ACF operations did not go through the NEPA process, it is inappropriate for the NAA to reflect those operations in any event. To convey the significant effects that the draft WCM would cause—complete with substantial operational changes designed to transform Buford into a project whose predominant purpose is to supply water to Atlanta—the draft EIS must use the 1958 operations as the NAA.

F

Response to ACF224 - Alabama Office of Water Resources

F. In the Council on Environmental Quality's (CEQ's) memorandum of March 23, 1981, Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, the response to question no. 3 addressing the NAA states: "the 'no action' alternative may be thought of in terms of continuing with the present course of action until that action is changed." Consequently, for purposes of the Master WCM update process, "no action" reflects current reservoir operations as they have evolved over time in response to laws, regulations, policy, and new technical information. Basing the NAA on a pre-NEPA 1958 WCM for the purpose of assessing the effects of alternative WCM update plans would neither accurately reflect current baseline operations nor be consistent with "no action" as defined in the CEQ memorandum. In the EIS, USACE endeavored not only to describe the affected environment in terms of current conditions in the ACF Basin, but also to incorporate a historical perspective on natural and human resources in the basin dating back to the early 1950s, when Jim Woodruff Lock and Dam and Lake Seminole were completed and placed in operation.

The discussion in section 4.0 of the EIS has been revised to add language indicating that the HEC-ResSim model was not "calibrated" to observed data and, therefore, would not be expected to necessarily simulate observed data for high or low flows. The HEC-ResSim model follows the operating plan when, in actuality, deviations from the operating plan might have been approved that the model cannot capture precisely. As stated in section 4.2.1.1 of the draft EIS:

> Water Management Alternative 1 represents no change from the current management direction or level of management intensity. This alternative would represent continuation of the current water control operations at each of the federal projects in the ACF Basin. Basinwide management for all seven project purposes (i.e., flood risk management, hydroelectric power generation, navigation, fish and wildlife conservation, recreation, water quality, and water supply) is also considered in the alternative.

Model simulations of the current management direction do not necessarily represent observed conditions as in cases in which deviations are request as stated in section 6.10:

> As in past years, working closely with states and affected stakeholders, special releases from USACE projects might be made to assist with public health and safety throughout the ACF Basin. USACE will periodically notify users when such releases are made, and water users can also directly notify USACE of their needs for special releases.

Historic special releases were not simulated in this modeling effort as the intent of the model was to evaluate the effects of changes in USACE's current management direction, not to mimic historic conditions.

* * *

For all these reasons, the draft WCM and EIS violate federal law. The Corps should not implement the draft WCM, and it should engage in substantial revisions before implementing any manual regarding the ACF system.

Sincerely,

J. Brian Atkins, P.E.
Division Chief
Alabama Office of Water Resources

JBA/jn

cc: Governor Robert Bentley
Senator Richard Shelby
Senator Jeff Sessions

EXHIBIT A

Glenn Affidavit

STATE OF ALABAMA)
)
JEFFERSON COUNTY)

DECLARATION OF ONIS "TREY" GLENN III

I, Onis "Trey" Glenn, III, declare as follows:

1. My name is Onis "Trey" Glenn, III. I am over the age of 21 years, and I am competent to testify to the matters contained in this Declaration, which are true and correct to the best of my knowledge.

2. I have a Bachelor of Civil Engineering degree from Auburn University where I studied hydrology and hydraulics. I have a Master in Business Administration degree from the University of Alabama at Birmingham.

3. I am a registered Professional Engineer in the State of Alabama. I currently serve as a Senior Consultant for Blue Ridge Consulting, Inc. I have held that position since January 2010. From approximately February 2005 to December 2009, I served as the Director of the Alabama Department of Environmental Management ("ADEM"). From approximately June 2001 to January 2005, I served as Director of the Alabama Office of Water Resources ("OWR") at the Alabama Department of Economic and Community Affairs. Prior to that, I worked for Alabama Power Company as a Hydrologic Engineer in the Reservoir Management Section of the Environmental Affairs Department.

4. My approximately twenty-one years of experience includes direct and extensive experience in hydrologic modeling and analysis. I have extensive experience performing hydrologic analyses, including hydrology, hydraulics, and reservoir operations on complex river systems in the Southeastern United States, including the river systems within the Apalachicola-Chattahoochee-Flint River Basin. My experience includes water quantity and quality modeling of complex river systems in connection with which I have developed customized models and run software packages such as HEC-ResSim, HEC-5, HEC-RAS, CE-QUAL-W2, and SSP. I also have directed extensive experience in the development, application, interpretation, and enforcement of environmental and water resources policies, rules, and laws, including regulatory permitting and compliance.

5. I have reviewed the draft Environmental Impact Statement ("EIS), including all of its attachments, issued in connection with the update of the Apalachicola-Chattahoochee-Flint ("ACF") River Basin Water Control Manual. I have also reviewed the modeling and other technical materials and data that have been made available by the United States Army Corps of Engineers ("Corps").

6. At the request of OWR, I have prepared the following exhibits to accompany comments being submitted by OWR to the Corps in response to the draft EIS:

a. Exhibit A-1, addressing the relationship between particular amounts of withdrawals from Lanier (Buford) and storage at Lanier (Buford);

b. Exhibit A-2, addressing the effects of the Proposed Action Alternative ("PAA") and other possible alternatives on hydropower generation at particular Corps projects;

c. Exhibit A-3, addressing the amount of storage at various Corps' projects associated with the net withdrawals associated with a direct withdrawal of 165 mgd from Lanier (Buford);

d. Exhibit A-4, addressing the amount of conservation storage in each action zone at Lanier (Buford) under the No Action Alternative ("NAA") and PAA;

e. Exhibit A-5, addressing the amount of conservation storage in each composite action zone in the ACF system under the NAA and PAA;

f. Exhibit A-6, addressing the frequency with which the PAA places Lanier (Buford) in Action Zone 1;

g. Exhibit A-7, addressing the effects of the PAA on ACF system hydropower generation;

h. Exhibit A-8, addressing the amount of conservation storage in each action zone at W.F. George (Eufaula) under the NAA and PAA;

i. Exhibit A-9, addressing recreation impacts at Lanier (Buford) and W.F. George (Eufaula) under the PAA and NAA;

j. Exhibit A-10, addressing the PAA's effect on weekly Columbus flows;

k. Exhibit A-11, addressing the PAA's effect on flows at Columbia;

l. Exhibit A-12, addressing the PAA's effect on drought operations;

m. Exhibit A-13, addressing the relationship between the NAA's portrayal of Columbia flows and observed historical flows;

n. Exhibit A-14, addressing the relationship between the NAA's portrayal of Columbus flows and observed historical flows;

o. Exhibit A-15, addressing the relationship between the NAA's portrayal of Lanier (Buford) elevations and observed historical elevations;

p. Exhibit A-16, addressing the relationship between the NAA's portrayal of West Point elevations and observed historical elevations;

q. Exhibit A-17, addressing the relationship between the NAA's portrayal of W.F. George (Eufaula) elevations and observed historical elevations;

r. Exhibit A-18, addressing the PAA's effect on the frequency with which daily flows at Columbus fall below 1350 cfs;

s. Exhibit A-19, addressing the storage and yield associated with 50,000 acre-feet or 15% of Lanier (Buford) storage; and

t. Exhibit A-20, addressing the effects of various alternatives on elevations at W.F. George (Eufaula).

7. The attached exhibits were personally prepared by me.

8. In connection with my preparation of the exhibits, I have reviewed and relied upon information made available by the Corps in connection with the issuance of the draft EIS as well as other information that is referenced in the exhibits.

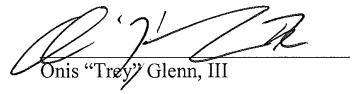
9. It is usual and customary in my field of hydrology, hydraulics, and reservoir operations and water resources to rely upon the types of information upon which I relied in the preparation of the exhibits.

10. The attached exhibits reflect my analysis, calculations, findings, and conclusions, which are based upon the information I reviewed as well as my education, training, and experience, The exhibits are true and correct to the best of my knowledge.

11. Further, the Declarant sayeth not.

I, Onis "Trey" Glenn, III, declare under penalty of perjury that the foregoing, and the statements in the exhibits, are true and correct.

Executed on January 29, 2016.



Onis "Trey" Glenn, III

EXHIBIT A-1

Lake Lanier (Buford) Gross Withdrawal and Storage Relationship

In October of 2015 the Corps of Engineers prepared a draft environmental impact statement (DEIS) associated with the Update of the Water Control Manual for the Apalachicola – Chattahoochee – Flint River Basin.

The Corps of Engineers provided a relationship between gross withdrawal and required reallocation storage volume at Lake Lanier (Buford) as part of the DEIS. On pages ES-30 and ES-31 of Volume 1 of the DEIS, the Corps of Engineers states:

> *This gross withdrawal of 165 mgd would require a reallocation of about 189,500 ac-ft of storage at a first cost of about $79.0 million.*

As shown in Figure 1 below, the Corps of Engineers states the total conservation storage of Lake Lanier (Buford) in table ES-1 on page ES-3 of the DEIS is 1,087,600 acre-feet.

The information listed above was used to develop a relationship between gross withdrawal and required storage to be reallocated at Lake Lanier (Buford):

$$\frac{Reallocated\ Storage\ (acre-feet)}{Gross\ Withdrawal\ (mgd)} = \frac{189{,}500\ acre-feet}{165\ mgd} = 1{,}148.5\ \frac{acre-feet}{mgd}$$

As shown in Figure 2 below, the Corps of Engineers presented several water supply withdrawal amounts associated with direct withdrawals from Lake Lanier (Buford).

The purpose of this exhibit is to demonstrate the equivalent storage (in both acre-feet and percent) associated with specific withdrawal values. To determine the conservation storage associated with a specific withdrawal, the withdrawal is multiplied by the storage-yield relationship defined above (1,148.5 acre-feet/mgd) and then rounded to five (5) significant digits. This value is then divided by the total conservation storage (1,087,600 acre-feet) to determine the percentage of Lake Lanier (Buford) associated with the specific withdrawal. The direct withdrawal values used for this analysis are 20 mgd, 108 mgd, 165 mgd, 205 mgd, and 277 mgd.

The specific calculations are as follows:

Direct withdrawal of 20 mgd:

$$20\ mgd\ \times 1{,}148.5\frac{acre-feet}{mgd} = 22{,}970\ acre-feet$$

$$22{,}970\ \ acre-feet\ \div 1{,}087{,}600\ acre-feet = 2.1\%$$

Direct withdrawal of 108 mgd:

$$108\ mgd\ \times 1{,}148.5\frac{acre-feet}{mgd} =\ 124{,}040\ \ acre-feet$$

$$124{,}040\ \ acre-feet\ \div 1{,}087{,}600\ acre-feet = 11.4\%$$

Direct withdrawal of 165 mgd:

$$165\ mgd\ \times 1{,}148.5\frac{acre-feet}{mgd} = 189{,}500\ acre-feet$$

$$189{,}500\ acre-feet\ \div 1{,}087{,}600\ acre-feet = 17.4\%$$

Direct withdrawal of 205 mgd:

$$205\ mgd\ \times 1{,}148.5\frac{acre-feet}{mgd} = 235{,}440\ acre-feet$$

$$235{,}440\ acre-feet\ \div 1{,}087{,}600\ acre-feet = 21.6\%$$

Direct withdrawal of 277 mgd:

$$277\ mgd\ \times 1{,}148.5\frac{acre-feet}{mgd} = 318{,}130\ acre-feet$$

$$318{,}130\ acre-feet\ \div 1{,}087{,}600\ acre-feet = 29.3\%$$

The Corps of Engineers Proposed Action Alternative includes a withdrawal below Lake Lanier (Buford) of 408 mgd. In addition to the above calculations, the Lake Lanier (Buford) storage equivalent associated with 408 mgd was calculated as shown below.

$$408\ mgd\ \times 1{,}148.5\frac{acre-feet}{mgd} = 468{,}590\ acre-feet$$

$$468{,}590\ acre-feet\ \div 1{,}087{,}600\ acre-feet = 43.1\%$$

Table ES-1.
Reservoirs on Mainstem ACF Basin Rivers

Basin/river/project name	Owner/state/ year initially completed	Drainage area (sq mi)	Reservoir size (ac)	Total storage (ac-ft)[a]	Conservation storage (summer elev) (ac-ft)	Power capacity (kW)	Normal (summer) lake elev (ft)	Authorized purposes for USACE-owned projects[b]
Chattahoochee River		*8,708*						
Buford Dam/Lake Sidney Lanier	USACE/GA/1957	1,034	38,542	2,554,000	1,087,600	127,000	1,071	FRM, HP, NAV, FW, REC, WQ, WS[c]
Morgan Falls Dam/Bull Sluice Lake	GPC/GA/1903	1,360	580	2,450	0	16,800	866	
West Point Dam and Lake	USACE/GA/1975	3,440	25,864	774,798	306,131	87,000	635	FRM, HP, NAV, FW, REC, WQ
Langdale Dam and Lake	GPC/GA/1860	3,640	152	NA[d]	0	1,040	547.7	
Riverview Dam and Lake	GPC/GA/1902	3,661	75	NA[d]	0	480	530.5	
Bartletts Ferry Dam/Lake Harding	GPC/GA/1926	4,240	5,850	181,000	0	173,000	521	
Goat Rock Dam and Lake	GPC/GA/1912	4,510	1,050	11,000	0	38,600	404	
Oliver Dam/Lake Oliver	GPC/GA/1959	4,630	2,150	32,000	0	60,000	337	
North Highlands Dam and Lake	GPC/GA/1900	4,630	131	1,500	0	29,600	269	
Walter F. George Lock, Dam, and Lake	USACE/GA/1963	7,460	45,181	934,400	244,400	168,000	190	HP, NAV, FW, REC, WQ
George W. Andrews Lock, Dam, and Lake	USACE/GA/1963	8,210	1,540	18,180	0	None	102	NAV, FW, REC, WQ
Flint River		*8,456*						
Warwick Dam/Lake Blackshear	Crisp Co./ GA/1930	3,770	8,700	144,000	0	15,200	237	
Flint River Dam/Lake Worth	GPC/GA/1920	5,290	1,400	NA[d]	0	5,400	182.3	
Apalachicola River		*2,409*	*(Total ACF Basin – 19,573 sq mi)*					
Jim Woodruff Lock and Dam/ Lake Seminole	USACE/FL/1954	17,164	37,500	367,318	0	43,350	77	HP, NAV, FW, REC, WQ

Notes:
a. Measured at top of storage for flood risk management.
b. As used in this table, the term *authorized purposes* includes purposes expressly identified in the project authorizing documents; incidental benefits recognized in projection authorizations; and objectives that result from other authorities, such as general authorities contained in congressional legislation, for which USACE operates each listed project as of 2009. FRM = flood risk management; HP = hydroelectric power generation; NAV = navigation; FW = fish and wildlife conservation; REC = recreation; WQ = water quality; WS = municipal & industrial water supply.
c. USACE operates the Buford Dam/Lake Sidney Lanier project in a manner that accommodates water supply withdrawals from Lake Lanier and from the Chattahoochee River downstream of Buford Dam.
d. NA = not available.

Figure 1 - Table ES-1 on Page ES-3 of Volume 1 of the DEIS

Exhibit A-1 **Lake Lanier (Buford) Gross Withdrawal and Storage Relationship** **Page 4 of 4**

Table ES-4.
Water Supply Options Considered

Water Supply Option	Lake Lanier relocation (mgd)	Lake Lanier withdrawal (mgd)	Lake Lanier total withdrawals (mgd)	Lake Lanier returns (mgd/% returned)	Glades Reservoir withdrawals (mgd)	Glades Reservoir returns (mgd/% returned)	Net Withdrawal from Lake Lanier and Glades Reservoir (mgd)	Storage required to support reallocation (ac-ft)	River withdrawals (mgd)	River returns (mgd/% returned
A - No Action	20	108	128	37/29%	0	0	91	124,034	277	227/82%
B – Relocation only	20	0	20	10/50%	0	0	10	n/a	277	227/82%
C - Future without project condition (w/Glades pumping)	20	0	20	10/50%	40	20/50%	30	n/a	408	335/82%
D - GA 2013 request	20	277	297	163*/55%	0	0	134	318,126	408	384/94%
E - GA 2013 request w/Glades pumping	20	237	257	141/55%	40	22/55%	134	272,187	408	384/94%
F - GA 2013, projected return volume for 2035	20	277	297	91/30.6%	0	0	206	318,126	408	335/82%
G - GA 2013 max treatment facility capacity	20	277	297	128/43%	0	0	169	*	408	477/117%
H - Projected return volume for 2035 w/Glades pumping	20	165	185	75/40.4%	40	16/40.4%	134	189,497	408	384/94%

Note: * Storage for this water supply option was not computed because this option was not carried forward for further consideration as explained in Section 5.1.4.1.1.

Figure 2 - Table ES-4 on Page ES-18 of Volume 1 of the DEIS

EXHIBIT A-2

Annual Hydropower at Buford, West Point and WF George

In October of 2015 the Corps of Engineers prepared a draft environmental impact statement (DEIS) associated with the Update of the Water Control Manual for the Apalachicola – Chattahoochee – Flint River Basin. The Corps of Engineers provided a ResSim model and results for the No Action Alternative (Baseline), Alternative 1B, Alternative 7B, and Alternative 7H (Proposed Action). The results from the Corps of Engineers' HEC-ResSim modeling analyses are contained in the file provided by the Corps titled:

"/ACF_WCM_2014_09162014/rss/Water_Supply_Options_Extended_TS/simulation.dss".

HEC-DSSVue is a software package provided by the Corps of Engineers to view data sets and model results contained in the ResSim models and supporting input files. The HEC-DSSVue program was used to analyze the hydropower energy generation data contained in the aforementioned file. Specifically, the HEC-DSSVue program was used to average and extract the hydropower energy generation data for Lake Lanier (Buford), West Point Lake, Lake Eufaula (W.F. George) and Jim Woodruff for several of the Corps of Engineers' model simulations from the aforementioned file.

The data attributes contained in the aforementioned file associated with the hydropower energy generation data that was averaged and extracted for this analysis are as follows:

- No Action
  "//BUFORD-POWER PLANT/ENERGY/03Jan1939 - 31Dec2011/1DAY/NOACTIONAX0/"
  "//WEST POINT-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/NOACTIONAX0/"
  "//WALTER F GEORGE-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/NOACTIONAX0/"
  "//JIM WOODRUFF-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/NOACTIONAX0/"

- Alternative 1B
  "//BUFORD-POWER PLANT/ENERGY/03Jan1939 - 31Dec2011/1DAY/ALT1_OPTBX0/"
  "//WEST POINT-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/ALT1_OPTBX0/"
  "//WALTER F GEORGE-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/ALT1_OPTBX0/"
  "//JIM WOODRUFF-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/ALT1_OPTBX0/"

- Alternative 7B
  "//BUFORD-POWER PLANT/ENERGY/03Jan1939 - 31Dec2011/1DAY/ALT7_OPTBX0/"
  "//WEST POINT-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/ALT7_OPTBX0/"
  "//WALTER F GEORGE-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/ALT7_OPTBX0/"
  "//JIM WOODRUFF-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/ALT7_OPTBX0/"

- Alternative 7H (Proposed Action)
  "//BUFORD-POWER PLANT/ENERGY/03Jan1939 - 31Dec2011/1DAY/ALT7_OPTHX0/"
  "//WEST POINT-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/ALT7_OPTHX0/"
  "//WALTER F GEORGE-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/ALT7_OPTHX0/"
  "//JIM WOODRUFF-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/ALT7_OPTHX0/"

The HEC-DSSVue Math Function was used to calculate annual cumulative energy generation associated with each of the aforementioned data sets. Figure 1 below shows a screenshot of the Math Functions settings used to develop the annual hydropower energy generation data.

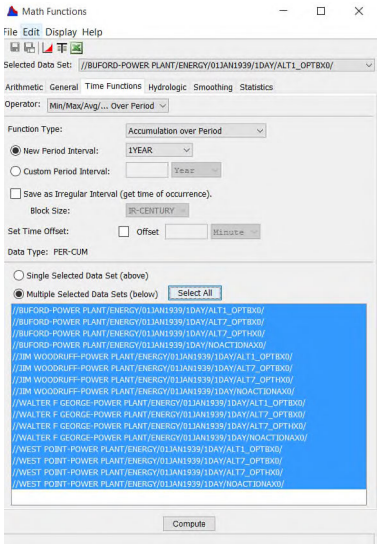


Figure 1 - Screenshot from HEC-DSSVue

The HEC-DSSVue program was then used to extract the annual energy value for the aforementioned data sets. Microsoft Excel was then used to analyze the extracted data. Specifically, the "AVERAGE" function of Microsoft Excel was used to average the 73 (1939 – 2011) annual energy generation values for each of the alternatives listed above. The results (the average of the annual energy values) of this analysis are shown in Table 1 below. Also, tables showing the yearly annual energy values are included as Appendix A, B, and C of this report.

	Average Annual Hydropower Energy Generation (mwh)		
Alternative	**Lake Lanier (Buford)**	**West Point Lake**	**Lake Eufaula (W.F. George)**
No Action	126,361	176,624	468,304
Alternative 1B	139,054	181,189	473,580
Alternative 7B	139,173	181,217	472,882
Alternative 7H (Proposed Action)	119,593	175,491	466,377

Table 1 – Average Annual Energy Generation

Summing the values from Table 1 shows that the combined average annual hydropower generation for the three projects is 793,272 mwh and 761,461 mwh for Alternative 7B and Alternative 7H respectively. The difference in these two numbers is 31,811 mwh. This represents 4% of the Alternative 7B average annual hydropower value (31,811 mwh ÷ 793,272 mwh). Four (4) percent of a year is equivalent to 14.6 days or over two (2) weeks (4% x 365 days = 14.6 days).

On page ES-31 of Volume 1 of the DEIS, the Corps of Engineers states that the proposed action alternative (Alternative 7H) produce a "slight reduction" in energy and capacity benefit. Specifically, the Corps of Engineers compared the total energy and capacity benefit of the Alternative 7H (Proposed Action) to that of the No Action resulting in a difference of "about 0.5 percent."

As shown in this exhibit, the Corps of Engineers' conclusion of a "slight reduction" in hydropower does not adequately represent the impact associated with the Corps of Engineers proposed action. This is due to two reasons. First, the Corps of Engineers would have calculated a greater impact if the proposed action were to be compared to a more appropriate baseline for each individual project. Second, the impact of 0.5 percent was obtained by comparing long term average values which has the effect of concealing the impact of individual years that may be higher than 0.5 percent. These two issues are explained in more detail below.

Proposed Action Compared to Wrong Alternative

The average annual hydropower energy generation for each of the reservoirs was compared for various model alternative analyses. The results of the comparison of the annual average hydropower energy generation are shown in Table 2 below. The Corps of Engineers compared the Proposed Action Alternative to the No Action Alternative and presented a 0.5 percent system impact to quantify the effects of the Proposed Action Alternative. The results presented in this table shows that the impact of the Proposed Action Alternative, compared to the No Action Alternative, at the three projects ranges from 0.41% to 5.36%. In addition, the results in Table 2 show that if the Corps of Engineers would have compared the Proposed Action Alternative to a more appropriate baseline the impact exceeds 14% at one of the projects.

	Comparison of Annual Hydropower Energy Generation (%)		
Alternative	**Lake Lanier (Buford)**	**West Point Lake**	**Lake Eufaula (W.F. George)**
Alternative 7H (Proposed Action) vs No Action *[(7H – No Action) / No Action]*	-5.36%	-0.64%	-0.41%
Alternative 7H (Proposed Action) vs 1B *[(7H – 1B) / 1B]*	-14.00%	-3.14%	-1.52%
Alternative 7H (Proposed Action) vs 7B *[(7H – 7B) / 7B]*	-14.07%	-3.16%	-1.38%

Table 2 – Comparison of Average Annual Energy

The following is an example of the calculation used to develop the values shown in Table 2.

Alternative 7H vs Alternative 1B for Lake Lanier (Buford) average annual hydropower

$$\frac{\text{(Alternative 7H} - \text{Alternative 1B)}}{\text{Alternative 1B}} = \frac{\text{119,593 mwh} - \text{139,054 mwh}}{\text{139,054 mwh}} = -14.00\%$$

Long Term Averaging versus Individual Years

As shown above the long term average annual Lake Lanier (Buford) hydropower difference between the Proposed Action Alternative and the No Action Alternative is 5.36%. The energy loss for individual years can be over five times greater than the long term average when comparing these two alternatives. For example, the largest average annual Lake Lanier (Buford) energy difference for the Proposed Action and No Action Alternatives was 31.48%. The largest annual average energy difference would be even greater if the Proposed Action Alternative was compared to a more appropriate baseline (like Alternative 1B). Table 3 below shows the largest individual annual average energy generation difference for the applicable reservoir.

	Largest Annual Differences of the Comparison of Annual Hydropower Energy Generation (%)		
Alternative	**Lake Lanier (Buford)**	**West Point Lake**	**Lake Eufaula (W.F. George)**
Alternative 7H (Proposed Action) vs No Action *[(7H – No Action) / No Action]*	-31.48%	-7.59%	-3.73%
Alternative 7H (Proposed Action) vs 1B *[(7H – 1B) / 1B]*	-49.36%	-13.84%	-7.50%
Alternative 7H (Proposed Action) vs 7B *[(7H – 7B) / 7B]*	-48.42%	-11.47%	-5.02%

Table 3 – Largest Annual Difference of Comparison of Average Annual Energy

APPENDIX A

Lake Lanier (Buford) Annual Energy in MWh

Year	Alternative 1A (No Action)	Alternative 1B	Alternative 7B	Alternative 7H (Proposed Action)	(7H - No Action) / No Action	(7H - 1B) / 1B	(7H - 7B) / 7B
1939	152,776	160,895	157,339	148,358	-2.89%	-7.79%	-5.71%
1940	68,732	79,085	82,158	62,294	-9.37%	-21.23%	-24.18%
1941	53,046	63,932	59,362	42,007	-20.81%	-34.29%	-29.24%
1942	61,686	80,782	82,574	57,738	-6.40%	-28.53%	-30.08%
1943	148,188	159,693	163,702	142,369	-3.93%	-10.85%	-13.03%
1944	154,079	165,430	163,443	148,445	-3.66%	-10.27%	-9.18%
1945	89,702	103,669	103,820	77,806	-13.26%	-24.95%	-25.06%
1946	240,535	252,609	254,689	234,739	-2.41%	-7.07%	-7.83%
1947	107,230	119,353	117,609	100,487	-6.29%	-15.81%	-14.56%
1948	159,526	178,358	180,695	153,289	-3.91%	-14.06%	-15.17%
1949	255,362	268,012	268,020	248,538	-2.67%	-7.27%	-7.27%
1950	136,472	141,247	143,911	136,564	0.07%	-3.32%	-5.11%
1951	93,787	108,776	107,533	86,797	-7.45%	-20.21%	-19.28%
1952	165,564	179,304	174,583	152,874	-7.66%	-14.74%	-12.43%
1953	113,729	127,678	126,853	104,912	-7.75%	-17.83%	-17.30%
1954	131,846	141,017	138,641	126,309	-4.20%	-10.43%	-8.89%
1955	65,918	78,528	81,512	53,566	-18.74%	-31.79%	-34.28%
1956	55,421	65,904	66,755	50,884	-8.19%	-22.79%	-23.78%
1957	81,660	99,050	98,100	78,864	-3.42%	-20.38%	-19.61%
1958	103,192	117,772	117,041	95,455	-7.50%	-18.95%	-18.44%
1959	87,736	95,165	97,612	82,138	-6.38%	-13.69%	-15.85%
1960	146,515	160,901	161,742	138,845	-5.23%	-13.71%	-14.16%
1961	157,296	178,407	178,693	148,687	-5.47%	-16.66%	-16.79%
1962	152,521	159,314	159,652	151,446	-0.70%	-4.94%	-5.14%
1963	125,367	137,936	137,213	112,317	-10.41%	-18.57%	-18.14%
1964	215,897	234,938	235,182	209,438	-2.99%	-10.85%	-10.95%
1965	130,286	137,863	135,024	126,055	-3.25%	-8.57%	-6.64%
1966	120,020	131,695	134,445	109,153	-9.05%	-17.12%	-18.81%
1967	153,667	172,978	173,105	148,035	-3.66%	-14.42%	-14.48%
1968	141,316	149,834	147,956	137,370	-2.79%	-8.32%	-7.16%
1969	122,200	134,051	133,161	112,985	-7.54%	-15.72%	-15.15%
1970	78,171	90,143	93,974	80,156	2.54%	-11.08%	-14.70%
1971	107,959	126,714	126,047	90,319	-16.34%	-28.72%	-28.35%
1972	154,719	167,157	167,350	147,639	-4.58%	-11.68%	-11.78%
1973	220,468	233,510	233,511	214,086	-2.89%	-8.32%	-8.32%
1974	166,274	172,966	172,957	162,874	-2.04%	-5.83%	-5.83%
1975	156,428	175,600	175,747	146,624	-6.27%	-16.50%	-16.57%
1976	193,978	201,055	200,506	187,068	-3.56%	-6.96%	-6.70%
1977	142,407	161,089	161,567	136,700	-4.01%	-15.14%	-15.39%
1978	135,692	143,250	141,846	128,754	-5.11%	-10.12%	-9.23%

Year	Alternative 1A (No Action)	Alternative 1B	Alternative 7B	Alternative 7H (Proposed Action)	(7H - No Action) / No Action	(7H - 1B) / 1B	(7H - 7B) / 7B
1979	167,227	184,631	188,041	160,367	-4.10%	-13.14%	-14.72%
1980	176,823	188,189	182,910	167,738	-5.14%	-10.87%	-8.29%
1981	55,714	64,632	50,890	41,341	-25.80%	-36.04%	-18.76%
1982	69,525	81,352	98,157	74,414	7.03%	-8.53%	-24.19%
1983	140,090	159,256	161,890	130,231	-7.04%	-18.23%	-19.56%
1984	171,739	179,959	180,217	166,582	-3.00%	-7.43%	-7.57%
1985	70,561	79,478	81,479	67,801	-3.91%	-14.69%	-16.79%
1986	31,384	38,460	25,451	23,299	-25.76%	-39.42%	-8.46%
1987	65,624	85,114	93,818	48,390	-26.26%	-43.15%	-48.42%
1988	31,079	40,187	29,843	24,604	-20.83%	-38.78%	-17.55%
1989	82,220	105,589	120,677	83,215	1.21%	-21.19%	-31.04%
1990	204,856	213,380	211,302	193,653	-5.47%	-9.25%	-8.35%
1991	148,555	164,685	166,456	148,808	0.17%	-9.64%	-10.60%
1992	189,896	203,998	202,042	178,740	-5.87%	-12.38%	-11.53%
1993	191,261	198,432	196,849	187,767	-1.83%	-5.37%	-4.61%
1994	125,389	143,570	146,557	116,233	-7.30%	-19.04%	-20.69%
1995	162,245	174,700	173,671	154,838	-4.57%	-11.37%	-10.84%
1996	201,358	210,151	208,630	193,070	-4.12%	-8.13%	-7.46%
1997	137,163	150,654	152,080	134,065	-2.26%	-11.01%	-11.85%
1998	214,682	227,642	224,432	206,781	-3.68%	-9.16%	-7.86%
1999	74,005	81,836	81,951	59,377	-19.77%	-27.44%	-27.55%
2000	52,634	71,226	57,420	36,067	-31.48%	-49.36%	-37.19%
2001	33,613	39,016	48,145	34,902	3.84%	-10.55%	-27.51%
2002	32,487	45,756	44,006	28,142	-13.37%	-38.50%	-36.05%
2003	166,211	187,115	200,232	168,055	1.11%	-10.19%	-16.07%
2004	126,033	138,830	137,494	117,478	-6.79%	-15.38%	-14.56%
2005	178,672	191,369	191,221	173,082	-3.13%	-9.56%	-9.49%
2006	103,702	109,914	103,639	93,896	-9.46%	-14.57%	-9.40%
2007	69,371	83,827	94,179	74,894	7.96%	-10.66%	-20.48%
2008	26,447	36,529	21,922	28,196	6.61%	-22.81%	28.62%
2009	105,292	125,275	136,268	77,120	-26.76%	-38.44%	-43.41%
2010	167,283	176,051	174,325	158,316	-5.36%	-10.07%	-9.18%
2011	103,835	114,477	117,779	105,835	1.93%	-7.55%	-10.14%
Average	**126,361**	**139,054**	**139,173**	**119,593**	**-5.36%**	**-14.00%**	**-14.07%**

APPENDIX B

West Point Annual Energy in MWh

Year	Alternative 1A (No Action)	Alternative 1B	Alternative 7B	Alternative 7H (Proposed Action)	(7H - No Action) / No Action	(7H - 1B) / 1B	(7H - 7B) / 7B
1939	182,533	185,244	183,651	181,815	-0.39%	-1.85%	-1.00%
1940	137,274	141,602	142,995	136,076	-0.87%	-3.90%	-4.84%
1941	94,590	99,081	97,157	92,135	-2.60%	-7.01%	-5.17%
1942	142,974	150,951	151,509	142,358	-0.43%	-5.69%	-6.04%
1943	187,477	191,783	192,710	186,527	-0.51%	-2.74%	-3.21%
1944	201,969	205,966	204,973	201,175	-0.39%	-2.33%	-1.85%
1945	172,646	178,012	177,864	168,456	-2.43%	-5.37%	-5.29%
1946	244,221	247,592	247,764	242,905	-0.54%	-1.89%	-1.96%
1947	178,835	182,956	181,957	177,263	-0.88%	-3.11%	-2.58%
1948	245,959	252,053	252,792	245,542	-0.17%	-2.58%	-2.87%
1949	265,748	270,744	270,744	264,123	-0.61%	-2.45%	-2.45%
1950	148,679	150,247	151,242	150,167	1.00%	-0.05%	-0.71%
1951	126,014	131,976	130,843	124,153	-1.48%	-5.93%	-5.11%
1952	174,823	180,055	178,228	171,933	-1.65%	-4.51%	-3.53%
1953	195,569	200,736	199,881	193,332	-1.14%	-3.69%	-3.28%
1954	121,990	124,933	122,556	118,122	-3.17%	-5.45%	-3.62%
1955	92,221	97,264	97,006	89,940	-2.47%	-7.53%	-7.28%
1956	112,510	116,663	120,937	115,587	2.73%	-0.92%	-4.42%
1957	150,970	157,091	154,797	150,386	-0.39%	-4.27%	-2.85%
1958	177,810	183,135	182,546	175,696	-1.19%	-4.06%	-3.75%
1959	151,635	154,629	155,472	150,505	-0.75%	-2.67%	-3.20%
1960	188,969	193,208	193,243	187,727	-0.66%	-2.84%	-2.85%
1961	217,219	223,727	225,086	217,178	-0.02%	-2.93%	-3.51%
1962	205,196	208,035	207,897	206,064	0.42%	-0.95%	-0.88%
1963	201,045	203,791	204,041	197,877	-1.58%	-2.90%	-3.02%
1964	288,629	294,173	294,117	287,770	-0.30%	-2.18%	-2.16%
1965	198,371	201,337	199,973	197,957	-0.21%	-1.68%	-1.01%
1966	213,008	215,289	216,264	210,574	-1.14%	-2.19%	-2.63%
1967	228,780	235,629	235,779	228,506	-0.12%	-3.02%	-3.08%
1968	189,865	193,063	192,551	190,012	0.08%	-1.58%	-1.32%
1969	177,804	182,218	181,971	175,186	-1.47%	-3.86%	-3.73%
1970	145,824	150,499	151,965	148,324	1.71%	-1.45%	-2.40%
1971	222,020	228,358	228,228	216,570	-2.45%	-5.16%	-5.11%
1972	209,176	212,953	212,841	206,971	-1.05%	-2.81%	-2.76%
1973	296,579	301,681	301,674	297,208	0.21%	-1.48%	-1.48%
1974	246,160	248,472	248,424	245,960	-0.08%	-1.01%	-0.99%
1975	257,443	264,155	264,174	255,204	-0.87%	-3.39%	-3.40%
1976	224,972	227,675	227,419	223,033	-0.86%	-2.04%	-1.93%
1977	181,796	188,823	188,978	181,382	-0.23%	-3.94%	-4.02%
1978	151,232	154,297	151,046	147,090	-2.74%	-4.67%	-2.62%

Year	Alternative 1A (No Action)	Alternative 1B	Alternative 7B	Alternative 7H (Proposed Action)	(7H - No Action) / No Action	(7H - 1B) / 1B	(7H - 7B) / 7B
1979	218,816	225,293	230,235	221,469	1.21%	-1.70%	-3.81%
1980	217,964	222,119	219,460	215,069	-1.33%	-3.17%	-2.00%
1981	96,738	100,427	93,890	91,891	-5.01%	-8.50%	-2.13%
1982	183,587	188,284	196,606	188,895	2.89%	0.32%	-3.92%
1983	230,088	236,660	236,061	227,790	-1.00%	-3.75%	-3.50%
1984	228,170	231,315	231,103	227,355	-0.36%	-1.71%	-1.62%
1985	136,604	140,155	141,330	137,638	0.76%	-1.80%	-2.61%
1986	78,744	80,846	76,062	77,853	-1.13%	-3.70%	2.35%
1987	138,594	146,369	147,468	130,551	-5.80%	-10.81%	-11.47%
1988	80,438	84,481	81,519	81,291	1.06%	-3.78%	-0.28%
1989	180,126	187,342	194,837	183,024	1.61%	-2.31%	-6.06%
1990	205,119	208,344	207,683	201,611	-1.71%	-3.23%	-2.92%
1991	198,499	204,869	205,706	199,800	0.66%	-2.47%	-2.87%
1992	213,179	218,408	217,123	209,725	-1.62%	-3.98%	-3.41%
1993	186,462	189,084	188,861	186,871	0.22%	-1.17%	-1.05%
1994	211,375	218,540	219,331	208,690	-1.27%	-4.51%	-4.85%
1995	188,273	192,126	191,746	186,296	-1.05%	-3.03%	-2.84%
1996	178,976	182,570	181,787	176,524	-1.37%	-3.31%	-2.90%
1997	199,157	202,896	204,430	199,096	-0.03%	-1.87%	-2.61%
1998	211,038	215,318	213,768	208,740	-1.09%	-3.06%	-2.35%
1999	91,781	95,588	92,677	84,819	-7.59%	-11.27%	-8.48%
2000	71,579	81,016	77,284	69,800	-2.48%	-13.84%	-9.68%
2001	116,893	114,532	119,999	116,234	-0.56%	1.49%	-3.14%
2002	92,680	97,325	99,722	96,105	3.70%	-1.25%	-3.63%
2003	244,828	252,354	257,789	246,519	0.69%	-2.31%	-4.37%
2004	170,735	176,035	175,129	168,503	-1.31%	-4.28%	-3.78%
2005	227,321	232,006	232,065	226,611	-0.31%	-2.33%	-2.35%
2006	128,002	130,268	127,556	125,505	-1.95%	-3.66%	-1.61%
2007	69,215	74,286	80,155	73,704	6.49%	-0.78%	-8.05%
2008	59,579	63,887	56,526	62,262	4.50%	-2.54%	10.15%
2009	204,663	212,785	216,604	198,041	-3.24%	-6.93%	-8.57%
2010	179,328	182,752	181,648	176,836	-1.39%	-3.24%	-2.65%
2011	104,454	108,433	109,354	106,945	2.38%	-1.37%	-2.20%
Average	**176,624**	**181,189**	**181,217**	**175,491**	**-0.64%**	**-3.14%**	**-3.16%**

APPENDIX C

Lake Eufaula (W.F. George) Annual Energy in MWh

Year	Alternative 1A (No Action)	Alternative 1B	Alternative 7B	Alternative 7H (Proposed Action)	(7H - No Action) / No Action	(7H - 1B) / 1B	(7H - 7B) / 7B
1939	496,752	499,857	498,019	495,663	-0.22%	-0.84%	-0.47%
1940	426,756	431,971	433,314	425,563	-0.28%	-1.48%	-1.79%
1941	290,132	295,494	289,972	284,105	-2.08%	-3.85%	-2.02%
1942	456,999	466,012	465,588	455,968	-0.23%	-2.16%	-2.07%
1943	521,430	525,865	525,732	520,192	-0.24%	-1.08%	-1.05%
1944	541,835	545,683	544,512	541,102	-0.14%	-0.84%	-0.63%
1945	474,426	480,992	479,778	470,388	-0.85%	-2.20%	-1.96%
1946	643,956	647,351	647,462	642,389	-0.24%	-0.77%	-0.78%
1947	570,002	574,696	573,617	568,338	-0.29%	-1.11%	-0.92%
1948	699,204	704,088	703,966	698,176	-0.15%	-0.84%	-0.82%
1949	691,006	696,559	696,542	689,293	-0.25%	-1.04%	-1.04%
1950	415,368	417,242	417,924	416,564	0.29%	-0.16%	-0.33%
1951	335,276	342,665	338,656	330,186	-1.52%	-3.64%	-2.50%
1952	444,616	451,207	448,803	441,319	-0.74%	-2.19%	-1.67%
1953	573,717	579,241	578,171	571,365	-0.41%	-1.36%	-1.18%
1954	325,501	328,969	324,090	317,877	-2.34%	-3.37%	-1.92%
1955	276,046	282,198	277,841	270,421	-2.04%	-4.17%	-2.67%
1956	330,310	335,522	338,672	332,584	0.69%	-0.88%	-1.80%
1957	448,446	453,685	453,448	445,781	-0.59%	-1.74%	-1.69%
1958	486,977	492,994	492,068	484,596	-0.49%	-1.70%	-1.52%
1959	501,132	504,573	505,471	500,305	-0.17%	-0.85%	-1.02%
1960	513,838	518,334	518,209	511,749	-0.41%	-1.27%	-1.25%
1961	539,393	547,734	554,223	546,000	1.22%	-0.32%	-1.48%
1962	530,977	533,612	533,446	531,429	0.09%	-0.41%	-0.38%
1963	460,364	464,880	464,270	456,059	-0.93%	-1.90%	-1.77%
1964	709,473	716,720	716,780	709,670	0.03%	-0.98%	-0.99%
1965	487,393	490,713	488,921	486,269	-0.23%	-0.91%	-0.54%
1966	550,132	552,338	553,262	547,228	-0.53%	-0.93%	-1.09%
1967	515,263	523,821	523,316	513,553	-0.33%	-1.96%	-1.87%
1968	426,436	430,231	427,492	424,414	-0.47%	-1.35%	-0.72%
1969	436,102	441,604	440,862	432,692	-0.78%	-2.02%	-1.85%
1970	420,604	425,773	427,484	423,166	0.61%	-0.61%	-1.01%
1971	605,403	612,724	612,194	599,948	-0.90%	-2.09%	-2.00%
1972	516,291	520,606	520,059	513,421	-0.56%	-1.38%	-1.28%
1973	689,819	694,948	694,941	690,481	0.10%	-0.64%	-0.64%
1974	582,149	584,969	584,767	581,206	-0.16%	-0.64%	-0.61%
1975	678,212	685,881	685,804	676,529	-0.25%	-1.36%	-1.35%
1976	598,426	602,640	602,336	598,006	-0.07%	-0.77%	-0.72%
1977	490,368	498,135	497,477	488,961	-0.29%	-1.84%	-1.71%
1978	475,284	478,796	472,905	468,174	-1.50%	-2.22%	-1.00%

Exhibit A-2 **Annual Hydropower at Buford, West Point and WF George** **Page 13 of 13**

Year	Alternative 1A (No Action)	Alternative 1B	Alternative 7B	Alternative 7H (Proposed Action)	(7H - No Action) / No Action	(7H - 1B) / 1B	(7H - 7B) / 7B
1979	557,037	563,879	568,004	559,824	0.50%	-0.72%	-1.44%
1980	522,105	526,910	523,494	518,918	-0.61%	-1.52%	-0.87%
1981	293,813	298,238	288,471	286,144	-2.61%	-4.06%	-0.81%
1982	449,130	454,611	464,288	454,955	1.30%	0.08%	-2.01%
1983	589,423	597,062	597,144	586,721	-0.46%	-1.73%	-1.75%
1984	531,982	535,695	535,379	531,060	-0.17%	-0.87%	-0.81%
1985	327,309	331,785	332,628	329,539	0.68%	-0.68%	-0.93%
1986	269,880	273,124	264,076	265,853	-1.49%	-2.66%	0.67%
1987	384,973	393,932	393,389	373,639	-2.94%	-5.15%	-5.02%
1988	257,365	262,037	257,234	256,824	-0.21%	-1.99%	-0.16%
1989	456,304	464,965	473,008	458,776	0.54%	-1.33%	-3.01%
1990	481,650	485,191	484,440	476,647	-1.04%	-1.76%	-1.61%
1991	486,981	494,373	495,795	488,679	0.35%	-1.15%	-1.44%
1992	521,057	526,829	524,340	514,840	-1.19%	-2.28%	-1.81%
1993	480,002	482,966	481,599	479,298	-0.15%	-0.76%	-0.48%
1994	552,977	560,861	561,518	549,913	-0.55%	-1.95%	-2.07%
1995	478,361	483,069	481,609	474,900	-0.72%	-1.69%	-1.39%
1996	509,839	512,665	511,601	506,887	-0.58%	-1.13%	-0.92%
1997	546,953	549,223	551,084	546,592	-0.07%	-0.48%	-0.82%
1998	543,757	548,247	546,143	540,872	-0.53%	-1.35%	-0.96%
1999	283,508	288,015	282,227	272,942	-3.73%	-5.23%	-3.29%
2000	225,435	238,987	230,562	221,066	-1.94%	-7.50%	-4.12%
2001	354,391	353,180	354,853	351,188	-0.90%	-0.56%	-1.03%
2002	255,263	261,679	262,704	257,334	0.81%	-1.66%	-2.04%
2003	576,134	584,626	591,508	578,075	0.34%	-1.12%	-2.27%
2004	420,913	427,127	426,493	418,956	-0.46%	-1.91%	-1.77%
2005	548,522	554,022	553,974	547,854	-0.12%	-1.11%	-1.10%
2006	320,196	323,062	317,367	314,804	-1.68%	-2.56%	-0.81%
2007	217,548	223,843	231,164	222,462	2.26%	-0.62%	-3.76%
2008	279,632	285,442	274,704	280,433	0.29%	-1.75%	2.09%
2009	576,391	584,632	587,313	567,083	-1.61%	-3.00%	-3.44%
2010	451,915	455,267	453,805	448,810	-0.69%	-1.42%	-1.10%
2011	259,633	264,439	266,090	262,494	1.10%	-0.74%	-1.35%
Average	**468,304**	**473,580**	**472,882**	**466,377**	**-0.41%**	**-1.52%**	**-1.38%**

EXHIBIT A-3

Lake Lanier (Buford) Net Withdrawal Impact on Volume and Elevation

Exhibit A-3 Lake Lanier (Buford) Net Withdrawal Impact on Volume and Elevation Page 1 of 5

In October of 2015 the Corps of Engineers prepared a draft environmental impact statement (DEIS) associated with the Update of the Water Control Manual for the Apalachicola – Chattahoochee – Flint River Basin.

The Corps of Engineers conducted a critical yield analysis for the ACF basin as part of the DEIS. On page 3 of this critical yield report, the Corps of Engineers also provides the unit conversions as follows:

1 cfs = 0.6464 mgd = 722.7 ac-ft/yr

As shown in Figure 1 below, the Corps of Engineers states the total conservation storage of Lake Lanier (Buford), West Point Lake, and Lake Eufaula (W.F. George) in table ES-1 on page ES-3 of the DEIS is 1,087,600 acre-feet, 306,131 acre-feet, and 244,400 acre-feet respectively.

As shown in Figure 2 below, the Corps of Engineers presented several water supply withdrawal amounts associated with direct withdrawals from Lake Lanier (Buford).

The purpose of this exhibit is to demonstrate the equivalent annual storage associated with net withdrawals. These values are presented in both total acre-feet terms, percent the total acre-feet represents of the total conservation storage for each reservoir, and elevation. This calculation has been made for each of the three reservoirs listed above. To determine the equivalent annual storage associated with a specific withdrawal, the withdrawal is multiplied by the conversion factor provided by the Corps of Engineers (722.7 acre-feet/year = 0.6464 mgd). This value is then divided by the total conservation storage, for each of the reservoirs listed above. The net withdrawal value used for this analysis is 98.34 mgd. This is the net withdrawal value associated with 165 mgd withdrawal and a 40.4% return at Lake Lanier as considered in Option H.

The specific calculations are as follows:

Net Withdrawal:

$$Withdrawal - Return = Net\ Withdrawal$$

$$Where: \quad Return = Withdrawal\ x\ Return\ Percentage$$

$$165\ mgd - (165\ mgd\ x\ 40.4\%) = 98.34\ mgd$$

Annual Volume Equivalent:

$$98.34\ mgd \times \frac{722.7\ acre - feet}{0.6464\ mgd} = 109{,}948\ acre - feet$$

$$109{,}948\ acre - feet \div 1{,}087{,}600\ acre - feet = 10\%\ of\ Lake\ Lanier\ (Buford)$$

$$109{,}948\ acre - feet \div 306{,}131\ acre - feet = 36\%\ of\ West\ Point\ Lake$$

$$109{,}948\ acre - feet \div 244{,}400\ acre - feet = 45\%\ of\ Lake\ Eufaula\ (W.F.\ George)$$

Exhibit A-3 Lake Lanier (Buford) Net Withdrawal Impact on Volume and Elevation Page 2 of 5

The data contained in Figure 1 below shows the normal (summer) lake elevation for each of the reservoirs that are discussed in this analysis. Specifically, the normal (summer) lake elevation for the reservoirs is shown in the following table. This table also contains the associated storage volumes in acre-feet. These values were obtained from the elevation-volume relationships shown in Figures 3-5.

Reservoir	Normal (summer) Lake Elevation in feet	Volume at Normal (summer) Lake Elevation in acre-feet
Lake Lanier (Buford)	1,071	1,955,200
West Point Lake	635	604,527
Lake Eufaula (W.F. George)	190	934,400

Table 1 - Normal (summer) Lake Elevation Information

To determine the equivalent elevation impact associated with the annual volume equivalent of the 98.34 mgd net withdrawal, the annual volume equivalent was subtracted from the normal (summer) lake volume for each reservoir. These results are shown in the following table. The elevation most closely related to these calculated volume values (as selected from the elevation-volume relationships shown in Figures 3-5) is shown in the table below.

Reservoir	Normal (summer) Volume minus the 98.34 mgd Annual Volume Equivalent in acre-feet	Approximate Elevation in feet
Lake Lanier (Buford)	1,955,200 – 109,948 = 1,845,252	1,068
West Point Lake	604,527 – 109,948 = 494,579	630
Lake Eufaula (W.F. George)	934,400 – 109,948 = 824,452	187

Table 2 – Volume and Elevation Impact Associated with Annual Equivalent of 98.34 mgd

The calculations in Table 2 above shows that the elevation impact at full pool of the annual volume associated with 98.34 mgd is 3, 5 and 3 feet at Lake Lanier (Buford), West Point Lake, and Lake Eufaula (W.F. George) respectively.

On page E-A-1 of Appendix E, Volume 2 of the DEIS, the Corps of Engineers states that the West Point Lake top of summer conservation pool and bottom of conservation pool is 635 feet msl and 620 feet msl respectively. Therefore, the five (5) foot impact at West Point Lake represents one third (33%) of the conservation pool elevation.

On page E-A-2 of Appendix C, Volume 2 of the DEIS, the Corps of Engineers states that the Lake Eufaula (W.F. George) top of summer conservation pool and bottom of conservation pool is 190 feet msl and 184 feet msl respectively. Therefore, the three (3) foot impact at Lake Eufaula (W.F. George) represents one half (50%) of the conservation pool elevation.

Table ES-1.
Reservoirs on Mainstem ACF Basin Rivers

Basin/river/project name	Owner/state/ year initially completed	Drainage area (sq mi)	Reservoir size (ac)	Total storage (ac-ft)[a]	Conservation storage (summer elev) (ac-ft)	Power capacity (kW)	Normal (summer) lake elev (ft)	Authorized purposes for USACE-owned projects[b]
Chattahoochee River		*8,708*						
Buford Dam/Lake Sidney Lanier	USACE/GA/1957	1,034	38,542	2,554,000	1,087,600	127,000	1,071	FRM, HP, NAV, FW, REC, WQ, WS[c]
Morgan Falls Dam/Bull Sluice Lake	GPC/GA/1903	1,360	580	2,450	0	16,800	866	
West Point Dam and Lake	USACE/GA/1975	3,440	25,864	774,798	306,131	87,000	635	FRM, HP, NAV, FW, REC, WQ
Langdale Dam and Lake	GPC/GA/1860	3,640	152	NA[d]	0	1,040	547.7	
Riverview Dam and Lake	GPC/GA/1902	3,661	75	NA[d]	0	480	530.5	
Bartletts Ferry Dam/Lake Harding	GPC/GA/1926	4,240	5,850	181,000	0	173,000	521	
Goat Rock Dam and Lake	GPC/GA/1912	4,510	1,050	11,000	0	38,600	404	
Oliver Dam/Lake Oliver	GPC/GA/1959	4,630	2,150	32,000	0	60,000	337	
North Highlands Dam and Lake	GPC/GA/1900	4,630	131	1,500	0	29,600	269	
Walter F. George Lock, Dam, and Lake	USACE/GA/1963	7,460	45,181	934,400	244,400	168,000	190	HP, NAV, FW, REC, WQ
George W. Andrews Lock, Dam, and Lake	USACE/GA/1963	8,210	1,540	18,180	0	None	102	NAV, FW, REC, WQ
Flint River		*8,456*						
Warwick Dam/Lake Blackshear	Crisp Co./ GA/1930	3,770	8,700	144,000	0	15,200	237	
Flint River Dam/Lake Worth	GPC/GA/1920	5,290	1,400	NA[d]	0	5,400	182.3	
Apalachicola River		*2,409*	*(Total ACF Basin – 19,573 sq mi)*					
Jim Woodruff Lock and Dam/ Lake Seminole	USACE/FL/1954	17,164	37,500	367,318	0	43,350	77	HP, NAV, FW, REC, WQ

Notes:
a. Measured at top of storage for flood risk management.
b. As used in this table, the term *authorized purposes* includes purposes expressly identified in the project authorizing documents; incidental benefits recognized in projection authorizations; and objectives that result from other authorities, such as general authorities contained in congressional legislation, for which USACE operates each listed project as of 2009. FRM = flood risk management; HP = hydroelectric power generation; NAV = navigation; FW = fish and wildlife conservation; REC = recreation; WQ = water quality; WS = municipal & industrial water supply.
c. USACE operates the Buford Dam/Lake Sidney Lanier project in a manner that accommodates water supply withdrawals from Lake Lanier and from the Chattahoochee River downstream of Buford Dam.
d. NA = not available.

Figure 1 - Table ES-1 on Page ES-3 of Volume 1 of the DEIS

Table ES-4.
Water Supply Options Considered

Water Supply Option	Lake Lanier relocation (mgd)	Lake Lanier withdrawal (mgd)	Lake Lanier total withdrawals (mgd)	Lake Lanier returns (mgd/% returned)	Glades Reservoir withdrawals (mgd)	Glades Reservoir returns (mgd/% returned)	Net Withdrawal from Lake Lanier and Glades Reservoir (mgd)	Storage required to support reallocation (ac-ft)	River withdrawals (mgd)	River returns (mgd/% returned
A - No Action	20	108	128	37/29%	0	0	91	124,034	277	227/82%
B – Relocation only	20	0	20	10/50%	0	0	10	n/a	277	227/82%
C - Future without project condition (w/Glades pumping)	20	0	20	10/50%	40	20/50%	30	n/a	408	335/82%
D - GA 2013 request	20	277	297	163*/55%	0	0	134	318,126	408	384/94%
E - GA 2013 request w/Glades pumping	20	237	257	141/55%	40	22/55%	134	272,187	408	384/94%
F - GA 2013, projected return volume for 2035	20	277	297	91/30.6%	0	0	206	318,126	408	335/82%
G - GA 2013 max treatment facility capacity	20	277	297	128/43%	0	0	169	*	408	477/117%
H - Projected return volume for 2035 w/Glades pumping	20	165	185	75/40.4%	40	16/40.4%	134	189,497	408	384/94%

Note: * Storage for this water supply option was not computed because this option was not carried forward for further consideration as explained in Section 5.1.4.1.1.

Figure 2 - Table ES-4 on Page ES-18 of Volume 1 of the DEIS

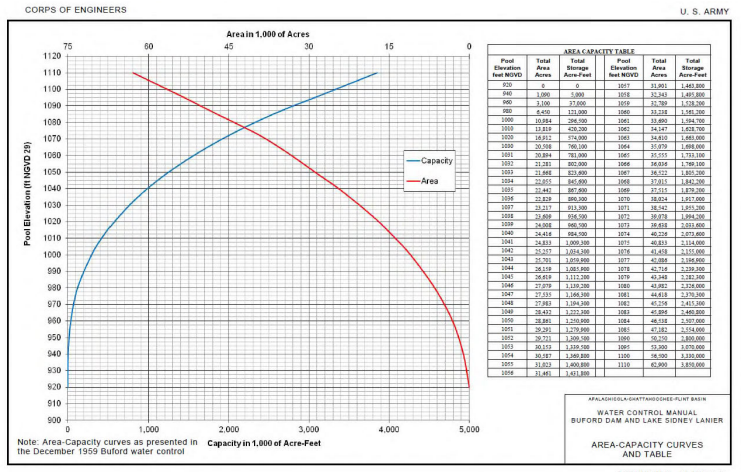


Figure 3 – Buford Elevation-Volume Relationship from Plate 2-5 of Appendix B of Volume 2 of the ACF DEIS

Exhibit A-3 Lake Lanier (Buford) Net Withdrawal Impact on Volume and Elevation Page 5 of 5

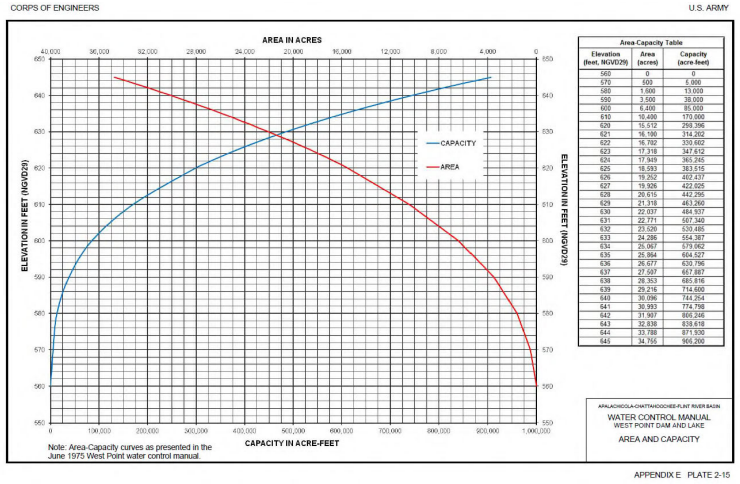


Figure 4 – West Point Elevation-Volume Relationship from Plate 2-15 of Appendix E of Volume 2 of the ACF DEIS

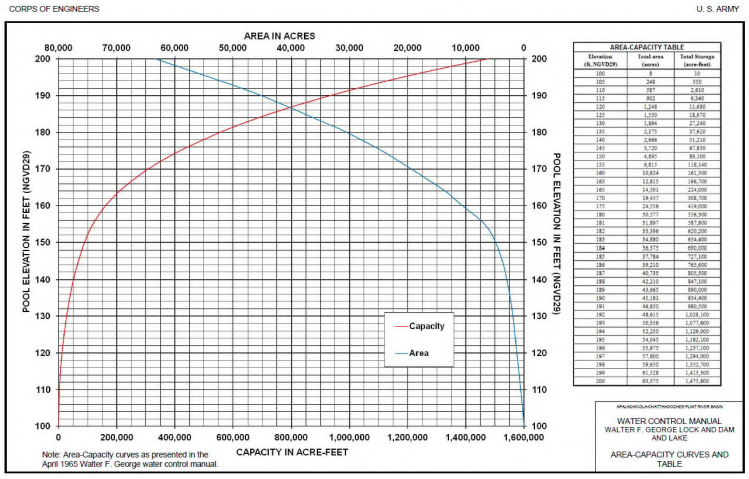


Figure 5 – Lake Eufaula Elevation-Volume Relationship from Plate 2-14 of Appendix C of Volume 2 of the ACF DEIS

EXHIBIT A-4

Lake Lanier (Buford) Zones NAA vs PAA

In October of 2015 the Corps of Engineers prepared a draft environmental impact statement (DEIS) associated with the Update of the Water Control Manual for the Apalachicola – Chattahoochee – Flint River Basin. The DEIS contains proposed water control zones to be implemented by Corps of Engineers relating to the operations of Lake Lanier (Buford). The proposed water control action zones for Lake Lanier are shown in Figure 1 below.

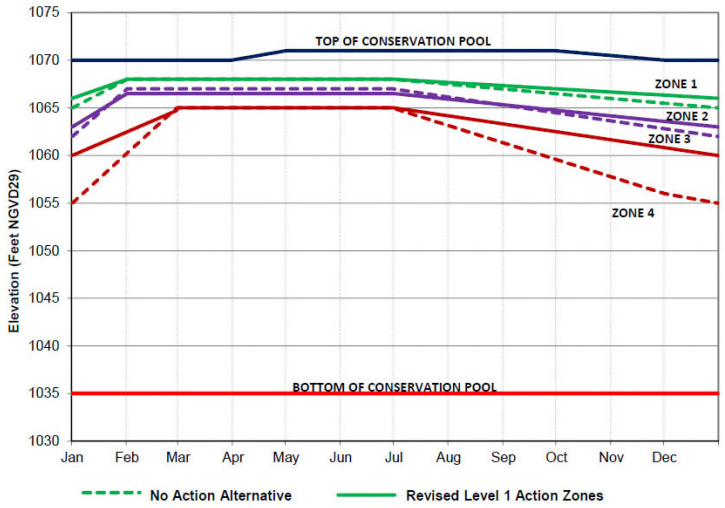


Figure 4.1-7. Lake Lanier Water Control Action Zones

Figure 1 - Water Control Zones from Figure 4.1-7 found on page 4-15 of Volume 1 of the DEIS

The Corps of Engineers provided a ResSim model and results for the No Action Alternative and the Proposed Action Alternative. The data and results from the Corps of Engineers' HEC-ResSim modeling analyses are contained in the file provided by the Corps titled:

"/ACF_WCM_2014_09162014/rss/Water_Supply_Options_Extended_TS/simulation.dss".

HEC-DSSVue is a software package provided by the Corps of Engineers to view data sets and model results contained in the ResSim models and supporting input files. The HEC-DSSVue program was used to analyze the Lake Lanier (Buford) action zones contained in the aforementioned file. Specifically, the HEC-DSSVue program was used to extract the data associated with the storage (in acre-feet) for the water control action zones from the aforementioned files.

The data attributes contained in the aforementioned files associated with the data are as follows:

- No Action Alternative Zones:
  simulation.dss://BUFORD-CONSERVATION/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/
  simulation.dss://BUFORD-ZONE 2/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/
  simulation.dss://BUFORD-ZONE 3/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/
  simulation.dss://BUFORD-ZONE 4/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/
  simulation.dss://BUFORD-OPERATING INACTIVE/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/
- Proposed Action Alternative Zones:
  simulation.dss://BUFORD-CONSERVATION/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/
  simulation.dss://BUFORD-ZONE 2/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/
  simulation.dss://BUFORD-ZONE 3/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/
  simulation.dss://BUFORD-ZONE 4/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/
  simulation.dss://BUFORD-OPERATING INACTIVE/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/

The proposed water control action zones associated with the No Action Alternative and Proposed Action Alternative (Alternative 7, Option H) for Lake Lanier (Buford) were analyzed to determine the percentage of the total conservation storage at Lake Lanier (Buford) that was contained in each zone. The resulting percentage was plotted for every day of the calendar year and is shown in Figure 2 below.

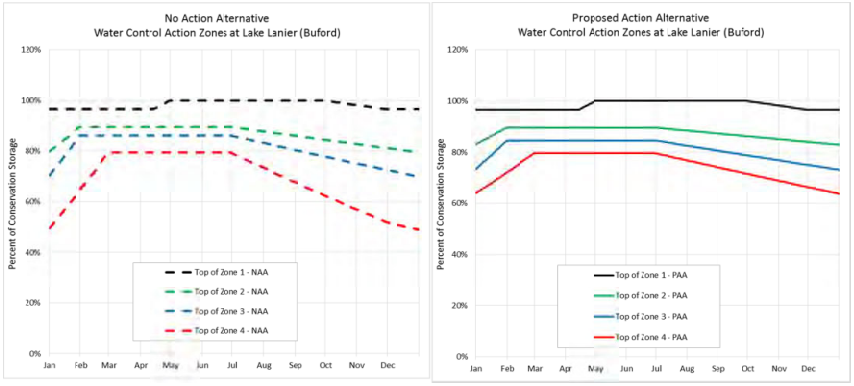


Figure 2 - Graphs showing percentage of Conservation Storage for No Action and Proposed Action Water Control Action Zones

The x-axis is time, ranging from January 1 through December 31. The y-axis is the percentage of the conservation storage that is contained in each zone. The graph on the left of Figure 2 shows the percentage of conservation storage associated with each of the action zones from the No Action Alternative (NAA). The graph on the right of Figure 2 shows the percentage of conservation storage associated with each of the action zones from the Proposed Action Alternative (PAA). The black line represents the percentage of the conservation that is contained in Zone 1 for every day of the calendar year. The green line represents the percentage of the conservation that is contained in Zone 2 for every day of the calendar year. The blue line represents the percentage of the conservation that is contained in Zone 3 for every day of the calendar year. The red line represents the percentage of the conservation that is contained in Zone 4 for every day of the calendar year. For example, on June 1st the storage contained in Zone 4 for both the NAA and PAA represents 80% of the conservation storage for that day.

Figures 1 and 2 shows that the Corps of Engineers is proposing to alter the shapes of the water control action zones at Lake Lanier (Buford). In fact, the minimum level of the top of zone 4 for the NAA and PAA is 49% and 64% respectively. The alterations to the top of zone 4 curve for the PAA, proposed by the Corps of Engineers, would have the effect of increasing the amount of storage that is contained in zone 4. Given that operations for project purposes are a function of the action zone (see exerpt from DEIS in figure 3 below), increasing the amount of storage that is contained in zone 4 would have a negative impact on operations for project purposes.

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

- Zone 1: Indicates that releases can be made in support of seasonal navigation (when the channel has been adequately maintained) and hydroelectric power releases. If all reservoirs are in Zone 1, USACE would operate the river system normally.
- Zone 2: Indicates that water to support seasonal navigation might be limited. Hydroelectric power generation is supported at a reduced level. Minimum flows are met.
- Zone 3: Indicates that water to support seasonal navigation might be significantly limited. Hydroelectric power generation is supported at a reduced level. Minimum flows are met.
- Zone 4: Indicates that navigation is not supported. Hydroelectric power demands will be met at minimum levels and might occur only for concurrent uses. Minimum flows are met.

Figure 3 - Excerpt from page 4-11 of Volume 1 of the DEIS

Furthermore, in lines 3 and 4 of page 2-65 of Volume 1 of the DEIS, the Corps of Engineers states: “The amount of generation per day is governed by a preset guide curve and action zones for each reservoir, with diminishing energy generation with declining storage.”

The specific calculation used to create the four lines shown on each graph in Figure 2 is shown below:

$$\textit{Percentage of Conservation Storage (\%)} = \textit{Top of Zone Usable Storage (acre - feet)} \Big/ \textit{Conservation Storage (acre - feet)}$$

Where:

$$\textit{Conservation Storage (acre - feet)} = 1{,}087{,}600\ \textit{acre - feet (See Table ES - 1 shown in Figure 4 below)}$$

$$\textit{Top of Zone Usable Storage (acre - feet)} = \textit{Top of Zone Storage(acre - feet)} - \textit{Operating Inactive Storage (acre - feet)}$$

For example, the calculation for the December 31st Top of Zone 4 percent of conservation storage for the NAA is shown below:

$$\textit{Conservation Storage (acre - feet)} = 1{,}087{,}600\ \textit{acre - feet}$$

$$\textit{Top of Zone 4 Usable Storage (acre - feet)} = 1{,}400{,}800\ (\textit{acre - feet}) - 867{,}600(\textit{acre - feet}) = 533{,}800\ \textit{acre - feet}$$

$$\textit{Percentage of Conservation (Zone 4)} = 533{,}800\ \textit{acre - feet} \Big/ 1{,}087{,}600\ \textit{acre - feet} = 49\%$$

Likewise, the calculation for the December 31st Top of Zone 4 percent of conservation storage for the PAA is shown below:

$$\textit{Conservation Storage (acre - feet)} = 1{,}087{,}600\ \textit{acre - feet}$$

$$\textit{Top of Zone 4 Usable Storage (acre - feet)} = 1{,}561{,}200\ (\textit{acre - feet}) - 867{,}600(\textit{acre - feet}) = 693{,}600\ \textit{acre - feet}$$

$$\textit{Percentage of Conservation (Zone 4)} = 693{,}600\ \textit{acre - feet} \Big/ 1{,}087{,}600\ \textit{acre - feet} = 64\%$$

Table ES-1.
Reservoirs on Mainstem ACF Basin Rivers

Basin/river/project name	Owner/state/ year initially completed	Drainage area (sq mi)	Reservoir size (ac)	Total storage (ac-ft)[a]	Conservation storage (summer elev) (ac-ft)	Power capacity (kW)	Normal (summer) lake elev (ft)	Authorized purposes for USACE-owned projects[b]
Chattahoochee River		*8,708*						
Buford Dam/Lake Sidney Lanier	USACE/GA/1957	1,034	38,542	2,554,000	1,087,600	127,000	1,071	FRM, HP, NAV, FW, REC, WQ, WS[c]
Morgan Falls Dam/Bull Sluice Lake	GPC/GA/1903	1,360	580	2,450	0	16,800	866	
West Point Dam and Lake	USACE/GA/1975	3,440	25,864	774,798	306,131	87,000	635	FRM, HP, NAV, FW, REC, WQ
Langdale Dam and Lake	GPC/GA/1860	3,640	152	NA[d]	0	1,040	547.7	
Riverview Dam and Lake	GPC/GA/1902	3,661	75	NA[d]	0	480	530.5	
Bartletts Ferry Dam/Lake Harding	GPC/GA/1926	4,240	5,850	181,000	0	173,000	521	
Goat Rock Dam and Lake	GPC/GA/1912	4,510	1,050	11,000	0	38,600	404	
Oliver Dam/Lake Oliver	GPC/GA/1959	4,630	2,150	32,000	0	60,000	337	
North Highlands Dam and Lake	GPC/GA/1900	4,630	131	1,500	0	29,600	269	
Walter F. George Lock, Dam, and Lake	USACE/GA/1963	7,460	45,181	934,400	244,400	168,000	190	HP, NAV, FW, REC, WQ
George W. Andrews Lock, Dam, and Lake	USACE/GA/1963	8,210	1,540	18,180	0	None	102	NAV, FW, REC, WQ
Flint River		*8,456*						
Warwick Dam/Lake Blackshear	Crisp Co./ GA/1930	3,770	8,700	144,000	0	15,200	237	
Flint River Dam/Lake Worth	GPC/GA/1920	5,290	1,400	NA[d]	0	5,400	182.3	
Apalachicola River		*2,409*	*(Total ACF Basin – 19,573 sq mi)*					
Jim Woodruff Lock and Dam/ Lake Seminole	USACE/FL/1954	17,164	37,500	367,318	0	43,350	77	HP, NAV, FW, REC, WQ

Notes:
a. Measured at top of storage for flood risk management.
b. As used in this table, the term *authorized purposes* includes purposes expressly identified in the project authorizing documents; incidental benefits recognized in projection authorizations; and objectives that result from other authorities, such as general authorities contained in congressional legislation, for which USACE operates each listed project as of 2009. FRM = flood risk management; HP = hydroelectric power generation; NAV = navigation; FW = fish and wildlife conservation; REC = recreation; WQ = water quality; WS = municipal & industrial water supply.
c. USACE operates the Buford Dam/Lake Sidney Lanier project in a manner that accommodates water supply withdrawals from Lake Lanier and from the Chattahoochee River downstream of Buford Dam.
d. NA = not available.

Figure 4 - Table showing Conservation Storage

EXHIBIT A-5

Composite Zone Comparison

In October of 2015 the Corps of Engineers prepared a draft environmental impact statement (DEIS) associated with the Update of the Water Control Manual for the Apalachicola – Chattahoochee – Flint River Basin. The DEIS contains proposed composite water control zones to be implemented by the Corps of Engineers relating to the operations of Lake Lanier (Buford), West Point Lake, and Lake Eufaula (W.F. George). The proposed composite water control action zones for the composite storage are shown in Figure 1 below.

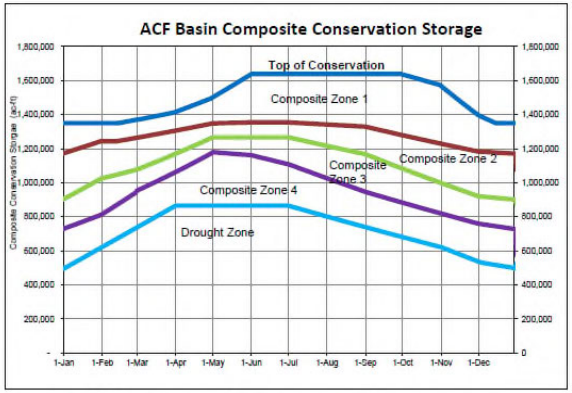


Figure 7-4. ACF Basin Composite Conservation and Flood Storage

The following definitions apply to the composite action zones:

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

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

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

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

7-6

Figure 1 – Composite Water Control Zones from page 7-6 of the Master Water Control Manual in Volume 2 of the DEIS

The Corps of Engineers provided a ResSim model and results for the No Action Alternative and the Proposed Action Alternative. The data and results from the Corps of Engineers' HEC-ResSim modeling analyses are contained in the file provided by the Corps titled:

"/ACF_WCM_2014_09162014/rss/Water_Supply_Options_Extended_TS/simulation.dss".

HEC-DSSVue is a software package provided by the Corps of Engineers to view data sets and model results contained in the ResSim models and supporting input files. The HEC-DSSVue program was used to analyze the composite storage action zones contained in the aforementioned file. Specifically, the HEC-DSSVue program was used to extract the data associated with the storage (in acre-feet) for the composite water control action zones from the aforementioned files.

The data attributes contained in the aforementioned files associated with the data are as follows:

- No Action Alternative Zones:

  simulation.dss://CS_CON/CS_CON/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/
  simulation.dss://CS_Z2/CS_Z2/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/
  simulation.dss://CS_Z3/CS_Z3/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/
  simulation.dss://CS_Z4/CS_Z4/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/
  simulation.dss://CS_IA/CS_IA/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/

- Proposed Action Alternative Zones:

  simulation.dss://CS_CON/CS_CON/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/
  simulation.dss://CS_Z2/CS_Z2/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/
  simulation.dss://CS_Z3/CS_Z3/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/
  simulation.dss://CS_Z4/CS_Z4/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/
  simulation.dss://CS_IA/CS_IA/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/

Microsoft Excel was then used to analyze the extracted data. The composite water control action zones associated with the No Action Alternative and Proposed Action Alternative (Alternative 7, Option H) were plotted. These plots are shown in Figure 2 below.

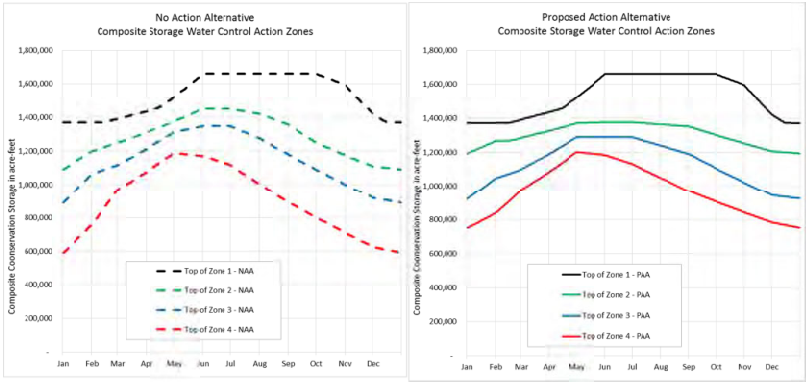


Figure 2 - Graphs showing Composite Conservation Storage for No Action and Proposed Action Water Control Action Zones

The x-axis is time, ranging from January 1 through December 31. The y-axis is the composite conservation storage that is contained in each zone. The graph on the left of Figure 2 shows the composite conservation storage associated with each of the action zones from the No Action Alternative (NAA). The graph on the right of Figure 2 shows the composite conservation storage associated with each of the action zones from the Proposed Action Alternative (PAA). The black lines represent the composite conservation that is contained in Zone 1 for every day of the calendar year. The green lines represent the composite conservation storage that is contained in Zone 2 for every day of the calendar year. The blue lines represent the composite conservation storage that is contained in Zone 3 for every day of the calendar year. The red lines represent the composite conservation storage that is contained in Zone 4 for every day of the calendar year.

The proposed composite water control action zones associated with the No Action Alternative and Proposed Action Alternative (Alternative 7, Option H) were analyzed to determine the percentage of the total composite conservation storage that was contained in each zone. The resulting percentage was plotted for every day of the calendar year and is shown in Figure 3 below.

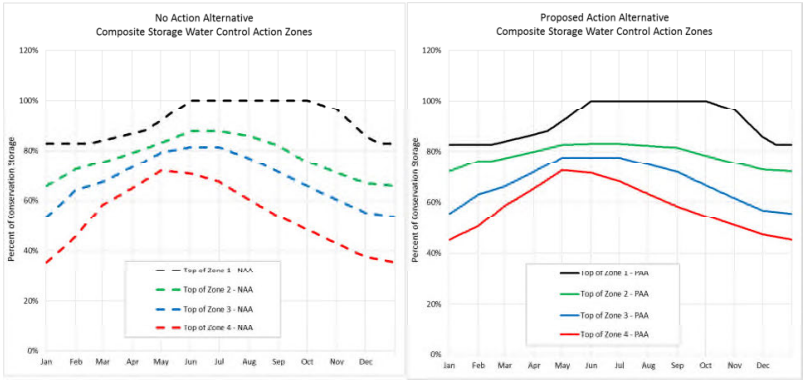


Figure 3 - Graphs showing percentage of Composite Conservation Storage for No Action and Proposed Action Water Control Action Zones

The x-axis is time, ranging from January 1 through December 31. The y-axis is the percentage of the conservation storage that is contained in each zone. The graph on the left of Figure 3 shows the percentage of conservation storage associated with each of the action zones from the No Action Alternative (NAA). The graph on the right of Figure 3 shows the percentage of conservation storage associated with each of the action zones from the Proposed Action Alternative (PAA). The black lines represent the percentage of the conservation storage that is contained in Zone 1 for every day of the calendar year. The green lines represent the percentage of the conservation storage that is contained in Zone 2 for every day of the calendar year. The blue lines represent the percentage of the conservation storage that is contained in Zone 3 for every day of the calendar year. The red lines represent the percentage of the conservation storage that is contained in Zone 4 for every day of the calendar year.

The lines shown on the graphs in Figure 2 were plotted on one graph. That graph is shown in Figure 4 below.

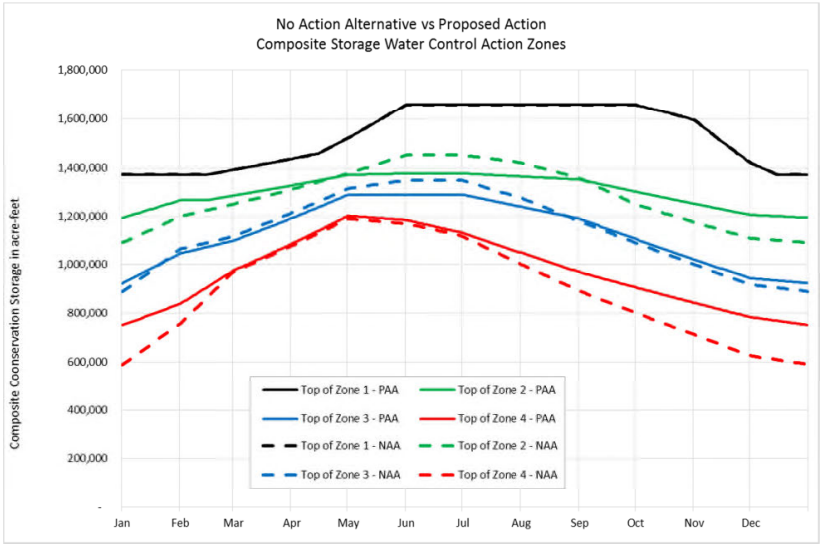


Figure 4 - Graph showing percentage of Composite Conservation Storage for No Action and Proposed Action Water Control Action Zones

Figures 1 through 4 show that the Corps of Engineers is proposing to alter the shapes of the composite water control action zones. In fact, the minimum level of the top of zone 4 for the NAA and PAA is 36% and 45% respectively. The alterations to the top of zone 4 curve for the PAA, proposed by the Corps of Engineers, would have the effect of increasing the amount of storage that is contained in zone 4. Given that operations for project purposes are a function of the action zone (see exerpt from DEIS in Figure 1), increasing the amount of storage that is contained in zone 4 would have a negative impact on operations for project purposes.

The specific calculation used to create the lines shown on each graph in Figure 3 is shown below:

$$Percentage\ of\ Composite\ Conservation\ Storage\ (\%) = {Top\ of\ Zone\ Usable\ Storage\ (acre-feet)}/{Total\ Composite\ Conservation\ Storage\ (acre-feet)}$$

Where:

$$Total\ Composite\ Conservation\ Storage\ (acre-feet) = 1{,}660{,}127\ acre-feet\ (See\ maximum\ value\ as\ shown\ in\ Figure\ 4)$$

$$Top\ of\ Zone\ Usable\ Storage\ (acre-feet) = Top\ of\ Zone\ Composite\ Conservation\ Storage(acre-feet)$$

For example, the calculation for the January 1st Top of Zone 4 percent of composite conservation storage for the NAA is shown below:

$$Conservation\ Storage\ (acre-feet) = 1{,}660{,}127\ acre-feet$$

$$Top\ of\ Zone\ 4\ Usable\ Storage\ (acre-feet) = 589{,}557\ acre-feet$$

$$Percentage\ of\ Conservation\ (Zone\ 4) = {589{,}557\ acre-feet}/{1{,}660{,}127\ acre-feet}$$

$$= 36\%$$

Likewise, the calculation for the January 1st Top of Zone 4 percent of conservation storage for the PAA is shown below:

$$Conservation\ Storage\ (acre-feet) = 1{,}660{,}127\ acre-feet$$

$$Top\ of\ Zone\ 4\ Usable\ Storage\ (acre-feet) = 749{,}957\ acre-feet$$

$$Percentage\ of\ Conservation\ (Zone\ 4) = {749{,}957\ acre-feet}/{1{,}660{,}127\ acre-feet}$$

$$= 45\%$$

Furthermore, the difference between the January 1st Top of Zone 4 composite conservation storage between the NAA and the PAA is 160,400 acre-feet. The calculation for this is shown below:

$$749{,}957\ acre-feet - 589{,}557\ acre-feet = 160{,}400\ acre-feet$$

EXHIBIT A-6

Lake Lanier (Buford) Percent of Time in Each Zone for PAA, NAA and 1B

Exhibit A-6 Lake Lanier (Buford) Percent of Time in Each Zone for PAA, NAA and 1B Page 1 of 4

In October of 2015 the Corps of Engineers prepared a draft environmental impact statement (DEIS) associated with the Update of the Water Control Manual for the Apalachicola – Chattahoochee – Flint River Basin. The DEIS contains proposed water control zones to be implemented by the Corps of Engineers relating to the operations of Lake Lanier (Buford). The proposed water control action zones for Lake Lanier are shown in Figure 1 below.

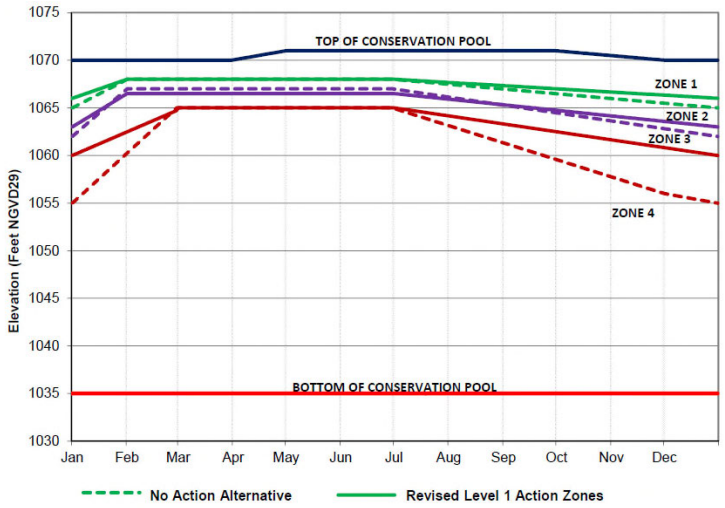


Figure 4.1-7. Lake Lanier Water Control Action Zones

Figure 1 - Water Control Zones from Figure 4.1-7 found on page 4-15 of Volume 1 of the DEIS

The Corps of Engineers provided an analysis of its model simulations for the percent of time that Lake Lanier (Buford) would be in specific revised action zones over the modeled period. As shown in the figure below, the results of this analysis are shown in Table 6.1-3 of Volume 1 of the DEIS.

Exhibit A-6 Lake Lanier (Buford) Percent of Time in Each Zone for PAA, NAA and 1B Page 2 of 4

Table 6.1-3.
Percent of Time the Lake Lanier Pool Would Be in the Revised Action Zone over Modeled Period of Record (1938-2011) for NAA and Alternatives 1B, 1C, 7A, 7C, 7D, 7E, 7F, and 7H (PAA)

	Lake Lanier Action Zone			
Alternative	Zone 1	Zone 2	Zone 3	Zone 4
NAA (Alt1A)	56%	21%	9%	15%
Alt1B	64%	17%	8%	10%
Alt1C	59%	20%	8%	13%
Alt7A	59%	18%	13%	11%
Alt7C	62%	17%	11%	10%
Alt7D	53%	19%	13%	15%
Alt7E	53%	19%	13%	15%
Alt7F	44%	18%	14%	24%
PAA (Alt7H)	53%	19%	13%	15%

ACF Draft EIS for Master Water Control Manual Updates *October 2015*
6-11

Figure 2 - Table 6.1-3 from page 6-11 of Volume 1 of the DEIS

The following analysis was performed to further analyze the results from the Corps of Engineers' proposal.

The Corps of Engineers provided a ResSim model and results for the No Action Alternative, Proposed Action Alternative (Alternative 7H), and the Alternative 1B. The data and results from the Corps of Engineers' HEC-ResSim modeling analyses are contained in the file provided by the Corps titled:

"/ACF_WCM_2014_09162014/rss/Water_Supply_Options_Extended_TS/simulation.dss".

HEC-DSSVue is a software package provided by the Corps of Engineers to view data sets and model results contained in the ResSim models and supporting input files. The HEC-DSSVue program was used to analyze the Lake Lanier (Buford) simulated elevations and action zones contained in the aforementioned file. Specifically, the HEC-DSSVue program was used to extract the data associated with the elevations of the simulated pool levels as well as the water control action zones from the aforementioned files.

First, the results presented in Figure 2 were validated. The data attributes contained in the aforementioned file used for this validation are as follows:

- Proposed Action Alternative Zones:
  simulation.dss://BUFORD-ZONE 2/ELEV-ZONE/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/
  simulation.dss://BUFORD-ZONE 3/ELEV-ZONE/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/
  simulation.dss://BUFORD-ZONE 4/ELEV-ZONE/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/
- Modeled Lake Lanier (Buford) Pool Levels:
  simulation.dss://BUFORD-POOL/ELEV/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/
  simulation.dss://BUFORD-POOL/ELEV/01JAN1939 - 01JAN2011/1DAY/ALT1_OPTBX0/
  simulation.dss://BUFORD-POOL/ELEV/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/

Microsoft Excel was used to analyze this data. Specifically, the modeled Lake Lanier (Buford) pool level was compared to the Proposed Action Water Control Zones using the "IF-THEN" function of Microsoft Excel. The logic used to compare the elevation to the zone values was as follows:

> IF the pool level is greater than the Zone 2 level, THEN the resulting zone is "1"
> ELSE IF the pool level is greater than the Zone 3 level, THEN the resulting zone is "2"
> ELSE IF the pool level is greater than the Zone 4 level, THEN the resulting zone is "3"
> ELSE the resulting zone is "4"

The number of "1" values was counted using the "COUNTIF" function of Microsoft Excel and compared to the total numbers of days in the modeled period. This analysis shows that the total number of days the simulated pool level was in the Revised Action Zone 1 (action zones contained in the Proposed Action Alternative) was 14,902, 17,180, and 14,168 for the No Action, Alternative 1B, and Proposed Action scenarios respectively. Dividing each of these numbers by the total number of days in the modeled period (26,661 days) shows that the percent of time Lake Lanier (Buford) is in the Revised Action Zone 1 (action zones contained in the Proposed Action Alternative) is 56%, 64%, and 53% for the No Action, Alternative 1B and Proposed Action scenarios respectively. These values are the same as those calculated by the Corps of Engineers and presented in Table 6.1-3 shown in Figure 2 above.

Secondly, since the No Action and Alternative 1B scenarios were operating under the Existing zones (action zones contained in the No Action and other Alternative 1 scenarios) the same analysis described above was performed for the No Action and Alternative 1B simulated pool levels compared to the Existing zones. The data attributes contained in the aforementioned file used for this analysis are as follows:

- Existing Action Zones (Zones contained in the No Action and other Alternative 1 scenarios):
  simulation.dss://BUFORD-ZONE 2/ELEV-ZONE/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/
  simulation.dss://BUFORD-ZONE 3/ELEV-ZONE/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/
  simulation.dss://BUFORD-ZONE 4/ELEV-ZONE/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/
- Modeled Lake Lanier (Buford) Pool Levels:
  simulation.dss://BUFORD-POOL/ELEV/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/
  simulation.dss://BUFORD-POOL/ELEV/01JAN1939 - 01JAN2011/1DAY/ALT1_OPTBX0/

The same methodology described above was used to calculate the total number of days the simulated pool level was in the Existing Action Zone 1 (Zones contained in the No Action and other Alternative 1 scenarios). The number of days the simulated pool level was in Existing Action Zone 1 was 16,026 and 18,095 for the No Action and Alternative 1B scenarios respectively. Dividing each of these numbers by the total number of days in the modeled period (26,661 days) shows that the percent of time Lake Lanier (Buford) is in the Existing Action Zone 1 is 60% and 68% for the No Action and Alternative 1B scenarios respectively.

Specifically, using the data from Table 6.1-3 shown in Figure 2 above, the Corps of Engineers predicts the Proposed Action Alternative will result in Lake Lanier (Buford) being below Zone 1 3% or 11% more often

when compared to the No Action Alternative and Alternative 1B scenarios respectively. These values are calculated by subtracting the percent of time Lake Lanier (Buford) is in Zone 1 under the Proposed Action Alternative (53%) from the No Action Alternative and Alternative 1B scenarios (56% and 64% respectively).

This impact is understated since, as described above, the Corps of Engineers compared the No Action Alternative and Alternative 1B simulated pool levels to the Revised Action zones instead of the Existing Action zones. Alternatively, using the results from the second analysis described above (comparing the No Action and Alternative 1B results to the Existing zones) the Proposed Action Alternative will result in Lake Lanier (Buford) being below Zone 1 7% or 15% more often when compared to the No Action Alternative and Alternative 1B scenarios respectively. These values are calculated by subtracting the percent of time Lake Lanier (Buford) is in Zone 1 under the Proposed Action Alternative (53%) from the No Action Alternative and Alternative 1B scenarios (60% and 68% respectively).

As described in the DEIS (see Figure 3 below), the Corps of Engineers states that operations for project purposes are reduced when the reservoir is below Zone 1. Since the pool level of a reservoir impacts the operations for project purposes, the Proposed Action Alternative will result in operations for which project purposes such as navigation and hydropower will be reduced.

> The storage projects are operated to maintain their lake level in the same zones concurrently. However, because of the hydrologic and physical characteristics of the river system and factors mentioned above, there might be periods when one reservoir is in a higher or lower zone than another. When that occurs, USACE makes an effort to bring the reservoirs back into balance with each other as soon as conditions allow. By doing so, effects on the river basin are shared equitably among the projects. The following definitions apply to the action zones:
>
> - Zone 1: Indicates that releases can be made in support of seasonal navigation (when the channel has been adequately maintained) and hydroelectric power releases. If all reservoirs are in Zone 1, USACE would operate the river system normally.
> - Zone 2: Indicates that water to support seasonal navigation might be limited. Hydroelectric power generation is supported at a reduced level. Minimum flows are met.
> - Zone 3: Indicates that water to support seasonal navigation might be significantly limited. Hydroelectric power generation is supported at a reduced level. Minimum flows are met.
> - Zone 4: Indicates that navigation is not supported. Hydroelectric power demands will be met at minimum levels and might occur only for concurrent uses. Minimum flows are met.

Figure 3 - Excerpt from page 4-11 of Volume 1 of the DEIS

EXHIBIT A-7

System Hydropower Comparison

In October of 2015 the Corps of Engineers prepared a draft environmental impact statement (DEIS) associated with the Update of the Water Control Manual for the Apalachicola – Chattahoochee – Flint River Basin. The Corps of Engineers provided a ResSim model and results for the No Action Alternative (Baseline), Alternative 1B, Alternative 7B, and Alternative 7H (Proposed Action). The results from the Corps of Engineers' HEC-ResSim modeling analyses are contained in the file provided by the Corps titled:

"/ACF_WCM_2014_09162014/rss/Water_Supply_Options_Extended_TS/simulation.dss".

HEC-DSSVue is a software package provided by the Corps of Engineers to view data sets and model results contained in the ResSim models and supporting input files. The HEC-DSSVue program was used to analyze the hydropower energy generation data contained in the aforementioned file. Specifically, the HEC-DSSVue program was used to average and extract the hydropower energy generation data for Lake Lanier (Buford), West Point Lake, Lake Eufaula (W.F. George) and Jim Woodruff for several of the Corps of Engineers' model simulations from the aforementioned file.

The data attributes contained in the aforementioned file associated with the hydropower energy generation data that was averaged and extracted for this analysis are as follows:

- No Action
  "//BUFORD-POWER PLANT/ENERGY/03Jan1939 - 31Dec2011/1DAY/NOACTIONAX0/"
  "//WEST POINT-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/NOACTIONAX0/"
  "//WALTER F GEORGE-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/NOACTIONAX0/"
  "//JIM WOODRUFF-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/NOACTIONAX0/"

- Alternative 1B
  "//BUFORD-POWER PLANT/ENERGY/03Jan1939 - 31Dec2011/1DAY/ALT1_OPTBX0/"
  "//WEST POINT-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/ALT1_OPTBX0/"
  "//WALTER F GEORGE-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/ALT1_OPTBX0/"
  "//JIM WOODRUFF-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/ALT1_OPTBX0/"

- Alternative 7B
  "//BUFORD-POWER PLANT/ENERGY/03Jan1939 - 31Dec2011/1DAY/ALT7_OPTBX0/"
  "//WEST POINT-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/ALT7_OPTBX0/"
  "//WALTER F GEORGE-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/ALT7_OPTBX0/"
  "//JIM WOODRUFF-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/ALT7_OPTBX0/"

- Alternative 7H (Proposed Action)
  "//BUFORD-POWER PLANT/ENERGY/03Jan1939 - 31Dec2011/1DAY/ALT7_OPTHX0/"
  "//WEST POINT-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/ALT7_OPTHX0/"
  "//WALTER F GEORGE-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/ALT7_OPTHX0/"
  "//JIM WOODRUFF-POWER PLANT/ENERGY/31Dec1939 - 31Dec2011/1DAY/ALT7_OPTHX0/"

The HEC-DSSVue Math Function was used to calculate annual cumulative energy generation associated with each of the aforementioned data sets. Figure 1 below shows a screenshot of the Math Functions settings used to develop the annual hydropower energy generation data.

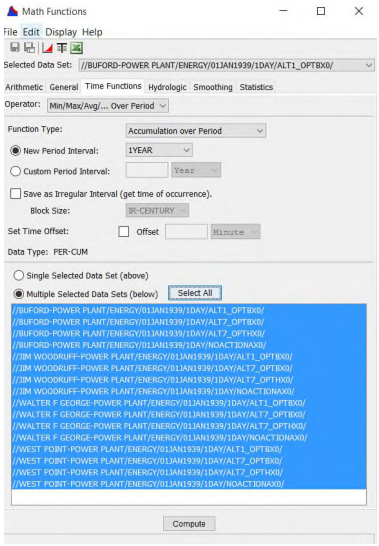


Figure 1 - Screenshot from HEC-DSSVue

The HEC-DSSVue program was then used to extract the annual energy value for the aforementioned data sets. Microsoft Excel was then used to analyze the extracted data. Specifically, for each of the alternatives listed above, Microsoft Excel was used to sum the annual energy generation for Lake Lanier (Buford), West Point Lake, Lake Eufaula (W.F. George) and Jim Woodruff for each year. The sum of these individual project's annual energy represents the System energy. Next the "AVERAGE" function of Microsoft Excel was used to average the 73 (1939 – 2011) annual system energy generation values for each of the alternatives listed above. The results (the average of the annual System energy) of this analysis are shown in Table 1 below. Also, a table showing the yearly annual System energy values is included as Appendix A.

Alternative	Average Annual System Hydropower Energy Generation (mwh)
No Action	1,026,237
Alternative 1B	1,049,255
Alternative 7B	1,048,454
Alternative 7H (Proposed Action)	1,016,308

Table 1 – Average Annual System Energy

On page ES-31 of Volume 1 of the DEIS, the Corps of Engineers states that the proposed action alternative (Alternative 7H) produce a "slight reduction" in energy and capacity benefit. Specifically, the Corps of Engineers compared the total energy and capacity benefit of the Alternative 7H (Proposed Action) to that of the No Action resulting in a difference of "about 0.5 percent".

As shown in this exhibit, the Corps of Engineers' conclusion of a "slight reduction" in hydropower does not adequately represent the impact associated with the Corps of Engineers' proposed action. This is due to two reasons. First, the Corps of Engineers would have calculated a greater impact if the proposed action were to be compared to a more appropriate baseline. Second, the impact of 0.5 percent was obtained by comparing long term average values which has the effect of concealing the impact of individual years that may be higher than 0.5 percent. These two issues are explained in more detail below.

Proposed Action Compared to Wrong Alternative

As shown in the following calculation, the average annual system energy generation for Alternative 7H (Proposed Action) is 0.97% lower than the No Action Alternative.

$$\frac{(1{,}016{,}308\ mwh - 1{,}026{,}237\ mwh)}{1{,}026{,}237\ mwh} = -0.97\%$$

To better understand the impact of the Proposed Action Alternative, the average annual system energy generation from Alternative 7H was compared to Alternative 1B. Alternative 1B represents the Corps of Engineers' depiction of its current operations with its Option B for water supply. Option B assumes only the relocation contract water supply at Lake Lanier (Buford) and 277 mgd of withdrawals from the River below Lake Lanier (Buford). As shown in the following calculation, Alternative 7H (Proposed Action) is 3.14% lower than Alternative 1B.

$$\frac{(1{,}016{,}308\ mwh - 1{,}049{,}255\ mwh)}{1{,}049{,}255\ mwh} = -3.14\%$$

In an attempt to isolate the impacts of the water supply scenarios being considered by the Corps of Engineers (water supply in excess of the Option B assumptions) the average annual system energy generation from Alternative 7H (Proposed Action) was compared to that of Alternative 7B. Alternative 7B represents the Water Management Alternative 7 operations with the Option B water supply assumptions. As shown in the following calculation, Alternative 7H (Proposed Action) is 3.07% lower than Alternative 7B.

$$\frac{(1{,}016{,}308\ mwh - 1{,}048{,}454\ mwh)}{1{,}048{,}454\ mwh} = -3.07\%$$

The calculations above show that if the Corps of Engineers would have compared the Proposed Action annual system hydropower generation to an Alternative with Option B water supply assumptions, the impact to system hydropower would have been over three times greater than the value presented by the Corps of Engineers.

Long Term Averaging versus Individual Years

As shown above the long term average annual system hydropower difference between the Proposed Action Alternative and the No Action Alternative is 0.97%. The system energy loss for individual years can be over five times greater than the long term average when comparing these two alternatives. For example in 1999 the annual system energy generation for the Proposed Action and No Action Alternatives was 638,096 mwh and 673,157 mwh respectively. As shown below, the difference between these two values is 5.21%.

$$\frac{(638{,}096\ mwh - 673{,}157\ mwh)}{673{,}157\ mwh} = -5.21\%$$

Comparing the Proposed Action Alternative to Alternative 1B reveals a maximum annual system hydropower impact of over 12%. Specifically, in 2000 the annual system energy generation for the Proposed Action Alternative and Alternative 1B was 509,389 mwh and 578,923 mwh respectively. As shown below, the difference between these two values is 12.01%.

$$\frac{(509{,}389\ mwh - 578{,}923\ mwh)}{578{,}923\ mwh} = -12.01\%$$

Lastly, comparing the Proposed Action Alternative to Alternative 7B reveals a maximum annual system hydropower impact of over 9%. Specifically, in 1987 the annual system energy generation for the Proposed Action Alternative and Alternative 7B was 795,729 mwh and 878,388 mwh respectively. As shown below, the difference between these two values is 9.41%.

$$\frac{(795{,}729 mwh - 878{,}388\ mwh)}{878{,}388\ mwh} = -9.41\%$$

APPENDIX A

Annual System Energy in MWh

Year	Alternative 1A (No Action)	Alternative 1B	Alternative 7B	Alternative 7H (Proposed Action)	(7H - No Action) / No Action	(7H - 1B) / 1B	(7H - 7B) / 7B
1939	1,118,803	1,133,276	1,126,082	1,112,572	-0.56%	-1.83%	-1.20%
1940	896,091	917,555	924,985	888,062	-0.90%	-3.21%	-3.99%
1941	665,941	687,747	671,445	643,382	-3.39%	-6.45%	-4.18%
1942	946,750	984,010	986,070	941,635	-0.54%	-4.31%	-4.51%
1943	1,117,445	1,138,110	1,143,076	1,109,697	-0.69%	-2.50%	-2.92%
1944	1,169,288	1,188,785	1,184,272	1,162,537	-0.58%	-2.21%	-1.84%
1945	1,028,739	1,054,539	1,053,806	1,007,457	-2.07%	-4.46%	-4.40%
1946	1,407,834	1,426,383	1,428,622	1,398,870	-0.64%	-1.93%	-2.08%
1947	1,139,682	1,160,079	1,156,419	1,129,905	-0.86%	-2.60%	-2.29%
1948	1,373,897	1,403,260	1,405,925	1,366,185	-0.56%	-2.64%	-2.83%
1949	1,501,867	1,525,236	1,525,232	1,491,721	-0.68%	-2.20%	-2.20%
1950	972,172	980,698	984,350	974,661	0.26%	-0.62%	-0.98%
1951	785,188	815,074	805,099	766,904	-2.33%	-5.91%	-4.74%
1952	1,030,512	1,056,068	1,046,669	1,011,868	-1.81%	-4.19%	-3.32%
1953	1,170,148	1,194,984	1,191,700	1,156,826	-1.14%	-3.19%	-2.93%
1954	804,861	820,411	807,557	784,272	-2.56%	-4.40%	-2.88%
1955	640,837	666,395	662,112	616,260	-3.84%	-7.52%	-6.93%
1956	718,932	740,090	748,635	721,724	0.39%	-2.48%	-3.59%
1957	944,071	972,706	971,332	935,316	-0.93%	-3.84%	-3.71%
1958	1,036,421	1,062,715	1,059,861	1,023,863	-1.21%	-3.66%	-3.40%
1959	1,026,996	1,041,004	1,046,330	1,021,095	-0.57%	-1.91%	-2.41%
1960	1,104,932	1,127,536	1,127,678	1,093,602	-1.03%	-3.01%	-3.02%
1961	1,174,487	1,210,092	1,222,057	1,175,793	0.11%	-2.83%	-3.79%
1962	1,141,175	1,153,503	1,153,235	1,140,742	-0.04%	-1.11%	-1.08%
1963	1,060,283	1,079,991	1,080,488	1,041,395	-1.78%	-3.57%	-3.62%
1964	1,476,445	1,507,625	1,507,872	1,469,408	-0.48%	-2.53%	-2.55%
1965	1,093,993	1,107,935	1,102,216	1,088,894	-0.47%	-1.72%	-1.21%
1966	1,160,983	1,177,049	1,181,646	1,144,751	-1.40%	-2.74%	-3.12%
1967	1,180,775	1,216,354	1,216,560	1,173,860	-0.59%	-3.49%	-3.51%
1968	1,003,145	1,019,185	1,013,506	996,951	-0.62%	-2.18%	-1.63%
1969	1,002,845	1,024,930	1,023,972	988,154	-1.46%	-3.59%	-3.50%
1970	926,400	948,703	959,351	937,737	1.22%	-1.16%	-2.25%
1971	1,216,979	1,248,834	1,247,275	1,188,969	-2.30%	-4.79%	-4.67%
1972	1,135,624	1,156,182	1,156,034	1,123,465	-1.07%	-2.83%	-2.82%
1973	1,466,110	1,489,312	1,489,289	1,461,234	-0.33%	-1.89%	-1.88%
1974	1,268,502	1,280,815	1,280,614	1,264,120	-0.35%	-1.30%	-1.29%
1975	1,373,280	1,406,179	1,406,330	1,360,011	-0.97%	-3.28%	-3.29%

Year	Alternative 1A (No Action)	Alternative 1B	Alternative 7B	Alternative 7H (Proposed Action)	(7H - No Action) / No Action	(7H - 1B) / 1B	(7H - 7B) / 7B
1976	1,295,867	1,309,640	1,308,455	1,286,801	-0.70%	-1.74%	-1.65%
1977	1,063,658	1,097,358	1,097,187	1,056,188	-0.70%	-3.75%	-3.74%
1978	1,007,291	1,021,830	1,009,240	987,501	-1.96%	-3.36%	-2.15%
1979	1,211,333	1,242,223	1,254,927	1,210,352	-0.08%	-2.57%	-3.55%
1980	1,150,623	1,171,741	1,159,677	1,135,189	-1.34%	-3.12%	-2.11%
1981	648,483	666,876	634,518	619,830	-4.42%	-7.05%	-2.31%
1982	983,307	1,005,734	1,040,612	1,000,496	1.75%	-0.52%	-3.86%
1983	1,214,671	1,247,930	1,249,651	1,199,978	-1.21%	-3.84%	-3.97%
1984	1,200,046	1,215,026	1,214,714	1,193,233	-0.57%	-1.79%	-1.77%
1985	790,635	808,965	814,905	795,599	0.63%	-1.65%	-2.37%
1986	602,565	615,828	584,575	587,802	-2.45%	-4.55%	0.55%
1987	834,011	870,650	878,388	795,729	-4.59%	-8.61%	-9.41%
1988	607,166	626,120	608,679	602,941	-0.70%	-3.70%	-0.94%
1989	998,627	1,038,643	1,071,386	1,002,767	0.41%	-3.45%	-6.40%
1990	1,109,803	1,125,753	1,121,981	1,088,418	-1.93%	-3.32%	-2.99%
1991	1,119,211	1,149,268	1,154,679	1,123,878	0.42%	-2.21%	-2.67%
1992	1,188,976	1,214,188	1,206,462	1,167,680	-1.79%	-3.83%	-3.21%
1993	1,102,979	1,116,028	1,111,924	1,098,530	-0.40%	-1.57%	-1.20%
1994	1,178,722	1,211,723	1,216,451	1,164,953	-1.17%	-3.86%	-4.23%
1995	1,090,354	1,111,585	1,109,891	1,078,522	-1.09%	-2.97%	-2.83%
1996	1,152,867	1,168,574	1,164,617	1,138,643	-1.23%	-2.56%	-2.23%
1997	1,155,215	1,174,859	1,180,496	1,151,863	-0.29%	-1.96%	-2.43%
1998	1,207,714	1,229,541	1,221,787	1,194,013	-1.13%	-2.89%	-2.27%
1999	673,157	690,248	680,232	638,096	-5.21%	-7.56%	-6.19%
2000	532,942	578,923	549,793	509,389	-4.42%	-12.01%	-7.35%
2001	721,448	726,549	739,789	716,904	-0.63%	-1.33%	-3.09%
2002	592,735	619,921	621,074	594,594	0.31%	-4.09%	-4.26%
2003	1,265,913	1,302,625	1,328,485	1,272,026	0.48%	-2.35%	-4.25%
2004	982,488	1,007,380	1,006,811	972,096	-1.06%	-3.50%	-3.45%
2005	1,236,259	1,259,180	1,259,253	1,229,698	-0.53%	-2.34%	-2.35%
2006	777,764	789,480	771,395	757,136	-2.65%	-4.10%	-1.85%
2007	534,225	561,648	586,041	551,049	3.15%	-1.89%	-5.97%
2008	593,962	616,063	581,828	600,023	1.02%	-2.60%	3.13%
2009	1,140,947	1,177,203	1,193,171	1,094,061	-4.11%	-7.06%	-8.31%
2010	1,021,194	1,037,225	1,032,862	1,005,907	-1.50%	-3.02%	-2.61%
2011	645,721	665,742	673,527	654,740	1.40%	-1.65%	-2.79%
Average	**1,026,237**	**1,049,255**	**1,048,454**	**1,016,308**	**-0.97%**	**-3.14%**	**-3.07%**

EXHIBIT A-8

Lake Eufaula (W.F. George) Zone NAA vs PAA

In October of 2015 the Corps of Engineers prepared a draft environmental impact statement (DEIS) associated with the Update of the Water Control Manual for the Apalachicola – Chattahoochee – Flint River Basin. The DEIS contains proposed water control zones to be implemented by Corps of Engineers relating to the operations of Lake Eufaula (W.F. George). The proposed water control action zones for Lake Eufaula (W.F. George) are shown in Figure 1 below.

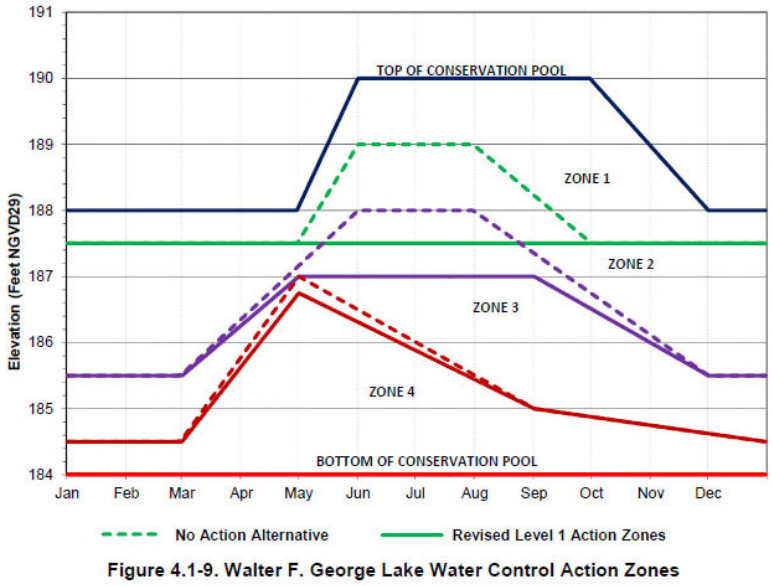


Figure 4.1-9. Walter F. George Lake Water Control Action Zones

Figure 1 - Water Control Zones from Figure 4.1-9 found on page 4-16 of Volume 1 of the DEIS

The Corps of Engineers provided a ResSim model and results for the No Action Alternative and the Proposed Action Alternative. The data and results from the Corps of Engineers' HEC-ResSim modeling analyses are contained in the file provided by the Corps titled:

"/ACF_WCM_2014_09162014/rss/Water_Supply_Options_Extended_TS/simulation.dss".

HEC-DSSVue is a software package provided by the Corps of Engineers to view data sets and model results contained in the ResSim models and supporting input files. The HEC-DSSVue program was used to analyze the Lake Eufaula (W.F. George) action zones contained in the aforementioned file. Specifically, the HEC-DSSVue program was used to extract the data associated with the storage (in acre-feet) for the water control action zones from the aforementioned files.

The data attributes contained in the aforementioned files associated with the data are as follows:

- No Action Alternative Zones:
  simulation.dss://WALTER F GEORGE-CONSERVATION/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/
  simulation.dss://WALTER F GEORGE-ZONE 2/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/
  simulation.dss://WALTER F GEORGE-ZONE 3/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/
  simulation.dss://WALTER F GEORGE-ZONE 4/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/
  simulation.dss://WALTER F GEORGE-INACTIVE/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/

- Proposed Action Alternative Zones:
  simulation.dss://WALTER F GEORGE-CONSERVATION/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/
  simulation.dss://WALTER F GEORGE-ZONE 2/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/
  simulation.dss://WALTER F GEORGE-ZONE 3/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/
  simulation.dss://WALTER F GEORGE-ZONE 4/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/
  simulation.dss://WALTER F GEORGE-INACTIVE/STOR-ZONE/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/

The proposed water control action zones associated with the No Action Alternative and Proposed Action Alternative (Alternative 7, Option H) for Lake Eufaula (W.F. George) were analyzed to determine the percentage of the total conservation storage at Lake Eufaula (W.F. George) that was contained in each zone. The resulting percentage was plotted for every day of the calendar year and is shown in Figure 2 below.

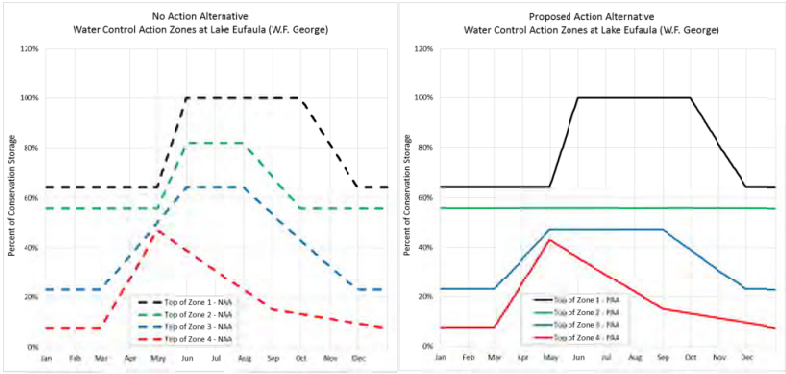


Figure 2 - Graphs showing percentage of Conservation Storage for No Action and Proposed Action Water Control Action Zones

The x-axis is time, ranging from January 1 through December 31. The y-axis is the percentage of the conservation storage that is contained in each zone. The graph on the left of Figure 2 shows the percentage of conservation storage associated with each of the action zones from the No Action Alternative (NAA). The graph on the right of Figure 2 shows the percentage of conservation storage associated with each of the action zones from the Proposed Action Alternative (PAA). The black line represents the percentage of the conservation that is contained in Zone 1 for every day of the calendar year. The green line represents the percentage of the conservation that is contained in Zone 2 for every day of the calendar year. The blue line represents the percentage of the conservation that is contained in Zone 3 for every day of the calendar year. The red line represents the percentage of the conservation that is contained in Zone 4 for every day of the calendar year. For example, on January 1st the storage contained in Zone 2 for both the NAA and PAA represents 56% of the conservation storage for that day.

Figures 1 and 2 show that the Corps of Engineers is proposing to alter the shapes of the water control action zones at Lake Eufaula (W.F. George). In fact, the maximum level of the top of zone 2 for the NAA and PAA is 82% and 56% respectively. The alterations to the top of zone 2 curve for the PAA, proposed by the Corps of Engineers, would have the effect of increasing the amount of storage that is contained in zone 1.

It should be noted that the proposed change to the Lake Eufaula (W.F. George) action zones is inconsistent with the types of changes made to the zones at Lake Lanier (Buford) (see Exhibit A-4). Given that operations for project purposes are a function of the action zone (see exerpt from DEIS in figure 3 below), the Corps of Engineers' proposal to raise the top of zone 4 at Lake Lanier (Buford) and lower the top of zone 4 at Lake Eufaula (W.F. George) would appear to have a detrimental effect on the lake levels at Lake Eufaula (W.F. George) since this proposal would increase the zone levels and in turn the releases made for project purposes.

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

- Zone 1: Indicates that releases can be made in support of seasonal navigation (when the channel has been adequately maintained) and hydroelectric power releases. If all reservoirs are in Zone 1, USACE would operate the river system normally.
- Zone 2: Indicates that water to support seasonal navigation might be limited. Hydroelectric power generation is supported at a reduced level. Minimum flows are met.
- Zone 3: Indicates that water to support seasonal navigation might be significantly limited. Hydroelectric power generation is supported at a reduced level. Minimum flows are met.
- Zone 4: Indicates that navigation is not supported. Hydroelectric power demands will be met at minimum levels and might occur only for concurrent uses. Minimum flows are met.

Figure 3 - Excerpt from page 4-11 of Volume 1 of the DEIS

Furthermore, in lines 3 and 4 of page 2-65 of Volume 1 of the DEIS, the Corps of Engineers states: "The amount of generation per day is governed by a preset guide curve and action zones for each reservoir, with diminishing energy generation with declining storage."

The specific calculation used to create the four lines shown on each graph in Figure 2 is shown below:

$$\textit{Percentage of Conservation Storage (\%)} = \textit{Top of Zone Usable Storage } (acre-feet) \Big/ \textit{Conservation Storage } (acre-feet)$$

Where:

$$\textit{Conservation Storage } (acre-feet) = 244{,}400\ acre-feet\ (\textit{See Table ES} - 1\ \textit{shown in Figure 4 below})$$

$$\textit{Top of Zone Usable Storage } (acre-feet) = \textit{Top of Zone Storage} (acre-feet) - \textit{Operating Inactive Storage } (acre-feet)$$

For example, the calculation for the December 31st Top of Zone 4 percent of conservation storage for the NAA is shown below:

$$\textit{Conservation Storage } (acre-feet) = 244{,}400\ acre-feet$$

$$\textit{Top of Zone 4 Usable Storage } (acre-feet) = 708{,}550\ (acre-feet) - 690{,}000\ (acre-feet) = 18{,}550\ acre-feet$$

$$\textit{Percentage of Conservation (Zone 4)} = 18{,}550\ acre-feet \Big/ 244{,}400\ acre-feet = 8\%$$

Likewise, the calculation for the December 31st Top of Zone 4 percent of conservation storage for the PAA is shown below:

$$\textit{Conservation Storage } (acre-feet) = 244{,}400\ acre-feet$$

$$\textit{Top of Zone 4 Usable Storage } (acre-feet) = 708{,}550\ (acre-feet) - 690{,}000\ (acre-feet) = 18{,}550\ acre-feet$$

$$\textit{Percentage of Conservation (Zone 4)} = 18{,}550\ acre-feet \Big/ 244{,}400\ acre-feet = 8\%$$

Table ES-1.
Reservoirs on Mainstem ACF Basin Rivers

Basin/river/project name	Owner/state/ year initially completed	Drainage area (sq mi)	Reservoir size (ac)	Total storage (ac-ft)[a]	Conservation storage (summer elev) (ac-ft)	Power capacity (kW)	Normal (summer) lake elev (ft)	Authorized purposes for USACE-owned projects[b]
Chattahoochee River		*8,708*						
Buford Dam/Lake Sidney Lanier	USACE/GA/1957	1,034	38,542	2,554,000	1,087,600	127,000	1,071	FRM, HP, NAV, FW, REC, WQ, WS[c]
Morgan Falls Dam/Bull Sluice Lake	GPC/GA/1903	1,360	580	2,450	0	16,800	866	
West Point Dam and Lake	USACE/GA/1975	3,440	25,864	774,798	306,131	87,000	635	FRM, HP, NAV, FW, REC, WQ
Langdale Dam and Lake	GPC/GA/1860	3,640	152	NA[d]	0	1,040	547.7	
Riverview Dam and Lake	GPC/GA/1902	3,661	75	NA[d]	0	480	530.5	
Bartletts Ferry Dam/Lake Harding	GPC/GA/1926	4,240	5,850	181,000	0	173,000	521	
Goat Rock Dam and Lake	GPC/GA/1912	4,510	1,050	11,000	0	38,600	404	
Oliver Dam/Lake Oliver	GPC/GA/1959	4,630	2,150	32,000	0	60,000	337	
North Highlands Dam and Lake	GPC/GA/1900	4,630	131	1,500	0	29,600	269	
Walter F. George Lock, Dam, and Lake	USACE/GA/1963	7,460	45,181	934,400	244,400	168,000	190	HP, NAV, FW, REC, WQ
George W. Andrews Lock, Dam, and Lake	USACE/GA/1963	8,210	1,540	18,180	0	None	102	NAV, FW, REC, WQ
Flint River		*8,456*						
Warwick Dam/Lake Blackshear	Crisp Co./ GA/1930	3,770	8,700	144,000	0	15,200	237	
Flint River Dam/Lake Worth	GPC/GA/1920	5,290	1,400	NA[d]	0	5,400	182.3	
Apalachicola River		*2,409*	*(Total ACF Basin – 19,573 sq mi)*					
Jim Woodruff Lock and Dam/ Lake Seminole	USACE/FL/1954	17,164	37,500	367,318	0	43,350	77	HP, NAV, FW, REC, WQ

Notes:
a. Measured at top of storage for flood risk management.
b. As used in this table, the term *authorized purposes* includes purposes expressly identified in the project authorizing documents; incidental benefits recognized in projection authorizations; and objectives that result from other authorities, such as general authorities contained in congressional legislation, for which USACE operates each listed project as of 2009. FRM = flood risk management; HP = hydroelectric power generation; NAV = navigation; FW = fish and wildlife conservation; REC = recreation; WQ = water quality; WS = municipal & industrial water supply.
c. USACE operates the Buford Dam/Lake Sidney Lanier project in a manner that accommodates water supply withdrawals from Lake Lanier and from the Chattahoochee River downstream of Buford Dam.
d. NA = not available.

Figure 4 - Table showing Conservation Storage

EXHIBIT A-9

Compare Lake Lanier and Lake Eufaula Recreation Impacts

In October of 2015 the Corps of Engineers prepared a draft environmental impact statement (DEIS) associated with the Update of the Water Control Manual for the Apalachicola – Chattahoochee – Flint River Basin. The Corps of Engineers performed and presented analyses showing the impact of the different alternatives described in the DEIS. Specifically, the Corps of Engineers analyzed how many years specific reservoirs would drop below designated recreational impact levels. The results of these analyses for Lake Lanier (Buford) and Lake Eufaula (W.F. George) are shown in Figures 1 and 2 below.

Table 6.1-2.
Number of Years the Lake Lanier Pool Would Drop below Designated Impact Levels over Modeled Period of Record (1939–2011) for NAA and Alternatives 1B, 1C, 7A, 7C, 7D, 7E, 7F, and 7H (PAA)

Alternative	Time interval analyzed for each year	Initial impact level (elev. 1066 ft)	Recreation impact level (elev. 1063 ft)	Water access limited level (elev. 1060 ft)
NAA	Jan–Dec (12 months)	54	23	17
	Peak Recreation May–Sep (5 months)	32	14	6
Alt1B	Jan–Dec (12 months)	49	19	14
	Peak Recreation May–Sep (5 months)	26	9	1
Alt1C	Jan–Dec (12 months)	53	21	16
	Peak Recreation May–Sep (5 months)	29	12	6
Alt7A	Jan–Dec (12 months)	50	23	11
	Peak Recreation May–Sep (5 months)	29	13	4
Alt7C	Jan–Dec (12 months)	48	22	10
	Peak Recreation May–Sep (5 months)	28	12	4
Alt7D	Jan–Dec (12 months)	58	29	16
	Peak Recreation May–Sep (5 months)	36	17	6
Alt7E	Jan–Dec (12 months)	59	29	15
	Peak Recreation May–Sep (5 months)	36	17	6
Alt7F	Jan–Dec (12 months)	69	46	21
	Peak Recreation May–Sep (5 months)	47	26	15
PAA (Alt7H)	Jan–Dec (12 months)	60	29	15
	Peak Recreation May–Sep (5 months)	36	17	6

Figure 1 - Table 6.1-2 from page 6-11 of Volume 1 of the DEIS

Table 6.1-5.
Number of Years Walter F. George Lake Water Surface Elevation Would Drop below Impact Thresholds for Recreation Use during 73-year Modeled Period of Record (1939–2011)

Alternative	Time interval analyzed for each year	Initial impact level (elev. 187 ft)	Recreation impact level (elev. 185 ft)	Water access limited level (elev. 184 ft)
NAA	Jan–Dec (12 months)	5	1	0
	Peak Recreation Jun–Aug (3 months)	3	0	0
Alt1B	Jan–Dec (12 months)	7	2	0
	Peak Recreation Jun–Aug (3 months)	4	0	0
Alt1C	Jan–Dec (12 months)	5	1	0
	Peak Recreation Jun–Aug (3 months)	3	0	0
Alt7A	Jan–Dec (12 months)	19	2	0
	Peak Recreation Jun–Aug (3 months)	6	1	0
Alt7C	Jan–Dec (12 months)	18	2	0
	Peak Recreation Jun–Aug (3 months)	7	0	0
Alt7D	Jan–Dec (12 months)	20	2	0
	Peak Recreation Jun–Aug (3 months)	6	0	0
Alt7E	Jan–Dec (12 months)	20	2	0
	Peak Recreation Jun–Aug (3 months)	6	0	0
Alt7F	Jan–Dec (12 months)	17	2	0
	Peak Recreation Jun–Aug (3 months)	4	0	0
PAA	Jan–Dec (12 months)	20	2	0
	Peak Recreation Jun–Aug (3 months)	6	0	0

Figure 2 - Table 6.1-5 from page 6-28 of Volume 1 of the DEIS

Figure 1 shows that recreation impact (Initial impact level) at Lake Lanier (Buford) will increase from 54 years to 60 years according to the No Action and Proposed Action Alternative respectively. This is an approximate 11% increase ([60 – 54 years] / 54 years) at Lake Lanier (Buford).

Figure 2 shows that recreation impact (Initial impact level) at Lake Eufaula (W.F. George) will increase from 5 years to 20 years according to the No Action and Proposed Action Alternative respectively. This is an approximate 300% increase ([20 – 5 years] / 5 years) at Lake Eufaula (W.F. George). Furthermore, the Corps of Engineers proposes to place Lake Eufaula (W.F. George) below the initial impact level in approximately one (1) out of every four (4) years (20 / 73 = 27%).

EXHIBIT A-10

Columbus Weekly Flow NAA vs PAA

The Corps of Engineers provided a ResSim model and results for the No Action Alternative (Baseline) and Proposed Action Alternative (Alternative 7H). The results from the Corps of Engineers' HEC-ResSim modeling analyses are contained in the file provided by the Corps titled:

"/ACF_WCM_2014_09162014/rss/Water_Supply_Options_Extended_TS/simulation.dss".

HEC-DSSVue is a software package provided by the Corps of Engineers to view data sets and model results contained in the ResSim models and supporting input files. The HEC-DSSVue program was used to analyze the Columbus, Georgia flow data contained in the aforementioned files. Specifically, the HEC-DSSVue program was used to average and then extract the data from the aforementioned files.

The data attributes contained in the aforementioned files associated with the data are as follows:

- No Action
  "simulation.dss://COLUMBUS/FLOW/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/"
- Proposed Action:
  "simulation.dss://COLUMBUS/FLOW/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/"

The Math Function module of the HEC-DSSVue program was used to calculate the weekly average flow for the no action and proposed action data sets. Figure 1 shows a screenshot from the HEC-DSSVue program containing the function used to produce the weekly average flow. The weekly average flow is obtained by summing each of the individual daily flow amounts for a given week and then dividing that sum by seven. The weekly average flow for a given week is a rear looking average, meaning that the weekly average flow amount calculated by HEC-DSSVue shown for a given day (i.e. 07Jan1939) is the sum of the daily flows for the given day and the six preceding days (i.e. 01Jan1939 – 07Jan1939) divided by seven.

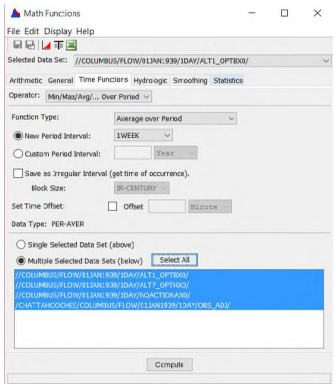


Figure 1 - Screenshot from the HEC-DSSVue Program: Average over Period Math Function

Microsoft Excel was then used to graph the extracted data. The graph shown in Figure 2 below is a plot of two different flow sets at Columbus, Georgia. The x-axis is time, ranging from July 4, 2009 to September 19, 2009, and the y-axis is the flow at Columbus, Georgia in cubic feet per second (cfs). The two different flow sets plotted on Figure 2 are:

- The simulated flow at Columbus, Georgia for the No Action (Baseline) model prepared by the Corps. This flow set was provided by the Corps and is represented by the blue line with the title "No Action".
- The simulated flow at Columbus, Georgia for the Proposed Action (Alternative 7H) model prepared by the Corps. This flow set was provided by the Corps and is represented by the red line with the title "Alt 7 Option H".

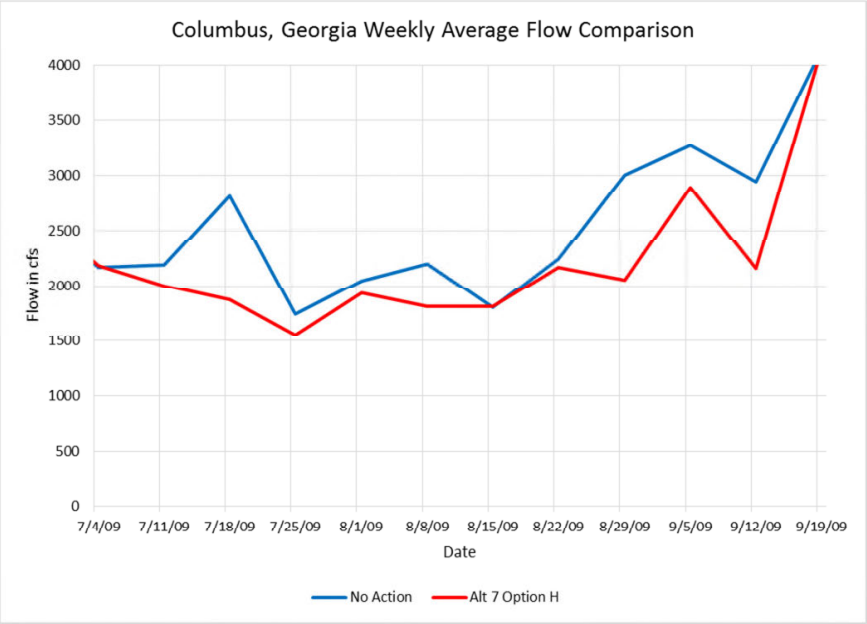


Figure 2 - Plot of Columbus, Georgia Flows

The above graph shows that during the plotted time period, the results from the Proposed Action (Alternative 7H) are lower than the results from the No Action (Baseline) for eleven out of the twelve weeks plotted. In fact, the Corps of Engineers is proposing to decrease the flows at Columbus, Georgia (comparing the Proposed Action to the No Action) by as much as 33% during the week of July 18, 2009.

This is calculated by subtracting the Proposed Action flow (1,877 cfs) from the No Action flow (2,815 cfs) and dividing the difference (938 cfs) by the No Action flow (2,815 cfs).

In addition to the above analysis, for the aforementioned data sets, the "COUNTIF" function of Microsoft Excel was used to count the number of weeks that contained a flow value below 1,850 cfs. Out of a total of 3,809 weeks for the January 1, 1939 through December 31, 2011 period there were 41 weeks of weekly average flow below 1,850 cfs for the No Action model results. During the same time period there were 66 weekly of weekly average flow below 1,850 cfs for the Proposed Action scenario. Comparing these numbers shows that it is the Corps of Engineers' intention to increase the instances of weekly average flows below 1,850 cfs at Columbus, Georgia by over 60%. This is calculated by subtracting the Proposed Action value (66 weeks) from the No Action flow (41 weeks) and dividing the difference (25 weeks) by the No Action value (41 weeks).

EXHIBIT A-11

Columbia Flow NAA vs PAA for 2000 cfs

The Corps of Engineers provided a ResSim model and results for the No Action Alternative (Baseline) and Proposed Action Alternative (Alternative 7H). The results from the Corps of Engineers' HEC-ResSim modeling analyses are contained in the file provided by the Corps titled:

"/ACF_WCM_2014_09162014/rss/Water_Supply_Options_Extended_TS/simulation.dss".

HEC-DSSVue is a software package provided by the Corps of Engineers to view data sets and model results contained in the ResSim models and supporting input files. The HEC-DSSVue program was used to analyze the Columbia, Alabama (George Andrews discharge) flow data contained in the aforementioned file. Specifically, the HEC-DSSVue program was used to extract the data from the aforementioned file.

The data attributes contained in the aforementioned files associated with the data are as follows:

- No Action
  "simulation.dss://GEORGE ANDREWS_OUT/FLOW/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/"
- Proposed Action:
  "simulation.dss://GEORGE ANDREWS_OUT/FLOW/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/"

Microsoft Excel was then used to analyze and graph the extracted data. Specifically, the "PERCENTILE" function contained in Microsoft Excel software was used to calculate the flow value associated with a percent of time (ranging from 0% to 100%) that flow would be equaled or exceeded. The graph shown in Figure 1 below is a plot of two different exceedance flow sets at Columbia, Alabama (George Andrews discharge). The x-axis is percent of time the given flow would be equaled or exceeded and the y-axis is the flow at Columbia, Alabama (George Andrews discharge) in cubic feet per second (cfs). In an effort to illustrate the exceedance percentiles at that lower flow values, the x-axis was adjusted to only show the values between 85% and 100%. The two different flow sets plotted on Figure 2 are:

- The simulated flow at Columbia, Alabama (George Andrews discharge) for the No Action (Baseline) model prepared by the Corps. This flow set was provided by the Corps and is represented by the blue line with the title "No Action".
- The simulated flow at Columbia, Alabama (George Andrews discharge) for the Proposed Action (Alternative 7H) model prepared by the Corps. This flow set was provided by the Corps and is represented by the blue line with the title "Alt 7 Option H".

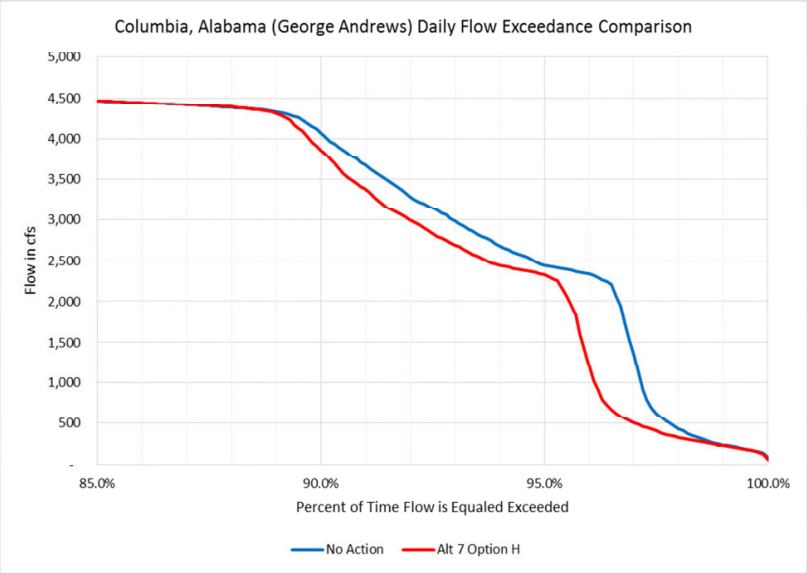


Figure 1 - Flow Exceedance Graph for Columbia, Alabama (George Andrews)

The way to interpret the graph shown in Figure 1 is to determine the flow value and exceedance percentile value associated with any point on one of the curves. For example, the No Action model results shows that a flow of approximately 4,000 cfs is equaled or exceeded approximately 90% of the time.

Figure 1 shows that the Corps of Engineers proposes to decrease the percent of time that certain lower flows are exceeded. In fact, reviewing Figure 1 shows that 2,000 cfs will be exceeded 95.5% according the Proposed Action results, compared to 96.6% of the time according to the No Action results.

Microsoft Excel was then used to further analyze the extracted data. Specifically, for the aforementioned data sets, the "COUNTIF" function of Microsoft Excel was used to count the number of days that contained a flow value below 2,000 cfs. Out of a total of 26,661 days for the January 3, 1939 through December 31, 2011 period there were 891 days of flow below 2,000 cfs for the No Action model results. During the same time period there were 1,186 days of flow below 2,000 cfs for the Proposed Action scenario. Comparing these numbers shows that it is the Corps of Engineers' intention to increase the instances of daily flow below 2,000 cfs at Columbia, Alabama (George Andrews discharge). Specifically, the instances of daily flow below 2,000 cfs would increase by approximately 33% [(1,186 – 891) / 891 = 33.1%].

EXHIBIT A-12

Drought Operations

Exhibit A-12 **Drought Operations** **Page 1 of 1**

In October of 2015 the Corps of Engineers prepared a draft environmental impact statement (DEIS) associated with the update of the Water Control Manual for the Apalachicola – Chattahoochee – Flint River Basin. The Corps of Engineers performed ResSim model analyses for the No Action Alternative (Baseline), Alternative 1B, and Alternative 7H (Proposed Action). The effects of the different alternatives on drought operations were assessed by the Corps of Engineers. The Corps of Engineers presented a tabulation of results from this assessment in Table 6.1-11 on page 6-77 of Volume 1 of the DEIS. This table is shown in Figure 1 below:

Table 6.1-11.
Number of Years Drought Operations and EDO Are Triggered and Percent of Time in Composite Zones 3 and 4, Drought Operations, and EDO in the ACF Basin over the Modeled Period of Record (1939–2011)

Alternative	Drought operations triggered	Percent of simulated period in drought operations [a]	Percent of time in composite Zone 3[a]	Percent of time in composite Zone 4[a]	Extreme drought operations (EDO) triggered	Percent of simulated period in EDO [a]
NAA	3	6.7	11.3	0.9	0	0.0
Alt1B	1	1.3	9.6	0.1	0	0.0
Alt1C	3	6.3	10.8	0.5	0	0.0
Alt7A	21	16.3	5.7	3.3	1	0.1
Alt7C	21	15.5	5.9	2.4	0	0.0
Alt7D	21	17.6	7.0	3.6	1	0.2
Alt7E	22	18.1	6.9	3.6	1	0.2
Alt7F	17	25.1	10.8	7.4	1	0.2
PAA	22	18.1	6.9	3.6	1	0.2

Note:
[a] 1% of modeled period of record (73 years) = 267 days; 0.1% = 27 days.

Figure 1 - Table 6.1-11 from Page 6-77 of Volume 1 of the ACF DEIS

This table shows that the Corps of Engineers Proposed Action Alternative (also known as PAA and Alternative 7H) would trigger drought operations 633% more times than triggered by the No Action Alternative. The calculation for this analysis is shown below:

$$\frac{3-22}{3} = -6.33 = -633\%$$

This table also shows that the Corps of Engineers Proposed Action Alternative (also known as PAA and Alternative 7H) would trigger drought operations 2100% more times than triggered by Alternative 1B. The calculation for this analysis is shown below:

$$\frac{1-22}{1} = -21.00 = -2100\%$$

EXHIBIT A-13

Columbia Flow NAA vs Observed

The Corps of Engineers provided a ResSim model and results for the No Action Alternative (Baseline). The results from the Corps of Engineers' HEC-ResSim modeling analyses are contained in the file provided by the Corps titled:

"/ACF_WCM_2014_09162014/rss/Water_Supply_Options_Extended_TS/simulation.dss".

The Corps of Engineers also provided historical observed data in the files titled:

"/ACF_WCM_2014_09162014/shared/ACFHEC_11_30May2014.dss."

HEC-DSSVue is a software package provided by the Corps of Engineers to view data sets and model results contained in the ResSim models and supporting input files. The HEC-DSSVue program was used to analyze the Columbia, Alabama (George Andrews discharge) flow data contained in the aforementioned files. Specifically, the HEC-DSSVue program was used to average and then extract the data from the aforementioned files.

The data attributes contained in the aforementioned files associated with the data are as follows:

- Observed:
  "ACFHEC_11_30May2014.dss:/CHATTAHOOCHEE/GEORGE ANDREWS/DISCHARGE/01JAN1939 - 01JAN2012/1DAY/COE_ADJ/"
- No Action
  "simulation.dss://GEORGE ANDREWS_OUT/FLOW/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/"

The Math Function module of the HEC-DSSVue program was used to calculate the monthly average flow for the observed and no action data sets. Figure 1 shows a screenshot from the HEC-DSSVue program containing the function used to produce the monthly average flow. The monthly average flow is obtained by summing each of the individual daily flow amounts for a given month and then dividing that sum by the total number of days in the given month.

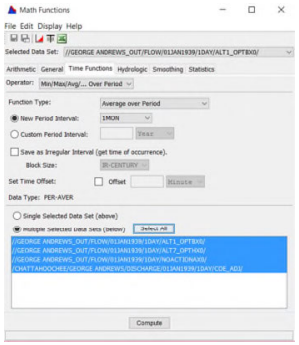


Figure 1 - Screenshot from the HEC-DSSVue Program: Average over Period Math Function

Microsoft Excel was then used to graph the extracted data. The graph shown in Figure 2 below is a plot of two different flow sets at Columbia, Alabama (George Andrews discharge). The x-axis is time, ranging from May 2007 to December 2007, and the y-axis is the flow at Columbia, Alabama (George Andrews discharge) in cubic feet per second (cfs). The two different flow sets plotted on Figure 2 are:

- The actual flow observed at Columbia, Alabama (George Andrews discharge). The observed flow is represented by the grey line with the title "Observed".
- The simulated flow at Columbia, Alabama (George Andrews discharge) for the No Action (Baseline) model prepared by the Corps. This flow set was provided by the Corps and is represented by the blue line with the title "No Action".

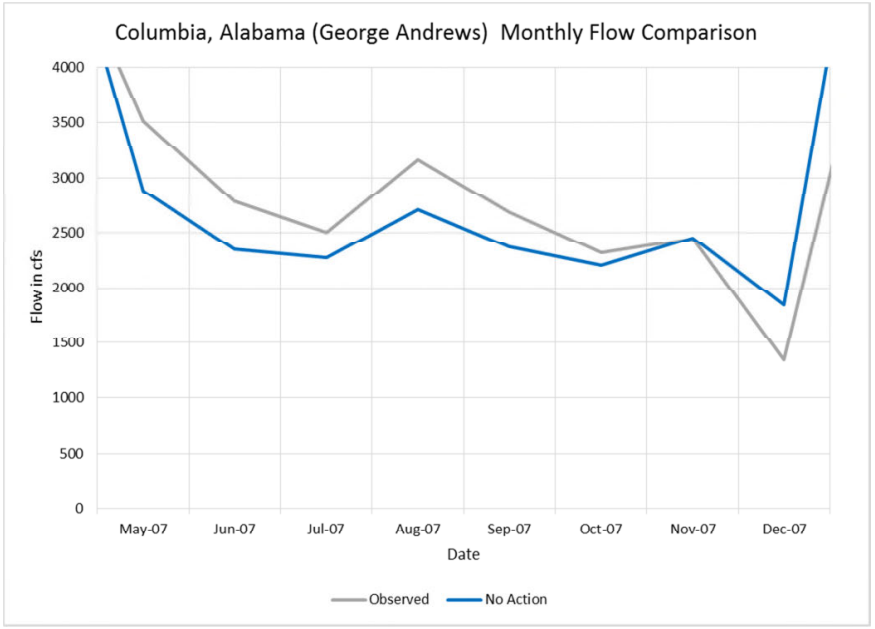


Figure 2 - Plot of Columbia, Alabama (George Andrews discharge) Flows

The above graph shows that during the May through December 2007 time period, the results from the No Action (Baseline) Alternative do not reflect actual flows at Columbia, Alabama (George Andrews discharge). In the majority of these months the flows simulated by the Corps of Engineers for the No Action (Baseline) Alternative (blue line) are lower than the actual observed flows (grey line). In fact, the

average of the May through October 2007 monthly average flows for the Observed data (grey line) and No Action data (blue line) are 2,826 cfs and 2,463 cfs respectively. The difference between these two values is 363 cfs or 13% (363 cfs / 2,826 cfs).

EXHIBIT A-14

Columbus Flow NAA vs Observed

The Corps of Engineers provided a ResSim model and results for the No Action Alternative (Baseline). The results from the Corps of Engineers' HEC-ResSim modeling analyses are contained in the file provided by the Corps titled:

"/ACF_WCM_2014_09162014/rss/Water_Supply_Options_Extended_TS/simulation.dss".

The Corps of Engineers also provided historical observed data in the files titled:

"/ACF_WCM_2014_09162014/shared/ACFHEC_11_30May2014.dss."

HEC-DSSVue is a software package provided by the Corps of Engineers to view data sets and model results contained in the ResSim models and supporting input files. The HEC-DSSVue program was used to analyze the Columbus, Georgia flow data contained in the aforementioned files. Specifically, the HEC-DSSVue program was used to average and then extract the data from the aforementioned files.

The data attributes contained in the aforementioned files associated with the data are as follows:

- Observed:
  "ACFHEC_11_30May2014.dss:/CHATTAHOOCHEE/COLUMBUS/FLOW/01JAN1939 - 01JAN2012/1DAY/OBS_ADJ/"
- No Action
  "simulation.dss://COLUMBUS/FLOW/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/"

The Math Function module of the HEC-DSSVue program was used to calculate the monthly average flow for the observed and no action data sets. Figure 1 shows a screenshot from the HEC-DSSVue program containing the function used to produce the monthly average flow. The monthly average flow is obtained by summing each of the individual daily flow amounts for a given month and then dividing that sum by the total number of days in the given month.

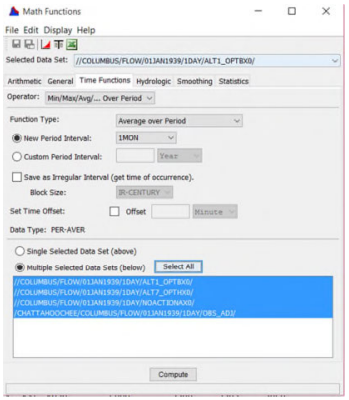


Figure 1 - Screenshot from the HEC-DSSVue Program: Average over Period Math Function

Microsoft Excel was then used to graph the extracted data. The graph shown in Figure 2 below is a plot of two different flow sets at Columbus, Georgia. The x-axis is time, ranging from May 2007 to December 2007, and the y-axis is the flow at Columbus, Georgia in cubic feet per second (cfs). The two different flow sets plotted on Figure 2 are:

- The actual flow observed at the Columbus, Georgia USGS gaging station. The observed flow is represented by the grey line with the title "Observed".
- The simulated flow at Columbus, Georgia for the No Action (Baseline) model prepared by the Corps. This flow set was provided by the Corps and is represented by the blue line with the title "No Action".

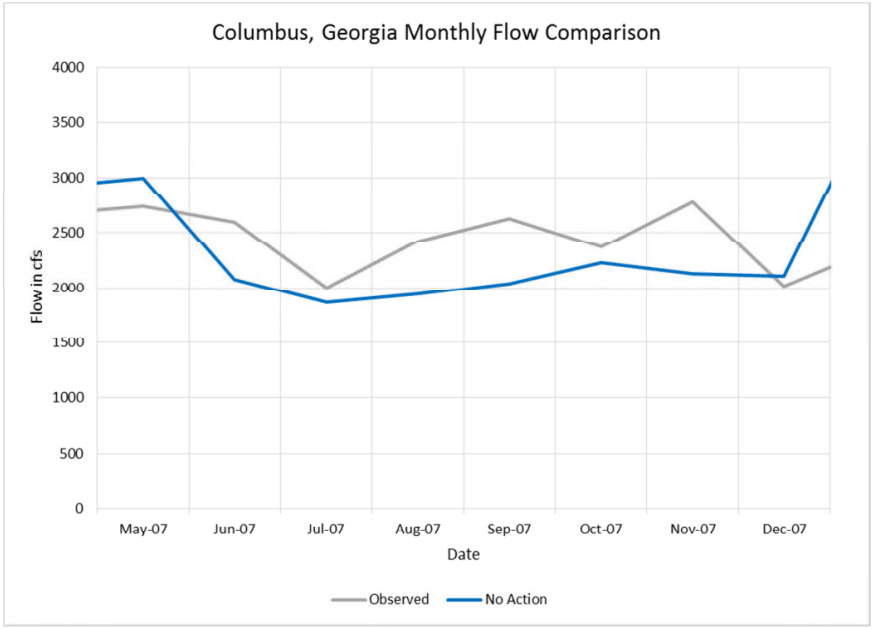


Figure 2 - Plot of Columbus, Georgia Monthly Flows

The above graph shows that during the May through December 2007 time period, the results from the No Action (Baseline) Alternative do not reflect actual flows at Columbus, Georgia. In every month from June through November of 2007, the flows simulated by the Corps of Engineers for the No Action (Baseline) Alternative (blue line) are lower than the actual observed flows (grey line). In fact, the

average of the June through November 2007 monthly average flows for the Observed data (grey line) and No Action data (blue line) are 2,464 cfs and 2,048 cfs respectively. The difference between these two values is 416 cfs or 17% (416 cfs / 2,464 cfs).

EXHIBIT A-15

Lake Lanier (Buford) Elevation NAA vs Observed

The Corps of Engineers provided a ResSim model and results for the No Action Alternative (Baseline). The results from the Corps of Engineers' HEC-ResSim modeling analyses are contained in the file provided by the Corps titled:

"/ACF_WCM_2014_09162014/rss/Water_Supply_Options_Extended_TS/simulation.dss".

The Corps of Engineers also provided historical observed data in the files titled:

"/ACF_WCM_2014_09162014/shared/ACFHEC_11_30May2014.dss."

HEC-DSSVue is a software package provided by the Corps of Engineers to view data sets and model results contained in the ResSim models and supporting input files. The HEC-DSSVue program was used to analyze the Lake Lanier (Buford) reservoir elevation data contained in the aforementioned files. Specifically, the HEC-DSSVue program was used to extract the data from the aforementioned files.

The data attributes contained in the aforementioned files associated with the extracted data are as follows:

- Observed:
  "ACFHEC_11_30May2014.dss:/CHATTAHOOCHEE/BUFORD/ELEV/01JAN1956 - 01JAN2012/1DAY/OBS_ADJ/"
- No Action
  "simulation.dss://BUFORD-POOL/ELEV/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/"

Microsoft Excel was then used to graph the extracted data. The graph shown in Figure 1 below is a plot of two different elevation sets at Lake Lanier (Buford). The x-axis is time, ranging from January 1, 2007 to December 31, 2008, and the y-axis is the elevation at Lake Lanier (Buford) in feet mean sea level. The two different elevation sets plotted on Figure 1 are:

- The actual observed Lake Lanier (Buford) elevation. The observed elevation is represented by the grey line with the title "Observed".
- The simulated elevation at Lake Lanier (Buford) for the No Action (Baseline) model prepared by the Corps. This elevation set was provided by the Corps and is represented by the blue line with the title "No Action".

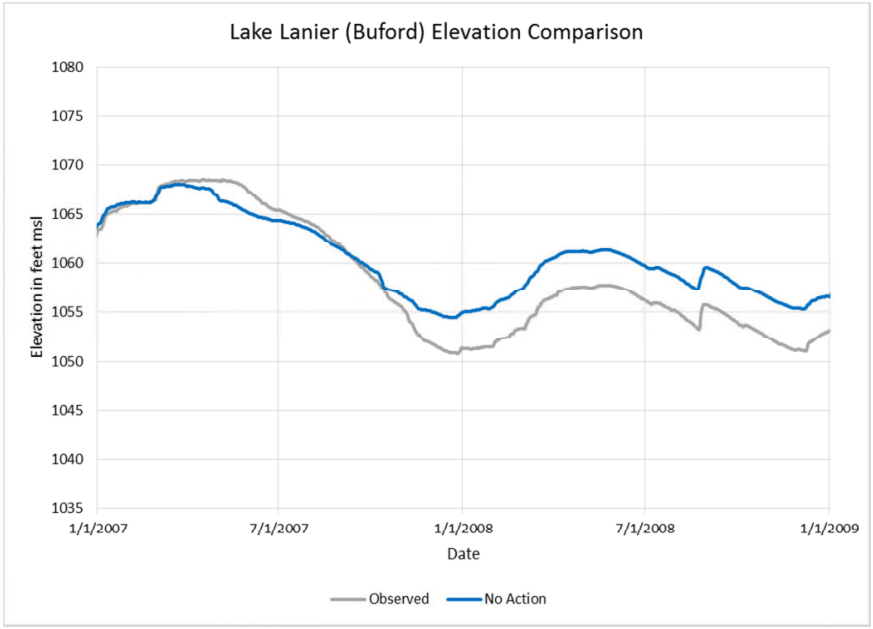


Figure 1 - Plot of Lake Lanier (Buford) Elevations

The above graph shows that during the 2007 – 2008 time period, the results from the No Action (Baseline) Alternative do not reflect actual operations at Lake Lanier (Buford). In the majority of the days plotted in Figure 1, the reservoir elevations simulated by the Corps of Engineers for the No Action (Baseline) Alternative (blue line) are higher than the actual observed elevations (grey line). In fact, Figure 1 shows that during the 2008 time period the Corps simulates the lake being approximately 4 feet higher on average under the No Action Alternative compared to what actually occurred at the reservoir.

EXHIBIT A-16

West Point Lake Elevation NAA vs Observed

The Corps of Engineers provided a ResSim model and results for the No Action Alternative (Baseline). The results from the Corps of Engineers' HEC-ResSim modeling analyses are contained in the file provided by the Corps titled:

"/ACF_WCM_2014_09162014/rss/Water_Supply_Options_Extended_TS/simulation.dss".

The Corps of Engineers also provided historical observed data in the files titled:

"/ACF_WCM_2014_09162014/shared/ACFHEC_11_30May2014.dss".

HEC-DSSVue is a software package provided by the Corps of Engineers to view data sets and model results contained in the ResSim models and supporting input files. The HEC-DSSVue program was used to analyze the West Point Lake reservoir elevation data contained in the aforementioned files. Specifically, the HEC-DSSVue program was used to extract the data from the aforementioned files.

The data attributes contained in the aforementioned files associated with the extracted data are as follows:

- Observed:
  "ACFHEC_11_30May2014.dss:/CHATTAHOOCHEE/WEST POINT R/ELEV/01JAN1975 - 01JAN2012/1DAY/OBS_ADJ/"
- No Action
  "simulation.dss://WEST POINT-POOL/ELEV/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/"

Microsoft Excel was then used to graph the extracted data. The graph shown in Figure 1 below is a plot of two different elevation sets at West Point Lake The x-axis is time, ranging from January 1, 2007 to December 31, 2008, and the y-axis is the elevation at West Point Lake in feet mean sea level. The two different elevation sets plotted on Figure 1 are:

- The actual observed West Point Lake elevation. The observed elevation is represented by the grey line with the title "Observed".
- The simulated elevation at West Point Lake for the No Action (Baseline) model prepared by the Corps. This elevation set was provided by the Corps and is represented by the blue line with the title "No Action".

Exhibit A-16 **West Point Lake Elevation NAA vs Observed** **Page 2 of 2**

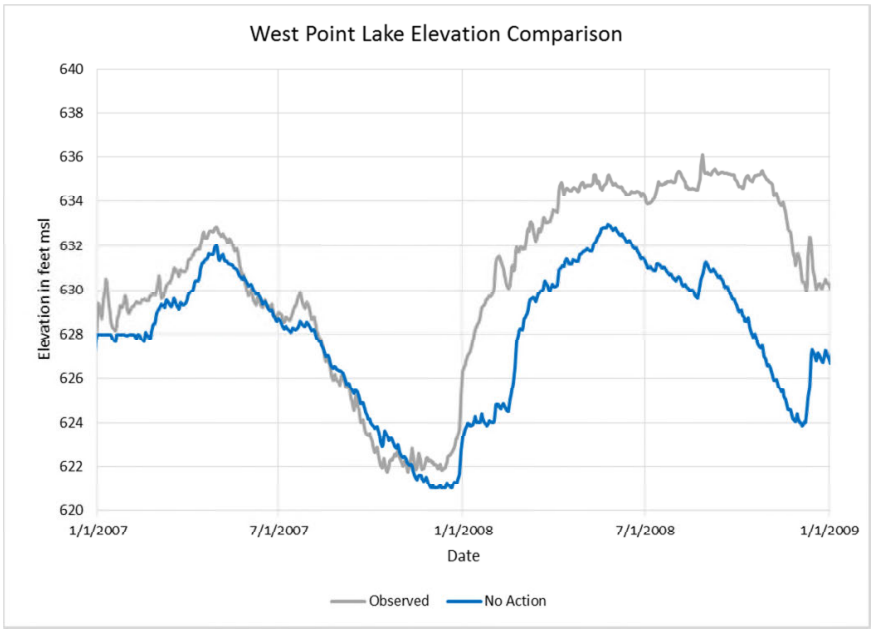


Figure 1 - Plot of West Point Lake Elevations

The above graph shows that during the 2007 – 2008 time period, the results from the No Action (Baseline) Alternative do not reflect actual operations at West Point Lake. In the majority of the days plotted in Figure 1, the reservoir elevations simulated by the Corps of Engineers for the No Action (Baseline) Alternative (blue line) are lower than the actual observed elevations (grey line). In fact, Figure 1 shows that during the fall 2008 period at times the Corps simulates the lake being more than 8 feet lower according to the No Action Alternative compared to what actually occurred at the reservoir.

EXHIBIT A-17

Lake Eufaula (W.F. George) Elevation NAA vs Observed

Exhibit A-17 Lake Eufaula (W.F. George) Elevation NAA vs Observed Page 1 of 2

The Corps of Engineers provided a ResSim model and results for the No Action Alternative (Baseline). The results from the Corps of Engineers' HEC-ResSim modeling analyses are contained in the file provided by the Corps titled:

"/ACF_WCM_2014_09162014/rss/Water_Supply_Options_Extended_TS/simulation.dss".

The Corps of Engineers also provided historical observed data in the files titled:

"/ACF_WCM_2014_09162014/shared/ACFHEC_11_30May2014.dss".

HEC-DSSVue is a software package provided by the Corps of Engineers to view data sets and model results contained in the ResSim models and supporting input files. The HEC-DSSVue program was used to analyze the Lake Eufaula (W.F. George) reservoir elevation data contained in the aforementioned files. Specifically, the HEC-DSSVue program was used to extract the data from the aforementioned files.

The data attributes contained in the aforementioned files associated with the extracted data are as follows:

- Observed:
  "ACFHEC_11_30May2014.dss:/CHATTAHOOCHEE/W.F.GEORGE/ELEV/01JAN1963 - 01JAN2012/1DAY/OBS_ADJ/"
- No Action
  "simulation.dss://WALTER F GEORGE-POOL/ELEV/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/"

Microsoft Excel was then used to graph the extracted data. The graph shown in Figure 1 below is a plot of two different elevation sets at Lake Eufaula (W.F. George). The x-axis is time, ranging from January 1, 1999 to December 31, 2000, and the y-axis is the elevation at Lake Eufaula (W.F. George) in feet mean sea level. The two different elevation sets plotted on Figure 1 are:

- The actual observed Lake Eufaula (W.F. George) elevation. The observed elevation is represented by the grey line with the title "Observed".
- The simulated elevation at Lake Eufaula (W.F. George) for the No Action (Baseline) model prepared by the Corps. This elevation set was provided by the Corps and is represented by the blue line with the title "No Action".

Exhibit A-17 Lake Eufaula (W.F. George) Elevation NAA vs Observed Page 2 of 2

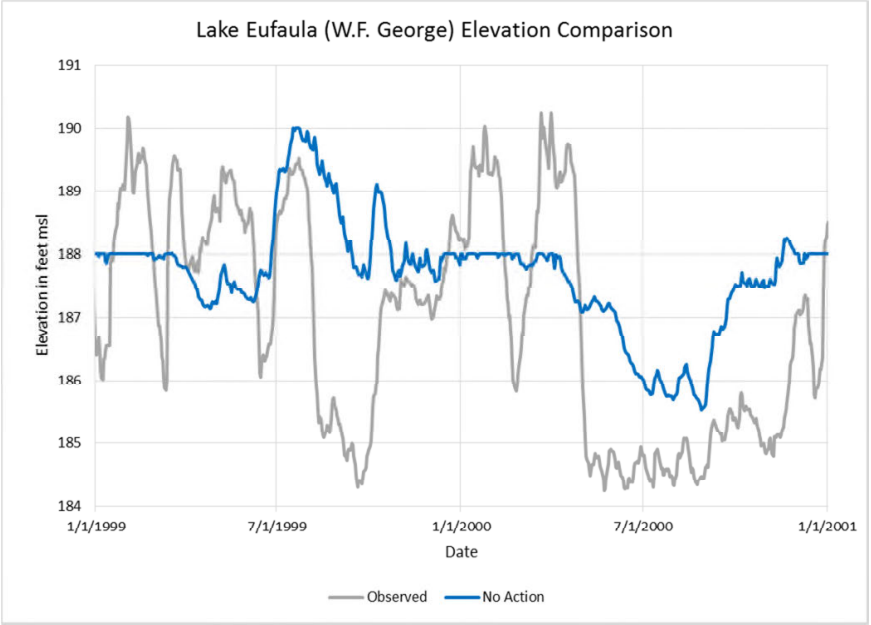


Figure 1 - Plot of Lake Eufaula (W.F. George) Elevations

The above graph shows that during the 1999 – 2000 time period, the results from the No Action (Baseline) Alternative do not reflect actual operations at Lake Eufaula (W.F. George). In the majority of the days plotted in Figure 1, the reservoir elevations simulated by the Corps of Engineers for the No Action (Baseline) Alternative (blue line) are higher than the actual observed elevations (grey line). In fact, Figure 1 shows that during the summer 1999 period at times the Corps simulates the lake being more than 4 feet higher according to the No Action Alternative compared to what actually occurred at the reservoir.

EXHIBIT A-18

Columbus Flow NAA vs PAA for 1350 cfs

The Corps of Engineers provided a ResSim model and results for the No Action Alternative (Baseline) and Proposed Action Alternative (Alternative 7H). The results from the Corps of Engineers' HEC-ResSim modeling analyses are contained in the file provided by the Corps titled:

"/ACF_WCM_2014_09162014/rss/Water_Supply_Options_Extended_TS/simulation.dss".

HEC-DSSVue is a software package provided by the Corps of Engineers to view data sets and model results contained in the ResSim models and supporting input files. The HEC-DSSVue program was used to analyze the Columbus, Georgia flow data contained in the aforementioned files. Specifically, the HEC-DSSVue program was used to extract the data from the aforementioned files.

The data attributes contained in the aforementioned files associated with the data are as follows:

- No Action
  "simulation.dss://COLUMBUS/FLOW/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/"
- Proposed Action:
  "simulation.dss://COLUMBUS/FLOW/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/"

Microsoft Excel was then used to analyze the extracted data. Specifically, for the aforementioned data sets, the "COUNTIF" function of Microsoft Excel was used to count the number of days that contained a flow value below 1,350 cfs. Out of a total of 26,661 days weeks for the January 3, 1939 through December 31, 2011 period there were 1,345 days of flow below 1,350 cfs for the No Action model results. During the same time period there were 1,389 days of flow below 1350 cfs for the Proposed Action scenario. Comparing these numbers shows that it is the Corps of Engineers' intention to increase the instances of daily flow below 1,350 cfs at Columbus, Georgia.

EXHIBIT A-19

Lake Lanier (Buford) 15 Percent or 50,000 acre-feet

In October of 2015 the Corps of Engineers prepared a draft environmental impact statement (DEIS) associated with the Update of the Water Control Manual for the Apalachicola – Chattahoochee – Flint River Basin. Several times in the DEIS, the Corps of Engineers references following the guidance contained in ER 1105-2-100, Planning Guidance Notebook, (April 22, 2000). On page 3-33 of ER 1105-2-100 the Corps of Engineers states:

> *Reallocation or addition of storage that would seriously affect other authorized purposes or that would involve major structural or operational changes requires Congressional approval. Provided these criteria are not violated, 15 percent of the total storage capacity allocated to all authorized project purposes or 50,000 acre feet, whichever is less, may be allocated from storage authorized for other purposes.*

The Corps of Engineers provided a relationship between gross withdrawal and required reallocation storage volume at Lake Lanier (Buford) as part of the DEIS. On pages ES-30 and ES-31 of Volume 1 of the DEIS, the Corps of Engineers states:

> *This gross withdrawal of 165 mgd would require a reallocation of about 189,500 ac-ft of storage at a first cost of about $79.0 million.*

As shown in Figure 1 below, the Corps of Engineers states the total storage capacity (at elevation 1085' or top of flood control pool) of Lake Lanier (Buford) is 2,554,000 acre-feet. In this same text, the Corps of Engineers also states that the minimum conservation storage volume (at elevation 1035') is 867,600 acre-feet. Subtracting these two values (2,554,000 acre-feet – 867,600 acre-feet) results in a total storage capacity of 1,686,400 acre-feet.

c. Reservoir. Lake area at elevation 1,070 feet NGVD29 composes about five percent of the drainage area. The lower portion of the lake is about 3 miles wide and 12 miles long. The upper portion is split into two arms that extend 44 and 19 miles along the Chattahoochee and Chestatee Rivers, respectively. The reservoir has a total storage capacity of 2,554,000 acre-feet at full-flood risk management pool, elevation 1,085 feet NGVD29, and it covers an area of 47,182 acres. At full conservation pool, elevation 1,071 feet NGVD29, the reservoir covers 38,542 acres and has a total storage capacity of 1,955,200 acre-feet. At minimum conservation pool, elevation 1,035 feet NGVD29, the area covered is 22,442 acres with storage capacity of 867,600 acre-feet, giving the total conservation storage between elevation 1,035 and 1,071 of 1,087,600 acre-feet. Area-capacity curves and tabulation are shown in Plate 2-5. A total of

2-3

Figure 1 - Excerpt of text from Page 2-3 of Appendix B of Volume 2 of the DEIS

Exhibit A-19 **Lake Lanier (Buford) 15 Percent or 50,000 acre-feet** **Page 2 of 2**

The information provided above was used to perform the following calculations:

1. Relationship between gross withdrawal and required storage to be reallocated at Lake Lanier (Buford):

$$\frac{Reallocated\ Storage\ (acre-feet)}{Gross\ Withdrawal\ (mgd)} = \frac{189{,}500\ acre-feet}{165\ mgd} = 1{,}148.5\ \frac{acre-feet}{mgd}$$

2. Yield Associated with 50,000 acre-feet:

$$50{,}000\ acre-feet\ \div\ 1{,}148.5\ \frac{acre-feet}{mgd} = 43.54\ mgd$$

3. 15 Percent of the Total Conservation Storage:

$$15\% \times 1{,}686{,}400\ acre-feet = 252{,}960\ acre-feet$$

EXHIBIT A-20

Lake Eufaula (W.F. George) Elevation
NAA vs PAA vs 1B

Exhibit A-20 Lake Eufaula (W.F. George) Elevation NAA vs PAA vs 1B Page 1 of 2

The Corps of Engineers provided a ResSim model and results for the No Action Alternative (Baseline), Proposed Action Alternative (Alternative 7H), and Alternative 1B. The results from the Corps of Engineers' HEC-ResSim modeling analyses are contained in the file provided by the Corps titled:

"/ACF_WCM_2014_09162014/rss/Water_Supply_Options_Extended_TS/simulation.dss".

HEC-DSSVue is a software package provided by the Corps of Engineers to view data sets and model results contained in the ResSim models and supporting input files. The HEC-DSSVue program was used to analyze the Lake Eufaula (W.F. George) reservoir elevation data contained in the aforementioned file. Specifically, the HEC-DSSVue program was used to extract the data from the aforementioned file.

The data attributes contained in the aforementioned files associated with the extracted data are as follows:

- No Action
  "simulation.dss://WALTER F GEORGE-POOL/ELEV/01JAN1939 - 01JAN2011/1DAY/NOACTIONAX0/"
- Proposed Action (Alternative 7H)
  "simulation.dss://WALTER F GEORGE-POOL/ELEV/01JAN1939 - 01JAN2011/1DAY/ALT7_OPTHX0/"
- Alternative 1B
  "simulation.dss://WALTER F GEORGE-POOL/ELEV/01JAN1939 - 01JAN2011/1DAY/ALT1_OPTBX0/

Microsoft Excel was then used to graph the extracted data. The graph shown in Figure 1 below is a plot of three different elevation sets at Lake Eufaula (W.F. George). The x-axis is time, ranging from January 1, 2007 to December 31, 2007, and the y-axis is the elevation at Lake Eufaula (W.F. George) in feet mean sea level. The three different elevation sets plotted on Figure 1 are:

- The simulated elevation at Lake Eufaula (W.F. George) for the No Action (Baseline) model prepared by the Corps. This elevation set was provided by the Corps and is represented by the blue line with the title "No Action".
- The simulated elevation at Lake Eufaula (W.F. George) for the Proposed Action (Alternative 7H) model prepared by the Corps. This elevation set was provided by the Corps and is represented by the red line with the title "Alt 7 Option H".
- The simulated elevation at Lake Eufaula (W.F. George) for the Alternative 1B model prepared by the Corps. This elevation set was provided by the Corps and is represented by the green line with the title "Alt 1 Option B".

Exhibit A-20 Lake Eufaula (W.F. George) Elevation NAA vs PAA vs 1B Page 2 of 2

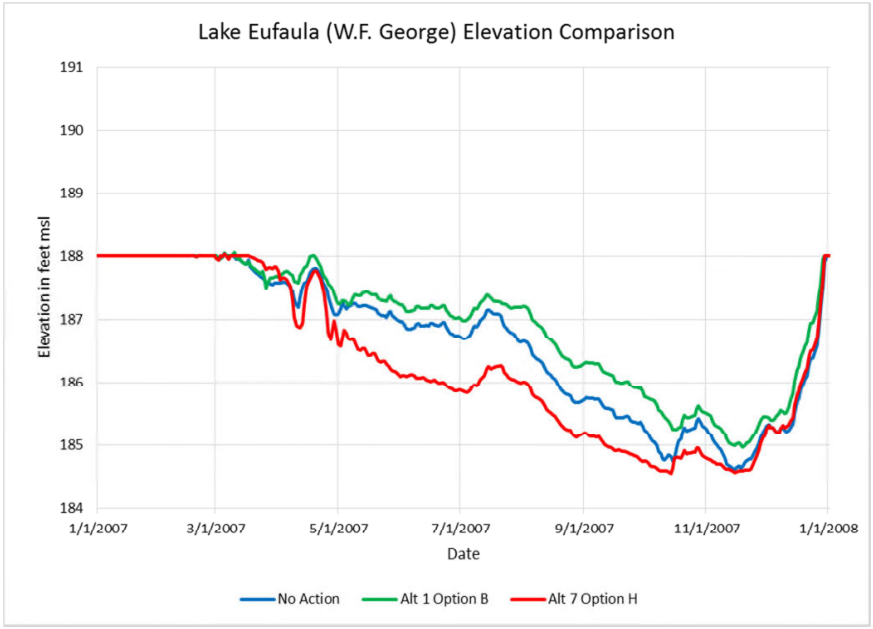


Figure 1 - Plot of Lake Eufaula (W.F. George) Elevations

The above graph shows that during the January 1, 2007 to December 31, 2007 time period, the results from the Proposed Action scenario (red line) are expected to be lower than those for the No Action scenario (blue line). In fact, the graph shows that on June 23, 2007 the Corps of Engineers' proposed operations (red line) is approximately 1 foot lower than the no action value (blue line).

Similarly, comparing the Corps of Engineers' proposal to the Alternative 1B (green line) shows more of an impact to the elevation at Lake Eufaula. For example, for the same June 23, 2007 period, the proposed action scenario (red line) is approximately 1 ¼ feet below the Alternative 1B scenario (green line).

Based on the graph shown above, it is clear that during this period, the Corps of Engineers would have concluded that the Proposed Action Alternative would have more of an impact on Lake Eufaula (W.F. George) elevations if they had compared the Proposed Action Alternative to Alternative 1B instead of comparing it to the No Action Alternative.

Response to ACF225 – City of LaGrange-Mike Criddle

From: Mike Criddle
Sent: Friday, January 29, 2016 6:47 PM
To: ACF-WCM
Cc: Tom Hall; James C. Thornton
Subject: [EXTERNAL] Draft Environmental Impact Statement (DEIS) and Water Control Manual (WCM) Comments
Attachments: DEIS and WCM Comments - City of LaGrange 012916.pdf

Please see attached document for comments to the subject matter by the City of LaGrange.

Mike Criddle
Director of Economic Development
City of LaGrange

Response to ACF225 – City of LaGrange-Mike Criddle

LAGRANGE
GEORGIA

Colonel Jon J. Chytka
Commander, Mobile District
U.S. Army Corps of Engineers
ATTN: PD-EI (ACF-DEIS)
P.O. Box 2288, Mobile, AL 36628
January 29, 2016

RE: **Apalachicola-Chattahoochee-Flint River Basin**
Water Control Manual and Draft Environmental Impact Statement

Dear Colonel Chytka:

This letter provides the comments of the City of LaGrange regarding the Draft Environmental Impact Statement ("DEIS") and new Water Control Manual for the Apalachicola-Chattahoochee-Flint ("ACF") River Basin.

We certainly appreciate the effort put forth by the Corps of Engineers to compile the momentous amount of information about the ACF basin and flows. Please accept these comments as part of your review and edit process.

Comments:

- Recreation Impact Levels: While the Top of Zone 1 for West Point Lake has been solidified in the WCM, rarely is the reservoir at or near this level. Due to the compression of Zones 1 & 2, WPL is more likely to be in Zone 2 or even Zone 3 for the majority of any given year. Only during very good water years can WPL expect to be at or near the Top of Zone 1 for any period of time. As indicated in the PAA, WPL is not expected to be above Elev. 632.5 more than 60% of time in any given year. For a reservoir with a congressional authorized purpose of Recreation this seems to be an inordinate amount of time the reservoir cannot meet one of its authorized purposes. Clearly, WPL is suffering from loss of inflows from upstream out of Lake Lanier. The purpose of the Lake Lanier specific WCM is to maintain its elevation as long as possible to serve water supply and recreation. As a comparison of impact levels and associated elevations for Lake Lanier, that reservoir can be expected to be at or below Elev. 1066.0 only 27% for any given period of time. A

In addition, the frequency of lower reservoir levels at WPL will have an impact on minority and low income populations around the reservoir and thus could impact the environmental justice finding of the PAA in question. B

- Balance of Resources: While WPL is operated to utilize the full storage in the Conservation Storage, the Corps has established via the PAA that Elev. 1050 as an absolute minimum

CITY OF LAGRANGE
200 Ridley Avenue • LaGrange, Georgia 30240 • (706) 883-2010 • FAX (706) 883-2020
www.lagrangega.org

A. The draft EIS considered raising the winter guide curve at West Point Lake as described in section 4.1.3.1.1. An analysis of the effects of raising the winter guide curve concluded that such a change would likely increase the flood risk downstream of the project. Accordingly, the options for changing the guide curve for West Point Lake were eliminated from further consideration.

B. The frequency of the lower reservoir levels decreases in the PAA as compared to the NAA. As shown in Table 6.1-4 of the EIS, lake levels declined for fewer years below Water Access Limited Level and Recreation Impact Level under the PAA as compared to the NAA.

elevation for Lake Lanier even during the most extreme drought events. At Elev. 1050 there continues to be 15 feet of Active Storage remaining in the Conservation Pool. This defies the stated collective intent to "balance all of the resources" in the basin. The DEIS and WCM establish from the very beginning that water supply for the Metropolitan Atlanta region is by far the most critical issue it addresses. The Corps has focused almost solely on water supply to the extent that it draws attention to the Water Supply Storage Assessment ("WSSA") in the very first paragraph of the Executive Summary of Volume 1 of the DEIS. This focus is placed ahead of all other authorized purposes, stakeholder needs, and competing uses - even ahead of ecological and environmental needs of the basin. To further reinforce the WSSA importance, the Corps not only evaluates the current water supply needs and criteria but also expands their analysis to include the water supply demands as far into the future as 2040. No other authorized purpose, stakeholder need or environmental impact is evaluated with this timeframe in mind. A more fair and balanced approach should be utilized with equal consideration given to the PAA's that support the congressionally authorized purposes of WPL.

C

- National Environmental Policy Act Process: The Corps has determined the No Action Alternative or commonly referred to as the "baseline" should be the current management direction from which all alternative operating scenarios are to be measured. This means that all the changes made to the operation of WPL during the 1980's and 1990's has now been memorialized into the 2007 numbers that were chosen by the Corps. Unfortunately, NEPA regulations clearly articulate that a proper NEPA process starts with a baseline that has been defined by the most recent completed and implemented NEPA process (not the 2007 numbers). The Corps is effectively bypassing this regulation and establishes the current level of operation as the baseline. Using this approach the Corps obfuscates all current parameters with the incremental changes in the basin that have occurred since the most recent "approved" NEPA process. If the current DEIS and WCM are implemented via a Record of Decision (ROD) then these changes will be incorporated into the WCM without proper scrutiny. There are numerous additional failures of the Corps to adhere to a rigorous application of NEPA. We request that the Corps follow the requirements of NEPA, as is necessary for all federally controlled reservoirs including WPL.

D

In conclusion, I appreciate the Corp's analysis of the ACF basin and the attempt at trying to meet multiple stakeholder needs. However, the preferred alternative in the DEIS appears to be heavily weighted toward Metropolitan Atlanta water supply needs at the cost of all other downstream stakeholders needs and in the case of WPL – congressional authorizations. We believe that other viable WMA's (such as the Georgia Contemplation) should be evaluated more thoroughly, and a strict NEPA process must be followed.

E

Sincerely,

Michael J. Criddle
Director of Economic Development

cc: Tom Hall, City Manager
Jim Thornton, Mayor

CITY OF LAGRANGE
200 Ridley Avenue • LaGrange, Georgia 30240 • (706) 883-2010 • FAX (706) 883-2020
www.lagrangega.org

Response to ACF225 – City of LaGrange-Mike Criddle

C. The Buford Dam's entire conservation pool from elevation 1,035 ft to 1,071 ft is available to fulfill authorized project purposes. There is no intent to limit the reservoir drawdown to elevation 1,050 ft. Modeling of the 73-year historic hydrologic period indicated that the reservoir would be drawn down to approximately 1,050 ft, but under more severe drought conditions the reservoir elevation will likely be lower. USACE took into account that West Point and Walter F. George lakes are more likely to refill each year than is Lake Lanier because of reservoir inflow and precipitation. The watershed area that contributes to West Point and Walter F. George lakes is greater than the area contributing to Lake Lanier. The amount of annual precipitation also is greater in the more southerly portions of the ACF Basin. The revised action zones achieve the objectives of putting the greater burden of the system demands on the lower two reservoirs when in the upper action zones and on Lake Lanier when the system reaches drought operation. During extreme droughts similar to those in 2007–2009, there are times when system demands will be met exclusively by storage releases from the Buford Dam.

The purpose of the EIS is to support the update to the WCMs in determining how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws, and to implement those operations through updated water control plans and manuals. Because of the 11th Circuit Court ruling of June 2011 and the USACE legal opinion in 2012, updating the water control plans and manuals includes making a decision on Georgia's water supply request. Accordingly, this EIS considers not only operations for all authorized purposes, but also an expanded range of water supply alternatives associated with the Buford Dam/Lake Lanier project, including current levels of water supply withdrawals and additional amounts that Georgia in 2015 requested from Lake Lanier and downstream for Metro Atlanta. Forecasting water demands for parts of the ACF Basin other than Metro Atlanta is outside the scope of Master WCM update process and this EIS.

D. Council on Environmental Quality (CEQ) regulations for implementating NEPA require consideration of the NAA (section 1502.14). In the CEQ's memorandum of March 23, 1981, *Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations*, question no. 3 addresses the NAA. The response to question no. 3 states, in part:

> The first situation might involve an action ... where ongoing programs initiated under existing legislation and regulations will continue, even as new plans are developed. In these cases, "no action" is "no change" from the current management direction or level of management intensity. To construct an alternative that is based on no management at all would be a useless academic exercise. Therefore, the "no action" alternative may be thought of in terms of continuing with the present course of action until that action is changed.

Consequently, for purposes of the Master WCM update process, the NAA reflects current reservoir operations as they have evolved over time in response to laws, regulations, policy, and new technical information. Basing the NAA for the ACF Basin on a pre-NEPA 1958 WCM or a predam condition to assess the effects of alternative WCM update plans would neither accurately reflect current baseline operations nor be consistent with "no action" as defined in the referenced CEQ memorandum

E. The PAA provides a balance across all authorized purposes throughout the basin. One of the authorized purposes for the ACF system is water supply. USACE does not prioritize authorized purposes. USACE complied with all applicable laws and guidance in updating the Master WCM, including NEPA.

Response to ACF226 – Alabama Municipal Electric Authority

From: Alan Williford
Sent: Saturday, January 30, 2016 3:50 PM
To: ACF-WCM
Cc: Alan Williford
Subject: [EXTERNAL] Comment for Draft ACF Water Control Manual and Draft Environmental Impact Statement
Attachments: AMEA Letter_Col. Jon Chytka_RE ACF WCM_1.pdf

Please find attached a letter submitted on behalf of Alabama Municipal Electric Authority in support of comments filed by the Southeastern Federal Power Customers, Inc.. A hard copy of this letter will be sent to Colonel Jon J. Chytka.

Best regards,

G. Alan Williford
Chief Operating Officer
Alabama Municipal Electric Authority

1

ALABAMA MUNICIPAL ELECTRIC AUTHORITY
P.O. BOX 5220 • MONTGOMERY, ALABAMA 36103
804 SOUTH PERRY STREET
TEL 334/262-1126 • FAX 334/262-2267
www.amea.com

Power That Works For You!®

January 30, 2016

Via E-Mail (acf-wcm@usace.army.mil) and U. S. Mail

Commander Jon J. Chytka
U.S. Army Corps of Engineers
Mobile District
Attn: PD-EI (ACF-DEIS)
P. O. Box 2288
Mobile, AL 36628-0001

Re: Draft ACF Water Control Manual and Draft Environmental Impact Statement

Dear Colonel Chytka:

On behalf of Alabama Municipal Electric Authority, I am writing to comment on the United States Army Corps of Engineers (Corps) draft Apalachicola-Chattahoochee-Flint (ACF) Water Control Manual (WCM) and draft EIS. Alabama Municipal Electric Authority is a Joint Action Agency whose Member Cities are 11 municipals providing electric energy services that serve approximately 350,000 residential, commercial and industrial consumers in Alabama.

These municipal electric systems each have a contract with the Southeastern Power Administration (SEPA) to purchase capacity and energy from the GA-AL-SC system of projects, including the projects in ACF basin. SEPA charges our members for the capacity and energy at rates that are sufficient to recover 100% of the cost of the projects allocated to hydropower. That cost allocation was prepared by the Corps in consultation with other agencies based on the original project purposes and expected benefits when authorized by Congress. Thus we have a substantial interest in any revision to Corps operations that reduces the value of hydropower without a commensurate reduction in the cost our members are responsible for repaying. With our interest in the Federal Hydropower Program in the Southeast, we are deeply concerned with the potential impacts that the changed operations will have on the availability of a peaking power resource in the Southeast. A

An organization to which we belong, the Southeastern Federal Power Customers, Inc., (SeFPC) has submitted extensive comments documenting concerns with the Draft Environmental Impact Statement (DEIS). We agree with the points raised in the letter that they

MEMBER CITIES: ALEXANDER CITY, DOTHAN, FAIRHOPE, FOLEY, LAFAYETTE, LANETT, LUVERNE, OPELIKA, PIEDMONT, SYLACAUGA, TUSKEGEE

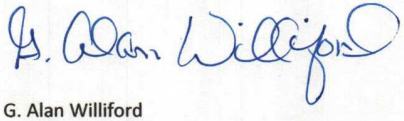
Response to ACF226 – Alabama Municipal Electric Authority

A. The credit to the power marketing agency (Southeastern Power Administration) is presented in section 5.3 and appendix D of the WSSA (appendix B in the EIS).

have submitted and share the concerns raised. As we look into the future and consider the challenges that we will face in providing power to our customers, the carbon neutral resource provided by the Corps of Engineers hydropower projects remains an important part of our portfolio.

Thank you for the opportunity to comment on the Corps' proposed actions. We look forward to continued participation in the implementation of the proposed WCM.

Very truly yours,



G. Alan Williford
Chief Operating Officer
Alabama Municipal Electric Authority

From: Gladys Delgadillo
Sent: Saturday, January 30, 2016 11:44 AM
To: ACF-WCM
Subject: [EXTERNAL] Re: Corps of Engineers Draft Environmental Impact Statement regarding the update of the water control manual for the Apalachicola - Chattahoochee – Flint River Basin
Attachments: Apalachicola Riverkeeper ACF WCM EIS comments FINAL.pdf; FCC Comments on DEIS of USACE operating manual for ACF river system.docx

Dir Sir,

Please disregard my previous e-mail. It was a gross error on my part and does not represent the views of the FCC.
You have my sincere apologies.

Attached you will find the *correct* letter from former U.S. Senator and former Florida Governor Bob Graham, founder and Chairman of the Florida Conservation Coalition regarding the USACE' DEIS on the water control manual update for the ACF River system.

Thank you.

Gladys

On Sat, Jan 30, 2016 at 11:41 AM, Gladys Delgadillo <floridaconservationcoalition@gmail.com> wrote:

> Dir Sir,
>
> Attached you will find a letter from former U.S. Senator and former Florida Governor Bob Graham, founder and Chair of the Florida Conservation Coalition regarding the USACE' DEIS on the water control manual update for the ACF River system.
>
> Thank you.
>
> Gladys
>
> --
> Gladys Delgadillo
> Administrator
> Florida Conservation Coalition
>
> floridaconservationcoalition.org

--
Gladys Delgadillo
Administrator
Florida Conservation Coalition

floridaconservationcoalition.org



Colonel Jon Chytka
District Commander
U. S. Army Corps of Engineers – Mobile District
P. O. Box 2288
Mobile AL 36628-0001

Re: Corps of Engineers Draft Environmental Impact Statement regarding the update of the water control manual for the Apalachicola - Chattahoochee – Flint River Basin

Dear Colonel Chytka,

This is to provide you with the Florida Conservation Coalition's comments and position on the above referenced Draft Environmental Impact Statement (DEIS). The Florida Conservation Coalition is composed of over 50 conservation organizations and over one thousand individuals dedicated to the protection of Florida's environmental resources and the State's well-being.

The DEIS does not meet the standards and intent of the National Environmental Policy Act (NEPA) or the Council on Environmental Quality (CEQ) guidance.

A

The fundamental intent and purpose of NEPA is to ensure that Federal actions which may significantly affect the environment are adequately assessed for all direct, indirect, and cumulative impacts. CEQ guidelines and NEPA state that indirect effects are those caused by the action and are later in time or further removed in distance, but are still reasonably foreseeable. CEQ guidance further says that mitigation and monitoring are key components of NEPA. The DEIS does not assess the potential impacts on the lower section of the river, the floodplain and the bay, nor does it address mitigation of any impacts on them.

FOUNDER and CHAIRMAN
Bob Graham, Former Governor of Florida and U.S. Senator

VICE CHAIRMEN
Nathaniel Pryor Reed, Former Assistant Secretary of the Interior, Former Chairman SFWMD, Founder and Chairman Emeritus 1000 Friends of Florida
&
Commissioner Lee Constantine, Seminole County Commissioner, Former State Senator and State Representative

AUDUBON OF FLORIDA
Eric Draper, Executive Director

CONSERVANCY OF SOUTHWEST FLORIDA
Rob Moher, President
Jennifer Hecker, Director of Natural Resource Policy

FLORIDA WILDLIFE FEDERATION
Manley Fuller, President
Martha Musgrove, Board Member
Preston Robertson, General Counsel and VP for Conservation

LEAGUE OF WOMEN VOTERS
Pam Goodman, President

1000 FRIENDS OF FLORIDA
Ryan Smart, President
Victoria Tschinkel, Board Member, former Secretary Department of Environmental Regulation
Roy Rogers, Board Member Emeritus

SIERRA CLUB
Frank Jackalone, Senior Organizing Manager

ST. JOHNS RIVERKEEPER
Lisa Rinaman, Riverkeeper
Jimmy Orth, Executive Director

TRUST FOR PUBLIC LAND
Greg Chelius, Florida State Director
Will Abberger, Director Conservation Finance

INDIVIDUALS
Lester Abberger
John Finlayson, Agriculturist, former Chairman SRWMD
Bill Kerr, Environmental Consultant, , former Chairman SJRWMD
Gary Kuhl, Former Executive Director, SWFWMD
Jay Landers, Former Secretary of the Department of Environmental Protection, Former Director of the Department of Natural Resources
Auley Rowell, Agriculturist, former Chairman of SRWMD
Sonny Vergara, Former Executive Director, SWFWMD and SJRWMD
Estus Whitfield, Former Principal Environmental Advisor to 5 Florida Governors

Response to ACF227 – Florida Conservation Coalition

A. The draft EIS meets the standards and intent of NEPA and the Council on Environmental Quality guidance by considering all impacts including direct, secondary, and cumulative. Impacts throughout the basin were considered and found to vary by location, but were generally minor. Impacts to the lower section of the Apalachicola River and Bay were evaluated and found to be minor (see section 6 of the EIS). Mitigation was considered in the EIS and a determination was made that no specific compensatory mitigation would be required (see section 6.11 of the EIS).

The Apalachicola River and floodplain, estuary and Bay will clearly be adversely affected by the action proposed in the DEIS. Impacts of the proposed action are described in the attached letter by Dan Tonsmeire, Apalachicola Riverkeeper, dated January 29, 2016. The Florida Conservation Coalition endorses Mr. Tonsmeire's letter on behalf of Apalachicola Riverkeeper. B

During droughts over the past decade, particularly in 2012, the river and floodplain, estuary, and bay suffered tremendously as a result of the Corps operation of the Apalachicola - Chattahoochee – Flint (ACF) project which favored upstream users and denied sufficient river flow to sustain the resources downstream in Florida. C

The natural and biological resources and diversity of the River and Bay system are unparalleled in the U. S. and the economic values are enormous. Again, we refer you to Mr. Tonsmeir's letter. D

The Apalachicola River and Bay system is the basis of the economy of the region, and without a healthy river and bay the economy suffers severely, as we have experienced in recent years.

The River and Bay system is not just the economic driver of the region; it defines the region's culture, way of life, and quality of life. E

The DEIS is inadequate; it does not meet the requirements of NEPA and CEQ. We ask that the Corps continue to assess the impacts of the proposed action before making a final decision. A final decision based on this defective DEIS would be extremely detrimental to the river and bay and the people of the region. F

Surely an alternative could be developed that assessed the direct, indirect, and cumulative impact, and provided for mitigation of impacts, as is required by NEPA and CEQ guidelines.

Your attention and action on this request for the development of an alternative EIS would be of great comfort and importance to the people of Florida.

Respectfully,



Bob Graham

Founder and Chairman of the Florida Conservation Coalition

Response to ACF227 – Florida Conservation Coalition

B. The purposes of the Master WCM update and WSSA (appendix B in the EIS) are to determine how the federal projects in the basin should be operated for their authorized purposes, in light of current conditions and applicable laws, and to assess the extent to which reservoir storage at Lake Lanier can be made available to meet current and future water supply needs for Metro Atlanta. In the WCM update process, balancing project operations to fulfill all authorized purposes, while evaluating impacts to the environment was a top priority. The analysis in the EIS demonstrates that the PAA would result in little to no change in flow and water quality conditions in the Apalachicola River and Bay and, consequently, that there would be little to no effect on biological and other resources in the river and bay. The authorized purposes of the federal ACF system do not include a specific directive to provide freshwater inflows to Apalachicola Bay to sustain the resources of the bay. Additionally, the PAA includes measures necessary to address the adverse effects of project operations on federally listed endangered or threatened species downstream of Jim Woodruff Lock and Dam. USACE consulted on the PAA and the results are presented in appendix J of the final EIS. In the biological opinion the USFWS concluded that effects to estuarine invertebrate production are insignificant because the PAA provides slightly beneficial effects from increasing the number of freshwater pulses and increasing the number of days greater than or equal to 16,200 cfs in the winter. USFWS also anticipate only minor changes in salinity regimes and estuarine habitat due to the WCM.

C. The authorized purposes of the federal ACF system do not include a specific directive to provide freshwater inflows to Apalachicola Bay to sustain the resources of the bay. However, water management measures suggested by stakeholders that would increase freshwater flows into Apalachicola Bay were considered, as discussed in section 4 of the final EIS. The PAA includes fish and wildlife conservation operations throughout the basin (e.g., the reservoir fish spawn operations, minimum flow provisions in the Apalachicola River, and fish passage at Jim Woodruff Lock and Dam). Section 5 of the EIS provides additional information on the PAA. The EIS considered and disclosed the expected impacts that the PAA could have on fish and wildlife resources in the Apalachicola River and Bay (or elsewhere in the system). The analysis presented in section 6 of the EIS indicates that the PAA would have a minimal effect on flow conditions in the Apalachicola River and into the bay compared to current reservoir operations under the NAA. Because flow and water quality changes in the Apalachicola River and Bay are not expected under the PAA, no anticipated incremental effect would be expected on fish or wildlife resources in the bay. In the biological opinion, included in appendix J, the USFWS concluded that effects to estuarine invertebrate production are insignificant because the PAA provides slightly beneficial effects from increasing the number of freshwater pulses and increasing the number of days greater than or equal to 16,200 cfs in the winter. USFWS also anticipate only minor changes in salinity regimes and estuarine habitat due to the WCM.

D. The PAA is not expected to result in a change to conditions that currently exist for the commercial fishing industry (including oysters) in Apalachicola Bay compared to current reservoir operations (i.e., the NAA). Physical and ecological conditions that affect the extent and overall abundance of commercial species are not expected to change under the PAA. Section 6.5.5 addresses the effects of the various Master WCM update alternatives on the Apalachicola bay oyster industry.

E. The economic, social, and cultural resource effects associated with the Master WCM update alternatives are presented in section 6.6 through 6.8 of the EIS. The USACE PAA would have little to no effect on flow and water quality conditions in the Apalachicola River downstream of Jim Woodruff Lock and Dam compared to the NAA (current reservoir operations). Accordingly, the PAA is not expected to cause a change in Apalachicola Bay ecological or socioeconomic resources compared to current operations.

F. The draft EIS meets the standards and intent of NEPA and the Council on Environmental Quality guidance by considering all impacts including direct, secondary, and cumulative. Impacts throughout the basin were considered and found to vary by location, but were generally minor. Impacts to the lower section of the Apalachicola River and Bay were evaluated and found to be minor (see section 6 of the EIS). Mitigation was considered in the EIS and a determination was made that no specific compensatory mitigation would be required (see section 6.11 of the EIS).

Cc: The Honorable Jo-Ellen Darcy, Assistant Secretary of the Army (Civil Works) Lieutenant General Thomas P. Bostick, USACE Commander General and Chief of Engineers Major General Ed Jackson, USACE Deputy Commanding General for Civil Works and Emergency Operations Brigadier General David Turner, USACE Commander, South Atlantic Division Office of General Counsel, USACE The Honorable Christy Goldfuss, Chair, President's Council on Environmental Quality The Honorable Gina McCarthy, Administrator, U.S. Environmental Protection Agency The Honorable Dr. Kathryn Sullivan, Secretary, U.S. National Oceanic and Atmospheric Administration (NOAA) The Honorable U.S. Senator Bill Nelson - Florida The Honorable U.S. Senator Marco Rubio – Florida The Honorable U.S. Representative Gwen Graham – Florida District 2 The Honorable Governor Rick Scott - Florida The Honerable Bill Montford, Florida State Senator The Honorable Brad Drake, Florida State Representative The Honorable Halsey Beshears, Florida State Representative Jon Steverson, Secretary, Florida Department of Environmental Protection Nick Wiley, Director, Florida Fish and Wildlife Conservation Commission

See responses to comment letter #ACF187

APALACHICOLA RIVERKEEPER®
SAVING AN AMERICAN TREASURE

January 28, 2016

Colonel Jon Chytka
District Commander
US Army Corps of Engineers - Mobile District
PO Box 2288
Mobile AL 36628-0001

Tetra Tech, Inc.
61 St. Joseph Street
Suite 550
Mobile, Al 36602-3521

RE: Update to the Water Control Manual (WCM) and Environmental Impact Statement (DEIS) for the Apalachicola-Chattahoochee-Flint River Basin

Dear Colonel Chytka:

On behalf of our Board of Directors and over 1,500+ members and supporters across the United States, ***Apalachicola Riverkeeper*** has reviewed the referenced documents and submits the following comments on the referenced Water Control Manual (WCM) DEIS. The document's length (over 4,700 pages) and complexity speaks to the unenviable task the Corps faces in meeting the myriad objectives specified through legislation and other federal guidance, and made far more difficult by the competing interests in the basin. However, with all due respect, we believe the Corps can and must do better to recognize and respect the conservation of fish and wildlife in the Apalachicola portion of the basin. To do otherwise, as in the current version of the document, risks the loss of an ecosystem and culture that are widely recognized as significant economic and ecological resources.

Our comments proceed as follows:

PART A outlines an alternative proposed action for consideration by the Corps based on the comments, data, and other information in the sections following and/or included in the documents attached to these comments. PART B. Sections 1-7 address short comings, flaws and additional information needs in the DEIS as follows: Section 1 contains our most fundamental objection: the scope of the DEIS is fatally flawed, in that it fails to consider the interests of, and impacts in, the Apalachicola River, Floodplain, Estuary, and Bay. Section 2 describes the ecological relationships and interactions that are omitted from the DEIS as a result of the too-narrow scope. Section 3 focuses specifically on issues related to low-flow conditions, which will become more frequent and more severe if the PAA is adopted. Section 4 discusses the failure to consider Conjunctive Uses of flow, which may serve many needs and objectives simultaneously. Section 5 discusses technical failures and shortcomings of the DEIS, such as the failure to use the best available scientific knowledge and data. Section 6 delineates the Environmental Justice issues that arise from the concentration of the negative impacts upon culturally-distinct low-income communities. Section 7 offers our conclusions. Attachments are included on the flash drive accompanying this document or on dropbox upon email request to Dan Tonsmeire.

A NON-PROFIT ORGANIZATION DEDICATED TO THE PROTECTION AND STEWARDSHIP OF THE APALACHICOLA RIVER & BAY
PO Box 8 (232-B Water Street) Apalachicola FL 32329 (850) 653-8936 Riverkeeper@ApalachicolaRiverkeeper.org

PART A. Alternative Proposed Action and Approach

As requested by the Corps, in PART A we present an alternative to addressing the needs of the Fish and Wildlife Conservation authorized purposes which have been sorely neglected in the DEIS. That alternative includes metrics, data, methods and actions to help the Corps make the DEIS acceptable and improve the operations to a point that the Fish and Wildlife Conservation purposes are better served in the short term and can be further improved using an adaptive management approach as more information is acquired and understood.

Metrics for flowing sections of the river and estuary:

Flows provided by releases from the reservoirs should mimic natural flows (pre-dam flows using the 1939-1957 USGS observed flow data set) to the greatest extent possible. More detailed descriptions of natural flows and how to mimic natural flows are provided in ***Attachment 3a***, the **ACF Stakeholders Sustainable Water Management Plan** (SWMP) in ***Appendix B - Stakeholder Perspectives*** under two separate sections. In the section under the ***Apalachicola Sub-basin*** (page 100 – 104) the concept of ***Preserving Natural Flow Variability*** and ***Measuring the Health and Productivity of the Sub-basin: Critical Flow Needs*** are explained. Additional explanation and guidance is provided in the section of ***Appendix B - Environment and Conservation - Principles of Sustainable Water Management*** (Page 126-129) referred to as "The Natural Flow Paradigm".

The selected metrics are described below at the nodes and data collection points known to exist and used by the Corps. The Corps will need to become familiar with and understand the ecosystem functions that are integral to the Apalachicola portion of the ACF Basin in order to recover and sustain the services provided by the flow regime for fish and wildlife and humans. These functions are described in detail in the comments following PART A. Metrics we have provided are:

Chattahoochee River below Peachtree Creek metric: Maintain a minimum flow of 750 cfs to maintain safe and reliable recreational use and water quality. Other considerations:

1. Develop a method to make releases from Buford occur in a more gradual rise and fall of the river to reduce risk of injury and/or loss of life, provide better ecological habitat, and reduce erosion of banks and habitat loss.
2. No new reservoirs are added within the ACF Basin.
3. Additional storage may be added by increasing the conservation pool of Lake Lanier, but is not required as part of this proposal.

Apalachicola River USGS Chattahoochee gage at Chattahoochee, FL metric: Flow should mimic natural flows to restrain aquatic habitat loss to no greater than an overall 13% for dry year flows. Habitat loss is determined by developing a relationship between the number of acres inundated at a certain flow regime that would sustain all but 13% of the aquatic habitat. This can be achieved with a reduction no greater than 6% from the baseline flow described below. This will sustain floodplain inundation at levels, frequency, timing, and duration using the flow/inundation relationship described in Darst 2008, Light 2006, and Light 1998. Development of the desired baseline flow regime is described below:

Use UIF median monthly flows of pre-dam dry years (for example, the three driest years from 1939-1957) to develop and bracket the lower end of low flows for comparing alternatives. This metric is set to limit aquatic habitat loss to an overall maximum of 13% by maintaining acres of inundated aquatic habitat of the river and floodplain for a duration that all aquatic habitat will be sustained during dry years. Using this metric for dry years equates to a maximum 6% reduction in flow from the UIF. In the current conditions run and the subsequent water management runs, these flows will serve to help bracket and be a reference line for meeting or exceeding this dry year metric. The resultant hydrograph represents the performance metric line for dry year flows, and should not be used for normal and wet years. Maintaining the 6% reduction in flow below UIF flows for comparable years is necessary in order to avoid creating drought conditions during normal years.

For convenience, these same flows should also be expressed in cfs at the Blountstown and Sumatra gages. Minimize the times flows during drought conditions go below 16,000 cfs between April thru June and minimize the times flows go below 8,000 cfs for the months of July thru November. This may be accomplished by instituting pulses that would achieve pre-dam flows for some or all of these time periods.

To the extent possible under modeled conditions during non-drought years, maintain monthly flows at the Blountstown gage fluctuating between 18,000 – 20,000 cfs for the months of February thru May, then between 10,000 – 16,000 cfs the remainder of the year. This may be accomplished by instituting pulses that would achieve pre-dam flows for these time periods. During normal and dry (but not drought) times a spring pulse during mid-April thru mid-June and a mid-summer pulse in July may be needed to achieve pre-dam flows as much as possible.

Apalachicola River USGS gage at Sumatra, FL metric: Use the flow and habitat loss methodology to provide the flows at the Sumatra gage as the input to be run thru the Bay Assessment hydrodynamic model to determine salinity in the Bay under the resultant conditions.

Apalachicola Bay metric – Using a Sumatra gage flow/bay salinity relationship established using the hydrodynamic model and cumulative frequency distribution/occurrence salinity plots, to the extent possible, maintain salinities in an optimal range for oysters between 10-24 PPT (for explanation see Attachment 3a - SWMP page 57-58). During May thru October (during the spawning, reproduction, and recruitment season), salinity should be maintained in the desirable range a minimum of 50-55% of the year at locations throughout the Bay. During late fall and winter (primary growth season) months November, December, and January thru April, salinities should be maintained in the desirable range a minimum of 75-80 % of the year at locations throughout the Bay.

This concept of seeking to maintain salinities which will help sustain the health of the oyster populations in Apalachicola Bay was used by the USFWS and to develop the Apalachicola Bay Assessment tables presented in the ACFS SWMP. In the bottom line of Table 5-3 on page 61 of the main SWMP report, in which eight scenarios were modeled for the drought year of 2007, **the salinity regime in the Bay was improved over the RIOP with current consumptive uses (Scenario 3) and USGS observed flows (Scenario 1)**. The basis for the desirable salinity values is to sustain a range of salinities in the Bay for oyster reproduction, recruitment and growth during dry periods as much as possible and to minimize high salinities which are detrimental to oysters. It has been explained in Attachment 4c by Doug Barr that prolonged low flow and high salinities experienced during droughts lowers dissolved oxygen (DO) along the estuary bottom. Low DO is not conducive to improved oyster production or other marine species.

For these suggested metrics and pulse flows, 12,000 cfs flow is recommended to be the beginning point for modeling and serve as an example of an alternative management scenario the Corps could consider during late May/early June and again in late July for a two week period each time. The basis for that selected flow is the benefits that would be achieved by such a flow, including but not limited to: flushing flows in the larger slough systems of the floodplain improving water quality and fish habitat; a pulse of nutrients would be supplied to the delta and estuary; an increase in DO and an estimated 3-4 ppt decrease in salinity of the Bay at Cat Point for a period of time; a 5 foot depth for a navigation channel without dredging; and increased water availability for hydropower, low-consumption/high return rate industry, recreation, and fish and wildlife conservation between Buford Dam and Jim Woodruff Dam. Modeling will provide information on the capacity of the ACF system to meet these flows and estimate impacts to reservoir levels throughout the system.

The following assumptions and considerations are provided to help further understand the basis for the metrics developed above:

1) The Chattahoochee River metric will enhance recreational opportunities, shoal bass population and ecological and environmental quality of the Chattahoochee River flowing sections, particularly below Peach Tree Creek, by using recommended patterns of flow at National Recreational Area, both above and below Morgan Falls. A stream rating curve is needed to allow for a forecast of habitat change differences between 650 minimum flow, and 750 minimum flow to demonstrate the benefits.
2) No new reservoirs can be allowed due to increased evaporation and changes in timing of flows to downstream portions of the system. The cumulative impacts of the Glades Reservoir project and other potential projects (e.g., Bear Creek Reservoir, South Fulton) on ACF operations were not evaluated. For example, Glades will impede basin inflow into Lanier and increase evaporative losses in the watershed. The DEIS fails to explain how the hydrology of the ACF system will change in response to the inclusion of Glades and how the hydrological changes will impact ACF operations and subsequently the downstream ecosystem and communities.
3) A thorough discussion of the interactions and effects of changes to rainfall/flow and the relationship between the two with forecasted climate change is necessary and should be accomplished at the earliest possible time. Appropriate adjustments to the UIF, basin inflows, and baseline flows discussed in Section 5 should be carried out.

4) During dry periods, it is possible to allow for pulses of elevated flow to accommodate increase inundation in the floodplain, lower salinity levels in the Bay, and improved water quality in the floodplain and bay.
5) The NAA/Existing condition (current operations) should use pre-2007 changes, or earlier, instead of RIOP 2012 condition for comparison with proposed and preferred alternatives. Impacts would be identified if the baseline being considered was prior to 2006, instead of the current baseline condition (2012). These differences may require mitigation for those cumulative impacts. There is adequate data available to make this comparison (operations, inflow, consumption, etc.).
6) An over-riding commitment to an Adaptive Management approach to scheduling water releases to meet conservation needs, including climate change issues is required from the starting point recommended. Vigilance for opportunities to improve wetland function and associated ecological services is necessary.
7) Using these metrics for guiding operations could diminish impacts from the PPA and will improve the proposed operations.

Using the metrics presented above, modeling using a hydrologic and hydrodynamic model with the data sets referenced and provided in this document should allow a reasonable evaluation of the fish and wildlife conservation freshwater flow needs below Jim Woodruff Dam on the Apalachicola River.

Modeling and Analysis considerations:

Dr. Aris Georgakakos of the Georgia Water Resources Institute (GWRI) has well established hydrologic and hydrodynamic models to carry out modeling of the recommended metrics to evaluate the impacts on floodplain inundation and salinities. GWRI models were used to evaluate alternatives by the ACFS. Those modeling results for floodplain inundation and the salinity criteria were analyzed by Atkins Global. The DEIS analysis should further investigate the modeling and analysis of pulse flows to maximize the benefits for appropriate levels of inundation and salinity based on timing, frequency, and duration to mimic natural flow and salinity regime conditions to the greatest extent possible.

PART B. Short comings, flaws, and additional information needs in the DEIS

1. The Scope of the DEIS is far too narrow; further, the Scope serves to unfairly favor the needs of part of the basin and authorized purposes over others

The Scope of the DEIS precludes the consideration of many important issues and impacts, especially in the Apalachicola River, Floodplain, and Bay. The ecosystems that exist in these areas are truly unique in their natural, environmental, cultural and economic importance. They are of international, national, regional, and local significance. For the Scope to be adequate it is necessary to understand the functioning of the Apalachicola system, and how those functions depend upon timely and adequate flow in the river. The system's incredible biodiversity and ecological services are substantially degraded by low flows. Assessment of the impacts of alternatives requires an understanding of the ways in which reduced river flow will result in negative ecosystem impacts. Reduced river flow, and the reduced nutrient flow and degraded water quality that accompany it, are not addressed in the DEIS. Nor is there

any consideration of the level of flow needed to sustain the ecosystem. A competent, ethical and responsible analysis of the impacts of water flow in this system requires a thorough and comprehensive assessment of impacts in these areas. Any alternative action that is adopted should be shown to avoid, minimize, or mitigate the inevitable negative impacts of reduced flow in the Apalachicola River, in order to assure that the ecosystem functions and natural services provided within the Apalachicola Basin are sustained. Because of its constrained Scope, the DEIS fails to consider these impacts. This failure, in turn, serves to favor the needs of part of the basin over others, in a manner that we consider unethical. Further, as discussed in Section 4, this favoritism will be seen to be a failure of Environmental Justice, in a way that the DEIS fails to address.

Sadly, this is not the first time we have brought these issues before the Corps in a formal proceeding. ***Apalachicola Riverkeeper*** sent comments in November, 2013 to Colonel Steve Roemhildt ***(Attachment 1a)*** in response to the most recent change to the Scope of Work. Those comments will not be repeated here, but all remain relevant because they were not addressed in the DEIS. From our view, operations have been altered since 1958 with a consistent trend to maximize the reservoirs' benefits for upstream uses. Policy and operations have consistently targeted the minimum releases possible from those reservoirs to the Apalachicola River to meet narrowly-focused objectives that utterly fail to include any substantive evaluation of the ecosystem functions provided by the Apalachicola ecosystem, or the ecosystem services thereby furnished to people who live and work in communities in the basin.

We share the criticisms offered by The US Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) in its Draft Fish and Wildlife Conservation Report (DFWCAR) ***(Attachment 1b);*** as summarized on the first page of that attachment, the DEIS does not accurately represent or give equal consideration to the Fish and Wildlife Conservation authorized purpose. We concur with the similar criticisms from the Independent External Peer Reviewers (IEPR) ***(Attachment 1c)***; the comments from IEPR reinforce the positions of the USFWS and NOAA and add to their criticisms, citing a lack of consistency and clarity that result in confusion and baseless conclusions of the DEIS. These are summarized in the attached Executive Summary (page iii –viii) of the IEPR report. Further, we are also co-signor of the comments provided to the Corps by the National Wildlife Federation**.**

Despite listing numerous authorizations, guidance and legislation that provide both authority and responsibility for all federal actions to protect and restore the ecological integrity of ecosystem functions (i.e., ***Attachment 1d*** – National Water Policy), the DEIS does not give adequate consideration to the Apalachicola ecosystem or the citizens' natural-resource-based economy and culture as part of the Fish and Wildlife Conservation authorized purpose. Further, the current document ignores the cumulative impacts of 60 years of manipulations by the Corps, and of present and future upstream water consumption. In mistaking current conditions for 'baseline' conditions, the DEIS creates a flawed and false basis for the analysis of cumulative impacts between the "No Action Alternative" (NAA) and "Preferred Action Alternation" (PAA). To claim that proposed conditions are only slightly worse than current conditions is equivocating over fully-documented impacts, which show the Apalachicola ecosystem to be significantly degraded by current policies and practices.

This DEIS must be redone to consider a more healthy condition of the Apalachicola River, Floodplain and Bay ecosystem as a whole for the historical baseline comparison to recent (NAA) and proposed (PAA) evaluations of the estuarine and floodplain conditions.

2. Overall ecological system function is not assessed, addressed or considered by the limited focus of the DEIS

2a. Ecosystem dependence upon level and timing of flows

The ACF System and particularly the Apalachicola River, Floodplain and Bay and the eastern Gulf of Mexico are an inextricably-linked ecosystem in which river flow is the primary driver of its biological diversity and ecological and economic productivity. It is a unique and significant ecological resource hosting the highest biodiversity of any river system in North America and one of the most productive estuaries in the northern hemisphere. Economically, the fisheries supported by the Apalachicola system are valued in the billions of dollars. These values have been recognized for decades and provide a basis for exceptional efforts to understand, protect and maintain the system's ecological integrity, economic vitality, and natural resource benefits to the greatest extent. Climate change and extreme pressure from water use on river systems around the world are causing the loss of natural systems' productivity. Numerous examples are available which demonstrate how the proposed alternatives will result in eventual loss of the ecosystem services now provided by the Apalachicola system.

It is environmentally unacceptable and economically infeasible to ignore this system, where management can sustain its integrity if properly understood and appropriate action taken.

2b. Changes in flow

The DEIS does not describe or address changes in the flow regime due to the Corps management of the ACF system or to increased consumption. Without recognition of these basic needs to meet the Fish and Wildlife Conservation authorized purpose in the Apalachicola portion of the system, there is no opportunity for consideration of providing alternatives that would protect, restore or improve conditions. Analysis for the ecosystem should include: protection of the natural pattern of seasonal low, moderate and high flows; maintaining or restoring floodplain inundation; and distribution of flood waters to maintain the fish, wildlife, and botanical resources of the River, Floodplain and Bay.

2c. Impacts of changes in flow

The DEIS should recognize that change in the flow regime has caused declines in species abundance and reduced areal occupancy; many areas in the flood plain are no longer suitable habitat because of sustained dry conditions. There is potential for extirpation from the Region of Impact if additional change above that already experienced occurs. The DEIS accepts the current operations of the NAA as if they are adequate to sustain a healthy ecosystem in the Apalachicola. This is wholly false: the system is neither healthy nor being sustained. The PAA is considered only slightly (not significantly) worse than the NAA, despite the fact that drought conditions will be more frequent and more severe. The DEIS does not recognize that even small negative changes to previously-stressed systems can cause significant ecological upheaval.

The lack of understanding of the systems' dependence upon the level and timing of flows causes the cumulative impact analysis to erroneously conclude that current operations and the proposed alternatives will not have an appreciable or significant effect, and that no mitigation is required. This is simply not true.

2d. The DEIS lacks a discussion of how flow sustains the River, Floodplain, and Bay and Eastern Gulf

Flows needed to sustain the most basic of the ecosystem functions must be considered to avoid a loss of floodplain connectivity; only when water flows (and therefore, water levels) are high is the floodplain fully connected to the river. This connection is essential, so that the inundating flows carry life-sustaining nutrients to the estuary and to the Bay. Further, the flow of nutrients continues some 250 miles southward in the eastern Gulf; this so-called Green River is crucial to the health and growth of many commercially-important species of finfish offshore. The timing and the areal coverage of the floodplain inundation is critical to the vegetation, fish and wildlife that make up the complex of plants, fish, birds, reptiles, crustaceans, amphibians and mammals (including humans) that use the floodplain for nourishment, growth, foraging, spawning, resting and protection. Under truly natural conditions, the hydrologic connectivity of the floodplain to the main river channel provides the mechanism of transport of water to the vital areas of the floodplain at the appropriate time and for sufficient duration to support the diverse assemblages of species that inhabit and use the floodplain. The importance of the floodplain inundation is well-documented in the literature and can be found in the documents included in the Apalachicola River and Bay Management Plan (***Attachment 3b***), ***Livingston 2008*** (***Attachment 4a***), and other reports and documents including but not limited to: ***Livingston 1983, Livingston 2015***; and the 3 USGS Reports - ***Light 1998, Light 2006, and Darst 2008***.

2e. Importance of Inundation

The USFWS Planning Aid Letters and the USGS documents (***Darst 2008, Light 2006, and Light 1998***) explain that the timing, duration, and depth of inundation of the floodplain are important to the vegetation of the floodplain for propagation and growth of the bottomland hardwood forest. Forest density, composition, tree size, age, mortality, and recruitment are all part of the forest ecosystem upon which the wildlife depend. As the floodplain becomes drier due to reduced duration and depth or offsets in the timing of flood flows, the forest loses density, mass, and canopy cover. Apalachicola Floodplain has experienced a loss of over 4 million swamp trees, primarily Tupelo, Cypress and Popash. The decrease in forest density and canopy will result in an increase in light on the forest floor, thereby encouraging a thicker growth of ground cover plants, which in turn will further reduce the success of forest replacement. If these changes continue, a resultant loss of leaf litter biomass, increase evaporation from the soil, decrease in soil organisms, and speeding up decomposition of the leaf liter. These changes and loss of biomass would result in a net loss of substrate for benthic organisms in the floodplain and ultimately downstream waters of the river, delta and estuary. (***Darst 2008, Light 2006, and Light 1998***)

2f. Importance of flow to the Bay

As flows move through the complex of sloughs and distributary creeks of the Floodplain and Delta, nutrients are accumulated and carried to the estuarine nursery areas of the Bay. This creates a low-salinity, high-nutrient condition conducive to growth and development of larval and juvenile stages of most (over 90%) of all commercially harvested species in the Gulf of Mexico. Apalachicola Bay has up until the very recent drought produced 90% of the oysters in Florida and over 10% of the national harvest from native oyster bars. Native oyster reefs are in global peril and over the last two centuries, 90% of native oyster reefs have become functionally extinct, as was reported in the journal *BioScience*

in 2011 (***Beck 2011***). That same report, before the BP oil spill, looked to the Gulf of Mexico as the last remaining region on the planet for sustainable harvest from native oyster reefs. We know that Apalachicola Bay's situation is even more rare and important now, given the subsequent damage. The nutrient-laden flows support and balance the food web and habitats within the estuary (***Attachment 4a, Livingston 1983, Livingston 2015***). Those same nutrient rich freshwaters move over 250 miles offshore and nourish the habitat and mature stages of the same recreational and commercially-harvested species as described in ***Attachments 5a, 5b, 5c, and 5d***) that NOAA has valued at over $5.8 Billion (***Attachments 6a and 6b***).

3. Impacts of Reduced River Flow and the need to consider and accomplish a more balanced alternative is missing in the DEIS

3a. Low Flow Impacts to Riverine Hydrology and Biology

Drought imposes highly-stressful conditions on ecosystems. To impose increased severity on the biological resources of an ecosystem during high-stress drought conditions ignores well-documented information related to conditions on Apalachicola River, Floodplain and Bay. These conditions are leading to degradation and collapse of the ecosystem. The three USGS Reports (***Darst 2008, Light 2006, and Light 1998***) and ***Attachments 3b, 3c, 3d and 3e*** provide an overview of the impacts to the Apalachicola River Floodplain due to reduced high, median, low, and drought flows. During the drought of 2006-2007 and 2011-2012 just such an increase in stress was put on the Apalachicola ecosystem by the Corps' operations with the ultimate result being degradation of water quality and loss of floodplain and fish habitat. The consequences were near-ecological-collapse of the estuary during and following both drought periods, with significant declines in every commercial fishery in the estuary. Since 2012, over three years since the 2012 drought, Apalachicola Bay is experiencing only a meager recovery from those stressful conditions. These impacts were documented in the ***Apalachicola Bay Oyster Situation Report.***

3b. The Apalachicola River Floodplain and Bay are not healthy and are under significant stress from a documented altered flow regime.

Flows during droughts are even more critical because of the compromised conditions existing across the ecosystem. Hydrographs in ***Attachment 1e***, based on the observed flow data in ***Attachment 2d***, show the differences between observed pre- and post-dam flows on the Apalachicola. These changes in flow are primarily due to: (a) Corps operations; (b) residential water consumption; (c) evaporation in the basin due to reservoirs; (d) municipal and industrial water supply; and (d) agricultural irrigation (as shown in ***Attachments 2a and 2b***). Altered timing and reduction of flow magnitude by the quantity shown in these attachments can be equivalent to a 40-50% reduction of flow below normal to the Apalachicola River, Floodplain and Bay during dry and drought periods. Reducing flows to the Apalachicola portion of the system that do not mimic natural flows commensurate with changes in rainfall, can cause the system to degrade or fail. A report by Steve Leitman (***Attachment 2c***) compares the relationship between rainfall and flow alterations in the Apalachicola, and explains that flows during earlier more-severe droughts have been higher than flows in more recent less-severe droughts in the Apalachicola. This can only be explained by increased water depletions from use, water regulation, and/or reservoir evaporation in the upstream basin. The DEIS does not include any information that supports lower flows from climate change.

3c. Documented impacts of low flows

The document at ***Attachment 3f*** (*Presumptive Flows Standards*, by Brian Richter*)*, concludes that a river system experiencing a 10% reduction in the pre-development flow regime may maintain its ecological functions, while a 20% reduction of flow in the natural river flow regime is significant enough to result in significant loss of ecological functions and integrity. ***Attachment 4d*** also highlight the impacts to streams from reduced flow. The Corps' failure to compensate for the water uses in Georgia or to impose limitations on Georgia to allow the Corps to meet it authorized purpose for Fish and Wildlife Conservation is a defacto allocation of water away from Florida.

An appropriate preferred alternative would consider the flows needed to sustain a healthy river and floodplain connection and mimic the frequency, timing and duration of the natural flow regime and floodplain inundation conditions during droughts.

3d. Low Flow Impacts to Estuarine Ecology

During normal low flows, less water is carried through the floodplain and results in an overall reduction of nutrients, lower Dissolved Oxygen (DO) and increase salinity in the Bay. During typical low water months, and particularly during droughts, higher salinities increase the naturally-occurring diseases and predators that prey on oyster beds in the Bay, and which decrease DO near the bay floor. As lower-than-normal drought flows are released by the Corps, water quality impacts cause even higher salinities for prolonged periods, lower nutrients and DO, increased disease and predation on oysters, which combined, result in an overall loss of oyster, fish, shrimp, crab, and wildlife in the estuary. ***Attachments 4a, 4b, 4c, 4e and 4g*** explain and demonstrate the importance of river flows to the water quality and estuarine conditions of Apalachicola Bay and document water quality impacts during drought conditions. Salinity data for Apalachicola Bay was received from the Apalachicola National Estuarine Research Reserve is included in ***Attachment 4f*** and serves as the basis for demonstrating much of the discussion in these comments and emphasized in ***Attachments 4a - 4d***.

3e. Related Marine Ecology of the Gulf of Mexico

Because the ACF System provides 35% of the freshwater flow to the Eastern Gulf (***Edmiston 2008***), it is logical to correlate the freshwater flow and related nutrients' contribution to the health and productivity of the offshore fisheries and habitat in this region of the Gulf. ***Attachments 5a, 5b, 5c, 5d, and 4c*** provide an explanation of the importance of the freshwater and nutrient plume from the ACF System to the eastern Gulf. Once the connection with freshwater flows from the ACF System to the health of the Eastern Gulf fisheries is understood, it is important to recognize the economic importance of those flows to West Florida, and ultimately the SE United States. Those values have been evaluated by NOAA in ***Attachment 6a***. A further analysis of the NOAA estimated value of the fisheries of Apalachicola Bay and the Gulf (***Attachment 6b***) shows the value to West Florida to be over $5.8 billion. The linkages of the same freshwater flows which nourish Apalachicola Floodplain, Delta, and Bay with the productivity of Gulf fisheries provide an obvious correlation between appropriate freshwater flows and a healthy Gulf fishery and Essential Fish Habitat (EFH). This further emphasizes the importance of consideration for the flows needed to sustain a healthy River, Floodplain and Bay as a critical component of a complete DEIS.

Flows that sustain a healthy estuarine environment should also provide the Gulf marine environment with adequate nutrient output to sustain offshore fisheries, including Essential Fish Habitat.

4. The DEIS should consider Conjunctive Uses of water releases

Water Releases with Conjunctive Uses are those that meet multiple purposes and that also benefit the ecology of the Apalachicola River, Floodplain and Bay. Such releases would improve flows for the river, floodplain and bay and would also benefit hydropower, recreation and navigation in the basin below Lake Lanier. Properly managed, conjunctive-use releases would have little or no impacts to the capacity or ability for north Georgia metro water supply demands to be met. Such releases are not critically evaluated in the DEIS.

For example: target releases for navigation established in the DEIS alternatives did not consider the potential for benefits to the ecology of the Apalachicola River, Floodplain and Bay. Such releases were explained in the Sustainable Water Management Plan (SWMP) (***Attachment 3a***) provided by the ACF Stakeholders and the USFWS in its Planning Aid Letters. The SWMP provides detailed information that demonstrates that the release of relatively minor pulses during dry periods (to more closely mimic natural flow paradigm) can lower salinity in Apalachicola Bay to the extent that it stress on the oyster population could be moderated.

In PART A of these comments, we have suggested pulse flows of 12,000 cfs as an example of an alternative scenario the Corps could consider to achieve conjunctive uses. The basis for that selected flow is the benefits that would be achieved by such a flow, including but not limited to: flushing flows in the larger slough systems of the floodplain improving water quality and fish habitat, a pulse of nutrients would be supplied to the Delta and estuary, an increase in DO and an estimated 3- 4 ppt decrease in salinity of the Bay at Cat Point for a period of time, a 5' depth for a navigation channel without dredging, and increase water availability for hydropower, low-consumption/high-return rate industry, recreation, and fish and wildlife conservation between Buford Dam and Jim Woodruff Dam.

The Corps is unique in its failure to fully analyze such multipurpose flows. In contrast, USFWS is considering similar adjustments in Corps flow regulation; these adjustments would benefit oyster and gulf sturgeon habitat and spawning. The Florida Fish and Wildlife Conservation Commission (FWCC) demonstrated in its summary report (***Attachment 3c***) how increasing river levels above 10,000 cfs maintains habitat and water quality in the Apalachicola Floodplain. Flows that are sufficient to maintain water quality in the floodplain can also benefit navigation (without inducing the impacts associated with dredging), recreation, estuarine habitat and water quality, and hydropower.

Conjunctive uses of water that improve ecological conditions in the basin should be included in the evaluation of alternatives to provide a more balanced and equitable range of benefits to all users in the basin.

5. The DEIS does not provide an Environmentally Preferable alternative using the best available data and science

5a. The estuary is currently neither healthy nor sustainable.

In contrast to the DEIS statements that Apalachicola Bay is a relatively healthy estuarine ecosystem, ***Attachments 7a and 7b*** document impacts to the estuary during the droughts of 2007 and 2012. These were periods during which drought flows were lower than ever before recorded and well below what a natural flow regime would have provided during similar drought conditions. Leitman provides a comparison of drought flows and their relationship in ***Attachment 2c***. The 2nd slide in ***Attachment 3e*** depicts the flow during 2007 relative to the average flow from 1923-2009. The flat-line low flow released during 2007 was unprecedented and was followed by a similar record flat-lined low flow for a duration that lasted for an even greater time period during 2011-2012. Further documentation of the decline of Apalachicola Bay immediately after the prolonged periods of flat lined extreme drought flows are also documented in the April 2013 ***Apalachicola Bay Oyster Situation Report*** from the Oyster Recovery Task Force.

An appropriate preferred alternative would consider the flows needed to sustain as healthy an estuarine condition in Apalachicola Bay during droughts as possible.

5b. Climate change, rainfall, and runoff

The discussions of climate change and rainfall/runoff relationships provided in the DEIS are not well-founded and do not support or justify the reductions in flow that have been experienced or that have been recommended. Recommendations on the flow needs for riverine and estuarine ecosystems that will maintain ecological functions are found throughout the literature, and can be found specifically in documents outlining the presumptive standards and calculable quantities for instream flow needs developed by Brian Richter et al. (***Attachment 3f***), recommended for use by The Instream Flow Council (***Annear 2004***), and outlined in the USFWS Planning Aid Letters provided to the Corps. The need to mimic the natural flow regime, and to limit alteration thereto, is clearly described in these and other literature. The Corps (and its contractors) with the responsibility to meet the Fish and Wildlife Conservation authorized purpose should be well-versed in the determination of the flow needs for systems such as the Apalachicola or should defer to experts in the instream flow field. Documentation of flow alteration due to climate change should be included as a high priority for research for the ACF Basin.

A comprehensive study of instream flow needs should be undertaken to establish the natural flow regime requirements for Apalachicola River, Floodplain, and Bay before any re-allocation of water is undertaken.

5c. The Unimpaired Flow Database (UIF) is not scientifically valid.

The Unimpaired Flow Database (UIF) and Basin Inflow calculation were not updated. Because the original calculations were based upon insufficient and/or invalid data, evaluations based on these data are necessarily inaccurate. Modeling investigations should explore why the UIF flows data being used by the Corps in the lower Flint River Basin are very close to the current USGS observed flows. Given the known volume of depletions in that region, these figures **MUST** differ substantially. The similarity of these two flow data sets clearly show that the large depletions of flow from municipal and industrial use, agricultural irrigation and evaporation in the Flint River Basin are not accurately represented in the

UIF data set. This inaccuracy completely discredits the evaluations of alternatives and most modeling exercises undertaken by the Corps, by making it appear that less water would have been flowing in the Apalachicola portion of the system in pre-developed times represented by the UIF data set. These inaccuracies have led the Corps to consider the flows currently being released during droughts to the Apalachicola are the same or close to natural flows during droughts. This is false. Some of the problems associated with the UIF were outlined in the Draft UIF Report by GWRI/GT, 2012. This document was released to the Corps for review.

The methods used by the Corps to calculate basin inflow provide for reducing flows more often and earlier as water consumption increases, placing the burden of the drought operations on the Apalachicola portion of the system, while providing water supply users with no incentive to conserve water use. The flaw in this method of deciding to reduce flows downstream of Jim Woodruff is discussed in more detail in ***Attachment 2c and 2e***. A more balanced approach to curtailing water use and at the same time reducing downstream flows for implementing drought operations will improve flow conditions in the Apalachicola.

The Corps' assumptions and results are inconsistent with the impacts being realized in the floodplain and estuary; and, therefore underestimate the cumulative impacts being experienced by the ecosystem and economy due to the Corps' operations.

5d. Conclusions in the DEIS regarding Anthropogenic Impacts to Apalachicola Bay are not supported

The DEIS surmises that Apalachicola Bay has been subjected to numerous anthropogenic impacts including, but not limited to, sea level rise, climate change and harvesting impacts. The implication is that these impacts are the cause for changes to conditions in the Bay. The runoff/rainfall data and analysis provided in the DEIS appears to be intended to show changes to this relationship from anthropogenic and other changes, but is inadequate to be evaluated or accepted. While all of these factors and others may have an effect, the degree of the impacts being experienced in the Bay from these and other causes is not supported by available data, nor is it included in the DEIS. Tellingly, the predominant cause for the recent fisheries collapse has been documented as a lack of freshwater flow (FWCC Disaster Declaration report ***Attachment 7a and 7b***) and the referenced ***Apalachicola Bay Oyster Situation Report 2013***).

Sea level rise is noted in the DEIS to be 0.05 inches/year (1.27mm/year) in the climate change section. This section concludes that the Corps' operations, as planned, will be adequate to handle the forecasted climate changes. At the same time, the DEIS insinuates that the Bay condition is a lost cause due to the suspected increase in sea level rise and/or other anthropogenic impacts. These conclusions conflict and are not supported. According to NOAA, Apalachicola Bay has been experiencing a 1.82 mm/year rise in sea level in the more recent past, which is the lowest rise in sea level recorded among all locations monitored by NOAA on the Gulf and Southeastern Atlantic coasts. No effects have been documented in Apalachicola Bay from either the rise in sea level or increased carbon. Climate-change-induced reductions in flow that reach the level of decline being realized in the Apalachicola Basin have not been demonstrated. There is a need to accurately assess rather than assume certain conditions exist, have resulted in an impact, or project impacts will occur. Potential impacts to Bay salinity could be evaluated with an appropriate hydrodynamic model such as that developed by Aris Georgakakos.

Impacts due to anthropogenic activities can be considered valid after a reasonable assessment of the conditions have been thoroughly considered. Management should continue to assess the climate conditions and rainfall/runoff relationship that exist throughout the River, Floodplain and Bay in order to accurately evaluate impacts and manage for change.

6. The Corps creates an environmental injustice by not recognizing the cultural aspects of the Oystermen community

According to EPA, *"Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work."*
(http://www3.epa.gov/environmentaljustice/)

In the real world, we understand Environmental Justice to mean that the communities of least resistance are not unduly burdened by our environmental choices, which they are largely helpless to alter. In the ACF system, the community most burdened by the current Corps operations, and which will be further burdened by the proposed revisions, are the poor and powerless fisheries harvesters that work the Bay, the Estuary, and the Floodplain. Their livelihoods, their culture, and their social relationships, arrangements, and institutions depend on the ready availability of healthy organisms and other natural products to harvest. Their very economic and cultural existence is threatened by the proposed alteration. As noted by scholar John Moran in his comments regarding Section 6.5.8 of the DEIS:

> *The threat of collapse of the oyster industry is an environmental justice issue in Eastpoint, qualifying under low-income community. The oystermen of Eastpoint and Apalachicola are widely recognized in Florida by journalists, travel writers, authors, and social science researchers as a distinct cultural group. This increasingly low-income, often multi-generational population of resource users also relies on subsistence to supplement their diets. The oystermen are facing suicide, homelessness, drug addiction, and other social ills related to resource disaster in the Apalachicola Bay. Some of the oystermen have indigenous heritage. Other oystermen are illiterate and have limited schooling. Professional oral historians, such as Amy Evans for the Southern Foodways Alliance at the University of Mississippi, have documented this unique cultural heritage, including the local invention and manufacture of tongs, the local ecological knowledge of the community, and the transmission of this knowledge across multiple generations, leading back to the first wave of settlers in the community. Based on my training in environmental justice literature at Stanford University's Department of Anthropology, I testify that the oystermen population in Eastpoint is a low-income community whose economic and social health is totally inseparable from the Apalachicola Bay. The need of their community for a functioning estuary must be considered and assessed through an environmental justice framework using quantitative and qualitative data at the municipal, rather than regional, level.*

This lack of Environmental Justice receives no substantive consideration in the DEIS; this omission is in clear contradiction to EPA policy, is completely unacceptable and must be rectified.

7. Summary and conclusion

The members, board, and staff of ***Apalachicola Riverkeeper*** believe that the Corps has an ethical and legal responsibility to include a full assessment of the freshwater flow needs of the Apalachicola River, Bay, Estuary, and Floodplain in the update of the ACF WCM. This is especially crucial and critical given that this is the first revision since 1958, and likely the last for many years to come. Conditions have changed substantially in the last 56 years, and will continue to change. This may be the Corps' last meaningful chance to get it right, and to protect the future of our unique, and uniquely-valuable resource. Once lost, it is unlikely ever to be recovered.

We ask that you consider the following summary (repeated from our earlier comments) in your decisions:

The Apalachicola River, Floodplain, and Bay System is a national treasure and one of the most productive river systems in the North America. Its significance cannot be overstated. It has been designated as an International Biosphere Reserve by the United Nations, as a National Estuarine Research Reserve by the United States, and as an Outstanding Florida Water by the State of Florida. The river harbors the most diverse assemblage of freshwater fish in Florida, the largest number of species of freshwater snails and mussels, and the largest number of endemic species in western Florida. The river basin is home to some of the highest densities of reptile and amphibian species on the continent and the river's floodplain boasts one of the most diverse floodplain forests in North America.

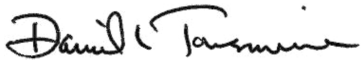
The Apalachicola River's waters and floodplain are also the biological factory that fuels the Apalachicola Bay - one of the most productive estuaries in the Northern Hemisphere. The Apalachicola Bay is home to one of the largest and most productive oyster harvesting areas in the Gulf of Mexico, one of the principal nurseries for Gulf shrimp and blue crabs, and major commercial fishing operations. Apalachicola Bay provides nearly 90 percent of Florida's oyster harvest and over ***10 percent of the nation's oyster harvest****. The river and bay provide thousands of commercial fishing, recreational fishing, and ecotourism jobs. These jobs form the cornerstone of the economy for the six Florida riparian counties along the Apalachicola River.*

Apalachicola Riverkeeper has repeatedly urged the Corps to develop a water management regime for the ACF system that will protect and recover the ecological health of the Apalachicola River and Bay and the entire ACF system. Fundamental to such a regime is the establishment and maintenance of the ecological in-stream flows needed to protect and restore the chemical, physical, and biological integrity of the ACF Rivers and the species that depend on them. **We respectfully urge you to institute the assessments and considerations outlined above to ensure that this happens. Without the protection of these flows, the Florida citizens' livelihoods, cultural heritage and communities with economies that depend on the functioning of these natural systems will be lost.**

*Apalachicola Riverkeeper is also submitting a separate set of additional comments that are signed jointly by Apalachicola Riverkeeper, National Wildlife Federation, Florida Wildlife Federation, and 1000 Friends of Florida. These group comments are in addition to the comments provided in this document.

Thank you for the opportunity to provide comments. We look forward to working with the Corps to accomplish a WCM that we can all live with.

Sincerely,



Dan Tonsmeire
Riverkeeper
Dan@Apalachicolariverkeeper.org

Cc:
The Honorable Jo-Ellen Darcy, Assistant Secretary of the Army (Civil Works)
Lieutenant General Thomas P. Bostick, USACE Commander General and Chief of Engineers
Major General Ed Jackson, USACE Deputy Commanding General for Civil Works and Emergency Operations
Brigadier General David Turner, USACE Commander, South Atlantic Division
Office of General Counsel, USACE
The Honorable Christy Goldfuss, Chair, President's Council on Environmental Quality
The Honorable Gina McCarthy, Administrator, U.S. Environmental Protection Agency
The Honorable Dr. Kathryn Sullivan, Secretary, U.S. National Oceanic and Atmospheric Administration (NOAA)
The Honorable U.S. Senator Bill Nelson - Florida
The Honorable U.S. Senator Marco Rubio – Florida
The Honorable U.S. Representative Gwen Graham – Florida District 2
The Honorable Governor Rick Scott - Florida
The Honerable Bill Montford, Florida State Senator
The Honorable Brad Drake, Florida State Representative
The Honorable Halsey Beshears, Florida State Representative
Jon Steverson, Secretary, Florida Department of Environmental Protection
Nick Wiley, Director, Florida Fish and Wildlife Conservation Commission

Reference List

Ager, L. C., Mesing, C. L., Land, R. S., Hill, M. J., Spelman, M., Rousseau, R., & Stone, K. (1986). *Five year completion report (1981-1986): Fisheries ecology and dredging impacts on the Apalachicola River system.* Prepared for the State of Florida Game and Fresh Water Fish Commission.

Annear, T., Chisholm, I., Beecher, H., Locke, A., Aarrestad, P., Coomer, C., Estes, C., Hunt, J., Jacobson, R., Jobsis, G., Kauffman, J., Marshall, J., Mayes, K., Smith, G., Wentworth, R., & Stalnaker, C. (2004). *Instream flows for riverine resource stewardship, revised edition.* Instream Flow Council, Cheyenne, WY.

Edmiston, H. L. (Ed.). (2008). *A river meets the bay: a characterization of the Apalachicola River and Bay system.* Apalachicola, FL: Apalachicola National Estuarine Research Reserve.

Edmiston, H. L. & Tuck, H. A. (1987). *Resource inventory of the Apalachicola River and Bay drainage basin.* Apalachicola, FL: Office of Environmental Services, Florida Game and Fresh Water Fish Commission.

Leitman, H., Sohm, J. & Franklin, M. (1984). *Wetland hydrology and tree distribution of the Apalachicola River flood plain*. (U.S. Geological Survey Water Supply Paper 2196). Washington, DC: U.S. Government Printing Office.

Livingston, R. J. (2015). *Climate change and coastal ecosystems*. Boca Raton, FL: CRC Press.

Livingston, R. J. (1983). *Resource atlas of the Apalachicola estuary*. (Florida Sea Grant College Program, Sea Grant Project No. T/P-1, Grant No. NA80AA-D-00038, Report 55). Gainesville, FL: Florida Sea Grant College Program.

Livingston, R.J., Leitman, S., Woodsum, G., Galperin, B., Homann, P., Christensen, J. D., & Monaco, M. E. (2003). *Relationships of river flow and productivity of the Apalachicola River-Bay system.* Tallahassee, FL: Florida State University.

Locke, A., Stalnaker, C., Zellmer, S., Williams, K., Beecher, H., Richards, T., Robertson, C., Wald, A., Paul, A., & Annear, T. (2008). *Integrated approaches to riverine resource stewardship: case studies, science, law, people, and policy.* Instream Flow Council, Cheyenne, WY.

Shields, J. & Pierce, B. D. (1997). *Comprehensive shellfish harvesting area survey of Apalachicola Bay, Franklin County, Florida*. Tallahassee, FL: Florida Department of Environmental Protection.

U. S. Department of Commerce's National Oceanic and Atmospheric Administration. (2013). *Apalachicola Bay Oyster Situation Report.* Grant No. NA10-OAR4170079. Gainesville, FL: Florida Sea Grant College Program.

Beck, Michael W., Robert D. Brumbaugh, Laura Airoldi, Alvar Carranza, Loren D. Coen, Christine Crawford, Omar Defeo et al. "Oyster reefs at risk and recommendations for conservation, restoration, and management." *Bioscience* 61, no. 2 (2011): 107-116.

Darst, M.R., Light, H.M., 2008, Drier Forest Composition Associated with Hydrologic Change in the Apalachicola River Floodplain, Florida: U.S. Geological Survey Scientific Investigations Report 2008-5062, 81 p., plus 12 apps. Found at http://pubs.usgs.gov/sir/2008/5062/

Light, Helen M., 1998, Aquatic Habitats in relation to river flow in the Apalachicola River Floodplain, Florida / by Helen M. Light, Melanie R. Darst, and J.W. Grubbs. Found at http://fl.water.usgs.gov/PDF_files/pp1594_light.pdf

Helen M. Light[1], Kirk R. Vincent[2], Melanie R. Darst[1], and Franklin D. Price[3], 2006, Water-Level Decline in the Apalachicola River, Florida, from 1954 to 2004, and Effects on Floodplain Habitats. Found at http://pubs.usgs.gov/sir/2006/5173/

Apalachicola Bay Oyster Situation Report, 2013. Found at: http://www.flseagrant.org/wp-content/uploads/tp200_apalachicola_oyster_situation_report.pdf

From: Cynde Aaron <>
Sent: Saturday, January 30, 2016 6:23 AM
To: ACF-WCM
Subject: [EXTERNAL] Protect Apalachicola River and Bay

I understand you are having a meeting soon to discuss the fate of the Apalachicola River system. I encourage you to vote for protection of the river and bay. As you know, this is an important estuary system and somewhat healthy, considering the loss health of may such systems due to the BP oil spill. The estuary is a great resource for our sea life to reproduce in the safety of its bay. Our fishing industry needs this resource, as well as the marine animals themselves. Again, I encourage you to side on the side of protection of our wild resources. A

Thank you.

Cynde Aaron
Gulf County resident and voter
Wewahitchka, FL

Response to ACF228 – Cynde Aaron

A. The authorized purposes of the federal ACF system do not include a specific directive to provide freshwater inflows to Apalachicola Bay to sustain the resources of the Bay. However, the environmental effects of the PAA on the Apalachicola River and Bay, when compared to the NAA (i.e., current reservoir operations), are considered in the EIS. The analysis in the EIS demonstrates that the PAA would result in little to no change in flow and water quality conditions in the Apalachicola River and Bay, and consequently there would be little to no effect on biological, cultural, and other resources in the river and bay. USACE consulted on the PAA and the results are presented in appendix J of the final EIS. In the biological opinion the USFWS concluded that effects to estuarine invertebrate production are insignificant because the PAA provides slightly beneficial effects from increasing the number of freshwater pulses and increasing the number of days greater than or equal to 16,200 cfs in the winter. USFWS also anticipate only minor changes in salinity regimes and estuarine habitat due to the WCM.

Response to ACF229 – John Howard

From: John Howard
Sent: Friday, January 29, 2016 3:34 PM
To: ACF-WCM
Subject: [EXTERNAL] PUBLIC COMMENT FROM JOHN HOWARD, CUMMING, GA
Attachments: WCM Comments.docx

Sirs,

Please find the attached comments with regard to the ACF–WCM. It is requested that serious attempts be made to fold some of the enclosed constructive suggestions into the draft WCM. These suggestions are intended to reinforce and elucidate some of the excellent comments provided by the Lake Lanier Association.

Thanking you for your attention,

John Howard

1

Future Challenges to the ACF System
The most crucial and least understood aspect of ACF operations is that the entire basin is being served by a lake system that can store only 72 B Cu ft or one eighth of an average year's basin flows. It has become increasingly obvious to all concerned that in the current unsettled climatic conditions, Corps' operations must be improved to ensure that this fragile water reserve is protected at all costs, particularly in drought years. A

Twice in the past decade lake storage has been depleted by over 70%. In each case, a succeeding drought year would have brought the basin to its knees - zero flows at Woodruff dam. This good luck may not continue.

Navigation
Revise or scrap the navigation plan to avoid the severe impact that it will have on Lanier's water levels and lake storage as a whole. Today, the ACF lakes lose 4,320 Cu Ft of storage for each ton carried, versus 670 Cu Ft in 1985. This seven-fold increase in stress on the lake storage system is inconsistent with the Corps attempts to actually improve management of the ACF system during drought years. Today, one day of navigation is equivalent to the loss of one foot at lake Lanier. Two weeks of navigation is equivalent to the loss of one third of the entire ACF lake storage. A major advantage of de-authorizing the current navigation requirements is that it will eliminate one of the many complex constraints on Corps' operations.

The basic facts are that with the lakes 100% full, navigation flows of 20,00 cfs would deplete the storage in 6 weeks, or 5000 cfs minimum flows at Woodruff would deplete the storage in 24 weeks. However, in drought seasons, when the lakes usually are already sitting at 50% full, navigation requirements would deplete the storage in 3 weeks, or 5000 cfs minimum flows at Woodruff would deplete the storage in 12 weeks. B

Recreation
When compared to other constraints on ACF basin management, recreation falls into an entirely different category. All other aspects are not only highly dependent on a healthy and abundant ACF lake system, they also have the potential to draw down and degrade the system. Recreation, on the other hand is relatively neutral, in that it has side benefits from a healthy system but has little deleterious impact on the system as a whole. C

Monitoring
Incorporate operating techniques that will rigorously and continuously monitor lake levels during both drought or high rainfall flooding conditions. In particular, the most important metric will be to optimize the use of flows in the current year while minimizing reliance on water stored in previous years. D

Current Management Methods
Progressively incorporate modern feedback operating techniques to replace the current operating protocol. Current ACF basin operations are based on techniques that are at least 60 years old. Today, releases are not automatically controlled, but rather based on a step-wise zoning system, requiring frequent judgement calls on the part of system managers. It's natural that these calls frequently miss the mark. The proposed WCM indicates that there is absolutely no attempt to relinquish the comfort provided by these old safety belt methods. Typewriters have long been replaced by electronic tablets featuring cut-and-paste, spell check, etc. Few would contemplate returning to the old way. E

Future Management Methods
The same is true for modern, feedback technology. Studies have shown that such technology offers a more stable and efficient way of running the ACF lake system. Stability makes it possible to operate the lakes so that their drought and flood boundaries can be readily avoided. These modern methods would make daily adjustments and incorporate the ability to use past data trends and future predictive trends to assist managers to 'aim' releases to the desired optimum outcome. Storage of past historical data would also allow managers to set the control system to automatically follow the best fit with similar conditions in previous years. With F

Response to ACF229 – John Howard

A. As shown in Figure 6.1-6 of the EIS, the PAA would likely result in lake levels at Lake Lanier ranging from about 2 to 4 ft lower than those for the NAA. That condition would be expected to occur less than 2 percent of the days over the entire modeled period of record (73 years) during the worst drought conditions for that period. The differences would be attributable largely to increased water supply withdrawals from the lake as well as increased releases from Buford Dam to meet future water supply demands for Metro Atlanta users (i.e., Cobb, Fulton, and DeKalb counties and the City of Atlanta). It should be noted that navigation is not supported when drought operations are in effect.

B. USACE proposed and evaluated water management measures and alternatives that balance across all authorized project purposes, while considering Georgia's water supply storage request as directed by the 11th Circuit Court of Appeals. To maintain higher pool levels, sacrifices would be made for other project purposes including hydropower, water supply, water quality, navigation, and fish and wild life coordination.

C. Sophisticated instrumentation is used to monitor critical project data such as pool elevation and discharge on an instantaneous and continuous basis. That information is fed directly into the water management data storage system. The basin managers monitor and use the information in directing reservoir operations. Water management of the ACF system used all water storage in the reservoirs. Utilization of water from storage is not limited to water entering the reservoir in the current calendar year. Such an operation was not anticipated in the design of the system and would not support meeting the authorized project purposes.

D. Today's basin managers have access to the reservoir real-time data such as inflow, pool elevation, discharge, flow from tributaries, real-time radar, and forecasted precipitation/river levels in the palm of their hands on smartphones. Substantial progress has been made in the last 60 years. The Corps Water Management System (CWMS) is the automated information system used by USACE to support its water control management mission. That mission encompasses the regulation of river flow through more than 700 reservoirs, locks, and other water control structures located throughout the nation.

   CWMS is an integrated system of hardware and software that begins with the receipt of hydromet, watershed, and project status data. Those data are then processed, stored, and made available through a user-friendly interface to the water manager to evaluate and model the watershed. Both model and processed data can be displayed and disseminated in tabular, graphical, and/or geospatial format resulting in an effective decision support system. Although automated tools are made available to basin managers, current USACE policy requires human interaction in water management operations.

E. USACE policy does not support setting water management decisions to be controlled by an automated system. The USACE Hydrology, Hydraulic and Coastal Community of Practice (HH&C CoP) is the steward of the body of knowledge constituting the professional practice of hydrology, hydraulics, and coastal engineering. The HH&C CoP is responsible for documenting the state of practice, fostering and promoting growth and development of needed technology, providing access to subject matter experts, providing outreach to others, establishing and operating mechanisms for promoting best practices and capturing, and making available lessons learned. Water management is a subcomponent of hydrology, hydraulics, and coastal engineering. The Mobile District is an active member of the HH&C CoP and uses the best available resources to incorporate modern technology into its water management practice.

F. See response to comment E above.

refinement, this technology holds the promise of an automatic management system which allows overall oversight from the water control managers.

Caution
It is anticipated that the Corps would not embark on using such new methods without running them alongside the traditional methods for a few years. In this way, comparison between both methods would make it possible to gain insights into both.

G

Response to ACF229 – John Howard

G. Concur

Response to ACF230– Matt Pursley

From: matt pursley
Sent: Friday, January 29, 2016 7:50 PM
To: ACF-WCM
Subject: [EXTERNAL] Public Input on the WCM plan

Jan 29, 2015

USACE - Comments on Draft WCM

Please accept the following comments on the proposed Water Management Plan. I do understand that this is a complex situation with a significant amount of variables to consider. This is evident by the 1000 page document you have drafted.

1) You have requested public input to a 1000 page document. I think it would be very beneficial to boil this down into a couple of pages of "key" points. The document was so overwhelming that I resorted to scanning the document for what I thought were key points that I could provide meaningful input. This was a daunting task. If you are sincere about seeking input, please consider publishing a brief synopsis of the changes being proposed. Due to the magnitude of the document, some of the input given below may have already been addressed in the Draft WCM and was overlooked. A

2) Water is our most precious resource. The Plan needs to be changed to provide for maintaining as much storage capacity at all times. The drought in California has shown that management for anticipation of a drought is crucial. Incorporate better drought prediction methods and use results of the improved prediction methods in management of storage in the basin. B

3) Add consideration in the Plan to raising basin levels to provide for an increased storage over time and then manage to keep the reservoirs at maximum capacity at all times for water usage (reduce any consideration for Power Generation, Navigation and the like). C

4) If Navigation is to be included in the Plan, the Plan should take greater consideration of the overall impact that navigation would have on the overall basin and that alternatives to navigation should be considered. I thought that navigation demands had subsided over the years. If I understand correctly, Florida no longer dredges the water way (further evidence of reduced navigation demand) and as a result maintaining a navigable

A. Both the draft EIS and the final EIS have an executive summary. The Master WCM update covers reservoir operations in a large river basin with multiple USACE reservoirs with a number of complex water resource issues. We recognize that the EIS is a large and challenging document to read. Accordingly, it was our intent that the executive summary would provide a relatively concise overview of the Master WCM update process, the PAA, and the environmental effects associated with the various alternatives that were considered. The executive summary preceding the draft EIS document was 34 pages long, and we have kept the executive summary at about the same length for the final EIS.

B. USACE regulations do not allow use of forecasts in real-time project operations. Forecasted conditions may be used for planning future operations, but releases will follow the water control operations plan based on observed conditions within the watershed to the extent practicable. The Drought Contingency Plan (DCP) sections 3-02 and 3-03 contained as an exhibit in the WCMs in appendix A of the EIS includes discussion of drought identification and National Integrated Drought Information System (NIDIS). An NIDIS pilot program has been established for the ACF River Basin with the goal of developing a regional Drought Early Warning Information System. The system will use key indicators of drought to make timely drought forecast. USACE is a contributor and user of the NIDIS pilot project tools.

C. Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008.

water depth would take a much larger volumetric flow. I.E. navigation in the future could require more water due to lack of dredging.

D

A cost benefit analysis for alternatives to navigation should be included in development of the plan. Water must be used wisely. Navigation should be eliminated for the waterway except in rare or emergency cases. Truck, Rail and the Tennessee - Tom Waterway all provide competitive viable alternatives to navigation on ACF basin. The Tenn-Tom water basin has considerably more resources to support navigation. ACF Navigation has suitable competitive alternatives, which would allow elimination of this demand on the resource allowing more prudent preservation.

---

5) Management of the resource should include funding at the local level to prevent degradation of the resource (pollution and siltation). Published Statements by the Officer in charge of Lake Lanier have indicated that they are not resourced to do simple things like dealing with abandoned boats, litter and siltation. It would be prudent to allow local Corp Offices to have the authority to impose and collect fines much like local Sheriffs. These funds should be restricted to ONLY be used on management and protection of the resource. This would provide a funding mechanism to allow the Corp to more adequately protect the resource. This would have a significant impact on the overall quality of the resource and hence benefit all people on the Basin. If this requires a law change or Corp policy change would it not be beneficial to be tied to management of the Basin?

E

---

6) "Common sense" decisions should be allowed to be made at a local level to protect the resource. Siltation - development along the lakeshore has led to significant localized erosion and siltation. Infill housing focuses water run off into narrow streams between homes. The runoff, which was once spread over the width of the shore, is concentrated between the homes. A simple common sense solution to this problem would be to allow the installation of buried drains or dry creek beds across Corp property to the lake, which would minimize the detrimental impact of the concentrated drainage to the lake. I do not believe this activity is currently permitted on Lanier and local Rangers have indicated that this would greatly benefit the quality of the lake. Input - Allow Local Resource Offices to conduct permitting activity to protect the resource.

F

Another "common sense" solution should be allowed for Shore Erosion - Larger Vessels and recreational activity designed to generate large waves for wake surfing is taking a toll on the resource. Islands have completely vanished and shoreline trees frequently fall into the lake as a result of vessel wave generation. Wave breaks, both fixed and floating (like those used by Marinas) could greatly reduce shore damage from waves. In addition, newly developed floating wave breaks have been shown to terminate waves without the normal issues generated by fixed wave breaks. I do not believe private installation of wave breaks is currently permitted on Lanier and local Rangers have indicated that this would greatly benefit the quality of the lake much like private rip rap installations have done. Input - Allow Local Resource Offices to conduct permitting activity to protect the resource.

G

Thank you for allowing this input. You can contact me directly if I can offer clarification on my input.

Response to ACF230– Matt Pursley

D. The Master WCM update is not a study and is only a change to operation of existing constructed projects. Therefore, it was not the purpose of the WCM update to compute benefits of authorized project purposes. Navigation remains an authorized purpose for the ACF system although it currently faces many challenges. The operations described in the Master WCM are based on balancing all authorized purposes throughout the system.

E. Changes to funding levels and authorities at the Lanier Project are outside the scope of the ACF Water Control Manual Update. The Corps of Engineers at Lake Lanier follows established criteria for determining when to expend appropriated funds to remove a vessel from the Lake. These criteria are: a) if it is a hazard to public safety or navigation, b) if it impacts the project, c) if it has damaged, or is causing damage, to the project, and d) if it is impacting the missions for which the project is authorized and required to accomplish. The expansion of authorities suggested in this comment would require Congressional action as would the other changes.

F. Development and erosion control is the responsibility of local entities and outside the scope of the Master WCM update. The Lanier project office staff works with those entities to resolve issues impacting the lake.

G. Lakeshore erosion control techniques are outside the scope of the Master WCM update. Lanier project staff should be contacted for information on the type of wave breaks that can be installed around docks.

Matt Pursley

From: Judi Overstreet
Sent: Friday, January 29, 2016 9:22 PM
To: ACF-WCM
Subject: [EXTERNAL] Fw: URGENT: Your WCM comments to the Corps are needed no later than Saturday, January 30, 2016

Dear Commander, U.S.Army Corps of Engineers, Mobile District,

I am forwarding to you this urgent email I received as a member of the Lake Lanier Association. I could think of no way to better state these facts than to have you read this yourself. PLEASE take their studies and in-depth research under your advisement to prevent a drought crisis such as the one we experienced in 2007-2008. I trust your good common sense will prevail! A

Thank you so much,

Judi and Roy Overstreet, homeowners

On Thursday, January 28, 2016 3:33 PM, Lake Lanier Association wrote:

Having trouble viewing this email? Click here

Dear Roy & Judi:

The Corps' Water Control Manual ("WCM") comment period ends on Saturday, January 30th. The Lake Lanier Association has prepared formal comments that it will submit. Those comments can be viewed here:

click here to see the Lake Lanier Association's comments

We are calling on all Lake Lanier users and businesses to submit comments to the Corps by this Saturday's deadline. Recent hydrologic analysis has revealed a large, unrevealed impact from the Corps' proposed navigation plan. According to that analysis, the Corps' navigation operations alone would lower Lake Lanier by more than four feet in a drought similar to the one in 2007-2008. This impact is even greater than the impact of the projected population increases between now and 2050.

The impact of this portion of the proposed WCM is of such magnitude that we believe that a large volume of comments in opposition is critical in convincing the Corps to change its plan.

Specifically, in your own words emphasize the need for the Corps to:

1. Revise the navigation plan to avoid the severe impact the proposed plan will have on Lanier's water levels. B
2. Incorporate rigorous drought prediction that will trigger changes in reservoir operations to preserve lake levels during drought. C

Response to ACF231– Judi and Roy Overstreet

A. Comment noted.

B. Navigation is one of several project purposes for which Congress authorized the ACF Basin project, and USACE considers that purpose along with all other authorized purposes when making operational decisions.

Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations provisions in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008. It should be noted that navigation is not supported when drought operations are in effect.

C. USACE regulations do not allow use of forecasts in real-time project operations. Forecasted conditions may be used for planning future operations, but releases will follow the water control operations plan based on observed conditions within the watershed to the extent practicable. The Drought Contingency Plan (DCP) sections 3-02 and 3-03 contained as an exhibit in the WCMs in appendix A of the EIS includes discussion of drought identification and National Integrated Drought Information System (NIDIS). An NIDIS pilot program has been established for the ACF River Basin with the goal of developing a regional Drought Early Warning Information System. The system will use key indicators of drought to make timely drought forecast. USACE is a contributor and user of the NIDIS pilot project tools.

3. Manage the reservoirs to retain maximum storage levels in the reservoirs so that drought conditions will not have the devastating impact that was experienced in December 2007. D
4. Model and plan for raising Lake Lanier's full pool level to 1073. E

Public comments may be submitted via the following methods:

Email to: ACF-WCM@usace.army.mil

Letter to:

Commander, U.S. Army Corps of Engineers
Mobile District
Attn: PD-EI (ACF-DEIS)
P.O. Box 2288
Mobile, AL 36628

Please share your comments with us by sending a copy to: lakeinfo@lakelanier.org

Thank you for your support of Lake Lanier!



Forward email



This email was sent to judi.overstreet@att.net by icloud@lakelanier.org |
Update Profile/Email Address | Rapid removal with SafeUnsubscribe™ | About our service provider.



The Lake Lanier Association | 615F Oak Street, Suite 100 | Gainesville | GA | 30501

Response to ACF231– Judi and Roy Overstreet

D. Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008.

E. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management. Accordingly, raising the conservation pool at Lake Lanier by 2 ft would not meet this criterion and was not carried forward.

Response to ACF232– Patrick McConnon

From: Patrick McConnon
Sent: Saturday, January 30, 2016 10:23 AM
To: ACF-WCM
Cc:
Subject: [EXTERNAL] Comments on Water Control Manual (WCM)
Attachments: CorpsJanuary30letter.docx

Please find an attached letter on the referenced subject. Thank you for your consideration on this matter.

Pat McConnon

January 30, 2016

Commander, U.S. Army Corp of Engineers
Moblile District
Attn: PD-EI (ACF-DEIS)
P.O. Box 2288
Mobile, Alabama
36628

Dear Colonel Chytka:

This letter is sent to support the Corps' effort and process for revisions to the Water Control Manual (WCM) and the operations affecting the Lake Lanier reservoir and the ACF system. As a resident on and frequent user of Lake Lanier, I have always been respectful of the lake and environment surrounding the lake. I also care about this and the other reservoirs and the system they support for water supply, recreation, commerce and navigation and try to stay abreast of the issues related to it. As such, I've observed the Corps' management of Lake Lanier and have been consistently supportive of their role in maintaining the lake as part of a healthy system. Thus, I am interested in the content of the WCM operations manual and how it will guide the Corps' responses. As a member of the Lake Lanier Association (LLA), I am very supportive of their input on the issues raised by the proposed WCM and hope you would give them every consideration.

In addition to the LLA comments, I would like to add the following for your consideration: A

Following the drought in 2007-2008, the idea of raising the level of Lake Lanier was promoted as a win-win-win for Lake Lanier residents, businesses and the ACF system as a whole. A hedge against severe drought and a greater control measure against the effects of moderate drought conditions. At the time, the impacts of raising the full pool level had some unknowns and were based on modeling what adverse effects might occur. However, since that time, we have had at least two periods where the full pool exceeded the 1073' level because of naturally occurring events that caused the rise in level. So, we have experience to draw from that would support safely raising the level and reaping the benefits. I would strongly urge the Corps to consider WCM language to accommodate a raised level now or in the future once the issue has been resolved to the satisfaction of the experts looking at this issue and the public view. B

I am also concerned that the WCM language on the navigation plan may be too one sided in that severe reductions in Lake Lanier levels could occur to provide water downstream when there is no change to the river system that could add support to an antiquated navigation system. Unless there is a strong commitment supporting the upgrading and maintenance of the navigation system downstream, it doesn't seem to make sense to adhere to antiquated release guidelines that won't solve the navigation problems. A twenty first century look at the relative impact, cost, and pain to maintain the navigation system should be undertaken to support continued adherence to release guidelines and WCM language should be included to accommodate a more flexible approach releases when lake levels drop more than a few feet below full pool level. C

Finally, I would like to reiterate the suggestion by the LLA supporting the maximization of storage levels in the ACF system as a priority for the Corps including WCM language changes that supports that concept as a priority.

Response to ACF232– Patrick McConnon

A. When complete, the Master WCM update process will result in an updated Master WCM that includes updated water control plans and manuals for the ACF system and each federal project within the system. It will reflect operations under existing congressional authorizations, taking into account changes in basin hydrology and demands from years of growth and development, new/rehabilitated structural features, legal developments, and environmental issues. The effects of climate change on the PAA are discussed in section 6.8 of the draft EIS. Refer to the USACE response to the Lake Lanier Association comment letter (# ACF145) for additional information.

B. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management. Accordingly, raising the conservation pool at Lake Lanier by 2 ft would not meet this criterion and was not carried forward.

C. As shown in Figure 6.1-6 of the EIS, the PAA would likely result in lake levels at Lake Lanier ranging from about 2 to 4 ft lower than those for the NAA. That condition would be expected to occur less than 2 percent of the days over the entire modeled period of record (73 years) during the worst drought conditions for that period. The differences would be attributable largely to increased water supply withdrawals from the lake as well as increased releases from Buford Dam to meet future water supply demands for Metro Atlanta users (i.e., Cobb, Fulton, and DeKalb counties and the City of Atlanta). It should be noted that navigation is not supported when drought operations are in effect.

Thank you for your consideration of these comments regarding the WCM.

Sincerely,

Patrick J. McConnon

cc: LLA

From: Craig Diamond
Sent: Saturday, January 30, 2016 8:51 AM
To: ACF-WCM
Subject: [EXTERNAL] Water Control Manual - Draft ACF EIS

Colonel Jon Chytka
District Commander
US Army Corps of Engineers - Mobile District

Colonel:
On behalf of the Board of Directors of the Apalachicola Bay and Riverkeeper, I urge you to direct staff to consider broadly their charge and responsibility with regard to the Update to the Water Control Manual (WCM) and Draft Environmental Impact Statement (DEIS) for the Apalachicola-Chattahoochee-Flint River Basin.

We are not looking for any special consideration in the context of managing the entire watershed, but want the Corps to ensure that the Apalachicola River and Bay are given equal weight as the other components of the system. While the various federal agencies have their unique missions, ignoring – or worse, impacting -- national objectives relating to species protection and biological diversity is not an option. I'd be remiss if I failed to point out that revising the Manual and providing the Apalachicola's resources the opportunity to recover and eventually be restored will have significant benefits to the regional economy. The basin's water resources are largely a managed system and therefore need to be managed to benefit the various elements of that regional economy, from recreational and cultural use to navigation, industrial withdrawals, public supply and hydropower. Shortchanging any one party is ultimately detrimental to all. A

Improving the balance of water resources is fully within the Corps' purview and will dampen and perhaps prevent any escalation of the "water wars" between Alabama, Florida and Georgia. Achieving a flow regime through a revised Manual to better satisfy ALL users will also serve to advance the efforts of the A-C-F Stakeholders that have coalesced around workable proposals. Consensus, as you know, is a difficult thing; it would behoove the Corps to build upon the excellent work conducted to resolve many of the basin's key hydrological issues. B

Thank,

CJD
Craig Diamond
President, Board of Directors of the Apalachicola Bay and Riverkeeper

1

Response to ACF233 – Craig Diamond

A. The PAA includes fish and wildlife conservation operations throughout the basin (e.g., the reservoir fish spawn operations, minimum flow provisions in the Apalachicola River, and fish passage at Jim Woodruff Lock and Dam). Section 5 of the EIS provides additional information on the PAA. The EIS considered and disclosed the expected impacts that the PAA could have on fish and wildlife resources in the Apalachicola River and Bay (or elsewhere in the system). If expected impacts to significant resources would be adverse as a result of revised operations, USACE must consider potential measures to mitigate those effects. The analysis presented in section 6 of the EIS indicates that the PAA would have a minimal effect on flow conditions in the Apalachicola River and into the Bay, compared to current reservoir operations under the NAA. Because flow and water quality changes in the Apalachicola River and Bay are not expected under the PAA, no anticipated incremental effect would be expected on fish and wildlife resources in the bay.

B. The authorized purposes of the federal ACF system do not include a specific directive to provide freshwater inflows to Apalachicola Bay to sustain the resources of the bay. USACE does make releases to limit adverse effects to threatened and endangered species downstream of Jim Woodruff Lock and Dam, including Apalachicola Bay. USACE consulted on the PAA and the results are presented in appendix J of the final EIS. In the biological opinion the USFWS concluded that effects to estuarine invertebrate production are insignificant because the PAA provides slightly beneficial effects from increasing the number of freshwater pulses and increasing the number of days greater than or equal to 16,200 cfs in the winter. USFWS also anticipate only minor changes in salinity regimes and estuarine habitat due to the WCM.

From: Melissa Samet
Sent: Friday, January 29, 2016 7:36 PM
To: ACF-WCM
Cc: White, Jonas SAM
Subject: [EXTERNAL] ACF Water Control Manual Draft EIS Comments
Attachments: Conservation Group Comments_ACF WCM Draft EIS w attachment_01-29-16_Final.pdf

Importance: High

Please see the attached comments submitted by the National Wildlife Federation, Florida Wildlife Federation, Apalachicola Riverkeeper, and 1000 Friends of Florida.

I would greatly appreciate it if you could confirm receipt of these comments by responding to this email.

Thank you.

Melissa Samet
Senior Water Resources Counsel
National Wildlife Federation

Comments on the October 2015 Draft 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

Submitted by

National Wildlife Federation
Florida Wildlife Federation
Apalachicola Riverkeeper
1000 Friends of Florida

January 29, 2016

Submitted by email to: ACF-WCM@usace.army.mil

Table of Contents

A. Introduction 2

B. The Corps Should Develop and Select an Alternative that Mimics Natural Flows to the Apalachicola and Chattahoochee Rivers 3

C. The Proposed Action Alternative Will Make Ecological Conditions Worse and Must be Rejected 5

D. The DEIS Utilizes an Inappropriate Purpose and Need Statement 6

E. The DEIS Fails to Properly Address Authorized Purposes 8

1. The DEIS Fails to Properly Address Fish and Wildlife Conservation 8
2. The DEIS Improperly Prioritizes Management for Commercial Navigation 10
3. The DEIS Fails to Properly Limit the Scope of the Water Supply Purpose 13
4. The DEIS Fails to Incorporate Key Congressional Directives Into the Project Purposes 17

F. The DEIS Fails to Evaluate a Full Range of Reasonable Alternatives 18

1. The DEIS Explicitly Excludes Reasonable Alternatives 19
2. The DEIS Uses Flawed Screening Criteria to Eliminate Reasonable Alternatives 20
3. The DEIS Only Evaluates Alternatives that Would Produce the Same Outcomes 21
4. The DEIS Fails to Consider Alternatives that Would Improve Ecological Conditions 22

G. The DEIS Fails to Properly Define, Analyze, and Consider Baseline Conditions 22

1. The DEIS Fails to Properly Define the No Action Alternative 22
2. The DEIS Uses an Inappropriate Baseline for Assessing the Severity of Impacts 23
3. The DEIS Lacks Fundamental and Essential Baseline Data 25
4. The DEIS Fails to Accurately Describe Baseline Conditions 25
5. The DEIS Uses An Inconsistent Baseline Across Alternatives 28

H. The DEIS Lacks Scientific Integrity 28

1. The DEIS Bases its Analyses on Inappropriate Models and Data 29
   (a) The Modeled Period of Record Cannot Accurately Assess Future Impacts 29
   (b) The Unimpaired Flow Set Has Serious Flaws that Taint the Entire DEIS 30
   (c) The ResSim Model Results Have Been Used Inappropriately 31
   (d) The DEIS Relies on an Inadequate and Outdated Critical Yield Methodology 32
2. The DEIS Uses Flawed Metrics to Assess and Compare Alternatives 32
3. The DEIS Fails to Obtain a Vast Array of Information Essential to Making a Reasoned Choice among Alternatives 34

I. The DEIS Profoundly Understates Adverse Impacts 39

1. The DEIS Fails to Provide Quantified or Detailed Information 40
2. The DEIS Fails to Evaluate Impacts to Wetlands 42
3. The DEIS Fails to Adequately Evaluate Impacts to Endangered Species and Designated Critical Habitat 45
4. The DEIS Fails to Meaningfully Evaluate Impacts on Fisheries 48
5. The DEIS Fails to Evaluate Impacts on Birds and Waterfowl 50
6. The DEIS Fails to Evaluate Impacts on Amphibians and Reptiles 52
7. The DEIS Fails to Evaluate Impacts to Mammals 56
8. The DEIS Fails to Evaluate Impacts to Plants 56
9. The DEIS Fails to Evaluate Impacts to Salinity Levels and the Ecological Productivity of the Apalachicola Bay 57
10. The DEIS Fails to Adequately Evaluate Cumulative Impacts 58
11. The DEIS Fails to Adequately Evaluate the Impacts of Climate Change 63
12. The DEIS Fails to Adequately Evaluate the Risk of Disproportionate Impacts to Low Income and Minority Communities 67
13. The DEIS Fails to Evaluate Impacts to Ecosystem Services 68

J. The DEIS Fails to Comply with Federal Mitigation Requirements 68

K. The DEIS and PAA Are At Odds with Longstanding Federal Policy 70

L. Conclusion 71

The National Wildlife Federation, the Florida Wildlife Federation, Apalachicola Riverkeeper,[1] and 1000 Friends of Florida (collectively, the Conservation Organizations) appreciate the opportunity to submit these comments on the Draft Environmental Impact Statement Update of the Water Control Manual for the Apalachicola-Chattahoochee-Flint River Basin in Alabama, Florida, and Georgia and a Water Supply Storage Assessment (October 2015) (the "DEIS").

The Conservation Organizations strongly oppose the Proposed Action Alternative in the DEIS, and urge the U.S. Army Corps of Engineers to develop and select an alternative that mimics natural flows to the Chattahoochee and Apalachicola Rivers to the maximum extent practicable.

The National Wildlife Federation (NWF) is the nation's largest conservation education and advocacy organization. NWF has almost six million members and supporters and conservation affiliate organizations in forty-nine states and territories. NWF has a long history of advocating for the protection and restoration of the Apalachicola River, Apalachicola Floodplain, and Apalachicola Bay and the entire Gulf of Mexico. NWF also has a long history of working to modernize federal water resources planning to protect the nation's coasts, rivers, wetlands and floodplains, and the fish and wildlife that depend on those vital resources.

The Florida Wildlife Federation (FWF), a non-profit corporation established in 1936, has approximately 13,000 members and 60,000 supporters statewide. FWF is affiliated with the National Wildlife Federation. FWF has long supported environmental sustainability and conservation in Florida by education, advocacy and litigation. The Apalachicola River and Bay system has been the focus of FWF efforts over the course of many years, as this region of the state is one of the most biologically rich in the entire nation. Moreover, the River and Bay play a critical role in the overall health of the Gulf of Mexico. FWF has previously worked with the U.S. Army Corps of Engineers and relevant state agencies to restore the Apalachicola to the betterment of both the economy and ecology of this unique area.

Apalachicola Riverkeeper is a 501c3 membership-supported non-profit corporation established in 1998 and licensed by the Waterkeeper Alliance in 1999. The mission of Apalachicola Riverkeeper is to *provide stewardship and advocacy for the protection of the Apalachicola River and Bay, its tributaries and watersheds, in order to improve and maintain its environmental integrity and to preserve the natural, scenic, recreational, and commercial fishing character of these waterways*. Headquartered on the Bay at the mouth of the Apalachicola River, Apalachicola Riverkeeper's 1500 supporting members and their families include those who live within the Apalachicola River Basin and visitors from across the country and the world who visit this premiere natural resource regularly. Apalachicola Riverkeeper is committed to working with the U.S. Army Corps of Engineers and other stakeholders to develop reasonable, equitable and sustainable uses of the water resources of the Apalachicola-Chattahoochee-Flint river system.

1000 Friends of Florida, a nonprofit organization founded in 1886, is Florida's leading not-for-profit smart growth advocacy organization. 1000 Friends is building better communities and saving special places in one of the fastest growing states in the nation. We promote vibrant, sustainable, walkable, livable communities which provide residents with affordable housing choices and transportation alternatives. We work to protect natural lands that cleanse and store fresh water needed for residents, agriculture and the environment, provide refuge for wildlife, and support abundant recreational

[1] Apalachicola Riverkeeper has also submitted a separate set of comments on the DEIS. These separate comments are in addition to the comments provided in this document.

opportunities for residents and visitors alike. Above all, we strive to give citizens a meaningful role in shaping the futures of their communities and state.

A. Introduction

The Conservation Organizations strongly oppose the Proposed Action Alternative (PAA) in the DEIS, and urge the U.S. Army Corps of Engineers (Corps) to develop and select an alternative that mimics natural flows to the Chattahoochee and Apalachicola Rivers to the maximum extent practicable.

The Apalachicola River and its floodplain form an incredibly rich and diverse system of exceptional ecological importance. More than 131 species of fresh and estuarine fish live in the Apalachicola River, more than any other river in Florida. More than 50 species of mammals, including the Florida black bear and the endangered West Indian Manatee are found in the Apalachicola drainage basin. More than 40 species of amphibians and 80 species of reptiles live within the Apalachicola River basin, the highest diversity of amphibians and reptiles in the United States and Canada. More than 1,300 species of plants, including 103 that are threatened or endangered, are also found in the Apalachicola drainage basin. Sufficient and properly timed freshwater flows are critical for this rich array of species and for maintaining the estimated $5 billion in free services provided by the Apalachicola ecosystem, including clean water, flood protection, and fish and wildlife habitat.

The Apalachicola River is the lifeblood of the Apalachicola Bay, an estuary of major ecological and economic importance to the eastern Gulf of Mexico. Sufficient freshwater flows are essential for maintaining the salinity regimes needed to sustain an economically viable oyster harvest from the Apalachicola Bay, and for sustaining many other commercially viable fisheries. Apalachicola Bay provides 90 percent of Florida's oysters and over 13 percent of the total oyster production in the United States. It is also a major nursery for shrimp, blue crabs, and many species of fish including striped bass, sturgeon, grouper, snapper, red fish, speckled trout, and flounder. The commercial and recreational fisheries in the Gulf of Mexico generate over $5 billion dollars in sales revenue and support over 50,000 jobs in West Florida. The harvest of shrimp, crab, fish, and oysters is the driving force in the economy of Franklin County, Florida.

Despite the importance of this incredible ecosystem, the ACF system has been managed for decades in a way that adversely alters the quantity and timing of freshwater flows and starves the system of the flows it needs to thrive. This mismanagement has pushed the Apalachicola River, floodplain, and bay to the brink of collapse. For example, lack of sufficient flows have led to the loss of more than 4.3 million floodplain trees and harmed the tourism, recreation, and other businesses that rely on a healthy Apalachicola River. Lack of freshwater flows led to the collapse of the bay's rich oyster population leading to a devastating loss of income for the region. In 2013, the Secretary of Commerce declared a commercial fishery failure for the oyster fishery to help alleviate the economic hardship.

Continuation of this status quo is neither sustainable nor acceptable. As Florida's Deputy Secretary of the Department of Environmental Protection recently testified, if we do not restore historic flow

patterns to the Apalachicola River, "the ecosystem and, indeed, the very way of life for generations of Floridians will be devastated."[2]

However, instead of restoring a more natural flow regime, the PAA would hold even more water back for upstream users, initiate drought restrictions earlier and more frequently, and severely restrict flows to the Apalachicola River more often and for longer periods of time. This will make the ecological conditions even worse in the Apalachicola River, floodplain, and bay.

In addition to selecting this unacceptable alternative, the DEIS fails in almost every way possible to comply with the longstanding requirements of the National Environmental Policy Act (NEPA). As discussed in detail below, the DEIS utilizes an inappropriate statement of purpose and need, fails to properly address authorized purposes, fails to evaluate a full range of reasonable alternatives, fails to properly define and analyze baseline conditions, lacks scientific integrity, profoundly understates adverse impacts, fails to include mitigation, and is at odds with longstanding federal policy.

The Corps should go back to the drawing board and develop and select an alternative that mimics the amount, timing, and variability of natural flows to the Apalachicola and Chattahoochee Rivers, to the maximum extent practicable.

B. The Corps Should Develop and Select an Alternative that Mimics Natural Flows to the Apalachicola and Chattahoochee Rivers

A

The Corps should develop and select an alternative that: (1) mimics the amount, timing, and variability of natural flows to the Chattahoochee and Apalachicola Rivers, to the maximum extent practicable; (2) restores river reaches where bed degradation or other changes are causing lower water levels; and (3) makes use of tools such as a drought indicator index, real-time weather forecasting, and/or satellite imagery to adapt operations to actual weather conditions. Such an alternative is essential for restoring and maintaining the health of the Chattahoochee River, the Apalachicola River, the Apalachicola River Floodplain, and the Apalachicola Bay.

As discussed in Section F of these comments, the Corps has the authority and responsibility to adopt such an alternative given its fish and wildlife conservation authorized purpose, the National Water Resources Planning Policy, and a host of Congressional directives that require and/or promote the protection and restoration of the nation's waters and fish and wildlife resources. Moreover, preliminary modeling carried out in developing the ACF Stakeholders *Sustainable Water Management Plan* demonstrates that changes in reservoir storage and operations, along with water efficiency and conservation measures, "could simultaneously improve instream flows that sustain aquatic habitats in the Basin and the Apalachicola Bay while providing for both current and future consumptive uses."[3]

The first step in developing this alternative, and in conducting a meaningful assessment of the impacts of alternative water control manual management regimes, is for the Corps to determine the amount, timing, and variability of flows needed to maintain a healthy and vibrant river, floodplain, and bay. Of

[2] Testimony of Jonathan P. Steverson, Executive Director of the Northwest Florida Water Management District, "Effects of Water Flows on Apalachicola Bay: Short and Long Term Perspectives", United States Senate Committee on Commerce, Science and Transportation Field Hearing, August 13, 2013 at 4.
[3] ACF Stakeholders, Inc., Sustainable Water Management Plan for the ACF Basin (May 13, 2015) at 72.

Response to ACF234 – National Wildlife Federation

A. The PAA was selected to maintain the health of the ACF Basin within USACE's authorities. The scope of USACE's authorities to manage projects in the ACF Basin limits the Agency's ability to mimic natural flows to the Chattahoochee and Apalachicola rivers. Its authorities include the responsibility to produce peaking hydropower, operate for flood damage reduction, and release minimum flows from Jim Woodruff Dam for threatened and endangered species to comply with the terms and conditions in the biological opinion. This EIS compares the PAA to current operations (represented by the NAA). The NAA does not represent conditions before construction of Jim Woodruff Dam, therefore, mitigation to restore the river's natural channel would not apply in this action.

USACE water management staff work closely with meteorologists and consider the drought indicator index, real-time weather forecasting, and/or satellite imagery to adapt real-time operations to actual weather conditions.

critical importance is recognizing and accounting for the importance of protecting natural low, moderate, and high flows for an appropriate duration at the right times of year. This information is essential to making a reasoned choice among alternatives and as a result must be obtain by the Corps unless the costs of doing so would be "exorbitant." 40 C.F.R. § 1502.22.

The flow regime adopted by this alternative must ensure the appropriate timing, depth, and extent of inundation of the Apalachicola River Floodplain. This is critical because depth and extent of inundation is the driving factor in floodplain wetland hydrology; floodplain plant species diversity; fish and wildlife access to the floodplain; and fish and wildlife spawning, breeding, rearing, feeding and resting cycles.[4] Floodplain inundation is also critical because "[n]utrients and detritus carried from the floodplain by river floods contribute significantly to the relatively high productivity of Apalachicola Bay." DEIS at 2-190. The Corps should utilize LIDAR (Light Detection and Ranging) data to assist in meaningfully evaluating the depth and extent of inundation of the Apalachicola River floodplain under various flow regimes. As the Corps is aware, LIDAR data for the floodplain can be obtained from the State of Florida.[5]

To facilitate floodplain inundation, the alternative should also include actions to: correct the significant riverbed degradation below and downstream of the Jim Woodruff Lock and Dam; and restore other areas in the Apalachicola River where past ACF system operations and maintenance activities have lowered water levels in the river system. For example:

- Restoring or minimizing the bed degradation below and downstream of Jim Woodruff Lock and Dam would increase water levels in this stretch of the river and facilitate appropriate inundation of the floodplain. As the DEIS recognizes, "[s]ince the construction of Jim Woodruff Lock and Dam, the Apalachicola River bed has degraded by about 5 ft within a mile below the dam and by about 2 ft at Blountstown . . . ." DEIS at 2-163.

- Rerouting the Apalachicola River through Battle Bend, the river's natural channel, would provide a key opportunity to restore fluvial processes to increase water levels. Such an approach would be expected to raise water levels for some distance along the river upstream, providing important ecological benefits to the river and its floodplain. Preliminary estimates suggest that the river levels could be raised for as much as several miles upstream, increasing flow through the sloughs during low flow months.

- Flow to the Apalachicola River Floodplain could be improved by manually removing sediment plugs that cut off flow into sloughs that convey water away from the mainstem of the Apalachicola River. This would increase the flow of water into the complex slough network that extends for many miles through the floodplain. Manual removal of these small sediment plugs would minimize adverse impacts, and avoid the substantial impacts that would result from use of large dredging equipment and barges.

These projects could properly be carried out either as a component of the Corps' proposed water control manual or as mitigation for damage caused by the continued operation of the ACF system. Additional Congressional authorization would not be required for such activities.

[4] U.S. Fish and Wildlife Service, Planning Aid Letter (April 2, 2010) at 11, 12, 16, DEIS Appendix J ("Assessing the extent of floodplain inundation will be a critical component of the alternatives analysis assessment.")
[5] U.S. Fish and Wildlife Service Draft Fish and Wildlife Coordination Act Report, July 31, 2015 at 17, DEIS Appendix J; 2010 Planning Aid Letter at 16.

To minimize adverse impacts and improve the health of the Apalachicola Bay (which is part of the region of influence of the ACF system), the flow regime adopted by this alternative should also ensure appropriate salinity concentrations in the Apalachicola Bay. *See* DEIS at 2-206 ("River flow is the primary determinant of salinity concentrations in the estuary . . . . Salinity is one of the major limiting factors in oyster production. Prolonged high salinities due to drought or other factors affect freshwater flow and allow for increased [oyster] predation . . . and decreased food availability.")

B

C. The Proposed Action Alternative Will Make Ecological Conditions Worse and Must be Rejected

C

The Conservation Organizations strongly oppose the Proposed Action Alternative (PAA) because it will make the ecological conditions even worse in the Apalachicola River, floodplain, and bay.[6] The PAA would hold even more water back for Georgia water supply, initiate drought restrictions earlier and more frequently, and severely restrict flows to the Apalachicola River more often and for longer periods of time.

The DEIS provides the following comparison between the PAA and the "no action" alternative (NAA):

- Under the PAA drought operations would be **triggered 22 times**, compared to just 3 times under the NAA. This is a **633 percent increase** in the triggering of drought operations.
- Under the PAA drought operations would be **in effect 18.1 percent** of the time, compared to just 6.7 percent of the time under the NAA. This is a **170 percent increase** in the percentage of time that drought operations will be in effect.
- Under the PAA, extreme drought operations would be **triggered 2 times**, compared with zero times for the NAA. These operations would reduce flows in the Apalachicola River to **4,500 cfs for 0.2 percent of the time,** compared to zero times for the NAA.
- Under the PAA, **drought operations would be triggered earlier** (when composite conservation storage falls into zone 3), as compared to the later trigger in the NAA (when composite storage reaches the lower level of zone 4).

DEIS at ES-27, 5-24, 5-20 to 5-30.

These comparisons clearly show that the PAA will put the system into drought operations much more frequently and for significantly longer periods of time. **The PAA would increase the triggering of drought operations by 633 percent, and almost triple the amount of time that drought operations will be in effect.** This in turn will cause additional significant harm to a system that is already starved of critically-needed freshwater flows. The damage will be amplified by the drought operations being triggered earlier during key periods for breeding and reproduction when flows are most critical. Indeed, the impacts could be catastrophic.

It is also important to note that inclusion of the Glades Reservoir proposed for Hall County in the PAA and other alternatives is premature and unnecessary. The DEIS has no legitimate basis for assuming that the Glades Reservoir will in fact be needed, permitted, and constructed. The Glades Reservoir

D

[6] The PAA would also harm Peachtree Creek by reducing the creek's minimum flows in some situations.

Response to ACF234 – National Wildlife Federation

B. The authorized purposes of the federal ACF system do not include a specific directive to provide freshwater inflows to Apalachicola Bay to sustain the resources of the bay. USACE does make releases to limit adverse effects to threatened and endangered species downstream of Jim Woodruff Lock and Dam, including Apalachicola Bay. USACE consulted on the PAA and the results are presented in appendix J of the final EIS. In the biological opinion the USFWS concluded that effects to estuarine invertebrate production are insignificant because the PAA provides slightly beneficial effects from increasing the number of freshwater pulses and increasing the number of days greater than or equal to 16,200 cfs in the winter. USFWS also anticipate only minor changes in salinity regimes and estuarine habitat due to the WCM.

C. There appears to be a misunderstanding regarding "drought" as compared to reservoir "drought operations." Droughts are a function of hydrologic conditions across the basin, not how the USACE ACF Basin projects are managed. The NAA includes a drought contingency plan developed in the 1980s. That plan was included as part of the revised interim operating plan in consultation with the USFWS under section 7 of the Endangered Species Act. The PAA includes a more robust drought contingency plan than the NAA under which drought operations are triggered more often because the drought trigger has been revised to promote faster recovery of the reservoirs and less severe impacts throughout the basin. The analysis presented in the EIS does not indicate that droughts will occur at twice the current level under the PAA. Section 2.1.1.1.1.2 of the EIS discusses three drought periods before 1957 and five drought periods since construction of Jim Woodruff Lock and Dam. The streamflows associated with those droughts are included in the unimpaired flow data set used for HEC-ResSim modeling. The effects associated with drought operations are discussed in section 6.1.1.3 of the EIS. Drought operations would be triggered more frequently under the PAA compared to the NAA, but that fact does not mean that droughts would be occurring more frequently. Under the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe in order to conserve storage to enable the projects to continue to fulfill all authorized project purposes and needs in the basin until drought conditions improve and to promote faster recovery of the reservoirs.

D. In December 2015, the State of Georgia submitted information regarding the water supply needs for Metro Atlanta. The GAEPD letter dated January 29, 2016, stated that Hall County's certification of need for water supply from Glades Reservoir has been rescinded. Accordingly, USACE has revised the water supply options presented in the final EIS to exclude Glades Reservoir as a reasonably foreseeable action with regard to water supply. While Glades Reservoir was carried over in the final EIS to show continuity, no alternatives except the previous PAA in the draft EIS include Glades.

project has changed multiple times in terms of need, purpose, yield, and configuration over the past decade and the project continues to be revised. Indeed, the Glades project contemplated in the Section 404 permit application currently before the Corps' Savannah District is substantially different from the project contemplated by the Mobile District in this DEIS. The Corps cannot base the future management of the ACF basin, which supplies water to three states, on a misplaced hope that an unnecessary reservoir is commissioned and completed at some point in the indeterminate future.

As discussed in detail throughout these comments the DEIS vastly understates the adverse impacts of the PAA on the Apalachicola River, floodplain, and bay. For example, despite the significant changes in the timing, number and duration of drought operations, the DEIS concludes that the PAA would have no impact on the Apalachicola River and Bay. The DEIS concludes that the PAA will have no impact – i.e., cause "no change" – on the Apalachicola Rivers' vegetation and wildlife, riverine fish and aquatic resources, and estuarine fish and aquatic resources. DEIS at 6-168, 6-173, and 6-185. The DEIS concludes that despite increased drought operations, the PAA will very slightly increase the floodplain connectivity on the Apalachicola.[7] DEIS at 6-179. These conclusions are not supported by any evidence and indeed are directly contradicted by the Corps' own comparisons between the PAA and the NAA.

E

D. The DEIS Utilizes an Inappropriate Purpose and Need Statement

F

The DEIS utilizes an inappropriately restrictive statement of project purpose and need that has undermined consideration of a reasonable range of alternatives. As a result, the DEIS fails to comply with the NEPA. The Conservation Organizations urge the Corps to modify the purpose and need statement and to consider all reasonable alternatives that would satisfy the properly defined project purpose.

A proper statement of purpose and need must consider "the views of Congress, expressed, to the extent that an agency can determine them, in the agency's statutory authorization to act, **as well as in other Congressional directives**."[8] In the case of the operation of the ACF projects, these directives include a host of Congressional directives that require and/or promote the protection and restoration of the nation's waters and fish and wildlife resources.

Such directives include the National Water Resources Planning Policy established by Congress in 2007. This policy requires "all water resources projects" to protect and restore the functions of natural systems and to mitigate any unavoidable damage to natural systems. 42 U.S.C. § 1962-3. NEPA, enacted in 1970, directs the "Federal Government to use all practicable means" to "fulfill the responsibilities of each generation as trustee of the environment for succeeding generations." 42 U.S.C. § 4331(b). The Fish and Wildlife Coordination Act enacted in 1958, directs that "wildlife conservation shall receive equal consideration and be coordinated with other features of water-resource development" and that water resources development is to prevent loss and damage to fish and wildlife and improve the health of fish and wildlife resources. Fish and Wildlife Coordination Act, 16 U.S.C. §§ 661, 662. Many additional directives to protect the environment and fish and wildlife are found, *inter alia*, in the Clean Water Act, the Endangered Species Act, and the Clean Air Act.

[7] The DEIS also concludes – again without supporting evidence – that even though drought operations "would occur more frequently under the PAA" the PAA "would likely prevent more severe drought conditions from occurring than under the NAA." DEIS ES-19.

[8] *Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 196 (D.C. Cir. 1991) (emphasis added).

Response to ACF234 – National Wildlife Federation

E. The authorized purposes of the federal ACF system do not include a specific directive to provide freshwater inflows to Apalachicola Bay to sustain the resources of the bay. The environmental effects of the PAA on the Apalachicola River and Bay compared to the NAA (current reservoir operations) are considered in the EIS. The analysis in the EIS demonstrates that the PAA would result in little to no change in flow and water quality conditions in the Apalachicola River and Bay and, consequently, that there would be little to no effect on biological and other resources in the river and bay. In addition to its own modeling and analysis, USACE also addressed and considered all information and data provided by commenters. USACE consulted on the PAA and the results are presented in appendix J of the final EIS. In the biological opinion the USFWS concluded that effects to estuarine invertebrate production are insignificant because the PAA provides slightly beneficial effects from increasing the number of freshwater pulses and increasing the number of days greater than or equal to 16,200 cfs in the winter. USFWS also anticipate only minor changes in salinity regimes and estuarine habitat due to the WCM.

F. The proposed operational changes in the ACF Basin were developed to balance authorized project purposes in light of recent rulings that allow reservoir storage at Lake Lanier to be used for water supply storage. The purpose of the Master WCM update and WSSA (appendix B in the EIS) are to determine how the federal projects in the basin should be operated for their authorized purposes, in light of current conditions and applicable laws, and to assess the extent to which reservoir storage at Lake Lanier may be made available to meet current and future water supply needs for Metro Atlanta. In the WCM update process, balancing project operations to fulfill all authorized purposes in the most effective manner requires consideration of stakeholder interests as well as the environmental effects of proposed changes to current operations.

The DEIS purpose and need statement fails to account for these clear directives and instead effectively limits the analysis of alternatives to those that will operate the system for all authorized purposes, regardless of current needs, national priorities, and ecological implications:

> "Specifically, the purpose and need for the federal action is to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable law, and to implement those operations through updated water control plans and manuals." DEIS at 1-3.

This statement of project purpose and need is unduly restrictive because:

(1) It fails to account for the extensive array of longstanding Congressional directives that require the Corps to protect and restore the environment and the nation's fish and wildlife resources.
(2) It fails to account for the significant degradation of the ACF system, and the resulting damage to resource-based economies, caused by construction and operation of the ACF projects.
(3) It inappropriately restricts consideration of reasonable alternatives that would discontinue support for authorized purposes that are no longer viable, including operations designed to maintain a commercial navigation channel.
(4) It inappropriately excludes consideration of alternatives that would require additional Congressional authorization, in direct violation of NEPA.[9]

Along with the other failings discussed in these comments, the unduly restrictive project purpose prevents the DEIS from satisfying the requirements of NEPA. It is well established that:

> "If the agency constricts the definition of the project's purpose and thereby excludes what truly are reasonable alternatives, the EIS cannot fulfill its role. Nor can the agency satisfy the Act."[10]

To ensure appropriate consideration of all reasonable alternatives in light of both the authorized project purposes and other relevant Congressional directives, the Conservation Organizations urge the Corps to adopt the following statement of project purpose and need:

> The purpose of the federal action is to establish an operations plan for managing the ACF system that addresses modern system needs, complies with current laws and policies, ensures the sustainability of the ACF system, and protects and restores the ecological health of the ACF system including the severely degraded Apalachicola River, floodplain, and bay.
>
> The need for this federal action includes the critical need to:
> (1) Improve the degraded conditions of the Apalachicola River, floodplain, and bay.
> (2) Conserve and restore populations of **all** fish and wildlife species affected by the project.

[9] 42 C.F.R. § 1502.14, §1506.2(d); CEQ, Forty Most Asked Questions Concerning CEQ's NEPA Regulations (reasonable alternatives that are outside the legal jurisdiction of the lead agency or outside the scope of what Congress has approved or funded must be analyzed).
[10] *Simmons v. United States Army Corps of Eng'rs*, 120 F.3d 664, 666 (7th Cir. 1997) (*citing* 42 U.S.C. § 4332(2)(E)); *see Methow Valley Citizens Council v. Regional Forester*, 833 F.2d 810, 815-16 (9th Cir. 1987) (impact statements must consider all reasonable alternatives that accomplish project purpose, but need not consider alternatives not reasonably related to purpose).

(3) Establish healthy river flows in the Chattahoochee and Apalachicola Rivers.
(4) Reduce extreme and unnatural variabilities in flow in the Chattahoochee River.
(5) Ensure connectivity and appropriate overflow between the Apalachicola River and its floodplain to protect and restore fish, wildlife, and plant species; and to ensure needed inputs of nutrients into the Apalachicola River and Bay from flood events.
(6) Restore as much of the natural functions of the ACF system as possible.
(7) Sustain healthy resource-based economies affected by management of the ACF system, and particularly the commercial and recreational fishing economies that rely on a healthy Apalachicola River, floodplain, and bay.
(8) Improve the shortcomings of current water management in the ACF system.
(9) Address modern system needs.
(10) Ensure full compliance with Federal law and policy in management of the ACF system.

E. The DEIS Fails to Properly Address Authorized Purposes

As discussed above, a proper statement of purpose and need must consider "the views of Congress, expressed, to the extent that an agency can determine them, in the agency's statutory authorization to act, **as well as in other Congressional directives**."[11] As a result, the authorized purposes of the ACF system must be evaluated in light of the project purposes as they have been added to and/or qualified by subsequent legislation, and in light of current law, policy, and needs.

The DEIS fails to properly analyze and consider the authorized purposes of the ACF projects, including by: (1) failing to properly define and consider the Fish and Wildlife Conservation authorized purpose; (2) prioritizing management for non-existent commercial navigation in direct contradiction of the Corps' rules regarding designated low use waterways; (3) failing to properly limit the scope of the water supply purpose; and (4) failing to account for and comply with the National Water Resources Planning Policy and other laws established by Congress for the express intent of ensuring that federal projects protect and restore the environment.

Because of these deficiencies (and the other deficiencies discussed throughout these comments), the DEIS fails to properly identify and evaluate a full range of reasonable alternatives and fails to select an appropriate alternative.

1. The DEIS Fails to Properly Address Fish and Wildlife Conservation

G

The DEIS correctly recognizes that Fish and Wildlife Conservation is an authorized purpose of the ACF projects. *See, e.g.*, DEIS at ES-1, 1-1, 2-68 to 2-74. However, the DEIS fails to properly apply and address that authorized purpose, particularly with respect to protecting and restoring the fish and wildlife that rely on the Apalachicola River and its floodplain.

The directives of the Fish and Wildlife Coordination Act (FWCA) explicitly apply to "**all** species of wildlife" and their habitat. 16 U.S.C. § 661 (emphasis added). Among other things, the FWCA requires that:

[11] *Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 196 (D.C. Cir. 1991) (emphasis added).

Response to ACF234 – National Wildlife Federation

G. The PAA includes fish and wildlife conservation operations throughout the basin (e.g., the reservoir fish spawn operations, minimum flow provisions in the Apalachicola River, and fish passage at Jim Woodruff Lock and Dam). Section 5 of the EIS provides additional information on the PAA. The EIS considered and disclosed the expected impacts that the PAA could have on fish and wildlife resources in the Apalachicola River and Bay (or elsewhere in the system). If expected impacts to significant resources would be adverse as a result of revised operations, USACE must consider potential measures to mitigate those effects. The analysis presented in section 6 of the EIS indicates that the PAA would have a minimal effect on flow conditions in the Apalachicola River and into the Bay, compared to current reservoir operations under the NAA. Because flow and water quality changes in the Apalachicola River and Bay are not expected under the PAA, no anticipated incremental effect would be expected on fish and wildlife resources in the bay.

(a) The conservation of all species of wildlife "shall receive equal consideration and be coordinated with other features of water-resource development." 16 U.S.C. § 661.
(b) Consultation shall be carried out for "the purpose of determining the possible damage to wildlife resources and for the purpose of determining means and measures that should be adopted to prevent the loss of or damage to such wildlife resources, as well as to provide concurrently for the development and improvement of such resources." 16 U.S.C. § 662.
(c) Recommendations arising from consultation "shall be made an integral part of any report prepared or submitted by any agency of the Federal Government." 16 U.S.C. § 662.

Because the FWCA is the basis for the Fish and Wildlife Conservation project purpose (for all but West Point Dam[12]), the Fish and Wildlife Conservation purpose also applies to **all** wildlife and it requires the Corps to manage the ACF projects in a manner that will both avoid damage to, and improve the health of, **all** fish and wildlife affected by the project.

Despite this very clear and important mandate, the DEIS fails even to consider options for managing the ACF projects to protect species other than some river fish and mussels. *See* DEIS 2-68 to 2-74. In connection with the Apalachicola River, the DEIS places limits on management only to ensure compliance with the Endangered Species Act (ESA). *Id*. While ESA compliance, including protecting species, protecting critical habitat, and restoring listed species is absolutely critical; it is by no means the only aspect of fish and wildlife conservation.

An incredible array of fish and wildlife species rely on sufficient and appropriately timed freshwater flows in the Apalachicola River (and to the Apalachicola Bay), and on connectivity between the Apalachicola River and its floodplain through flows that lead to appropriately timed floodplain inundation.[13] These include: the more than 131 species of fresh and estuarine fish that live in the Apalachicola River, more than any other river in Florida; the more than 40 species of amphibians and 80 species of reptiles found in the Apalachicola River basin, the highest diversity of amphibians and reptiles in the United States and Canada; and more than 50 species of mammals. Flows are also critical for the federally threatened Gulf sturgeon, the federally listed mussel species, and the designated critical habitat found in the Apalachicola River (the entire river has been designated as critical habitat under the Endangered Species Act.)

In addition, the Apalachicola River is the fresh water and nutrient source for Apalachicola Bay, an estuary of major ecological and economic importance to the eastern Gulf of Mexico. The Apalachicola Bay provides 90 percent of Florida's oysters and over 13 percent of the total oyster production in the United States. The Bay is also a major nursery for shrimp, blue crabs, and many fish species including striped bass, sturgeon, grouper, snapper, red fish, speckled trout, and flounder. The Gulf Commercial and Recreational Fisheries in the Gulf of Mexico generate over $5 billion in sales revenue and support over 50,000 jobs in West Florida. The harvest of shrimp, crab, fish, and oysters is the driving force in the economy of Franklin County, Florida.

[12] The DEIS states that "West Point Dam is the only federal project in the ACF Basin with fish and wildlife conservation specifically included in its original congressional authorization." DEIS at 2-68. However, the mandates of the Fish and Wildlife Coordination Act also apply to West Point Dam.
[13] In addition to fish and wildlife, the Apalachicola Drainage Basin boasts more than 1,300 species of plants, 103 of which are threatened or endangered.

The Fish and Wildlife Conservation purpose is intended to ensure the protection and restoration of this full range of fish and wildlife species. However, the PAA will harm, not protect and restore, this full range of fish and wildlife species. Moreover, the DEIS fails to identify the full array of specific species that rely on appropriate flows; fails to assess the implications of alternative flow regimes on those species; and fails to evaluate alternatives that would protect and restore the habitat and conditions needed to support this vast array of fish and wildlife species.

2. The DEIS Improperly Prioritizes Management for Commercial Navigation

H

The DEIS improperly prioritizes management of the ACF for commercial navigation, and the PAA would manage water flows to support navigation at the expense of other system needs including critically important fish and wildlife conservation needs. The problems created by this approach are amplified by the Corps' failure to ensure sufficient and timely flows to protect and restore fish and wildlife in the Apalachicola River, floodplain, and bay. Commercial navigation on the Apalachicola River is not economically justified. As a result, flows that would otherwise support navigation should be managed to protect and restore fish and wildlife as that authorized purpose requires. If maintaining some degree of commercial navigation remains a justifiable purpose, flows should first be managed to protect and recover fish and wildlife in the Apalachicola River, floodplain, and bay, while secondarily accommodating navigation.

The Corps has designated the Apalachicola River as a low use segment of the Inland Waterway System.[14] A low use waterway is one that "has less than one billion ton-miles of commercial cargo annually."[15] The Apalachicola River falls far below transporting this minimal level of cargo as there is currently virtually no commercial navigation on the river. *See, e.g.*, Final IEPR Report, Final Panel Comment 4 at 11.

Designation as a low use waterway imposes important restrictions on the expenditure of federal funds for operating and maintaining low use waterways.[16] These restrictions essentially limit the expenditure of funds to addressing public safety issues and conducting minimal, caretaker-type, maintenance activities.[17]

[14] *See* Fiscal Year 2014 Civil Works Budget Details for the U.S. Army Corps of Engineers (February 2013) at SAD-187 and SAD-200; Fiscal Year 2013 Civil Works Budget Details for the U.S. Army Corps of Engineers (February 2013) at SAD-193 and SAD-213 (both are available at http://www.usace.army.mil/Missions/CivilWorks/Budget.aspx under Budget Justification).
[15] *E.g.*, EC 11-2-204 (31 Mar 13) at ¶ F-13 and EC 11-2-199 (31 Mar 10) at ¶ V-14 (a low-use waterway project is one that "has less than one billion ton-miles of commercial cargo annually").
[16] See, e.g., USACE. 2013. *Corps of Engineers Civil Works Direct Program, Budget Development Guidance, Fiscal Year 2015.* Engineering Circular No. 11-2-204. Washington, D.C., March 31. http://www.cmanc.com/web/fy15ec_final.pdf, Appendix F, Table F-1 and Sections F-12 and F-13.
[17] Concerted efforts to redirect funding from low use segments of the system to high use segments began in FY 2002. https://www.whitehouse.gov/sites/default/files/omb/assets/OMB/expectmore/detail/10000008.2008.html ("Beginning in FY 2002, budgets have proposed redirecting funds from low-use segments (<1 million-ton-miles) that provide lesser economic return to high-use (>1million ton segments) that provide higher economic return for the constrained O&M dollars.")

Response to ACF234 – National Wildlife Federation

H. Navigation is a congressionally authorized purpose of the ACF system. Therefore, the PAA provides an opportunity to fulfill this purpose in balance with other project purposes, including fish and wildlife conservation, by defining a navigation season when supported by hydrologic conditions in the basin as described in section 4.1.2.6.4 of the EIS.

Lack of commercial navigation on the Apalachicola (and many other segments of the Inland Waterway System) is due in large part to the tremendous changes in the nation's economy and available modes of transportation since the ACF was authorized. As a 2012 National Research Council study makes clear:

> "There have been major changes to the U.S. economy, patterns of trade, and other cargo transportation alternatives since much of the inland navigation system was constructed several decades ago. Before the nation had its current, extensive rail and highway systems, 'inland waterways were a primary means of transporting bulk goods' (Stern, 2012). Today, alternative modes for shipping inland navigation goods—namely roads and rail—are in a more advanced state of development than during the period when the lock and dam projects were constructed. Although they remain important transportation modes for some sectors in some areas, 'inland waterways are a relatively small part of the nation's overall freight transportation network.'"[18]

The impacts of these major changes will not be reversed by the PAA's efforts to manipulate flow to attempt to maintain a commercial navigation channel on the Apalachicola River.

However, it could be possible to provide opportunities for navigation by providing flows that protect and recover fish and wildlife while providing conjunctive benefits to navigation. Under such an approach, flows would have to be carefully managed to support fish and wildlife and improve ecological conditions by providing flows and pulses that mimic natural flows, while assiduously abstaining from the use of navigation windows that have caused significant damage in the past. Fundamental to this approach would be a clear and unwavering commitment to recovery of channel morphology (profile, cross section, and pattern) by prohibiting future dredging and channel modifications for the sole purpose of facilitating navigation, and to significantly restrict future snagging to the absolute minimum required for public safety.

The longstanding lack of economic value (and return to the taxpayers) for the historic operation of the Apalachicola for commercial navigation is well documented.[19] In 2000, the Corps estimated that only 40 cents was returned to the nation for each federal dollar invested in the river (which at that time was nearly $3 million each year for dredging), making the Apalachicola one of the nation's most wasteful inland waterways.[20] The Corps' leadership further concluded that maintaining navigation on the Apalachicola was "not economically justified or environmentally defensible."[21] In 2001, the last commercial company regularly using barges on the Apalachicola River shut down.[22] In 2003, only six

[18] National Academy of Sciences, National Research Council, Corps of Engineers Water Resources Infrastructure: Deterioration, Investment, or Divestment? (2012) at 26-27.

[19] Despite the low use of many segments of the Inland Waterway System, including the Apalachicola – and the extremely high environmental cost of maintaining them for navigation – federal taxpayers pay 100% of the costs of operating and maintaining the Inland Waterway System. This full federal funding of operation and maintenance is unique to the inland waterways system. For example, harbor maintenance projects are funded almost entirely through the Harbor Maintenance Trust Fund. Maintenance of Corps flood control projects and Corps restoration projects typically are funded by the local project sponsor. Ongoing maintenance of shore protection projects is also fully cost-shared.

[20] Letters from Assistant Secretary of the Army (Civil Works) Joseph Westphal to Senator Bob Graham (D-FL) and Rep. Bob Barr (R-GA), August 14, 2000 (maintaining navigation on the Apalachicola is "not economically justified or environmentally defensible.")

[21] *Id*.

[22] This company, Martin Marietta Aggregates, mined the river for sand and gravel and barged the sand and gravel a short distance from one side of the Jim Woodruff Lock and Dam to the other side.

loaded barges used the Apalachicola River despite the investment of $6.5 million taxpayer dollars to maintain navigation on the ACF system. In October 2005, the State of Florida denied the Corps' request for a new dredging and snagging permit.[23] While Florida issued a new snagging permit to the Corps in 2013, that permit authorizes only extremely limited snagging efforts on the Apalachicola (with significant restrictions designed to limit the damage to the environment) that, according to the Corps, are required to ensure public safety.[24]

It is also important to note that the ACF Final Independent Peer Review Report concludes that the "finding that the PAA would have a substantially beneficial effect on navigation is not supported by data or analysis." Final IEPR Report, Panel Comment 4 at 11-12. The IEPR Report states:

> "Due to the unreliability of the existing navigation channel under current water management operations, there is currently no navigation on the waterway. In order for any alternative to have an impact that would result in a highly noticeable effect (significantly beneficial), shippers would have to divert commodity movements away from existing established modes of transportation (truck and rail), to the waterway under the restricted navigation conditions (limited depth, availability, and reliability) that are expected to occur under the PAA. No data are provided to support this assertion, nor are any data provided to quantify the potential amount of cargo that could be diverted to the waterway under the action alternatives." *Id*.

The impacts of past efforts to maintain navigation went far beyond the waste of taxpayer dollars. Efforts to maintain navigation on the Apalachicola have caused significant harm to the ecological health of this enormously valuable river system.[25] Historically, efforts to maintain navigation on the Apalachicola have included extensive dredging and snagging, and creation of artificial floods to provide high water to aid navigation (known as navigation windows). These navigation activities destabilized and widened the river's channel; reduced the river's hydraulic complexity and habitat diversity; smothered and displaced habitat in the river's rich sloughs, floodplains, and channel margins; and altered the river's flow regimes. Moreover, the extensive removal of tree snags significantly reduced the river's productivity and fish and wildlife habitat.

By enlarging the channel (a problem that, like the others discussed above, continues to plague the system), navigational dredging has also lowered water levels in the Apalachicola River. Among other problems, decreased water levels in the river have caused the Apalachicola's floodplains and sloughs to dry out, with severe ecological effects, including the loss of over 4.3 million trees in the floodplain.[26]

[23] Matter of an Application for Permit/Water Quality Certification and Authorization to Use Sovereign Submerged Land: File No. 0129424-005-DF at 4, 6; Consolidated Notice Denial for the Wetland Resource Permit (2005) at IV.A.1.b.

[24] Florida Department of Environmental Protection, Apalachicola River Snagging, Permit No. 07-0129424-008-EI (November 27, 2013).

[25] Additional significant harm to the Apalachicola River has been caused by the impoundment of water in upstream reservoirs and other consumptive uses of water upstream.

[26] Darst, M.R., Light, H.M., 2008, Drier Forest Composition Associated with Hydrologic Change in the Apalachicola River Floodplain, Florida: U.S. Geological Survey Scientific Investigations Report 2008-5062, 81 p., plus 12 apps. ("The density of trees in swamps significantly decreased by 37 percent from 1976 to 2004. Of the estimated 4.3 million (17 percent) fewer trees that existed in the nontidal floodplain in 2004 than in 1976, 3.3 million trees belonged to four swamp species: popash, Ogeechee tupelo, water tupelo, and bald cypress. Water tupelo, the most important tree in the nontidal floodplain in terms of basal area and density, has declined in number of trees

Navigation maintenance practices of dredging, extensive snagging, disposal of dredged spoils within bank and on the floodplain, and channel modifications that included bend easings and cutoffs directly destroyed a significant amount of habitat. Disposal of material dredged from the river buried approximately one-quarter of the Apalachicola's banks – in numerous places, the river's banks are now buried under huge mounds of sand, including one 60 foot high mound known as Sand Mountain. In addition to burying the vital habitat along the river's banks, the sand piles have choked the river's rich interconnected system of natural sloughs and distributaries by preventing the flow of water between the river and its floodplain. This flow is critically important for hydrating the floodplain and maintaining aquatic habitat and water quality. Seasonal floods also push the slurry of dredged sand deep into the area's vital wetlands, where it smothers habitat, blocks sloughs, dehydrates the floodplain and threatens a local economy based on tupelo tree honey production.

The Corps' use of navigation windows without regard to ecological functions and needs also caused rapid declines in the Apalachicola River's sport fish populations. The artificial floods created to establish the navigation windows triggered spawning behavior for many fish species at inappropriate times and left fish stranded upstream and in backwater areas when the water rapidly subsided. In 2000, when only 33 loaded barges traveled the Apalachicola River, an April navigation window resulted in an almost complete failure of sport fish spawn along the entire Apalachicola River and reservoirs upstream.

Designation of the Apalachicola as a low use waterway, the long-term lack of commercial navigation on the River, and the significant adverse environmental impacts of maintaining commercial navigation on the River over the past five decades demonstrate that commercial navigation as envisioned in the original authorizing legislation is neither viable nor ecologically acceptable.

If maintaining some degree of commercial navigation remains a justifiable purpose, flows should first be managed to protect and recover fish and wildlife in the Apalachicola River, floodplain, and bay, while secondarily accommodating navigation. Initial modeling suggests that this type of management is viable. If maintaining commercial navigation is no longer justifiable, flows should continue to be managed to protect and restore fish and wildlife.

3. The DEIS Fails to Properly Limit the Scope of the Water Supply Purpose

I

The DEIS fails to properly evaluate and limit the scope of the Rivers and Harbors Act water supply authority. A proper evaluation could result in limits on the amount of water that can be provided, if properly balanced against other authorized purposes, under this authority.[27]

The Court of Appeals for the Eleventh Circuit[28] directed the Corps to undertake a two-step analysis in considering Georgia's request for water supply:

by nearly 20 percent since 1976. Ogeechee tupelo, the species valuable to the tupelo honey industry, has declined in number of trees by at least 44 percent.").

[27] Any additional water supply could then only be provided if allowed under the restrictive criteria of the Water Supply Act.

[28] In Re Tri-State Water Rights Litigation, 644 F.3d 1160 (11th Cir. 2011).

Response to ACF234 – National Wildlife Federation

I. The extent of USACE's authority to provide releases for water supply needs in Metro Atlanta under the River and Harbor Act of 1946 (RHA) has not been determined; however, at the direction of the 11th Circuit Court of Appeals, USACE did determine that it has the authority under the RHA and the Water Supply Act of 1958 to meet the total 2000 Georgia request. This topic is discussed in sections 3.5.2.8.2 and 3.5.2.8.3 of the draft and final EIS.

(1) The Corps must first assess the extent to which it can provide water supply for the Atlanta metropolitan area under its Rivers and Harbors Act authority. As the Court made clear, this authority is not unlimited and any decision to provide water supply under the Rivers and Harbors Act authority must be balanced with meeting other authorized project purposes.
(2) The Corps can then assess whether any water supply needs that cannot be provided pursuant to the Rivers and Harbors Act would be allowed under the Water Supply Act.

The Eleventh Circuit, however, did not define the term "Atlanta metropolitan area." The Newman report (which the Court relied upon in reaching its decision) likewise did not define that term and variously refers to the area as the "Atlanta area", "metropolitan area", and the "city."[29]

The Corps' 2012 legal opinion regarding its "Authority to Provide for Municipal and Industrial Water Supply from the Buford Dam/Lake Lanier Project, Georgia" purports to conduct the two part analysis required by the Court. However, that legal opinion fails to follow one of its own key directives that is critical for determining the Rivers and Harbors Act water supply authority:

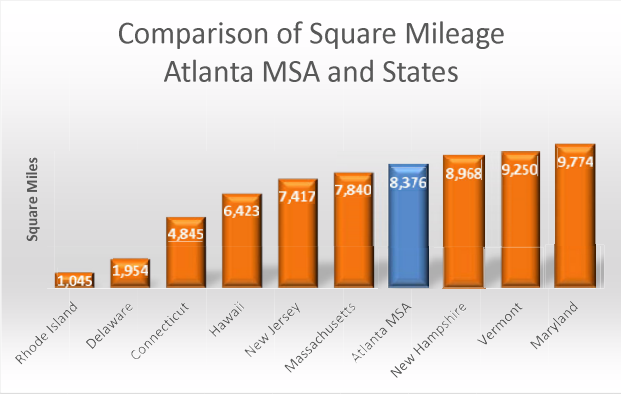
> "In the absence of strict allocations of multipurpose storage, the Corps must design operations that balance all authorized purposes, in a manner that respects Congressional **intentions and expectations when authorizing the project for construction**." 2012 Legal Opinion at 28 (emphasis added).

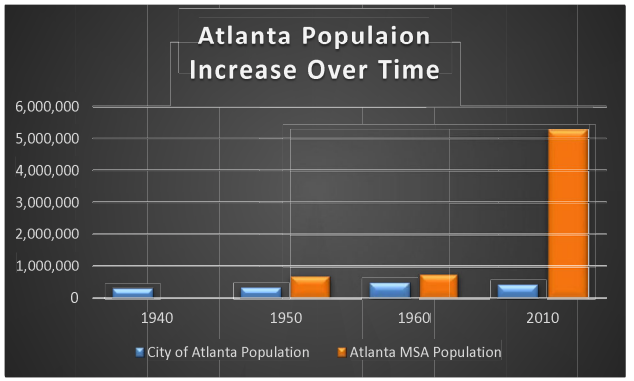
Neither the 2012 Legal Opinion nor the DEIS address the critical question of the intent and expectations of Congress in 1946 regarding the likely future growth in both population and areal extent of the Atlanta metropolitan region. Moreover, neither the 2012 Legal Opinion nor the DEIS point to any information in the Newman report or the legislative history to suggest that in 1946 Congress contemplated that Atlanta would metastasize to its current size and population.[30]

While the Newman report does acknowledge that water supply needs would increase over time,[31] it does not in any way suggest the level of growth that has actually occurred. For example, the Newman report estimated that the population of Atlanta would increase to 600,000 in 1965. However, this estimate was wildly incorrect – it vastly overestimates the population of the city of Atlanta in 1965, and vastly underestimates the population of the larger Atlanta metropolitan area. *See* Population Charts and Graphs below.

Regardless of the accuracy of the Corps' population growth estimate, it is hard to imagine any scenario under which the 1946 Congress would have anticipated the exponential growth in both the population and square mileage of the Atlanta metropolitan area. Indeed, the Atlanta metropolitan area has grown so large that it is now covers more area than each of six states.

[29] In Re Tri-State Water Rights Litigation, 644 F.3d at 1190.
[30] The Newman report does contemplate an increase in river flow at Atlanta from 650 cfs to 800 cfs to address Atlanta's growth, but increases in river flow do not necessary translate into the amount of water to be withdrawn for water supply purpose. Importantly, regardless of estimated flow needs, the authority to provide water supply under the Rivers and Harbors Act is limited to an area variously described as the "Atlanta area", the "metropolitan area" and the "city." *In Re Tri-State Water Rights Litigation*, 644 F.3d at 1190.
[31] In Re Tri-State Water Rights Litigation, 644 F.3d at 1188 and n. 19.





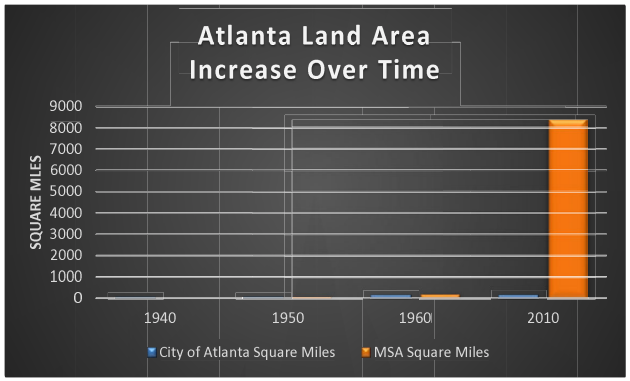
Both the population and areal extent of the metropolitan Atlanta region have exploded. Since 1950, the population of the Atlanta Metropolitan Statistical Area has **increased 627 percent** to 5.3 million people, and the area of the Atlanta Metropolitan Statistical Area has **increased 3,305 percent** to cover 8,376 square miles.

Atlanta Population Increase Since 1940		
Year	**City of Atlanta Population**	**Metropolitan Statistical Area Atlanta - Population**
1940	[32]302,288	[33]N/A
1950	[34]331,314	[35]726,789
1960	[36]487,000	[37]786,000
2010	[38]420,003	[39]5,286,728
Percent Increase (1950-2010)	**27 %**	**627 %**

Atlanta Land Area Increase Since 1940		
Year	**City of Atlanta Square Miles**	**Metropolitan Statistical Area Atlanta – Square Miles**
1940	[40]34.70	N/A
1950	[41]37.00	[42]106
1960	[43]128.00	[44]246
2010	[45]133.15	[46]8,376
Percent Increase (1950-2010)	**260 %**	**3,305 %**

[32] https://www.census.gov/population/www/documentation/twps0027/tab17.txt
[33] The Metropolitan Statistical Area was not established until 1950.
[34] https://www.census.gov/population/www/documentation/twps0027/tab18.txt
[35] http://www.demographia.com/dm-usmet-fr50.htm
[36] Demographia US Urbanized Areas 1950-1990 Central City Data
[37] Demographia Urban Areas in the United States: 1950-2010
[38] http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF
[39] http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF

[40] https://www.census.gov/population/www/documentation/twps0027/tab17.txt
[41] Demographia US Urbanized Areas 1950-1990 Central City Data
[42] Demographia Urban Areas in the United States: 1950-2010
[43] Demographia US Urbanized Areas 1950-1990 Central City Data
[44] Demographia Urban Areas in the United States: 1950-2010
[45] http://quickfacts.census.gov/qfd/states/13/1304000.html
[46] *"Atlanta MSA Growth Statistics" (PDF). Metro Atlanta Chamber of Commerce. May 2006. Archived from the original (PDF) on 2007-09-27. Retrieved 2007-09-28.* This provides information as of 2007.



The DEIS should analyze the water supply authority in the context of Congress' intent and expectations – as they existed in 1946 – regarding the extent of the Corps' authority to provide water supply to the Atlanta area under the Rivers and Harbors Act water supply authority.

4. The DEIS Fails to Incorporate Key Congressional Directives Into the Project Purposes

The DEIS fails to incorporate critically important post-project authorization Congressional directives into the project purposes for the ACF system, as required by law.[47]

For example, the DEIS project purpose (and the entire DEIS) ignores the National Water Resources Planning Policy established by Congress in 2007. This policy requires the Corps to operate the ACF projects to protect the Chattahoochee River, and the Apalachicola River, floodplain, and bay. This policy requires that "all water resources projects" protect and restore the functions of natural systems and mitigate any unavoidable damage to natural systems. 33 U.S.C 1962-3 (established by § 2031(a) of the Water Resources Development Act of 2007, and immediately applicable to all water resources projects).

The DEIS project purpose also fails to incorporate the environmental protection mandates and goals established by an extensive suite of federal laws and policies, including: the Endangered Species Act, the Clean Water Act, the Magnuson-Stevens Fishery Conservation and Management Act, the Coastal Zone Management Act, and the mitigation requirements applicable to Corps civil works projects established by § 2036(a) of the Water Resources Development Act of 2007. The alternative recommended in the final EIS must also comply with these laws.

[47] See Citizens Against Burlington, Inc. v. Busey, 938 F.2d 190, 196 (D.C. Cir. 1991).

Response to ACF234 – National Wildlife Federation

J

J. The purpose of the Master WCM update and EIS is to evaluate and compare alternative plans to update project operations in the ACF Basin to improve upon current operations (i.e., the NAA). The NAA reflects current reservoir operations as they have evolved over time in response to laws, regulations, policy, and new technical information. Basing the NAA for the ACF Basin on a pre-NEPA 1958 WCM or a predam condition to assess the effects of alternative WCM update plans would neither accurately reflect current baseline operations nor be consistent with "no action" as defined in the Council on Environmental Quality's memorandum of March 23, 1981, Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations. The EIS considered direct, secondary, and cumulative impacts and indicates that there would be essentially no incremental effect on the Apalachicola River and Bay as a result of the PAA as compared to the NAA.

The project purpose also fails to reflect that Corps' longstanding objective – based on law and policy – to protect and improve the health of the environment when operating and maintaining water resources projects. Corps regulations in place since 1980 state that:

> "Laws, executive orders, and national policies promulgated in the past decade require that the quality of the environment be protected and, where possible, enhanced as the nation grows. . . . Enhancement of the environment is an objective of Federal water resource programs to be considered in the planning, design, construction, and **operation and maintenance of projects**. Opportunities for enhancement of the environment are sought through each of the above phases of project development. Specific considerations may include, but are not limited to, **actions to preserve or enhance critical habitat for fish and wildlife; maintain or enhance water quality; improve streamflow**; preservation and restoration of certain cultural resources, **and the preservation or creation of wetlands.**"

33 C.F.R. § 236.4 (emphasis added).

Long-standing Corps guidance also requires the establishment of the minimum stream flow needed to address water quality, fish and wildlife, recreation, and aesthetic considerations when developing water control manuals, even where maintenance of minimum instream flows is not an authorized project purpose. EM 1110-2-3600, 30 Nov 87 (Management of Water Control Systems) at 2-3.

K

To achieve these objectives, the EIS must evaluate and select an alternative that will ensure the establishment and protection of the freshwater flows required to reestablish and maintain a healthy and vibrant Apalachicola River and Bay. Such flows would: (a) support and reestablish the chemical, physical, biological, and overall ecological integrity of the ACF system; (b) support and reestablish a thriving and resilient Apalachicola River, Apalachicola River floodplain, and Apalachicola Bay; and (c) restore and recover species that are endangered, threatened, or at risk.

F. The DEIS Fails to Evaluate a Full Range of Reasonable Alternatives

As discussed in detail in Section B of these comments, the Corps should fully develop, and select, an alternative that mimics natural river flows to the maximum extent possible in the Chattahoochee and Apalachicola Rivers. This extremely reasonable alternative would be able to address modern operational needs while also improving the health and resiliency of the environment.

The DEIS alternatives analysis is inadequate as a matter of law because it fails to evaluate a full range of reasonable alternatives. The DEIS explicitly excludes reasonable alternatives, uses flawed screening criteria to eliminate reasonable alternatives, evaluates only those alternatives that would produce essentially the same outcomes, and fails to consider alternatives that would improve the health and resiliency of the ACF system by ensuring appropriately timed and sufficient freshwater flows. The DEIS also fails to identify the environmentally preferable alternative.

NEPA requires that each EIS "[r]igorously explore and objectively evaluate all reasonable alternatives."[48] This requires a "**thorough consideration of all appropriate methods of accomplishing the aim of the**

[48] 40 C.F.R. § 1502.14.

Response to ACF234 – National Wildlife Federation

K. The authorized purposes of the federal ACF system do not include a specific directive to provide freshwater inflows to Apalachicola Bay to sustain the resources of the bay. USACE does make releases to limit adverse effects to threatened and endangered species downstream of Jim Woodruff Lock and Dam, including Apalachicola Bay. USACE consulted on the PAA and the results are presented in appendix J of the final EIS. In the biological opinion the USFWS concluded that effects to estuarine invertebrate production are insignificant because the PAA provides slightly beneficial effects from increasing the number of freshwater pulses and increasing the number of days greater than or equal to 16,200 cfs in the winter. USFWS also anticipate only minor changes in salinity regimes and estuarine habitat due to the WCM.

action" and an "**intense consideration of other more ecologically sound courses of action**."[49] The rigorous and objective evaluation of all reasonable alternatives is the "heart of the environmental impact statement."[50] Importantly, "the discussion of alternatives must be undertaken in good faith; it is not to be employed to justify a decision already reached."[51]

While an EIS need not explore every conceivable alternative, it must rigorously explore all reasonable alternatives that are consistent with its basic policy objective and that are not remote or speculative. A viable but unexamined alternative renders an EIS inadequate.[52] An alternative may not be disregarded merely because it does not offer a complete solution to the problem.[53] Importantly, an alternative also may not be disregarded because it would require additional Congressional authorization. To the contrary, the alternatives analysis must "[i]nclude reasonable alternatives not within the jurisdiction of the lead agency."[54]

Failure to look at an appropriate range of alternatives likewise renders an alternatives analysis inadequate.[55] The range of alternatives that must be considered is determined by the nature and scope of the proposed action. The greater the impacts and scope of the proposed action, the greater the range of alternatives that must be considered.[56] The range of alternatives considered is not sufficient if each alternative has the same end result.[57]

1. The DEIS Explicitly Excludes Reasonable Alternatives

The DEIS alternatives analysis does not comply with NEPA because the DEIS has explicitly excluded consideration of alternatives that must be reviewed as a matter of law. As discussed above, an alternative may not be disregarded merely because it would require additional Congressional authorization[58] or because it does not offer a complete solution to the problem.[59]

L

In direct violation of these mandates, the DEIS improperly and dramatically restricts its alternatives analysis by refusing to consider any alternatives that may require additional Congressional authorization and by refusing to consider any alternatives that do not accomplish all authorized purposes:

[49] Environmental Defense Fund, Inc. v. Corps of Engineers of U.S. Army, 492 F.2d 1123, 1135 (5th Cir. 1974) (emphasis added).
[50] 40 C.F.R § 1502.14.
[51] Citizens Against Toxic Sprays, Inc. v. Bergland, 428 F.Supp. 908, 933 (D.Or. 1977).
[52] E.g. Muckleshoot Indian Tribe v. U.S. Forest Service, 177 F.3d 800, 810, 814 (9th Cir. 1999).
[53] Natural Resources Defense Council, Inc. v. Morton, 458 F.2d 827, 836 (D.C. Cir. 1972).
[54] 40 C.F.R. § 1502.14(c).
[55] *E.g. Resources Ltd., Inc. v. Robertson*, 35 F.3d 1300, 1307 (9th Cir. 1993).
[56] *Alaska Wilderness Recreation and Tourism v. Morrison*, 67 F.3d 723, 729 (9th Cir. 1995); *see Sierra Club v. Espy*, 38 F.3d 792, 803 (5th Cir. 1994) (the range of alternatives that must be considered in an environmental assessment decreases as the environmental impact of the proposed action becomes less and less substantial).
[57] *State of California v. Block*, 690 F.2d 753, 767 (9th Cir. 1982) (holding that an inadequate range of alternatives was considered where the end result of all eight alternatives evaluated was development of a substantial portion of wilderness).
[58] 40 C.F.R. § 1502.14(c).
[59] Natural Resources Defense Council, Inc. v. Morton, 458 F.2d 827, 836 (D.C. Cir. 1972).

Response to ACF234 – National Wildlife Federation

L. As stated in section 1.2 of the EIS, USACE considered, in addition to operations for all authorized purposes, an expanded range of water supply alternatives associated with the Buford Dam/Lake Lanier project, including current levels of water supply withdrawals and additional amounts that Georgia requested in 2013 from Lake Lanier and downstream for Metro Atlanta. The Master WCM update represents a change in operation of existing constructed projects; it does not include structural changes or alternatives outside the operational authority. As concluded by the 11th Circuit Court of Appeals, USACE is authorized under the River and Harbor Act of 1946 to make releases from Buford Dam to meet the downstream water needs of Metro Atlanta. The draft EIS and final EIS both include a "future without project condition alternative" that evaluates the impacts of withdrawing only 20 million gallons per day (mgd) from Lake Lanier under the relocation contracts. Therefore, USACE has evaluated and proposed water management measures and alternatives that balance operations across all authorized project purposes throughout the basin while considering Georgia's water supply storage request, as directed by the 11th Circuit Court of Appeals.

> "Any proposed changes to the ACF Basin water control operations that would not accomplish all authorized purposes of the system or that would require substantial structural modifications or congressional authorization would not be consistent with the purpose and need of updating the WCM. Accordingly, this EIS does not address any structural changes to federal ACF Basin improvements or proposed changes to water management practices that are expected to exceed existing authority. Further, to the extent that existing operations must be adjusted to come into compliance with applicable law, such changes will be included as part of any proposed action (other than the no-action alternative)." DEIS at 1-4.

This position has also led to the inappropriate exclusion of any alternatives that do not equally weight the various project purposes (as improperly determined by the Corps). As the Final IEPR Panel report concludes, the equal weighting of the project purposes for the alternative analysis "is not consistent with the disproportionate importance of some project purposes." IEPR Final Report, Comment 1.

2. The DEIS Uses Flawed Screening Criteria to Eliminate Reasonable Alternatives

M

The DEIS improperly excludes reasonable alternatives by using a flawed two-phased screening process.

As stated in the IEPR Final Report, Comment 13: "The two-phased approach to the screening of alternatives is not explained, and the use of different terms for alternatives is confusing." The IEPR Panel went on to state that "Without additional discussion and a clear rationale for using a two-phased approach to screen alternatives, there is not sufficient information to understand why other alternative combinations were not considered viable, and confusion resulting from using inconsistent terms can affect the understanding of the project." *Id.*

The Conservation Organizations strongly agree with this assessment. Despite being referred to in numerous places in the DEIS, the Corps' two-phased initial screening process is never actually described. However, it would appear to include considerations that would prohibit compliance with NEPA, including for example, requiring alternatives to meet all project purposes (except fish and wildlife) and explicitly excluding alternatives that would require additional Congressional authorization.

Importantly, the U.S. Fish and Wildlife Service has stated that discussions with the Corps "indicated that to warrant full consideration, an alternative would need to: 1) accommodate a navigation season, and 2) retain the storage action zones to ensure a balanced system operation." 2015 Draft Fish and Wildlife Coordination Act Report at 36, DEIS Appendix J. The DEIS provides no justification for why the action zones cannot be modified and the inability to consider changes to the action zones dramatically and inappropriately restricts the types of alternatives that can be considered. The problems associated with requiring a navigation season are discussed in Section E of these comments.

Both individually and collectively, the initial screening criteria in the DEIS dramatically and inappropriately limited the development and analysis of highly reasonable alternatives. The significant problems with the metrics used to assess and compare alternatives are discussed in Section H of these comments.

Response to ACF234 – National Wildlife Federation

M. After extensive interagency analysis, USACE determined that the two-phase approach was necessary to appropriately "tease out" the impacts to the human environment resulting from different actions. The rationale for the two-phased formulation process is described in the introduction to section 4 of the draft EIS.

3. The DEIS Only Evaluates Alternatives that Would Produce the Same Outcomes

N

As discussed above, an alternatives analysis is inadequate if it fails to look at an appropriate range of alternatives.[60] The range of alternatives that must be considered is determined by the nature and scope of the proposed action. The greater the impacts and scope of the proposed action, the greater the range of alternatives that must be considered.[61]

Importantly, the range of alternatives considered is not sufficient if each alternative has the same end result.[62] For example, the Ninth Circuit Court of Appeals has ruled that an inadequate range of alternatives was considered where the end result of all eight alternatives evaluated was development of a substantial portion of wilderness.[63]

The scope of the proposed ACF management plan is enormous. It impacts three major river systems in three states and the Apalachicola Bay and establishes water control plans for five major federal reservoirs. As discussed throughout these comments, the impacts of the proposed action are both extensive and significant. As Florida's Deputy Secretary of the Department of Environmental Protection recently testified, if we do not restore historic flow patterns to the Apalachicola River, "the ecosystem and, indeed, the very way of life for generations of Floridians will be devastated."[64]

Despite the significance of the impacts of the proposed action, there are only minor variations amongst the various alternatives analyzed. *See, e.g.*, 2015 Draft Fish and Wildlife Coordination Act Report Appendix XV at DEIS Appendix J. Each alternative has the same end result – upstream uses are prioritized at the expense of the Apalachicola River, floodplain, and bay; and the Apalachicola continues to be starved of the freshwater flows it needs.

Indeed, despite the significant impacts of the PAA, the DEIS concludes that the "PAA has the least overall adverse effects [on] . . . stream flow conditions, water quality, and other natural resource and socioeconomic resource considerations of all the alternatives that fully or partially met both the water management and water supply objectives." DEIS ES-19. This conclusion demonstrates that the Corps has not considered a full range of reasonable alternatives, since it has not considered even one alternative that would improve the health of the Apalachicola River, floodplain, and bay.

To satisfy NEPA, the DEIS must evaluate a full range of alternatives, including alternatives that will restore the health of the Apalachicola ecosystem by mimicking natural river flows to the maximum extent possible.

[60] *E.g. Resources Ltd., Inc. v. Robertson*, 35 F.3d 1300, 1307 (9th Cir. 1993).
[61] *Alaska Wilderness Recreation and Tourism v. Morrison*, 67 F.3d 723, 729 (9th Cir. 1995); *see Sierra Club v. Espy*, 38 F.3d 792, 803 (5th Cir. 1994) (the range of alternatives that must be considered in an environmental assessment decreases as the environmental impact of the proposed action becomes less and less substantial).
[62] *State of California v. Block*, 690 F.2d 753, 767 (9th Cir. 1982) (holding that an inadequate range of alternatives was considered where the end result of all eight alternatives evaluated was development of a substantial portion of wilderness).
[63] *State of California v. Block*, 690 F.2d 753, 767 (9th Cir. 1982).
[64] Testimony of Jonathan P. Steverson, Executive Director of the Northwest Florida Water Management District, "Effects of Water Flows on Apalachicola Bay: Short and Long Term Perspectives", United States Senate Committee on Commerce, Science and Transportation Field Hearing, August 13, 2013 at 4.

Response to ACF234 – National Wildlife Federation

N. Section 4 of the EIS describes the process for developing measures and alternatives in consideration of water management operations in the basin.

4. The DEIS Fails to Consider Alternatives that Would Improve Ecological Conditions

The DEIS fails to evaluate a full range of reasonable alternatives because it fails to consider even one alternative that would improve the health and resiliency of the Apalachicola River, floodplain, and bay, or any other portions of the ACF system. Indeed, the DEIS fails even to evaluate any alternative that might minimize adverse impacts.

The DEIS instead acknowledges that the "PAA has the least overall adverse effects [on] . . . stream flow conditions, water quality, and other natural resource and socioeconomic resource considerations of all the alternatives that fully or partially met both the water management and water supply objectives." DEIS ES-19. Given the significant adverse impacts of the PAA, this conclusion demonstrates that the Corps has not considered even one alternative that would improve the health of the Apalachicola River, floodplain, and bay.

O

As discussed in Section B of these comments, the Corps should develop and select an alternative that mimics the amount and timing of natural flows to the Apalachicola and Chattahoochee Rivers, to the maximum extent practicable. In addition, this alternative should: restore those river reaches where bed degradation or other changes are causing lower water levels; and make use of such tools as a drought indicator index, real-time weather forecasts, and/or satellite imagery to improve operations. This alternative is essential for restoring and maintaining the health of the Chattahoochee River, the Apalachicola River, the Apalachicola River Floodplain, and the Apalachicola Bay.

G. The DEIS Fails to Properly Define, Analyze, and Consider Baseline Conditions

The DEIS violates NEPA because it fails to properly define, analyze, and consider baseline conditions. It is well established that:

> "Without establishing the baseline conditions ... there is simply no way to determine what effect the [action] will have on the environment, and consequently, no way to comply with NEPA."[65]

Problems with the DEIS baseline include: (1) failing to properly define the "no action" alternative; (2) using an inappropriate, single extreme drought year as the baseline for comparing the severity of impacts; (3) failing to provide fundamental and critical baseline data; (4) failing to accurately describe baseline conditions; and (5) using an inconsistent baseline across alternatives.

1. The DEIS Fails to Properly Define the No Action Alternative

P

The DEIS fails to properly define the "no action" alternative. The DEIS appears to use the operations allowed under the 2012 Modified RIOP as baseline operations for the "no action" alternative. However, using the 2012 Modified RIOP in this way is inappropriate and fundamentally misconstrues the purpose and role of the 2012 Modified RIOP.

[65] *Half Moon Bay Fisherman's Mktg. Ass'n. v. Carlucci,* 857 F.2d 505, 510 (9th Cir.1988). As a result, the entire DEIS is inadequate as a matter of law. *E.g., Friends of Back Bay v. U.S. Army Corps of Engineers*, 681 F.3d 581, 588 (4th Cir. 2012) (an EIS fails to comply with NEPA if it relies on a "material misapprehension of the baseline conditions.")

Response to ACF234 – National Wildlife Federation

O. The PAA was selected to maintain the health of the ACF Basin within USACE's authorities. The scope of USACE's authorities to manage projects in the ACF Basin limits the Agency's ability to mimic natural flows to the Chattahoochee and Apalachicola rivers. Its authorities include the responsibility to produce peaking hydropower, operate for flood damage reduction, and release minimum flows from Jim Woodruff Dam for threatened and endangered species to comply with the terms and conditions in the biological opinion. This EIS compares the PAA to current operations (represented by the NAA). The NAA does not represent conditions before construction of Jim Woodruff Dam, therefore, mitigation to restore the river's natural channel would not apply in this action.

USACE water management staff work closely with meteorologists and consider the drought indicator index, real-time weather forecasting, and/or satellite imagery to adapt real-time operations to actual weather conditions.

P. An environmental assessment and finding of no significant impact were prepared for the May 2012 revised interim operating plan (RIOP) for threatened and endangered species and is available in the document library of the Master WCM update Web page of the USACE, Mobile District Web site. USACE has been operating the ACF system in accordance with the 2012 RIOP since 2012. Council on Environmental Quality regulations for implementing NEPA define "no action" as "no change" from the current management direction or level of management intensity. Accordingly, the May 2012 RIOP is included as part of the NAA considered in the draft EIS.

Response to ACF234 – National Wildlife Federation

As the Corps has clearly acknowledged, the purpose of the 2012 Modified RIOP is limited:

> "The proposed action is a modification to the Corps' current Revised Interim Operations Plan (RIOP) for Jim Woodruff Dam, which is a component of the water control plan for the ACF system and **describes minimum releases describes minimum releases and maximum fall rates for releases from the dam to the Apalachicola River in order to minimize or avoid adverse impacts or provide support to endangered and threatened species and critical habitat which occur on the Apalachicola River**."[66]

The Modified 2012 RIOP does not assess or define the levels of flow needed to avoid or minimize harm to the many other fish, reptile, amphibian, waterfowl, bird, mammal, and plant species that rely on appropriate flows. The Modified 2012 RIOP does not assess or define flows needed to improve the health of those species. And the Modified 2012 RIOP does not assess or define the levels of flows needed to satisfy the authorized purposes of the ACF projects.

Moreover, the 2012 Modified RIOP has never been assessed in an EIS. The 2012 Modified RIOP modified a 2008 Revised Interim Operating Plan (RIOP) which in turn had modified a 2007 Interim Operating Plan (IOP). Each of these interim operating plans imposed progressively more severe restrictions on releases from Jim Woodruff Dam, and each in turn resulted in increased impacts to the Apalachicola River, floodplain, and bay. Despite the significant adverse impacts of each change, the Corps prepared only very limited environmental assessments of each (the U.S. Fish and Wildlife Service also prepared Biological Assessments on the interim operating plans). The Conservation Organizations have been advised that Florida objected to the changed operating procedures, but these objections were ignored.

While the Corps must of course comply with the mandates of the 2012 Modified RIOP (and any modifications required to comply with the ESA), the DEIS must look beyond compliance with the ESA and assess the full suite of impacts to the environment.

Because of its limited purpose and lack of environmental review, the Modified 2012 RIOP should not be used as the "no action" alternative. Instead, the DEIS should use the pre-2007 operating plan as the "no action" alternative. The Modified 2012 RIOP should be factored into the evaluation of alternatives as establishing the absolute minimum flows needed to avoid to avoid jeopardy to listed species and harm to designated critical habitat.

2. The DEIS Uses an Inappropriate Baseline for Assessing the Severity of Impacts

The DEIS uses conditions in 2007 as the "baseline for determining the severity of effects."[67] DEIS at ES-10. During and leading up to 2007, the ACF Basin experienced Extreme (D3) and Exceptional (D4) drought conditions. These conditions triggered ACF system drought management operations that

Q

Q. The Council on Environmental Quality (CEQ) regulations for implementation of NEPA require consideration of the NAA (section 1502.14). In the CEQ's memorandum of March 23, 1981, Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, question no. 3 addresses the NAA. The response to question no. 3 states, in part:

> The first situation might involve an action … where ongoing programs initiated under existing legislation and regulations will continue, even as new plans are developed. In these cases, "no action" is "no change" from the current management direction or level of management intensity. To construct an alternative that is based on no management at all would be a useless academic exercise. Therefore, the "no action" alternative may be thought of in terms of continuing with the present course of action until that action is changed.

[66] U.S. Army Corps of Engineers, Finding of No Significant Impact Revised Interim Operations Plan for Support of Endangered and Threatened Species Jim Woodruff Dam Gasden and Jackson Counties, Florida and Decatur County, Georgia (22 May 2012) at FONSI-1 (emphasis added).

[67] The DEIS can account for the significant withdrawals of 2007 in its alternatives analysis without utilizing the ecological conditions of 2007 as the project baseline for comparing the severity of impacts.

caused significant harm to the Apalachicola River, floodplain, and bay; and to the fish and wildlife, commercial fishing, recreational fishing, and ecotourism that rely on these waters.

Using the single point in time of the 2007 extreme drought conditions as the baseline for assessing the severity of impacts is inappropriate for at least the following four reasons.

First, as the Council on Environmental Quality has made clear, the DEIS may not use a single point in time as baseline conditions upon which to evaluate the severity of impacts. In situations such as those in the ACF where the environment has already been greatly modified by human activities, it is **not** sufficient to compare the impacts of the proposed alternative against the current conditions. Instead, the baseline must include a clear description of "how conditions have changed over time and how they are likely to change in the future without the proposed action" to determine whether additional stresses will push it over the edge.[68] This is critically important, as it "is often the case that when a large proportion of a resource is lost, the system nears collapse as the surviving portion is pressed into service to perform more functions."[69]

This critical information is missing from the assessment of baseline conditions. For example, the DEIS fails to provide information on the conditions in existence during the 2007 drought year for the Apalachicola River, floodplain, and bay, even though it is using 2007 as the baseline for determining severity of impacts. *See, e.g.*, DEIS at 2-9 (the description of the various droughts that have affected the ACF basin, including the 2007 drought, fails to describe the conditions in Florida). The DEIS fails to describe or analyze the loss of well over 4.3 million trees in the Apalachicola floodplain since the mid-1970s.[70] The DEIS fails to describe or address the changes in flow regime over time due to the Corps' management of the ACF system and increased consumption. The cumulative impacts analysis also fails to provide a clear description of how conditions have changed over time. *See* Discussion of Cumulative Impacts at Section I of these comments.

Second, the Corps appears to be using the 2007 baseline in an attempt to make the adverse impacts of proposed alternatives appear much less severe than they actually are. For example, flows in the Apalachicola were limited to 5,000 cfs for much of 2007. The DEIS appears to have used this fact to conclude that the PAA will have no effect on the Apalachicola because the PAA will also keep flows at 5,000 cfs during droughts (or 4,500 cfs during extreme droughts). In addition to being skewed by comparison against an extreme drought year, this conclusion is plagued by a host of misconceptions and flawed reasoning – including failing to account for the most basic science on the biological impacts of severely reduced flows over time, and a wholesale lack of supporting data and scientific information.

Third, because the "no action" (and all proposed) alternatives include a range of management options that address normal, flood, drought, and extreme drought years, the severity of impacts should not be based on a comparison with conditions that existed in a single extreme drought year.

Fourth, the conditions that existed in 2007 do not reflect the conditions that currently exist in the watershed and do not reflect typical conditions in the watershed.

---

[68] Council on Environmental Quality, Considering Cumulative Effects Under the National Environmental Policy Act at 41 (January 1997).
[69] *Id.*
[70] Darst, M.R., Light, H.M., 2008, Drier Forest Composition Associated with Hydrologic Change in the Apalachicola River Floodplain, Florida: U.S. Geological Survey Scientific Investigations Report 2008-5062, 81 p., plus 12 apps.

The DEIS may not measure the severity of impacts against the single, extreme drought year of 2007.

3. The DEIS Lacks Fundamental and Essential Baseline Data

The DEIS lacks fundamental and essential baseline data on fish, wildlife, plants, salinity, and ecological conditions. As a result, the DEIS fails to provide sufficient information on baseline conditions and fails to take the "hard look" at impacts required by NEPA.

R

Without baseline data, "an agency cannot carefully consider information about significant environment impacts. Thus, the agency fails to consider an important aspect of the problem, resulting in an arbitrary and capricious decision."[71] If information that is essential for making a reasoned choice among alternatives is not available, the Corps must obtain that information unless the costs of doing so would be "exorbitant."[72] 40 C.F.R. § 1502.22.

The DEIS fails even to identify the vast majority of the many hundreds of individual species that rely on the Apalachicola River and floodplain or that rely on sufficient freshwater inputs into the Apalachicola Bay. Critically, the DEIS also fails to provide any information on the amount and timing of freshwater flows needed throughout the full life cycles of those species, including the amount of flow needed to support breeding (including access to the floodplain), rearing, feeding, resting, and the amount of flow needed to maintain appropriate salinity levels. Without this information, it is impossible to assess the impacts of alternative flow regimes.

The Corps must obtain needed baseline information before it can assess the environmental impacts of a proposed action in a manner that will satisfy NEPA.

4. The DEIS Fails to Accurately Describe Baseline Conditions

As discussed above, in situations such as those in the ACF where the environment has already been greatly modified by human activities, it is **not** sufficient to compare the impacts of the proposed alternative against the current conditions. Instead, the baseline must include a clear description of "how conditions have changed over time and how they are likely to change in the future without the proposed action" to determine whether additional stresses will push it over the edge.[73] This is critically

S

[71] *N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1083, 1085 (9th Cir. 2011) (the EIS did "not provide baseline data for many of the species" of concern and thus "did not take a sufficiently 'hard look'" to fulfill its NEPA-imposed obligations at the impacts as to these species).

[72] *See also*, *Half Moon Bay Fisherman's Mktg. Ass'n.* 857 F.2d 505; N. Plains Res. Council, 668 F.3d 1067; *Gifford Pinchot Task Force v. Perez*, No. 03:13-CV-00810-HZ, 2014 WL 3019165, at *27-29 (D. Or. July 3, 2014), *appeal dismissed* (Dec. 23, 2014), *appeal dismissed* (Dec. 29, 2014); *Idaho Conservation League v. U.S. Forest Serv.,* No. 1: 11 –CV–00341 -EJL, 2012 WL 3758161, at *16 (D.Idaho Aug. 29, 2012) (analyzing an EA, ruling that the agency needed to conduct a baseline study and actual investigation of groundwater before reaching a conclusion regarding the impacts of a mining project on groundwater).

[73] Council on Environmental Quality, Considering Cumulative Effects Under the National Environmental Policy Act at 41 (January 1997).

Response to ACF234 – National Wildlife Federation

R. Additional studies and research on the Apalachicola Bay are beyond the scope of this Master WCM update process. Focused efforts directly related to assessing the effects of water management activities in the basin on the Apalachicola River and Bay were conducted as part of the coordination for the Master WCM update between USACE, Mobile District and the USFWS under the Fish and Wildlife Coordination Act. The results of these activities have been incorporated into the final EIS.

S. Council on Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) require consideration of the No Action Alternative (NAA) (40 CFR section 1502.14). In the CEQ's memorandum of March 23, 1981, Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, question no. 3 addresses how the NAA is defined depending on the nature of the specific federal action. The response to question no. 3 states, in part:

> The first situation might involve an action … where ongoing programs initiated under existing legislation and regulations will continue, even as new plans are developed. In these cases, "no action" is "no change" from the current management direction or level of management intensity. To construct an alternative that is based on no management at all would be a useless academic exercise. Therefore, the "no action" alternative may be thought of in terms of continuing with the present course of action until that action is changed.

Consequently, for purposes of the Master WCM update process, the NAA reflects current reservoir operations as they have evolved over time in response to laws, regulations, policy, and new technical information. Basing the NAA for the ACF Basin on a pre-NEPA 1958 WCM or on a predam condition to assess the effects of alternative WCM update plans would neither accurately reflect current baseline operations nor be consistent with "no action" as defined in the referenced CEQ memorandum

.

important, as it "is often the case that when a large proportion of a resource is lost, the system nears collapse as the surviving portion is pressed into service to perform more functions."[74]

However, the DEIS fails to accurately describe baseline conditions with respect to the Apalachicola River, floodplain, and bay. Among other things, the DEIS fails to describe the degraded state of those resources, fails to describe the recent droughts that affected those resources; fails to discuss the impacts to those resources caused by the Corps' current management regime, including the significant impacts of the operational changes that began with the 2007 IOP; and fails to discuss the collapse of oysters and other resources in the Apalachicola Bay. As discussed in Section I of these comments, the cumulative impacts analysis likewise fails to provide (or assess) this information.

For example, the DEIS description of the historic droughts of 2006-2008 and 2011-2012 fail to mention conditions in the Florida panhandle or the Apalachicola River, floodplain, and bay.[75] *See* DEIS at 2-9. The DEIS also fails to include or address the fact that conditions in the Apalachicola River and Bay have grown increasingly worse over time. As the State of Florida told Congress in 2013:

> "Apalachicola River flows have been lower and low flows have occurred more frequently and for longer durations than any other time in recorded history. The problem has grown more dire during the last 10 years, and is creating long-lasting impacts to the river and bay.
>
> In 2012, Florida experienced widespread damage to its oyster resource as a result of two years of prolonged low-flow conditions. **In fact, last year set a record for the least amount of water delivered to the bay since record-keeping first began in 1923, although this was not the year with the least amount of rainfall.** The corresponding reduction in freshwater inflow raised salinity levels in the bay well above tolerable thresholds, and the continued lack of inflow precluded any opportunity to reduce salinity levels. It is well documented that elevated salinity levels lead to increased oyster mortality through disease and predation.
>
> State agencies and local fisherman have documented a severe decline in the oyster harvests. Drastic declines in all age classes of oysters suggest that a collapse of the fishery has indeed occurred. The latest state agency reports reveal that oyster production estimates on commercially important oyster reefs are the lowest in the past 20 years. The data suggests that many of the reefs have too few oysters to support commercial harvesting, devastating the livelihoods of the men and women who make their living harvesting, processing or selling oysters on Florida's Gulf Coast.
>
> As a result, Governor Rick Scott requested the Secretary of the U.S. Department of Commerce declare a commercial fishery failure for Florida's oyster harvesting areas in the Gulf of Mexico, pursuant to Section 312 (a) of the Magnuson-Stevens Fishery Management and Conservation Act.[76]

* * *

> In 1989, pursuant to the Draft Water Control Plan, the Corps essentially began prioritizing reservoir operations to support this water supply demand, which has increased dramatically over time. Under the Corps' present operating schedule, each new demand placed on the system upstream is absorbed, not from reservoir storage, but entirely from downstream river flows. In other words, every acre-foot of water that Georgia wants is taken directly from flows that would otherwise reach Alabama and Florida. These practices have deprived downstream interests of basic river flow needs, despite the empirical evidence that such operations are devastating Apalachicola Bay and its oyster population.
>
> It is clear that the Apalachicola River needs more flow to help recover from the devastating oyster mortality that occurred in the bay in 2012, as well as the massive die-offs of endangered mussels, decline in fisheries, and drying of the floodplain forest that have occurred in recent years."[77]

The DEIS also downplays the implications of the degradation that it does describe. For example, the DEIS acknowledges that the "composition of floodplain forests along the Apalachicola River has been changing during the last 30 to 40 years. The USGS found that the present-day forest composition along the river has shifted toward drier conditions compared to data collected in the 1970s (Darst and Light 2008)." DEIS at 2-190. However, the DEIS does not include information from that same Darst and Light study that describes the extremely significant loss of trees due to the drying out of the floodplain:

> "The density of trees in swamps significantly decreased by 37 percent from 1976 to 2004. Of the estimated 4.3 million (17 percent) fewer trees that existed in the nontidal floodplain in 2004 than in 1976, 3.3 million trees belonged to four swamp species: popash, Ogeechee tupelo, water tupelo, and bald cypress. Water tupelo, the most important tree in the nontidal floodplain in terms of basal area and density, has declined in number of trees by nearly 20 percent since 1976. Ogeechee tupelo, the species valuable to the tupelo honey industry, has declined in number of trees by at least 44 percent."[78]

The DEIS must fully and properly describe baseline conditions in the Apalachicola River, floodplain, and bay, including by providing a clear description of "how conditions have changed over time" to allow decision makers and the public to evaluate the full suite of impacts and determine whether additional stressors will push this vital ecosystem to collapse.[79]

---

[74] *Id.*

[75] The only mention of Florida in these sections is the statement: "The depletion of flows in the Flint River placed more pressure on USACE reservoirs in the Chattahoochee River Basin to provide releases necessary to meet minimum flow requirements downstream of Jim Woodruff Lock and Dam." DEIS at 2-9.

[76] That request was granted in 2013.

[77] Testimony of Jonathan P. Steverson, Executive Director of the Northwest Florida Water Management District, "Effects of Water Flows on Apalachicola Bay: Short and Long Term Perspectives", United States Senate Committee on Commerce, Science and Transportation Field Hearing, August 13, 2013 at 6-7 (emphasis added).

[78] Darst, M.R., Light, H.M., 2008, Drier Forest Composition Associated with Hydrologic Change in the Apalachicola River Floodplain, Florida: U.S. Geological Survey Scientific Investigations Report 2008-5062, 81 p., plus 12 apps.

[79] Council on Environmental Quality, Considering Cumulative Effects Under the National Environmental Policy Act at 41 (January 1997).

5. The DEIS Uses An Inconsistent Baseline Across Alternatives

As stated in the Final Independent Peer Review Report, the DEIS uses inconsistent baseline conditions (future without-project conditions) when considering different alternatives.[80] Notably, the DEIS includes the proposed Glades Reservoir as a baseline condition for some, but not all alternatives. Problems with including Glades Reservoir in the PAA are discussed in Section C of these comments.

T

The DEIS also appears to be using different baseline conditions for modeling, assessing the severity of impacts, and assessing the maximum amount of water that would be withdrawn from the system. The DEIS uses the 2012 Modified RIOP for modeling the "no action" alternative. However, the DEIS uses the 2007 drought year for assessing the severity of impacts and for establishing the maximum amount of water that would be withdrawn from the system.

The DEIS also fails to provide a clear project life span (i.e., the time period for the proposed management changes). While the DEIS does suggest that it is looking at ensuring Georgia's water supply request through 2040, it is not clear if this is the time period covered by the proposed management changes. That time period may end in 2040, 2050[81] or some other date entirely. Without this information, it is not possible to accurately assess the future without-project conditions, or to appropriately assess and compare the impacts of proposed alternatives.

The absence of consistent baseline conditions across all alternatives makes it impossible to accurately compare the impacts across alternatives.

H. The DEIS Lacks Scientific Integrity

U

"Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA."[82] Accordingly, the DEIS must be based on "high quality" science and information and the Corps must "insure professional integrity, including scientific integrity, of the discussions and analysis in environmental impact statements."[83] Importantly, if information that is essential for making a reasoned choice among alternatives is not available, the Corps **must** obtain that information unless the costs of doing so would be "exorbitant."[84]

[80] Final Independent External Peer Review Report Apalachicola-Chattahoochee-Flint River Water Control Manual, Environmental Impact Statement, and Water Supply Storage Assessment Report, September 24, 2015 (Final Panel Comment 7 at p. 16).
[81] See DEIS at 6-207 (Results of the climate change-affected unimpaired flow (UIF) for "Years 2021–2050 most closely match the anticipated project lifespan for the Master WCM update/WSSA analyses, as reflected in the project NEPA documentation.")
[82] 40 C.F.R. § 1500.1(b).
[83] 40 C.F.R. § 1502.24 ("Agencies shall insure professional integrity, including scientific integrity, of the discussions and analysis in environmental impact statements"); *Earth Island Inst. v. U.S. Forest Service*, 442 F.3d 1147, 1159-60 (9th Cir. 2006) (quoting 40 CFR §1502.24).
[84] 40 C.F.R. § 1502.22. During the November 9, 2015 Public Meeting on the DEIS (in Eastpoint, FL), a representative of the Corps advised the public that the Corps would not research a public comment on a technical issue unless the comment was accompanied by data and analysis that demonstrates the point made. This demonstrates a severe misunderstanding of the rules that govern preparation of an EIS. As noted above, the Corps (not the public) must obtain information that is essential for making a reasoned choice among alternatives. It is also the Corps

Response to ACF234 – National Wildlife Federation

T. The NAA is the baseline against which all other alternatives are compared in the draft EIS. The NAA does not include Glades Reservoir but does include the 2012 Revised Interim Operating Plan. As explained in section 4.1.2.9 of the EIS, for modeling purposes, a fixed water supply demand was identified to enable effective comparison of alternatives. The highest levels of basinwide water supply withdrawals occurred in 2007, during the 2006–2008 drought. Although basinwide withdrawals since 2007 have been lower overall, 2007 was selected as representative of "current" demand because using the highest recent figure provides the most conservative estimate of the storage available for all purposes, assuming the highest reasonably forecasted water supply demand, including during times of drought. The project life, referred to as the "period of analysis" in the WSSA (appendix B of the EIS), is 50 years. The WSSA states that storage contracts for reallocated storage for water supply would be expected to be signed in 2017. Accordingly, the 50-year period of analysis would begin in 2017.

U. Additional studies and research on the Apalachicola Bay are beyond the scope of this Master WCM update process. Focused efforts directly related to assessing the effects of water management activities in the basin on the Apalachicola River and Bay were conducted as part of the coordination for the Master WCM update between USACE, Mobile District and the USFWS under the Fish and Wildlife Coordination Act. The results of these activities have been incorporated into the final EIS.

An EIS must utilize "quantified or detailed information" when analyzing impacts.[85] The DEIS may not rely "on conclusory statements unsupported by data, authorities, or explanatory information."[86] Accordingly, the DEIS must supply supporting data and authorities, and explain how and why it has drawn the conclusion it has reached.

The Corps must also candidly disclose the risks of its proposed action and respond to adverse opinions held by respected scientists:[87]

> "'Where scientists disagree about possible adverse environmental effect, the EIS must inform decision-makers of the full range of responsible opinion on the environmental effects.' Where the agency fails to acknowledge the opinions held by well respected scientists concerning the hazards of the proposed action, the EIS is fatally deficient."[88]

V

It is not sufficient to include the statements of the resource agencies or the Independent Peer Review panel in an Appendix or some other document, the expert comments must be included and appropriately responded to in the impacts section of the DEIS.[89]

The DEIS falls woefully short of meeting these longstanding NEPA requirements.

1. The DEIS Bases its Analyses on Inappropriate Models and Data

The DEIS bases its analyses on inappropriate models and data. These problems taint the entire DEIS.

(a) The Modeled Period of Record Cannot Accurately Assess Future Impacts

The DEIS relies on a modeled period of record (1939 to 2011) as the basis for its assessment of impacts and comparison of alternatives. The Corps developed this modeled period of record by taking the observed flows for 1939 to 2011 and using those flows to develop an unimpaired flow set. The unimpaired flow set was then used as a fundamental input for all simulations run through the Corps' ResSim model.

W

The DEIS uses the runs of the ResSim model to assess the impacts of each alternative, and to compare the impacts of the various alternatives. Thus, for example, when the DEIS concludes that the PAA would trigger drought operations 22 times over the modeled period of record it means that the ResSim run of the PAA triggered drought operations 22 times over the modeled period from 1939-2011.

responsibility to prepare the EIS in a manner that complies with NEPA, and that includes obtaining and providing important information on alternatives and possible impacts.

[85] *Neighbors of Cuddy Mountain v. U. S. Forest Service*, 137 F.3d 1372, 1379 (9th Cir. 1998); *Ecology Center v. Castaneda*, 574 F.3d 652, 666 (9th Cir. 2009) (requiring "quantified or detailed data"); *Natural Resources Defense Council v. Callaway*, 524 F.2d 79, 87 (2d Cir. 1975).

[86] *Id.*

[87] *Seattle Audubon Soc'y v. Mosely*, 798 F.Supp. 1473, 1482 (W.D. Wash. 1992) (citing *Friends of the Earth v. Hall*, 693 F.Supp. 904, 934, 937 (W.D.Wash. 1988).

[88] *Friends of the Earth v. Hall*, 693 F. Supp. 904, 934 (W.D. Wash. 1988)(citations omitted).

[89] *Id.*

Response to ACF234 – National Wildlife Federation

V. Every comment received from the public and government agencies has been addressed, and the best available technical information and analyses and provisions of pertinent laws and regulations have been considered, in determining the Proposed Action Alternative (PAA) for the Master WCM update. Responses to all public and agency comments have been included in the final EIS, including appropriate revisions made to the EIS as a result of public comments.

W. The effects of climate change on the PAA are described in section 6.8 of the EIS. The level of analysis of climate change contained in the EIS exceeds the requirements of applicable USACE regulations.

As discussed below, there are significant problems with the unimpaired flow set that undermine the accuracy of the ResSim analysis. But even without these problems, reliance on the past hydrologic record cannot accurately assess future conditions or the future impacts of the various alternatives. Indeed, because of the changes being wrought by climate change, water managers now routinely warn against relying solely on historical conditions:

> "In view of the magnitude and ubiquity of the hydroclimatic change apparently now under way, however, we assert that stationarity is dead and should no longer serve as a central, default assumption in water-resource risk assessment and planning."[90]

This is because the climate change-induced variability will likely lead to more extreme weather and more severe droughts, than have been experienced in the past. Variability is already present in the system. For example, the frequency, duration and severity of droughts from 1999-2012 were much greater that at any time in the previous seven decades.

As discussed below, neither the climate change analysis nor the cumulative impact analysis correct the problems created by the wholesale reliance on the modeled period of record for assessing impacts and comparing alternatives.

(b) The Unimpaired Flow Set Has Serious Flaws that Taint the Entire DEIS

X

As noted above, the unimpaired flows are a synthetic data set that are input to every run of the ResSim model. The unimpaired flows were originally developed by the Corps in the 1990's and have been updated periodically. Unimpaired flows should be developed by taking the observed flows and removing the impacts of reservoirs (storage, lake evaporation, etc.), withdrawals, wastewater returns and other quantifiable impacts. The unimpaired flows do not represent "natural" flows, but are purely a computed (or synthetic) data set.

The unimpaired flow set has a number of critical problems that create significant limitations on the reliability of model runs utilizing that data. Computation of an accurate unimpaired flow set requires accurate date on withdrawals throughout the ACF basin, but such data is not available. For example, there is little information on the municipal and industrial water demands for most of the period covered (1939-2011). Data on such demands is particularly lacking prior to the 1990s. Agricultural withdrawals in the Flint Basin are also not well documented because Georgia does not require metering of those withdrawals. The DEIS fails to discuss the limitations with the unimpaired flow set.

As discussed below, errors in the unimpaired flow set will be imbedded in the ResSim modeled flows. Importantly, errors in the unimpaired flows will be proportionally greater at low flows (particularly during drought periods) than at higher flows. The DEIS fails to describe the limitations of the model runs resulting from errors in the unimpaired flow set.

[90] P.C.D. Milly, *et al.*, CLIMATE CHANGE: Stationarity Is Dead: Whither Water Management?, Science February 2008, Vol 319 (5863), pp. 573-574, available at http://wwwpaztcn.wr.usgs.gov/julio_pdf/milly_et_al.pdf (visited November 2, 2013).

Response to ACF234 – National Wildlife Federation

X. As stated in the Unimpaired Flow Report in Volume I: Surface Water Availability of USACE's 1997 *ACT/ACF Comprehensive Water Resources Study*, as with all data sets, development of this data set involved various assumptions and approximations. The analyst must consider those items and judge their effect on any analysis employing the unimpaired flows. Use of the data should be carefully evaluated based on the methods, assumptions, and data irregularities described in this report. Missing data fill-in, correlations, net evaporation calculations, channel routings, withdrawals and returns, leakages, and flow smoothing are some of the many factors considered before using these data. The 1997 report is referenced in the HEC-ResSim modeling report in appendix E of the final EIS. The unimpaired flow data set has been updated for the period 1939-2011, and documentation has been included in appendix O of the final EIS.

(c) The ResSim Model Results Have Been Used Inappropriately

Y

The DEIS inappropriately uses the results of the ResSim modeling to draw conclusions about the actual flows that will result from a given alternative. As discussed below, the ResSim model does not – and cannot – predict actual flows; it can only evaluate changes in flow between different runs in the ResSim model. This is a very important distinction.

As noted above, the ResSim model uses the unimpaired flow set as the initial conditions. For each model run, changes to reservoirs operations, withdrawals, return rates, evaporation and other parameters are then either added or subtracted (as appropriate) from the unimpaired flows. Theoretically, because all the runs use the unimpaired flows as the initial condition, the runs are computationally consistent and can be used to examine the **change** in flows between runs. This allows comparison of a large number of alternatives.

The ResSim model cannot be used to represent actual flows that will result from a given alternative because of the model's reliance on the unimpaired flow set. The unimpaired flows can provide for an internally consistent set of model runs for comparison purposes, because errors in the unimpaired flows are assumed to be the same in all runs and, therefore, can be ignored. However, model results do not represent actual flows because errors in the unimpaired flow set will be imbedded in the modeled flows.

Importantly, errors in the unimpaired flows will be proportionally greater at low flows (particularly during drought periods) than at higher flows. For example, during low flows the model results do not accurately replicate the observed flows at the Chattahoochee streamflow station on the Apalachicola River. The correlation between the simulated and observed flows is weak and there are very large differences (residuals) between the observed and the modeled flows.

The Corps also has not calibrated the ResSim model and has not carried out any other analyses to determine whether the ResSim model can accurately reproduce observed flows, particularly during low flows. For example, the Corps has not run simulations comparing the model results with observed data on reservoir levels or flows. The Corps also has not conducted a sensitivity analysis or systematic error analysis on the DEIS ResSim model and data. As a result, no objective measures or analyses are available to demonstrate that the model can accurately reproduce observed flows and reservoir levels during low flows.

For additional detailed information on the problems with the DEIS modeling, the Conservation Organizations direct the Corps to the January 14, 2013 Letter from Douglas E. Barr to Col. Seven Roehmildt. Mr. Barr is the former Executive Director of the Northwest Florida Water Management District. A copy of these letter is attached to these comments at Attachment A.

In addition, as discussed above, the DEIS runs of the ResSim – which are based on the modeled period of record – cannot predict how the various alternatives will work in the future. This is because hydrologic conditions in the future will be different than hydrologic conditions over the modeled period of record both due to natural variability and climate change. The changes in hydrologic conditions are already evident. For example, the frequency, duration and severity of droughts from 1999-2012 were much greater that at any time in the previous seven decades.

Response to ACF234 – National Wildlife Federation

Y. The verification and analysis of the HEC-ResSim model is described throughout the HEC -ResSim modeling report in appendix E of the EIS. For example, the Muskingum routing method was selected for use in the final model because well-calibrated coefficients were available from an HEC-HMS model of the ACF Basin. The Muskingum parameters were used in developing the unimpaired inflow data set (USACE 2010b).

(d) The DEIS Relies on an Inadequate and Outdated Critical Yield Methodology

Z

The DEIS relies on an inadequate and outdated "critical yield" methodology to establish the baseline for future water allocations rather than the ecological in-stream flows needed to maintain the health and integrity of the ACF system.[91]

Water resources experts have long recognized that "critical yield" is **not** appropriate as a basis for making water management decisions as it looks only at the amount of water that may be physically available and does not assess the economic, environmental, social, and political constraints on the use of that water.[92] The Corps "critical yield" analysis also sets the stage for continued conflicts among the many competing users in the ACF Basin by significantly overstating even the amount of water that is physically available. *See* DEIS at 2-101 ("Critical Yield provides the basis from which water stored in a reservoir is allocated to various project purposes.")

In addition to being inappropriate for making water management decisions, the "critical yield" analysis in the DEIS is flawed and cannot be relied on for at least the following two reasons. First, the "critical yield" analysis is based on a flawed unimpaired flow data set (see discussion above). Second, the "critical yield" analysis is based on flawed assumptions regarding critical reservoir management practices, including that reservoir levels can be lowered far below the levels that have ever been reached, even during extreme drought years.

2. The DEIS Uses Flawed Metrics to Assess and Compare Alternatives

AA

The DEIS lacks scientific integrity because it uses flawed metrics to assess and compare alternatives. The metrics are far too simplistic, focus on the wrong data, rely heavily on averages that do not provide meaningful information, and mask important differences. Some of the critical failings in the metrics used in the DEIS are discussed below.

The DEIS uses metrics that fail to address the most critical fish and wildlife impacts. The DEIS uses six metrics for fish and wildlife. Of these, three metrics address mussels and two address fall rates. Only

[91] The Corps defines the ACF critical yield as "the maximum amount of water that can be consistently removed from a reservoir through releases from the dam and/or withdrawals from the reservoir during the most severe drought in the period of record (1939-2008), without depleting the reservoir conservation storage. Conservation storage is the amount of water available in a reservoir to meet project purposes other than flood control. Critical yield is the amount of water available from a reservoir at any time under any conditions described in the hydrologic period of record." The Corps' states that critical yield "is important because it is the basis from which water stored in a reservoir is allocated to various project purposes. The amount or volume of water stored in a reservoir can be allocated to a specific project purpose, such as hydropower or water supply, based on a percent of critical yield. A change in critical yield could result in modifications of the allocations for a project purpose." U.S.A.C.E., *Federal Storage Reservoir Critical Yield Analysis, Alabama-Coosa-Tallapoosa (ACT) and Apalachicola-Chattahoochee-Flint (ACF) River Basins*, February 2010 at 2-3.

[92] *The Regulated Riparian Model Water Code* (Dellapenna, 1997) (water management decisions should be based on an evaluation of safe-yield, which is defined as the "amount of water available for withdrawal without impairing the long-term social utility of the water source, including the maintenance of the protected biological, chemical, and physical integrity of the source"); *see* U.S.A.C.E. Institute For Water Resources, *Managing Water For Drought*, *National Study Of Water Management During Drought*, IWR Report 94-NDS-8 (September 1994) (recommending use of safe-yield). Indeed, we been unable to locate any Corps guidance identifying "critical yield" as an appropriate or necessary methodology for developing water control manuals.

Response to ACF234 – National Wildlife Federation

Z. The critical yield methodology adheres to USACE policy. As stated in the Critical Yield Report in appendix F of the EIS, the amount of storage to allocate to water supply is based on a percentage of the critical yield. In determining the critical yield, the entire conservation storage is used. Historic operation maximum drawdown is not a limiting factor in the computation. Critical yield is computed during the design phase of a reservoir project and periodically updated using more severe recent hydrology and/or updated techniques. Buford Dam is a multipurpose project with no current allocation to a single purpose. Limiting the critical yield to historic levels would assume a specific allocation exists that is not available for water supply consideration.

AA. The U.S. Fish and Wildlife Service (USFWS) provided assistance in identifying performance measures for fish and wildlife conservation, some of which USACE used in its development of the fish and wildlife conservation performance metrics. USACE also relied on experts within its organization to assist in developing performance metrics for the other authorized project purposes (e.g., hydropower, water supply, recreation, and navigation). As appropriate, USACE also considered metrics used by non-USACE entities to evaluate project purposes.

one metric addresses floodplain connectivity. The U.S. Fish and Wildlife Service, the nation's fish and wildlife experts, recommended a different set of metrics but those recommendations were ignored.

The fish and wildlife metrics used in the DEIS place too much weight on a narrow range of impacts and too little weight on impacts that would affect a broad range of species. For example, the DEIS metrics assign half of the justification for ranking alternatives to metrics that measure impacts to mussels. The DEIS metrics assign one third of the justification for ranking alternatives to metrics that measure impacts on fall rates. The DEIS metrics assign just one sixth of the justification for ranking alternatives to metrics that measure impacts to floodplains. Put another way, the Fish and Wildlife Service has stated that the "math used by the Corps means that mussels are five times more important than floodplain inundation and fishes. This is inconsistent with the intent of our PALs and performance measures. We tested one solution (giving equal weight to the floodplain metric) and found that it changed the overall ranking of alternatives for the Fish and Wildlife component of the evaluation."[93]

The DEIS fails to provide any justification for weighting fall rates so heavily, nor does it make sense to do so. In addition, while managing flows to protect mussels is clearly important, assessing impacts to floodplain connectivity and inundation provides a far more robust – and in the context of the fish and wildlife conservation purpose (as opposed to ESA considerations) – and far more appropriate measure of impacts.

Floodplain connectivity and the appropriate timing, depth, and duration of floodplain inundation is critical to assessing impacts to a broad range of fish and wildlife species. Multiple studies establish the importance of floodplain habitats and floodplain connectivity to a wide range of riverine fishes. Fish use in floodplain habitats requires time for adult movement from the main channel into the floodplain, courtship and spawning behaviors, egg incubation, and juvenile growth to a size capable of moving to and surviving in the main channel when water levels recede. In addition, appropriate timing, depth, and extent of floodplain inundation is critical for a host of other wildlife species and for maintaining appropriate wetland hydrology.

The DEIS creates additional problems through its selection of metrics for water supply and recreation. The water supply metrics would appear to have little to nothing to do with the reliability of water supply or even with exposure of water supply intakes at Lake Lanier. Instead, those metrics focus on maintaining high reservoir levels. *See* DEIS at 4-72. The metrics used for recreation are similarly focused on keeping reservoir levels high. *See* DEIS at 4-69. The use of two sets of metrics that focus on keeping reservoir levels high create a strong bias **towards** keeping reservoir levels full and a strong bias **against** releasing flows for downstream purposes.

Many of the metrics are also highly problematic because they rely on averages that do not provide meaningful information for determining what may or may not be a better alternative. For example, interpreting the effects on ecosystem health require much more than average flow data. It is critical to know the amount, timing, and duration of flows to determine whether a proposed flow regime is mimicking the natural patterning of high and low flows and supporting fish and wildlife.

The ranking process then compounds the many problems created by its use of incorrect and information poor metrics by converting all differences between alternatives to a 1-to-7 scale for each of the performance measure metrics. The ranking process then eliminates the possibility of evaluating the

[93] 2015 Draft Fish and Wildlife Coordination Act Report Appendix XV at 6 (at DEIS Appendix J).

relative significance among difference performance measures by giving each measure an equal weighting through use of a composite rank for each project purpose.

For additional detailed information on the flawed metrics, the Conservation Organizations direct the Corps to the 2015 Draft Fish and Wildlife Coordination Act Report and its Appendix XV (which are found at DEIS, Appendix J) and the January 27, 2015 Fish and Wildlife Service Comments on the DEIS.

In short, the metrics layer flaw upon flaw upon flaw that makes the assessment and comparison of alternatives meaningless. The Conservation Organizations strongly urge the Corps to correct the many failings with these metrics, including by following the recommendations of the Fish and Wildlife Service.

3. The DEIS Fails to Obtain a Vast Array of Information Essential to Making a Reasoned Choice among Alternatives

AB

The DEIS lacks scientific integrity because it fails to conduct a host of scientific evaluations that are critical for making a reasoned choice among alternatives and for developing alternatives that would improve the health and resiliency of the ACF system. As noted above, the Corps must obtain information essential for making a reasoned choice among alternatives unless the costs of doing so would be "exorbitant."[94]

The lack of scientific information informing the conclusions and recommendations in the DEIS is particularly disturbing given: (a) the incredible ecological and economic value of the ACF system, and the current severely degraded state of the Apalachicola River, floodplain, and bay; (b) the fact that the Corps has had many decades to obtain such information to better manage the ACF system in accordance with federal law and policy and the Corps' own internal guidance; (c) the three separate scoping periods during which the Corps received numerous comments urging extensive scientific investigations; and (d) the repeated requests from federal and state agencies, members of Congress, and the public to modernize the Corps' current ACF management regime to improve the dire and unsustainable conditions in the Apalachicola River, floodplain, and bay.

The following are just some of the critical scientific assessments that are missing from the DEIS. These assessments are essential for making a reasoned choice among alternatives because without them it is not possible to assess the impacts of alternative water control management regimes on the Apalachicola River, floodplain, and bay and the many plant and animal species that rely on those resources. It is also not possible to identify less damaging alternatives, or alternatives that would improve the health of these vital resources.

(1) The DEIS fails to determine the amount, timing, and variability of flows needed to maintain a healthy and vibrant Apalachicola River, floodplain, and bay.[95] Understanding the flows needed to maintain a healthy system is fundamental to assessing the adverse impacts of alternative flow regimes, and for developing alternative flow regimes that would result in meaningful improvements to the health of the system.

[94] 40 C.F.R. § 1502.22.
[95] This would include identifying the needed minimum flows, but minimum flows cannot – and do not – ensure a healthy and vibrant system.

Response to ACF234 – National Wildlife Federation

AB. Additional studies and research on the Apalachicola Bay are beyond the scope of this Master WCM update process. Focused efforts directly related to assessing the effects of water management activities in the basin on the Apalachicola River and Bay were conducted as part of the coordination for the Master WCM update between USACE, Mobile District and the USFWS under the Fish and Wildlife Coordination Act. The results of these activities have been incorporated into the final EIS.

(2) The DEIS fails to meaningfully evaluate the depth and extent of inundation of the Apalachicola River floodplain under various flow regimes. This information is "a critical component of the alternatives analysis" because the depth and extent of inundation is the driving factor in such things as floodplain wetland hydrology; floodplain plant species diversity; fish and wildlife access to the floodplain; and spawning, rearing, feeding and resting cycles.[96] Use of LIDAR (Light Detection and Ranging) data would greatly improve the floodplain analyses, including by allowing quantification of floodplain acreage connected to the river at a range of flow levels. LIDAR data is available from the State of Florida, but the Corps did not utilize that data.[97]

(3) The DEIS fails to identify specific plant species, and fails to identify a host of specific fish,[98] amphibians, reptiles, birds, and other wildlife species that utilize the Apalachicola River, floodplain, and bay that could be affected by the proposed changes to the hydrological regime. Notably, the DEIS fails to identify, let alone assess the impacts to, even those fish species that rely on access to, and inundation of, the floodplain to spawn. Without identifying specific species, it is not possible to determine whether segments of their lifecycles are flow-dependent and could be affected by alternative flow regimes.

(4) The DEIS fails to assess how the various phases in the lifecycles of the many species that utilize the Apalachicola River, floodplain, and bay would be affected by flow changes proposed in the various alternatives. As the U.S. Fish and Wildlife Service has advised the Corps, "flow is a master variable in fluvial systems" and "the ecology of fish and wildlife is closely linked to the flow regimes in which they evolved."[99] As a result, the Service has advised the Corps that the DEIS should look at "[s]pecific flow statistics and species-specific flow-ecology relationships (as available) that are important to natural resource sustainability, as well as the ACF Riverine Community Habitat Assessment and Restoration Concept (RCHARC) study (Freeman et al. 1997)."[100]

(5) The DEIS fails to meaningfully assess impacts to species listed under the Federal Endangered Species Act or to habitat designated as critical habitat under the Federal Endangered Species Act. The DEIS also fails to assess the implications of alternative flow regimes on recovery of these species. While the DEIS states that a Biological Assessment will be prepared in the future, as a matter of law the impacts on listed species and critical habitat must also be included in the DEIS. *See* Section I of these comments.

(6) The DEIS fails to assess whether, and at what point, additional significant changes in the flow regime could cause significant declines in species abundance, reduced area of occupancy, and potential extirpation from the region of influence. This information is

[96] 2010 Planning Aid Letter at 11, 12, 16, DEIS Appendix J ("Assessing the extent of floodplain inundation will be a critical component of the alternatives analysis assessment.")
[97] 2015 Draft Fish and Wildlife Coordination Act Report at 17; 2010 Planning Aid Letter at 16 (both included in DEIS Appendix J).
[98] The DEIS mentions estuarine fish, gulf sturgeon, protected mussels and shoal bass. DEIS at ES-25. It also provides examples of some of the various types of species found in the ACF Basin. DEIS at Section 2.5.
[99] 2010 Planning Aid Letter, DEIS Appendix J.
[100] *Id*.

essential for evaluating the impacts, including cumulative impacts, of alternative flow regimes given the significant degradation of the Apalachicola River, floodplain, and bay.

(7) The DEIS fails to assess the role of flow, and the impacts of alternative flow regimes, on wetlands. Understanding the potential impacts to wetlands is fundamental to any environmental impact statement, and is absolutely crucial to the DEIS.

(8) The DEIS fails to assess (or even mention) the role of flow, and the impacts of alternative flow regimes on plant species (including trees) in both wetland and non-wetland areas. Critically, the DEIS fails to assess the role that flow changes have played in the extensive die-off of trees in the Apalachicola River floodplain.[101] Understanding the potential impacts to plants and trees, including wetland plant species, is fundamental to any environmental impact statement, and is absolutely crucial to the DEIS.

(9) The DEIS fails to assess the impacts of alternative flow regimes on nutrient cycling between the River and its floodplain. As the DEIS acknowledges, "[n]utrients and detritus carried from the floodplain by river floods contribute significantly to the relatively high productivity of Apalachicola Bay." DEIS at 2-190. Moreover, there is important documentation that freshwater and nutrients from the Apalachicola River, floodplain, and bay sustain the offshore Gulf ecosystem through a process often referred to as the "Green River" effect. As a result, understanding the impacts of alternative flow regimes on nutrient cycling is essential for assessing impacts.

(10) The DEIS fails to assess the impacts of alternative flow regimes within the system's distributaries, and fails to assess the significance of distributary flows on ecosystem health particularly during periods of drought. The impacts of flow regimes do not stop at the mainstems of the Apalachicola and Chattahoochee Rivers. Flow changes could cause significant direct, indirect, and cumulative impacts in the distributary systems. These impacts must be understood to fully assess impacts.

(11) The DEIS fails to assess the effects (including cumulative effects) of low flow conditions on water temperature and the resulting effects on species. Flow can cause significant changes in water temperature, which in turn can cause significant impacts on fish and wildlife. These impacts must be understood to fully assess impacts.

(12) The DEIS fails to analyze the impacts of flow changes on salinity in the Apalachicola Bay and estuary despite acknowledging that river flow determines salinity concentrations in the estuary. *See* DEIS at 2-206 ("River flow is the primary determinant of salinity concentrations in the estuary . . . . Salinity is one of the major limiting factors in oyster production. Prolonged high salinities due to drought or other factors affect freshwater flow and allow for increased [oyster] predation . . . and decreased food availability.") There is no legitimate rationale for excluding an examination of the impacts on salinity from the DEIS, and this information is essential for making a reasoned choice among alternatives.

[101] Darst, M.R., Light, H.M., 2008, Drier Forest Composition Associated with Hydrologic Change in the Apalachicola River Floodplain, Florida: U.S. Geological Survey Scientific Investigations Report 2008-5062, 81 p., plus 12 apps.

(13) The DEIS fails to assess the impacts of modified flow regimes on estuarine productivity, including, but not limited to, oyster productivity. In light of the importance of the Apalachicola Bay to the regional and state economy, it is critical to understand how flow changes will affect productivity in the estuary.

(14) The DEIS fails to assess the impacts of modified flow regimes on marine species and their habitats. Freshwater and nutrients from the Apalachicola River, floodplain, and bay sustain the offshore Gulf ecosystem through a process often referred to as the "Green River" effect. Salinity levels that could affect these species are also affected by flow. As discussed above, this information is essential for assessing the impacts of alternative flow regimes.

(15) The DEIS fails to assess the additive (*i.e.*, cumulative) effects of climate change on the alternatives evaluated in the DEIS. For example, the DEIS fails to evaluate the impacts of climate change on nutrient cycles that are critical to the health of the species that utilize the Apalachicola River, floodplain, and bay. The reduction in the areal extent of floodplain inundation due to the Corps' current management of the ACF has already led to significant reduction in recruitment in the Apalachicola River forest canopy. Even small additional changes could lead to measurable negative changes in the river ecosystem. Understanding the cumulative effects of climate change is fundamental to a legally sufficient EIS and for understanding the full import of alternative management regimes. "Together, regional climate change and local water management practices have the potential to permanently alter the composition and functioning of many river ecosystems . . . ."[102]

(16) The DEIS fails to evaluate the cumulative effects of adding additional years of man-made drought to the ACF system, an outcome that would be created by the PAA. The PAA would almost triple the amount of time the system is in drought operations and would trigger drought operations 22 times, as compared to just 3 times under the NAA (a 633 percent increase). Since flow is the master variable for fluvial systems and hydrology is the master variable for wetland systems (including floodplain wetlands), understanding the cumulative impacts of these additional drought operations is fundamental to making a reasoned choice among alternatives.

(17) The DEIS fails to assess the point at which repeated, extended, and/or additional low flows would push the Apalachicola system to its tipping point – the point at which it would be difficult or impossible for the River, floodplain, and/or bay to recover from the current degraded state. As noted above, flow is the master variable for fluvial systems and hydrology is the master variable for wetland systems (including floodplain wetlands). As a result, understanding the long term implications of repeated, extended, and/or additional low flows is fundamental to making a reasoned choice among alternatives.

(18) The DEIS fails to assess future water demands downstream of Atlanta including agricultural withdrawals even though a stated objective of the DEIS is to "accurately assess current and future water demands." The DEIS also fails to evaluate the ability to reduce water supply needs through water conservation measures. Without understanding the full suite of water demands and available conservation measures, it is not possible to assess the impacts of various alternatives or develop appropriate alternatives.

(19) The DEIS fails to assess the actual volume of flood storage needed to protect downstream properties, and fails to assess whether other flood damage reduction efforts have reduced (or could reduce) the amount of flood storage required in the ACF reservoirs. Without this information it is not possible to consider changes to flood storage or to assess a full range of reasonable alternatives.

(20) The DEIS fails to evaluate the use of a drought indicator index, real-time weather forecasts, or satellite imagery to improve water management decisions. These tools could provide important flexibility and/or true adaptive management regimes that should be analyzed.

(21) The DEIS fails to assess the effects of modified flow regimes on the commercial fishing, recreational fishing, and ecotourism industries that rely on a healthy Apalachicola River, floodplain, and bay. The commercial and recreational fishing industries that rely on a healthy Apalachicola River and Bay contribute almost $400 million to the regional economy and directly support 85 percent of the local population. Sufficient freshwater flows are essential for maintaining the salinity regimes needed to sustain many commercially viable fisheries, including oyster harvesting from the Apalachicola Bay which provides 90 percent of Florida's oysters and over 13 percent of the total oyster production in the United States. Understanding the effects of alternatives on these industries is essential for making a reasoned choice among alternatives.

(22) The DEIS fails to assess the quality, quantity, and value of ecosystem services that would be adversely affected by modified flow regimes. The Apalachicola River and Bay provide an estimated $5 billion in free ecosystem services, including clean water, flood protection, and fish and wildlife habitat. Understanding the impacts to these services is critical for assessing the true impacts of alternatives.

The importance of many of these investigations is also discussed throughout Section I of these comments.

The DEIS also fails to address the many significant concerns raised by the Independent External Peer Review panel (IEPR Panel). As noted above when scientists disagree with possible adverse environmental impacts the EIS must inform decision-makers and the public about those opinions. An EIS that fails to acknowledge the opinions held by well-respected scientists concerning the risks of a proposed action is "fatally deficient."[103] It is not sufficient to include the statements of IEPR Panel in an Appendix or some other document, the expert comments must be included and appropriately responded to in body of the DEIS.[104]

[102] H.S. Galbraith, D.E. Spooner, C.C. Vaugh, Synergistic effects of regional climate patterns and local water management on freshwater mussel communities, Biological Conservation 143 (2010) 1175–1183 (available at http://vmpincel.ou.edu/download/publications/GalbraithetalBC10.pdf).

[103] *Friends of the Earth v. Hall*, 693 F. Supp. 904, 934 (W.D. Wash. 1988)(citations omitted).

[104] *Id*.

I. The DEIS Profoundly Understates Adverse Impacts

AC

The DEIS profoundly understates the adverse impacts of the PAA, and each of the other alternatives assessed in the DEIS. At the most basic level, the DEIS fails to consider – or evaluate impacts to – the Apalachicola River, floodplain, and bay through the proper lens of these resources forming an inextricably interconnected ecosystem. The DEIS also fundamentally fails to consider – or evaluate impacts to – the Apalachicola and Chattahoochee Rivers as river systems. Instead, the limited analysis in the DEIS focuses primarily on impacts to upstream reservoirs or to individual species in a particular location.

A meaningful impacts analysis for the ACF system must begin with an understanding of the amount, timing, and variability of flows needed to maintain a healthy and vibrant Apalachicola River, floodplain, and bay.[105] Understanding the flows needed to maintain a healthy system is fundamental to assessing the adverse impacts of alternative flow regimes, and for developing alternative flow regimes that would result in meaningful improvements to the health of the system.

Flow determines the health of the Apalachicola River, floodplain, and bay and the species that rely on those resources. As the U.S. Fish and Wildlife Service has advised the Corps, "flow is a master variable in fluvial systems" and "the ecology of fish and wildlife is closely linked to the flow regimes in which they evolved."[106] For example, flow is the master variable in the timing, depth, and extent of inundation of the Apalachicola Floodplain and this in turn is the driving factor in such things as floodplain wetland hydrology; floodplain plant species diversity; fish and wildlife access to the floodplain; and spawning, rearing, feeding and resting cycles.[107] "Hydrology is probably the single most important determinant of the establishment and maintenance of specific types of wetlands and wetland processes."[108]

As the DEIS recognizes river flow is also "the primary determinant of salinity concentrations in the estuary" and salinity is "one of the major limiting factors in oyster production." DEIS at 2-206. And river flow and a healthy floodplain drive the export of critically important nutrients to the Apalachicola Bay and eastern Gulf of Mexico.

In comparing and analyzing potential alternatives, the DEIS must examine, among other things, the direct, indirect, and cumulative environmental impacts of the flow regimes in the different alternatives, the conservation potential of those alternatives, and the means to mitigate adverse environmental impacts. 40 C.F.R. § 1502.16. A robust analysis of project impacts is essential for determining whether less environmentally damaging alternatives are available.

AD

Direct impacts are caused by the action and occur at the same time and place as the action. Indirect impacts are also caused by the action, but are later in time or farther removed from the location of the action. 40 C.F.R. § 1508.8. Cumulative impacts are:

[105] This would include identifying the needed minimum flows, but minimum flows cannot – and do not – ensure a healthy and vibrant system.
[106] 2010 Planning Aid Letter, DEIS Appendix J.
[107] 2010 Planning Aid Letter at 11, 12, 16, DEIS Appendix J ("Assessing the extent of floodplain inundation will be a critical component of the alternatives analysis assessment.")
[108] William J. Mitsch and James G. Gosselink, *Wetlands* (2nd ed.) (1993) at 67-68.

Response to ACF234 – National Wildlife Federation

AC. The authorized purposes of the federal ACF system do not include a specific directive to provide freshwater inflows to Apalachicola Bay to sustain the resources of the bay. The environmental effects of the PAA on the Apalachicola River and Bay compared to the NAA (current reservoir operations) are considered in the EIS. The analysis in the EIS demonstrates that the PAA would result in little to no change in flow and water quality conditions in the Apalachicola River and Bay and, consequently, that there would be little to no effect on biological and other resources in the river and bay. In addition to its own modeling and analysis, USACE also addressed and considered all information and data provided by commenters. USACE consulted on the PAA and the results are presented in appendix J of the final EIS. In the biological opinion the USFWS concluded that effects to estuarine invertebrate production are insignificant because the PAA provides slightly beneficial effects from increasing the number of freshwater pulses and increasing the number of days greater than or equal to 16,200 cfs in the winter. USFWS also anticipate only minor changes in salinity regimes and estuarine habitat due to the WCM.

AD. Direct, indirect, and cumulative impacts are addressed in section 6 of the EIS. A 73-year period of record was used to evaluate the impacts of the various alternatives. Additionally, USACE regulations require that the WCMs be reviewed every 5 years to determine if more updates are necessary.

> "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

40 C.F.R. § 1508.7. A cumulative impact analysis ensures that the agency will not "treat the identified environmental concern in a vacuum."[109]

In analyzing the impacts of alternative flow regimes for the ACF system, the DEIS must account for the fact that ongoing operations will have direct, indirect, and cumulative impacts over the entire life of the water control manual. So for example, operating the system in year one will have direct and indirect impacts, operating the system in year two will direct and indirect impacts, and this will continue over the life of the water control manual. Collectively, the operations over the life of the water control manual will also add to the cumulative impacts of the proposed action.

When assessing the direct, indirect, and cumulative impacts, the DEIS must utilize "quantified or detailed information" so that the courts and the public can be assured that the Corps has taken the mandated hard look at the environmental consequences of the project.[110] "The hallmarks of a 'hard look' are thorough investigation into environmental impacts and forthright acknowledgment of potential environmental harms."[111] The impacts analyses must be based on "high quality" science and information and the Corps must "insure professional integrity, including scientific integrity, of the discussions and analysis in environmental impact statements."[112] Importantly, if information that is essential for making a reasoned choice among alternatives is not available, the Corps must obtain that information unless the costs of doing so would be "exorbitant." 40 C.F.R. § 1502.22.

As discussed in Section H of these comments, the DEIS lacks the scientific integrity needed to justify its evaluation of impacts and selection of the PAA. Among other significant problems, the DEIS has failed to obtain the information needed to understand the amount, timing, and variability of flows needed to maintain a healthy and vibrant Apalachicola River, floodplain, and bay. The scientific failings taint the entire DEIS and each of the impacts analyses discussed below. The impacts analyses also fail to satisfy the requirements of NEPA for the additional reasons discussed in this Section.

AE

1. The DEIS Fails to Provide Quantified or Detailed Information

AF

The DEIS fails to provide quantified or detailed information on impacts. Indeed, the DEIS provides virtually no information on impacts at all but instead relies on generalizations and conclusory statements unsupported by evidence. For example, the DEIS does not identify the vast majority of

[109] *Grand Canyon Trust v. FAA*, 290 F.3d 339, 346 (D.C. Cir. 2002).
[110] *Neighbors of Cuddy Mountain v. U. S. Forest Service*, 137 F.3d 1372, 1379 (9th Cir. 1998); *Ecology Center v. Castaneda*, 574 F.3d 652, 666 (9th Cir. 2009) (requiring "quantified or detailed data"); *Natural Resources Defense Council v. Callaway*, 524 F.2d 79, 87 (2d Cir. 1975).
[111] National Audubon Society v. Dep't of Navy, 422 F.3d 174, 185 (4th Cir. 2005).
[112] 40 C.F.R. § 1502.24 ("Agencies shall insure professional integrity, including scientific integrity, of the discussions and analysis in environmental impact statements"); *Earth Island Inst. v. U.S. Forest Service*, 442 F.3d 1147, 1159-60 (9th Cir. 2006) (quoting 40 CFR §1502.24).

Response to ACF234 – National Wildlife Federation

AE. Additional studies and research on the Apalachicola Bay are beyond the scope of this Master WCM update process. Focused efforts directly related to assessing the effects of water management activities in the basin on the Apalachicola River and Bay were conducted as part of the coordination for the Master WCM update between USACE, Mobile District and the USFWS under the Fish and Wildlife Coordination Act. The results of these activities have been incorporated into the final EIS.

AF. Section 2 of the EIS characterizes a number of the species in the basin, including those found in the Apalachicola River. The fish and wildlife impact assessments provided in the EIS address riverine and floodplain habitats. Impacts to those habitats, if any, provide insight into the species that make use of the habitats.

species that utilize the Apalachicola River and its floodplain, let alone assess the impacts of alternative flow regimes on the life cycles of those species.

As discussed above, an EIS must utilize "quantified or detailed information" when analyzing impacts.[113] "General discussion of an environmental problem over a large area" is not sufficient and cannot satisfy NEPA.[114] Unsupported conclusory statements likewise cannot satisfy NEPA:

> "A conclusory statement unsupported by empirical or experimental data, scientific authorities, or explanatory information of any kind not only fails to crystalize the issues, but affords no basis for a comparison of the problems involved with the proposed project and the difficulties involved in the alternatives."[115]

In direct violation of these requirements, the DEIS relies extensively on unsupported conclusory statements and generalizations, including the many that are discussed below. The IEPR Panel Final Report also highlights a number of unsupported statements, including:

- "The future water demand requirements, which are the basis for assessing the impacts of the alternatives on M&I water supply, could not be confirmed."
- "The maximum reasonable withdrawal from Lake Lanier is not identified . . . ."
- "The finding that the PAA would have a 'substantially beneficial' effect on the M&I water supply is not supported by the data or analysis."
- "The conclusion that specific compensatory mitigation measures would not be required for the PAA in resource areas where substantial adverse effects and slightly adverse effects were identified is not supported."
- "For four resource categories, the rationale for measuring some parameters and/or determining the resulting conclusions or environmental condition changes is not described."
- "All alternatives are considered to perform equally well in flood control; however, changes in storage capacity during storm events due to differences in lake states are not considered."
- "There is no evidence to support the use of equal weighting for each water availability and water quality parameter/indicator used to evaluate effects on fish and wildlife resources."
- "The finding that the PAA would have a substantially beneficial effect on navigation is not supported by data or analysis."[116]

---

[113] *Neighbors of Cuddy Mountain v. U. S. Forest Service*, 137 F.3d 1372, 1379 (9th Cir. 1998); *Ecology Center v. Castaneda*, 574 F.3d 652, 666 (9th Cir. 2009) (requiring "quantified or detailed data"); *Natural Resources Defense Council v. Callaway*, 524 F.2d 79, 87 (2d Cir. 1975).

[114] South Fork Band Council v. U.S. Dept. of Interior, 588 F.3d 718 (9th Cir. 2009); Neighbors of Cuddy Mountain v. U.S. Forest Service, 137 F.3d 1372, 1379-80 (9th Cir. 1998).

[115] *Seattle Audubon Society v. Moseley*, 798 F. Supp. 1473, 1479 (W.D. Wash. 1992), *aff'd* 998 F.2d (9th Cir. 1993); *see also, e.g.*, *Klamath-Siskiyou Wildlands Ctr. v. BLM*, 387 F.3d 989,995-996 (9th Cir. 2004) ("generalized or conclusory statements" in cumulative effects analyses do not satisfy NEPA); *Friends of the Earth v. Army Corps of Engineers*, 109 F. Supp. 2d 30, 38 (D.D.C. 2000) (ruling that the Corps must "provide further analysis" to satisfy NEPA because the Corps did not provide "the basis for any" of its claims that the project would have an insignificant impact or that fish and other organisms would simply move to other areas); *Sierra Club v. Norton*, 207 F. Supp. 2d 1310, 1335 (S.D. Ala. 2002) (stating "Defendant's argument in this case would turn NEPA on its head, making ignorance into a powerful factor in favor of immediate action where the agency lacks sufficient data to conclusively show not only that proposed action would harm an endangered species, but that the harm would prove to be 'significant'").

[116] ACF Final Independent Peer Review Report at vii.

The DEIS must provide quantified, detailed, and scientifically supportable information on the impacts of the PAA and other alternatives.

2. The DEIS Fails to Evaluate Impacts to Wetlands

AG

The DEIS does not – and cannot – comply with NEPA because it fails to evaluate impacts to the forested, freshwater, and estuarine wetlands that make up a significant component of the ACF basin. This is a stunning failure in the DEIS that causes the DEIS to profoundly understate the adverse impacts of the proposed action.

Assessing the impacts to wetlands from the PAA and other alternatives, requires a scientifically sound assessment of the impacts of the proposed flow changes on wetland hydrology and wetland plant species. This is critically important because "[h]ydrology is probably the single most important determinant of the establishment and maintenance of specific types of wetlands and wetland processes":

> "Hydrology affects the species composition and richness, primary productivity, organic accumulation, and nutrient cycling in wetlands. . . . Water depth flow patterns, and duration and frequency of flooding, which are the result of all the hydrologic inputs and outputs, influence the biochemistry of the soils and are major factors in the ultimate selection of the biota of wetlands. . . . Hydrologic conditions can directly modify or change chemical and physical properties such as nutrient availability, degree of substrate anoxia, soil salinity, sediment properties, and pH."[117]

Even "small changes in hydrology can result in significant biotic changes"[118] and produce ecosystem-wide changes:

> "**When hydrologic conditions in wetlands change even slightly, the biota may respond with massive changes in species composition and richness and in ecosystem productivity.**"[119]

As a result the impacts from even small changes in the duration and extent of inundation of wetlands in the ACF system must be evaluated as such changes could create significant adverse impacts to the structure and function of the ACF system wetlands leading to adverse impacts to fisheries, wildlife habitat, plant communities, water quality, water quantity, soil moisture recharge, nutrient cycling, and flood pulse conditions.

Understanding these impacts is particularly critical for the Apalachicola River and its extensive wetland system. As recognized in the DEIS, the "Apalachicola River floodplain is a vast wetland system of bottomland hardwood forests and tupelo cypress swamps, the largest floodplain forest in Florida. . . . The floodplain forest of the Apalachicola River is Florida's largest, and it has long been recognized for its tree species richness." DEIS at 2-189. The floodplain supports at least 47 different tree species (DEIS at

[117] William J. Mitsch and James G. Gosselink, *Wetlands* (2nd ed.) (1993) at 67-68.
[118] *Id*. at 68.
[119] *Id*. at 68 (emphasis added).

Response to ACF234 – National Wildlife Federation

AG. USACE used metrics defined by the USFWS to determine the extent of inundation of the Apalachicola River floodplain. The impacts are discussed in 6.4.3.1.4 of the EIS. Flood inundation assessment concerns are addressed in appendix J of the EIS.

2-189) and is "one of the most productive floodplain forests found in warm, temperate regions (Elder and Cairns 1982)." DEIS at 2-189.

The Apalachicola floodplain wetlands are immensely important to fish and wildlife species. For example, "at least 80 percent of Apalachicola River fish species use floodplain habitats, especially for spawning and foraging." DEIS at 2-190 (*citing* Light et al. 1995). "Nutrients and detritus carried from the floodplain by river floods contribute significantly to the relatively high productivity of Apalachicola Bay." DEIS at 2-190.

Changes to the floodplain wetland hydrology have already caused significant impacts. "The USGS found that the present-day forest composition along the river has shifted toward drier conditions compared to data collected in the 1970s (Darst and Light 2008)." DEIS at 2-190. That same Darst and Light report provides important information on the magnitude of those changes created by these drier conditions (this information was inexplicably excluded from the DEIS):

> "The density of trees in swamps significantly decreased by 37 percent from 1976 to 2004. Of the estimated 4.3 million (17 percent) fewer trees that existed in the nontidal floodplain in 2004 than in 1976, 3.3 million trees belonged to four swamp species: popash, Ogeechee tupelo, water tupelo, and bald cypress. Water tupelo, the most important tree in the nontidal floodplain in terms of basal area and density, has declined in number of trees by nearly 20 percent since 1976. Ogeechee tupelo, the species valuable to the tupelo honey industry, has declined in number of trees by at least 44 percent."[120]

Despite the significance of the wetland resources in the ACF basin and the Apalachicola ecosystem, the critical importance on connectivity between the Apalachicola River and its floodplain, the significant losses of floodplain wetland trees that have already resulted from hydrologic changes, and the significant changes that can be produced by even slight changes in hydrology, the DEIS provides no assessment of impacts to wetland resources.

The entire "discussion" of impacts to vegetation (including wetland vegetation) and wildlife "along the Apalachicola River" consists of the following paragraphs that are wholly unsupported – and entirely unsupportable – by any data or scientific information:

> **"6.4.1 Vegetation and Wildlife Resources**
> As discussed in section 2.5, vegetation resources include the terrestrial vegetation communities in the ACF Basin, as well as freshwater and estuarine wetland communities, and terrestrial wildlife resources in the ACF Basin, with an emphasis on those species known, or likely, to occur in riparian or terrestrial areas. Under normal climatic and water quantity conditions, water management operations in the ACF Basin have little to no discernible effect on terrestrial vegetative communities and wildlife. Under drought conditions, it is the intensity and duration of the drought that affects terrestrial vegetative communities and wildlife. Under drought conditions, water management operations in the ACF Basin have no discernible effect on terrestrial vegetative communities and wildlife. Under flood conditions, however, water management operations in the ACF Basin have the potential to affect terrestrial vegetative communities and wildlife beneficially or adversely. A summary of effects on vegetation and wildlife resources is provided in Table 6.4-1."[121] DEIS at 6-168.
>
> * * *
>
> "**6.4.1.1.3 1 Apalachicola River**
> Implementing the NAA would have no effect on terrestrial vegetation or wildlife along the Apalachicola River and Bay. Flows from the Jim Woodruff Lock and Dam and the amount and extent of floodplain inundation along the Apalachicola River and in the Apalachicola Bay would not change under the NAA. The current drought plan specifies a minimum release of 5,000 cfs from the Jim Woodruff Lock and Dam unless the composite conservation storage falls below the Drought Zone, in which case the minimum release from the Jim Woodruff Lock and Dam is 4,500 cfs. This plan would continue to be implemented under the NAA." DEIS at 6-169.
>
> * * *
>
> **"6.4.1.9.3 Apalachicola River**
> The PAA would not appreciably alter flow conditions in the Apalachicola River downstream of Jim Woodruff Lock and Dam and continuing to the Apalachicola Bay compared to the NAA (see section 6.1.1.2.5). Under the PAA, vegetation and wildlife along the Apalachicola River would be expected to experience slightly adverse conditions when flow in the river drops below 5,000 cfs during extreme drought conditions. These conditions would occur infrequently and would generally be of relatively short duration (a few weeks or less). The vegetation and wildlife along the Apalachicola River would be able to endure the conditions with no measureable changes to vegetative community composition or wildlife populations."[122] DEIS at 6-172.

This so-called "discussion" of wetland impacts is abjectly inadequate.

The Corps must undertake a meaningful analysis of the impacts to wetlands – including the forested wetlands, freshwater wetlands, and estuarine wetlands of the Apalachicola River, floodplain, and bay. This analysis should include an assessment of the depth and extent of inundation of the Apalachicola River floodplain under various flow regimes. This information is "a critical component of the alternatives analysis" because the depth and extent of inundation is the driving factor in such things as floodplain wetland hydrology; floodplain plant species diversity; fish and wildlife access to the floodplain; and spawning, rearing, feeding and resting cycles.[123] The Corps should utilize the LIDAR (Light Detection and Ranging) data available from the State of Florida to assist in this analysis.[124] LIDAR data would allow a meaningful quantification of floodplain acreage connected to the river at a range of flow levels.

[120] Darst, M.R., Light, H.M., 2008, Drier Forest Composition Associated with Hydrologic Change in the Apalachicola River Floodplain, Florida: U.S. Geological Survey Scientific Investigations Report 2008-5062, 81 p., plus 12 apps.

[121] Table 6.4-1 referred to in this paragraph indicates "No change" for any of the alternatives for vegetation and wildlife resources of the Apalachicola River. DEIS at 6-168.

[122] The discussion of impacts to vegetation and wildlife along the Apalachicola River for the other alternatives discussed in the DEIS are limited to one or two sentences per alternative, and each says that the impacts on such resources would either be "the same" or "similar" to those of the NAA. *See* DEIS at 6-169 to 6-171.

[123] 2010 Planning Aid Letter at 11, 12, 16, DEIS Appendix J ("Assessing the extent of floodplain inundation will be a critical component of the alternatives analysis assessment.")

[124] 2015 Draft Fish and Wildlife Coordination Act Report at 17; 2010 Planning Aid Letter at 16 (both at DEIS Appendix J).

This analysis should also assess, among other things: (1) the role of flow and other hydrologic changes in the loss of millions of wetland trees; (2) the role of flow changes on loss or reduction of connectivity between the river and its floodplain forest wetlands; (3) the role of flow and other hydrologic changes on loss or modification of wetland hydrology; (4) the role of flow and other hydrologic changes on changes in wetland plant species composition and diversity, including facilitating the introduction and spread of invasive species; and (5) the role of flow and other hydrologic changes on distributary wetlands.

As with all impacts analyses, the wetland assessment must look at the direct, indirect, and cumulative impacts to wetlands. The cumulative impacts assessment should look at the cumulative impacts to wetland resources and floodplain connectivity due to climate change, river bed degradation and other channel modifications, the burying of river banks under sand dredged from the river for navigation maintenance, the creation of sediment plugs in sloughs that cut off flow into the floodplain which is also the result of historic navigation maintenance activities, and the decades of flow manipulation carried out under ACF system operations. The cumulative impacts assessment must also take into account the historic loss of wetlands in Florida. Between the 1780s and 1980s, Florida lost 46 percent of its wetland acreage, and lost more acres of wetlands – 9.3 million acres – that any other state.

3. The DEIS Fails to Adequately Evaluate Impacts to Endangered Species and Designated Critical Habitat

AH

The DEIS does not – and cannot – comply with NEPA because it fails to adequately evaluate the impacts to species listed under the Federal Endangered Species Act (ESA) and fails to adequately evaluate impacts to ESA-designated critical habitat. The DEIS instead includes a flawed "preliminary assessment of potential effects of the PAA on listed species"[125] and states that a draft Biological Assessment on the PAA will be prepared after public review of the DEIS.[126] DEIS at ES-30, 4-28.

As a matter of law, present or future compliance with the ESA cannot satisfy the NEPA requirement to evaluate the impact of the proposed management alternatives on these species. This is because the Corps' legal obligations under the ESA and NEPA are entirely separate and apply fundamentally different standards. Compliance with the ESA Section 7 prohibition against jeopardizing the continued existence of a species does not satisfy NEPA's requirements to analyze significant impacts that fall short of the

[125] According to this preliminary assessment, "No effects on Gulf sturgeon would be expected under the PAA or the other alternatives. No appreciable change in the amount of median spawning habitat for the Gulf sturgeon would be expected. Compared to the NAA, adverse effects on listed mussel species in the Apalachicola River would not be expected under the PAA. Potential adverse effects on performance measures for mussels would arise primarily from potential increased exposure of the animals during low flow conditions. Among the pertinent factors affecting mussels, USACE considered fall rates in the Apalachicola River and the ramping of releases from Jim Woodruff Lock and Dam in the development of the alternatives considered for evaluation. The PAA would be expected to have a slightly beneficial effect on shoal bass because recruitment performance would be slightly higher compared to the NAA." DEIS at ES-30.

[126] *E.g.*, DEIS at 4-28 to 4-29; DEIS at 5-33 to 5-36. The Corps and the Fish and Wildlife Service appear not to have begun consultation yet on the PAA.

Response to ACF234 – National Wildlife Federation

AH. USACE has worked extensively with the USFWS staff to fully comply with the requirements of the Fish and Wildlife Coordination Act (FWCA) and the Endangered Species Act (ESA) for water management activities in the ACF Basin for many years. Relative to ongoing work to update the Master WCM, the USFWS and District staff have engaged in formal consultation under section 7 of the ESA and have cooperated to develop several USFWS Planning Aid Letters and draft reports prepared in accordance with the FWCA. These consultation and coordination activities are summarized in section 6.4 of the EIS, and all pertinent documents are compiled in appendix J of the EIS.

threat of extinction.[127] "Clearly, there can be a significant impact on a species even if its existence is not jeopardized."[128]

As a fundamental matter, the preliminary assessment suffers from the many problems identified throughout these comments, including relying on inappropriate models and data. *See* Section H of these comments. Some of the many additional problems with the preliminary assessment are outlined below.

Gulf Sturgeon: The DEIS provides virtually no life-cycle information on the federally listed Gulf sturgeon and fails to provide any type of meaningful analysis of the impacts of alternatives on the threatened Gulf sturgeon or its designated critical habitat, which includes the entire Apalachicola River and its distributaries. *See* DEIS 2-210 to 2-212. AI

In assessing potential impacts, the DEIS looks only at "change in median annual Gulf sturgeon spawning habitat." DEIS at 6-187. However, this analysis fails to provide any type of meaningful assessment of adverse impacts. The "median" is simply a middle value in a list of numbers, and provides nothing more than a measure of central tendency. As a result, it really is does not provide any meaningful information regarding impacts to spawning habitat.

The DEIS should have followed the recommendations of the Fish and Wildlife Service and evaluated the following to assess the impacts on Gulf Sturgeon:

- Frequency (% of days) of Gulf sturgeon spawning habitat availability (acres of potentially suitable spawning substrate inundated to depths of 8.5 to 17.8 feet) on each day March 1st through May 31st, at the two sites that support spawning;
- Frequency (% of years) of Gulf sturgeon spawning habitat availability (maximum acres of potentially suitable spawning substrate inundated to depths of 8.5 to 17.8 feet for at least 30 consecutive days each year), March 1st through May 31st, at the two sites that support spawning;
- Daily fall rates with respect to exposure of Gulf sturgeon eggs and larvae;
- Maximum number of consecutive days per year less than 16,000 cfs; and
- Departures from average water temperatures between March 1st to May 31st.

Fish and Wildlife Planning Aid Letter, April 20, 2010 at 17 (DEIS Appendix J). The Service's 2013 Planning Aid Letter also recommends that the Corps us the Sturgeon Spawning Habitat Performance Measure (SSHPM) to help assess impacts. While the Corps has stated that they in fact used the SSHPM, the DEIS

[127] *See Greater Yellowstone Coalition v. Flowers*, 359 F.3d 1257, 1275-76 (10th Cir. 2004) (recognizing that FWS' conclusion that the action is not likely to cause jeopardy does not necessarily mean the impacts are insignificant); *Makua v. Rumsfeld*, 163 F. Supp.2d 1202, 1218 (D. Haw. 2001) ("A FONSI . . . must be based on a review of the potential for significant impact, including impact short of extinction. Clearly, there can be a significant impact on a species even if its existence is not jeopardized."); *National Wildlife Federation v. Babbitt*, 128 F. Supp.2d 1274, 1302 (E.D. Cal. 2000) (requiring EIS under NEPA even though mitigation plan satisfied ESA); *Portland Audubon Society v. Lujan*, 795 F. Supp. 1489, 1509 (D. Or. 1992) (rejecting agency's request for the court to "accept that its consultation with [FWS under the ESA] constitutes a substitute for compliance with NEPA.").

[128] *Makua v. Rumsfeld*, 163 F. Supp.2d 1202, 1218 (D. Haw. 2001) ("A FONSI . . . must be based on a review of the potential for significant impact, including impact short of extinction. Clearly, there can be a significant impact on a species even if its existence is not jeopardized.")

Response to ACF234 – National Wildlife Federation

AI. The results of the analyses were performed consistent with the USFWS Planning Aid Letter (PAL). The detailed results were not included in the EIS because, as stated in the EIS, there is little change in flows between the various alternatives. However, the results of these analyses have been included in the final EIS in appendix J and section 6.4.4.3.1 of the EIS.

fails to provide the details of this analysis and instead provides only the change in median spawning habitat discussed above. 2015 Draft Fish and Wildlife Coordination Act Report at 20, DEIS, Appendix J.

Mussels: The DEIS provides no life-cycle and virtually no habitat information on the endangered fat threeridge mussel, the threatened purple bankclimber mussel, or the threatened Chipola slabshell mussel (*Eliptio chipolaensis*), and their associated critical habitat. *See* DEIS at 2-214 to 2-215, 6-187. The DEIS also fails to provide any type of meaningful analysis of the impacts of alternatives on these mussels. AJ

However, even in this vague, preliminary analysis, the DEIS acknowledges that the PAA would have both adverse and slightly adverse impacts on certain identified parameters, including at low flows. DEIS at 6-188. However, the Fish and Wildlife Service has concluded that these impacts could in fact be quite severe. The 2015 Draft Fish and Wildlife Coordination Act Report concludes that the data provided by the Corps demonstrates that the PAA will result in more extreme and more frequent low flow conditions that could increase mortality to federally-listed mussels and fall rates that have a higher potential to strand mussels. 2015 Draft Fish and Wildlife Coordination Act Report at 21-22, DEIS Appendix J.

Since the "effects to mussels are more extreme at the lower range of flows" the DEIS should fully and carefully assess the impacts of low flow levels, including the flows in the PAA, on listed mussels. 2015 Draft Fish and Wildlife Coordination Act Report at 21, DEIS, Appendix J. The DEIS must supply the supporting data and authorities it relies on, explain how and why it has drawn the conclusion it has reached, and candidly disclose the risks of the PAA on listed mussels and their critical habitat.[129]

Notably, the DEIS must carefully assess the implications of increased droughts and the Corps' proposed increase in drought operations, on mussel species. As noted above, low flow conditions can be particularly damaging to mussel species. Indeed, scientists have concluded that sessile species like mussels are "bearing the brunt" of the environmental changes created by the increasing frequency and severity of drought conditions in the Southeastern United States.[130] "Freshwater unionid mussel populations are already among the most endangered groups of organisms in the world. Growing efforts to document the stunning diversity and varied life history strategies of unionids are also recording the measurable impacts of altered stream flows and thermal profiles on survival, recruitment, reproductive strategies, and community structure of these species."[131]

> "As evidenced by the situation in the Apalachicola River and elsewhere, the synergistic effects of regional climate patterns coupled with reduced flows due to water management practices can cause significant damage to overall densities and species richness in mussel communities. For example, a period of very low flows in the Kiamichi River in southeastern Oklahoma, caused by 'a combination of climate patterns (a regional drought) and local water management practices

[129] *Seattle Audubon Soc'y v. Mosely*, 798 F.Supp. 1473, 1482 (W.D. Wash. 1992) (citing *Friends of the Earth v. Hall*, 693 F.Supp. 904, 934, 937 (W.D.Wash. 1988).
[130] Luo Y, Li C, Landis AG, Wang G, Stoeckel J, et al. (2014) Transcriptomic Profiling of Differential Responses to Drought in Two Freshwater Mussel Species, the Giant Floater Pyganodon grandis and the Pondhorn Uniomerus tetralasmus. PLoS ONE 9(2): e89481. doi:10.1371/journal.pone.0089481 (available at http://www.researchgate.net/profile/Eric_Peatman/publication/260448127_Transcriptomic_Profiling_of_Differential_Responses_to_Drought_in_Two_Freshwater_Mussel_Species_the_Giant_Floater_Pyganodon_grandis_and_the_Pondhorn_Uniomerus_tetralasmus/links/0a85e538e17b5dd4e6000000.pdf).
[131] *Id*. (internal citations omitted).

Response to ACF234 – National Wildlife Federation

AJ. The results of the analyses were performed consistent with the USFWS Planning Aid Letter. The detailed results are not included in the EIS because, as stated in the EIS, there is little change in flows between the various alternatives. In response to this comment, updates were made to the EIS to include additional analysis of the impacts to mussels. The results of the Endangered Species Act consultation with USFWS are provided in appendix J and section 6.4.4.3.2 of the EIS.

(decreased reservoir releases)' created conditions that led to high mortality rates for thermally sensitive mussel species."[132]

Importantly, as noted in the 2015 Draft Fish and Wildlife Coordination Act Report:

> "Mussel population viability is intricately tied to host fish density (Watters 1997; Haag and Warren 1998). Because many of the fish species dependent on the floodplain serve as host fish to freshwater mussels in the Apalachicola River, freshwater mussels may also be impacted by fall rates that occur at higher flow magnitudes."

2015 Draft Fish and Wildlife Coordination Act Report at 34, DEIS Appendix J.

Because mussel populations are so intricately tied to host fish density, lack of connectivity between the river and floodplain – and alternative management regimes that reduce that connectivity – could also have significant implications for both viability and recovery of listed mussel species. This information should be, but is not, evaluated in the DEIS.

4. The DEIS Fails to Meaningfully Evaluate Impacts on Fisheries

AK

The DEIS does not – and cannot – satisfy NEPA because it fails to meaningfully evaluate impacts on fisheries. This failure presents a fundamentally flawed image of the impacts of the PAA that renders the DEIS inadequate.

The Apalachicola River supports more than 131 species of fresh and estuarine fish, more than any other river in Florida. "[A]t least 80 percent of Apalachicola River fish species use floodplain habitats, especially for spawning and foraging." DEIS at 2-190 (*citing* Light et al. 1995). There can be no dispute that appropriate freshwater flows are vital to supporting this vast array of species.

The DEIS fails to provide anything approaching a meaningful assessment of impacts to fishery resources in the Apalachicola River. For example, the DEIS fails to provide any life cycle information on the extensive array of fish species that utilize the river and floodplain, and fails to consider the impacts of alternative flow regimes on the critical phases of those life cycles. Instead, the DEIS lumps together its fisheries assessment with a dizzying array of other aquatic species:

> "The criteria used to define water quantity effects on fish and aquatic resources in the Apalachicola River downstream of Jim Woodruff Lock and Dam include discharge rates and area of floodplain habitat. These criteria are appropriate for assessing overall effects on the wide variety of aquatic organisms, including aquatic vegetation, **riverine and estuarine fish**, amphibians, reptiles, mollusks, and other invertebrates that inhabit the Apalachicola River and the adjacent floodplain." DEIS at 6-173 (emphasis added).

These impacts are then summarized – without reference to any scientific information – in a scant four paragraphs:

[132] H.S. Galbraith, D.E. Spooner, C.C. Vaugh, Synergistic effects of regional climate patterns and local water management on freshwater mussel communities, Biological Conservation 143 (2010) 1175–1183 (available at http://vmpincel.ou.edu/download/publications/GalbraithetalBC10.pdf).

Response to ACF234 – National Wildlife Federation

AK. The PAA includes fish and wildlife conservation operations throughout the basin (e.g., the reservoir fish spawn operations, minimum flow provisions in the Apalachicola River, and fish passage at Jim Woodruff Lock and Dam). Section 5 of the EIS provides additional information on the PAA. The EIS considered and disclosed the expected impacts that the PAA could have on fish and wildlife resources in the Apalachicola River and Bay (or elsewhere in the system). If expected impacts to significant resources would be adverse as a result of revised operations, USACE must consider potential measures to mitigate those effects. The analysis presented in section 6 of the EIS indicates that the PAA would have a minimal effect on flow conditions in the Apalachicola River and into the Bay, compared to current reservoir operations under the NAA. Because flow and water quality changes in the Apalachicola River and Bay are not expected under the PAA, no anticipated incremental effect would be expected on fish and wildlife resources in the bay.

"6.4.2.1.4 Apalachicola River
In the Apalachicola River, fish and aquatic resources, including aquatic vegetation, riverine and estuarine fish, amphibians, reptiles, mollusks, and other invertebrates, could be affected by changes in discharge rates and area of floodplain habitat on the Apalachicola River. The river level (dependent on the discharge from the Jim Woodruff Dam) largely dictates available floodplain habitat.

Discharge rates on the Apalachicola River are similar across alternatives. Flow conditions downstream of Jim Woodruff Lock and Dam for the proposed alternatives would not be appreciably different from flow conditions under the NAA. As described in detail in section 6.1.1.2.5 and summarized in Table 6.1-2, flow conditions under each alternative were essentially characterized as "no change" from the NAA.

Floodplain habitat connectivity on the Apalachicola River is also similar across alternatives. The maximum 30-day growing season floodplain habitat connectivity for each alternative was calculated as the maximum amount of floodplain spawning habitat available for at least 30 consecutive days during the months of April through October. This criterion was based on the life history requirements of many riverine fishes, including species specific to the Apalachicola River. This criterion is also an appropriate standard for assessing habitat for the wide range of other aquatic organisms that inhabit the Apalachicola River and its floodplain. Table 6.4-3 shows the area of floodplain habitat for each alternative. All alternatives are less than 2 percent different from the NAA.

Discharge rates and area of floodplain habitat are the principal factors that could influence aquatic organisms and communities in the Apalachicola River and for each of these evaluation criteria, the differences are slight between each of the alternatives and the NAA. Given wastewater return rates are unchanged along this reach and flows in the Apalachicola River are similar across alternatives, water quality in the Apalachicola River would also be relatively unchanged as illustrated in Figures 6.1-65 through 6.1-126. Therefore, each of the alternatives evaluated would be expected to have negligible effects on fish and aquatic resources in the Apalachicola River." DEIS at 6-179 to 6-180.

The wholesale inadequacy of this assessment is evident on its face. In addition, the assessment fails to follow the recommendations of the Fish and Wildlife Service which urged the Corps to look at "[s]pecific flow statistics and species-specific flow-ecology relationships (as available) that are important to natural resource sustainability, as well as the ACF Riverine Community Habitat Assessment and Restoration Concept (RCHARC) study (Freeman et al. 1997)" when assessing impacts to species[133] The inadequacy of the DEIS fisheries assessment is further compounded by the many other problems identified throughout these comments, including relying on inappropriate models and data and failing to account for impacts to the Apalachicola River Floodplain.

[133] 2010 Planning Aid Letter, DEIS Appendix J.

5. The DEIS Fails to Evaluate Impacts on Birds and Waterfowl

AL

The DEIS does not – and cannot – comply with NEPA because it fails to provide any evaluation at all of the impacts on birds and waterfowl. Indeed, the DEIS fails to even identify a single bird or waterfowl species that specifically utilizes the Apalachicola River or its floodplain. This is a stunning failure in the DEIS that causes the DEIS to profoundly understate the adverse impacts of the proposed action.

It is inconceivable that a project that affects the ACF system, including the ecologically rich Apalachicola River, floodplain, and bay would not have an impact on birds and waterfowl. Indeed, even the limited information in the DEIS makes this clear. For example, the DEIS acknowledges (in a single paragraph) that riparian forests, forested wetlands, and appropriate hydroperiods are extremely important to bird species:

> **"2.5.2.1.1 Birds**
> Riparian forests typically support a wide diversity of birds; however, the exact makeup of a bird assemblage depends on specific characteristics of the forest. Suitability of a forest for birds is affected by age and size of a stand; in fact, Dickson and Warren (1993) note that bird assemblages are associated with vertical foliage layers, total foliage volume, habitat patchiness, stand successional stage, moisture gradient, and hydroperiod. Forested, poorly drained wetlands are known to support higher densities and more diverse assemblages of breeding birds, and in general, riparian zones with lower vegetative diversity support fewer birds from a less diverse assemblage (Dickson and Warren 1993). The oak-gum-cypress forest type exists throughout portions of the Southeastern Plain, in the midsection of the ACF Basin (Figure 2.1-8). Bird censuses have shown that yellow-billed cuckoos (*Coccyzus americanus*), Acadian flycatchers (*Empidonax virescens*), tufted titmice (*Baeolophus bicolor*), Carolina wrens (*Thryothorus ludovicianus*), red-eyed vireos (*Vireo olivaceous*), and Northern cardinals (*Cardinalis cardinalis*) are consistently abundant in mature forests of this type (Dickson and Warren 1993). Various raptors prefer living and hunting in riparian hardwood forests, including the Mississippi (*Ictinia mississippiensis*) and American swallow-tailed kites (*Elanoides forficatus*), bald eagles (*Haliaeetus leucocephalus*), and ospreys (*Pandion haliaetus*), whereas barred owls (*Strix varia*) and red-shouldered hawks (*Buteo lineatus*) are more frequently found in forested wetlands. Wood storks (*Mycteria americana*), purple gallinules (*Porphyrio martinicus*), and moorhens (*Gallinula chloropus*) rely on aquatic areas for habitat and for foraging zones; in addition, wood storks require tall cypress and hardwoods for nesting spots. Woodpeckers are adapted to more mature hardwood forests, and red- and white-eyed vireos live in the forest canopy and low, shrubby vegetation of riparian habitats, respectively. Bottomland hardwood forests support a diverse bird assemblage, which can include a number of warblers (i.e., prothonotary, Swainson's, Northern parula, Kentucky, and hooded), some of which nest in cavities of trees killed by floods (prothonotary warbler) or prefer bottomland understory thickets (Swainson's warbler) or Spanish moss (Northern parula warbler) (Dickson and Warren 1993)." DEIS at 2-193 to 2-194.

Elsewhere, the DEIS recognizes that the Apalachicola River Floodplain is a "vast wetland system of bottomland hardwood forests and tupelo cypress swamps, the largest floodplain forest in Florida. . . . [that] has long been recognized for its tree species richness." DEIS at 2-189. The DEIS also recognizes that the "the present-day forest composition along the river has shifted toward drier conditions compared to data collected in the 1970s (Darst and Light 2008)." DEIS at 2-190. Though not included in

Response to ACF234 – National Wildlife Federation

AL. Potential adverse effects on hydrodynamic and ecological conditions in Apalachicola Bay that are associated with the PAA, compared to the NAA (current operations), are addressed in section 6 of the EIS. The analysis concludes that the PAA would have little to no effect on these conditions in the bay compared to the NAA. Consequently, adverse effects on coastal bird colonies and other wildlife are not expected.

the DEIS, information from that same report (Darst and Light 2008) describes the significant loss of floodplain trees that have already resulted from changes to the floodplain hydrology:

> "The density of trees in swamps significantly decreased by 37 percent from 1976 to 2004. Of the estimated 4.3 million (17 percent) fewer trees that existed in the nontidal floodplain in 2004 than in 1976, 3.3 million trees belonged to four swamp species: popash, Ogeechee tupelo, water tupelo, and bald cypress. Water tupelo, the most important tree in the nontidal floodplain in terms of basal area and density, has declined in number of trees by nearly 20 percent since 1976. Ogeechee tupelo, the species valuable to the tupelo honey industry, has declined in number of trees by at least 44 percent."[134]

Even a cursory review of the science demonstrates the critical importance of healthy floodplain processes – including floodplain connection, inundation, and flood pulses – for birds and waterfowl. For example:

> "Disruption of lateral connectivity and the flood pulse can affect both aquatic and non-aquatic organisms, as well as nutrient processing, and other floodplain functions (Cobb et al. 1993, Lytle and Poff 2006 and references therein). For example, productivity of songbirds and waterfowl can be affected because of the influence of the flood pulse on predators and food availability (Heitmeyer 2006, Hoover 2006, Cooper et al. 2009, Hoover 2009). Furthermore, channelization and dams can alter the timing, depth, duration, and frequency of floods and disrupt synchronized linkages between the flood pulse and life history processes of organisms (Richter et al. 1997, Bunn and Arthington 2002, Heitmeyer 2006, Hupp et al. 2009).
>
> * * *
>
> Floodplain forests historically provided a variety of habitats for breeding amphibians, secretive marsh birds, and wintering and breeding waterfowl. Furthermore, the diversity of hydroperiods resulted in abundant aquatic invertebrate populations and high seed production by moist-soil plants. These food and structural resources are critical for fulfilling wintering, breeding, and migrating waterfowl and shorebird needs; however, they have been lost over broad expanses of the landscape as a result of widespread drainage. Such resources are not restored through simple planting of trees. Thus, local hydrologic restoration and intensive moist-soil management on smaller areas are necessary strategies to replace these historic floodplain wetland functions."135

Accordingly, the DEIS must analyze the potential impacts of the proposed alternatives on birds and waterfowl.

[134] Darst, M.R., Light, H.M., 2008, Drier Forest Composition Associated with Hydrologic Change in the Apalachicola River Floodplain, Florida: U.S. Geological Survey Scientific Investigations Report 2008-5062, 81 p., plus 12 apps.
[135] Sammy L. King, et, al, The Ecology, Restoration, And Management Of Southeastern Floodplain Ecosystems: A Synthesis, Wetlands, Vol. 29, No. 2, June 2009, pp. 624–634.

6. The DEIS Fails to Evaluate Impacts on Amphibians and Reptiles

AM

The DEIS does not – and cannot – satisfy NEPA because it fails to evaluate impacts to amphibians and reptiles. This failure presents a fundamentally flawed image of the impacts of the PAA and renders the DEIS inadequate.

The Apalachicola River Basin is home to more than 40 species of amphibians and 80 species of reptiles, the highest diversity of amphibians and reptiles in the United States and Canada. DEIS at 2-205. This is not surprising given the critical importance of wetlands to amphibians and reptiles.

While the DEIS acknowledges the significant numbers of amphibian and reptile species in both the ACF basin,[136] and in the Apalachicola River Basin,[137] the DEIS fails to provide anything approaching a meaningful assessment of impacts to these species. Instead, as noted above, the DEIS lumps together its assessment of amphibians and reptiles with a dizzying array of other aquatic species:

> "The criteria used to define water quantity effects on fish and aquatic resources in the Apalachicola River downstream of Jim Woodruff Lock and Dam include discharge rates and area of floodplain habitat. These criteria are appropriate for assessing overall effects on the wide variety of aquatic organisms, including aquatic vegetation, riverine and estuarine fish, **amphibians, reptiles**, mollusks, and other invertebrates that inhabit the Apalachicola River and the adjacent floodplain." DEIS at 6-173 (emphasis added).

As also noted above, these impacts are then summarized – without reference to any supporting data or scientific information – in a scant four paragraphs:

> **"6.4.2.1.4 Apalachicola River**
> In the Apalachicola River, fish and aquatic resources, including aquatic vegetation, riverine and estuarine fish, amphibians, reptiles, mollusks, and other invertebrates, could be affected by changes in discharge rates and area of floodplain habitat on the Apalachicola River. The river level (dependent on the discharge from the Jim Woodruff Dam) largely dictates available floodplain habitat.
>
> Discharge rates on the Apalachicola River are similar across alternatives. Flow conditions downstream of Jim Woodruff Lock and Dam for the proposed alternatives would not be appreciably different from flow conditions under the NAA. As described in detail in section 6.1.1.2.5 and summarized in Table 6.1-2, flow conditions under each alternative were essentially characterized as "no change" from the NAA.
>
> Floodplain habitat connectivity on the Apalachicola River is also similar across alternatives. The maximum 30-day growing season floodplain habitat connectivity for each alternative was calculated as the maximum amount of floodplain spawning habitat available for at least 30 consecutive days during the months of April through October. This criterion was based on the life history requirements of many riverine fishes, including species specific to the Apalachicola River. This criterion is also an appropriate standard for assessing habitat for the wide range of other aquatic organisms that inhabit the Apalachicola River and its floodplain. Table 6.4-3

[136] *See* DEIS at 2-194, 2-195.
[137] *See* DEIS at 2-205.

Response to ACF234 – National Wildlife Federation

AM. Sections 2.5.2.3 and 2.5.2.4 and Tables H-2 and H-3 in appendix H identify reptiles and amphibians known or likely to occur in the ACF Basin. USACE considered how changes from the NAA might effect species presented in sections 2.5.2.3 and 2.5.2.4 and presented those effects in section 6.4.3.1 of the EIS. The analysis in the EIS demonstrates that the PAA would result in little to no change in flow and water quality conditions in the Apalachicola River and Bay and, consequently, that there would be little to no effect on biological, cultural, and other resources in the river and bay.

shows the area of floodplain habitat for each alternative. All alternatives are less than 2 percent different from the NAA.

Discharge rates and area of floodplain habitat are the principal factors that could influence aquatic organisms and communities in the Apalachicola River and for each of these evaluation criteria, the differences are slight between each of the alternatives and the NAA. Given wastewater return rates are unchanged along this reach and flows in the Apalchicola River are similar across alternatives, water quality in the Apalachicola River would also be relatively unchanged as illustrated in Figures 6.1-65 through 6.1-126. Therefore, each of the alternatives evaluated would be expected to have negligible effects on fish and aquatic resources in the Apalachicola River." DEIS at 6-179 to 6-180.

The problems with this so-called "assessment" are too numerous to identify in full, but include a complete and total lack of information relevant to amphibians and reptiles, a complete failure to assess wetland impacts, a complete failure to assess floodplain impacts, and reliance on inappropriate models and data. This so-called "assessment" is entirely inadequate to properly evaluate the impacts to any species, let alone to species like amphibians and reptiles that are facing unprecedented risks of extinction.

In the United States, the IUCN Red List of Threatened Species lists 56 amphibian species and 37 reptile species as known to be critically endangered, endangered, or vulnerable.[138] Worldwide, at least 1,950 species of amphibians are threatened with extinction of which 520 species are critically endangered, 783 are endangered, and 647 species are vulnerable. This represents 30 percent of all known amphibian species.[139] In 2004, scientists estimated that most of 1,300 other amphibian species are also threatened though sufficient data are currently lacking to be able to accurately assess the status of those species.[140] The IUCN Red List of Threatened Species also lists 879 species of reptiles as threatened with extinction worldwide, which represents 21 percent of all evaluated reptile species.[141]

A recent study demonstrates the increasingly dire conditions of amphibians worldwide:

> "Current extinction rates are most likely 136–2707 times greater than the background amphibian extinction rate. These are staggering rates of extinction that are difficult to explain via natural processes. No previous extinction event approaches the rate since 1980 (Benton and King, 1989).

[138] IUCN Red List version 2013:2, Table 5: Threatened species in each country (totals by taxonomic group), available at http://cmsdocs.s3.amazonaws.com/summarystats/2013_2_RL_Stats_Table5.pdf (visited on November 24, 2013.)
[139] IUCN Red List version 2013:2, Table 3a: Status category summary by major taxonomic group (animals), available at http://cmsdocs.s3.amazonaws.com/summarystats/2013_2_RL_Stats_Table3a.pdf (visited on November 24, 2013).
[140] Science Daily, Amphibians In Dramatic Decline; Study Finds Nearly One-Third Of Species Threatened With Extinction (October 15, 2004), available at http://www.sciencedaily.com/releases/2004/10/041015103700.htm (visited on November 24, 2013).
[141] IUCN Red List version 2013:2, Table 3a: Status category summary by major taxonomic group (animals), available at http://cmsdocs.s3.amazonaws.com/summarystats/2013_2_RL_Stats_Table3a.pdf (visited on November 24, 2013).

> Despite the catastrophic rates at which amphibians are currently going extinct, these are dwarfed by expectations for the next 50 yr (Fig. 1). If the figure provided by Stuart et al. (2004) is true (but see Pimenta et al., 2005; Stuart et al., 2005), one-third of the extant amphibians are in danger of extinction. This portends an extinction rate of 25,000–45,000 times the expected background rate. Episodes of this stature are unprecedented. Four previous mass extinctions could be tied to catastrophic events such as super volcanoes and extraterrestrial impacts that occur every 10 million to 100 million years (Wilson, 1992). The other mass extinction seems to be tied to continental drift of Pangea into polar regions leading to mass glaciation, reduced sea levels, and lower global temperatures (Wilson, 1992). The current event far exceeds these earlier extinction rates suggesting a global stressor(s), with possible human ties."[142]

Amphibians thrive in cool wetland environments, and are found in all types of wetlands except more saline coastal environments. Small, isolated wetlands play especially important roles in amphibian productivity.[143] Amphibian populations thrive when there are a variety of small ecosystems within a regional landscape in which a "dynamic equilibrium" of different populations becomes established.[144] However, if the environment becomes overly fragmented, the dynamic equilibrium is disturbed because patterns of emigration and immigration may be disrupted.

Amphibians spend part of their life cycles in an aquatic environment and part in a terrestrial environment (typically returning to water to breed). For example, some salamanders undergo larval development within an aquatic environment, and then live along wet streamsides following metamorphosis into adult stages. Those that do not breed in water still need moist environments to prevent extreme dehydration.[145] The tadpoles of most frog species develop in ponds, lakes, wet prairies, and other still bodies of water, while others are known to breed in a wide variety of wetland habitats. As adults, toads, frogs and some salamanders can travel relatively great distances from water sources, but they return to water to reproduce.

Recent studies also point to the role of global climate change in promoting potentially catastrophic impacts to amphibian populations. For example:

- Global climate change will result in changes to weather and rainfall patterns that can have significant adverse effects on amphibians. Drought can lead to localized extirpation. Cold can induce winterkill in torpid amphibians. It is possible that the additional stress of climate change, on top of the stresses already created by severe loss of habitat and habitat fragmentation may jeopardize many amphibian species.[146]

[142] McCallum, M. L. (2007). "Amphibian Decline or Extinction? Current Declines Dwarf Background Extinction Rate. *Journal of Herpetology* 41 (3): 483–491. doi:10.1670/0022-1511(2007)41[483:ADOECD]2.0.CO;2.
[143] Gibbons, J. Whitfield, Christopher Winne, et. al. 2006. Remarkable Amphibian Biomass and Abundance in an Isolated Wetland: Implications for Wetland Conservation. Conservation Biology Volume 20, No. 5, 1457–1465.
[144] Mann, W., P. Dorn, and R. Brandl. 1991. Local distribution of amphibians: The importance of habitat fragmentation. Global Ecology and Biogeography Letters 1:36-41.
[145] Semlitsch, R. D. 1987. Relationship of pond drying to the reproductive success of the salamander Ambystoma talpoideum. Copeia 1987:61-69; Pechmann, J. H. K., D. E. Scott, J. W. Gibbons, and R. D. Semlitsch. 1989. Influence of wetland hydroperiod on diversity and abundance of metamorphosing juvenile amphibians. Wetlands Ecology and Management 1:3-11.
[146] Sjogren, P. 1993a. Metapopulation dynamics and extinction in pristine habitats: A demographic explanation. Abstracts, Second World Congress of Herpetology, Adelaide, Australia, p. 244; Sjogren, P. 1993b. Applying

- Recent studies suggest that climate change may be causing global mass extinctions of amphibian populations. Particularly alarming is the fact that many of these disappearances are occurring in relatively pristine area such as wilderness areas and national parks.[147] One recent study suggests that climate change has allowed the spread of a disease known as chytridiomycosis which has led to extinctions and declines in amphibians. Climate change has allowed this disease to spread by tempering the climate extremes that previously kept the disease in check.[148] About two-thirds of the 110 known harlequin frog species are believed to have vanished during the 1980s and 1990s because of the chytrid fungus *Batrachochytrium dendrobatidis.* Other studies indicate that amphibians may be particularly sensitive to changes in temperature, humidity, and air and water quality because they have permeable skins, biphasic life cycles, and unshelled eggs.[149]

- Climate change may also affect amphibian breeding patterns.[150] Amphibians spend a significant part of the year protecting themselves from cold or shielding themselves from heat. They receive cues to emerge from their shelters and to migrate to ponds or streams to breed from subtle increases in temperature or moisture. As the earth warms, one potential effect on amphibians is a trend towards early breeding, which makes them more vulnerable to snowmelt-induced floods and freezes common in early springs. Some studies already indicate a trend towards earlier breeding in certain amphibian species.[151]

- Increases in UV-B radiation in the northern hemisphere due to ozone depletion is also having an adverse impact on amphibians.[152] One study suggests that ultraviolet-B (UV-B) radiation adversely affects the hatching success of amphibian larvae.[153] High levels of UV-B also induced higher rates of developmental abnormalities and increased mortality in certain species (*Rana*

---

metapopulation theory to amphibian conservation. Abstracts, Second World Congress of Herpetology, Adelaide, Australia, p. 244-245.

[147] Pounds, J. A., and M. L. Crump. 1994. Amphibian declines and climate disturbance: The case of the golden toad and the harlequin frog. Conservation Biology 8:72-85; Lips, K. R. 1998. Decline of a Tropical Montane Amphibian Fauna. Conservation Biology 12:106-117; Lips, K., F.Brem, R. Brenes, J.D. Reeve, R.A. Alford, J. Voyles, C. Carey, L. Livo, A. P. Pessier, and J.P. Collins 2006. Emerging infectious disease and the loss of biodiversity. Proceedings of the National Academy of Sciences 103:3165-3170.

[148] Pounds, J.A., M.P.L. Fogden, J.H. Campbell. 2006. Biological response to climate change on a tropical mountain. Nature 398, 611-615.

[149] Carey, C., and M. A. Alexander. 2003. Climate change and amphibian declines: is there a link? Diversity and Distributions 9:111-121.

[150] Carey, C., and M. A. Alexander. 2003. Climate change and amphibian declines: is there a link? Diversity and Distributions 9:111-121.

[151] Beebee, T. J. C. 1995. Amphibian Breeding and Climate. Nature 374:219-220; Blaustein, A. R., L. K. Belden, D. H. Olson, D. M. Green, T. L. Root, and J. M. Kiesecker. 2001. Amphibian breeding and climate change. Conservation Biology 15:1804-1809; Gibbs, J. P., and A. R. Breisch. 2001. Climate warming and calling phenology of frogs near Ithaca, New York, 1900-1999. Conservation Biology 15:1175-1178.

[152] Blumthaler, M., and W. Ambach. 1990. Indication of increasing solar ultraviolet-B radiation flux in alpine regions. Science 248:206-208; Kerr, J. B., and C. T. McElroy. 1993. Evidence for large upward trends of ultraviolet-B radiation linked to ozone depletion. Science 262:1032-1034.

[153] Blaustein, A. R., P. D. Hoffman, D. G. Hokit, J. M. Kiesecker, S. C. Walls, and J. B. Hays. 1994a. UV repair and resistance to solar UV-B in amphibian eggs: A link to population declines? *Proceedings of the National Academy of Science* 91:1791-1795.

clamitans and *R. sylvatica*) than others that were shielded from UV-B.[154] UV-B also can have detrimental effects on embryo growth.

The failure of the DEIS to meaningfully evaluate the impacts to amphibians and reptiles renders the DEIS grossly inadequate.

7. The DEIS Fails to Evaluate Impacts to Mammals

AN

The DEIS does not – and cannot – satisfy NEPA because it fails to evaluate impacts to mammals. This failure presents a fundamentally flawed image of the impacts of the PAA and renders the DEIS inadequate.

While the DEIS recognizes the presence of a significant number of mammal species (59) in the ACF basin, including many that are found in riparian areas, the DEIS fails to provide any analysis whatsoever on the potential impacts to mammals from alternative water management regimes, including the PAA. *See* DEIS at 2-194. Because the PAA and other alternatives will affect riparian areas, wetland areas, and estuarine areas, the DEIS must evaluate impacts to the mammal species found in those areas.

8. The DEIS Fails to Evaluate Impacts to Plants

AO

The DEIS does not – and cannot – satisfy NEPA because it fails to evaluate impacts to plants, including wetland plant species. This failure presents a fundamentally flawed image of the impacts of the PAA and renders the DEIS grossly inadequate.

The Apalachicola River Basin is home to more than 1,300 species of plants, including 103 that are listed by the federal government or the State of Florida as endangered or threatened. DEIS at 2-205. As also recognized in the DEIS, the "Apalachicola River floodplain is a vast wetland system of bottomland hardwood forests and tupelo cypress swamps, the largest floodplain forest in Florida. . . . The floodplain forest of the Apalachicola River is Florida's largest, and it has long been recognized for its tree species richness." DEIS at 2-189. The floodplain supports at least 47 different tree species (DEIS at 2-189) and is "one of the most productive floodplain forests found in warm, temperate regions (Elder and Cairns 1982)." DEIS at 2-189.

As discussed above, the DEIS further acknowledges that the "composition of floodplain forests along the Apalachicola River has been changing during the last 30 to 40 years. The USGS found that the present-day forest composition along the river has shifted toward drier conditions compared to data collected in the 1970s (Darst and Light 2008)." DEIS at 2-190. However, the DEIS does not include information from that same Darst and Light study describing the magnitude of that tree loss:

> "The density of trees in swamps significantly decreased by 37 percent from 1976 to 2004. Of the estimated 4.3 million (17 percent) fewer trees that existed in the nontidal floodplain in 2004 than in 1976, 3.3 million trees belonged to four swamp species: popash, Ogeechee tupelo, water tupelo, and bald cypress. Water tupelo, the most important tree in the nontidal floodplain in

[154] Grant, K. P., and L. E. Licht. 1993. Effects of ultraviolet radiation on life history parameters of frogs from Ontario, Canada. Abstracts, Second World Congress of Herpetology, Adelaide, Australia, p. 101.

Response to ACF234 – National Wildlife Federation

AN. Section 2.5.2.12 and Table H-1 provided in appendix H identify mammals that actually or potentially could inhabit riparian and/or upland areas in the ACF Basin. USACE considered how changes from the NAA might effect species presented in 2.5.2.12 and presented those effects in section 6.4.2 of the final EIS. The analysis in the EIS demonstrates that the PAA would result in little to no change in flow and water quality conditions in the Apalachicola River and Bay and, consequently, that there would be little to no effect on biological, cultural, and other resources in the river and bay.

AO. Section 2.5.1.2 of the EIS discusses vegetation resources in the freshwater and estuarine wetland communities in the ACF Basin. USACE considered how changes from the NAA might effect species presented in section 2 and presented those effects in section 6.4.2 of the final EIS. The analysis in the EIS demonstrates that the PAA would result in little to no change in flow and water quality conditions in the Apalachicola River and Bay and, consequently, that there would be little to no effect on biological, cultural, and other resources in the river and bay.

terms of basal area and density, has declined in number of trees by nearly 20 percent since 1976. Ogeechee tupelo, the species valuable to the tupelo honey industry, has declined in number of trees by at least 44 percent."[155]

This significant loss of trees and other plant species has very real implications for the health of the Apalachicola River, floodplain, and bay. For example, forest density, composition, tree size, age, mortality, and recruitment are all part of the forest ecosystem upon which the wildlife depend. As the floodplain becomes drier due to reduced duration and depth of inundation or artificially altered timing of flood flows, the forest will continue to lose density, mass, and canopy cover. This results in a direct and significant loss of important habitat.

Decreases in forest density and canopy also increase the amount of light that reaches the forest floor. Such increases in light encourage a thicker growth of ground cover plants, which in turn further reduces the success of forest replacement. Such changes also cause further reductions in leaf litter biomass, increase evaporation from the soil, decrease soil organisms, and speed up decomposition of the leaf litter. This in turn results in a loss of substrate for benthic organisms in the floodplain and ultimately in waters downstream.[156] The drying out of the floodplain also facilitates the movement of invasive species into the floodplain.

The impacts of the proposed alternatives on plant species, including wetland plants and trees, must be analyzed. The complete failure to do so renders the DEIS grossly inadequate.

9. The DEIS Fails to Evaluate Impacts to Salinity Levels and the Ecological Productivity of the Apalachicola Bay

AP

The DEIS does not – and cannot – satisfy NEPA because it fails to evaluate the impacts of modified flow regimes on salinity levels and the ecological productivity of the Apalachicola Bay. In light of the importance of the Apalachicola Bay to the regional and state economy, it is critical to understand how flow changes will affect productivity in the estuary.

The DEIS acknowledges the importance of Apalachicola River flow on salinity and productivity in the Apalachicola Bay. For example, the DEIS states that:

- Salinity in the Apalachicola Bay "is heavily influenced by flow from the Apalachicola River, decreasing both north to south and east to west as freshwater input from the river increases (Edmiston 2008)." DEIS at 2-56.
- "River flow is the primary determinant of salinity concentrations in the estuary (Livingston 1984)"; and juvenile Gulf sturgeon and oyster habitats "are of primary importance within the Apalachicola Bay ecosystem and depend principally on salinity regime largely driven by discharge from the Apalachicola River." DEIS 2-206.

[155] Darst, M.R., Light, H.M., 2008, Drier Forest Composition Associated with Hydrologic Change in the Apalachicola River Floodplain, Florida: U.S. Geological Survey Scientific Investigations Report 2008-5062, 81 p., plus 12 apps.
[156] *Id*.

Response to ACF234 – National Wildlife Federation

AP. Efforts to assess the effects of water management activities on salinity in the Apalachicola Bay have been conducted as part of the coordination between USACE, Mobile District and the USFWS under the Fish and Wildlife Coordination Act. The current analysis presented in the EIS indicates that freshwater flow and water quality conditions in the river and bay under the PAA would not measurably change compared to current reservoir operations (i.e., the NAA). Therefore, salinity and nutrient transfer conditions would not be expected to change (see EIS sections 6.4.3.3 and 6.1.2). The results of further USFWS analyses in the final Fish and Wildlife Coordination Act Report were included in the final EIS.

Response to ACF234 – National Wildlife Federation

- "Salinity is one of the major limiting factors in oyster production. Prolonged high salinities due to drought or other factors affect freshwater flow and allow for increased [oyster] predation . . . and decreased food availability." DEIS 2-206.

- "Nutrients and detritus carried from the floodplain by river floods contribute significantly to the relatively high productivity of Apalachicola Bay." DEIS at 2-190.

The Conservation Organizations direct the Corps to the discussion of the scientific evidence regarding the importance of freshwater flows on salinity and productivity in the Apalachicola Bay in the January 28, 2016 comments on the DEIS submitted by the Apalachicola Riverkeeper.

Despite the critical importance of flow and river-floodplain connectivity to the health and productivity of the Apalachicola Bay, the DEIS fails to conduct any analysis regarding the impacts of the proposed alternatives on salinity levels and ecological productivity. Instead, the DEIS makes the following wholly unsupported and general conclusion:

> **"Estuarine fish and aquatic resources.** Compared to the NAA, the PAA would be expected to have a negligible effect on the hydrodynamic and salinity characteristics of the Apalachicola Bay estuary. No effects on fish and aquatic resources in estuaries would be expected under the PAA as compared to the NAA. Because the changes in flow and water quality conditions in the Apalachicola River and Bay between the NAA and the PAA would be negligible, no incremental effects on species for which essential fish habitat has been designated under a Fishery Management Plan would be expected to occur as a result of implementing the PAA." DEIS at ES-30.

The failure to conduct a meaningful evaluation, supported by credible data and science, on the impacts on salinity and productivity in the Apalachicola Bay renders the DEIS grossly inadequate.

10. The DEIS Fails to Adequately Evaluate Cumulative Impacts

AQ

The DEIS does not – and cannot – satisfy NEPA because it abjectly fails to evaluate cumulative impacts. This failure renders the DEIS grossly inadequate.

The cumulative impacts analysis is a critical component of NEPA review. It ensures that the reviewing agency will not "treat the identified environmental concern in a vacuum."[157] Cumulative impacts are defined as:

> "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."[158]

In evaluating cumulative impacts:

AQ. Cumulative effects and impacts, including climate change, are addressed in section 6 of the EIS.

[157] *Grand Canyon Trust v. FAA*, 290 F.3d 339, 346 (D.C. Cir. 2002).
[158] 40 C.F.R. § 1508.7.

> "The analyst's primary goal is to determine the magnitude and significance of the environmental consequences of the proposed action in the context of the cumulative effects of other past, present, and future actions. Much of the environment has been greatly modified by human activities, and most resources, ecosystems, and human communities are in the process of change as a result of cumulative effects. **The analyst must determine the realistic potential for the resource to sustain itself in the future and whether the proposed action will affect this potential; therefore, the baseline condition of the resource of concern should include a description of how conditions have changed over time and how they are likely to change in the future without the proposed action.** The potential for a resource, ecosystem, and human community to sustain its structure and function depends on its resistance to stress and its ability to recover (i.e., its resilience). Determining whether the condition of the resource is within the range of natural variability or is vulnerable to rapid degradation is frequently problematic. Ideally, the analyst can identify a threshold beyond which change in the resource condition is detrimental. More often, the analyst must review the history of that resource and evaluate whether past degradation may place it near such a threshold. For example, the loss of 50% of historical wetlands within a watershed may indicate that further losses would significantly affect the capacity of the watershed to withstand floods. **It is often the case that when a large proportion of a resource is lost, the system nears collapse as the surviving portion is pressed into service to perform more functions.**"[159]

A meaningful assessment of cumulative impacts must identify:

> "(1) the area in which effects of the proposed project will be felt; (2) the impacts that are expected in that area from the proposed project; (3) other actions – past, present, and proposed, and reasonably foreseeable – that have had or are expected to have impacts in the same area; (4) the impacts or expected impacts from these other actions; and (5) the overall impact that can be expected if the individual impacts are allowed to accumulate."[160]

Where, as here, the project area encompasses entire river basins, the cumulative impacts analysis must analyze the cumulative effects of other projects in those river basins.[161] This includes an analysis of the cumulative effects of federal, state, and private projects and actions. The requirement to assess non-Federal actions is not "impossible to implement, unreasonable or oppressive: one does not need control over private land to be able to assess the impact that activities on private land may have" on the project area.[162]

The cumulative impacts analysis must also assess the magnifying and additive effects of climate change (climate change must also be assessed when evaluating direct and indirect effects) on the proposed flow regime changes for the ACF system. As made clear in guidance issued by the Council on Environmental Quality:

> "Climate change can affect the environment of a proposed action in a variety of ways. Climate change can increase the vulnerability of a resource, ecosystem, human community, or structure, which would then be more susceptible to climate change and other effects and result in a proposed action's effects being more environmentally damaging. For example, a proposed action may require water from a stream that has diminishing quantities of available water because of decreased snow pack in the mountains, or add heat to a water body that is exposed to increasing atmospheric temperatures. Such considerations are squarely within the realm of NEPA, informing decisions on whether to proceed with and how to design the proposed action so as to minimize impacts on the environment, as well as informing possible adaptation measures to address these impacts, ultimately enabling the selection of smarter, more resilient actions.
>
> * * *
>
> Therefore, climate change adaptation and resilience — defined as adjustments to natural or human systems in response to actual or expected climate changes — are important considerations for agencies contemplating and planning actions with effects that will occur both at the time of implementation and into the future."[163]

The Council on Environmental Quality guidance makes clear that analyzing the impacts of climate change is not restricted to evaluating whether a project could itself exacerbate climate change. The magnifying and additive effects that climate change would cause on the resources affected by the project must also be evaluated. Potential impacts of climate change are discussed in Section H.11. of these comments.

In conducting the cumulative impacts assessment, it is not enough to simply catalog past actions. The DEIS instead must determine the specific impacts on the system, including the Apalachicola River, floodplain, and bay. The DEIS must also assess whether the past degradation of the system combined with the proposed alternative will significantly affect the ecological health and functioning of the Apalachicola River, floodplain, and bay.

While the DEIS provides some extremely general information on some past activities in the ACF basin, it fails to provide any meaningful insight into, or analysis of, the implications of those activities, when combined with the adverse impacts of the PAA. The cumulative impacts analysis makes just a single reference to the Apalachicola River, no reference to the Apalachicola River Floodplain, and only a passing reference to the Apalachicola Bay. *See* DEIS 6-208 to 6-212.

[159] Council on Environmental Quality, *Considering Cumulative Effects Under the National Environmental Policy Act* (January 1997) at 41 (emphasis added).
[160] *TOMAC, Taxpayers Of Michigan Against Casinos v. Norton,* 435 F.3d 852 (D.C. Cir. 2006) (quoting Grand Canyon Trust, 290 F.3d at 345); *Fritiofson v. Alexander*, 772 F.2d 1225, 1245 (5th Cir. 1985) (holding this level of detail necessary even at the less detailed review stage of an Environmental Assessment).
[161] *See, e.g.*, *LaFlamme v. F.E.R.C.*, 852 F.2d 389, 401-02 (9th Cir. 1988); *Natural Resources Defense Council v. Callaway*, 524 F.2d 79, 94 (2d Cir. 1975).
[162] *Resources Ltd., Inc. v. Robertson*, 35 F.3d 1300, 1306 (9th Cir. 1993).
[163] Council on Environmental Quality, Revised Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions (December 2014) (internal citations omitted); see Center for Biological Diversity v. Nat'l Hwy Traffic Safety Administration, 538 F.3d 1172, 1217 (9th Cir. 2008) (holding that analyzing the impacts of climate change is "precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct"); Center for Biological Diversity v. Kempthorne, 588 F.3d 701, 711 (9th Cir. 2009) (NEPA analysis properly included analysis of the effects of climate change on polar bears, including "increased use of coastal environments, increased bear/human encounters, changes in polar bear body condition, decline in cub survival, and increased potential for stress and mortality, and energetic needs in hunting for seals, as well as traveling and swimming to denning sites and feeding areas.").

These few references simply repeat the flawed, and unsupported conclusion that the PAA will have "little effect on the flow regime on the river" compared to the NAA. As a result, the DEIS concludes that

> "the PAA, or any of the other alternatives, would be expected to have a negligible incremental effect on the hydrodynamic regime, aquatic resources, and ecological function of the Apalachicola Bay estuary compared to the NAA. Any negligible changes to hydrodynamic conditions in the bay that would occur under the PAA would most likely be inconsequential compared to the cumulative effects of anticipated sea level rise on physical and ecological conditions in the estuary." DEIS at 6-211.

These generalized statements cannot satisfy the requirement to conduct a meaningful cumulative impacts assessment. In addition to being based on a conclusion regarding the effects of the PAA that is fundamentally flawed (as discussed throughout these comments), the cumulative impact assessment ignores a vast amount of critical information.

The following are just some of the many issues that must be examined in a legally adequate cumulative impacts assessment:

- The cumulative impacts to wetland resources, floodplain connectivity, and distributaries, and resulting impacts on species, in light of historic and ongoing management of the ACF system. This includes assessing the cumulative impacts of: river bed degradation, channel modifications for navigation purposes, sand deposition on river banks and in sloughs as a consequence of past navigation maintenance activities, extensive snagging operations, and decades of flow manipulation carried out under ACF system operations.

- The cumulative impacts in light of the historic extensive loss of wetlands in Florida. Between the 1780s and 1980s, Florida lost 46 percent of its wetlands and lost more acres of wetlands – 9.3 million acres – that any other state.

- The cumulative impacts of Glades Reservoir and other potential projects (e.g., Bear Creek Reservoir, South Fulton). Because the DEIS assumes that Glades Reservoir will be constructed to support water supply needs, the DEIS must examine the cumulative impacts of this project and other potential projects on the ACF system. Glades will impede basin inflow into Lake Lanier and increase evaporative losses in the watershed. This could potentially lead to additional triggering of drought operations and more frequent low flows downstream. The Corps has failed to explain how the hydrology of the ACF system would change in response to the inclusion of Glades and how the hydrological changes will impact ACF operations and subsequently the downstream ecosystem and communities.[164]

[164] As discussed in Section C above, the inclusion of the Glades Reservoir proposed for Hall County in the PAA and other alternatives is premature and unnecessary. The DEIS has no legitimate basis for assuming that the Glades Reservoir will in fact be needed, permitted, and constructed. The Glades Reservoir project has changed multiple times in terms of need, purpose, yield, and configuration over the past decade and the project and continues to be revised. Indeed, the Glades project contemplated in the Section 404 permit application currently before the Corps' Savannah District is substantially different from the project contemplated by the Mobile District in this DEIS. The Corps cannot base the future management of the ACF basin, which supplies water to three states, on a misplaced hope that an unnecessary reservoir is commissioned and completed at some point in the indeterminate future.

- The cumulative impacts of low flow conditions on water temperature and the resulting effects on species. Flow can cause significant changes in water temperature, which in turn can cause significant impacts on fish and wildlife. The DEIS concludes that the "climate change-adjusted water quality scenario displayed increased water temperature throughout the length of the ACF Basin." DEIS, Appendix N at N-7. The DEIS, however, fails to address or even comment on the direct or cumulative effects of such increased temperatures on fish and wildlife.

- The cumulative impacts of flow alterations and other actions on species abundance, areas of occupancy and potential extirpation from the region of influence, including whether, and at what point, additional significant changes in the flow regime could push species in the region to the point where they would not be able to recover (*i.e.*, to a "tipping point").

- The cumulative impacts of adding many additional years of man-made drought to the ACF system, an outcome that would be created by the PAA. The PAA would almost triple the amount of time the system is in drought operations and would trigger drought operations 22 times, as compared to just 3 times under the NAA (a 633 percent increase). Understanding these implication is critical since flow is the master variable for fluvial systems and hydrology is the master variable for wetland systems (including floodplain wetlands).

- The point at which the cumulative impact of repeated, extended, and/or additional low flows would push the Apalachicola system to its tipping point – the point at which it would be difficult or impossible for the River, floodplain, and/or bay to recover from the current degraded state.

- The cumulative impacts of climate change on species health and viability. *See, e.g.*, Section H.6. of these comments.

- The cumulative impacts of climate change, with a particular focus on climate change induced alterations to flow levels, water temperature, nutrient cycling, floodplain health, and other ecosystem functions that are critical to the health of the species that utilize the Apalachicola River, floodplain, and bay. For example, the reduction in the areal extent of floodplain inundation due to the Corps' current management of the ACF has already led to significant reduction in recruitment in the Apalachicola River forest canopy. Even small additional changes could lead to measurable negative changes in the river ecosystem. "Together, regional climate change and local water management practices have the potential to permanently alter the composition and functioning of many river ecosystems . . . ."[165] Potential impacts of climate change are discussed in more detail in Section H.11. of these comments.

- The cumulative impacts of reduced flows on the ecological health and productivity of the Apalachicola Bay. Evidence of the significance of these impacts includes the catastrophic collapse of the oyster fishery that led to the 2013 oyster fishery disaster declaration for the Apalachicola Bay. Even relatively small additional increases in drought conditions could cause significant ecological changes. As described by Pine et al (2015) the oyster "fishery now seems

[165] H.S. Galbraith, D.E. Spooner, C.C. Vaugh, Synergistic effects of regional climate patterns and local water management on freshwater mussel communities, Biological Conservation 143 (2010) 1175–1183 (available at http://vmpincel.ou.edu/download/publications/GalbraithetalBC10.pdf).

to be at a crossroads in terms of continued existence and possibly risks an irreversible collapse."[166] Other fisheries in the Bay have also been in severe decline.

The failure to conduct a full and meaningful assessment of cumulative impacts renders the DEIS grossly inadequate.

11. The DEIS Fails to Adequately Evaluate the Impacts of Climate Change

The DEIS fails to evaluate whether the impacts of climate change could exacerbate the adverse impacts of the PAA and other alternatives on the Apalachicola ecosystem and the species that rely on it. The DEIS also fails to assess whether the PAA or other alternatives would make the Apalachicola ecosystem and the species that rely on it less resilient to climate change.

The DEIS relies on a *USACE Institute for Water Resources ACF Climate Change Support Analysis* for its assessment of climate change. That *Climate Change Support Analysis* "generally assesses the capacity of the operations [of the PAA] to meet the congressionally authorized purposes of the ACF system of federal reservoirs under climate change-adjusted conditions." DEIS Appendix N at N-6. In other words, the DEIS and the *Climate Change Support Analysis* look at whether the agency will still be able to operate the system under the PAA as the climate changes.

While assessing whether the Corps will still be able to operate the ACF system using the PAA as the climate changes may be a useful analysis for the Corps, it is **not** the analysis that is required by NEPA. NEPA requires a careful assessment and consideration of whether the changes wrought by climate change could add to, amplify, or exacerbate impacts of the PAA or other alternatives.[167] Neither the *Climate Change Support Analysis* nor the climate change discussion in the DEIS satisfy these requirements.

The only reference to environmental impacts in the *Climate Change Support Analysis* is that it claims to make "a general appraisal of impacts to biological resources" using water quality as the only "analytic proxy." It then concludes that the "climate change-adjusted water quality scenario displayed increased water temperature throughout the length of the ACF Basin." DEIS Appendix N at N-6 and N-7. However, neither the DEIS nor the *Climate Change Support Analysis* discuss the impacts of this change on fish and wildlife.

[166] Pine, W. E., III, C. J. Walters, E. V. Camp, R. Bouchillon, R. Ahrens, L. Sturmer, and M. E. Berrigan, 2015. The curious case of eastern oyster *Crassostrea virginica* stock status in Apalachicola Bay, Florida. *Ecology and Society* **20**(3):46. http://dx.doi.org/10.5751/ES-07827-200346 (available at http://www.ecologyandsociety.org/vol20/iss3/art46/).

[167] *See Center for Biological Diversity v. Nat'l Hwy Traffic Safety Administration*, 538 F.3d 1172, 1217 (9th Cir. 2008) (holding that analyzing the impacts of climate change is "precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct" and that NEPA requires analysis of the cumulative impact of greenhouse gas emissions when deciding not to set certain CAFE standards); *Center for Biological Diversity v. Kempthorne*, 588 F.3d 701, 711 (9th Cir. 2009) (NEPA analysis properly included analysis of the effects of climate change on polar bears, including "increased use of coastal environments, increased bear/human encounters, changes in polar bear body condition, decline in cub survival, and increased potential for stress and mortality, and energetic needs in hunting for seals, as well as traveling and swimming to denning sites and feeding areas.").

Response to ACF234 – National Wildlife Federation

AR

AR. The PAA has been evaluated for adaptation to climate change in compliance with current USACE regulations (section 6.8 of the final EIS). Water management is an iterative process and decisions are made every day to address climate variability. Under the conditions referenced by the Third National Climate Assessment report of the U.S. Global Change Research Program, the operations in the proposed WCMs would be used to minimize the effects to fisheries in the ACF system by ensuring minimum flows and working with stakeholders to make releases in support of the health of the system, as has been done in the past through drought calls open to all stakeholders.

Importantly, neither the DEIS nor *Climate Change Support Analysis* address a host of additional critical issues. These include: the likely impacts of climate change on flow, water quantity, floodplain connectivity, floodplain soil moisture, salinity, and sea level rise. The DEIS and *Climate Change Support Analysis* also fail to address the resulting climate change-related impacts on fish, wildlife, and trees and other plants.

Moreover, the *Climate Change Support Analysis* contains a number of critical modeling flaws. First, it relies on data that is far too coarse to provide a meaningful assessment of climate change impacts. It runs an analysis only at the level of HUC 4, which has an average size of 16,800 square miles. The analysis should have been refined to the level of HUC 8 (having an average size of 700 square miles) or smaller in order to meaningfully assess the impacts of climate change. Second, it relies in part on the Unimpaired Flow Set, which has a number of problems that are discussed in Section H of these comments. Errors in the unimpaired flow set will be imbedded in the model used for the climate change analysis, and these errors are greatest at low flow conditions, which are the conditions of paramount concern for the ACF.

An appropriate climate change assessment should consider the potentially significant implications of the predicted changes in climate for the ACF Basin and the Apalachicola River, floodplain, and bay. For example, the Third National Climate Assessment provides the following assessment of the ACF Basin:

> "The Apalachicola-Chattahoochee-Flint River Basin in Georgia exemplifies a place where many water uses are in conflict, and future climate change is expected to exacerbate this conflict. The basin drains 19,600 square miles in three states and supplies water for multiple, often competing, uses, including irrigation, drinking water and other municipal uses, power plant cooling, navigation, hydropower, recreation, and ecosystems. **Under future climate change, this basin is likely to experience more severe water supply shortages, more frequent emptying of reservoirs, violation of environmental flow requirements (with possible impacts to fisheries at the mouth of the Apalachicola), less energy generation, and more competition for remaining water.** Adaptation options include changes in reservoir storage and release procedures and possible phased expansion of reservoir capacity. Additional adaptation options could include water conservation and demand management."[168]

The Third National Climate change assessment also highlights three critical areas of concern arising from climate change in the southeastern United States: sea level rise, increased temperatures, and decreased water availability.[169] Each of these is potentially significant for the Apalachicola ecosystem. For example:

- "A major consequence of climate change will be higher temperatures, including a significant increases in the number of hot days (95°F or above) and decreases in freezing events." This could have significant implications for water temperature, water levels, and wetland and

[168] Carter, L. M., J. W. Jones, L. Berry, V. Burkett, J. F. Murley, J. Obeysekera, P. J. Schramm, and D. Wear, 2014: Ch. 17: Southeast and the Caribbean. *Climate Change Impacts in the United States: The Third National Climate Assessment*, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 396-417, 406. doi:10.7930/J0N-P22CB. (available at http://nca2014.globalchange.gov/report/regions/southeast) (emphasis added).
[169] *Id*.

floodplain hydrology that should be fully analyzed in the DEIS.[170] Indeed, there is "a reasonable expectation that there will be reduced water availability due to the increased evaporative losses resulting from rising temperatures alone."[171]

- Increased temperatures could also cause greater forest disturbances due to climate-changed induced factors such as increased tree stress, shifting phenology, and altered insect and pathogen lifecycles.[172] Given the significance of the Apalachicola River Floodplain, the DEIS should look carefully at the cumulative impacts of these climate-changed induced impacts.

- Climate change is expected to lead to increased water withdrawals for agricultural irrigation and other uses and "increases in water demand by the energy, agricultural, and urban sectors will increase the competition for water, particularly in situations where environmental water needs conflict with other uses." [173] These impacts should be carefully considered in assessing the cumulative impacts of the PAA.

- Climate change is expected to increase changes in nutrient cycling with potentially significant cumulative impacts. The reduction in the areal extent of floodplain inundation has already led to significant reduction in recruitment in the forest canopy. Even small additional changes could lead to measurable negative changes in the river ecosystem and needs to be fully assessed. These impacts should be carefully considered in assessing the cumulative impacts of the PAA on the river ecosystem and the fish and wildlife that depend on it.

- Climate change may cause significant adverse impacts for the migratory species that utilize the ACF basin, and these impacts must be considered in evaluating the cumulative impacts of the proposed alternatives. Migratory birds are at particular risk from climate change. Migratory birds are affected by changes in water regime, mismatches with food supply, sea level rise, and habitat shifts, changes in prey range, and increased storm frequency.[174] As recognized by the United Nations Environment Program and the Convention on the Conservation of Migratory Species of Wild Animals:

  > "As a group, migratory wildlife appears to be particularly vulnerable to the impacts of Climate Change because it uses multiple habitats and sites and use a wide range of resources at different points of their migratory cycle. They are also subject to a wide range of physical conditions and often rely on predictable weather patterns, such as winds and ocean currents, which might change under the influence of Climate Change. Finally, they face a wide range of biological influences, such as predators, competitors and diseases that could be affected by Climate Change. While some of this is also true for more sedentary species, migrants have the potential to be affected by Climate Change not only on their breeding and non-breeding grounds but also while on migration."

[170] *Id*.
[171] *Id*.
[172] *Id*.
[173] *Id*.
[174] *Id*. at 42-43.

> "Apart from such direct impacts, factors that affect the migratory journey itself may affect other parts of a species' life cycle. Changes in the timing of migration may affect breeding or hibernation, for example if a species has to take longer than normal on migration, due to changes in conditions *en route*, then it may arrive late, obtain poorer quality breeding resources (such as territory) and be less productive as a result. If migration consumes more resources than normal, then individuals may have fewer resources to put into breeding . . . ."
>
> * * *
>
> "Key factors that are likely to affect all species, regardless of migratory tendency, are changes in prey distributions and changes or loss of habitat. Changes in prey may occur in terms of their distributions or in timing. The latter may occur though differential changes in developmental rates and can lead to a mismatch in timing between predators and prey ("phenological disjunction"). Changes in habitat quality (leading ultimately to habitat loss) may be important for migratory species that need a coherent network of sites to facilitate their migratory journeys. Habitat quality is especially important on staging or stop-over sites, as individuals need to consume large amounts of resource rapidly to continue their onward journey. Such high quality sites may [be] crucial to allow migrants to cross large ecological barriers, such as oceans or deserts."[175]

- Climate change may also cause significant impacts to the fish and wildlife that rely on the Apalachicola Bay and these impacts must be considered in evaluating the cumulative impacts of the proposed alternatives. Climate change induced impacts to ocean species include changes to both geographical range and seasonal phrenology (timing of migration, flowering, spawning, and larval recruitment) are occurring at levels that far exceed the rate of such changes for land species. Climate change also facilitates the spread of highly invasive marine species.

  For example, a 2011 study published in *Science,* concludes that average geographical range shifts for marine communities due to climate change over the past 50 years are from 1.4 to 28 km per decade—or 0.9 to 17.4 miles per decade.[176] Shifts in seasonal timing for marine species are advancing an average of 4.3 days per decade in the oceans.[177] This study also concludes that range shifts in the ocean are from 1.5 to 5 times faster than range shifts on land, likely due to the more homogeneous nature of surface water temperature changes in the ocean than on land, and shifts in the timing of spring temperatures were 30 to 40% faster in the ocean than on land (from 1960–2009).[178] A 2010 study published in *Global Ecology and Biogeography* also concludes that range shifts occurred much faster in marine systems than terrestrial systems, and

[175] UNEP/CMS Secretariat, Bonn, Germany, Migratory Species and Climate Change: Impacts of a Changing Environment on Wild Animals (2006) at 40-41 (available at http://www.cms.int/publications/pdf/CMS_CimateChange.pdf).
[176] Michael T. Burrows, Schoeman D.S., Buckley L.B., et al, The Pace of Shifting Climate in Marine and Terrestrial Ecosystems. Science, Vol 334: 652-55 (Nov. 4, 2011).
[177] *Id*.
[178] *Id*.

noted that most of the species documented as shifting their range were coastal species.[179] A 2009 study published in *Fish and Fisheries*, projected a climate-change induced range shift for marine fish and invertebrates of "45–59 km per decade"—or 28 to 37 miles per decade.[180]

- Climate change also facilitates the spread of invasive species, and these impacts must be considered in evaluating the cumulative impacts of the proposed alternatives. A 2002 study published in the Proceedings of the National Academy of Sciences that looked at invasive marine species concludes that "the greatest effects of climate change on biotic communities may be" to "facilitate a shift of dominance by nonnative species, accelerating the homogenization of the global biota."[181] This report also concludes that the greatest effects of climate change on biotic communities may be due to changing maximum and minimum temperatures rather than annual means.[182]

The Corps should completely redo its climate change assessment to address the types of concerns raised in these comments and should ensure that it uses the most up to date climate science in this new review.

12. The DEIS Fails to Adequately Evaluate the Risk of Disproportionate Impacts to Low Income and Minority Communities

AS

The DEIS fails to assess the environmental justice impacts of the proposed alternatives on communities in Florida. Executive Order 12898 requires that each Federal agency achieve environmental justice by identifying and addressing disproportionately high adverse human health or environmental effects of federal activities on minority and low-income populations.

John Moran, a PhD candidate in the Department of Anthropology at Stanford University, provided the following comments on this critical issue in his November 9, 2015 comment letter to the Corps regarding the DEIS:

> "The threat of collapse of the oyster industry is an environmental justice issue in Eastpoint, qualifying under low-income community. The oystermen of Eastpoint and Apalachicola are widely recognized in Florida by journalists, travel writers, authors, and social science researchers as a distinct cultural group. This increasingly low-income, often multi-generational population of resource users also relies on subsistence to supplement their diets. The oystermen are facing

[179] Cascade J. B. Sorte, S.L. Williams and J.T Carlton, Marine range shifts and species introductions: comparative spread rates and community impacts**,** Global Ecology and Biogeography (2010) 19, 303–316. The study defines range shifts "as any changes in the distributions of native species that are not directly human mediated." The study also concludes that "[r]ange shifts of native species and introductions of non-native species are analogous in that both are fundamentally biological invasions, involving the movement of individuals from a donor community into a recipient community." A copy of this study is attached to these comments.
[180] William W.L. Cheung, V.W.Y. Lam, J.L. Sarmiento, K. Kearney, R. Watson and D. Pauly, Projecting global marine biodiversity impacts under climate change scenarios, Fish and Fisheries, 10, 235–251 (2009).
[181] John J. Stachowicz, Terwins J.R., Whitlatch R.B., Osman R.W., Linking climate change and biological invasions: Ocean warming facilitates nonindigenous species invasions, Proceedings of the National Academy of Sciences (PNAS) Vol. 99, No 24: 15497–15500 (November 26, 2002) available at www.pnas.org_cgi_doi_10.1073_pnas.242437499. A copy of this study is attached to these comments.
[182] *Id*.

Response to ACF234 – National Wildlife Federation

AS. Pertinent information from this comment has been incorporated into the environmental justice discussion in the EIS (in sections 2.6.10 and 6.6.8). The EIS indicates that implementing the PAA would have no effect on the Apalachicola Bay ecosystem and commercial fishing/oyster harvesting activities as compared to the NAA. Accordingly, the PAA would not be expected to have an incremental adverse effect on the community.

suicide, homelessness, drug addiction, and other social ills related to resource disaster in the Apalachicola Bay. Some of the oystermen have indigenous heritage. Other oystermen are illiterate and have limited schooling. Professional oral historians, such as Amy Evans for the Southern Foodways Alliance at the University of Mississippi, have documented this unique cultural heritage, including the local invention and manufacture of tongs, the local ecological knowledge of the community, and the transmission of this knowledge across multiple generations, leading back to the first wave of settlers in the community. Based on my training in environmental justice literature at Stanford University's Department of Anthropology, I testify that the oystermen population in Eastpoint are a low-income community whose economic and social health is totally inseparable from the Apalachicola Bay. The need of their community for a functioning estuary must be considered and assessed through an environmental justice framework using quantitative and qualitative data at the municipal, rather than regional, level."

The DEIS must analyze these important environmental justice impacts.

13. The DEIS Fails to Evaluate Impacts to Ecosystem Services

AT

The DEIS fails to provide any assessment of ecosystem services that will be lost as a result of the PAA or other alternatives. Ecosystem services valuations are well recognized as providing important information for decision makers.

The importance of ecosystem services valuation is made clear in the 2013 *Principles and Requirements for Federal Investments in Water Resources* and *Interagency Guidelines* (collectively, the PR&G). The PR&G focus extensively on the importance of evaluating the value of ecosystem services lost and gained during project planning. While the Conservation Organizations recognize that the Corps is not yet utilizing the PR&G, the Corps should nevertheless evaluate the impacts on ecosystem services.

The Apalachicola River and Bay provide an estimated $5 billion in free ecosystem services, including clean water, flood protection, and fish and wildlife habitat. Understanding the impacts to these services is critical for assessing the true impacts of alternatives.

The Conservation Organizations urge the Corps to contract with an organization expert in conducting ecosystem services valuations to properly account for the ecosystem services that will be lost to the project.

J. The DEIS Fails to Comply with Federal Mitigation Requirements

AU

The DEIS must fully assess the adverse impacts of the project and include mitigation for those adverse impacts. The DEIS states that no mitigation is required for the PAA. This is fundamentally incorrect both as a matter of law and science.

First, the Corps must provide mitigation for all fish and wildlife impacts that are more than "negligible." The DEIS itself recognizes that these impacts exist. The IEPR Panel Final Report states that the "conclusion that specific compensatory mitigation measures would not be required for the PAA in resource areas where substantial adverse effects and slightly adverse effects were identified is not

Response to ACF234 – National Wildlife Federation

AT. The referenced guidance applies to federal investment in water resources planning efforts. This EIS is not a water resources planning study. It supports an operational update to the WCMs in light of current conditions and applicable laws.

AU. USACE has consulted with representatives of the State of Florida, who provided comments during numerous scopings and the public comment process. Because the PAA would have insignificant impacts compared to the NAA (current reservoir operations), as described in the EIS, no mitigation is required.

supported." The IEPR Panel also found that the "conclusion that no mitigation would be required for the PAA is contrary to the results of the effects analysis." IEPR Panel Final Report at 17.

Second, the Corps must meaningfully assess the full extent of the harm to fish and wildlife as a result of the direct, indirect, and cumulative impacts of the project. As discussed throughout these comments, the DEIS abjectly fails to assess project impacts. Once the DEIS properly assesses project impacts, the Corps must develop a specific plan to mitigate those fish and wildlife losses – and include that plan in the DEIS. The mitigation carried out under that plan must then be monitored until it can be demonstrated that the mitigation has been ecologically successful. The detailed mitigation requirements are discussed below.

The Water Resources Development Acts require that the Corps mitigate all losses to fish and wildlife created by a project unless the Secretary determines that the adverse impacts to fish and wildlife would be "negligible." 33 U.S.C. § 2283(d)(1). To ensure that this happens, the Corps is prohibited from selecting a "project alternative in any report" unless that report includes a "specific plan to mitigate fish and wildlife losses." *Id*. Accordingly, the DEIS must include a specific mitigation plan.

Corps mitigation plans must ensure that "impacts to bottomland hardwood forests are mitigated in-kind and harm to other habitat types are mitigated to not less than in-kind conditions, to the extent possible." 33 U.S.C. § 2283(d)(1). Mitigation plans "shall include, at a minimum:"

1. The type, amount, and characteristics of the habitat being restored, a description of the physical actions to be taken to carry out the restoration, and the functions and values that will be achieved;
2. The ecological success criteria, based on replacement of lost functions and values, that will be evaluated and used to determine mitigation success;
3. A description of the lands and interest in lands to be acquired for mitigation, and the basis for determining that those lands will be available;
4. A mitigation monitoring plan that includes the cost and duration of monitoring, and identifies the entities responsible for monitoring if it is practicable to do so (if the responsible entity is not identified in the monitoring plan it must be identified in the project partnership agreement that is required for all Corps projects). Corps mitigation must be monitored until the monitoring demonstrates that the ecological success criteria established in the mitigation plan have been met; and
5. A contingency plan for taking corrective action in cases where monitoring shows that mitigation is not achieving ecological success as defined in the plan. 33 U.S.C. § 2283(d).

Corps mitigation plans must also comply with the "the mitigation standards and policies established pursuant to the regulatory programs" administered by the Corps. 33 U.S.C. § 2283(d).

Corps mitigation must be monitored until the monitoring demonstrates that the ecological success criteria established in the mitigation plan have been met. The Corps is also required to consult yearly on each project with the appropriate Federal agencies and the states on the status of the mitigation efforts. The consultation must address the status of ecological success on the date of the consultation, the likelihood that the ecological success criteria will be met, the projected timeline for achieving that success, and any recommendations for improving the likelihood of success. 33 U.S.C. § 2283(d).

In addition, mitigation lands for Corps civil works projects must be purchased before any construction begins. 33 U.S.C. § 2283(a). Any physical construction required for purposes of mitigation should also be undertaken prior to project construction but must, at the latest, be undertaken "concurrently with the physical construction of such project." *Id.*

K. The DEIS and PAA Are At Odds with Longstanding Federal Policy

AV

The DEIS and PAA are at odds with at least the following longstanding Federal policies that require and/or promote protection of the nation's waters and floodplains.

The National Water Resources Planning Policy: The National Water Resources Planning Policy states that: "It is the policy of the United States that all water resources projects" are to, among other things, "protect[] and restor[e] the functions of natural systems and mitigat[e] any unavoidable damage to natural systems."[183] The PAA violates this policy because it would harm, not protect and restore, the functions of the Apalachicola River, floodplain, and bay.

National Wetlands and Floodplain Policies: A broad array of federal laws and policies promote protection of the nation's remaining wetlands and floodplains and restoration of those resources to reverse historic wetland losses. Such Federal laws include, the Clean Water Act; the 1985 and 1990 Farm Bills; the Emergency Wetlands Protection Act of 1986; the Water Resources Development Acts of 1986, 1992, and 1996; the Agriculture Credit Act of 1987; the Conservation Reserve Program; the Food Security Act of 1992; the Wetlands Reserve Program (WRP); and the Federal Agriculture Improvement and Reform Act of 1996. Longstanding Executive Orders also call for the protection of wetlands and floodplains. For example:

- Executive Order 11990 (Protection of Wetlands) directs each federal agency to provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values in carrying out agency policy.

- Executive Order 11988 (Floodplain Management) directs each federal agency to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains; to avoid direct and indirect support of floodplain development wherever there is a practicable alternative; and "to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities."

- The Water Resources Development Act of 1990 establishes a wetlands protection goal for Corps civil works projects. That Act establishes "an interim goal of no overall net loss of the Nation's remaining wetlands base, as defined by acreage and function, and a long-term goal to increase the quality and quantity of the Nation's wetlands, as defined by acreage and function." 33 U.S.C. § 2317(a)(1). That Act further established "environmental protection as one of the primary missions of the Corps of Engineers in planning, designing, constructing, operating, and maintaining water resources projects." Water Resources Development Act of 1990, 33 U.S.C. § 2316(a) (emphasis added).

[183] 42 USC § 1962–3.

Response to ACF234 – National Wildlife Federation

AV. USACE has complied with all applicable laws and guidance in updating the Master WCM.

The PAA is at odds with Executive Order 11990 (Protection of Wetlands) and Executive Order 11988 (Floodplain Management), and works against the goals and initiatives designed to protect and restore wetlands and floodplains. The PAA will add to – not reverse – historic wetland losses.

National Climate Change Policies: The scientific recognition of our changing climate has led to federal policies requiring greater consideration of the effects of climate change on federal infrastructure investment and planning. On November 13, 2013 the President issued an Executive Order entitled "Preparing the United States for the Impacts of Climate Change." Among other things, this Executive Order requires federal agencies to "complete an inventory and assessment of proposed and completed changes to their land- and water-related policies, programs, and regulations necessary to make the Nation's watersheds, natural resources, and ecosystems, and the communities and economies that depend on them, more resilient in the face of a changing climate" and in recognition of "the many benefits the Nation's natural infrastructure provides" directs agencies to focus on program and policy adjustments that promote the dual goals of greater climate resilience and carbon sequestration where possible. The PAA works against these critical policies and goals by, among other things, significantly undermining the resiliency and sustainability of fish and wildlife populations by imposing an artificial, environmentally damaging flow regime.

Army Corps of Engineers Climate Change Adaptation Policy: The June 2014 *USACE Climate Preparedness and Resilience Policy Statement* directs the Corps to integrate climate change preparedness and resilience planning and actions into the DEIS. This policy requires the Corps to "mainstream climate change adaptation in all activities to help enhance the resilience of our built and natural water-resource infrastructure and military missions reduce their potential vulnerabilities to the effects of climate change and variability. Mainstreaming means to integrate and incorporate climate change and variability considerations for missions and operations in all phases of the project lifecycle for both new and existing projects." The DEIS violates this policy because it fails to increase the resiliency of the natural environment and instead significantly undermines such resiliency.

/

/

/

/

/

/

/

/

/

/

L. Conclusion

As discussed above, the Conservation Organizations strongly oppose the PAA and urge the Corps to develop and select an alternative that: (1) mimics the amount, timing, and variability of natural flows to the Chattahoochee and Apalachicola Rivers, to the maximum extent practicable; (2) restores river reaches where bed degradation or other changes are causing lower water levels; and (3) makes use of tools such as a drought indicator index, real-time weather forecasting, and/or satellite imagery to adapt operations to actual weather conditions.

In developing this alternative, the Corps should carry out the scientific evaluations discussed throughout these comments, and address the many legal and scientific deficiencies discussed throughout these comments. The Conservation Organizations urge the Corps to respond to, and fully adopt, the recommendations made throughout these comments.

Respectfully submitted,

Melissa Samet
Senior Water Resources Counsel
National Wildlife Federation
83 Valley Road
San Anselmo, CA 94960
sametm@nwf.org

Manley K. Fuller
President
Florida Wildlife Federation
PO BOX 6870
Tallahassee, FL 32301
wildfed@gmail.com

Dan Tonsmeire
Riverkeeper
Apalachicola Riverkeeper
23 Avenue D
Apalachicola, FL 32328
dan@apalachicolariverkeeper.org

Ryan Smart
President
1000 Friends of Florida
308 N. Monroe Street
Tallahassee, FL 32301
rsmart@1000fof.org

cc:
The Honorable Jo-Ellen Darcy, Assistant Secretary of the Army (Civil Works)
Lieutenant General Thomas P. Bostick, USACE Commander General and Chief of Engineers
Brigadier General David Turner, USACE Commander, South Atlantic Division
The Honorable Christy Goldfuss, Managing Director, Council on Environmental Quality
The Honorable Bill Nelson, United States Senator
The Honorable Marco Rubio, United States Senator
The Honorable Gwen Graham, United States Representative

Attachment A

Conservation Organization Comments on the October 2015 Draft 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

Sent Via Email on
January 14, 2013

January 14, 2013

Colonel Steven J. Roemhildt
Mobile District, USACE
P.O. Box 2288
Mobile, Alabama 36628

Dear Colonel Roemhildt:

Below are comment on the updating of the Corps of Engineers (COE) Water Control Manuals and plans for the federal reservoirs in the Apalachicola-Chattahoochee-Flint River Basin (ACF) per the October 12, 2012 announcement. In part, these comments are based on review of the HEC ResSim simulations utilizing the "IMProved" operations as described in the 2012 report entitled "Apalachicola-Chattahoochee-Flint (ACF) Remand Technic al Modeling Report" (Remand Report). These simulations were run in support of modifying the May 2012 Revised Interim Operating Procedures by incorporating the changes specified in the Improved Operations. The Improved Operations were released in June 2012, just one month after the May 2012 RIOP was approved by the U.S. Fish and Wildlife Service and became effective. Subsequently, the COE announced the reopening of the scoping process for updating the Water Control Manuals. The updated manuals will supersede the interim operating procedures.

It is assumed that the June 2012 "IMProved" operations reflect the modifications to the Water Control Manuals that are currently preferred by the COE. Therefore the comments below are primarily directed at the operations described in the June Remand Report, the simulations of the alternatives described on page 44 of the report and the adequacy of the HEC ResSim model used for the simulations. Comments on the June 2012 operations transmitted by letter of August 10, 2012 to Mr. Curtis Flakes, Mobile District and comments on the May RIOP transmitted by letter to Dr. Donald W. Imm, Panama City Field Office, U.S. Fish and Wildlife Service are included by reference as part the comments provided herein.

As stated in my previous letters, the May RIOP for the reservoirs and the June 2012 recommended reservoir operations are a de facto interstate allocation of the water in the ACF basin. The reservoir operations effectively prioritize water use in the ACF basin with releases to Apalachicola River having a lower priority than water demands in Georgia and refilling the federal reservoirs. The latter is especially beneficial to Lake Lanier since it contains significantly more active (useable) storage capacity than the combined active storage of West Point Lake, Lake Walter F. George and Lake Seminole.

Each version of the interim operating procedures have included a component covering releases to Apalachicola River during non-drought periods and a separate component describing releases during "drought". During non-drought periods, releases to Apalachicola River are specified in a table which lists the release requirement at different times of the year based on the combined volume of water stored in Lake Lanier, West Point Lake and Lake Walter F. George ("composite storage") and the basin inflow. In addition to the release requirement for Apalachicola River, the table also specifies the amount of the basin inflow that is available for reservoir storage. Attachment 1 is June 2012 Improved Interim Operations table of releases to Apalachicola River (=water releases from Jim Woodruff Dam).
Each version of the interim operating procedures also describes the releases to Apalachicola River during "drought" periods, as defined by the COE. These are described as the Emergency Drought

Operations (EDO). During drought, all releases to the river are suspended except for a daily release of 5,000 cfs. The COE's definition of drought and the trigger for reducing releases to Apalachicola River is based solely on the composite storage remaining in the upper three federal reservoirs (Lake Lanier, West Point Lake and Lake Walter F. George). Drought operations are triggered when the composite reservoir storage declines to the top of composite Zone 4. If composite storage declines to the top of a COE specified "Drought Zone", the required release to Apalachicola River is further reduced from 5,000 to 4,500 cfs. Under the recommended "Improved" Operations the release restriction to Apalachicola River remains in effect until the composite storage of the federal reservoirs is refilled to the top of Zone 2 or an average of 86% of full capacity (see below for refill requirement by month).

The Apalachicola-Chattahoochee-Flint River Basin interstate dispute has been ongoing for over 20 years. The dispute has always focused on how water is to be allocated under low flow conditions. At moderate to high flows there is sufficient water to meet all demands in the basin, maintain the reservoirs at or near full capacity and provide adequate freshwater inflow for the protection and preservation of Apalachicola River and Bay. Therefore, the comments below are primarily directed at the impact of reservoir operations on releases to Apalachicola River (and ultimately to Apalachicola Bay) during low flows.

The last of the federal reservoirs (West Point Lake) was filled and began operations in late 1975. Most comments are based on analysis and comparison of the actual flows, releases, reservoir levels, etc. with the COE model simulations for the period beginning January 1, 1976. This allows a direct comparison of observed data with the COE simulations of flow alterations due to the Improved Interim Operations and increasing water demands in Georgia. Finally, the COE simulations end on December 31, 2008. Therefore, comparison of observed data with the simulations utilize the period from January 1, 1976 to December 31, 2008.

HEC ResSim Simulations

The COE ResSim model of the ACF will undoubtedly have an important role in the revision of the Water Control Manuals and reservoir releases that will directly impact Apalachicola River and Bay. The model, however, has not been calibrated nor have simulations been made comparing the model results with observed data on reservoir levels or streamflow measured at U.S. Geological Survey monitoring stations. Likewise, no sensitivity analysis or systematic error analysis have been performed. As a result, no objective measures or analysis are available demonstrating that the model can accurately reproduce observed flows and reservoir levels that occurred in the past. This is an essential component in the development of any hydrologic model and especially for a model used to predict future flows and reservoir levels/storage in a large, complex basin such the ACF. If the model cannot replicate flows and reservoir levels that occurred in the past, then it cannot be expected to accurately predict future impacts resulting from new reservoir operations and increased demands. The lack of validation is a serious deficiency in the development of the current model especially given the importance of the modeling for updating the Water Control Manuals and examining the impact the changes in operating procedures will have on the future of Apalachicola River and Bay.

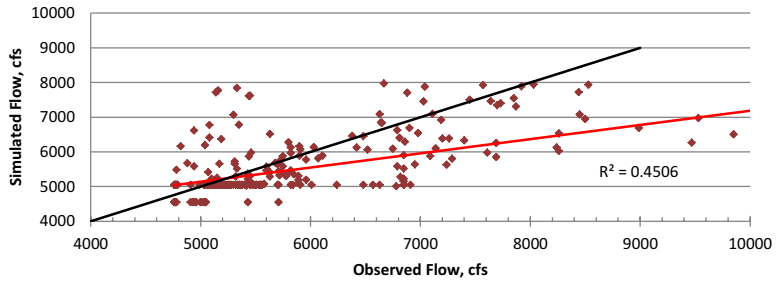
Although no systematic calibration and verification of the model has apparently been performed, there is a short period in the simulation entitled "Baseline" which corresponds to the actual operating procedures for the reservoirs in 2008 and part of 2007. These same procedures were in use until adoption of the May 2012 RIOP, however, the unimpaired flow data set needed for the ResSim modeling stops on December 21, 2008. Nevertheless, even this short record can at least provide some insight on the simulated versus observed flows. This is especially useful for examining the predictive capability of the model during low flow periods.

Previous analysis suggests that the COE began operating the reservoirs in a manner similar to the original Interim Operating Procedures in 2007. This is confirmed by correspondence transmitting comments by the Northwest Florida Water Management District to the Mobile District COE and U.S. Fish and Wildlife Service on the impact of the 2007 interim procedures on inflows to Apalachicola River. Specifically, the impacts examined were associated with the U.S. Fish and Wildlife Service February 28, 2007 approval of the COE request to operate the federal reservoirs under "Concept 5" of the Interim Operating Procedures as requested by the COE on February 27, 2007.

In 2007 the COE began operating the reservoirs under the first version of the Interim Operating Procedures. As a result, during the low flow event in 2007 releases from Lake Seminole were limited to 5,000 cfs and closely matched the simulated flows for the interim operations approved in February 2007. The 2012 COE simulation of the Baseline alternative also limited releases during this period to 5,000 cfs. Therefore, the actual releases from Lake Seminole during this period followed the requirements of the 07 interim procedures. In contrast, the low flow periods in 2001, 2002 and 2006 occurred prior to the 2007 IOP and formalization of the 5,000 cfs release limit. As a result, during the 2001-2002 drought the releases were generally much greater than 5,000 cfs. Therefore, during the period from mid-2007 through the end of 2008 the actual reservoir operations should be similar to the 2012 simulation of the "Baseline" alternative performed by the COE for the "Remand" report. The 07/08 period, therefore, can be used to examine how well the ResSim Model simulated flows match the observed flows.

Figure 1 illustrates a standard calibration plot of the 2012 "Baseline" simulated flows versus the observed flows during low flow periods (i.e., flows ≤8000 cfs). The line at a 45 degrees angle from the x and y axis represents an exact match between the observed and simulated flows. These plots are intended as a check on whether the simulated flows accurately replicate the observed flows.

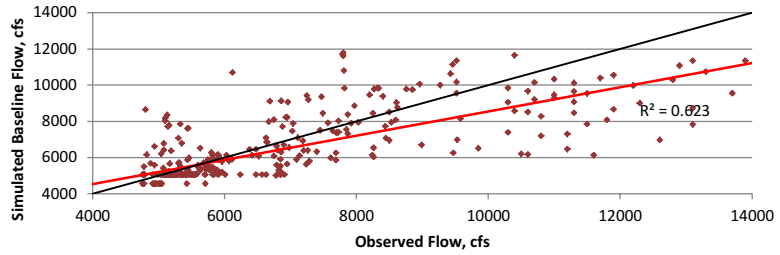
Figure 1. -- 2007-08 Baseline Simulated Flow<=8,000 cfs versus Observed Flow.



As illustrated, under low flow conditions the simulated flows are not well correlated with the observed flows. The linear regression trend line is significantly skewed from the line representing and exact match of simulated versus observed flows. In addition, the value of R^2=0.45 means only 45% of the variation in the simulated flow is accounted for by the linear regression with the observed flow. The Correlation Coefficient of R=0.67 means the simulated and observed flows are only weakly correlated. The "Baseline" model, therefore, does not accurately reproduce releases of 8,000 cfs or less to Apalachicola River in 2007-08 even though the Baseline operations were in use during this period.

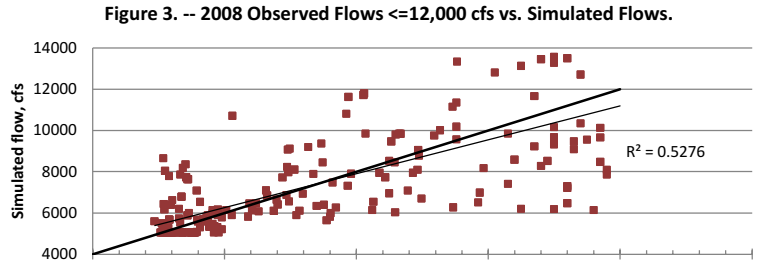
Figure 2 illustrates the actual flow (reservoir releases) in 2007-08 when the simulated releases were 12,000 cfs or less. Again, observed flows vary over a wide range when the simulated flows are less than 12,000 cfs. The trend line deviates considerably from the line representing a one to one correspondence between the observed and simulated flows. In addition, the correlation coefficient is weak and only about 62% of the variance of the simulated flows is accounted for by observed flows. The model, therefore, does not very accurately replicate the releases that reservoir operators actually made in 2007-08. Significantly, when the actual releases were at or near 5,000 cfs, the simulated flows were generally higher suggesting the model is augmenting extreme low flows to a greater extent than actually occurred (i.e., the model understates the occurrence of flows at or slightly above 5,000 cfs).

Figure 2. -- 2007-08 Baseline Simulated Flow <=12,000 cfs versus Observed Flow, 2007-08.



Similar patterns are evident in a comparison of Observed and simulated low flows in 2008 (Figure 3). The actual reservoir operator releases were less than the model when flows were at 5,000 cfs but were greater than the model releases at flows up to 12,000 cfs. Generally, the model does not perform well in reproducing the actual low flow releases to Apalachicola River that occurred in 2008.

Figure 3. -- 2008 Observed Flows <=12,000 cfs vs. Simulated Flows.



The releases to Apalachicola River under the "Improved" operations are specified in a single table (see Attachment 1) along with a brief description of releases during "Emergency Drought Operations". The reservoir operators, however, have considerable discretion in making releases to Apalachicola River.

The ResSim simulations, however, cannot accurately replicate or predict the release decisions by the operators.

The model simulations require a complex decision tree of releases based on assumed water supply needs, hydropower production, reservoir balancing and many others. Unless specified in the updated Water Control Manual the operators will not follow the operations used for the simulations. As a result, actual releases to Apalachicola River may (and likely will) differ significantly from the simulations. This reinforces the need for a rigorous examination of the accuracy and adequacy of the model simulations in predicting future releases to Apalachicola River, the composite storage of the reservoirs, reservoir levels, etc. This should include simulations that examine worst case scenarios in which operators release only the minimum required flow to Apalachicola River during drought periods.

On a related matter, the COE operated the reservoirs under variations of the interim operating procedures for the period from 2009-2012. The "Unimpaired Flows", therefore, should be updated through 2012 to allow simulation of this additional period of interim reservoir operations.

Calculation of Basin Inflow and Provision of 100% of Current and Future Demands in the Georgia Portion of the Basin

The 2007/08 and subsequent interim operations use basin inflow and composite reservoir storage as the basis for determining releases to Apalachicola River and the flows that will be diverted to storage in the reservoirs. The computational method used by the COE to determine basin inflow, however, fails to account for withdrawals of water for consumptive demands. These are primarily in Georgia and include direct surface water withdrawals from Lake Lanier, direct surface withdrawals from the Chattahoochee River and the Flint River and streamflow losses resulting from ground water withdrawals in the Flint River Basin. Therefore, the COE's calculated basin inflow is actually the hydrologic inflow minus Georgia's consumptive withdrawals. As a result, the releases to Apalachicola River during non-drought periods are determined only after 100% of Georgia water demands are met both now and in the future. Currently, these withdrawals exceed 1,000 cfs in net loss of flow during some periods each year and are generally highest during the summer dry season.

The Georgia consumptive demands always "come off the top" of the actual hydrologic inflow. Only the remainder is the "Basin Inflow" used by the COE in allocating water to reservoir storage and releases to Apalachicola Bay. As a result, the basin inflow available for release to Apalachicola River during non-drought periods will continuously decline as the Georgia demands increase. Effectively, therefore, the past and current Interim Operating Procedures and the recommended "Improved" procedures make Georgia water demands the highest allocation priority in the ACF Basin.

The methodology for computing basin inflow creates a fundamental inequity between water for Georgia's consumptive water demands and releases of water into Florida for Apalachicola River and ultimately Apalachicola Bay. The updating of the Water Control Manuals should eliminate this inequity and use the true hydrologic Basin Inflow for determining releases to Apalachicola River during non-drought periods.

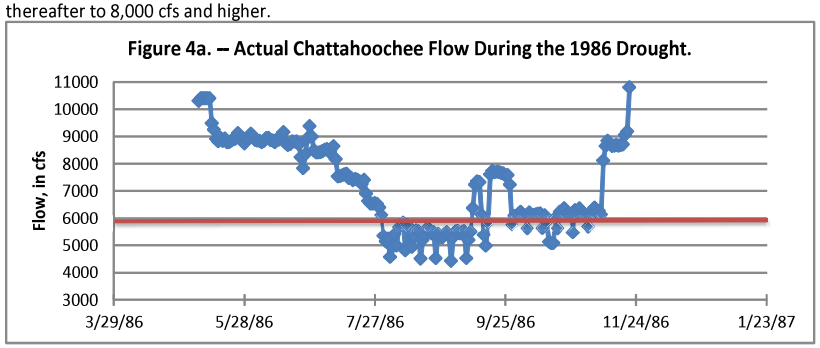
As noted in my July 20, 2012 letter to Dr. Donald W. Imm of the U.S. Fish and Wildlife Service, approximately 500 cfs of inflow to the Apalachicola River was lost when the COE changed from using the outflow from Jim Woodruff Dam to measure compliance with the 5,000 cfs minimum flow to using the U.S.G.S. streamflow station on the Highway 90 Bridge near Chattahoochee, Florida. This change resulted in a loss of inflow to the Apalachicola River during low flow periods. During the 2000/02 drought event, the COE measured compliance using the discharge from Woodruff. During the 2006/08

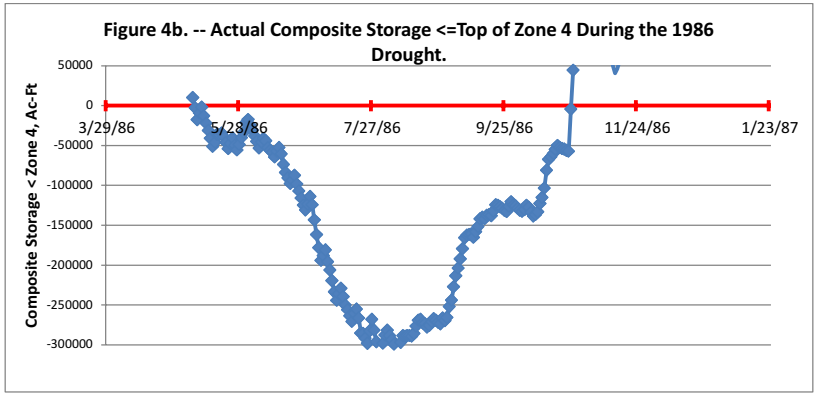
drought the COE was using the Chattahoochee streamflow station to measure compliance with the 5,000 cfs minimum. When the streamflow station was at or slightly above 5,000 cfs, the measured Woodruff discharge was significantly below this value from 1999 to 2002. Unfortunately, the COE did not reset the minimum from 5,000 cfs at Woodruff to the higher corresponding flow at the USGS streamflow station. Instead the COE simply equated the Woodruff discharge to the gage flow and thereby reduced the actual inflow to the river. Based on the Chattahoochee streamflow station, the loss in flow was on the order of 500 cfs (+/-). The loss of inflow to Apalachicola River, of course, reduced reservoir releases by an equivalent amount which aided the COE in conserving reservoir storage. Additional detail on this matter is provided in the July 2012 letter to Dr. Imm referenced above.

The determination of the impacts of modifications to the Water Control Manuals and modeling should account for this change in measurement of inflow to ensure the actual impacts to Apalachicola River are fully represented.

Increased Occurrence of "Drought" Operations and Restricted Inflows to Apalachicola River

Before the COE began operating the federal reservoirs under interim procedures in 2007, releases to Apalachicola River during droughts were determined on a case-by-case basis depending on the severity of the drought. Generally, releases to Apalachicola River were reduced to 5,000 cfs (+/-) when composite storage reached the top of Zone 4. Releases were then increased when the composite storage recovered to the top of Zone 4 or slightly above. This was the case during the 1981, 1986, 1988 and 2000 drought periods. In the 1988 drought, releases to Apalachicola River actually remained above 6,500 cfs for approximately two months after composite storage declined below the top of Zone 4 and was reduced to 5,000 cfs for a comparatively short period. In 2000, inflows were reduced to approximately 5,000 cfs just prior to composite storage reaching the top of Zone 4 but were then increased to 6,000 cfs for the next 1-2 months even though composite storage remained below Zone 4. Inflows were then increased to 7,000 cfs and higher when composite storage increased above Zone 4. Figures 5a and 5b illustrate the COE releases to Apalachicola River and the composite reservoir storage during the 1986 drought. Over the five month period during which the composite storage was below Zone 4, the releases to Apalachicola River were at or above 6,000 cfs for four of the five months. When composite storage recovered above the top of Zone 4, inflows to Apalachicola River increased shortly thereafter to 8,000 cfs and higher.





Beginning in 2007, the COE formalized conditions under which "Emergency Drought Operations (EDO) would automatically take effect when the composite storage of the reservoirs declined below the bottom of composite zone 4. The EDO was subsequently modified in the2008 and May 2012 interim procedures. The June 2012 recommended additional to the EDO in comparison to the May 2012 procedures. In all cases the start and end of emergency operations is based solely on the composite storage of the reservoirs. During the emergency operations, the COE suspends normal operations which provide for increased releases to Apalachicola River depending on the basin inflow, time of year and composite reservoir storage. During drought operations the required release to Apalachicola River is reduced to 5,000 cfs. The COE also defined a composite storage Drought Zone. If composite storage drops below the top of the drought zone, the required release to Apalachicola River is reduced from 5,000 to 4,500 cfs.

Each succeeding version of the interim procedures has increased the frequency and duration of Emergency Drought Operations during which the required release to Apalachicola River is 5,000 or 4,500 cfs. As outlined below, the COE has progressively increased the composite reservoir refill requirement at the expense of releases to Apalachicola River.

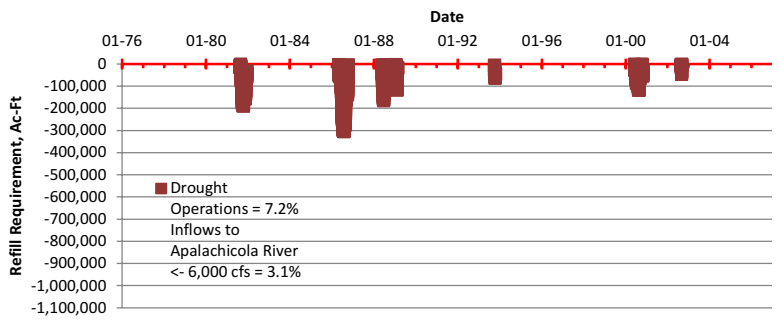
The 2007/08 interim procedures triggered Emergency Drought Operations when composite storage declined below the top of composite Zone 4. Drought operations were discontinued when the composite storage increased above the top of Zone 3 (bottom of Zone 2). The May 2012 interim operations changed the reservoir refill requirement to the top of Zone 2 before the drought operations would be discontinued. This significantly increased the occurrence and duration of drought operations and the associated release limit of 5,000 cfs to Apalachicola River. The May 2012 interim operations also allowed for the refilling of the reservoirs from December through February of all years with only a 5,000 cfs release requirement to Apalachicola River. Since this is identical to the Emergency Drought Operation release the COE effectively expanded drought operations to include December through February of non-drought years. This assures that the equivalent of drought operations are in effect at least three months of every year (25%) even in non-drought years.

The "Improved" interim operations outlined in the June 2012 "Remand" report recommend additional modifications which would further expand Emergency Drought Operations. These included increasing

the top of composite storage Zone 4 in January, February and August - December of each year. As a result, Emergency Drought Operations and the 5,000 cfs release limit begin earlier than in the previous interim operations. Similarly, the top of Zone 2 was increased in January through April and October through December. Increasing the composite storage volume of Zone 2 prolongs drought operations and the lower releases to Apalachicola River. The Composite Zone 2 storage was decreased in June, July and August, however, since these are dry months the change had did end drought operations any sooner than the previous versions of the interim operations.

Figure 5 illustrates the periods of actual drought operations prior to the 2007 interim operating procedures along with the reservoir refill volume that triggered the return to higher releases to Apalachicola River. As shown, before implementation of the interim operating procedures in 2007, release to Apalachicola were infrequently reduced to 5,000 cfs and coincided with the occurrence and duration of hydrologic droughts. As a result, drought operations were in effect for only 7.2% of the period from 1976-2006 and releases to Apalachicola River were at or below 6,000 cfs for only 3.1% of the period.

Figure 5. -- Actual Drought Releases to Apalachicola River, 1976-06.



In contrast, Figures 6 and 7 illustrate the duration of drought operations and the refill requirement for ending drought operations under the "Baseline" and "Improved" interim operations as simulated by the COE for the June 2012 "Remand" report. The baseline represents the 2007/08 interim operations with the 2007 water use reported by the State of Georgia. The "improved" simulation represents the interim operations as recommended in the "Remand" report with what appears to be the 2007 water use. Drought operations are in effect 16.4 and 17.8% of the time for the baseline and improved operations, respectively. There is also a significant increase in the volume of reservoir refill that is required to end the drought related release limits for Apalachicola River under the "Improved" operations. For some drought events the refill requirement needed to end drought operations has doubled.

Figure 6. -- Occurrence of Drought Operations and Reservoir Refill Required to End Limits on Releases to Apalachicola River, BASELINE Operations.

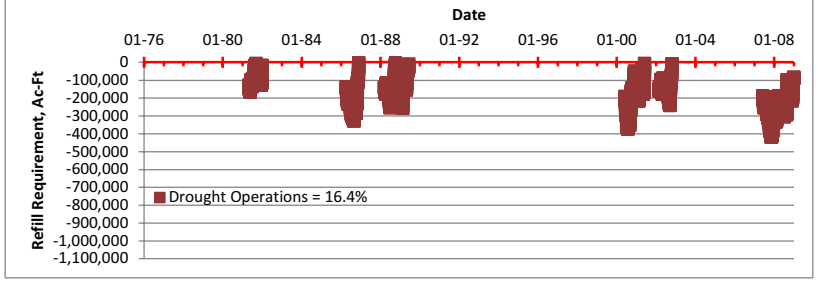
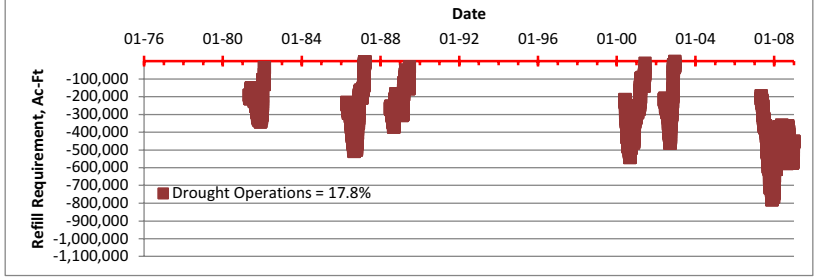


Figure 7. -- Occurrence of Drought Operations and Reservoir Refill Required to End Limits on Releases to Apalachicola River, IMPROVED Operations.



The increase in the duration of drought operations illustrated above result from the changes made to the May 2012 Interim Operating Procedures and in the June 2012 "Improved" operations. Clearly, the purpose was to increase the refill requirement for the reservoirs prior to ending the Emergency Drought Operations. In addition, as demands in Georgia increase in the future, the "improved" operations result in further increases in the duration of drought operations and the amount of water that must be diverted to reservoir storage before ending the release limitations for Apalachicola River. This is illustrated by Figures 8 and 9 which show the duration of the Emergency Drought Operations and reservoir refill requirement for Georgia's 2020 and 2030 requested withdrawals from Lake Lanier and the Chattahoochee River with the "Improved" Operations (COE simulations GAIMP2020C and GAIMP2030C).

Figure 8. -- Occurrence of Drought Operations and Reservoir Refill Required to End Limits on Releases to Apalachicola River, 2020 Georgia Demands.

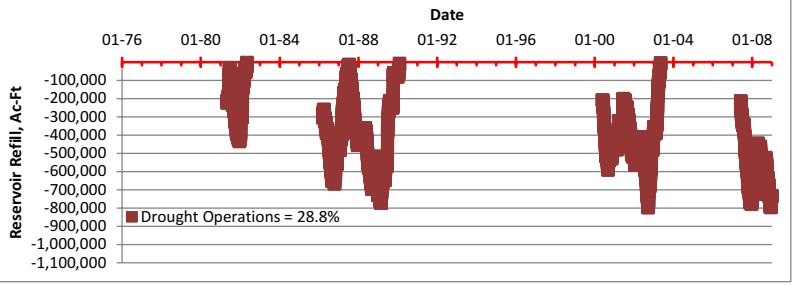
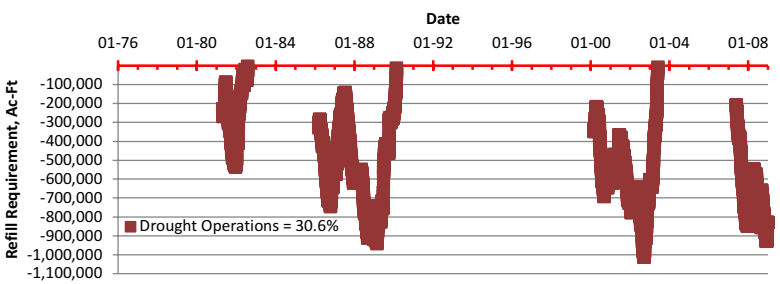


Figure 9. -- Ocurrence of Drought Operations and Reservoir Refill Required to End Limits on Releases to Apalachicola River, 2030 Georgia Demands.



Under the "Improved" operations with the 2020 and 2030 Georgia demands, drought operations are no longer infrequent events that occur only during actual hydrologic droughts. With the 2020 and 2030 requested Georgia demands, emergency drought operations would be in effect for 28.8 to 30.6% of the period from 1976-2008. The COE simulation of the 2030 demands includes a continuous period of almost four years during which the drought operations and the associated limits on releases to Apalachicola River would remain if effect. The duration of drought operations also expand to include all or parts of several non-drought years (1982, 1987, 1990, 2003, etc.). As shown in Figure 9, the reservoir refill required to end drought operations would increase to over 1 million acre-ft. At this point the "Emergency Drought Operations" are no longer confined to either emergency conditions or periods of natural hydrologic drought.

December through February Yearly Reduction of Apalachicola River Release to 5,000 cfs to Allow Additional Reservoir Refill

The May 2012 Revised Interim Operating Procedures (currently in effect) and June 2012 "Improved" interim operations allow the reservoirs to be refilled in December and January through February of each year by reducing the required release for Apalachicola River to 5,000 cfs. The 5,000 cfs required release limit applies regardless of the basin inflow or the composite storage of the reservoirs. In addition, no provision is made to share the added storage with Florida for the purposes of increasing inflows to Apalachicola River during the spring spawning period or for low flow augmentation during the summer and early fall.

The December and January-February release requirement is identical to the release during Emergency "Drought" Operations. This greatly increases the period of time in which the required release to Apalachicola River is 5,000 cfs. Under the "Improved" operations and current withdrawals from Lake Lanier and the Chattahoochee River, the duration of the 5,000 cfs reduced release requirement is increased from 17.8% to 38.7% of the period from 1976 to 2008. With Georgia's 2030 requested withdrawals, the 5,000 cfs required release limitation would increase from 30.6 to 48.4% (16 years) of the period from 1976-2008.

Obviously, it is not possible for the COE to reduce releases to Apalachicola River to this level over such a long time period due to the limit on available reservoir storage. It does, however, further expand the COE's discretion to reduce inflows to Apalachicola River to extreme low-flow levels when needed to ensure that all water needs in Georgia are met and the reservoirs refilled to full capacity. It also provides a perspective on the COE's water allocation priorities in the event that the frequency and duration of future droughts is greater than occurred in the past.

The update of the Water Control Manuals should not allow such extreme levels of discretion in reducing the required release to Apalachicola River to 5,000 cfs. At a minimum, the updated manuals should provide for the equitable sharing of the additional storage obtained by the diversion of water to storage from December through February. In addition, the refill provisions should be more constrained with required releases during December – February at higher levels than 5,000 cfs.

Composite Storage Levels Triggering "Drought" Operations and Levels of Reservoir Refill Required to End Release Restrictions to Apalachicola River

The "Improved" operations increase the volume of composite storage Zone 4. This change allows the COE to begin drought operations earlier than the previous interim operations. As a result, drought operations and the curtailing of releases to Apalachicola River begin when composite reservoir storage is at an average of 63% of full capacity and up to 77% of full capacity in some months. The "Improved" operations also increased the composite storage volume of Zone 2. This increased the volume of storage that must be refilled before drought operations are discontinued. The May 2012 revised interim operations already increased the refill requirement from the top of Zone 3 to the top of Zone 2. The "Improved" operations further increased the volume of composite Zone 2. Specifically, the active composite storage of the reservoirs must now be refilled to an average of 86% of full capacity (82-92% of full capacity depending on the month) before drought operations are discontinued. Especially troublesome, are the new requirements for the spring spawning period from March through the end of May. In each of these months, drought operations are triggered when the reservoirs are already at 70 to 77% of full capacity and are not discontinued until the reservoirs reach 90 to 93% of full capacity. Therefore, the required release to Apalachicola River during the river spawning period is reduced to

5,000 cfs even to allow the reservoirs to be filled from 70% of full capacity of over 90%. Figures 10 and 11 illustrate the composite storage by month which begin and end drought operations.

Figure 10. -- Percent of Filled Reservoir Capacity Remaining at Beginning of Drought Operations and Release Restrictions to Apalachicola River, IMPROVED Operations.

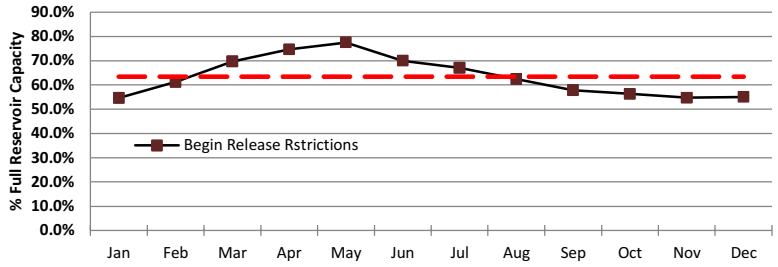
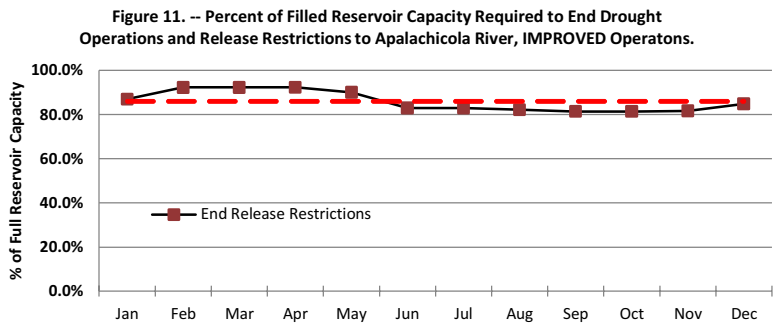


Figure 11. -- Percent of Filled Reservoir Capacity Required to End Drought Operations and Release Restrictions to Apalachicola River, IMPROVED Operatons.



The elevation of Lake Lanier is also of interest since it contains over 60% of the reservoir storage and is the source for water demands in the metro-Atlanta area either by direct withdrawals or releases that are withdrawn from the Chattahoochee River downstream of the lake. Figures 12 and 13 illustrate the actual elevation of Lake Lanier for the period 1976 through 2008 and the COE simulated elevations using the "Improved" operations and current Lake Lanier and Chattahoochee River withdrawals. During droughts, the "Improved" operations result in Lanier elevations that are typically two to seven feet higher than levels that actually occurred in the past (see, for example, 1981, 1993, and 2000). At the discretion of the reservoir operators, even higher elevations could be achieved under the "Improved" operations by reducing the release to Apalachicola River to 5,000 cfs during droughts or in December through February of non-drought periods when the required release to Apalachicola River is reduced to 5,000 cfs to for sole purpose of refilling the reservoirs.

Figure 12. -- Actual Lake Lanier Elevations, 1976-2008.

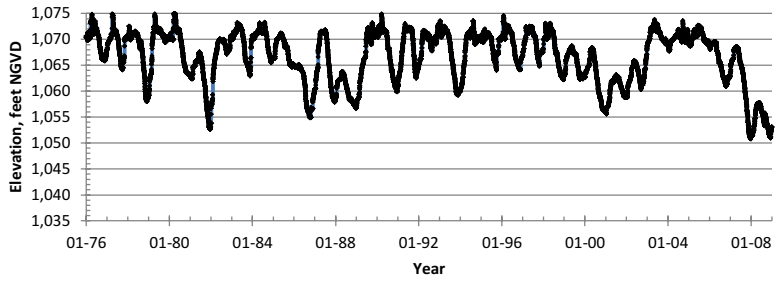
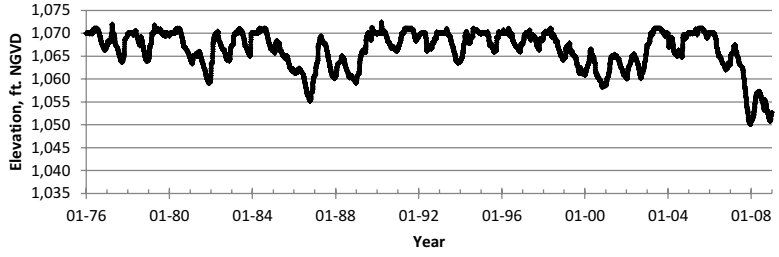


Figure 13. -- Simulated Lake Lanier Elevation, IMPROVED Operations, 2007 Georiga Demands, 1976-2008.



As described above, each version of the interim operating procedures has increased the instances in which the required release to Apalachicola River can be reduced to 5,000 cfs. The 5,000 cfs release, however, is an extreme low flow that has very seldom occurred in the past. Over the 31 year period from 1976 (first complete operational year after completion the last federal reservoir) through 2006 (last complete year before the beginning of interim operational procedures) there were less than 100 days in which the flow at the Chattahoochee streamflow station on the Apalachicola River was less than 5,100 cfs (5,000 cfs minimum plus 100 cfs release buffer). This represents the lowest 0.82% of daily inflows to Apalachicola River. Equivalently this means the actual inflows to Apalachicola River exceeded 5,000 cfs over 99% of the time. A daily flow less than 4,600 cfs (4,500 cfs plus 100 cfs release buffer) occurred on only 31 days and is equivalent to the lowest 0.28% of daily inflows during the 31 period and was exceeded more than 99.5% of the time. Therefore, the required release to Florida's Apalachicola River is set at the lowest 1% of the flow regime while Georgia meets 100% of current and future water demands and the COE is refilling the reservoirs to an average of 86% of the full capacity. The "Improved" operations place the entire burden of drought on Florida and Apalachicola River and Bay.

Reduction of Inflows to Apalachicola River

The "Improved" operations with Georgia's 2010 water demands results in substantial impacts on Apalachicola River. The impacts, of course, are even greater under the increased water demands requested by Georgia for 2020 and 2030. Table 1 provides a summary of the impact of the "Improved" Operations on inflows to Apalachicola River with Georgia's increased demands in comparison to what actually occurred during the period from 1976-2008.

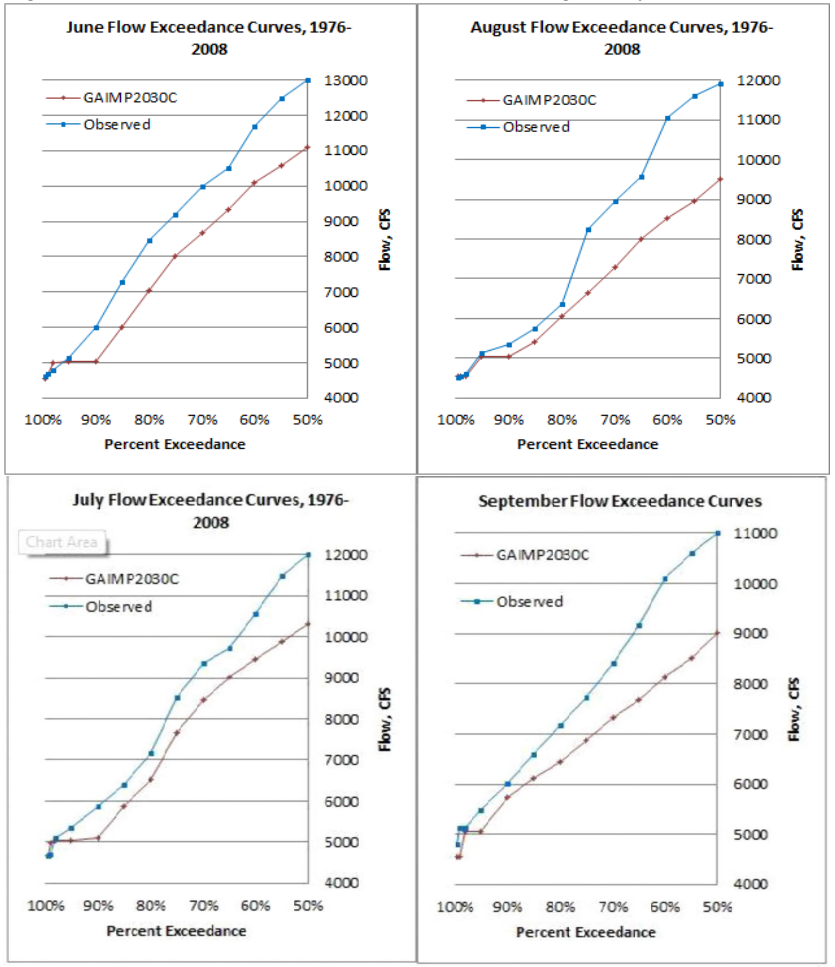
Table 1 – Summary of Simulated Impacts on Inflows to Apalachicola River with "Improved" Reservoir Operations and current and future Georgia Demands

Impact on Apalachicola River	"Improved" Operations, 2010 Georgia Requested Demands	"Improved" Operations, 2020 Georgia Requested Demands	"Improved" Operations, 2030 Georgia Requested Demands
Mean Daily Loss in Flow, CFS	581 cfs	693 cfs	782 cfs
Cumulative Loss in Flow, Acre-Feet	13.9 Million	16.6 Million	18.7 Million
Total Days of "Emergency" Drought Operations	2,730 days	3,459 days	3,691 days
Percent of Time "Emergency" Drought Operations are in Effect	22.7%	28.8%	30.6%
Loss of Flow During Drought Operations, Acre-Feet	2.0 Million	4.0 Million	5.1 Million

The losses of inflow to Apalachicola River summarized above are primarily the result of increased demands in the Georgia portion of the basin over the period from 1976-2008. These are exacerbated by the "Improved" operations which preferentially store water when "Emergency" Drought Operations are in effect. As a result, during the 1981-82, 1986-1990 and 2000-2003 Emergency Drought Operations, the COE's GAIMP2030C simulated daily inflows to Apalachicola River were 1,043 cfs, 1, 058 cfs and 178 cfs below the observed inflow to Apalachicola River, respectively.

The increase in demands and the frequency of drought operations have expanded the problem of reduced inflow to Apalachicola River beyond just low flow periods. The flow duration curves for June, July, August and September show substantial losses of inflow to Apalachicola River over much of the lower 50% of flow regime (Figure 14). Low-flow augmentation of the 5,000 cfs flow requirement is minimal and losses at higher percentile flows range up to 2,500 cfs. Even in May (an important river spawning month), flow losses range from approximately 800 to 1,100 cfs from the 80th to 98th percentile flows.

Figure 14 – Actual and Simulated Flow Exceedance Curves, June through and September, 1976-2008.

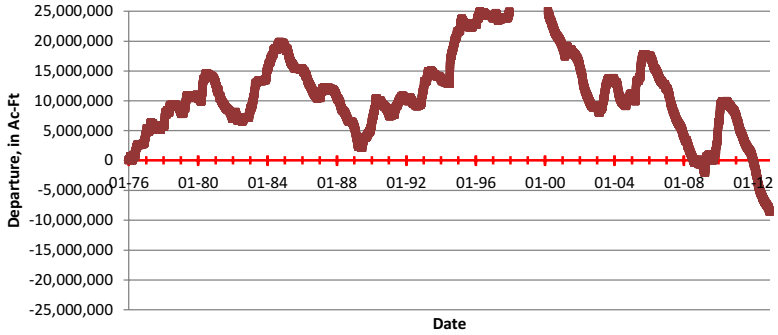


The magnitude of the simulated reductions of inflows to Apalachicola River resulting from increased demands in Georgia and the expansion of "Emergency" Drought Operations results in impacts that would extend over multiple years. The result is a progressively greater decline of the simulated inflows from the observed mean

daily inflow over the period from 1976-2008 and losses that extend over a greater proportion of the historical flow regime of Apalachicola River.

In 2012 there was a well-documented and widely reported decline in availability of oysters in Apalachicola Bay. The decline, however, was not limited to oysters. Reportedly, the decline was unprecedented and extended too much of the biota of the bay including shrimp, crabs, bait fish and commercial/sport fish. As illustrated by Figure 15, the decline in the biota of the Bay coincided with a large deficit (negative departure) between the daily inflows to Apalachicola River and the 1976-2008 daily average inflow. Since inflow to Apalachicola River is the largest source of freshwater inflow to Apalachicola Bay, the cumulative loss of inflow to the river results in approximately an equivalent loss to the bay. Currently the deficit is approximately 9.9 million acre-feet. In comparison the total volume of Apalachicola Bay is approximately 1.34 million acre=feet based on the reported surface area of 214 square miles and an average depth of 9.83 feet. The only other instance in which this occurred was in 2008/09, however the duration and magnitude was much smaller than in 2012.

Figure 15. -- Cumulative Departure of Daily Inflows to Apalachicola River from Average Daily Inflows, 1976-2012.



Based on the COE simulations of the Georgia 2010 and 2030 requested demands and the "Improved" reservoir operations (COE alternatives GAIMP2010R and GAIMP2030C) the cumulative departure in 2008 would be substantially greater than during the 2012 event. Figures 15 and 16, illustrate the cumulative departure of the COE simulated inflows from the observed average daily flows for the period 1976-2008.

Figure 16. -- Cumulative Departure of Simulated Daily Inflows to Apalachicola River from Actual Inflows, 1976-2008. Improved Operations, 2010 Demands.

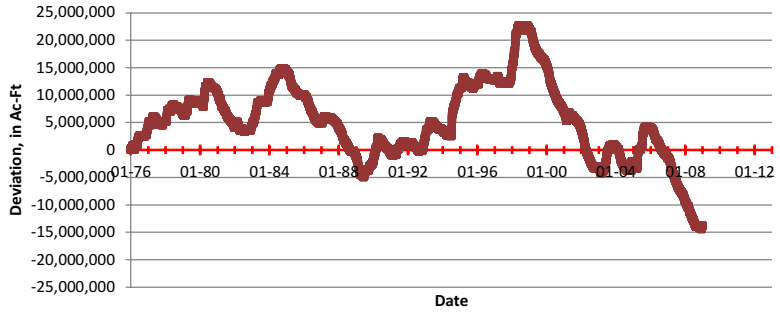
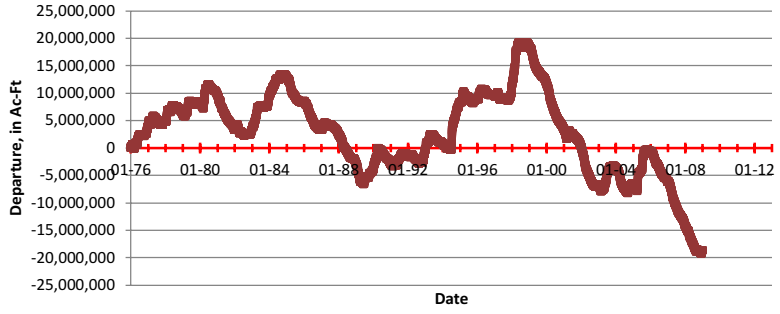


Figure 17. -- Cumulative Departure of Simulated Daily Inflows to Apalachicola River from Actual Inflows, 1976-2008. Improved Operations, 2030 Demands.

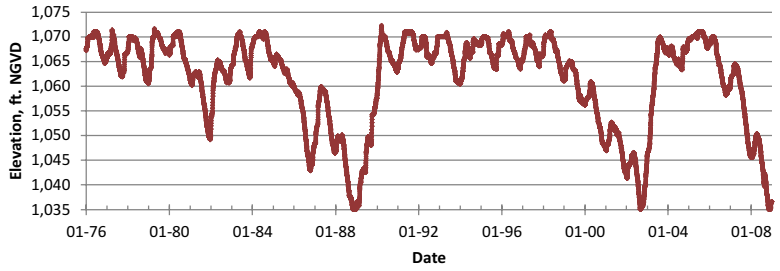


In the case of the 2030 demands, the departure in 2008 would increase from approximately 0.5 million acre-feet to almost 20 million acre-feet with the increased demands and reservoir operations. This is approximately double the inflow deficit that coincides with the 2012 decline in oysters, shrimp and fin fish in Apalachicola Bay. In addition, deficits would occur in the simulated equivalent 1988-1992 and continuously from 2001 to 2008. The COE simulations do not extend to 2012 but it is to be expected that simulation of this period would result in a greater inflow deficits than actually occurred in 2012.

Additional Impacts to Apalachicola River resulting from unrealistic depletion of Lake Lanier Conservation Storage

The simulations of Georgia's requested 2030 demands with the historical return flows results in depletion of the active storage in Lake Lanier (Figure 18). This would directly impact water supply withdrawals from Lake Lanier and releases to the Chattahoochee River for downstream water supply intakes for metro Atlanta and hydropower production.

Figure 18. --Simulated Elevation of Lake Lanier with Improved Operations and 2030 Georgia Demands, 1976-2008.



Presumably, the COE will not realistically allow Lake Lanier to decline to the bottom of the conservation pool. The COE, therefore, would be forced to reduce releases from Lake Lanier to conserve storage. Ultimately, this would lead to reduction of releases to Apalachicola River much greater than represented by the COE simulations. For example, if the COE elected to hold the level of Lake Lanier at the lowest historical level of 1,050' then an estimate of the reduction in releases required to keep Lake Lanier at this level can be easily determined. To my knowledge, the COE has never stated an acceptable minimum level or duration for Lake Lanier. Therefore, Table 2 provides the additional reductions in releases to Apalachicola River required to prevent Lake Lanier from falling below elevations of 1,050', 1.045' and 1,040' with the requested Georgia 2030 projected withdrawals (COE alternative GAIMP2030C). These reductions would be in addition to the release reductions to Apalachicola River illustrated in Figures 16 and 17.

Table 2 -- Additional Reduction of Releases to Apalachicola River to maintain the level of Lake Lanier at Minimum Elevations of 1,050', 1045' and 1040', "Improved" Operations with 2030 Demands.

"Drought" Period	1,050' Minimum Lake Lanier Elevation	1,045' Minimum Lake Lanier Elevations	1,040' Minimum Lake Lanier Elevation
1981-1982	28,000 Acre-Feet	0	0
1986-1990	884,000 Acre-Feet	400,000 Acre-Feet	177,000 Acre-Feet
2000-2003	677,000 Acre-Feet	377,000 Acre-Feet	144,000 Acre-Feet
2007-2008	588,000 Acre-Feet	312,000 Acre-Feet	124,000, Acre-Feet

The impact, of course, would be further reduction of releases to Apalachicola River. The severity of the impacts would depend on how low the COE would lower Lake Lanier before reducing releases to Apalachicola River. Alternatively, the COE could recognize via the update of the Water Control Manuals that there is a limit on the amount of water that can be supplied by Lake Lanier without endangering Apalachicola River and Bay or reducing the level of the lake to near the bottom of the conservation pool.

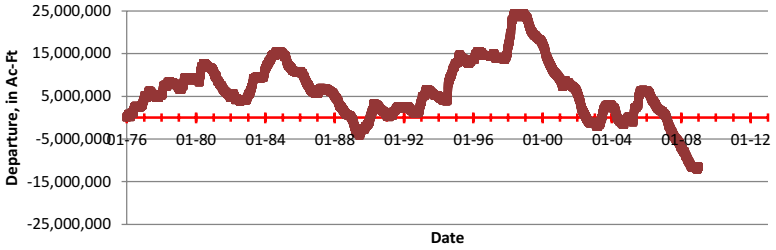
Simulated Lake Lanier declines to at or near the bottom of conservation storage is not unique to alternative GAIMP2030C. The simulated Lake Lanier elevation for alternative GAIMP2030P also depletes conservation storage by allowing Lanier to decline to an elevation of 1,035'. Alternative GAIMP2030R allows the simulated level of Lanier to decline to an elevation of 1,040' which is 10 feet below the historical minimum elevation of the lake. Even at the 2020 demands, the simulated level of Lake Lanier declines to 1,040' (alternative GAIMP2020C) or 1,045' (alternative GAIMP2020R).

Use of "Baseline" Alternative to Determine Impacts of Drought Operations

It is my understanding that the COE will use the Baseline simulation to determine whether increasing the frequency and duration of 5,000/4,500 cfs releases to Apalachicola River to accommodate additional demands in the Georgia is acceptable. This determination, however, should be based on comparison with the observed inflows for the periods 1939-2006 and 1976-2006. The baseline simulation includes the 2007 Georgia demands and the 2008 Revised Interim Operating Procedures. Therefore, the baseline alternative already includes demands and reservoir operations that significantly reduce inflows to Apalachicola River. For example, the observed flow record includes only 99 days during the pre-"interim" operations (1976 to 2006) in which in which inflows to Apalachicola River were less than 5,100 cfs. In contrast the simulated Baseline alternative includes 537 days in which the release to Apalachicola River was less than 5,100 cfs.

Figure 19 shows the departure of the Baseline simulated flows from the daily average inflow received during the period from 1976 to 2008. The deficit inflows to Apalachicola River in 1989, 2002–2004 and 2007-2008 result from the existing impacts of Georgia demands and the 2007/08 interim reservoir operations. Therefore, the update of the Water Control Manuals should utilize the observed flows at the Chattahoochee streamflow station on the Apalachicola River as the baseline for the simulation of new reservoir operations.

Figure 19. -- Cumulative Departure of Simulated Daily Inflows from Actual Inflows to Apalachicola River, 1976-2008. Baseline Operations, Current Demands.



Summary

The June 2012 "Remand" reports states (page 19) that "Improved Operations reflect system and project operation improvements that the Corps has identified as potentially more efficient in achieving congressionally authorized purposes." The reports also states (page 32) that "Improved Operations use revised guide curves and/or action zones … These guide curves and/or action zones are used to manage the lakes at the highest level possible while balancing the needs of all the authorized purposes." Specific to Lake Lanier, the reports states "The Improved action zones for Lake Lanier facilitate refill and store of water relative to the watershed." Therefore, it appears the "Improved" operations represent the COE's preferences for updating the Water Control Manuals. Most of the comments provided, herein are directed at the "Improved" operations. Most also apply to the May 2012 Revised Interim Operating Procedures that are currently in effect.

1. There is no documentation demonstrating that the ResSim model of the ACF accurately simulates past flows and especially low-flows at the Chattahoochee streamflow station on the Apalachicola River (or other locations in the basin). Lacking this, the model cannot be considered as calibrated or verified based on comparison of the simulated versus past observed flows, reservoir elevations, composite reservoir storage, or reservoir releases. The adequacy of the model for simulating the impacts of future demands and alteration of the reservoir operations is unknown. *The model used for simulation of the modifications incorporated into the updated Water Control Manuals should be validated by comparing simulation of past flows and operations with observed data. The results of this simulations should be documented and made available as part of the COE's decision record.*

2. The simulation results for the COE "Baseline" (also referred to as "Current" operations) alternative should approximate the withdrawals and reservoir operations in 2007 and 2008. The simulated flows however, only weakly correlate (at best) with the observed flows during this period. In addition, there appears to be systematic error in the simulated versus observed inflows to Apalachicola River. T*he COE should analyze and document the magnitude and variation of the simulated versus observed flow including both random error and systematic error, if any, that would indicate bias in the model simulations.*

3. Of necessity, ResSim must specify detailed reservoir operating procedures including releases for all purposes from each reservoir based on basin inflow and composite storage, diversions to storage, reservoir balancing and all other facets of operations. Reservoir operators, however, would not be required to follow these and would have the discretion to release only the required 5,000 cfs. The simulations, therefore, may greatly underestimate the impact of the June 2012 "Improved" operations on reducing releases to Apalachicola River during "Emergency" Drought Operations. *Worst case scenarios should be simulated which examine the potential impacts on releases to Apalachicola River if reservoir operators exercise the broad discretion allowed under the interim operating procedures in a manner different from the base model assumptions.*

4. Currently, the unimpaired flows used for the ResSim model only extend through 2008. The four year period from 2009-2012 during which the COE was operating the reservoirs under an earlier versions of the interim Operation Procedures is not included in the current model simulations. *The unimpaired flows should be updated through the end of 2012.*

5. The baseline for determining the impacts of the update of Water Control Manual operating procedures should not be simulated flows for an earlier version of the interim operating procedures. These simulations already include substantial impacts from increased Georgia demands and impacts of reservoir operations which differ significantly from the actual operations used from 1976-2006. *The impact analysis, therefore, should be based on comparing the simulated inflows to Apalachicola River with the actual (observed) flows at the USGS Chattahoochee streamflow station on the Apalachicola River.*

6. Currently, reservoir releases to Apalachicola River during non-drought periods are based on the composite storage level of the federal reservoirs and the calculated Basin Inflow. However, the COE's calculated Basin Inflow is actually the true (hydrologic) basin inflow minus all of Georgia's consumptive withdrawals from the Chattahoochee River and Flint River. Therefore, releases to Apalachicola River are determined only after 100% of Georgia water demands are met both now and in the future. *This inequity should be corrected in the update of the Water Control Manuals by modifying the method used to compute Basin Inflow.*

7. Since the first interim operating procedures were implemented in 2007, several revisions have been made to the "Emergency Drought Operations." These revisions have progressively increased the volume of composite reservoir storage that must be refilled before the drought operations are ended and the minimum release requirement to Apalachicola River increased above 5,000 cfs. The June 2012 Improved Operations continued this trend and recommended that the emergency operations end only after the volume of composite reservoir storage has been refilled to 81-92% of full capacity. This is especially beneficial to Lake Lanier since it contains over 60% of the active reservoir storage in the basin. *The updated water control manuals should reduce the refill requirement to the levels specified in the 2007 interim operating procedures.*

8. The beginning and ending of the emergency drought operations is solely a function of composite storage in the federal reservoirs all of which are located in the Chattahoochee River Basin. Therefore, as consumptive water use in the Chattahoochee Basin increases (primarily due to metro-Atlanta) the frequency and duration of drought operations and the 5,000 cfs minimum release to Apalachicola River will increase. As discussed in the preceding paragraph, the occurrence of drought operations also increased as the COE increased the reservoir refill requirement before ending drought operations. Analysis of COE simulations of "Improved" operating procedures using Georgia's requested 2030 water demands indicates that drought operations will be in effect on 3,691 days or 31% of the period from 1976–2008. On average, drought operations will be in effect during 1 in every 3 years and will include all or part of several non-drought years. *The current and recommended "Improved" operations place the adversity associated with drought on Florida. This inequity should be corrected in the update of the Water Control Plans and the impacts of drought should be shared equally by Georgia.*

9. During drought operations, the required release to Apalachicola River is 5,000 cfs which is an extreme low flow. During the 31 year period prior to the interim operating procedures (1976 to 2006) there were only 99 days (0.4%) in which the flow was less than 5,100 cfs at the USGS streamflow station at Chattahoochee on the Apalachicola River. Therefore, a flow of 5,100 cfs was exceeded 99.6% of the time from 1976 through 2006 even though this period included three major drought events. As a result, under the proposed "Improved" interim operations, the required release to Apalachicola River is set at a level that occurs less than 1% percent of the time while simultaneously ensuring that 100% of the current and future water demands in Georgia are met and that the federal reservoirs will be refilled to an average of 86% of full capacity before lifting the release restrictions to Apalachicola River. *The update of the Water Control Plans should equitably distribute drought adversity to all three states rather than placing the burden of droughts exclusively on Florida.*

10. The "Improved" operations allow the COE to reduce the required release to Apalachicola River to 5,000 cfs each year in December, January and February for the purpose of reservoir refill. This is identical to the limit during the emergency drought operations. This would allow the COE to reduce the

release to Apalachicola River to 5,000 cfs for up to 48% of the period from 1976-2008 based on the COE simulation of the 2030 withdrawals (alternative GAIMP2030C). Similarly large increases also occur in the simulations at lower levels of withdrawals. In addition, there are no requirements that the additional storage be shared with Florida to augment flows during the spawning season or the dry season. *Allowing the COE to reduce releases to Apalachicola River with such frequency is unreasonable and should be excluded from the update of the Water Control Manuals or requirements added to equitably share the additional storage.*

11. The recommended improved operations allow the COE to discontinue the balancing of operating zone of the reservoirs during droughts. This would allow the COE to reduce releases from Lake Lanier for the purpose of refilling storage in West Point Lake and Lake Walter F. George. Water, therefore, is preferentially stored in Lake Lanier at the expense of the downstream reservoirs. *The updated Water Control Manuals should retain the traditional COE practice of balancing the reservoirs.*

12. The ResSim model simulation labeled GAIMP2030C appears to best represent Georgia's requested withdrawals, projected Lake Lanier and Chattahoochee River withdrawals in 2030 with the historic (current) return rates. A summary of the impacts of this alternative on inflows to Apalachicola River is provided below:

a. The simulated daily flow at the Chattahoochee Streamflow Station on the Apalachicola River is an average of 782 cfs below the observed flow on each day of the 31 years simulation period.

b. Much of the flow loss during drought periods when the required release to Apalachicola River was reduced to 5,000 cfs or less. The COE's Emergency Drought Operations were in effect for 3,691 days or approximately 31% of the 32 year period or a frequency of 1 in every 3 years.

c. The COE's Emergency Drought Operations are in effect continuously for 462 days (15.2 months) in 1981-82, 1447 days (47.6 months) in 1986-1990, 1187 days (39.0 months) in 2000-03 and 595 days (19.6 months) in 2007-2008 (and continued past the end of the simulation).

d. During the 1981-82, 1986-1990 and 2000-2003 Emergency Drought Operations, the GAIMP2030C simulated daily inflows to Apalachicola River were 1,043 cfs, 1, 058 cfs and 178 cfs below the observed inflow to Apalachicola River, respectively.

13. The simulated flows include a much higher occurrence of extreme low flows in comparison to actual flows. Prior to implementation of the first set of interim operating procedures in 2007 (i.e., 1976-2006) there were 99 days in which the actual inflows to the Apalachicola River were less than 5,100 cfs. In comparison, under the "Improved" interim operation procedures, the simulation of the GAIMP2030C resulted in 541 days in which flows were less than 5,100 cfs. This equates to a 380% increase in the occurrence of extreme low inflows to Apalachicola River and illustrates the impact of the significantly longer duration of drought operations under the "Improved" interim operations. Further, over the six year period from 2007-2012 when interim operations have been in effect, inflows to Apalachicola River have been less than 5,100 cfs on 151 days. This compares to 99 days during the 31 year period from 1976 to 2006. *The update of the Water Control Manuals should correct this inequity and recognize that there are limits on the level of consumptive withdrawals in the Georgia portion of the basin.*

14. The COE simulation of the recommended "Improved" reservoir operations with Georgia's 2030 requested withdrawals from Lake Lanier and the Chattahoochee River results in long periods in which the level of Lake Lanier is below the historical low of 1,050 feet above NGVD. With the 2030 demands, the simulated level of Lake Lanier declines to the bottom of the conservation pool (1035' NGVD) during the 1985-1990, 2000-2003 and 2007-09 periods of Emergency Drought Operations. Since the COE has traditionally conserved storage in Lake Lanier, it seems very unlikely that the Lanier would be allowed to decline to these levels. The only alternative is to further reduce inflows to Apalachicola River to the minimum required release of 5,000 cfs or less. The impacts of the "Improved" reservoir operations on Apalachicola River and Bay, therefore, will be much more severe than indicated by the simulations. Since the improved interim operations would not prevent this from occurring, the COE simulations likely underestimate the inflow reductions to Apalachicola River and the loss of flow during periods of Emergency Drought Operations. *The update of the Water Control Plan should be based on a realistic minimum acceptable level for Lake Lanier and should not use the Emergency Drought Operations to reduce the required inflow to Apalachicola River to offset the over-draft of Lake Lanier for Water Supply.*

15. The flow reduction resulting from the GAIMP2030C alternative in comparison to the actual flows is not evenly distributed by month. Instead, the impact on low-flow durations is greatest in May, June, July, August and September. For example, the simulated August the median flow is 2,500 cfs less than the actual median flow for the period from 1976 through 2008. Since these are low flow months, losses of this magnitude change the hydrology of the river and the inflows to Apalachicola Bay during the dry season. In addition, the 2012 decline in the biota of Apalachicola Bay occurred at the same time as the largest cumulative deficit of daily flows from normal (average) flows to occur over the past 37 years. The only other deficit occurred in 2008 and was not of the magnitude or duration of the 2012 deficit. This event was considerably more severe than previous historical extremes and may have represented a cumulative loss of freshwater inflow that exceeded the tolerance levels of a broad range of species. The COE simulations of the "improved" operations and requested 2010, 2020 and 2030 Georgia withdrawals result in deficits of freshwater inflow to Apalachicola River and by extension to Apalachicola Bay that are considerably more severe than 2012 deficit. *The update of the Water Control Plan must recognize that the limits on the reduction of inflows to Apalachicola River and Bay may have already been reached and possibly exceeded and any additional reductions must be minimized.*

Thank you,

Douglas E. Barr[1]
P.O. Box 16586
Tallahassee, Florida 32317

[1]Formerly:

Executive Director (1992-2012)
Northwest Florida Water Management District

State of Florida Technical Representative
ACF Comprehensive Study, Interstate Compact,
& Gubernatorial directed discussion of ACF allocation
Formula (1991-2008)

Attachment – June 2012 recommended revisions to releases from Jim Woodruff Dam to Apalachicola River.

TABLE 5
RIOP Water Releases from Jim Woodruff Dam

Months	Composite conservation storage zone	Basin inflow (BI) (cfs)	Releases from JWLD (cfs)	BI available for storage[a]
March–May	Zones 1 and 2	>= 34,000	>= 25,000	Up to 100% BI > 25,000
		>= 16,000 and < 34,000	>= 16,000 + 50% BI > 16,000	Up to 50% BI > 16,000
		>= 5,000 and < 16,000	>= BI	
		< 5,000	>= 5,000	
	Zone 3	>= 39,000	>= 25,000	Up to 100% BI > 25,000
		>= 11,000 and < 39,000	>= 11,000 + 50% BI > 11,000	Up to 50% BI > 11,000
		>= 5,000 and < 11,000	>= BI	
		< 5,000	>= 5,000	
June–November	Zones 1, 2, and 3	>= 24,000	>= 16,000	Up to 100% BI > 16,000
		>= 8,000 and < 24,000	>= 8,000 + 50% BI > 8,000	Up to 50% BI > 8,000
		>= 5,000 and < 8,000	>= BI	
		< 5,000	>= 5,000	
December–February	Zones 1, 2, and 3	>= 5,000	>= 5,000 (Store all BI > 5,000)	Up to 100% BI > 5,000
		< 5,000	>= 5,000	
At all times	Zone 4	NA	>= 5,000	Up to 100% BI > 5,000
At all times	Drought zone	NA	>= 4,500[b]	Up to 100% BI > 4,500

Notes:
a. Consistent with safety requirements, flood-control purposes, and equipment capabilities.
b. Once composite conservation storage falls below the top of the Drought Zone, ramp down to 4,500 cfs will occur at a rate of 0.25 ft/d drop.

From: Mitch Spruill
Sent: Friday, January 29, 2016 9:21 PM
To: ACF-WCM
Cc: lakeinfo@lakelanier.org
Subject: [EXTERNAL] Clean Lake, Full Lake, Safe Lake

To the Commander of the USACE, Mobile District,

The Lake Lanier Association has recently made public USACE plans for navigation and water releases under drought conditions. We want to express our complete support for the Lake Lanier Association's position on these topics. Their assertions are logical and well-considered. A

Has recent research been performed on current navigational water level requirements of the Chattahoochee river? Based on the Association's statement that the early projections for navigational usage have not materialized, added to the fact that the basin has degraded, thus requiring the release of more water to maintain the designated level , shouldn't the plan be revisited and modified to more appropriately reflect the current situation? B

Also, the Lake Lanier Association has asked for consideration of raising the full pool level by 2'. With the current levels of the lake so high, would this not be a logical time to consider the request? Changing the "full pool" level might go a long way towards mitigating the awful ramifications from lowering the lake so drastically, thus changing our beloved Lake Lanier to "Lake La-nearly Empty". Despite the fact that peak usage drops off in September (not July!), the lake is used year-round for recreation. It is a significant part of the economic engine in North Georgia, and lowering the lake to the point that it becomes hazardous creates hardships for much of the region. C

Thank you in advance for taking our comments into consideration.

Kindest regards,

Mitch and Rachel Spruill

Please excuse the short response. This was sent from my iPhone 5.

Response to ACF235 – Mitch and Rachel Spruill

A. When complete, the Master WCM update process will result in an updated Master WCM that includes updated water control plans and manuals for the ACF system and each federal project within the system. It will reflect operations under existing congressional authorizations, taking into account changes in basin hydrology and demands from years of growth and development, new/rehabilitated structural features, legal developments, and environmental issues. The effects of climate change on the PAA are discussed in section 6.8 of the draft EIS. Refer to the USACE response to the Lake Lanier Association comment letter (# ACF145) for additional information.

B. The operations described in the WCM are based on balancing all authorized purposes throughout the system. Navigation remains an authorized purpose for the ACF system although it currently faces many challenges. The navigation season contained in the PAA provides authorized navigation while preserving conservation storage by occurring during a time of naturally high flows, providing only a 7-ft channel depth and occurring only when ACF Basin composite conservation storage is in Zone 1 or 2. Navigation would not be supported when ACF Basin composite conservation storage is in Zone 3 or lower (drought operations). Seasonal navigation would not resume until ACF Basin composite conservation storage returns to Zone 1. Under the PAA and hydrology similar to 2007–2008, navigation would have been suspended as of May 1, 2007 as part of drought operations and would not have been reinstated until May 2009.

C. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management. Accordingly, raising the conservation pool at Lake Lanier by 2 ft would not meet this criterion and was not carried forward.

From: Benschoter, Amy
Sent: Friday, January 29, 2016 4:28 PM
To: ACF-WCM
Subject: [EXTERNAL] ACF Master Water Control Manual Update - Comments of Alabama Power Company
Attachments: 2016.01.29 - Comments of Alabama Power Company.pdf; APC Comments - Attachment A.pdf; APC Comments - Attachment B.pdf; APC Comments - Attachment C.pdf; APC Comments - Attachment D.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

To Whom It May Concern:

Attached please find the comments of Alabama Power Company and Attachments A-D to same. If you have any questions or need additional information, please feel free to contact me.

Sincerely,
Amy Benschoter

BALCH & BINGHAM LLP

Amy E. Benschoter, Attorney, Balch & Bingham LLP
1901 Sixth Avenue North • Suite 1500 • Birmingham, AL 35203-4642

Blockedwww.balch.com

CONFIDENTIALITY: This email and any attachments may be confidential and/or privileged and are therefore protected against copying, use, disclosure or distribution. If you are not the intended recipient, please notify us immediately by replying to the sender and double deleting this copy and the reply from your system.

Matthew W. Bowden
Vice President
Environmental Affairs

600 North 18th Street
Post Office Box 2641
Birmingham, Alabama 35291-0830

ALABAMA POWER
A SOUTHERN COMPANY

January 29, 2016

The U.S. Army Corps of Engineers (the "Corps") has solicited public comments on the draft Apalachicola-Chattahoochee-Flint ("ACF") River Basin water control manual and draft Environmental Impact Statement ("DEIS"). 80 Fed. Reg. 59,741 (Oct. 2, 2015). This letter provides the comments of Alabama Power Company ("Alabama Power").[1]

Alabama Power owns, and Southern Nuclear Operating Company ("Southern Nuclear") operates, the Farley Nuclear Plant ("Plant Farley"), located on lands riparian to the Chattahoochee River near Dothan, Alabama. This letter incorporates by reference previous comment letters and submissions by Alabama Power and Southern Nuclear, which demonstrate that the safe and reliable operation of Plant Farley is dependent on the Corps' operation and management of its ACF projects, especially the upstream storage projects Buford, West Point, and Walter F. George. (Attachments A, B, and C.)

As recognized by the Corps in the DEIS, "a daily average flow need of 2,000 cfs at Columbia, Alabama, just downstream of George W. Andrews Lock and Dam [is] considered necessary to sustain continuous power generation operations at the Farley Nuclear Plant." (DEIS at 6-36.) In fact, this 2,000 cfs flow need was validated through significant investigation and evaluation, and was ultimately agreed to by the States of Alabama, Florida, and Georgia in the 2003 Memorandum of Understanding ("MOU') relating to the ACF Compact negotiations. Nevertheless, as a result of the numerous changes in operations proposed by the Corps' draft ACF water control manual and DEIS, low flows below 2,000 cfs will be more frequent at Plant Farley under the Corps' Proposed Action Alternative ("PAA"), as compared with the No Action Alternative ("NAA") or actual historical operations. Alabama Power is very concerned by the Corps' refusal to even consider "management measures that change minimum releases," (*Id.* at 4-7), and its stated position that this and similar flow targets are "nonmandatory with respect to USACE project operations." (*Id.* at 6-35.)

Moreover, the PAA prioritizes upstream storage for water supply and recreation over hydropower generation and navigation support, with predictable and admitted adverse consequences to downstream storage, flows, navigation, water quality, and other interests. The PAA thus effects a substantial reordering of project purposes contrary to Congressional intent. The Corps' DEIS also fails to adequately assess the potential downstream impacts likely to occur

[1] Alabama Power also supports the comments submitted by the State of Alabama and the Tri Rivers Waterway Development Association.

Response to ACF236 – Alabama Power Company

as a result of operations under the proposed water control manual. The Corps' NEPA analysis is faulty in several respects, as herein described, especially the Corps' inclusion in the baseline condition of significant changes in project operations over the many years since the adoption of prior manuals and environmental review. In addition, while the Corps' analysis pays close attention to future growth and demands in the upper ACF basin, the Corps ignores or discounts documented downstream flow needs, as well as future growth and demands downstream. At the very least, the Corps should reconsider the balance and use of project storage between Lake Lanier, West Point, and W. F. George, including operations to meet the minimum flow targets in the Middle Chattahoochee, especially at Plant Farley.

I. The Proposed Master Manual Impermissibly Reorders Project Purposes

The overall ACF development, including Buford Dam, as authorized by the Rivers and Harbors Act of 1946 in accordance with the general plan presented in House Document No. 300, was intended by Congress to support a 9-foot deep by 100-foot wide navigation channel from the Gulf Intracoastal Waterway in the Apalachicola River to Columbus, Georgia on the Chattahoochee River. According to this authorizing legislation, the projects below Columbus—now W. F. George, Andrews, and Woodruff—"could not operate economically unless some considerable flow regulation were provided by a large storage-power reservoir upstream." (House Doc. 300 at ¶67.) "The best development for that purpose is that at Buford proposed herein. Provision of that development as part of the system would increase the minimum monthly flow at the Upper Columbia site [near the present location of Plant Farley] from about 1,300 second-feet to 6,040 second-feet, with a corresponding increase at the Junction site. [Woodruff dam site]." (*Id.* at ¶100.) The 1949 Definite Project Report described the primary purposes of the Buford Project as "flood control" plus "hydroelectric power," which would result in "increased flow for navigation," and "increased water supply for Atlanta." (ACF001459.)[2] Likewise, the original 1959 Buford manual designated the entire 35' of storage between elevations 1035 and 1070 as "power storage," which was "allocated for power and low-water flow regulation," and provided that "[n]ormally, the Buford project will be operated as a peaking plant for the production of hydroelectric power," and "[d]uring low-water periods such regulation will provide increased flow downstream for navigation, water supply, pollution abatement, and other purposes." (ACF001784, 001796.)

A

Notwithstanding this authorizing legislation and operational history showing that all of Buford's power storage was to be used for substantially increased downstream flows in the Chattahoochee River, the Corps in the PAA abandons any obligation to support navigation during the low-flow summer and fall seasons, adopts action zones that reserve the vast majority of conservation storage for water supply and recreation requirements to the exclusion of navigation support and hydropower generation. The PAA reserves virtually unlimited discretion to reduce hydropower generation in order to conserve storage for water supply and recreation.

The Corps does not have the administrative discretion to make these changes without Congressional reauthorization of the Buford Project. The Corps may not undertake a reallocation that substantially changes the relative sizes of project purposes. *EDF v. Alexander*,

[2] Citations in this format are to the Bates-stamped pages of the administrative record provided by the Corps in *In re Tri-State Water Rights Litigation*, Case No. 3:07-md-01 (M.D. Fla.).

A. USACE submitted a legal opinion to the 11th Circuit of Appeals in 2012, and this update falls within the parameters of that legal opinion. USACE does not prioritize project purposes, and the PAA continues to balance all authorized project purposes.

467 F. Supp. 885 (N.D. Miss. 1979), *aff'd on other grounds*, 614 F.2d 474 (5th Cir. 1980). The Corps' reordering of project purposes also conflicts with the Corps' substantive obligations under the Flood Control Act, 33 U.S.C. § 708, 709, and the Water Supply Act, 43 U.S.C. § 390b. Both require the Corps to manage water storage reservoirs for the original purposes for which they were authorized. Likewise, the Corps' own regulations prohibit the Corps from reallocating storage to recreation. (*See* EP-1165-2-1, ER 1105-2-100.)

The reordering of project purposes to favor upstream storage over hydropower generation and navigation support is shown by the proposed action zones under the new ACF master manual. Action zones were first implemented by the Corps in the 1989 draft manual, yet the 1989 draft manual was never previously made final or subjected to required environmental review. As the District Court noted in the prior ACF litigation, the action zones "highlight the shift in operations at Buford from hydropower, flood control, and navigation to water supply and recreation." *In re Tri-State Water Rights Litigation*, 639 F.Supp.2d 1308, 1333 (M.D. Fla. 2009), *rev'd on other grounds*, 644 F.3d 1160 (11th Cir. 2011).

B

The new action zones put even *more* storage off limits to normal hydropower and navigation support operations than the 1989 manual. Seasonal navigation and hydropower may be fully supported only in zone 1, and support is reduced in zone 2, and effectively abandoned in zones 3 and 4. Yet the vast majority of the storage of the reservoir is in zones 3 and 4. During the critical summer period (July 1-September 30) the action zones for Lake Lanier under the 1989 draft manual put 71% of the conservation storage in zone 4, while under the PAA zone 4 contains 75% of the conservation storage, which was accomplished by reducing the zone 3 storage. Only about 18% of the conservation storage is in zones 1 and 2, under both the NAA and PAA. Also, for the ACF Basin as a whole, the zone 4 storage increased from 57% under the NAA to 60% under the PAA. These percentages actually overstate the amount of water available for normal operations. As shown by Figure 6.1-2, the modeled elevation of Lake Lanier during normal (50% exceedance) years is about 1067 msl during September, which is below the top of zone 2. At the same time, the top of zone 4 is about 1063 msl. This means that during the average year, in September, a low flow month when upstream storage is needed most, there will be no storage in zone 1, and only about 4 vertical feet of storage in zones 2 and 3, yet there will be 28 vertical feet of storage in zone 4 that is unavailable for normal operations. In addition, the revised action zones place greater demands on storage from the Corps' Middle Chattahoochee projects and less from Lake Lanier. The revised zone 4 elevation for Lake Lanier would reserve 25 feet of storage in January. (DEIS at Table 4.1-7.) In contrast, zone 4 at Walter F. George would be triggered in January with only 2.5 feet left in storage. (*Id.* at Table 4.1-9.)

Changes to drought operations will further limit downstream flow support. Under the current 1989 manual action zones, drought operations are initiated when the composite conservation storage enters zone 4, while under the PAA zones drought operations are triggered when composite conservation storage declines into zone 3. Drought operations would not be suspended until composite conservation storage recovers to zone 1. The effect of this change would be more frequent and severe drought operations—resulting in less downstream flow. The DEIS acknowledges that the PAA "would be expected to trigger drought operations 22 times over the modeled period of record, *seven times more often* than the [no action alternative] (3 occurrences) (see Table 6.1-11)." (*Id.* at 6-79) (emphasis added). Furthermore, "[d]rought operations would be in effect 18.1 percent of the modeled period, which would be equivalent to

Response to ACF236 – Alabama Power Company

B. USACE does not prioritize project purposes. The PAA continues to balance all authorized project purposes. The 2012 legal opinion, discussed in section 3.5.2.8.3 of the EIS, determined that meeting Georgia's 2000 water supply request would not constitute a reordering of project purposes. As long as reservoir storage remains within the maximum and minimum hydropower design head, no storage is off limits for hydropower generation. The proposed navigation season provides an adequate channel depth when sufficient water is available.

158 months, or a total of about 13 years of the 73-year period of record (versus 6.7 percent of the time for the [no action alternative]).” (*Id.*) As a result of this mode of operation, more of the conservation storage is off limits to downstream flow support, as admitted by the DEIS: “[C]omposite conservation storage values and conservation storage levels in the reservoirs would tend to remain higher for a longer period of the time under the PAA [preferred action alternative] compared to the NAA [no action alternative].” (*Id.* at 6-79.)

Another consequence of the proposed action zones is reduced hydropower generation—and therefore downstream flows—during so-called drought conditions, *i.e.*, when composite conservation storage reaches zone 3 and continuing until recovery to zone 1. The DEIS proposes to cut generation at Buford by 1/2 (from 2 hours to 1 hour) in zones 2 and 3, and by 1/3 (from 3 hours to 2 hours) in zone 1. (*Id.* at Table 4.1-6.) But even at this reduced level, the DEIS insists that generation is “not required.” (*Id.* at 5-32.) The conclusion of the DEIS that hydropower will not be adversely affected by the PAA, as compared to the NAA, is not supported. (*Id*. at 5-23.) In the first place, the NAA assumes and is based on current operations, including water supply diversions and off-peak generation. The baseline should have been based on hydropower generation in the 1970s, the time of the last environmental review.[3]

C

These concerns are not hypothetical, as demonstrated during operations in 2009. At West Point Dam there is a continuous minimum flow release requirement of 675 cfs, based on water supply and waste assimilation needs when the West Point project was being planned and constructed. However, a more contemporary statement of the Middle-Chattahoochee flow requirements is set forth in the FERC licenses for the Georgia Power projects just below West Point. The FERC license for the North Highlands project provides an instantaneous target minimum flow release of 800 cfs, or inflow, whichever is less, downstream of the dam; a daily average target minimum flow of 1,350 cfs, or inflow, whichever is less, downstream of the project; and a weekly average target minimum flow of 1,850 cfs, or inflow, whichever is less, downstream of the project. (*Id.* at 2-38). During the summer of 2009 (June, July, August), a period of releases from West Point lower than 1350 cfs occurred on 28 days, which reduced the flows at Columbus and downstream. According to the DEIS, low flows of this magnitude will occur more frequently under the PAA.

Downstream flows will also be reduced because the proposed new manual effectively abandons navigation support. Traditionally, flow support from storage for navigation is made in the summer and fall when flows are lower and maintaining navigation channel depth requires flow supplementation. However, the proposed plan proposes a winter/spring navigation season when flows are typically higher and navigation channel depth does not require flow supplementation. This support is also limited to a 7-ft. channel instead of the authorized 9-ft. channel. Moreover, there is no plan for dredging or other maintenance of the channel, yet any flow support for navigation is dependent on the channel in the Apalachicola River downstream of Jim Woodruff Lock and Dam being relatively stable and able to support a minimum navigable depth of 7 ft when the necessary flows are provided. (*Id.* at 6-80.) Moreover, under the proposed new action zones, there is no navigation support at all in zone 3 until recovery to zone

D

[3] The Corps’ hydropower impact analysis suffers many of the same flaws as the Corps’ hydropower impact analysis contained in its ACT EIS for the new ACT master manual.

Response to ACF236 – Alabama Power Company

C. USACE recognizes that the ACF Basin projects cannot reliably provide sufficient hydropower under those circumstances without significantly impacting other project purposes. Past operations during droughts have demonstrated the USACE commitment to generating hydropower during peak hours to the greatest extent possible.

D. USACE believes that the navigation season proposed in the PAA best meets the authorized purpose of navigation without significant impacts to other authorized project purposes and is in keeping with USACE’s stated purpose of operating the ACF system in a balanced manner to fulfill all authorized purposes.

1 and total storage is forecast to remain above zone 2 for a practicable, continuous period. This is inadequate to meet the ACF's navigation function.

The Corps should also consider modifications to the required minimum flows for federally listed threatened and endangered species from Woodruff Dam that would better protect against low-flows in the summer. Both the Corps' current and proposed operations include substantially identical versions of the 2012 Revised Interim Operations Plan (RIOP). *Compare* Table 2.1-5 with Table 5.4-3. In our prior May 13, 2008 comment letter on the 2008 version of the RIOP, (Attachment D), we included as Attachment E a technical report by Mr. Randy Kerr. One recommended change identified by Mr. Kerr would be to require the daily average release to be at least 1,000 cfs less (for basin inflows of 16,000 cfs or less) than the basin inflow until the 5,000 cfs threshold is met. This would still allow some storage of water in the ACF River Basin while mimicking natural flows in the basin. Also, any modified drought plan should address revisions to the operations at West Point and W.F. George to allow overfilling to ensure adequate water storage to support low flows during the summer. As explained in Mr. Kerr's reports, under the EDO and the proposed modifications to the IOP, composite storage for the basin is largely determined by storage in Lake Lanier. Walter F. George and West Point reservoirs could both be in Zone 4, Lanier could be in Zone 1, and high flows could still be mandated under the EDO and the proposed modifications to the IOP. Therefore, the Corps should re-evaluate the Zone 4 elevations for the Corps' Walter F. George and West Point reservoirs, particularly during the August to December time period. Raising the Zone 4 elevations would allow these projects to help augment the flows required at Jim Woodruff Dam during extreme drought conditions. At the very least, this technical recommendation should have been included in the alternatives considered in the EIS.

E

II. The Master Manual Should Affirmatively Protect Flows in the Middle Chattahoochee

Although Alabama Power appreciates the Corps' recognition of the importance of the 2,000 cfs minimum flow at Plant Farley, the Corps should take affirmative steps to ensure minimum flows in the Middle Chattahoochee.

The PAA does not adequately protect flows downstream at Plant Farley. The DEIS, based on Corps modeling of the NAA and PAA alternatives, admits that flows below 2,000 cfs at Plant Farley will increase from 4% to 5% of the time, at the 90-percent exceedance level (drought conditions). This means that over the period of record the model predicts flows below 2,000 cfs on 1186 days—certainly not an insignificant number when dealing with Plant Farley. As the Corps has previously recognized, the "[l]oss of Plant Farley's generating capacity would be a major blow to the Southern services grid, and could result in significant power outages and disruptions." (ACF012334, 012391.) However, even this prediction understates the likely impact, due to assumptions included in the Corps model relating to ongoing operations, such as the Corps insufficiently substantiated belief that 94% of water withdrawn from the system for consumptive uses will be returned (discussed *infra*) (DEIS at 5-7), and the failure to consider or model increased consumptive uses, especially below the West Point project to Woodruff.

F

The new ACF master manual, as currently drafted, is designed to conserve upstream storage at the expense of downstream flows through several significant changes to prior

Response to ACF236 – Alabama Power Company

E. USACE considered modifications to the minimum flows for federally listed threatened and endangered species from Jim Woodruff Dam. Section 4 of the EIS outlines the various water management alternatives considered, including those that provide for higher and lower minimum flows over those prescribed by the PAA. It is correct that the minimum flow provisions of the PAA and the NAA are nearly identical. However, the PAA makes changes to the action zones at the storage projects, including initiating drought operations in Zone 3 rather than in Zone 4, changes in the timing, and, to a lesser extent, the volume of water released into the Apalachicola River. Since 2005, USACE has conducted multiple section 7 consultations with the USFWS regarding releases from Jim Woodruff Dam, which have included various ways of calculating basin inflow, minimum flow provisions, and storage options. The NAA and PAA basin inflow calculations remove the effects of upstream consumption and evaporation to more accurately represent the volume of water that actually enters USACE projects. The NAA and PAA also include provisions for the storage of basin inflow under both normal and drought operations as well as provisions for early refill at the West Point and Walter F. George projects during drought operations. PAA revisions to the action zones are designed to address the balancing scenario described and raise Zone 4 delineations at West Point and Walter F. George.

F. The authorized purposes of the federal ACF system do not include a specific directive to meet flow targets at Columbus, Georgia, or Columbia, Alabama. The stated daily and weekly average flow targets at Columbus, Georgia, are established in the Federal Energy Regulatory Commission (FERC) license for Georgia Power Company projects downstream of West Point Lake (see section 6.1.1.2.1 of the EIS). Each of the FERC target flows include an important qualifier, (e.g., "a daily average target minimum flow of 1,350 cfs, or inflow, whichever is less" [emphasis added]). Model results over the 73-year hydrologic period of record indicate that a daily average flow of 1,350 cfs at Columbus would be achieved on 94 percent of the days for the PAA compared to 95 percent for the NAA (refer to section 6.1.1.2.3.9 of the EIS). The Alabama Office of Water Resources and the Southern Nuclear Operating Company have identified a daily average flow need of 2,000 cfs at Columbia, Alabama, to support continued operation of the Farley Nuclear Plant. Model results indicate that the daily average flow need at Columbia would be met 95 percent of the days over the period of record for the PAA compared to 96 percent for the NAA.

operations, as described above. The manual recognizes only three flow targets—one at Atlanta, one at West Point, and one at Woodruff. The upstream Atlanta flow target is guaranteed sufficient for Atlanta water supply and waste assimilation (based on projections to 2030), and the downstream flow target from Woodruff is supposed to be sufficient for fish and wildlife and endangered species needs in the Apalachicola River. Yet the only flow target in the middle reach of the Chattahoochee, the 675 cfs target at West Point—based on water supply and waste assimilation needs in the 1970s—is admittedly insufficient for current, much less future, municipal and industrial water supply and water quality in the Chattahoochee River from West Point to Woodruff. In addition to Plant Farley's 2,000 cfs flow requirement, the 2003 MOU also specifically recognized the need for the Corps to provide, among other flows, a minimum daily flow of 1,350 cfs on the Chattahoochee River at Columbus, Georgia, and a flow of 1,850 cfs on a weekly basis provided that the top of the storage pool in West Point Reservoir is above 621.6 feet.

The Corps' stated position—that "authorized project purposes of federal projects do not include operating to meet requirements for which other parties are responsible," (DEIS at 4-7), and that these flow targets are "nonmandatory with respect to USACE project operations," subject to support only "as long as authorized project purposes are not adversely affected," (*Id.* at 6-35)—is wholly inadequate given the many changes proposed in the new manual to protect upstream storage at the expense of downstream flows. In any case, system operations to meet the 1,350, 1,850, and 2,000 cfs targets *are* directly authorized by Congress—releases to meet the targets fall squarely within the hydropower, navigation, and water quality purposes of the projects.

The Corps has ample authority under authorizing legislation to operate the upstream projects to meet the 1,350, 1,850, and 2,000 cfs flow targets. In addition to the original legislation already cited, West Point was authorized by Pub. L. 87-874 (Oct. 23, 1962) to be built and operated "substantially in accordance with … House Document Numbered 570 …." House Document 570 (1962) provides for a continuous minimum flow "to prevent a nuisance condition" in the river below the dam due to the preexisting discharge of "industrial and domestic wastes into the river." (House Doc. 570 at ¶73.) At that time the off-peak flow for "water supply and sewage dilution" was estimated to be "about 410 c.f.s." (*Id*. at ¶85.)

Later studies by the U.S. Public Health Service increased the minimum flow requirement to 670 cfs in 1964, and 675 cfs in 1975. (DEIS at 2-124.) The area of concern under the original legislative history was not simply the stretch of the river immediately below West Point Dam. In fact, House Document 570 observes that "[t]he Columbus-Phenix City area is another large contributor of pollution. Additional stream flow regulation which would be afforded by the … West Point reservoirs would help to dilute this pollution in some degree" (House Doc. 570 at ¶74); and that "the average weekly flow from all power releases would be 5,070 c.f.s. and the minimum monthly flow about 2,460 c.f.s." (*Id*. at ¶87).

This minimum monthly flow included in the legislative history—2,460 cfs—is more than adequate to satisfy the FERC weekly average target minimum flow of 1,850 cfs from Georgia Power's North Highlands project, upstream of Columbus. (DEIS at 2-38.) Nevertheless, the DEIS predicts daily flows below West Point Dam at the minimum level of 675 cfs on 10 percent of the days over the period of record, even though Georgia Power's ability to meet the FERC

flow target at Columbus with releases from the North Highlands Dam is usually dependent upon operations at West Point Dam (*Id*. at 6-58, 6-59), and that flows at Columbus less than the FERC daily average target flow of 1,350 cfs will increase from four to five percent of the days over the modeled period of record (*Id*. at 6-61.)

III. COE's NEPA Analysis Fails to Consider the Full Range of Impacts

An essential part of the process required by the National Environmental Policy Act ("NEPA") is the determination of a "No Action Alternative" baseline against which the environmental impacts of the proposed federal action can be evaluated. The No Action Alternative is fatally flawed because it relies on a faulty baseline. The Corps has also ignored the full range of cumulative impacts that can be reasonably expected under the PAA. Furthermore, the Corps has also failed to consider a reasonable range of alternatives, including alternatives that would provide greater flow support for the Middle Chattahoochee.

The Corps last conducted NEPA analysis of ACF operations for its projects in the 1970s. Specifically, the Corps prepared an EIS for continued operations of Buford Dam in 1974, an EIS for the construction of West Point Lake in 1977, and an EIS for the continued operation of W.F. George in 1979. All three of those EISs made assumptions about the operation of the ACF system that differ sharply from the Corps' current operations. Here, the Corps' baseline includes the 1989 draft ACF water control manual associated with the Post Authorization Change ("PAC") study that was never publically vetted or subject to NEPA review. The Corps' PAC study, in fact, triggered the tri-state litigation that has plagued the operation of the ACF and ACT. Among the original claims raised by Alabama, Alabama challenged the Corps' failure to subject its proposed 1989 draft manual to NEPA review. That claim was ultimately dismissed as premature. The Corps cannot now assume the legality of the operations set forth in the draft 1989 manual simply because the Corps chose to illegally implement them. Doing so would completely negate the purpose of NEPA. The baseline includes many other changes in operation since the original manuals and last NEPA review of the system in the 1970's on the theory that the baseline should reflect current operations whether lawful or not.

G

The District Court, in the summary judgment order in Phase 2 of the prior ACF litigation, concerning NEPA, the draft 1989 manual and the IOP, specifically wrote to this very issue: "The Court is troubled by the Corps's refusal to take responsibility for its utter failure to conduct any sort of environmental analysis whatsoever on the plan by which it has operated the ACF basin for more than 20 years…. [I]t is the Corps's ultimate responsibility to ensure that its actions conform to the law, and the law is clear that actions of the scope and magnitude of the 1989 WCP require the comprehensive environmental analysis performed in an EIS…. It is possible that if the parties had more information about the true effects of the Corps's operations, resolving their differences would have been easier." *In re Tri-State Water Rights Litigation*, Case No. 3:07-md-01 (M.D. Fla.) July 21, 2010 memorandum and order, at p. 22-23 (holding claims moot due to Corps plan to develop a new manual), *vacated on mootness grounds* by January 25, 2013 order.

Other baseline assumptions, which represent significant changes from former authorized operations include the Corps' operations of Buford to permit increased water supply withdrawals from Lake Lanier and to facilitate current Atlanta area water supply withdrawals from the river

Response to ACF236 – Alabama Power Company

G. Council on Environmental Quality (CEQ) regulations for implementating NEPA require consideration of the NAA (section 1502.14). In the CEQ's memorandum of March 23, 1981, Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, question no. 3 addresses the NAA. The response to question no. 3 states, in part:

> The first situation might involve an action … where ongoing programs initiated under existing legislation and regulations will continue, even as new plans are developed. In these cases, "no action" is "no change" from the current management direction or level of management intensity. To construct an alternative that is based on no management at all would be a useless academic exercise. Therefore, the "no action" alternative may be thought of in terms of continuing with the present course of action until that action is changed.

Consequently, for purposes of the Master WCM update process, the NAA reflects current reservoir operations as they have evolved over time in response to laws, regulations, policy, and new technical information. Basing the NAA for the ACF Basin on a pre-NEPA 1958 WCM or a predam condition to assess the effects of alternative WCM update plans would neither accurately reflect current baseline operations nor be consistent with "no action" as defined in the referenced CEQ memorandum

below the dam, as well as the abandonment of navigation support and maintenance. No such changes can be incorporated into the baseline. Doing so unlawfully minimizes the real impacts of the Corps' proposal. Setting a baseline based only on current operations impermissibly excludes a range of Corps actions from any NEPA review, including the Corps' 1989 manual. Numerous courts have ruled that a baseline cannot assume the existence of elements of the proposed action. *See, e.g., N.C. Wildlife Federation v. N.C. Dept. of Transp.*, 677 F.3d 596, 603 (4th Cir. 2012); *Friends of Yosemite Valley v. Kempthorne*, 520 F.3d 1024, 1037-38 (9th Cir. 2008).

Under NEPA, the Corps must consider the cumulative effects of its proposed actions. (*See* 40 CFR § 1508.27). Cumulative effects "results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions . . . ." (*Id*. at 1508.07.) "To consider cumulative effects some quantified or detailed information is required. Without such information, neither the courts nor the public in reviewing the [agency's] decisions, can be assured that the [agency] provided the hard look that it is required to provide." *Neighbors of Cuddy Mtn. v. U.S. Forest Serv.*, 127 F.3d 1372, 1379-80 (9th Cir. 1998). "General statements about possible effects and some risk do not constitute a hard look absent a justification regarding why more definitive information could not be provided." (*Id*. at 1380.) Among other things, this requires the Corps to consider the impacts downstream of all "past, present, and reasonably foreseeable" operational changes made in the ACF Basin, including changes at Lake Lanier to support water supply and recreation.

H

The Corps has also failed to consider a reasonable range of alternatives. None of the alternatives considered by the Corps considered any meaningful changes to the RIOP, minimum flows for the Middle Chattahoochee, or limitations on operations for water supply. The Corps also failed to consider any alternative based on *lawful* water supply operations. The NAA (Alt1A) is based on current (2007) water supply operations at Lanier—128 MGD from the Lake and 277 MGD from the River. (DEIS at Tables 5.1-2, 5.2-1, and Section 5.2.1.2.7.) The alternatives include Alt1B, which is more accurately based on the relocation contracts only—20 MGD—from the Lake, but this alternative also assumes current water supply of 277 MGD from the River. (*Id*. at Section 5.2.2.2.7.) Thus, the Corps did not evaluate any alternative based on lawful historic water supply operations, and, as a result there has been no NEPA analysis of the effects of increased consumptive use of Buford's peak and off-peak releases by downstream users.

I

A. COE NEPA Analysis Based on Faulty Return Assumptions

Of particular concern is the Corps' use of return flow assumptions to minimize downstream impacts. The DEIS assures downstream interests that they should not be concerned about increased diversions and consumptive loss for upstream water supply. For example, the DEIS states:

> USACE assumptions regarding water supply withdrawal options and return flows associated with Lake Lanier and downstream from Buford Dam to Peachtree Creek do not have an appreciable effect on flow conditions in the Chattahoochee River below George W. Andrews Lock and Dam.

(*Id*. at 6-68.)

Response to ACF236 – Alabama Power Company

H. Direct, indirect, and cumulative impacts are addressed in section 6 of the EIS. A 73-year period of record was used to evaluate the impacts of the various alternatives. Additionally, USACE regulations require that the WCMs be reviewed every 5 years to determine if more updates are necessary.

I. As stated in section 1.2 of the EIS, USACE considered, in addition to operations for all authorized purposes, an expanded range of water supply alternatives associated with the Buford Dam/Lake Lanier project, including current levels of water supply withdrawals and additional amounts that Georgia requested in 2013 from Lake Lanier and downstream for Metro Atlanta. The Master WCM update represents a change in operation of existing constructed projects; it does not include structural changes or alternatives outside the operational authority. As concluded by the 11th Circuit Court of Appeals, USACE is authorized under the River and Harbor Act of 1946 to make releases from Buford Dam to meet the downstream water needs of Metro Atlanta. The draft EIS and final EIS both include a "future without project condition alternative" that evaluates the impacts of withdrawing only 20 million gallons per day (mgd) from Lake Lanier under the relocation contracts. Therefore, USACE has evaluated and proposed water management measures and alternatives that balance operations across all authorized project purposes throughout the basin while considering Georgia's water supply storage request, as directed by the 11th Circuit Court of Appeals.

This conclusion rests in large measure on the Corps' assumptions about how much of the water supply withdrawals are actually returned to the ACF basin, as opposed to being lost to consumption. According to the DEIS:

> Table 2.1-21 simply presents an overall summary of water withdrawals and treated wastewater returns for the Chattahoochee and Flint River basins that occurred in the MNGWPD [Metropolitan North Georgia Water Planning District] over the 2000–2009 period…. In 2000, about 56 percent of all water withdrawn from the Chattahoochee River Basin within the MNGWPD area was returned as treated wastewater. Between 2001 and 2008 in the district, the percent return of water withdrawals from the Chattahoochee Basin ranged between 62 percent and 74 percent. In 2009, the percent return of withdrawals was 79 percent.

(*Id*. at 2-98.)

J

This Table shows great variation in return rates from year to year, from 56% to 79%, and also shows that return rates in wet years, such as 2003 (74%) and 2009 (79%) are significantly higher than return rates in dry years, such as 2000 (56%) and 2007 (61%). The same variation is true on a monthly basis, with usage higher and returns lower in the critical dry periods. However, for purposes of evaluating alternatives, the Corps used a return rate of 82% for releases from Buford Dam to support Metro-Atlanta water supply withdrawals, even though 82% exceeded both the range (56%-79%) and average (67%) of actual returns as documented in Table 2.1-21. (*Id*. at 4-33.) The 82% return was based on one year (2012)—even though the data show great variation from year to year—and was used for the comparison of alternatives A, B, C, and F. The Corps used an even *higher* return rate for modeling and comparing alternatives D, E, and H (including the PAA)—94%—which was the return rate "assumed" by Georgia in its 2013 water supply request. The DEIS does not reflect any validation of this "assumption," other than the bald statement that "USACE determined that this return rate was reasonable." (*Id*. at 5-7.)

DEIS Appendix E, HEC ResSim Modeling Report, Figure 24, p. 61, and Figure K.90, p. K-115, shows the importance of return rates for the modeling of alternatives. According to the Corps, "we need to insert some return figures here, because otherwise it is not apparent why these alternatives wouldn't be reasonable. (I believe they would exceed available storage, but assuming returns could be increased enough they would not, correct?)" Those figures also state that the 2012 return rate—82%—was based on information provided by the Georgia EPD, rather than any independent validation or analysis by the Corps. This apparent concession that the Corps needed a return rate high enough to insure sufficient storage explains why the Corps ignored its own data in assuming that 94% of the water withdrawn would be returned.

B. COE NEPA Analysis Fails to Consider Future Growth in Middle-Chattahoochee Region

While the Corps goes to great length to build its proposed ACF master manual around future growth projects for the Atlanta area, the Corps makes no effort to analyze future growth potential in the Middle Chattahoochee. This is critically important because increased diversions for municipal and industrial water supply, agricultural, and other uses, would directly impact the ability to the system to meet the needed flows, including the 1,350, 1,850, and 2,000 cfs flow

K

Response to ACF236 – Alabama Power Company

J. The 82-percent river return rate was computed from actual Metro Atlanta withdrawals and returns that occurred in 2012. USACE chose 2012 to be conservative, because it represented a dry year for current conditions. That current return rate of 82 percent was used for water supply options A, B, C, and F in the draft EIS. The historic water use information was provided by GAEPD, and the annual and monthly return rates were computed independently by USACE for years 1991–2012. Annual values range from 79 to 111 percent. USACE selected 2012 return rate of 82 percent as the best representative return rate for current conditions. As stated in the comment, return rates are higher during high-flow periods (years); therefore, we selected a dry year as a conservative estimate.

The 94-percent river return rate was part of the Georgia's January 2013 water supply request. That value included the assumption that wastewater treatment capacities would be expanded by the year 2035. Since Georgia's projected return rate is within the range of computed historic river return rates by USACE (i.e., 79–111%), it was declared a reasonable assumption. The 94-percent river return rate, validated by reviewing existing and proposed treatment facility returns described in the May 2009 Metropolitan North Georgia Water Planning District wastewater treatment plan, documented a larger volume of returns, which could represent treating and releasing water from sources outside the Chattahoochee River basin.
Based on additional information provided by the State of Georgia in December 2015, these return rates have been revised and are documented in section 5 of the final EIS

K. USACE proposed and evaluated water management measures and alternatives that balance across all authorized project purposes, while considering Georgia's water supply storage request as directed by the 11th Circuit Court of Appeals.

targets applicable to the West Point to Columbia stretch of the River. The Corps uses modeling to minimize the impacts of increased upstream diversions on downstream flows, but fails to model the impacts of increased downstream diversions on uses and flows.

Sincerely,



Matthew W. Bowden
Vice President Environmental Affairs

Attachment A

Southern Nuclear
Operating Company, Inc.
42 Inverness Center Parkway
Birmingham, Alabama 35242

SOUTHERN COMPANY
Energy to Serve Your World™

November 21, 2008

VIA E-MAIL TO COMMENTS@ACF-WCM.COM

Col. Byron Jorns, District Engineer
Mobile District, U.S. Army Corps of Engineers
107 Saint Francis Street, Suite 1403
Mobile, Alabama 36602-9986

Re: Scoping Comments – Water Control Manual for the Apalachicola-Chattahoochee-Flint River Basin

Dear Colonel Jorns:

The U.S. Army Corps of Engineers ("Corps") has solicited public comments regarding the scope of issues to consider as the Corps updates its water control manual for the Apalachicola-Chattahoochee-Flint ("ACF") River Basin. 73 Fed. Reg. 54,391 (Sept. 19, 2008). This letter provides the comments of the Southern Nuclear Operating Company ("Southern Nuclear").

Southern Nuclear operates the Farley Nuclear Plant ("Plant Farley"), located on the Chattahoochee River near Dothan, Alabama, which provides 19% of the total electricity generation for Alabama Power Company. Plant Farley relies on adequate elevations and flows in the Chattahoochee River for cooling water and discharge assimilation. From time to time, it is necessary to transport oversized equipment to and from Plant Farley by barge. Accordingly, Southern Nuclear has a significant interest in the Corps' management of its reservoirs in the ACF River Basin.

As the Corps revises its ACF water control manual, it is the position of Southern Nuclear that the Corps must ensure: (1) minimum flows of 2,000 cubic feet per second ("cfs") in the Chattahoochee River at Columbia, Alabama; (2) support of navigation on the Apalachicola and Chattahoochee Rivers; and (3) operation of the Corps' ACF reservoirs for their Congressionally authorized purposes. Each of these issues is explained more fully below.

1092455.1

The Corps must provide 2,000 cfs minimum flow at Columbia, Alabama.

Southern Nuclear defines a flow of 2,000 cfs and river elevation of 74.5 feet mean sea level ("ft MSL") as the minimum conditions necessary for long-term operation of Plant Farley. While Plant Farley can operate for short periods (a few days) with flow below 2,000 cfs, extended operation at lower flow would require detailed evaluation to determine the potential environmental and operational impacts. Generally, Plant Farley operates with a river elevation between 76 and 78 ft MSL. Operation below 74.5 ft MSL also would require detailed evaluation to determine the potential environmental and operational impacts. Other industrial facilities on the Chattahoochee River, including those of MeadWestvaco and Georgia Pacific, also require the same conditions to meet their applicable water quality standards.

Plant Farley's discharge is limited by a National Pollutant Discharge Elimination System Permit issued by the Alabama Department of Environmental Management. That permit contains limits and requirements to ensure the thermal discharge and chemical constituents in the effluent meet applicable water quality standards. At 2,000 cfs flowing past Plant Farley (*i.e.*, going through Andrews Lock and Dam), there are no significant adverse thermal or chemical impacts resulting from Plant Farley's discharge. Plant Farley also discharges small quantities of radioactive waste through the discharge line in strict compliance with regulations of the Nuclear Regulatory Commission ("NRC"). When flows are reduced below 2,000 cfs for extended periods, an evaluation of the impacts of that discharge is required by Southern Nuclear, state environmental agencies, and, potentially, the NRC.

The Final Environmental Impact Statement ("FEIS") of the Atomic Energy Commission for construction of Plant Farley at that site discussed the fact that the Corps would generally maintain an elevation of 76 ft MSL and flow of 2,000 cfs. FEIS Related to Construction of Joseph M. Farley Nuclear Plant Units 1 & 2, Alabama Power Company, II - 20 (June 1972). Thus, regulatory approval of the Plant Farley site was based on an assumption that the Corps would continue to maintain those parameters.

The States of Alabama, Florida, and Georgia considered Plant Farley's requirements and those of other facilities on the Chattahoochee River during the interstate compact negotiations concerning a proposed Allocation Formula for the ACF River Basin. The three states signed a Memorandum of Agreement providing for a minimum daily flow of 2,000 cfs below George W. Andrews Lock and Dam, just above Plant Farley.

The Corps has also recognized the need for flow of 2,000 cfs at Columbia, Alabama. For example, the Walter F. George Reservoir Regulation Manual specifically recognizes that Plant Farley and other industries require adequate flows and elevations for their operations and downstream water quality as follows:

> Among the industrial users are two paper company facilities and one nuclear power plant. Mead Paper Company, at the headwaters of W.F. George Lake, and the Georgia Pacific Corporation, in the headwaters of Lake Seminole, withdraw water for processes used in the manufacturing of wood products. These companies must also meet special water quality requirements for discharge that are based on a combination of dissolved oxygen and flow in the river. The Alabama Power Company's Farley Nuclear Power Plant is located on the Chattahoochee River downstream from Columbia, Alabama. The plant has an intake structure that provides cooling water for its nuclear fuel, and is dependent upon a river-stage above 76 feet MSL for safe operation.

Apalachicola River Basin Reservoir Regulation Manual, Appendix C, Walter F. George Dam at C-13 (Feb. 1993).

Plant Farley and the other industrial facilities in the region make a major contribution to the regional economy of southeastern Alabama and southwestern Georgia. Flows of 2,000 cfs at Columbia, Alabama, are critical for the continued safe and reliable operation of those facilities. Therefore, Southern Nuclear urges the Corps to ensure its manual revisions clearly provide for the continuation of flows at that level.

The Corps must support navigation on the Apalachicola and Chattahoochee Rivers.

In addition to flow assumptions, another primary factor in the siting of Plant Farley was proximity to a federally authorized and maintained navigable river. Most of the large equipment for the original plant construction was delivered by barge. In 2000 and again in January of 2006, barge transportation to and from the plant was necessary for vital equipment replacement and maintenance activities. No other mode of transportation to Farley was adequate for those purposes. Inadequate provision for reliable navigation will increase costs for Plant Farley and limit the potential for future expansion.

Navigation is one of the principal authorized purposes of the ACF River Basin reservoir system as authorized by Congress. Each of the Corps' ACF reservoirs plays a critical role in maintaining navigation in the ACF River Basin. For example, the current reservoir regulation manual for Jim Woodruff Reservoir describes Woodruff as "a multi-purpose project created primarily to aid navigation in the Apalachicola River below the dam and in the Chattahoochee and Flint Rivers above the dam and to generate electric power." Apalachicola River Basin Reservoir Regulation Manual, Appendix A, Jim Woodruff Reservoir at A-10 (1972 & Rev. July 1985). To this end, the Corps is directed to maintain Woodruff at an elevation of approximately 77 ft MSL while continuously releasing inflows to the Apalachicola River in order to support a nine foot deep navigation channel. *Id.* at A-16, A-17. Continuous navigation operations are to be curtailed only during unusual low-flow events, consistent with static head limitations. *Id.* at A-18.

Upstream, the George W. Andrews Reservoir is described in its Reservoir Regulation Manual as "a single purpose project designed to aid navigation by providing a 9-foot

navigation channel and by maintaining a more uniform downstream flow." Apalachicola River Basin Reservoir Regulation Manual, Appendix D, George W. Andrews Reservoir at D-5 (Rev. Feb. 1978). Andrews, like Woodruff, is a run-of-river project, and it aids navigation primarily by passing inflows released from upstream projects. All efforts are to be made to ensure Andrew's tailwater does not drop below 77 ft MSL—the minimum needed to maintain a nine foot navigation channel. *See id.* at D-26. When Andrews can no longer support this tailwater elevation, "arrangements may have to be made for limited operation of the Walter F. George power plant, or for equivalent spillway discharges." *Id.* Indeed, all three of the upstream reservoirs are required to support navigation from Columbus, Georgia, to the Gulf of Mexico. As the Corps' 1989 Draft Water Control Plan recognizes, "all three of the major storage projects will be utilized to provide the designated level of support" for navigation "for as long as possible and, of course, preferably year-round." ACF Basin Water Control Plan at 17-18 (Draft Oct. 1989).

As explained above, Plant Farley was designed and built on the assumption that the Corps would ensure a minimum elevation of 76 ft MSL between Andrews and Woodruff for as much of the year as possible. When the ACF reservoirs are operated to meet the elevation and flow targets specified in the Woodruff and Andrews Reservoir Regulation Manuals, Plant Farley's operational requirements are met.

Recently, the Corps has not maintained the Apalachicola River to provide for safe and reliable navigation, largely due to the State of Florida's denial of authorization pursuant to Clean Water Act ("CWA") Section 401, the Coastal Zone Management Act ("CZMA"), and various state statutes and regulations. As a result, commercial barge traffic from Alabama and Georgia to the Gulf of Mexico has all but ceased. Nevertheless, the Corps is responsible for maintaining navigation in the ACF River Basin notwithstanding Florida's decision. CWA Sections 404(t) and 511(a) provide sufficient authority for the Corps to proceed with navigation maintenance despite Florida's denial of a Section 401 permit. Additionally, Florida's coastal management program does not provide an independent basis to block navigation maintenance on the Apalachicola River. Under CZMA Section 307(e), the consistency review program may not be construed as diminishing, superseding, or modifying existing federal responsibilities over navigable waters. The Corps cannot use its failure to maintain the navigation channel and the subsequent reduction in barge traffic as a basis for not operating the reservoirs for navigation.

The Corps must operate the ACF reservoirs for their authorized purposes.

The Corps' method of developing its Interim Operations Plan ("IOP") and Revised Interim Operations Plan ("RIOP") raises concerns about how the Corps defines its statutory authority with respect to ACF River Basin operations. The IOP and RIOP are almost exclusively driven by fish and wildlife concerns. However, only one ACF reservoir—West Point—was expressly authorized by Congress for any fish and wildlife purpose, and that West Point authorization was for fish and wildlife *recreation*. There is no recreational purpose associated with the mussel and sturgeon species which were the

subject of the IOP and RIOP. The Corps has no independent authority to create an IOP or RIOP designed to benefit threatened and endangered species to the detriment of the authorized purposes of the ACF reservoir system.

The Endangered Species Act ("ESA") does not authorize federal actions independent of federal agencies' other statutory authorities. Rather, a federal agency may undertake an action for the conservation of a threatened or endangered species only if its authorizing statutes allow it to do so. The Eighth Circuit Court of Appeals, in an opinion addressing the Corps' Missouri River operations, noted that if "ESA compliance would force the Corps to abandon the dominant [Flood Control Act] purposes of flood control or downstream navigation, *the ESA would not apply." In re Operation of the Missouri River System Litigation*, 421 F.3d 618, 631 n.9 (8th Cir. 2005) (emphasis added). The Eighth Circuit's opinion largely upheld a decision by Judge Paul Magnuson, who now presides over the ACF litigation in the Middle District of Florida. Likewise, the Supreme Court has recently held that ESA Section 7 governs only *discretionary* federal action; it does not mandate any result beyond or contrary to an agency's discretionary authority. *Nat'l Ass'n of Home Builders v. Defenders of Wildlife*, 127 S. Ct. 2518, 2536 (2007).

Under the applicable provisions of the ESA and the regulations of the Fish and Wildlife Service, the Corps should have presented its method of operating the ACF reservoirs as the subject of the Section 7 consultation. Because the Corps failed to do so, there was never any determination whether the Corps' pre-IOP operations potentially "jeopardize[d] the continued existence" of the Gulf sturgeon or the Apalachicola mussels or "destroy[ed] or adversely modif[ied]" those species' critical habitats. Rather, the IOP itself was made the subject of Section 7 consultation—even though the Corps lacks independent statutory authority to develop the IOP or RIOP.

Support of navigation is among the primary Congressionally authorized purposes of the ACF reservoirs. Accordingly, the Corps has no discretion to abandon navigation support, nor may the Corps operate the ACF reservoirs for conservation of a species listed under the ESA if doing so results in operations which fail to provide for navigation and the other Congressionally authorized purposes of the ACF reservoirs. *See* 421 F.3d at 629 n.7 ("[I]f faced in the future with the unhappy choice of abandoning flood control or navigation on the one hand or recreation, fish and wildlife on the other, the priorities established by the [statutes authorizing the Missouri River projects] would forbid the abandonment of flood control or navigation."). Providing additional flows for fish and wildlife are appropriate only after the primary purposes of the ACF reservoir system, including navigation, are met.

Thank you for your consideration of these comments. Should you have any questions or if you wish to receive additional information, please contact me at (205) 992-6387 or jgodfrey@southernco.com .

Sincerely,

Mike Godfrey
Environmental Affairs Manager

JMG/ahl

ES File: E.01.51

1002455.1

Attachment B

IN THE UNITED STATES DISTRICT COURT
MIDDLE DISTRICT OF FLORIDA
JACKSONVILLE DIVISION

In re MDL-1824 Tri-State Water Rights Litigation	)	**Civil Action No. 3:07-MD-1-PAM (Member Case: 3:07-cv-00249-PAM-HTS)**

PLAINTIFF-INTERVENOR ALABAMA POWER COMPANY'S
NOTICE OF FILING AFFIDAVIT OF WILLARD L. BOWERS

Plaintiff-Intervenor Alabama Power Company gives notice of its filing the affidavit of Willard L. Bowers (attached hereto) in support of its standing in this proceeding.

/s/ James A. Byram, Jr.
One of the Attorneys for
ALABAMA POWER COMPANY

OF COUNSEL:

James A. Byram, Jr.
Balch & Bingham LLP
105 Tallapoosa St., Suite 200
P.O. Box 78
Montgomery, Alabama 36101-0078
(334) 834-6500

Spencer M. Taylor
Thomas L. Casey, III
Balch & Bingham LLP
1901 Sixth Avenue North
Suite 1500
P.O. Box 306 (35201)
Birmingham, Alabama 35203
(205) 251-8100

CERTIFICATE OF SERVICE

I hereby certify that the above and foregoing was filed with the Clerk of the Court using the CM/ECF system, and was served by electronic notification this 23rd day of January 2009.

/s/ James A. Byram, Jr.
OF COUNSEL

IN THE UNITED STATES DISTRICT COURT
MIDDLE DISTRICT OF FLORIDA
JACKSONVILLE DIVISION

In re MDL-1824 Tri-State Water Rights Litigation	)	**Civil Action No. 3:07-MD-1-PAM (Member Case: 3:07-cv-00249-PAM-HTS)**

AFFIDAVIT OF WILLARD L. BOWERS

STATE OF ALABAMA)

JEFFERSON COUNTY)

Before me, the undersigned notary public in and for the State of Alabama, Jefferson County, personally appeared Willard L. Bowers, who being by me first duly sworn, deposes and says as follows:

1. I, Willard L. Bowers, am the Vice-President of Environmental Affairs for Alabama Power Company ("Alabama Power"). I joined Alabama Power in 1971 as the Reservoir Regulation Engineer responsible for hydrologic studies of Alabama Power's hydroelectric system. In 1974, I joined Southern Company Services, a subsidiary of Southern Company, as Manager of Environmental Licensing. In this position I was responsible, in part, for licensing of nuclear facilities. In 1984, I returned to Alabama Power as Manager of Environmental Compliance with responsibility for compliance with environmental permits. Since 1984, I have served Alabama Power in the positions of Manager of Environmental Affairs, General Manager of Environmental Affairs, and, most recently, Vice President of Environmental Affairs. I am over twenty-one years of age and give this affidavit of my own free will and based on my personal knowledge and review of business records.

Alabama Power and the Farley Nuclear Plant

2. Alabama Power is a public utility company that supplies electricity to more than 1.4 million homes and businesses in all but the northernmost portion of Alabama. Southern Company is the parent company of Alabama Power. Through its regulated regional electric utilities (such as Alabama Power), Southern Company serves over 4.3 million customers in a 120,000-square mile territory in Alabama, Florida, Georgia and Mississippi.

3. Alabama Power owns or operates 24 generating plants throughout Alabama, including the Joseph M. Farley Nuclear Electric Generating Plant ("Plant Farley"), located near Dothan, Alabama on the Chattahoochee River in the Apalachicola-Chattahoochee-Flint ("ACF") River Basin.[1] Plant Farley is owned by Alabama Power and operated by Southern Nuclear Operating Company ("Southern Nuclear"), also a subsidiary of Southern Company. Alabama Power owns lands between the George Andrews Lock and Dam and the Jim Woodruff Lock and Dam, which are riparian to the Chattahoochee River in the ACF River Basin where Plant Farley is located.

4. Plant Farley is one of three nuclear facilities in the Southern Company electric system. It includes two nuclear fueled units. Construction of the plant began in 1970. Unit 1 began commercial operation in 1977. Unit 2 began commercial operation in July 1981. The total cost to build Plant Farley was approximately $1.57 billion.

5. Each unit at Plant Farley is capable of generating 888 megawatts ("mw") of power for a total capacity of 1,776 mw. Since beginning commercial operation in 1977, Plant Farley has generated more than 200 billion kilowatts of electricity—enough generation to supply

[1] The Chattahoochee River originates in northern Georgia, flows southward to become part of the border between Georgia and Alabama, and joins the Flint River to become the Apalachicola River, which flows through northern Florida into the Apalachicola Bay and Gulf of Mexico. These three interconnected rivers, along with their respective tributaries, make up the ACF River Basin.

every Alabama Power residential customer with electricity for 14 years. In 2000, a representative year, Plant Farley supplied 20 percent of Alabama Power's electricity, generating more than 12.5 million megawatt hours ("mwh"). In 2008, Plant Farley provided approximately 18% of Alabama Power's total electricity generation.

6. Because Plant Farley is Alabama Power's only generating plant in Southeastern Alabama, it is critical to the operation of Alabama Power's 78,000 miles of power lines through its 44,500 square mile operating territory, and is critical to maintaining regional transmission reliability for the Southern Company system. Without the safe and reliable operation of Plant Farley, Alabama Power could not effectively serve the citizens and businesses of Alabama. Shutdown of either of Plant Farley's units would have a significant impact on the electricity supply to the citizens in the Southeast, including those throughout the ACF River Basin. *See* Exhibit A (Harry Letter to DOE) at 3.[2] ("It is estimated that the loss of these resources would increase total production costs by approximately $1,500,000 per day").) As recognized by the United States Army Corps of Engineers ("the Corps" or "Corps of Engineers"), the "[l]oss of Plant Farley's generating capacity would be a major blow to the Southern services grid, and could result in significant power outages and disruptions. (ACF Phase I Administrative Record ["ACF Phase I AR"] at ACF012391).[3]

[2] Attached as **Exhibit A** to this Affidavit is a true and complete copy of the October 30, 2007 letter from Mr. L. Ray Harry, Southern Company, to Ms. Katharine A. Fredrikson, United States Department of Energy ("DOE"). This letter responded to questions by the DOE concerning the potential electricity impacts on Southern Company's subsidiary operating companies, including Alabama Power, from the 2007 drought conditions in the ACF Basin. The facts stated in the letter are true and accurate, and are adopted and incorporated herein by reference.

[3] This information is contained on page B-23 of the Corps of Engineers' Drought Management Strategy for the Apalachicola—Chattahoochee—Flint Basin (August 1986), which can be found in the Administrative Record beginning at ACF012334 and on page ACF012391.

Plant Farley's Dependence upon the Lawful Operation of the Corps' ACF Projects

7. Alabama Power's Plant Farley is dependent upon water from the Chattahoochee River for cooling its nuclear reactors, assimilating thermal and other discharges from the plant, and for providing adequate navigational flows to barge large pieces of equipment to and from the plant. The reliable and adequate flow of water in the Chattahoochee River is essential to the safe and reliable operation of Plant Farley.

8. One of the most important and consequential activities along the Chattahoochee River is the operation of the Corps' upstream reservoirs. These include Lake Sidney Lanier ("Lake Lanier"), West Point Lake and the Walter F. George Lock and Dam. Lake Lanier is a reservoir in north Georgia created by the Buford Dam. Congress authorized the Corps of Engineers to build and operate Lake Lanier in the Rivers and Harbors Act, July 24, 1946, ch. 595, for the purposes of hydropower, flood control, and navigation. Because releases of water from Lake Lanier flow downstream into the Chattahoochee River along Plant Farley's riparian land, the Corps' operation of Lake Lanier directly affects Plant Farley's operations. The Corps' 1989 draft ACF Water Control Plan explains that Lake Lanier provides 65% of the conservation storage capacity available in the basin for flow regulation.[4] In addition, conservation storage for downstream flow support is also provided by the West Point Dam and the Walter F. George Dam. On the other hand, George Andrews Lock and Dam and Jim Woodruff Lock and Dam, between which Plant Farley is located, are essentially run-of-river projects, and largely dependent on upstream impoundments for required flows and elevations. Accordingly, any action by the Corps that has the effect of reducing water releases from Buford Dam, West Point Dam, or Walter F. George Dam reduces flows and river elevations that otherwise would be

[4] The Corps' draft "1989" Water Control Plan can be found in the Administrative Record beginning at page ACF017553.

available for Plant Farley's use in its operations and for navigation. Likewise, actions by the Corps that interfere with the timing of releases can impact and limit navigation.

Alabama Power's Dependence upon the Lawful Operation of the ACF Projects For Plant Farley's Operational and Environmental Needs

9. Southern Nuclear defines a flow of 2,000 cfs and river elevation of 74.5 feet mean sea level ("ft MSL") as the minimum conditions necessary for long-term operation at Plant Farley.

10. Generally, Plant Farley operates with a river elevation between 76 and 78 ft MSL. The river elevation is critical to providing cooling water for the plant's nuclear reactors. As more fully explained in the attached October 30, 2007, letter from Southern Company to the U.S. Department of Energy, the plant withdraws 97,000 gallons per minute from the Chattahoochee River during normal operation to feed the service water pond utilized as the ultimate (emergency) heat sink[5] and to support once-through cooling and make-up to cooling towers for main condenser cooling. *See* Exhibit A at 5. This elevation is the typical elevation for Woodruff Dam and Lake Seminole, where Plant Farley is located, according to the Corps' manual for Jim Woodruff Lock and Dam. Similarly, the Corps manual for Andrews Lock and Dam provides that the Andrews tailwater should be maintained at elevation 77 or higher, with discharges from the upstream George project if necessary.[6]

11. Southern Nuclear has analyzed environmental and operational impacts under prior drought conditions and confirmed a river elevation of 74.5 ft MSL as the minimum necessary for long-term operation at Plant Farley. *See* Exhibit A at 6. Operation below this level would

[5] The service water pond provides an adequate volume of water to support safe shutdown of both Farley units, in the event the river water pumps are not available. *See* Exhibit A at 5.

[6] These references to the Corps' Reservoir Regulation Manuals for Jim Woodruff Lock and Dam and Andrews Lock and Dam can be found in the Administrative Record at ACF003807 and ACF005951, respectively.

require evaluation to determine the environmental and operational impacts as discussed earlier. *See* Exhibit A at 6.

12. In addition, Plant Farley relies on releases from Buford, West Point, and George for discharge assimilation. The Farley discharge is controlled by a National Pollutant Discharge Elimination System ("NPDES") Permit issued by the Alabama Department of Environmental Management ("ADEM"). *See* Exhibit A at 5. The permit contains limits and requirements to ensure the thermal discharge and chemical constituents in the effluent meet applicable water quality standards. *See* Exhibit A at 5.[7]

13. At 2,000 cfs flowing past Plant Farley, there are no significant thermal or chemical impacts resulting from Plant Farley's discharge. *See* Exhibit A at 5. If flows were reduced below 2,000 cfs for an extended period, then an evaluation of the impacts of the discharge would be required by Southern Nuclear, state environmental agencies and potentially the Nuclear Regulatory Commission ("NRC"). *See* Exhibit A at 5. The bases for regulatory decisions in environmental permits may require re-evaluation to confirm permit limits and that water quality standards are met. *See* Exhibit A at 5.[8]

14. Plant Farley also discharges small quantities of radwaste through the discharge line in strict compliance with NRC operating license conditions. *See* Exhibit A at 5. Plant Farley monitors the discharge for a wide array of radionuclides. Releases are based on both nuclide concentration as well as dose. *See* Exhibit A at 5. Changes in river flow could prompt

[7] Downstream flows, supported by Lake Lanier, West Point and Walter F. George are particularly important during the hot and dry summer months when temperature becomes a greater concern for downstream industries like Plant Farley. Actions by the Corps that have the effect of reducing hydropower or other releases during this timeframe magnify the potential problems for Plant Farley. In addition, when river flow drops below 2,000 cfs, impingement and entrainment at Plant Farley's water intake structure increase.

[8] It is important to note that because Plant Farley is located on the Chattahoochee River above the point where the Flint merges with Lake Seminole, the inflows from the Flint River are not available for Farley use. *See* Exhibit A at 6.

NRC review of operating license provisions to confirm acceptability of continued operations. *See* Exhibit A at 5.

15. Plant Farley's needs were considered over a number of months, along with other industry flow needs, as part of the interstate compact negotiations concerning a proposed Allocation Formula for the ACF River Basin. These flows were validated through significant investigation and evaluation and ultimately were agreed to in a Memorandum of Understanding ("MOU") entered into by the States of Alabama, Florida, and Georgia in 2003 as part of the ACF Compact negotiations.[9] The MOU specifically recognized the need for the Corps to provide, among other flows, a minimum daily flow of 1,350 cfs on the Chattahoochee River at Columbus, Georgia, and a flow of 1,850 cfs on a weekly basis provided that the top of the storage pool in West Point Reservoir is above 621.6 feet. Further, the MOU recognized the need for the Corps to provide a minimum daily flow of 2,000 cfs on the Chattahoochee River at Columbia Alabama. Columbia, Alabama is located just above Plant Farley. *See* Exhibit B at 3.[10]

16. Plant Farley is operated pursuant to operating licenses issued by the NRC that were obtained based on extensive environmental and safety analyses in conjunction with the NRC and its predecessor, the United States Atomic Energy Commission ("AEC"). Alabama Power relied on the historic flows in the ACF River Basin and the lawful operation of the Corps' ACF reservoirs, as well as information and review by the Corps, in its licensing process.

[9] A true and complete copy of the Memorandum of Understanding Regarding Initial Allocation Formula for the ACF River Basin ("MOU") entered into by the States of Alabama, Florida, and Georgia in 2003 is attached as **Exhibit B** to this Affidavit.

[10] The November 15, 2007 Environmental Assessment for the Corps' Exceptional Drought Operation Plan ("EDO") also recognized Plant Farley's flow requirements, and explained that the Corps incorporated these requirements into the EDO. *See* U.S. Army Corps of Engineers, Mobile District, Environmental Assessment, Temporary Exceptional Drought Operations Modifications to the Interim Operating Plan at 43 (Nov. 15, 2007), available at http://www.sam.usace.army.mil/ACF.htm, under the heading, "Jim Woodruff Dam Interim Operations Plan Modification Proposal" and subheading, "Appendix A, document 3" (accessed Jan. 20, 2009). The Corps' consideration of Plant Farley's flow needs is also recognized in the Corps' "ACF River Basin – The Facts and Status" report available on the Mobile District's Homepage, at http://www.sam.usace.army.mil (accessed Jan. 20, 2009).

17. Prior to construction of Plant Farley, the AEC published its June 1972 Environmental Statement. The AEC noted specifically Alabama Power's reliance on the Corps' obligation to maintain a nine foot deep navigation channel in the Chattahoochee River, which corresponds to a river elevation of 76 ft MSL at the plant site. The AEC's Final Environmental Statement provides as follows:

> The headwaters of [Lake Seminole] back up to the Chattahoochee as far as the Columbia Lock and Dam, so that the river at the Farley station site is actually the headwaters of Lake Seminole rather than a normal river. . . .
>
> At present the regime of the river is much changed by the completion of Columbia Dam and Walter F. George Dam in 1964. It is the controlled discharge of these dams that controls the low stage flow of the river, and also the discharge of the Jim Woodruff Dam and the stage of Lake Seminole. The level of Lake Seminole, and hence the level of the river at the station site, is held no lower than 76 ft msl to provide a mininum depth of 9 feet in the navigation channel. . . . the river stage must be maintained at 76 feet msl, and this will provide ample water for the station. A more complex problem is the minimum flow that should be used in determining the dilution of discharges from the station. An examination of the record suggests that a flow of 2,000 cfs (900,000 gpm) will be exceeded 90% - 95% of the time.

Final Environmental Statement Related to Construction of Joseph M. Farley Nuclear Plant Units 1 & 2, Alabama Power Company, II - 20 (June 1972).[11]

18. Likewise, Section 2.3.1 of the Final Environmental Impact Statement Related to the Operation of Plant Farley provides:

[11] This information is contained on page II-20 of the Final Environmental Statement Related to Construction of Joseph M. Farley Nuclear Plant Units 1 & 2, Alabama Power Company, (June 1972). A true and correct copy of the cover page and page II-20 of this document are attached as Exhibit C to this Affidavit. The Final Environmental Statement Related to Construction of Plant Farley observed that historic records of stream flow reflected a minimum daily flow in 1954 of 1210 cfs, a record dry year. However, the Final Environmental Statement further noted that the river had been much changed by the completion of Columbia Dam and the Walter F. George Dam in 1964, and that since the construction of the Walter F. George Dam, the minimum observed flow at the Columbia Dam was 1,760 cfs, when the Walter F. George was storing water. While flows of 1,210 cfs might sustain Plant Farley's operations on a short term basis, subsequent study has identified a minimum daily flow of 2,000 cfs as needed to sustain plant operations on a long-term basis.

> The Corps of Engineers retains controls over the operation and maintenance of the entire Chattahoochee – Flint – Apalachicola River system. Continuous surveillance is maintained over Lake Seminole, the portion of the Chattahoochee River which is most directly affected by the Farley Plant, as well as over other reservoirs upstream and downstream. The staff has made extensive use of the Corps' recent Environmental Impact Statement for this river system in assessing the current use of Lake Seminole. . . . A 100 foot wide channel is maintained at a depth of 9 feet by dredging; . . .

Final Environmental Statement Related to Operation of Joseph M. Farley Nuclear Plant Units 1 & 2, Alabama Power Company, 2-6.[12]

19. In addition, existing Corps ACF manuals recognize Plant Farley's flow and elevation needs. The Corps' Walter F. George Reservoir Regulation Manual specifically recognizes that Plant Farley and other industries require adequate flows and elevations for their operations and downstream water quality:

> Among the industrial users are two paper company facilities and one nuclear power plant. Mead Paper Company, at the headwaters of W.F. George Lake, and the Georgia Pacific Corporation, in the headwaters of Lake Seminole, withdraw water for processes used in the manufacturing of wood products. These companies must also meet special water quality requirements for discharge that are based on a combination of dissolved oxygen and flow in the river. The Alabama Power Company's Farley Nuclear Power Plant is located on the Chattahoochee River downstream from Columbia, Alabama. The plant has an intake structure that provides cooling water for its nuclear fuel, and is dependent upon a river-state above 76 feet MSL for safe operation.

Apalachicola River Basin Reservoir Regulation Manual, Appendix C, Walter F. George Dam at C-13 (Feb. 1993).[13]

[12] This information is contained on page 2-6 of the Final Environmental Statement Related to Operation of Joseph M. Farley Nuclear Plant Units 1 & 2, Alabama Power Company. A true and correct copy of the title page and page 2-6 of this document are attached as Exhibit D to this Affidavit.

[13] This information is contained on page c-13 of the Apalachicola River Basin Reservoir Regulation Manual, Appendix C, Walter F. George Dam at C-13 (Feb. 1993), which can be found beginning at ACF020169 in the Administrative Record. Page C-13 can be found at ACF020189.

Alabama Power's Dependence upon the Lawful Operation of the ACF Projects For Navigation

20. Alabama Power relies on the Corps' lawful operation of its dams and reservoirs to support downstream navigation consistent with its statutory obligations. Alabama Power depends upon adequate flows and navigation maintenance activities by the Corps in the Chattahoochee and Apalachicola Rivers to transport oversized and vital equipment to and from Plant Farley by barge. Alabama Power further relies on the Corps' operation of the upstream reservoirs consistent with their congressionally authorized purpose of hydropower, because of the related benefits that hydropower releases have on navigation.[14]

21. The proximity to a navigable waterway was one of the primary factors considered in the siting of Plant Farley. Most of the large equipment for the original plant construction was delivered by barge in the ACF River Basin.[15] *See* ACF043138 (Farley Nuclear . . . must have waterborne transport for their large and usually oversized shipments which cannot use other modes of transportation).) Rail is the "only alternative method of transportation" feasible; however rail "would require millions of dollars in infrastructure upgrades to accommodate the size of the shipments." *See* ACF043138). The waterway, when operated and maintained for navigation, also provides a more secure way to ship sensitive nuclear components. *See* ACF043126 ("For security purposes the scheduled shipment of radioactive reactor components from the Farley Nuclear Plant would most safely be moved by water transportation as planned for 2006").)

[14] For an example of how the reduction of hydropower releases impacts downstream flows, the Corps retained over 20,000 acre-feet of water in Lake Lanier in 1989 as a result of foregoing minimum two-hour hydropower operations. *See Final Report, Analysis of the Chattahoochee River Management System,* Gulf Engineers & Consultants, Inc. (Nov. 1989), found in the Administrative Record at SUPPAR010410. These releases, if not foregone, likely would have resulted in more flow downstream at Plant Farley.

[15] A copy of Corps' reports on river elevations and dredging operations and maintenance issues can be found in the Administrative Record at ACF043122 through ACF042147.

22. Examples from recent years demonstrate the scale of the plant's transportation needs. In 2000, Plant Farley received replacement steam generators by barge in the ACF River Basin to complete a $360 million replacement project. Between 2003 and 2005, Plant Farley shipped two reactor vessel heads valued at $380 million on this waterway. *See* ACF043141. A navigable waterway accessible to barges is an economical and practical method of transportation for such cargo.

23. In January 2006, the plant planned to move $100 million worth of reactor vessel heads that weighed approximately 200 tons along that same waterway. *See* ACF043138. The reactor vessel heads are radioactive and must be shipped in oversized lead containers for increased safety along with heightened security for their protection. *See* ACF043141. Plant Farley was able to remove the Unit 1 and Unit 2 reactor vessel heads from the site via a barge shipment; however, the failure to maintain the navigational channel rendered passage more difficult and increased the risk of incidents. The adverse conditions also complicated the scheduling of the shipment, requiring the plant to weigh the availability of equipment and personnel against flow levels and other channel conditions.

24. Plant Farley's transportation needs have not diminished, given that Plant Farley regularly depends on navigation to transport and receive large equipment as part of its maintenance and replacement activities. It is anticipated in the future that additional shipments will need to be made. Under current conditions, because of insufficient flows and maintenance activities in the navigation channel, it is questionable whether equipment can safely be barged to or from the plant. Without use of the waterway, Alabama Power would be forced to use rail for its transportation needs. However, the current railway system is inadequate and would require a

significantly greater expense to transport equipment and to otherwise accommodate maintenance and replacement projects.

Effects of Corps' Agency Actions on Plant Farley

25. Each of the actions of the Corps of Engineers at issue in Alabama Power Company's Seventh Amended and Supplemented Complaint in Intervention, both individually and when combined, has the impact of reducing flows that would otherwise flow downstream to Plant Farley or reducing the storage available for navigation. As a result, there is less water available for Plant Farley to use and depend upon for cooling its nuclear reactors, assimilating discharges from the plant, and for adequate navigational flows to barge large pieces of equipment to and from the plant. During times of drought such as the one experienced in 2007, these reduced flows, and changes in the timing of flows, have the potential to impact the safe and reliable operation of the plant.

The Harmful Impacts of the Water Storage Contracts, and Withdrawals and Releases for Water Supply

26. Counts One, Two, and Three of Alabama Power's Seventh Amended and Supplemented Complaint in Intervention challenge the legality of the Corps' expired or "holdover" water supply contracts with Gwinnett County, the City of Gainesville, the Atlanta Regional Commission and the City of Cumming, Georgia, as more specifically described in paragraphs 34 through 50(d) of the Seventh Amended and Supplemented Complaint, and the water supply withdrawals and releases pursuant to those contracts including those that are in excess of the specified amounts. In Count Four, Alabama Power challenges the Corps' failure to solicit public review and comment, and to obtain the necessary Congressional approval, prior to undertaking these actions.

27. These contracts and withdrawals reduce the amount of water that is available to and otherwise would flow downstream to Plant Farley for use in its operations. Water that is withdrawn directly from the reservoir, or that is released from the reservoir for a downstream withdrawal, reduces the flow to Plant Farley. Further, it reduces the amount of water in storage needed to support navigation.

28. These water withdrawals and releases also affect the timing of flows available for navigation and other purposes.[16] For example, by reducing releases related to hydropower production during the "peak" months (typically the hottest and driest times of the year), there is less flow downstream when operations at Plant Farley need more flow to assimilate discharges.

29. These water withdrawals and releases reduce the stability, reliability and availability of the navigation channel, and make navigation for the purpose of transporting equipment to and from Plant Farley more difficult. As a result, Alabama Power has suffered and will continue to suffer harm in the future because of these unlawful actions.

The Harmful Effects of the Corps' Operations Under the Water Control Plan

30. Paragraphs 96 through 140, and Counts Five through Eleven, of Alabama Power's Seventh Amended and Supplemented Complaint in Intervention, set forth how the Corps has failed to properly update, promulgate and operate under lawful Master Manuals, Water Control Plans and Reservoir Regulation Manuals in the ACF Basin, and is instead operating under plans that were never subjected to adequate public notice and comment procedures required by federal law and the Corps' own regulations.

[16] The Corps itself noted in its PAC report that the reallocation of Lake Lanier from hydropower to water supply to support new water supply contracts, when compared to its existing operations, would negatively affect navigation. A copy of page 26 from the "draft" 1989 Water Control Plan can be found in Administrative Record at SUPPAR024784 and SUPPAR024822.

31. The Corps purports to operate under the "draft" 1989 Water Control Plan for the ACF Basin, which has never been finalized or subjected to the appropriate review and coordination required by federal law and the Corps' own regulations.

32. On December 20, 1989, Alabama Power wrote to the Corps about its concerns with the Post Authorization Change Notification Report for the Reallocation of Storage from Hydropower to Water Supply at Lake Lanier, Georgia and the related "draft" 1989 Water Control Plan. In particular, Alabama Power noted that the Draft Report failed to reflect adequate consideration of the Corps' responsibility of all interests:

> . . . . Of most immediate concern to Alabama Power is the impact which the proposal may have on the Company's Joseph M. Farley Nuclear Plant. The Report does not adequately address the potential consequences the reallocation proposal and the WCP [Water Control Plan] would have on that facility because the Company was not contacted by the Corps for input prior to issuance of the Draft Report. As a result, the consumptive use of water by the Farley Nuclear Plant was not considered in the models used by the Corps to develop the proposed plan or to evaluate the results that would flow from the implementation of the plan.
>
> . . . . Operation of the Farley Nuclear Plant could be impacted significantly by implementation of any plan which would possibly reduce either the elevation or the flow rates of the River adjacent to the Plant. The droughts of 1986 and 1988 lowered the elevation of the Lake Seminole reservoir significantly. The level reached a point that approached the minimum level evaluated for operation of the Plant. Implementation of the plans that could result in even lower flow rates or river elevations during an extended drought increases the possibility of operational restrictions. . . . such limitations on the Plant's operation could impose significant costs in terms of replacement electric power, and could cause environmental concerns.
>
> The impact of possible increased siltation resulting from variation in flow rate and elevation of the ACF system is not sufficiently addressed in the Report. . . . Although the system is designed to provide a nine foot navigation channel, existing minimum flow characteristics are such that this channel depth can

> only be maintained 78% of the time below Jim Woodruff Dam on the Apalachicola River. The reallocation proposal and WCP should be examined for possible increases in siltation and impacts on water withdrawal and navigation.
>
> The Draft Report fails to give adequate consideration to the environmental and economic consequences of the plan on downstream users. Therefore, the Finding of No Significant Impact is not supported by the current Environmental Assessment. . .
>
> In summary, our primary concern is that the Draft Report does not adequately address possible impacts on the operation of the Joseph M. Farley Nuclear Plant. . . .

Letter from Bill M. Guthrie, Executive Vice President, Alabama Power Company to Colonel Larry S. Bonine, CE, District Engineer, Department of the Army, of December 20, 1989.[17]

33. Despite these comments, the Corps continued its operation and implementation of the "draft" 1989 Water Control Plan and the unlawful water supply contracts and withdrawals without adequately considering the impacts at Plant Farley. As a result, Alabama Power has not had significant or meaningful input into the development of the Water Control Plan. Further, as set forth below, various aspects of the Plan are directly contrary to the Congressionally authorized purposes of the ACF projects.

34. The Water Control Plan includes, and the Corps is currently implementing, "action zones" for the ACF Reservoirs. According to the Corps, these "action zones" are used to manage Lake Lanier at the highest possible level for recreation and other purposes that benefit from high lake levels. In addition to giving a higher priority to water supply and recreation than navigation, the "action zones" have the effect of limiting releases to support downstream navigation when levels in the Corps' downstream reservoirs (at West Point and Eufaula) are low, and when large amounts of water remain in Lake Lanier.

[17] A true and complete copy of this letter can be found in the Administrative Record at SUPPAR021657 through SUPPAR021659.

35. The Corps also has adopted "recreation impact levels" as part of the 1989 Water Control Plan. The initial recreational impact level at Lake Lanier is elevation 1066', with approximately 83% of storage remaining. The effect is that less water is released to support the authorized purposes of hydropower and navigation.

36. Furthermore, the Corps' inconsistent operation under the 1989 Water Control Plan, and its failure to properly update and promulgate appropriate reservoir regulation manuals or Master Manuals, results in uncertainty that negatively impacts Alabama Power's planning with respect to navigation, and results in significant additional time and expense in making other transportation arrangements for equipment replacement projects and other activities that are dependent on a viable navigation channel.

Willard L. Bowers, Vice President, Environmental Affairs, Alabama Power Company

SWORN TO and SUBSCRIBED before me this the 21st day of January, 2009.

Notary Public

My commission expires 9-6-10

EXHIBIT A

October 30, 2007

Ms. Katharine A. Fredriksen
Principal Deputy Assistant Secretary
Office of Policy and International Affairs
U.S. Department of Energy
1000 Independence Ave., SW
Washington, DC 20585

Re: Information Request

Dear Kathy:

Thank you for the opportunity to provide this additional information to help you better assess the situation in Alabama, Florida and Georgia and potential electricity impacts related to the on-going drought conditions.

In response to your questions of October 23, please find the attached documents covering:

- A discussion of Southern Company's system reliability including:
  - System Operations
  - Economic Dispatch, and
  - Transmission Reliability
- A discussion regarding Plant Farley, a nuclear plant on the middle Chattahoochee owned by Alabama Power Company;
- A diagram of the Intake Structure at Plant Farley;
- A discussion regarding Plant Scholz, a fossil-fueled facility on the Apalachicola owned by Gulf Power Company;
- A diagram of the Intake Structure at Plant Scholz; and
- A map of the main river basins for the Southern System.

This response is designed to give you sufficient context for the answers to your questions. If you find that you have additional questions after your review, please do not hesitate to contact me.

Very truly yours,

L. Ray Harry

CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

INTRODUCTION

As you are aware, the Southeast has been experiencing record drought conditions for over a year. Conditions are severe across the region, including the Apalachicola-Chattahoochee-Flint (ACF) River Basin, which runs through the states of Alabama, Georgia and Florida. The ACF River Basin is used for a variety of purposes, including navigation, electric generation, environmental flows, industrial uses, recreation and public consumption, and all three states have legitimate interests in its use.

Southern Company's public utility subsidiaries operate numerous electric-generating facilities located on several river basins in our service territory. These plants provide reliable, affordable electricity to customers in Alabama, Florida, Georgia and Mississippi. The majority of these generating assets have been impacted by the drought, and we anticipate continued challenges going forward; however, the purpose of this document is to provide some important background information and updates regarding drought impacts on a nuclear plant (Joseph M. Farley Nuclear Plant) in Alabama on the middle Chattahoochee owned by Alabama Power Company, and a fossil-fueled facility (Herbert J. Scholz Electric Generating Plant) in Florida on the Apalachicola owned by Gulf Power Company.

Prior to 2003, the U.S. Army Corps of Engineers (the Corps) operated the ACF system during low flow conditions using only two minimum-flow control points; 750 cubic feet per second (cfs) at Peachtree Creek below Atlanta to provide assimilative flows for the Atlanta wastewater discharge and 5000 cfs released from Woodruff Dam to support Gulf Power's Plant Scholz (and more recently, environmental needs in the Apalachicola River). In 2003, after significant investigation and evaluation, a Memorandum of Understanding (MOU) was developed by the states and the ACF stakeholders. The MOU was signed by the governors of Alabama, Florida and Georgia to endorse a low-flow regime with four minimum flow control points. Minimum flows of 750 cfs at Peachtree Creek below Atlanta; 1850 cfs at Columbus, Georgia; 2000 cfs below Andrews Dam in the middle Chattahoochee; and 5000 cfs below Woodruff Dam in the Apalachicola.

It is important to emphasize that the flow regime discussed above was developed by technical experts based on information provided by stakeholders in all areas of the ACF basin. The information was reviewed by the teams of utility representatives, governmental agencies, industry and environmental regulators from each state prior to being signed by the governors. The primary purpose of the MOU was to set minimum flow objectives, using a systematic, apolitical process during normal flow conditions that would balance the needs of industry and commerce in the region, protect the habitat of wildlife, and meet any legal and regulatory requirements. It was envisioned that the MOU could be used to manage flows during times of reduced flows.

CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

SYSTEM RELIABILITY

System Operations

The Southern Company system is a vertically integrated structure comprised of:

1. generating facilities distributed across our service territory that are operated on a real time basis according to an economic dispatch regime
2. an interconnected transmission system designed to reliably deliver power to firm retail and wholesale load, and
3. a power distribution system that delivers power to Southern Company retail customers.

Economic Dispatch

The objective of economic dispatch is to operate the required amount of system generation to meet all obligations in a manner that minimizes total system production costs. Resources are dispatched based on variable cost components that include: marginal replacement fuel, variable operation and maintenance, emissions, transmission loss, and fuel handling.

Farley units 1 and 2 are nuclear-fueled units rated at approximately 888 megawatts (MWs) each, while Scholz units 1 and 2 are fueled by coal and are rated at approximately 46 MWs each. Nuclear-fueled units typically are more economical than coal units in terms of average generation cost. Considering all non-hydro resources, the Farley units are currently the lowest cost generating units on Southern Company's system.

The loss of these generation resources would have a significant impact on total production costs. It is estimated that the loss of these resources would increase total production costs by approximately $1,500,000 per day.

CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

Transmission Reliability

Southern Company Transmission is responsible for the operation and control of transmission, its inputs (generation) and outputs (serving load) in a manner that is safe, reliable, and in compliance with reliability standards as approved by the Federal Energy Regulatory Commission (FERC) and enforced by North American Electric Reliability Corporation (NERC) and its regional entity, the Southeast Electric Reliability Corporation (SERC). Generation dispatch is planned in advance on a forward basis. In real time, the transmission function monitors the implementation of the plan and directs adjustments to ensure that generation and loads are properly balanced and the system is in compliance with NERC standards. Aside from the obvious reliability risks, non-compliance is subject to FERC's civil penalty authority.

Like all other generation controlled by Southern, Plant Scholz is planned to operate when economic dispatch indicates it is the next economic choice. There are two situations where transmission operations require Plant Scholz to operate to avoid interruption of service to customers or non-compliance with NERC Standards. At high system loads, Plant Scholz is required to operate to prevent thermal overloading of certain lines should a contingency event occur. At low system loads, Plant Scholz is required to operate to maintain voltages within acceptable limits.

During off-peak periods (October-May) when maintenance is performed on critical generation and transmission assets, Southern Company cannot reliably serve our customers without the availability of both units at Plant Farley.

There are potential physical solutions to the problems in the aforementioned situations and we are currently evaluating their effectiveness and feasibility. While we cannot speak with certainty without a detailed study of scenarios, we believe that our system would be significantly encumbered if we were not able to utilize generation at Plant Farley.

CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

PLANT FARLEY

Background and System Operations

The Joseph M. Farley Nuclear Plant is located along the Chattahoochee River near Dothan in southeast Alabama. The plant consists of two Westinghouse Pressurized Water Reactor (PWR) units capable of generating 888 megawatts (MW) for a total capacity of 1,776 MW. Approximately 900 employees oversee the plant's operation 24 hours a day, 7 days a week. Plant Farley accounts for 19 percent of Alabama Power's total electricity generation.

Plant Farley withdraws approximately 97,000 gallons per minute (gpm) from the Chattahoochee River during normal operation to feed the service water pond utilized as the ultimate (emergency) heat sink and support once-through cooling and make-up to cooling towers for main condenser cooling. The intake system consists of an intake canal which extends 200 feet from the Chattahoochee River to the intake structure. Its three intake bays are equipped with three-eighths inch mesh vertical traveling screens. Ten pumps force water from the river to an approximately 108-acre storage pond (Service Water Pond). A diagram of the intake structure is attached on page 7.

Water for normal operation is withdrawn via a second intake structure located on the Service Water Pond to support the once-through service water system and provide makeup for the cooling towers. Normal operation of both Farley units requires operation of eight of the ten available service water pumps for 80,000 gpm. The Service Water system utilizes this once through flow to reject heat from nuclear safety-related cooling systems. A portion of the flow from the Service Water system is routed as makeup to supply the cooling towers. The cooling towers have a total volume of nearly five million gallons, with a flow rate of 720,000 gpm. The cooling towers require 35,600 gpm as makeup during normal two-unit operation to disseminate heat from the main condensers for both Farley units. The cooling towers have evaporation and drift losses of 25,400 gpm and a blowdown rate of 10,200 gpm. The combined blowdown from both Farley units and the remainder of the once through service water is combined into a single discharge line routed to the Chattahoochee River. The Service Water Pond serves as the ultimate (emergency) heat sink for the Farley plant, providing an adequate volume of water to support safe shutdown of both Farley units, in the event the river water pumps are not available.

The Farley discharge is controlled by a National Pollutant Discharge Elimination System (NPDES) Permit issued by the Alabama Department of Environmental Management (ADEM). The permit contains limits and requirements to ensure the thermal discharge and chemical constituents in the effluent meet applicable water quality standards. At 2,000 cfs flowing past Farley, there are no significant thermal or chemical impacts resulting from Farley's discharge. If flows were reduced below 2,000 cfs for an extended period, then an evaluation of the impacts of the discharge would be required by Southern Company, state environmental agencies and potentially the Nuclear Regulatory Commission (NRC). The bases for regulatory decisions in environmental permits may require re-evaluation to confirm permit limits and that water quality standards are met. Farley also discharges small quantities of radwaste through the discharge line in strict compliance with NRC operating license conditions. Farley monitors the discharge for a wide array of radionuclides and releases are based on both nuclide concentration as well as dose.

CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

Changes in river flow would prompt NRC review of operating license provisions to confirm acceptability of continued operations.

The Farley intake structure is located on the Woodruff reservoir at the end of a 200 foot long canal and water is withdrawn by a combination of ten pumps operating in pump wet pits located in three intake bays. The bottom invert elevation of the canal is 64 ft MSL. Normal water elevation at Farley averages 77 ft MSL with the reservoir operation ranging from a normal minimum of 76 ft MSL to a normal maximum of 78 ft MSL. The 76 – 78 ft MSL elevation encompasses all of the available reservoir storage and the reservoir operates as run-of-river below that point. The Farley pumps reach their net positive suction head (NPSH) at 67.5 ft MSL. The environmental effects of operation below 74.5 ft mean sea level (MSL) have not been determined and evaluation will be required before operation at these reduced levels.

Impact of Reduced Flow and River Levels

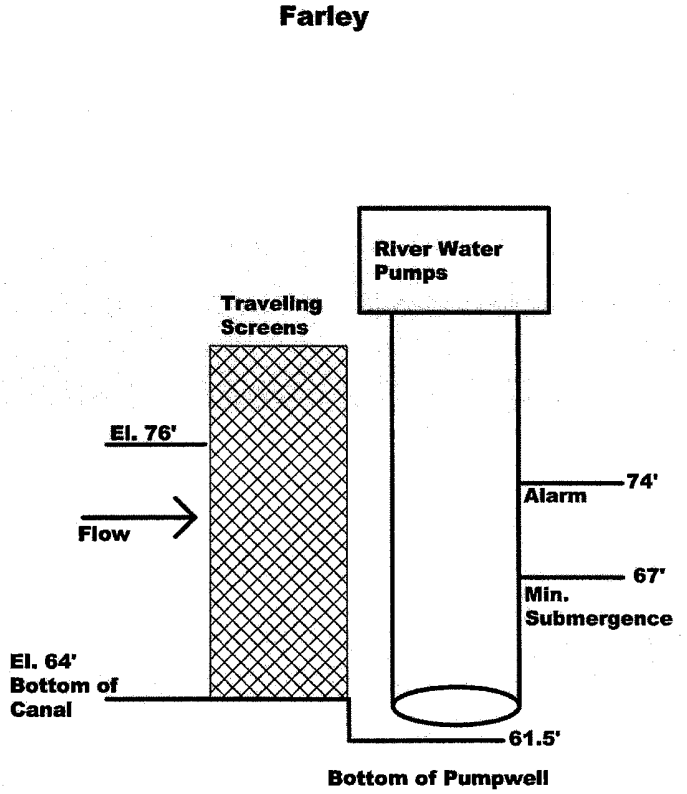
Flows at Farley are provided by releases from hydropower generation at the Walter F. George Dam located approximately 29 miles upstream, with that water passing through the George Andrew Lock and Dam approximately four miles upstream from Plant Farley. Power generation normally produces flows in excess of 20,000 cfs and occurs up to seven hours each weekday. Once hydro generation ceases, the dam only passes leakage flow (flows passing over, under or through a dam or lock that are not accounted for in flow measurements) for the balance of the day. Weekend flows normally consist of leakage and local inflow only. The leakage flow has been defined by the Corps as approximately 800 cfs instantaneous. After passing Plant Farley, the flow continues down the Chattahoochee River and merges with the flow from the Flint River above Jim Woodruff Dam to form Lake Seminole. It is important to note that because Plant Farley is located on the Chattahoochee River above the point where the Flint merges with Lake Seminole, the inflows from the Flint River are not available for Farley use.

Southern Nuclear defines 2000 cfs and 74.5 ft MSL as the minimum conditions necessary for long term operation at Farley. Plant Farley can operate for short periods (a few days) below 2000 cfs flow, but extended operation below this flow level will require evaluation to determine the environmental and operational impacts.

As stated above, the Farley intake canal is located on the Woodruff Reservoir with the reservoir having a small amount of storage capability and generally operating between elevation 76 and 78 ft MSL. Southern Company has analyzed environmental and operational impacts under prior drought conditions and confirmed river elevation of 74.5 ft MSL as the minimum necessary for long-term operation at Farley. Operation below this level would require evaluation to determine the environmental and operational impacts as discussed earlier.

CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

INTAKE STRUCTURE AT PLANT FARLEY



All elevations are at mean sea level.

Not to scale

CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

PLANT SCHOLZ

Background and System Operations

The Herbert J. Scholz Electric Generating Plant is a coal-fired power plant located on the Apalachicola River in northwest Florida. The plant consists of two generating units with a total nameplate generating capacity of 92,000 KW and has 31 Gulf Power employees. Scholz began commercial operations in 1953 and produces enough electricity to power approximately 19,000 homes.

The plant withdraws approximately 129 million gallons of water per day or approximately 200 cfs from the Apalachicola River primarily for non-consumptive, once through cooling purposes. The plant has a 500 foot long intake canal connecting the river with the intake structure. River water flows through the canal to the water intake structure and traveling screens then flows to an area directly beneath the plant's pump room which houses the cooling water pumps. The cooling water pumps pull the river water from the intake tunnel via submerged pump impellers. Most of the water is pumped through the steam turbine condenser, a large heat exchanger located above the pump room. The river water then travels through the circulating water system, absorbs heat from the steam circulating through the condenser and is returned to the river in its original condition at a slightly higher temperature. Without a sufficient supply of cooling water, the plant cannot operate. A diagram of the intake structure is attached on page 10.

The Scholz discharge is controlled by an NPDES Permit issued by the Florida Department of Environmental Protection. The permit contains limits and requirements on the plant cooling water discharge to ensure state water quality standards are met. Extremely low river levels increase cooling water velocities in the intake canal. This increases the potential for sediments from the river bottom to be picked up in the cooling water and discharged back to the river where it remains in suspension. This increase in suspended sediments can cause violations of various state water quality standards.

To maintain normal operations at Plant Scholz, the cooling water pumps at the plant require a minimum river elevation level at the plant intake structure of 38 ft MSL. Based on information from the Corps, it is our understanding that 38 ft MSL equates to a constant flow of 5,000 cfs in the Apalachicola River at Plant Scholz. The cooling pumps take suction at 33.5 ft MSL and the pumps are designed to operate with 4.75 ft of NPSH, equating to a river level of 38.25 MSL. The plant is presently operating slightly below design at only 4.5 ft of NPSH, and any further decrease in level is expected to cause the pumps to cavitate.

Impact of Reduced Flows and Lower River Levels

Plant Scholz is just downstream of the Jim Woodruff Dam and Lake Seminole, which receive their flows from the Chattahoochee and Flint Rivers. As stated, minimum flow for normal operations is 5000 cfs resulting in 38 ft MSL at Plant Scholz. The plant has operated on a temporary basis at levels down to 37.5 ft MSL or an equivalent flow of 4200. As river levels decrease, the chances increase that either there will be no water in the intake canal or the river

CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

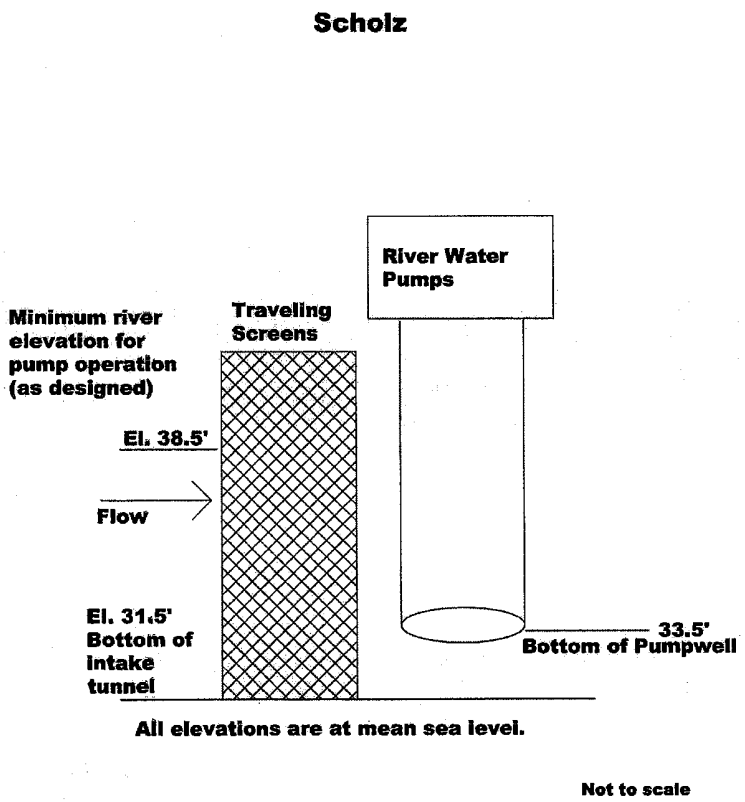
level will not be adequate to provide suitable pump suction for the cooling water pumps to operate.

There is a possibility that Plant Scholz can maintain temporary operations with the flows of 2000 cfs from the Chattahoochee near Farley Nuclear Plant plus the approximately 1200 cfs from the Flint River or a total of 3200 cfs. We anticipate that these combined flows should equate to between 36.5 and 36.8 ft MSL at Plant Scholz. Plant Scholz has never operated at intake levels lower than 37.5 ft MSL; in the event we are able to operate the plant below 37.5 ft MSL, we will be increasing operational risk as well as increasing the possibility of violation of the state water quality standards. Based on our calculations, 37.5 ft MSL at Plant Scholz would require 4200 cfs in the Apalachicola River. That may require 3000 cfs on the Chattahoochee River at Plant Farley if 1200 cfs were coming from the Flint River.

There is a great deal of uncertainty regarding the impact of making temporary plant modifications. Any deviation from normal operations to accommodate the lower flows and river levels will require testing to determine that impact. There is not a reduced operating load where the units can operate and any flow corresponding to a river level below 36.5 ft MSL would most likely result in the plant shutting down. While other options are possible, they require costly and untested plant modifications to Plant Scholz and permitting that normally could take up to one year. Again, these options could only be temporary in nature.

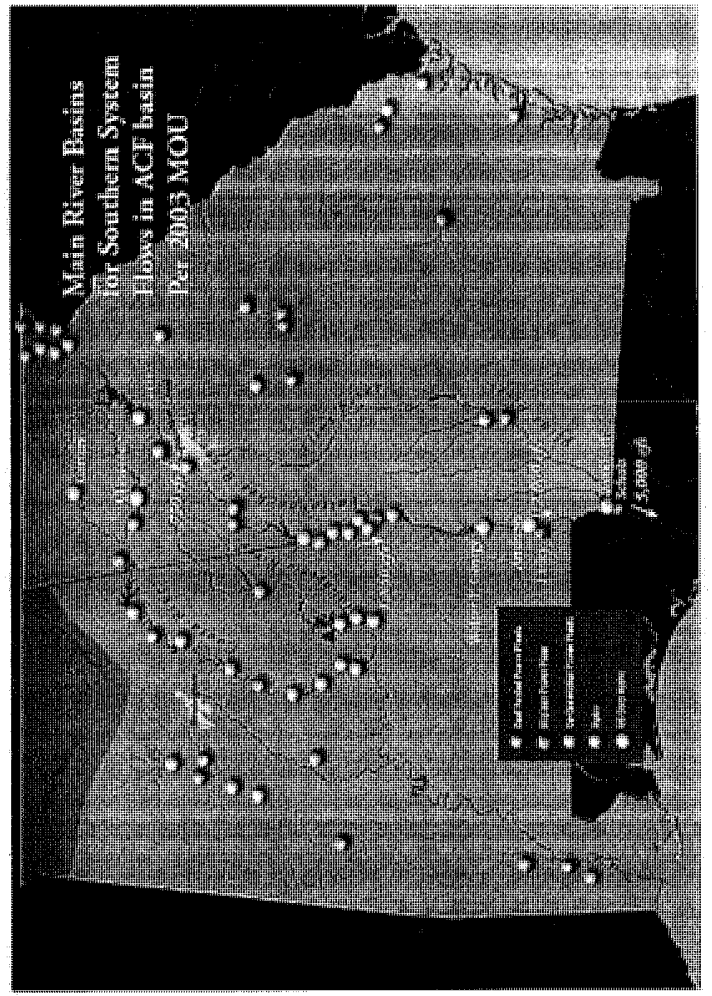
CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

INTAKE STRUCTURE AT PLANT SCHOLZ



CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

MAIN RIVER BASINS FOR THE SOUTHERN SYSTEM



CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

EXHIBIT B

Apalachicola – Chattahoochee – Flint (ACF)
River Basin Compact

On July 22, 2003, Governors Sonny Purdue of Georgia, Jeb Bush of Florida, and Bob Riley of Alabama signed a Memorandum of Understanding (MOU) regarding the initial allocation formula for the ACF River Basin. The MOU is shown below. This MOU provides guidance to the staffs of the three governors for developing the detailed draft allocation formula. It is important to realize that the MOU is NOT the detailed draft allocation formula.

Memorandum of Understanding
Regarding Initial Allocation Formula for the
ACF River Basin

WHEREAS, the States of Alabama, Florida and Georgia, along with the United States of America, are signatories to the Apalachicola - Chattahoochee - Flint River Basin Compact, (ACF Compact);

WHEREAS, the ACF Compact authorizes the States of Alabama, Florida and Georgia to develop an allocation formula for equitably apportioning the surface waters of the ACF Basin among the States; and it is the intent of the states that this formula will be consistent with the ACF Compact;

WHEREAS, the States of Alabama, Florida and Georgia have reached substantial agreement in principle regarding many of the terms of an allocation formula;

WHEREAS, the ACF Compact and the Operating Guidelines of the ACF Commission require the input of the public through public hearings and written comments prior to the adoption by the ACF Commission of an initial allocation formula;

WHEREAS, the ACF Compact requires that the allocation formula is subject to review and concurrence by the federal commissioner, and it is desirable to facilitate that review in a timely manner; and

WHEREAS, the States of Alabama, Florida and Georgia desire to express and commemorate their preliminary agreement to certain concepts in advance of the issuance of a draft initial allocation formula for public comment and federal review.

NOW, THEREFORE, IN CONSIDERATION OF THE FOREGOING, the States of Alabama, Florida and Georgia hereby agree to the following principles of an allocation formula:

1. Performance under the allocation formula shall begin when authorization for allocation of storage in Lake Lanier for 705 mgd for water supply has occurred, and the Corps has issued contracts for such use. Until the date on which performance commences, the Corps will operate the federal reservoirs consistent with the principles of the allocation formula to the maximum extent practicable.

2. The signatory states will begin negotiations to extend or modify the allocation formula no later than December 31, 2035.

3. **Notice to terminate 2038**
Expiration 2040

Effect after Termination
Neither the fact that the Signatory Parties have executed this Agreement nor the terms of this Agreement shall create any inference or presumption that such execution or terms would constitute an equitable apportionment of the surface waters of the ACF Basin after the expiration of this Agreement or termination of the ACF Compact.

4. The following flow requirements will be included in the allocation formula, and are intended to be met by the combined actions of maintaining waters uses consistent with the allocation formula, and by the Corps operating the federal reservoirs consistent with the allocation formula.

    a. On the Chattahoochee River above its confluence with Peachtree Creek, a flow of 750 cfs will be maintained on a daily basis, with the understanding that the State of Georgia is entitled to a variable flow regime that requires no less than 650 cfs in winters, and flows higher than 750 cfs in summers, provided that an annual average of 750 cfs is obtained from such a variable flow regime.

    b. On the Chattahoochee River at Columbus, Georgia, a flow of 1350 cfs will be maintained on a daily basis at all times, and a flow of 1850 cfs will be maintained on a weekly basis provided that the top of the storage pool in West Point Reservoir is above 621.6 feet.

    c. On the Chattahoochee River at Columbia, Alabama, a flow of 2000 cfs will be maintained on a daily basis.

    d. On the Apalachicola River at Chattahoochee, a minimum flow of 5000 cfs will be maintained on a weekly basis at all times. Monthly flows will be maintained at quantities that are determined by the composite storage levels in West Point Lake and Lake Walter F. George, and by a determination of whether drought relief is in effect. Table 1 sets the applicable minimum monthly flow requirements when drought relief is not in effect. Table 2 sets the applicable monthly flow requirements when drought relief is in effect. Table 3 lists the reservoir storage quantities which determine which set of monthly flow requirements at Chattahoochee is applicable. It is not the states' intent to over release to meet monthly flow requirements.

5. The formula will provide drought relief in any month when the following conditions exist:

    There is an indication of climatic drought, demonstrated by the following facts having existed in the prior month:

- The ACF Basin Weighted 12-Month Standard Precipitation Index was –1.26 or less;

AND

- The ACF Basin Weighted Hydrologic Palmer Index was -2.37 or less;

6. Georgia shall impose in the relief month the terms and conditions described in the published Georgia Drought Management Plan as appropriate for the existent level of drought.

7. The agreement shall consider and include the use of Lake Lanier as feasible and appropriate. West Point Lake, Lake Walter F. George and Lake Seminole shall be used to support all the flow requirements at Chattahoochee, FL.

8. The allocation formula will explicitly address future uses of water in the manner set forth below.

   a. The states will support authorization for allocation of storage in Lake Lanier for 705 mgd (annual average) for water supply. Consideration will be given to additional water supply in excess of 705 mgd.

   b. Of water withdrawn for municipal purposes within the Chattahoochee Basin above the Whitesburg gage and within the Corps jurisdictional boundary of Lake Lanier in Georgia, no less than 58% on an annual average basis shall be returned to the Chattahoochee River Basin and accounted for at Whitesburg.

   c. No water from the Chattahoochee River below Whitesburg may be exported for use above Whitesburg.

   d. All new water supply reservoirs with a storage capacity in excess of 500 acre feet shall be required to meet the instream flow requirements that are specified in the laws, regulations and policies of the state in which the reservoir is located.

   e. The states shall request and support raising the top of the conservation pools of Lake Lanier by 1 foot in all months and raising the top of the conservation pools of Lake Seminole to 78 feet above mean sea level. The states shall further request and support adjusting the top of the conservation pools of Lake Walter F. George and West Point Lake and zonal elevations of all four federal reservoirs to levels mutually agreed to by the states.

   f. There shall be no new transfers from the Flint River Basin to the Chattahoochee River Basin other than those that have state or federal permits as of the date of execution of this Memorandum of Understanding.

9. An adaptive management process will be established which will facilitate the implementation of the formula, and which will provide a foundation for potential changes to the formula. However, no changes to the formula resulting from a, b, c or d below shall be made except with the unanimous approval of the ACF Commission.

   a. The adaptive management process will include the following elements:
      - Comprehensive gathering of extant information on the water and water-dependent biologic resources of the ACF Basin;
      - Special studies of issues important to management of basin resources;
      - Analysis and interpretation of this information to establish cause-effect relationships and to identify conditions in which there is a need or opportunity to manage and use the resources more effectively; and,
      - Adaptation of basin management to accomplish this more effective resource management.

      The adaptive management process will make use of a Science Advisory Panel and of public participation.

   b. The formula will provide for using the Water Control Plan as one basis for implementing the terms of the formula.

   c. The formula will provide for development of a Drought Management Plan. Modifications to the Drought Management Plan will be accomplished through adaptive management.

   d. The agreement will provide for relief to a state in the event of unanticipated conditions.

10. The agreement shall include a provision governing the shared use of the surface water of the Chattahoochee River along the shared border between the states of Alabama and Georgia, including provisions regarding the issuance of permits for the withdrawal of surface water and discharge of treated wastewater by the state in which the person using the surface water or discharging the wastewater is located.

11. The agreement shall include a provision regarding commercial navigation in the Basin under such terms and conditions, as the states may deem reasonable and consistent with the remaining provisions of the agreement.

12. The States of Alabama, Florida and Georgia commit to work diligently to prepare a draft initial allocation formula agreement that incorporates the above concepts and such other terms upon which the States agree. Upon completion of the draft initial allocation formula, the ACF Commission Secretary shall provide copies of such draft initial allocation formula to the public, shall provide notice of a public comment period on the initial draft allocation formula, and shall establish dates for public hearings on the draft initial allocation formula in accordance with the ACF Commission Operating Guidelines.

13. The signatory states recognize the need to stay the litigation pending in Alabama, the District of Columbia and Georgia during the drafting of the agreement.

Approved and adopted this 22 day of July 2003.

Governor Bob Riley
State of Alabama

7-22-03
Date

Governor Jeb Bush
State of Florida

7-22-03
Date

Governor Bonny Perdue
State of Georgia

7-22-03
Date

Table 1
Apalachicola River at Chattahoochee, Florida
(Drought Relief Not in Effect)
(Mean Daily Flow for the Month, CFS)

	Monthly Average Flow For Zone 1 Total Composite Storage	Monthly Average Flow For Zone 2 Total Composite Storage	Monthly Average Flow For Zone 3 Total Composite Storage	Monthly Average Flow For Zone 4 Total Composite Storage
January	11,000	9,000	7,300	7,300
February	13,000	11,000	10,400	10,400
March	13,000	12,500	11,000	11,000
April	13,000	12,500	12,200	12,200
May	13,000	10,000	8,500	5,000
June	13,000	11,000	9,000	5,000
July	13,000	10,000	8,500	5,000
August	13,000	9,000	7,000	5,000
September	12,000	8,000	6,500	5,000
October	9,500	7,500	5,300	5,000
November	9,500	7,000	5,600	5,000
December	9,500	7,500	7,300	5,000

Note: Total composite storage volume is the sum of the active storage plus the dead storage for West Point Lake and Lake Walter F. George.

Table 2
Apalachicola River at Chattahoochee, Florida
(Drought Relief in Effect)
(Mean Daily Flow for the Month, CFS)

	Monthly Average Flow For Zone 1 Total Composite Storage	Monthly Average Flow For Zone 2 Total Composite Storage	Monthly Average Flow For Zone 3 Total Composite Storage	Monthly Average Flow For Zone 4 Total Composite Storage
January	7,000	7,000	5,000	5,000
February	9,500	9,000	5,000	5,000
March	10,000	9,000	5,000	5,000
April	10,000	9,000	5,000	5,000
May	9,500	9,000	5,000	5,000
June	9,500	9,000	5,000	5,000
July	9,000	8,500	5,000	5,000
August	8,000	6,500	5,000	5,000
September	6,500	6,000	5,000	5,000
October	6,000	5,300	5,000	5,000
November	5,600	5,600	5,000	5,000
December	7,000	6,000	5,000	5,000

Table 3

DAILY TOTAL COMPOSITE STORAGE AT WEST POINT LAKE AND LAKE WALTER F. GEORGE

Month	Bottom of Zone 1/Top of Zone 2	Bottom of Zone 2/Top of Zone 3	Bottom of Zone 3/Top of Zone 4
1-Jan	1,189	1,092	1,021
2-Jan	1,189	1,092	1,021
3-Jan	1,189	1,092	1,021
4-Jan	1,189	1,092	1,021
5-Jan	1,189	1,092	1,021
6-Jan	1,189	1,092	1,021
7-Jan	1,189	1,092	1,021
8-Jan	1,189	1,092	1,021
9-Jan	1,189	1,092	1,021
10-Jan	1,189	1,092	1,021
11-Jan	1,189	1,092	1,021
12-Jan	1,189	1,092	1,021
13-Jan	1,189	1,092	1,021
14-Jan	1,189	1,092	1,021
15-Jan	1,189	1,092	1,021
16-Jan	1,189	1,092	1,021
17-Jan	1,189	1,092	1,021
18-Jan	1,189	1,092	1,021
19-Jan	1,189	1,092	1,021
20-Jan	1,189	1,092	1,021
21-Jan	1,189	1,092	1,021
22-Jan	1,189	1,092	1,021
23-Jan	1,189	1,092	1,021
24-Jan	1,189	1,092	1,021
25-Jan	1,189	1,092	1,021
26-Jan	1,189	1,092	1,021
27-Jan	1,189	1,092	1,021
28-Jan	1,189	1,092	1,021
29-Jan	1,189	1,092	1,021
30-Jan	1,189	1,092	1,021
31-Jan	1,189	1,092	1,021
1-Feb	1,193	1,095	1,024
2-Feb	1,194	1,097	1,026
3-Feb	1,196	1,099	1,027
4-Feb	1,198	1,101	1,029
5-Feb	1,199	1,102	1,030
6-Feb	1,201	1,104	1,032
7-Feb	1,203	1,106	1,034
8-Feb	1,204	1,107	1,035
9-Feb	1,206	1,109	1,037
10-Feb	1,208	1,111	1,038
11-Feb	1,209	1,113	1,040
12-Feb	1,211	1,114	1,042
13-Feb	1,213	1,116	1,043
14-Feb	1,215	1,118	1,045
15-Feb	1,216	1,120	1,047
16-Feb	1,218	1,121	1,048
17-Feb	1,220	1,123	1,050
18-Feb	1,222	1,125	1,052
19-Feb	1,223	1,127	1,053
20-Feb	1,225	1,128	1,055
21-Feb	1,227	1,130	1,057
22-Feb	1,229	1,132	1,058

23-Feb	1,230	1,134	1,060
24-Feb	1,232	1,136	1,062
25-Feb	1,234	1,138	1,063
26-Feb	1,236	1,139	1,065
27-Feb	1,238	1,141	1,067
28-Feb	1,239	1,143	1,068
1-Mar	1,243	1,149	1,075
2-Mar	1,245	1,152	1,078
3-Mar	1,246	1,155	1,081
4-Mar	1,248	1,158	1,084
5-Mar	1,250	1,160	1,088
6-Mar	1,252	1,163	1,091
7-Mar	1,254	1,166	1,094
8-Mar	1,256	1,169	1,097
9-Mar	1,257	1,172	1,100
10-Mar	1,259	1,175	1,104
11-Mar	1,261	1,178	1,107
12-Mar	1,263	1,181	1,110
13-Mar	1,265	1,184	1,113
14-Mar	1,267	1,187	1,117
15-Mar	1,269	1,190	1,120
16-Mar	1,270	1,192	1,123
17-Mar	1,272	1,195	1,127
18-Mar	1,274	1,198	1,130
19-Mar	1,276	1,201	1,133
20-Mar	1,278	1,204	1,137
21-Mar	1,280	1,207	1,140
22-Mar	1,282	1,210	1,143
23-Mar	1,284	1,213	1,147
24-Mar	1,286	1,216	1,150
25-Mar	1,288	1,220	1,154
26-Mar	1,290	1,223	1,157
27-Mar	1,292	1,226	1,160
28-Mar	1,294	1,229	1,164
29-Mar	1,296	1,232	1,167
30-Mar	1,298	1,235	1,171
31-Mar	1,300	1,238	1,174
1-Apr	1,304	1,244	1,181
2-Apr	1,306	1,247	1,184
3-Apr	1,308	1,250	1,188
4-Apr	1,310	1,254	1,191
5-Apr	1,312	1,257	1,195
6-Apr	1,314	1,260	1,198
7-Apr	1,316	1,263	1,202
8-Apr	1,318	1,266	1,205
9-Apr	1,320	1,269	1,209
10-Apr	1,322	1,272	1,212
11-Apr	1,324	1,275	1,216
12-Apr	1,326	1,279	1,219
13-Apr	1,328	1,282	1,223
14-Apr	1,330	1,285	1,226
15-Apr	1,332	1,288	1,230
16-Apr	1,334	1,291	1,234
17-Apr	1,336	1,295	1,237
18-Apr	1,339	1,298	1,241
19-Apr	1,341	1,301	1,244
20-Apr	1,343	1,304	1,248
21-Apr	1,345	1,307	1,252
22-Apr	1,347	1,311	1,255
23-Apr	1,349	1,314	1,259
24-Apr	1,351	1,317	1,263
25-Apr	1,353	1,321	1,266

26-Apr	1,355	1,324	1,270
27-Apr	1,358	1,327	1,273
28-Apr	1,360	1,331	1,277
29-Apr	1,362	1,334	1,281
30-Apr	1,364	1,337	1,284
1-May	1,369	1,342	1,288
2-May	1,371	1,343	1,287
3-May	1,373	1,344	1,286
4-May	1,376	1,345	1,286
5-May	1,378	1,346	1,285
6-May	1,380	1,347	1,284
7-May	1,383	1,348	1,284
8-May	1,385	1,349	1,283
9-May	1,387	1,350	1,283
10-May	1,389	1,351	1,282
11-May	1,392	1,352	1,281
12-May	1,394	1,354	1,281
13-May	1,397	1,355	1,280
14-May	1,399	1,356	1,280
15-May	1,401	1,357	1,279
16-May	1,404	1,358	1,278
17-May	1,406	1,359	1,278
18-May	1,408	1,360	1,277
19-May	1,411	1,361	1,276
20-May	1,413	1,362	1,276
21-May	1,416	1,363	1,275
22-May	1,418	1,364	1,275
23-May	1,420	1,365	1,274
24-May	1,423	1,366	1,273
25-May	1,425	1,367	1,273
26-May	1,427	1,369	1,272
27-May	1,430	1,370	1,272
28-May	1,432	1,371	1,271
29-May	1,434	1,372	1,270
30-May	1,437	1,373	1,270
31-May	1,439	1,374	1,269
1-Jun	1,442	1,375	1,267
2-Jun	1,442	1,375	1,265
3-Jun	1,442	1,375	1,263
4-Jun	1,442	1,375	1,262
5-Jun	1,442	1,375	1,260
6-Jun	1,442	1,375	1,258
7-Jun	1,442	1,375	1,256
8-Jun	1,442	1,375	1,255
9-Jun	1,442	1,375	1,253
10-Jun	1,442	1,375	1,251
11-Jun	1,442	1,375	1,250
12-Jun	1,442	1,375	1,248
13-Jun	1,442	1,375	1,246
14-Jun	1,442	1,375	1,245
15-Jun	1,442	1,375	1,243
16-Jun	1,442	1,375	1,241
17-Jun	1,442	1,375	1,240
18-Jun	1,442	1,375	1,238
19-Jun	1,442	1,375	1,236
20-Jun	1,442	1,375	1,235
21-Jun	1,442	1,375	1,233
22-Jun	1,442	1,375	1,231
23-Jun	1,442	1,375	1,230
24-Jun	1,442	1,375	1,228
25-Jun	1,442	1,375	1,226
26-Jun	1,442	1,375	1,225

27-Jun	1,442	1,375	1,223
28-Jun	1,442	1,375	1,221
29-Jun	1,442	1,375	1,220
30-Jun	1,442	1,375	1,218
1-Jul	1,441	1,372	1,214
2-Jul	1,441	1,371	1,213
3-Jul	1,440	1,370	1,211
4-Jul	1,440	1,369	1,210
5-Jul	1,440	1,367	1,208
6-Jul	1,439	1,366	1,207
7-Jul	1,439	1,365	1,205
8-Jul	1,438	1,363	1,203
9-Jul	1,438	1,362	1,202
10-Jul	1,438	1,361	1,200
11-Jul	1,437	1,359	1,199
12-Jul	1,437	1,358	1,197
13-Jul	1,437	1,357	1,196
14-Jul	1,436	1,356	1,194
15-Jul	1,436	1,354	1,192
16-Jul	1,436	1,353	1,191
17-Jul	1,435	1,352	1,189
18-Jul	1,435	1,350	1,188
19-Jul	1,434	1,349	1,186
20-Jul	1,434	1,348	1,185
21-Jul	1,434	1,347	1,183
22-Jul	1,433	1,345	1,182
23-Jul	1,433	1,344	1,180
24-Jul	1,433	1,343	1,179
25-Jul	1,432	1,342	1,177
26-Jul	1,432	1,340	1,176
27-Jul	1,432	1,339	1,174
28-Jul	1,431	1,338	1,172
29-Jul	1,431	1,336	1,171
30-Jul	1,431	1,335	1,169
31-Jul	1,430	1,334	1,168
1-Aug	1,427	1,330	1,165
2-Aug	1,426	1,328	1,163
3-Aug	1,425	1,326	1,162
4-Aug	1,423	1,324	1,160
5-Aug	1,422	1,321	1,159
6-Aug	1,421	1,319	1,157
7-Aug	1,419	1,317	1,156
8-Aug	1,418	1,315	1,154
9-Aug	1,416	1,313	1,153
10-Aug	1,415	1,311	1,151
11-Aug	1,414	1,309	1,150
12-Aug	1,412	1,307	1,148
13-Aug	1,411	1,305	1,147
14-Aug	1,410	1,303	1,145
15-Aug	1,408	1,301	1,144
16-Aug	1,407	1,299	1,142
17-Aug	1,406	1,297	1,141
18-Aug	1,404	1,295	1,139
19-Aug	1,403	1,293	1,138
20-Aug	1,401	1,291	1,136
21-Aug	1,400	1,289	1,135
22-Aug	1,399	1,287	1,133
23-Aug	1,397	1,285	1,132
24-Aug	1,396	1,283	1,130
25-Aug	1,395	1,281	1,129
26-Aug	1,393	1,279	1,127
27-Aug	1,392	1,277	1,126

28-Aug	1,390	1,275	1,124
29-Aug	1,389	1,273	1,123
30-Aug	1,388	1,271	1,121
31-Aug	1,386	1,269	1,120
1-Sep	1,382	1,265	1,117
2-Sep	1,379	1,263	1,116
3-Sep	1,376	1,261	1,115
4-Sep	1,373	1,259	1,114
5-Sep	1,370	1,257	1,113
6-Sep	1,367	1,255	1,112
7-Sep	1,364	1,253	1,111
8-Sep	1,361	1,251	1,110
9-Sep	1,358	1,249	1,109
10-Sep	1,355	1,247	1,108
11-Sep	1,352	1,245	1,107
12-Sep	1,349	1,243	1,105
13-Sep	1,346	1,241	1,104
14-Sep	1,343	1,239	1,103
15-Sep	1,340	1,237	1,102
16-Sep	1,337	1,235	1,101
17-Sep	1,334	1,233	1,100
18-Sep	1,332	1,231	1,099
19-Sep	1,329	1,229	1,098
20-Sep	1,326	1,227	1,097
21-Sep	1,323	1,225	1,096
22-Sep	1,320	1,224	1,095
23-Sep	1,317	1,222	1,094
24-Sep	1,314	1,220	1,093
25-Sep	1,311	1,218	1,092
26-Sep	1,308	1,216	1,091
27-Sep	1,306	1,214	1,090
28-Sep	1,303	1,212	1,089
29-Sep	1,300	1,210	1,088
30-Sep	1,297	1,208	1,087
1-Oct	1,293	1,205	1,085
2-Oct	1,292	1,203	1,084
3-Oct	1,290	1,201	1,083
4-Oct	1,288	1,199	1,082
5-Oct	1,286	1,197	1,081
6-Oct	1,284	1,195	1,080
7-Oct	1,283	1,193	1,079
8-Oct	1,281	1,191	1,078
9-Oct	1,279	1,190	1,077
10-Oct	1,277	1,188	1,076
11-Oct	1,275	1,186	1,075
12-Oct	1,273	1,184	1,074
13-Oct	1,272	1,182	1,073
14-Oct	1,270	1,180	1,072
15-Oct	1,268	1,178	1,071
16-Oct	1,266	1,177	1,070
17-Oct	1,265	1,175	1,069
18-Oct	1,263	1,173	1,068
19-Oct	1,261	1,171	1,067
20-Oct	1,259	1,169	1,066
21-Oct	1,258	1,167	1,065
22-Oct	1,256	1,165	1,064
23-Oct	1,254	1,164	1,063
24-Oct	1,253	1,162	1,062
25-Oct	1,251	1,160	1,061
26-Oct	1,249	1,158	1,060
27-Oct	1,248	1,156	1,059
28-Oct	1,246	1,154	1,058

29-Oct	1,244	1,152	1,057
30-Oct	1,243	1,151	1,056
31-Oct	1,241	1,149	1,055
1-Nov	1,237	1,145	1,054
2-Nov	1,236	1,143	1,053
3-Nov	1,234	1,141	1,052
4-Nov	1,232	1,140	1,051
5-Nov	1,231	1,138	1,050
6-Nov	1,229	1,136	1,049
7-Nov	1,227	1,134	1,048
8-Nov	1,226	1,132	1,047
9-Nov	1,224	1,131	1,046
10-Nov	1,223	1,129	1,045
11-Nov	1,221	1,127	1,044
12-Nov	1,219	1,125	1,043
13-Nov	1,218	1,124	1,042
14-Nov	1,216	1,122	1,041
15-Nov	1,215	1,120	1,040
16-Nov	1,213	1,118	1,039
17-Nov	1,211	1,117	1,038
18-Nov	1,210	1,115	1,037
19-Nov	1,208	1,113	1,037
20-Nov	1,207	1,111	1,036
21-Nov	1,205	1,110	1,035
22-Nov	1,203	1,108	1,034
23-Nov	1,202	1,106	1,033
24-Nov	1,200	1,104	1,032
25-Nov	1,199	1,103	1,031
26-Nov	1,197	1,101	1,030
27-Nov	1,196	1,099	1,029
28-Nov	1,194	1,097	1,028
29-Nov	1,193	1,096	1,027
30-Nov	1,191	1,094	1,026
1-Dec	1,189	1,092	1,025
2-Dec	1,189	1,092	1,025
3-Dec	1,189	1,092	1,025
4-Dec	1,189	1,092	1,025
5-Dec	1,189	1,092	1,025
6-Dec	1,189	1,092	1,025
7-Dec	1,189	1,092	1,024
8-Dec	1,189	1,092	1,024
9-Dec	1,189	1,092	1,024
10-Dec	1,189	1,092	1,024
11-Dec	1,189	1,092	1,024
12-Dec	1,189	1,092	1,024
13-Dec	1,189	1,092	1,024
14-Dec	1,189	1,092	1,023
15-Dec	1,189	1,092	1,023
16-Dec	1,189	1,092	1,023
17-Dec	1,189	1,092	1,023
18-Dec	1,189	1,092	1,023
19-Dec	1,189	1,092	1,023
20-Dec	1,189	1,092	1,023
21-Dec	1,189	1,092	1,022
22-Dec	1,189	1,092	1,022
23-Dec	1,189	1,092	1,022
24-Dec	1,189	1,092	1,022
25-Dec	1,189	1,092	1,022
26-Dec	1,189	1,092	1,022
27-Dec	1,189	1,092	1,022
28-Dec	1,189	1,092	1,021
29-Dec	1,189	1,092	1,021

30-Dec	1,189	1,092	1,021
31-Dec	1,189	1,092	1,021

NOTE: If volume is greater than or equal to the bottom of Zone 1 then the Total Composite Storage Zone is Zone 1, if volume is greater than or equal to the bottom of Zone 2 and less than the top of Zone 2 then the Total Composite Storage Zone is 2, if the volume is greater than or equal to the bottom of Zone 3 and less than the top of Zone 3 then the Total Composite Storage Zone is 3 and if the volume is less than the top of Zone 4 then the Total Composite Storage Zone is 4.

EXHIBIT C

Final

environmental statement

CT-III-7

related to construction of

JOSEPH M. FARLEY NUCLEAR PLANT
UNITS 1 and 2

ALABAMA POWER COMPANY

DOCKET Nos. 50-348 and 50-364

June 1972

UNITED STATES ATOMIC ENERGY COMMISSION

DIRECTORATE OF LICENSING

The Chattahoochee is no longer a natural stream. Many dams have been constructed on it to make reservoirs for flood control, water power, and navigation. One of the largest reservoirs is the Lake Sidney Lanier (Buford Dam) just north of Atlanta, some 200 miles north of the site, which is used for flood control and electric power. Coming down stream there are also the Morgan Falls Dam, the West Point Dam, the Bartlett Dam, the Goat Rock Dam, and the Oliver Dam. The Walter F. George Dam, 31 miles upstream from the site, forms Lake Eufaula and is used for water power, flood control, and navigation. Lake Eufaula is navigable as far as Columbus, Georgia, some 75 miles north of the site. The Columbia Lock and Dam is located 3 miles north of the site and is used for flood control and navigation, but not for water power. The Jim Woodruff Dam, 44 miles downstream from the site just north of the Georgia-Florida boundary, is the most southerly of the dams. It dams the Flint River as well as the Chattahoochee and forms Lake Seminole, which covers more than 37,500 acres. The headwaters of this lake back up the Chattahoochee as far as the Columbia Lock and Dam, so that the river at the Farley station site is actually the headwaters of Lake Seminole rather than a normal river.

Records of stream flow were kept at Columbia, Alabama, starting in 1928. The minimum daily flow, before construction of the Columbia Lock and Dam in 1960, was 1210 cfs (542,000 gpm) in 1954, a record dry year. At present the regime of the river is much changed by the completion of Columbia Dam and the Walter F. George Dam in 1964. It is the controlled discharge of these dams that controls the low stage flow of the river, and also the discharge of the Jim Woodruff Dam and the stage of Lake Seminole. The level of Lake Seminole, and hence the level of the river at the station site, is held no lower than 76 ft msl to provide a minimum depth of 9 ft in the navigation channel. Since the completion of the Columbia Dam and the Walter F. George Dam, the minimum observed flow at Columbia Dam was 1760 cfs, but the Walter F. George Dam at that time was storing water. Due to the expected flooding of the gage at Columbia by Columbia Reservoir, a gage was established in 1960 at Alaga, Alabama, about 8 miles downstream from the station site. The lowest flow so far recorded by this gage was 1230 cfs (552,000 gpm) in October 1962, but at this time also the reservoirs upstream were being filled. It is possible, but unlikely, that at some future time the river flow at the station site will briefly be zero, because of regulation of the dams. This will have little, if any, effect on the station, because the river stage must be maintained at 76 ft msl, and this will provide ample water for the station. A more complex problem is the minimum flow that should be used in determining the dilution of discharges from the station. An examination of the record[19] suggests that a flow of 2000 cfs (900,000 gpm) will be exceeded 90 to 95% of the time.

EXHIBIT D

Final

environmental statement

related to operation of

JOSEPH M. FARLEY NUCLEAR PLANT UNITS 1 AND 2

ALABAMA POWER COMPANY

DOCKET NOS. 50-348 AND 50-364

UNIT

that the economic growth will continue after the Farley Plant has been constructed. The plant will have an operating staff of approximately 150 employees who will remain as permanent residents. It was emphasized that the financial benefits from the plant (especially taxes) will be needed to maintain the utilities and services required for the growth of the county and city (2).

2.3 Hydrology

2.3.1 Chattahoochee River

The Corps of Engineers retains controls over the operation and maintenance of the entire Chattahoochee - Flint - Apalachicola River system. Continuous surveillance is maintained over Lake Seminole, the portion of the Chattachoochee River which is most directly affected by the Farley Plant, as well as over other reservoirs upstream and downstream. The staff has made extensive use of the Corp's recent Environmental Impact Statement for this river system (3) in assessing the current use of Lake Seminole. There is no evidence that Lake Seminole and the other reservoirs on the Chattahoochee have been affected by the construction of the Farley Plant. A 100-foot wide channel is maintained at a depth of nine feet by dredging; however, the Corps now places the dredging spoil in diked areas above high water level. One of these spoil areas is on the east side of the Chattahoochee between the Farley site and the Andrews Lock and Dam (formerly Columbia Lock and Dam). The Corps of Engineers also continually removes debris that might interferewith boat and barge traffic. These and other recent activities, such as the impounding of much of the Apalachicola River, have caused both qualitative and quantitative changes in the aquatic biota of Lake Seminole during the past decade (3).

Local fishermen report that sports fishing remains very good in this lake in the vicinity of the Farley site (2). The value of the river for recreational purposes is evident from a compilation of visitations to Andrews Lake wherein the number of visitors is shown to have increased from 30,000 in 1964 to 265,164 in 1971 (3).

Recent investigations have been made by the applicant to determine the extent to which the river water downstream of the Farley Plant is used through withdrawal. A résumé of the applicant's findings (4) (ER-OL-Amend 1 P 2.2-1) is presented in Table 2.2.

Attachment C

Southern Nuclear Operating Company, Inc.
40 Inverness Center Parkway
Post Office Box 1295
Birmingham, Alabama 35201

SOUTHERN COMPANY
Energy to Serve Your World™

File: E.02.50
Log: EV-13-0116

January 14, 2013

FEDERAL EXPRESS AND E-MAIL TO ACF-WCM@usace.army.mil

Colonel Steven J. Roemhildt
Commander, Mobile District
U.S. Army Corps of Engineers
c/o Tetra Tech, Inc.
Attn: ACF-WCM
61 St. Joseph Street, Suite 550
Mobile, Alabama 36602-3521

Re: Scoping for Draft Environmental Impact Statement for Updating the Water Control Manual for the Apalachicola-Chattahoochee-Flint River Basin

Dear Colonel Roemhildt:

The U.S. Army Corps of Engineers ("Corps") has solicited public comments regarding the Corps' revision of the scope of issues to consider as it updates its water control manual for the Apalachicola-Chattahoochee-Flint ("ACF") River Basin. 77 Fed. Reg. 62,224 (Oct. 12, 2012). This letter provides the comments of Alabama Power Company ("Alabama Power") and the Southern Nuclear Operating Company ("Southern Nuclear").[1]

Southern Nuclear operates the Farley Nuclear Plant ("Plant Farley"), located on the Chattahoochee River near Dothan, Alabama, which provides 19% of the total electricity generation for Alabama Power Company. Plant Farley is owned by Alabama Power. Plant Farley relies on adequate elevations and flows in the Chattahoochee River for cooling water and discharge assimilation. From time to time, it is necessary to transport oversized equipment to and from Plant Farley by barge. Accordingly, Alabama Power and

[1] Southern Nuclear has previously submitted comments in connection with the scoping for this manual update, and these comments supplement those previous comments. Southern Nuclear also agrees with the comments of the State of Alabama and incorporates them by reference.

Southern Nuclear have a significant interest in the Corps' management of its reservoirs in the ACF River Basin.

As the Corps revises its ACF water control manual, and considers new water supply operations for the Atlanta-metropolitan area, it is the position of Alabama Power and Southern Nuclear that the Corps must ensure minimum flows of 2,000 cubic feet per second ("cfs") in the Chattahoochee River at Columbia, Alabama and support navigation on the Apalachicola and Chattahoochee Rivers. Each of these issues is explained more fully below.

The Corps must provide 2,000 cfs minimum flow at Columbia, Alabama.

Southern Nuclear defines a flow of 2,000 cfs and river elevation of 74.5 feet mean sea level ("ft MSL") as the minimum conditions necessary for long-term operation of Plant Farley. While Plant Farley can operate for short periods (a few days) with flow below 2,000 cfs, extended operation at lower flow would require detailed evaluation to determine the potential environmental and operational impacts. Generally, Plant Farley operates with a river elevation between 76 and 78 ft MSL. Operation below 74.5 ft MSL also would require detailed evaluation to determine the potential environmental and operational impacts. Other industrial facilities on the Chattahoochee River, including those of MeadWestvaco and Georgia Pacific, also require the same conditions to meet their applicable water quality standards.

Plant Farley's discharge is limited by a National Pollutant Discharge Elimination System Permit issued by the Alabama Department of Environmental Management. That permit contains limits and requirements to ensure the thermal discharge and chemical constituents in the effluent meet applicable water quality standards. At 2,000 cfs flowing past Plant Farley (*i.e.*, going through Andrews Lock and Dam), there are no significant adverse thermal or chemical impacts resulting from Plant Farley's discharge. Plant Farley also discharges small quantities of radioactive waste through the discharge line in strict compliance with regulations of the Nuclear Regulatory Commission ("NRC"). When flows are reduced below 2,000 cfs for extended periods, an evaluation of the impacts of that discharge is required by Southern Nuclear, state environmental agencies, and, potentially, the NRC.

Certain operational parameters concerning the Corps' ACF projects were assumed as part of Plant Farley's construction. The Final Environmental Impact Statement ("FEIS") of the Atomic Energy Commission for construction of Plant Farley discussed the fact that the Corps would generally maintain an elevation of 76 ft MSL and flow of 2,000 cfs. FEIS Related to Construction of Joseph M. Farley Nuclear Plant Units 1 & 2, Alabama Power Company, II - 20 (June 1972). Thus, regulatory approval of the Plant Farley site was based on an assumption that the Corps would continue to maintain those parameters.

Plant Farley's flow and elevation needs have always been taken into consideration by the three states served by the ACF system. The States of Alabama, Florida, and Georgia considered Plant Farley's requirements and those of other facilities on the Chattahoochee River during the interstate compact negotiations concerning a proposed Allocation Formula for the ACF River Basin. The three states signed a Memorandum of Agreement providing for a minimum daily flow of 2,000 cfs below George W. Andrews Lock and Dam, just above Plant Farley.

The Corps has also recognized the need for flow of 2,000 cfs at Columbia, Alabama. For example, the Walter F. George Reservoir Regulation Manual specifically recognizes that Plant Farley and other industries require adequate flows and elevations for their operations and downstream water quality as follows:

> Among the industrial users are two paper company facilities and one nuclear power plant. Mead Paper Company, at the headwaters of W.F. George Lake, and the Georgia Pacific Corporation, in the headwaters of Lake Seminole, withdraw water for processes used in the manufacturing of wood products. These companies must also meet special water quality requirements for discharge that are based on a combination of dissolved oxygen and flow in the river. The Alabama Power Company's Farley Nuclear Power Plant is located on the Chattahoochee River downstream from Columbia, Alabama. The plant has an intake structure that provides cooling water for its nuclear fuel, and is dependent upon a river-stage above 76 feet MSL for safe operation.

Apalachicola River Basin Reservoir Regulation Manual, Appendix C, Walter F. George Dam at C-13 (Feb. 1993).

Plant Farley and the other industrial facilities in the region make a major contribution to the regional economy of southeastern Alabama and southwestern Georgia. Flows of 2,000 cfs at Columbia, Alabama, are critical for the continued safe and reliable operation of those facilities. Therefore, Southern Nuclear urges the Corps to ensure its ACF manual revisions clearly provide for the continuation of flows at that level.

The Corps must support navigation on the Apalachicola and Chattahoochee Rivers.

In addition to flow assumptions, another primary factor in the siting of Plant Farley was the proximity to a federally authorized and maintained navigable river. Most of the large equipment for the original plant construction was delivered by barge. In 2000 and again in January of 2006, barge transportation to and from the plant was necessary for vital equipment replacement and maintenance activities. No other mode of transportation to Farley was adequate for those purposes. Inadequate provision for reliable navigation will increase costs for Plant Farley and limit the potential for future expansion.

Navigation is one of the principal authorized purposes of the ACF River Basin reservoir system as authorized by Congress. Each of the Corps' ACF reservoirs plays a critical role in maintaining navigation in the ACF River Basin. For example, the current reservoir regulation manual for Jim Woodruff Reservoir describes Woodruff as "a multi-purpose project created primarily to aid navigation in the Apalachicola River below the dam and in the Chattahoochee and Flint Rivers above the dam and to generate electric power." Apalachicola River Basin Reservoir Regulation Manual, Appendix A, Jim Woodruff Reservoir at A-10 (1972 & Rev. July 1985). To this end, the Corps is directed to maintain Woodruff at an elevation of approximately 77 ft MSL while continuously releasing inflows to the Apalachicola River in order to support a nine foot deep navigation channel. *Id.* at A-16, A-17. Continuous navigation operations are to be curtailed only during unusual low-flow events, consistent with static head limitations. *Id.* at A-18. Upstream, the George W. Andrews Reservoir is described in its Reservoir Regulation Manual as "a single purpose project designed to aid navigation by providing a 9-foot navigation channel and by maintaining a more uniform downstream flow." Apalachicola River Basin Reservoir Regulation Manual, Appendix D, George W. Andrews Reservoir at D-5 (Rev. Feb. 1978). Andrews, like Woodruff, is a run-of-river project, and it aids navigation primarily by passing inflows released from upstream projects. All efforts are to be made to ensure Andrew's tailwater does not drop below 77 ft MSL—the minimum needed to maintain a nine foot navigation channel. *See id.* at D-26. When Andrews can no longer support this tailwater elevation, "arrangements may have to be made for limited operation of the Walter F. George power plant, or for equivalent spillway discharges." *Id.* Indeed, all three of the upstream reservoirs—Lanier, Walter F. George, and West Point—are required to support navigation from Columbus, Georgia, to the Gulf of Mexico. As the Corps' 1989 Draft Water Control Plan recognizes, "all three of the major storage projects will be utilized to provide the designated level of support" for navigation "for as long as possible and, of course, preferably year-round." ACF Basin Water Control Plan at 17-18 (Draft Oct. 1989).

West Point and Walter F. George are thus essential in maintaining adequate flows in the middle Chattahoochee and the Apalachicola River. The more depleted these reservoirs become, the less likely they can adequately provide that support. Therefore, lowering action zones at these reservoirs to protect storage at Lake Lanier negatively impacts downstream flow support. Any revision to the ACF water control manual must ensure that both West Point and Walter F. George are able to continue their important role in maintaining adequate flows in the middle Chattahoochee and Apalachicola Rivers. And the Corps should reject any alternatives that shift the burden of supporting Atlanta-area water supply to these downstream reservoirs.

As explained above, Plant Farley was designed and built on the assumption that the Corps would ensure a minimum elevation of 76 ft MSL between Andrews and Woodruff for as much of the year as possible. When the ACF reservoirs are operated to meet the elevation and flow targets specified in the Woodruff and Andrews Reservoir Regulation Manuals, Plant Farley's operational requirements are met. Any new operations to support Atlanta-

area water supply must take account of the downstream flow requirements of Plant Farley and the congressionally mandated navigation support function of the ACF reservoir system. The Corps has not consistently maintained the Apalachicola River to provide for safe and reliable navigation, largely due to the State of Florida's denial of authorization pursuant to Clean Water Act ("CWA") Section 401, the Coastal Zone Management Act ("CZMA"), and various state statutes and regulations. As a result, commercial barge traffic from Alabama and Georgia to the Gulf of Mexico has all but ceased. Nevertheless, the Corps is responsible for maintaining navigation in the ACF River Basin notwithstanding Florida's decision. CWA Sections 404(t) and 511(a) provide sufficient authority for the Corps to proceed with navigation maintenance despite Florida's denial of a Section 401 permit. In short, the Corps cannot use its failure to maintain the navigation channel and the subsequent reduction in barge traffic as a basis for not operating the reservoirs for navigation.

The Corps' revised water control manual for the ACF Basin must ensure adequate flows to support navigation. Support of navigation is among the primary congressionally authorized purposes of the ACF reservoirs. Accordingly, the Corps has no discretion to abandon navigation support or to disfavor it in support of other reservoir purposes. Nothing in the legislative history of the ACF system or the Eleventh Circuit's *Tri-State* opinion authorizes the Corps to subordinate navigation support to other project purposes. Rather, navigation support is a co-equal authorized functions of the ACF reservoir system; therefore, each purpose must be given adequate support by the Corps. As the Corps' original 1959 reservoir regulation manual for Buford Dam recognizes, "[a] storage of 1,049,400 acre-feet between elevations 1,035 and 1,070 [at Buford Dam] has been allocated for power *and low-water flow regulation*." Apalachicola River Basin, Reservoir Regulation Manual, Buford Reservoir at B-13, ¶ 29 (Dec. 1959). (emphasis added). For this reason, as the Corps' 1991 Buford Dam water control plan states, maintaining the navigation channel sometimes requires "releases from storage in upstream reservoirs *considerably in excess of the flow requirements to meet power contract commitments*." Apalachicola River Basin, Reservoir Regulation Manual, Buford Reservoir at B7-1, ¶ 7-01 (Feb. 1991) (emphasis added). We urge the Corps to include this requirement in the scope of its EIS and in any revisions of the water control plans and manuals for the ACF Basin. At a minimum, a reasonable amount of conservation storage in Lanier should be reserved for navigation support.

Thank you for your consideration of these comments. Should you have any questions or if you wish to receive additional information, please contact me at 205-992-5264.

Sincerely,

Greg Elmore

Greg Elmore
Environmental Services Supervisor

GDE:ahl

Attachment D

Willard L. Bowers
Vice President
Environmental Affairs

600 North 18th Street / 12N-0830
Post Office Box 2641
Birmingham, Alabama 35291

Tel 205.257.4090
Fax 205.257.4349

ALABAMA POWER
A SOUTHERN COMPANY

May 13, 2008

Ms. Gail Carmody
Supervisor, Ecological Services
U.S. Fish and Wildlife Service
1601 Balboa Avenue
Panama City, FL 32405-3721

Mr. Curtis M. Flakes
Chief, Planning and Environmental
Division
Mobile District
U.S. Army Corps of Engineers
P.O. Box 2288
Mobile, AL 36628-0001

RE: Proposed Modification to Interim Operations Plan for ACF Reservoir Basin

Dear Ms. Carmody and Mr. Flakes:

Alabama Power Company has reviewed the U.S. Army Corps of Engineers' April 15, 2008, letter to the U.S. Fish and Wildlife Service ("FWS") requesting the initiation of formal Section 7 consultation on the Corps' proposed modifications to the current Interim Operations Plan ("IOP") at Jim Woodruff Dam. Alabama Power also has reviewed the separate description of the proposed action available on the website of the Corps' Mobile District Office. As a stakeholder in the Apalachicola-Chattahoochee-Flint ("ACF") River Basin, Alabama Power requests that the Corps and the FWS consider the following comments as the two agencies develop a revised IOP for the ACF River Basin projects.

As more fully set forth below, Alabama Power is very concerned that the proposed modified IOP does not expressly provide for the flows and reservoir elevations needed for the Farley Nuclear Plant's safe and reliable operation. Alabama Power is also very concerned that the IOP, and the proposed modified IOP, assume there will be no operations for navigation in the ACF River Basin. The historic operations of the ACF projects for both hydropower and navigation have generally provided adequate elevations and flows at Plant Farley for its operations, and, when necessary, for barge transportation to and from the plant. Allowing the ACF reservoirs to fill in the spring is crucial to providing adequate flows year round for navigation and other purposes. Actual operations under the current IOP have demonstrated that the IOP, as previously modified from time to time, has not provided adequate opportunities to store water during the spring. While the proposed modified IOP ostensibly seeks to provide for

more opportunities to fill the upstream reservoirs, in some circumstances the proposed modified IOP could make it even more difficult to fill the upstream reservoirs than under the current IOP.

Lastly, Alabama Power believes the Corps and FWS have not adequately assessed the flow needs of the Gulf sturgeon and the Apalachicola mussels, and have overestimated the flows these species need for survival. In some instances, the high spring flows mandated under both the current IOP, and under the proposed modified IOP, may actually be detrimental to these species.

I. Alabama Power's Interests in the ACF River Basin

Alabama Power is the owner of the Farley Nuclear Plant, which is located on the Chattahoochee River near Dothan, Alabama, below George W. Andrews Lock and Dam. Plant Farley is operated by Southern Nuclear Operating Company. Plant Farley, which provides 19% of Alabama Power's total electricity generation, relies on adequate elevations and flows in the river for cooling water and discharge assimilation. From time to time, Alabama Power also requires adequate flows and navigation maintenance activities by the Corps in the Chattahoochee and Apalachicola Rivers to transport oversized equipment to and from Plant Farley by barge. Accordingly, Alabama Power has significant interests in the flows of the ACF River Basin at Plant Farley and the storage in the Corps' upstream reservoirs which support those flows.

As more fully explained in the attached October 30, 2007, letter from the Southern Company to the U.S. Department of Energy (Attachment A), Plant Farley has two nuclear fueled units, which provide a combined 1,776 megawatts of baseload generation, which are critical to maintaining regional transmission reliability for the Southern Company's system. Shutdown of either of Plant Farley's units due to unacceptably low elevations or flows in the Chattahoochee River below Andrews Dam would have a significant impact on the electricity supply to the citizens in the Southeast, including those throughout the ACF River Basin. The reliability of the Southern Company's transmission system during off-peak periods (October–May), when critical maintenance is being performed on generation and transmission assets, cannot be maintained without Plant Farley's generation.

Southern Nuclear defines a flow of 2,000 cfs and river elevation of 74.5 feet mean sea level ("ft MSL") as the minimum conditions necessary for long-term operation at Plant Farley. While Plant Farley can physically operate for very short periods (a few days) below 2,000 cfs flow, extended operation below this flow level would require detailed evaluation to determine the potential environmental and operational impacts.[1] Generally, Plant Farley operates with a river elevation between 76 and 78 ft MSL. Operation below 74.5 ft MSL also would require detailed evaluation to determine the potential environmental and operational impacts. Plant Farley's discharge is limited by a National Pollutant Discharge Elimination System ("NPDES") Permit issued by the Alabama Department of Environmental Management ("ADEM"). That permit contains limits and requirements to ensure the thermal discharge and chemical

[1] Other industries, including Mead Westvaco and Georgia Pacific, also rely on these same flows to meet their applicable water quality standards.

constituents in the effluent meet applicable water quality standards. At 2,000 cfs flowing past Plant Farley (*i.e.*, going through Andrews Lock and Dam), there are no significant adverse thermal or chemical impacts resulting from Plant Farley's discharge. When flows are reduced below 2,000 cfs an evaluation of the impacts of that discharge is required by Southern Nuclear, state environmental agencies, and, potentially, the Nuclear Regulatory Commission ("NRC"). Plant Farley also discharges small quantities of radwaste through the discharge line in strict compliance with NRC's regulations. Consequently, lowering river flows would prompt NRC review of Plant Farley's operating license provisions to confirm the acceptability of continued operations.

Plant Farley is also operated pursuant to operating licenses issued by the NRC. These licenses were obtained based on extensive environmental and safety analyses in conjunction with the NRC and its predecessor, the United States Atomic Energy Commission. Alabama Power relied on the historic flows in the ACF River Basin and the lawful operation of the Corps' ACF reservoirs, as well as information and review by the Corps, in its licensing process.

For example, prior to construction of Plant Farley, the Atomic Energy Commission ("AEC") published its June 1972 Environmental Statement (Attachment B). The AEC noted specifically Alabama Power's reliance on the Corps' obligation to maintain a nine foot deep navigation channel in the Chattahoochee River, which corresponds to a river elevation of 76 ft MSL at the plant site. The AEC's Final Environmental Statement provides as follows:

> The headwaters of [Lake Seminole] back up to the Chattahoochee as far as the Columbia Lock and Dam, so that the river at the Farley station site is actually the headwaters of Lake Seminole rather than a normal river. . . .
>
> At present the regime of the river is much changed by the completion of Columbia Dam and Walter F. George Dam in 1964. It is the controlled discharge of these dams that controls the low stage flow of the river, and also the discharge of the Jim Woodruff Dam and the stage of Lake Seminole. The level of Lake Seminole, and hence the level of the river at the station site, is held no lower than 76 ft msl to provide a minimum depth of 9 feet in the navigation channel. . . .the river stage must be maintained at 76 feet msl, and this will provide ample water for the station. A more complex problem is the minimum flow that should be used in determining the dilution of discharges from the station. An examination of the record suggests that a flow of 2,000 cfs (900,000 gpm) will be exceeded 90% - 95% of the time.

Final Environmental Statement Related to Construction of Joseph M. Farley Nuclear Plant Units 1 & 2, Alabama Power Company, II - 20 (June 1972).

Likewise, Section 2.3.1 of the Final Environmental Impact Statement Related to the Operation of Plant Farley provides:

> The Corps of Engineers retains controls over the operation and maintenance of the entire Chattahoochee – Flint – Apalachicola River system. Continuous surveillance is maintained over Lake Seminole, the portion of the Chattahoochee River which is most directly affected by the Farley Plant, as well as over other reservoirs upstream and downstream. The staff has made extensive use of the Corps' recent Environmental Impact Statement for this river system in assessing the current use of Lake Seminole. . . . A 100 foot wide channel is maintained at a depth of 9 feet by dredging; . . .

Final Environmental Statement Related to Operation of Joseph M. Farley Nuclear Plant Units 1 & 2, Alabama Power Company, 2-6 (Attachment C). These Environmental Statements were reviewed by the Corps, and at no time did the Corps ever suggest that these historic flow and navigation conditions would not be met.

In addition to depending on these historic flows and elevations, as well as the Corps review and input necessary to the engineering, design and safety of the plant, the proximity of Plant Farley to a federally authorized and maintained navigable river was a primary factor considered in its siting. Most of the large equipment for the original plant construction was delivered by barge, and in both 2000 and January 2006 vital replacement and maintenance activities were performed requiring barge transport to and from the plant. This is particularly important because rail transportation to Farley is not adequate for these purposes. Additionally, abandonment of navigation would also increase costs and would limit the potential for expanding Plant Farley in the future.

II. Problems with the Interim Operations Plan ("IOP")

A. Plant Farley's Flow and Elevation Needs

Plant Farley's needs were considered over a number of months, along with other industry flow needs, as part of the interstate compact negotiations concerning a proposed Allocation Formula for the ACF River Basin. These flows were validated through significant investigation and evaluation and ultimately were agreed to in a Memorandum of Understanding ("MOU") entered into by the States of Alabama, Florida, and Georgia in 2003 as part of the ACF Compact negotiations. (Attachment D). The MOU specifically recognized the need for the Corps to provide a minimum daily flow of 2,000 cfs below George W. Andrews Lock and Dam just above Plant Farley. The recent November 15, 2007, Environmental Assessment for the Corps' Exceptional Drought Operation Plan ("EDO") recognizes Plant Farley's intake elevation and flow requirements and explains that the Corps incorporated these requirements into the EDO.[2]

[2] U.S. Army Corps of Engineers, Mobile District, Environmental Assessment, Temporary Exceptional Drought Operations Modifications to the Interim Operating Plan at 43 (Nov. 15, 2007). The Corps' consideration of Plant Farley's flow needs is also recognized in the Corps' "ACF River Basin – The Facts and Status" report on the Mobile District's Homepage, available at http://www.sam.usace.army.mil/webdoc/ACFDrought2007.pdf (created Oct. 21, 2007).]

In addition, existing Corps ACF manuals recognize Plant Farley's flow and elevation needs. The Corps' Walter F. George Reservoir Regulation Manual specifically recognizes that Plant Farley and other industries require adequate flows and elevations for their operations and downstream water quality:

> Among the industrial users are two paper company facilities and one nuclear power plant. Mead Paper Company, at the headwaters of W.F. George Lake, and the Georgia Pacific Corporation, in the headwaters of Lake Seminole, withdraw water for processes used in the manufacturing of wood products. These companies must also meet special water quality requirements for discharge that are based on a combination of dissolved oxygen and flow in the river. The Alabama Power Company's Farley Nuclear Power Plant is located on the Chattahoochee River downstream from Columbia, Alabama. The plant has an intake structure that provides cooling water for its nuclear fuel, and is dependent upon a river-state above 76 feet MSL for safe operation.

Apalachicola River Basin Reservoir Regulation Manual, Appendix C, Walter F. George Dam at C-13 (Feb. 1993).

Surprisingly, the proposed modified IOP wholly ignores the middle/lower Chattahoochee River needs and the agreed upon and required minimum flows at Columbus, Georgia [1,350 cfs daily/1,850 cfs weekly] and Columbia, Alabama [2,000 cfs daily]. By focusing solely on the required minimum flow at the downstream Woodruff dam, and given the uncontrolled inflow from the Flint River into Lake Seminole, it is likely that the stretch of the Chattahoochee River between Columbus and Columbia will be deprived of the minimum flows necessary for water quality and important municipal and industrial operations, including Plant Farley, all to the detriment of the public.

As of April 24, 2008, the ACF River Basin is in composite zone 4. Under the proposed modified IOP, the only required minimum flow would be 5,000 cfs at Woodruff. This flow could be provided solely from the Flint River's inflows, as opposed to sufficient releases from West Point and George reservoirs to provide the required minimum flows at Columbus and Columbia. During December 2007, the average daily discharge from George reservoir was 1,225 cfs [2,823 max/0 min], less than the 2,000 cfs required at Columbia, yet the average daily discharge from Woodruff Dam for the same period was 5,512 cfs [9,781 max/4,296 min], according to information from the Corps' ACF River Basin web site. According to USGS data, during December 2007, the average daily flow at Columbia was only 2,084.07 cfs, with daily low flows of 696 and 729 cfs. Similarly, during April 2008, average inflows to Lake Seminole were 70% of the historic average for the month—much higher than the average inflows to the upstream projects, 46% at Lanier, 43% at West Point, and 56% at George. This indicates high inflows to Woodruff from the Flint River.

Accordingly, Alabama Power requests the Corps to specify in the proposed modified IOP that the Corps' ACF projects will be operated to protect Plant Farley's elevation and flow needs as outlined in Section II above.

B. No Navigation Support

One of the principal purposes of the ACF River Basin reservoir system, as originally authorized by Congress, is navigation. Each of the federal projects located in the ACF has a critical role to play in maintaining navigation in the ACF River Basin. For example, the current reservoir regulation manual for Jim Woodruff Reservoir describes Woodruff as "a multi-purpose project created primarily to aid navigation in the Apalachicola River below the dam and in the Chattahoochee and Flint Rivers above the dam and to generate electric power." Apalachicola River Basin Reservoir Regulation Manual, Appendix A, Jim Woodruff Reservoir at A-10 (Rev. July 1985). To this end, the Corps is directed to maintain Woodruff at an elevation of approximately 77 ft MSL while continuously releasing inflows to the Apalachicola River in order to support a nine foot deep navigation channel. *Id.* at A-16, A-17. Continuous navigation operations are to be curtailed only during unusual low-flow events, consistent with static head limitations. *Id.* at A-18.

Upstream, the George W. Andrews Reservoir is described in its Reservoir Regulation Manual as "a single purpose project designed to aid navigation by providing a 9-foot navigation channel and by maintaining a more uniform downstream flow." Apalachicola River Basin Reservoir Regulation Manual, Appendix D, George W. Andrews Reservoir at D-5 (Rev. Feb. 1978). Because Andrews, like Woodruff, is a run-of-river project, Andrews aids navigation primarily by passing inflows released from upstream projects. All efforts are to be made to ensure Andrew's tailwater does not drop below elevation 77 ft MSL—the minimum elevation needed to maintain a nine foot navigation channel. *See id.* at D-26. When Andrews can no longer support this tailwater elevation, "arrangements may have to be made for limited operation of the Walter F. George power plant, or for equivalent spillway discharges." *Id.* Indeed, all three of the upstream reservoirs—W.F. George, West Point, and Lanier—are required to support navigation from Columbus, Georgia, to the Gulf of Mexico. As the Corps' 1989 Draft Water Control Plan recognizes, "all three of the major storage projects will be utilized to provide the designated level of support" for navigation "for as long as possible and, of course, preferably year-round." ACF Basin Water Control Plan at 17-18 (Draft Oct. 1989).

As explained above, Plant Farley was specifically designed and built on the assumption that the Corps would operate the ACF reservoirs to ensure a minimum elevation of 76 feet above MSL between Andrews and Woodruff, where Plant Farley is located, for as much of the year as possible. When the ACF reservoirs are operated to meet the elevation and flow targets specified in the Woodruff and Andrews Reservoir Regulation Manuals, Plant Farley's operational requirements are met. Nevertheless, the IOP, and the proposed modifications to the IOP, assume that there will be no operations for navigation. The exclusion of operations for navigation under the IOP is in blatant violation of the original Congressional authorization of the ACF reservoir system and the Corps' own ACF reservoir regulation manuals.

The IOP is almost exclusively driven by fish and wildlife concerns. However, only one ACF reservoir—West Point—was expressly authorized by Congress for fish & wildlife purposes. Additional flows for fish and wildlife are appropriate only after the primary purposes of the ACF reservoir system, including navigation, have been met.[3] Moreover, the entire process undertaken by the Corps and FWS is backwards. The Corps has no independent authority to create an "Interim Operating Plan" designed to benefit threatened and endangered species to the detriment of the authorized purposes of the ACF reservoir system. Under the applicable provisions of the Endangered Species Act and the FWS' implementing regulations, the discretionary elements of the Corps' 1989 Draft Water Control Plan—and the existing, authorized, reservoir regulation manuals for the specific ACF projects—should have been the subject of ESA Section 7 consultation. However, there has never been any actual determination whether the Corps' pre-IOP operations potentially "jeopardize[d] the continued existence" of the Gulf sturgeon or the Apalachicola mussels or "destroy[ed] or adversely modif[ied]" those species' critical habitats, as those terms are defined under the ESA. By making the IOP the subject of Section 7 consultation, the Corps and FWS have put the cart before the horse and have acted inconsistently with Section 7 and the authorized purposes of the ACF reservoirs.

The Corps has concluded that operation and maintenance activities to provide for navigation have been properly excluded from the IOP because the Corps has been unable to conduct navigation maintenance activities since 2000, due in large part to the State of Florida's denial of a Clean Water Act Section 401 permit to the Corps. However, the Corps has the authority under Clean Water Act Section 404(t) and Section 511(a) to proceed with navigation maintenance despite Florida's denial of a Section 401 permit. Additionally, Florida's Coastal Management Program, enacted pursuant to the federal Coastal Zone Management Act ("CZMA"), does not provide an independent basis for Florida to block navigation maintenance on the Apalachicola River. Under Section 307(e) of the CZMA, the CZMA's consistency review program may not be construed as diminishing, superseding, or modifying existing federal responsibilities over navigable waters. The lack of Florida's approval of navigation maintenance, therefore, does not provide a legitimate basis for the Corps' apparent abandonment of navigation under the IOP.

C. Inadequate Conservation of High Flow Events

Alabama Power is very concerned that the IOP, and the proposed modifications to the IOP, greatly undermine the ability of the Corps to meet minimum elevation and flow requirements for as much of the year as would otherwise be possible. It is particularly important

[3] *See In re Operation of the Missouri River System Litigation*, 421 F.3d 618, 631 n.9 (8th Cir. 2005) (if "ESA compliance would force the Corps to abandon the dominant [Flood Control Act] purposes of flood control or downstream navigation, *the ESA would not apply*") (emphasis added). The Supreme Court has recently held that ESA Section 7 consultation only applies to *discretionary* federal action. *Nat'l Ass'n of Home Builders v. Defenders of Wildlife*, 127 S. Ct. 2518, 2536 (2007). The Corps has no discretion to abandon navigation support, one of the dominant purposes of the ACF reservoir system. *See In re Operation of the Missouri River System Litigation*, 421 F.3d at 629 n.7 ("[I]f faced in the future with the unhappy choice of abandoning flood control or navigation on the one hand or recreation, fish and wildlife on the other, the priorities established by the [Flood Control Act] would forbid the abandonment of flood control or navigation.").

to fill the upstream reservoirs during the winter and spring, to the maximum extent consistent with downstream needs, so that water is conserved to provide reasonable and adequate downstream flows during the rest of the year. This is particularly important during the hot and dry summer months when temperature becomes a greater concern for downstream industries like Plant Farley, which must meet Clean Water Act thermal discharge limits and other water quality requirements.

Alabama Power asked Mr. Randy Kerr, a licensed professional engineer who served as Manager of Tennessee Valley Authority River Forecasting for over ten years, to review and critique both the Corps' IOP and the proposed modifications to the IOP. As described in his report (Attachment E), the IOP provides for unnecessarily high releases during the March to May time period when a larger portion of the inflows into the ACF River Basin should be retained in the upstream storage reservoirs to help meet other project purposes and objectives later in the year, including navigation and hydropower generation. In low-flow years, this problem is magnified despite the lower minimum flow requirements of the proposed modifications to the IOP.

As further explained by Mr. Kerr, the proposed modifications to the IOP do not improve, and in some cases exacerbate, these operational problems. The current IOP calls for releasing all basin inflows below 18,000 cfs between the months of March to May, while the proposed modified plan sets the threshold at 16,000 cfs. The current IOP keeps the release at 18,000 cfs until the basin inflow is 25,714 cfs. However, under the modified IOP, if the basin inflow is 25,714 cfs the release from Jim Woodruff Dam is required to be 16,000 cfs plus 50 percent of the basin inflow above 16,000 cfs (as long as the composite storage is in Zones 1 or 2). This results in a required release of 20,857 cfs, or 2,857 cfs *more* than is required under the current IOP. Examining inflow data for March to May in 2004, for example, the current IOP would have allowed 60,102 dsf of water to be stored in the upstream projects. Under the modified IOP, only 43,690 dsf of water could have been stored over the same period.

For the months of December, January, and February, the proposed modifications to the IOP appear to allow more water to be stored in the ACF River Basin than under the current IOP. However, limited storage capacity downstream of Buford Dam restricts the amount of water which actually can be stored during this season. As illustrated this past winter when the required minimum releases were only 5,000 cfs, the releases at Jim Woodruff Dam remained at approximately 5,000 cfs only until December 19, 2007. Once inflows increased in the ACF River Basin and the two lower storage projects, (West Point and W.F. George) were essentially full, releases at Jim Woodruff Dam had to be increased to maintain the reservoir's flood storage capacity. Thus, even with the ACF River Basin operating under the EDO, releases at Jim Woodruff Dam averaged over 13,000 cfs and 25,000 cfs for the months of January and February of 2008, respectively.

One recommended change identified by Mr. Kerr would be to require the daily average release to be at least 1,000 cfs less (for basin inflows of 16,000 cfs or less) than the basin inflow until the 5,000 cfs threshold is met. This would still allow some storage of water in the ACF River Basin while mimicking natural flows in the basin. Also, any modified drought plan should

address revisions to the operations at West Point and W.F. George to allow overfilling to ensure adequate water storage to support low flows during the summer. As explained in Mr. Kerr's reports, under the EDO and the proposed modifications to the IOP, composite storage for the basin is largely determined by storage in Lake Lanier. Walter F. George and West Point reservoirs could both be in Zone 4, Lanier could be in Zone 1, and high flows could still be mandated under the EDO and the proposed modifications to the IOP. Therefore, the Corps should re-evaluate the Zone 4 elevations for the Corps' Walter F. George and West Point reservoirs, particularly during the August to December time period. Raising the Zone 4 elevations would allow these projects to help augment the flows required at Jim Woodruff Dam during extreme drought conditions.

D. Inadequate Biological Assessment of Impacts to the Gulf Sturgeon and Apalachicola Mussels

The high flow regime mandated by the IOP is not necessary to comply with the Endangered Species Act or to otherwise benefit threatened and endangered species located in the Apalachicola River. Alabama Power asked two well-qualified biologists to independently review the scientific conclusions of the FWS set forth in the September 5, 2006, Biological Opinion (as corrected on September 22, 2006) and the November 15, 2007, Amended Biological Opinion. These reports indicate that the Corps and the FWS have erred in key respects in evaluating the flow requirements for the threatened and endangered species at issue.

As discussed in the October 16, 2007, report on the Gulf sturgeon prepared by ichthyologist Dr. Mike Howell, Ph.D., (Attachment F), the Biological Opinion identifies no basis for concluding that the Corps' historic operations of the ACF reservoirs have had any negative effect on the Gulf sturgeon, either during the sturgeon's spawning months of March-May or at any other time of the year. There is no data in the Biological Opinion, Amended Biological Opinion, or in any of the cited published studies, indicating any negative effect of the Corps of Engineers' IOP (or any pre-IOP discharges) on the Gulf sturgeon either during the sturgeon's spawning months or at any other time of the year. In fact, the findings of a population study done by two university professors from Florida (at the request of FWS) stated, "Currently, the Apalachicola River population of Gulf sturgeon appears to be slowly increasing over levels observed in the 1980's and 1990's." Pine and Allen, 2005, p. 4955-4956. Thus, the historical (pre-IOP) water discharges have not been shown to decrease the Gulf sturgeon population since the 1980's and early 1990's, because the population numbers have actually increased during this period. In other words, there is no scientific justification for the increased spring flows mandated by the IOP. Additionally, Dr. Howell determined that the record shows that the high spring flows required by the IOP are not necessary for successful Gulf sturgeon spawning. The study by Pine et al. (2006) found successful spawning at flows of 12,700-22,400 cfs. The Amended Biological Opinion itself recognizes little impact to sturgeon spawning acreage under the low-flow scenarios examined in formulating the EDO.

Moreover, flows of 20,400 cfs or higher would likely be detrimental to sturgeon eggs by preventing their attachment to the limestone shelf substratum. Additionally, it is Dr. Howell's professional opinion that the additional nutrients added by floodplain inundation have little to do

with the success of the Gulf sturgeon's survival in the Apalachicola River and, in fact, regular floodplain inundation would increase the amount of suspended sediment and toxins in the river.

In his report reviewing the Biological Opinion, malacologist Dr. Terry D. Richardson, Ph.D., determined that the scientific record indicates that low summer flows, in fact, tend to enhance mussel reproductive success. (Attachment G). Specifically, low flows typical of summer and fall, when fat three-ridge mussels release glochidia, may tend to concentrate host fish making them more likely to be parasitized by mussel glochidia and thus enhancing mussel reproductive success. This also suggests that high flows (above what might be normally expected) might adversely affect mussel reproduction by effectively "diluting" the host fish density. Results of samples included in the administrative record indicate that the most abundant age classes of fat three-ridge mussels are those which were produced during the droughts between 1998 and 2001.

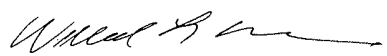
Dr. Richardson also believes that the aberrant mussel populations displaced after Hurricane Dennis would have been better served by relocation to deeper waters, a standard operating procedure for protecting threatened and endangered mussels. Since relocation is a standard FWS recommended procedure, it is difficult to understand why FWS recommends an increase in minimum discharge from 5,000 to 10,000 cfs, especially when relocation alone would suffice and remove the issue of detrimental impacts of low discharge (regardless of source) altogether. The vast majority of these mussels, at least according to FWS, previously lived elsewhere and safely survived the drought of 1999-2002 with low flows similar to those of 2006. Lastly, the subsequent studies undertaken by FWS in preparing the EDO concluded that there is "no jeopardy" to the mussels at issue as long as flows do not drop below 4,750 cfs.

III. Conclusion

Alabama Power requests the Corps and FWS, in reviewing the proposed modifications to the current IOP for the Corps' ACF reservoirs, to provide for Plant Farley's elevation and flow needs, as outlined in Section II above, both for adequate operation of the plant and for navigation. Additionally, Alabama Power reminds the Corps and the FWS of the important role navigation (and hydropower) are designed to play in the operation of the ACF reservoirs as authorized by Congress. When these purposes are met, Plant Farley's flow needs are secure. Alabama Power also requests the Corps and FWS to evaluate carefully the flow needs of the threatened and endangered species found in the Apalachicola River and to modify the IOP in order to allow the Corps to refill the upstream ACF reservoirs while also providing navigation, hydropower generation, and required minimum flows on the system for as much of the year as possible.

Thank you for your consideration. Please let us know if you have any questions.

Sincerely,



Enclosures (7)

ATTACHMENT A

October 30, 2007

Ms. Katharine A. Fredriksen
Principal Deputy Assistant Secretary
Office of Policy and International Affairs
U.S. Department of Energy
1000 Independence Ave., SW
Washington, DC 20585

Re: Information Request

Dear Kathy:

Thank you for the opportunity to provide this additional information to help you better assess the situation in Alabama, Florida and Georgia and potential electricity impacts related to the on-going drought conditions.

In response to your questions of October 23, please find the attached documents covering:

- A discussion of Southern Company's system reliability including:
  - System Operations
  - Economic Dispatch, and
  - Transmission Reliability
- A discussion regarding Plant Farley, a nuclear plant on the middle Chattahoochee owned by Alabama Power Company;
- A diagram of the Intake Structure at Plant Farley;
- A discussion regarding Plant Scholz, a fossil-fueled facility on the Apalachicola owned by Gulf Power Company;
- A diagram of the Intake Structure at Plant Scholz; and
- A map of the main river basins for the Southern System.

This response is designed to give you sufficient context for the answers to your questions. If you find that you have additional questions after your review, please do not hesitate to contact me.

Very truly yours,

L. Ray Harry

CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

INTRODUCTION

As you are aware, the Southeast has been experiencing record drought conditions for over a year. Conditions are severe across the region, including the Apalachicola-Chattahoochee-Flint (ACF) River Basin, which runs through the states of Alabama, Georgia and Florida. The ACF River Basin is used for a variety of purposes, including navigation, electric generation, environmental flows, industrial uses, recreation and public consumption, and all three states have legitimate interests in its use.

Southern Company's public utility subsidiaries operate numerous electric-generating facilities located on several river basins in our service territory. These plants provide reliable, affordable electricity to customers in Alabama, Florida, Georgia and Mississippi. The majority of these generating assets have been impacted by the drought, and we anticipate continued challenges going forward; however, the purpose of this document is to provide some important background information and updates regarding drought impacts on a nuclear plant (Joseph M. Farley Nuclear Plant) in Alabama on the middle Chattahoochee owned by Alabama Power Company, and a fossil-fueled facility (Herbert J. Scholz Electric Generating Plant) in Florida on the Apalachicola owned by Gulf Power Company.

Prior to 2003, the U.S. Army Corps of Engineers (the Corps) operated the ACF system during low flow conditions using only two minimum-flow control points; 750 cubic feet per second (cfs) at Peachtree Creek below Atlanta to provide assimilative flows for the Atlanta wastewater discharge and 5000 cfs released from Woodruff Dam to support Gulf Power's Plant Scholz (and more recently, environmental needs in the Apalachicola River). In 2003, after significant investigation and evaluation, a Memorandum of Understanding (MOU) was developed by the states and the ACF stakeholders. The MOU was signed by the governors of Alabama, Florida and Georgia to endorse a low-flow regime with four minimum flow control points. Minimum flows of 750 cfs at Peachtree Creek below Atlanta; 1850 cfs at Columbus, Georgia; 2000 cfs below Andrews Dam in the middle Chattahoochee; and 5000 cfs below Woodruff Dam in the Apalachicola.

It is important to emphasize that the flow regime discussed above was developed by technical experts based on information provided by stakeholders in all areas of the ACF basin. The information was reviewed by the teams of utility representatives, governmental agencies, industry and environmental regulators from each state prior to being signed by the governors. The primary purpose of the MOU was to set minimum flow objectives, using a systematic, apolitical process during normal flow conditions that would balance the needs of industry and commerce in the region, protect the habitat of wildlife, and meet any legal and regulatory requirements. It was envisioned that the MOU could be used to manage flows during times of reduced flows.

CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

SYSTEM RELIABILITY

System Operations

The Southern Company system is a vertically integrated structure comprised of:

1. generating facilities distributed across our service territory that are operated on a real time basis according to an economic dispatch regime
2. an interconnected transmission system designed to reliably deliver power to firm retail and wholesale load, and
3. a power distribution system that delivers power to Southern Company retail customers.

Economic Dispatch

The objective of economic dispatch is to operate the required amount of system generation to meet all obligations in a manner that minimizes total system production costs. Resources are dispatched based on variable cost components that include: marginal replacement fuel, variable operation and maintenance, emissions, transmission loss, and fuel handling.

Farley units 1 and 2 are nuclear-fueled units rated at approximately 888 megawatts (MWs) each, while Scholz units 1 and 2 are fueled by coal and are rated at approximately 46 MWs each. Nuclear-fueled units typically are more economical than coal units in terms of average generation cost. Considering all non-hydro resources, the Farley units are currently the lowest cost generating units on Southern Company's system.

The loss of these generation resources would have a significant impact on total production costs. It is estimated that the loss of these resources would increase total production costs by approximately $1,500,000 per day.

CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

Transmission Reliability

Southern Company Transmission is responsible for the operation and control of transmission, its inputs (generation) and outputs (serving load) in a manner that is safe, reliable, and in compliance with reliability standards as approved by the Federal Energy Regulatory Commission (FERC) and enforced by North American Electric Reliability Corporation (NERC) and its regional entity, the Southeast Electric Reliability Corporation (SERC). Generation dispatch is planned in advance on a forward basis. In real time, the transmission function monitors the implementation of the plan and directs adjustments to ensure that generation and loads are properly balanced and the system is in compliance with NERC standards. Aside from the obvious reliability risks, non-compliance is subject to FERC's civil penalty authority.

Like all other generation controlled by Southern, Plant Scholz is planned to operate when economic dispatch indicates it is the next economic choice. There are two situations where transmission operations require Plant Scholz to operate to avoid interruption of service to customers or non-compliance with NERC Standards. At high system loads, Plant Scholz is required to operate to prevent thermal overloading of certain lines should a contingency event occur. At low system loads, Plant Scholz is required to operate to maintain voltages within acceptable limits.

During off-peak periods (October-May) when maintenance is performed on critical generation and transmission assets, Southern Company cannot reliably serve our customers without the availability of both units at Plant Farley.

There are potential physical solutions to the problems in the aforementioned situations and we are currently evaluating their effectiveness and feasibility. While we cannot speak with certainty without a detailed study of scenarios, we believe that our system would be significantly encumbered if we were not able to utilize generation at Plant Farley.

CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

PLANT FARLEY

Background and System Operations

The Joseph M. Farley Nuclear Plant is located along the Chattahoochee River near Dothan in southeast Alabama. The plant consists of two Westinghouse Pressurized Water Reactor (PWR) units capable of generating 888 megawatts (MW) for a total capacity of 1,776 MW. Approximately 900 employees oversee the plant's operation 24 hours a day, 7 days a week. Plant Farley accounts for 19 percent of Alabama Power's total electricity generation.

Plant Farley withdraws approximately 97,000 gallons per minute (gpm) from the Chattahoochee River during normal operation to feed the service water pond utilized as the ultimate (emergency) heat sink and support once-through cooling and make-up to cooling towers for main condenser cooling. The intake system consists of an intake canal which extends 200 feet from the Chattahoochee River to the intake structure. Its three intake bays are equipped with three-eighths inch mesh vertical traveling screens. Ten pumps force water from the river to an approximately 108-acre storage pond (Service Water Pond). A diagram of the intake structure is attached on page 7.

Water for normal operation is withdrawn via a second intake structure located on the Service Water Pond to support the once-through service water system and provide makeup for the cooling towers. Normal operation of both Farley units requires operation of eight of the ten available service water pumps for 80,000 gpm. The Service Water system utilizes this once through flow to reject heat from nuclear safety-related cooling systems. A portion of the flow from the Service Water system is routed as makeup to supply the cooling towers. The cooling towers have a total volume of nearly five million gallons, with a flow rate of 720,000 gpm. The cooling towers require 35,600 gpm as makeup during normal two-unit operation to disseminate heat from the main condensers for both Farley units. The cooling towers have evaporation and drift losses of 25,400 gpm and a blowdown rate of 10,200 gpm. The combined blowdown from both Farley units and the remainder of the once through service water is combined into a single discharge line routed to the Chattahoochee River. The Service Water Pond serves as the ultimate (emergency) heat sink for the Farley plant, providing an adequate volume of water to support safe shutdown of both Farley units, in the event the river water pumps are not available.

The Farley discharge is controlled by a National Pollutant Discharge Elimination System (NPDES) Permit issued by the Alabama Department of Environmental Management (ADEM). The permit contains limits and requirements to ensure the thermal discharge and chemical constituents in the effluent meet applicable water quality standards. At 2,000 cfs flowing past Farley, there are no significant thermal or chemical impacts resulting from Farley's discharge. If flows were reduced below 2,000 cfs for an extended period, then an evaluation of the impacts of the discharge would be required by Southern Company, state environmental agencies and potentially the Nuclear Regulatory Commission (NRC). The bases for regulatory decisions in environmental permits may require re-evaluation to confirm permit limits and that water quality standards are met. Farley also discharges small quantities of radwaste through the discharge line in strict compliance with NRC operating license conditions. Farley monitors the discharge for a wide array of radionuclides and releases are based on both nuclide concentration as well as dose.

CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

Changes in river flow would prompt NRC review of operating license provisions to confirm acceptability of continued operations.

The Farley intake structure is located on the Woodruff reservoir at the end of a 200 foot long canal and water is withdrawn by a combination of ten pumps operating in pump wet pits located in three intake bays. The bottom invert elevation of the canal is 64 ft MSL. Normal water elevation at Farley averages 77 ft MSL with the reservoir operation ranging from a normal minimum of 76 ft MSL to a normal maximum of 78 ft MSL. The 76 – 78 ft MSL elevation encompasses all of the available reservoir storage and the reservoir operates as run-of-river below that point. The Farley pumps reach their net positive suction head (NPSH) at 67.5 ft MSL. The environmental effects of operation below 74.5 ft mean sea level (MSL) have not been determined and evaluation will be required before operation at these reduced levels.

Impact of Reduced Flow and River Levels

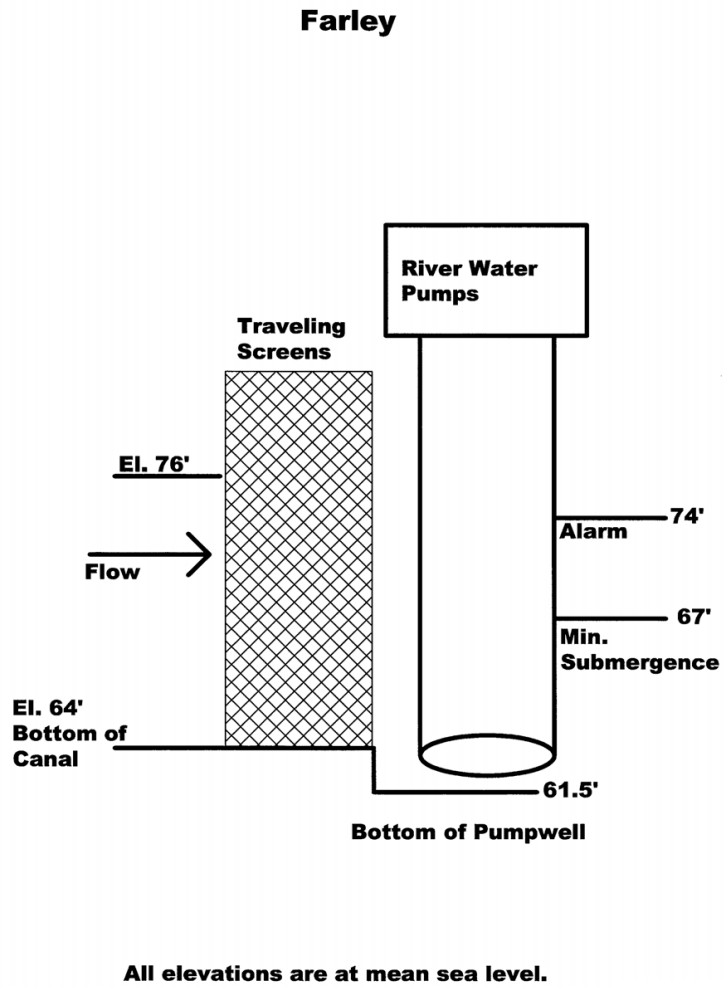
Flows at Farley are provided by releases from hydropower generation at the Walter F. George Dam located approximately 29 miles upstream, with that water passing through the George Andrew Lock and Dam approximately four miles upstream from Plant Farley. Power generation normally produces flows in excess of 20,000 cfs and occurs up to seven hours each weekday. Once hydro generation ceases, the dam only passes leakage flow (flows passing over, under or through a dam or lock that are not accounted for in flow measurements) for the balance of the day. Weekend flows normally consist of leakage and local inflow only. The leakage flow has been defined by the Corps as approximately 800 cfs instantaneous. After passing Plant Farley, the flow continues down the Chattahoochee River and merges with the flow from the Flint River above Jim Woodruff Dam to form Lake Seminole. It is important to note that because Plant Farley is located on the Chattahoochee River above the point where the Flint merges with Lake Seminole, the inflows from the Flint River are not available for Farley use.

Southern Nuclear defines 2000 cfs and 74.5 ft MSL as the minimum conditions necessary for long term operation at Farley. Plant Farley can operate for short periods (a few days) below 2000 cfs flow, but extended operation below this flow level will require evaluation to determine the environmental and operational impacts.

As stated above, the Farley intake canal is located on the Woodruff Reservoir with the reservoir having a small amount of storage capability and generally operating between elevation 76 and 78 ft MSL. Southern Company has analyzed environmental and operational impacts under prior drought conditions and confirmed river elevation of 74.5 ft MSL as the minimum necessary for long-term operation at Farley. Operation below this level would require evaluation to determine the environmental and operational impacts as discussed earlier.

CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

INTAKE STRUCTURE AT PLANT FARLEY



CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

PLANT SCHOLZ

Background and System Operations

The Herbert J. Scholz Electric Generating Plant is a coal-fired power plant located on the Apalachicola River in northwest Florida. The plant consists of two generating units with a total nameplate generating capacity of 92,000 KW and has 31 Gulf Power employees. Scholz began commercial operations in 1953 and produces enough electricity to power approximately 19,000 homes.

The plant withdraws approximately 129 million gallons of water per day or approximately 200 cfs from the Apalachicola River primarily for non-consumptive, once through cooling purposes. The plant has a 500 foot long intake canal connecting the river with the intake structure. River water flows through the canal to the water intake structure and traveling screens then flows to an area directly beneath the plant's pump room which houses the cooling water pumps. The cooling water pumps pull the river water from the intake tunnel via submerged pump impellers. Most of the water is pumped through the steam turbine condenser, a large heat exchanger located above the pump room. The river water then travels through the circulating water system, absorbs heat from the steam circulating through the condenser and is returned to the river in its original condition at a slightly higher temperature. Without a sufficient supply of cooling water, the plant cannot operate. A diagram of the intake structure is attached on page 10.

The Scholz discharge is controlled by an NPDES Permit issued by the Florida Department of Environmental Protection. The permit contains limits and requirements on the plant cooling water discharge to ensure state water quality standards are met. Extremely low river levels increase cooling water velocities in the intake canal. This increases the potential for sediments from the river bottom to be picked up in the cooling water and discharged back to the river where it remains in suspension. This increase in suspended sediments can cause violations of various state water quality standards.

To maintain normal operations at Plant Scholz, the cooling water pumps at the plant require a minimum river elevation level at the plant intake structure of 38 ft MSL. Based on information from the Corps, it is our understanding that 38 ft MSL equates to a constant flow of 5,000 cfs in the Apalachicola River at Plant Scholz. The cooling pumps take suction at 33.5 ft MSL and the pumps are designed to operate with 4.75 ft of NPSH, equating to a river level of 38.25 MSL. The plant is presently operating slightly below design at only 4.5 ft of NPSH, and any further decrease in level is expected to cause the pumps to cavitate.

Impact of Reduced Flows and Lower River Levels

Plant Scholz is just downstream of the Jim Woodruff Dam and Lake Seminole, which receive their flows from the Chattahoochee and Flint Rivers. As stated, minimum flow for normal operations is 5000 cfs resulting in 38 ft MSL at Plant Scholz. The plant has operated on a temporary basis at levels down to 37.5 ft MSL or an equivalent flow of 4200. As river levels decrease, the chances increase that either there will be no water in the intake canal or the river

CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

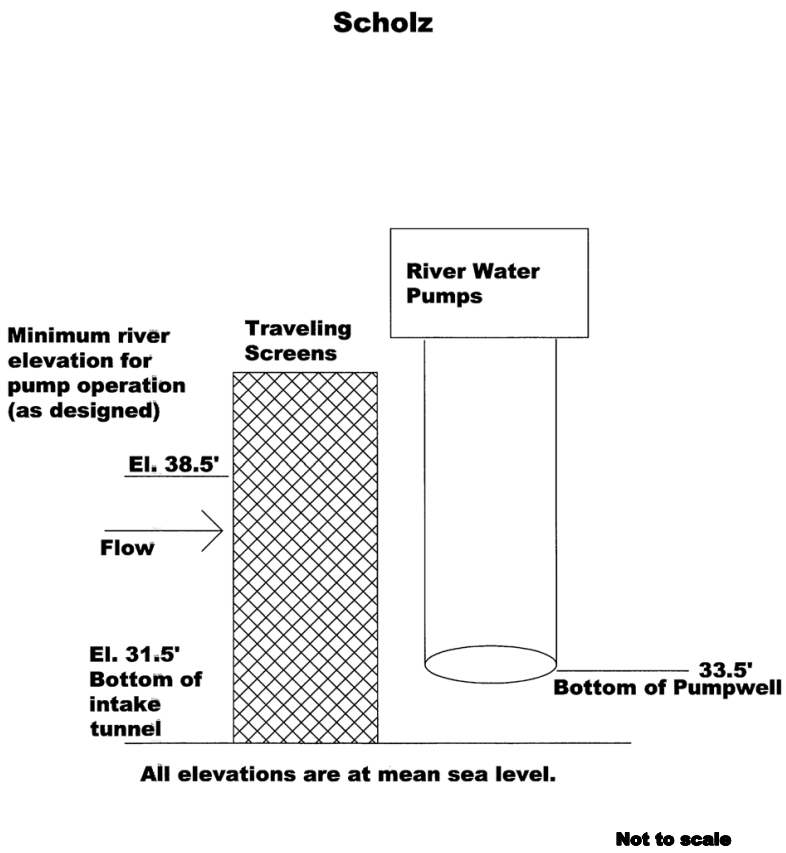
level will not be adequate to provide suitable pump suction for the cooling water pumps to operate.

There is a possibility that Plant Scholz can maintain temporary operations with the flows of 2000 cfs from the Chattahoochee near Farley Nuclear Plant plus the approximately 1200 cfs from the Flint River or a total of 3200 cfs. We anticipate that these combined flows should equate to between 36.5 and 36.8 ft MSL at Plant Scholz. Plant Scholz has never operated at intake levels lower than 37.5 ft MSL; in the event we are able to operate the plant below 37.5 ft MSL, we will be increasing operational risk as well as increasing the possibility of violation of the state water quality standards. Based on our calculations, 37.5 ft MSL at Plant Scholz would require 4200 cfs in the Apalachicola River. That may require 3000 cfs on the Chattahoochee River at Plant Farley if 1200 cfs were coming from the Flint River.

There is a great deal of uncertainty regarding the impact of making temporary plant modifications. Any deviation from normal operations to accommodate the lower flows and river levels will require testing to determine that impact. There is not a reduced operating load where the units can operate and any flow corresponding to a river level below 36.5 ft MSL would most likely result in the plant shutting down. While other options are possible, they require costly and untested plant modifications to Plant Scholz and permitting that normally could take up to one year. Again, these options could only be temporary in nature.

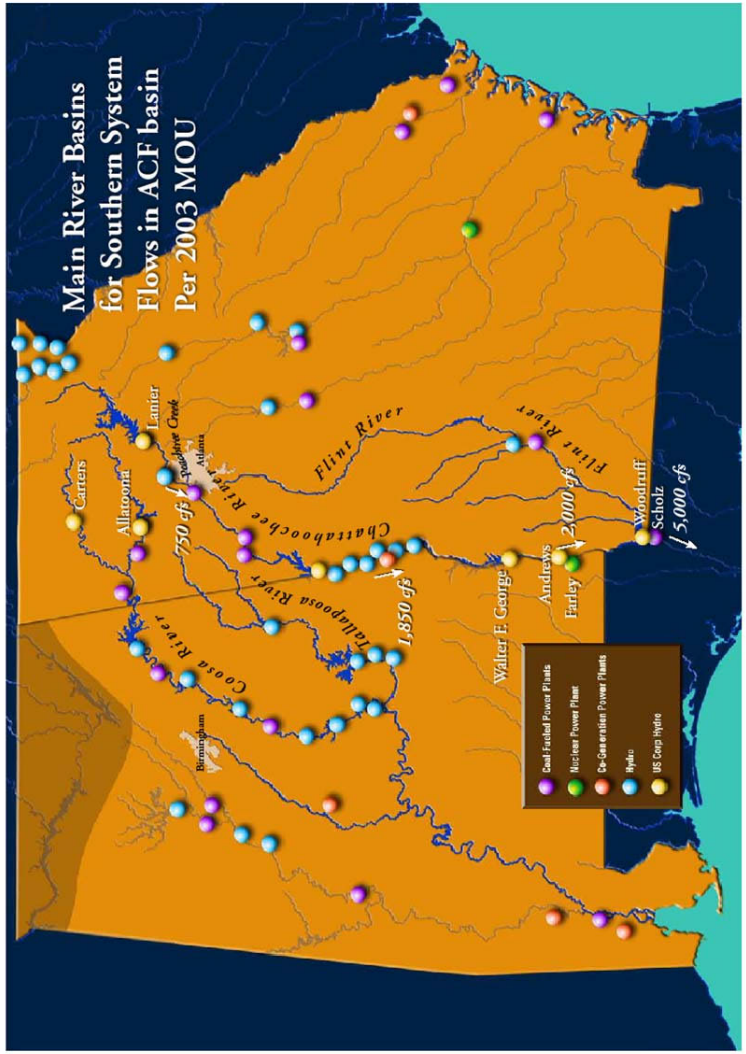
CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

INTAKE STRUCTURE AT PLANT SCHOLZ



CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

MAIN RIVER BASINS FOR THE SOUTHERN SYSTEM



CONFIDENTIAL AND PROPRIETARY INFORMATION
DUPLICATION AND/OR DISTRIBUTION PROHIBITED WITHOUT PERMISSION

ATTACHMENT B

Final

environmental statement

CT-III-7

related to construction of

JOSEPH M. FARLEY NUCLEAR PLANT
UNITS 1 and 2

ALABAMA POWER COMPANY

DOCKET Nos. 50-348 and 50-364



June 1972

UNITED STATES ATOMIC ENERGY COMMISSION

DIRECTORATE OF LICENSING

The Chattahoochee is no longer a natural stream. Many dams have been constructed on it to make reservoirs for flood control, water power, and navigation. One of the largest reservoirs is the Lake Sidney Lanier (Buford Dam) just north of Atlanta, some 200 miles north of the site, which is used for flood control and electric power. Coming down stream there are also the Morgan Falls Dam, the West Point Dam, the Bartlett Dam, the Goat Rock Dam, and the Oliver Dam. The Walter F. George Dam, 31 miles upstream from the site, forms Lake Eufaula and is used for water power, flood control, and navigation. Lake Eufaula is navigable as far as Columbus, Georgia, some 75 miles north of the site. The Columbia Lock and Dam is located 3 miles north of the site and is used for flood control and navigation, but not for water power. The Jim Woodruff Dam, 44 miles downstream from the site just north of the Georgia-Florida boundary, is the most southerly of the dams. It dams the Flint River as well as the Chattahoochee and forms Lake Seminole, which covers more than 37,500 acres. The headwaters of this lake back up the Chattahoochee as far as the Columbia Lock and Dam, so that the river at the Farley station site is actually the headwaters of Lake Seminole rather than a normal river.

Records of stream flow were kept at Columbia, Alabama, starting in 1928. The minimum daily flow, before construction of the Columbia Lock and Dam in 1960, was 1210 cfs (542,000 gpm) in 1954, a record dry year. At present the regime of the river is much changed by the completion of Columbia Dam and the Walter F. George Dam in 1964. It is the controlled discharge of these dams that controls the low stage flow of the river, and also the discharge of the Jim Woodruff Dam and the stage of Lake Seminole. The level of Lake Seminole, and hence the level of the river at the station site, is held no lower than 76 ft msl to provide a minimum depth of 9 ft in the navigation channel. Since the completion of the Columbia Dam and the Walter F. George Dam, the minimum observed flow at Columbia Dam was 1760 cfs, but the Walter F. George Dam at that time was storing water. Due to the expected flooding of the gage at Columbia by Columbia Reservoir, a gage was established in 1960 at Alaga, Alabama, about 8 miles downstream from the station site. The lowest flow so far recorded by this gage was 1230 cfs (552,000 gpm) in October 1962, but at this time also the reservoirs upstream were being filled. It is possible, but unlikely, that at some future time the river flow at the station site will briefly be zero, because of regulation of the dams. This will have little, if any, effect on the station, because the river stage must be maintained at 76 ft msl, and this will provide ample water for the station. A more complex problem is the minimum flow that should be used in determining the dilution of discharges from the station. An examination of the record[19] suggests that a flow of 2000 cfs (900,000 gpm) will be exceeded 90 to 95% of the time.

ATTACHMENT C

Final

environmental statement

related to operation of

JOSEPH M. FARLEY NUCLEAR PLANT UNITS 1 AND 2

ALABAMA POWER COMPANY

DOCKET NOS. 50-348 AND 50-364

UNIT

that the economic growth will continue after the Farley Plant has been constructed. The plant will have an operating staff of approximately 150 employees who will remain as permanent residents. It was emphasized that the financial benefits from the plant (especially taxes) will be needed to maintain the utilities and services required for the growth of the county and city (2).

2.3 Hydrology

2.3.1 Chattahoochee River

The Corps of Engineers retains controls over the operation and maintenance of the entire Chattahoochee - Flint - Apalachicola River system. Continuous surveillance is maintained over Lake Seminole, the portion of the Chattachoochee River which is most directly affected by the Farley Plant, as well as over other reservoirs upstream and downstream. The staff has made extensive use of the Corp's recent Environmental Impact Statement for this river system (3) in assessing the current use of Lake Seminole. There is no evidence that Lake Seminole and the other reservoirs on the Chattahoochee have been affected by the construction of the Farley Plant. A 100-foot wide channel is maintained at a depth of nine feet by dredging; however, the Corps now places the dredging spoil in diked areas above high water level. One of these spoil areas is on the east side of the Chattahoochee between the Farley site and the Andrews Lock and Dam (formerly Columbia Lock and Dam). The Corps of Engineers also continually removes debris that might interferewith boat and barge traffic. These and other recent activities, such as the impounding of much of the Apalachicola River, have caused both qualitative and quantitative changes in the aquatic biota of Lake Seminole during the past decade (3).

Local fishermen report that sports fishing remains very good in this lake in the vicinity of the Farley site (2). The value of the river for recreational purposes is evident from a compilation of visitations to Andrews Lake wherein the number of visitors is shown to have increased from 30,000 in 1964 to 265,164 in 1971 (3).

Recent investigations have been made by the applicant to determine the extent to which the river water downstream of the Farley Plant is used through withdrawal. A résumé of the applicant's findings (4) (ER-OL-Amend 1 P 2.2-1) is presented in Table 2.2.

ATTACHMENT D

Memorandum of Understanding
Regarding Initial Allocation Formula for the
ACF River Basin

WHEREAS, the States of Alabama, Florida and Georgia, along with the United States of America, are signatories to the Apalachicola - Chattahoochee - Flint River Basin Compact, (ACF Compact);

WHEREAS, the ACF Compact authorizes the States of Alabama, Florida and Georgia to develop an allocation formula for equitably apportioning the surface waters of the ACF Basin among the States; and it is the intent of the states that this formula will be consistent with the ACF Compact;

WHEREAS, the States of Alabama, Florida and Georgia have reached substantial agreement in principle regarding many of the terms of an allocation formula;

WHEREAS, the ACF Compact and the Operating Guidelines of the ACF Commission require the input of the public through public hearings and written comments prior to the adoption by the ACF Commission of an initial allocation formula;

WHEREAS, the ACF Compact requires that the allocation formula is subject to review and concurrence by the federal commissioner, and it is desirable to facilitate that review in a timely manner; and

WHEREAS, the States of Alabama, Florida and Georgia desire to express and commemorate their preliminary agreement to certain concepts in advance of the issuance of a draft initial allocation formula for public comment and federal review.

NOW, THEREFORE, IN CONSIDERATION OF THE FOREGOING, the States of Alabama, Florida and Georgia hereby agree to the following principles of an allocation formula:

1. Performance under the allocation formula shall begin when authorization for allocation of storage in Lake Lanier for 705 mgd for water supply has occurred, and the Corps has issued contracts for such use. Until the date on which performance commences, the Corps will operate the federal reservoirs consistent with the principles of the allocation formula to the maximum extent practicable.

2. The signatory states will begin negotiations to extend or modify the allocation formula no later than December 31, 2035.

3. **Notice to terminate 2038**
   Expiration 2040

Effect after Termination
Neither the fact that the Signatory Parties have executed this Agreement nor the terms of this Agreement shall create any inference or presumption that such execution or terms would constitute an equitable apportionment of the surface waters of the ACF Basin after the expiration of this Agreement or termination of the ACF Compact.

4. The following flow requirements will be included in the allocation formula, and are intended to be met by the combined actions of maintaining waters uses consistent with the allocation formula, and by the Corps operating the federal reservoirs consistent with the allocation formula.

   a. On the Chattahoochee River above its confluence with Peachtree Creek, a flow of 750 cfs will be maintained on a daily basis, with the understanding that the State of Georgia is entitled to a variable flow regime that requires no less than 650 cfs in winters, and flows higher than 750 cfs in summers, provided that an annual average of 750 cfs is obtained from such a variable flow regime.

   b. On the Chattahoochee River at Columbus, Georgia, a flow of 1350 cfs will be maintained on a daily basis at all times, and a flow of 1850 cfs will be maintained on a weekly basis provided that the top of the storage pool in West Point Reservoir is above 621.6 feet.

   c. On the Chattahoochee River at Columbia, Alabama, a flow of 2000 cfs will be maintained on a daily basis.

   d. On the Apalachicola River at Chattahoochee, a minimum flow of 5000 cfs will be maintained on a weekly basis at all times. Monthly flows will be maintained at quantities that are determined by the composite storage levels in West Point Lake and Lake Walter F. George, and by a determination of whether drought relief is in effect. Table 1 sets the applicable minimum monthly flow requirements when drought relief is not in effect. Table 2 sets the applicable monthly flow requirements when drought relief is in effect. Table 3 lists the reservoir storage quantities which determine which set of monthly flow requirements at Chattahoochee is applicable. It is not the states' intent to over release to meet monthly flow requirements.

5. The formula will provide drought relief in any month when the following conditions exist:

   There is an indication of climatic drought, demonstrated by the following facts having existed in the prior month:

   - The ACF Basin Weighted 12-Month Standard Precipitation Index was −1.26 or less;

   AND

   - The ACF Basin Weighted Hydrologic Palmer Index was -2.37 or less;

6. Georgia shall impose in the relief month the terms and conditions described in the published Georgia Drought Management Plan as appropriate for the existent level of drought.

7. The agreement shall consider and include the use of Lake Lanier as feasible and appropriate. West Point Lake, Lake Walter F. George and Lake Seminole shall be used to support all the flow requirements at Chattahoochee, FL.

8. The allocation formula will explicitly address future uses of water in the manner set forth below.

   a. The states will support authorization for allocation of storage in Lake Lanier for 705 mgd (annual average) for water supply. Consideration will be given to additional water supply in excess of 705 mgd.

   b. Of water withdrawn for municipal purposes within the Chattahoochee Basin above the Whitesburg gage and within the Corps jurisdictional boundary of Lake Lanier in Georgia, no less than 58% on an annual average basis shall be returned to the Chattahoochee River Basin and accounted for at Whitesburg.

   c. No water from the Chattahoochee River below Whitesburg may be exported for use above Whitesburg.

   d. All new water supply reservoirs with a storage capacity in excess of 500 acre feet shall be required to meet the instream flow requirements that are specified in the laws, regulations and policies of the state in which the reservoir is located.

   e. The states shall request and support raising the top of the conservation pools of Lake Lanier by 1 foot in all months and raising the top of the conservation pools of Lake Seminole to 78 feet above mean sea level. The states shall further request and support adjusting the top of the conservation pools of Lake Walter F. George and West Point Lake and zonal elevations of all four federal reservoirs to levels mutually agreed to by the states.

   f. There shall be no new transfers from the Flint River Basin to the Chattahoochee River Basin other than those that have state or federal permits as of the date of execution of this Memorandum of Understanding.

9. An adaptive management process will be established which will facilitate the implementation of the formula, and which will provide a foundation for potential changes to the formula. However, no changes to the formula resulting from a, b, c or d below shall be made except with the unanimous approval of the ACF Commission.

   a. The adaptive management process will include the following elements:
      - Comprehensive gathering of extant information on the water and water-dependent biologic resources of the ACF Basin;
      - Special studies of issues important to management of basin resources;
      - Analysis and interpretation of this information to establish cause-effect relationships and to identify conditions in which there is a need or opportunity to manage and use the resources more effectively; and,
      - Adaptation of basin management to accomplish this more effective resource management.

      The adaptive management process will make use of a Science Advisory Panel and of public participation.

   b. The formula will provide for using the Water Control Plan as one basis for implementing the terms of the formula.

   c. The formula will provide for development of a Drought Management Plan. Modifications to the Drought Management Plan will be accomplished through adaptive management.

   d. The agreement will provide for relief to a state in the event of unanticipated conditions.

10. The agreement shall include a provision governing the shared use of the surface water of the Chattahoochee River along the shared border between the states of Alabama and Georgia, including provisions regarding the issuance of permits for the withdrawal of surface water and discharge of treated wastewater by the state in which the person using the surface water or discharging the wastewater is located.

11. The agreement shall include a provision regarding commercial navigation in the Basin under such terms and conditions, as the states may deem reasonable and consistent with the remaining provisions of the agreement.

12. The States of Alabama, Florida and Georgia commit to work diligently to prepare a draft initial allocation formula agreement that incorporates the above concepts and such other terms upon which the States agree. Upon completion of the draft initial allocation formula, the ACF Commission Secretary shall provide copies of such draft initial allocation formula to the public, shall provide notice of a public comment period on the initial draft allocation formula, and shall establish dates for public hearings on the draft initial allocation formula in accordance with the ACF Commission Operating Guidelines.

13. The signatory states recognize the need to stay the litigation pending in Alabama, the District of Columbia and Georgia during the drafting of the agreement.

Approved and adopted this 22 day of July 2003.

Governor Bob Riley
State of Alabama

7-22-03
Date

Governor Jeb Bush
State of Florida

7-22-03
Date

Governor Sonny Perdue
State of Georgia

7-22-03
Date

ATTACHMENT E

Evaluation of the Corps of Engineers Interim Operations Plan

For the ACF Basin

The Interim Operating Plan

This report reviews certain operational aspects of the U. S. Army Corps of Engineers, Mobile District (USACE) interim operations plan dated September 7, 2006, as revised March 23, 2007, (IOP), including the temporary exceptional drought operations plan dated November 15, 2007 (EDO), and the proposed April 15, 2008 modifications of the current IOP (MIOP). [1]

Shortcomings of the IOP

The IOP adopted by the USACE increases flows below Jim Woodruff Dam at the expense of other multi-purpose benefits which should be provided by the upstream projects. The IOP provides for higher releases in the March to May time period when a larger portion of the inflows into the ACF basin should be retained in the upstream storage projects to help meet other multi-purpose objectives later in the year. This is particularly true in years where inflows are below normal. Under the rules of the current IOP, during extended dry periods or drought conditions, there is not enough leeway to allow the upstream projects to store water to benefit other multi-purpose benefits later in the year. This lack of storage affects the ability to maintain higher minimum flows and maintain higher pool levels for other project purposes. If additional water were allowed to be stored, then the releases would be higher in the June to September time period. This would improve water quality and water supply during critical times of the year and increase the quantity of hydro-generation, particularly during the high demand summer period This potential increase in value of hydro-generation would not only occur at the USACE projects, but those owned by Georgia Power Company as well. Allowing the upstream projects to store additional water in the March to May time period will also help ensure at least some refilling to near normal levels in consecutive years with below normal inflows. The storing of additional water during the March to May time period can also be accomplished without significantly impacting the endangered species downstream of Jim Woodruff Lock and Dam.

In the March to May time period the upstream storage projects, Buford, West Point and W. F. George, are scheduled to raise water levels from winter flood control pools to

[1] Copies of USACE descriptions of the IOP, EDO, and MIOP are available on line at http://www.sam.usace.army.mil/ACF.htm.

higher summer pool levels. At Buford dam the average pool level on March 1 is approximately elevation 1068. Based on the USACE current operating zones, this would put West Point at around elevation 627 and W. F. George at elevation 187.5. Target summer levels for these projects are 1071, 635, and 190, respectively. The amount of water required to raise these projects to summer levels by June 1 is approximately 203,480 day-second-feet (dsf), see Figure 1 below.

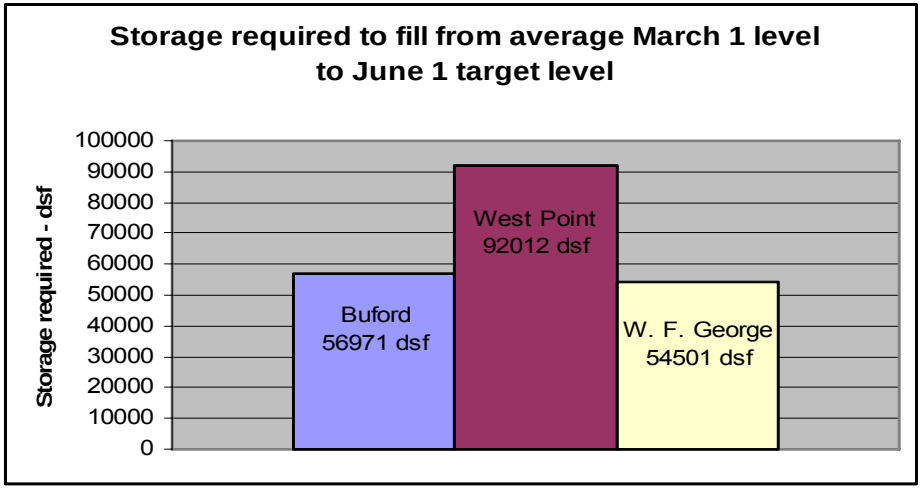


Figure 1

In fact, both West Point and W. F. George pool levels are scheduled to fill a minimum of two feet in the month of May based on their operating curves. This would require storing at least 69,000 dsf during the month of May alone. In examining the hydrologic inflows for the month of May only in the ACF basin from 1976 to 2007, only 14 of the 32 years or 44 percent of the time were the May inflows high enough under the IOP to be able to fill both the West Point and W. F. George reservoirs. This of course, assumes no additional storage is required at Buford Dam and the inflows are such that the water can be stored in the upstream projects. In 14 out of the 32 years of record, there was an opportunity to store less than 10,000 dsf, 15 percent of the water required to reach the targeted June 1 levels. And in 11 of those 14 years, or approximately 34 percent of the time, there were essentially no opportunities to store water in the upstream projects based on the IOP operating guidelines. See the Flow-Duration Curve showing Potential Storage for the May Inflows in Figure 2 below.

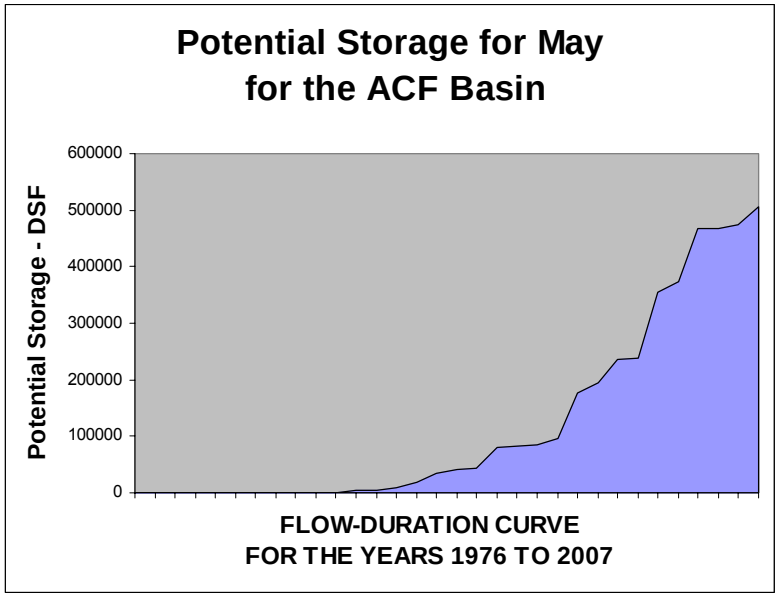


Figure 2

Based on the IOP, the average inflow into Jim Woodruff Dam must be above 25,710 cfs (70 percent of 25,710 cfs is 18,000 cfs) before any significant amount of water can be stored in the upstream projects. If hydrologic inflows are less than 25,710 cfs, the IOP allows only the difference between the inflow and 18,000 cfs to be stored upstream. Also, if significantly high inflows occur early in the period, not all of this additional water can be stored due to flood control requirements. A perfect example of this occurred in early March of 2007. Although inflows were high enough to allow potential storage of water under the rules of the IOP in the upstream projects, flood control guidelines for the reservoirs did not allow this water to be stored, see Figure 3. Adhering to the operating guides for flood control resulted in the release of over 81,100 dsf above what was required by the IOP guidelines in only a 9 day period. As a result, pool levels

at Buford Dam only rose 0.47 foot from March 1 to May 31, 2007. Pool levels at West Point and W. F. George actually fell 0.15 foot and 2.34 feet, respectively.

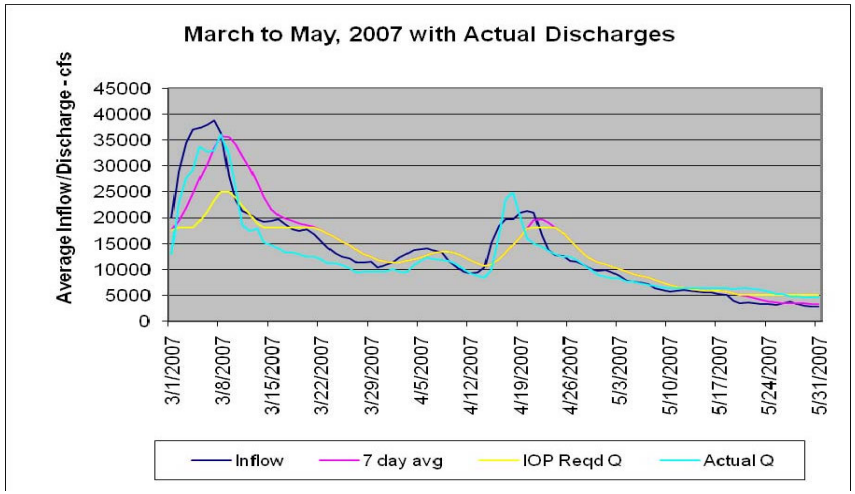


Figure 3

By examining the inflows into Jim Woodruff Dam over the past eleven years, it is easy to find potential pitfalls with the IOP, particularly in relatively dry years. No sophisticated "modeling" is required. Figure 4 below is a graph of the hydrologic inflows into Jim Woodruff Dam from January 1, 1997 until May 31, 2007. The hydrologic inflow data was obtained from the USACE, Mobile District and was used in the following analysis. The analysis uses the observed inflows into ACF drainage basin and looks back at the years 1997 to 2007 and assumes the operating rules of the IOP would have been used. The following assumes a "best case scenario" for the ability to store water. As shown above for the year 2007, this may or may not have been the case.

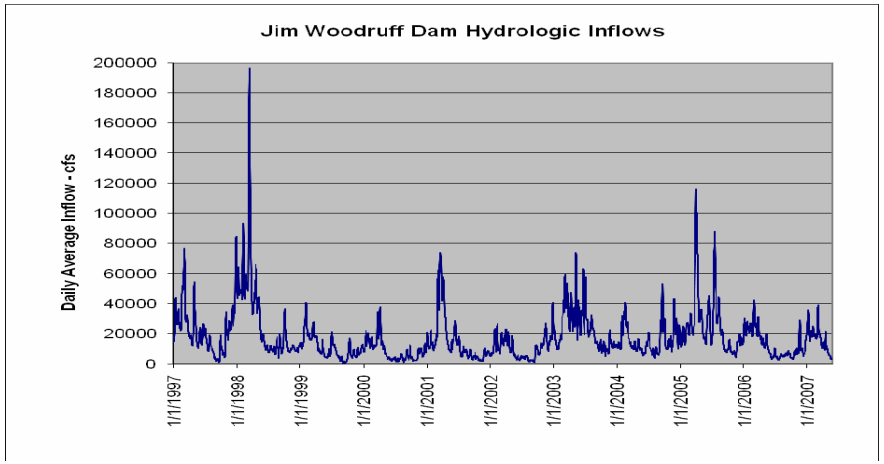


Figure 4

In 1997, there would have been an opportunity to store water in the upstream projects for most of March, a few days in April and the early part of May. However, essentially after May 13, the system would have been passing inflows (holding pool levels steady). This means the pool levels at West Point and W. F. George would have possibly remained stable for the last 18 days of May, filling only one foot instead of two feet.

1998 would have been one of the better operating years under the IOP, but again pool levels would have remained fairly stable for the latter part of May.

The years 1999, 2002, and 2004 demonstrate how the IOP fails to store sufficient water to provide other multi-purpose benefits. There were only 13 days in the March to May time period for the year 1999 when the IOP would have allowed storing more than 1,000 cfs and all of these occurring in March. During this period of time, only 61,998 dsf could have been stored under the best conditions, only 30 percent of the amount required, see Figure 5. Note – on the following graphs, if the IOP required discharge (IOP reqd) matches the 7 day average inflow (7 day avg) the graph will only show the IOP required discharge. The difference between the 7 day avg and IOP required lines on the graphs show the opportunities to store water in the upstream projects.

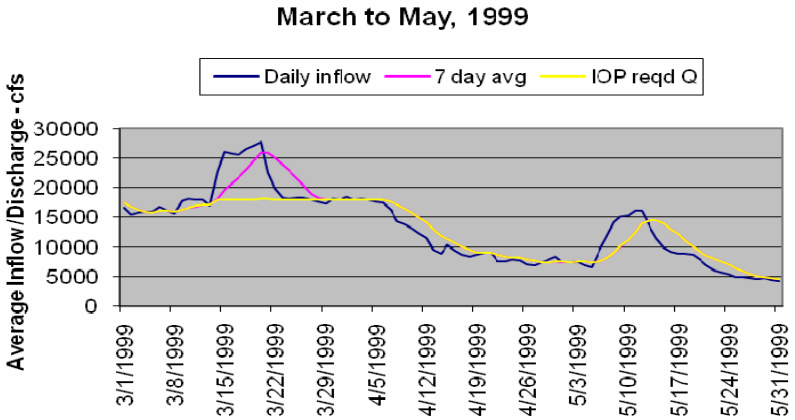


Figure 5

In 2002, there were only 7 days the ACF basin could have stored more than 1,000 cfs. A total of only 17,244 dsf could have been stored in the upstream projects, only 8 percent of the water necessary to reach target pool levels, see Figure 6. If one assumes the three storage projects would have been at the "average" pool levels on March 1, 2002 and the pool levels were then "balanced" on June 1, this would result in the following: Buford reservoir would have actually been drawn down 0.7 foot, West Point would have risen 3 feet, but still be 5 feet below the June 1 target level, and W. F. George would still be at elevation 187.5, see Figures 7, 8 and 9.

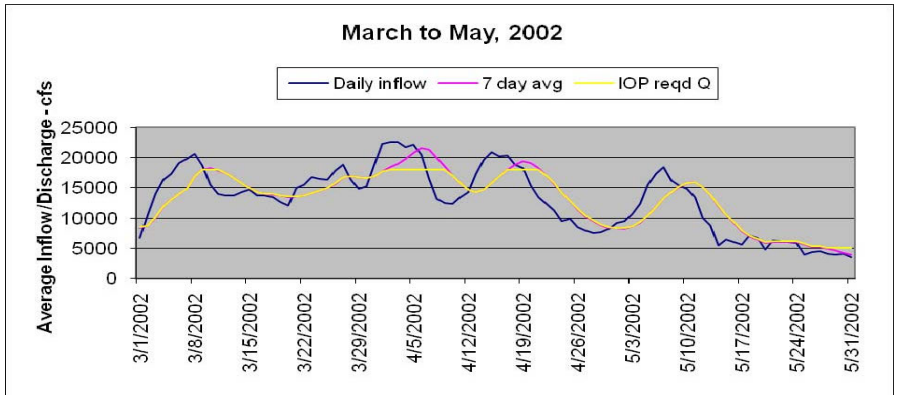


Figure 6

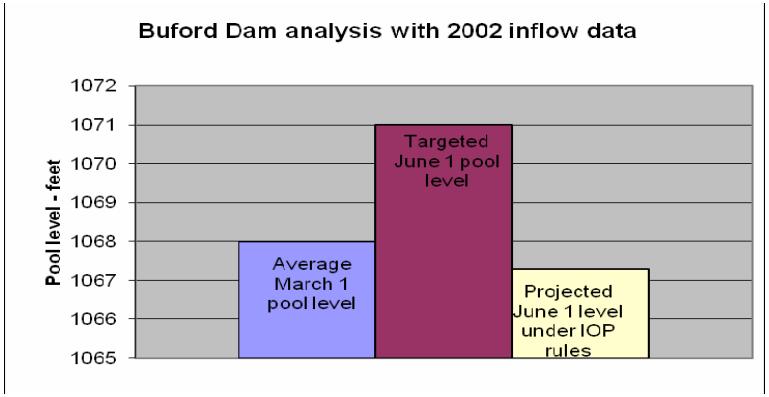


Figure 7

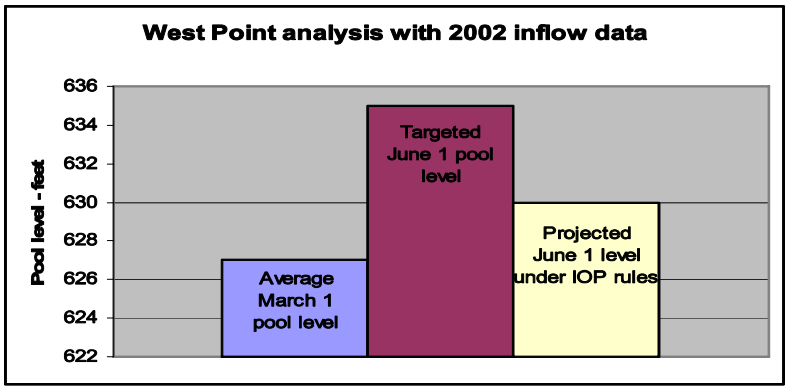


Figure 8

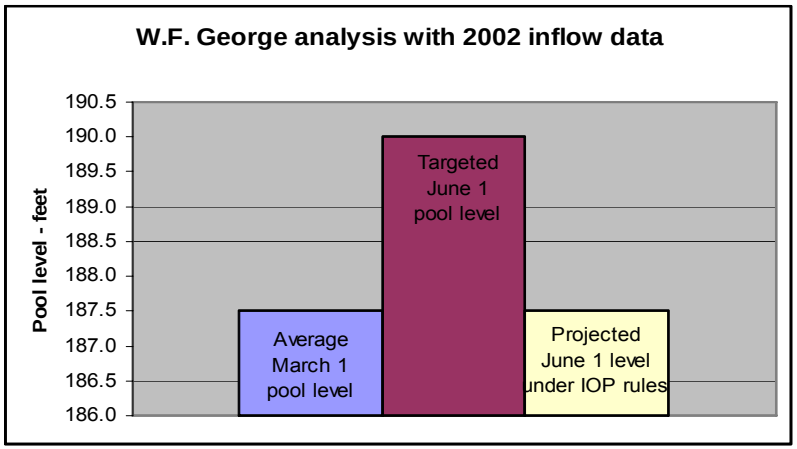


Figure 9

In 2004 there were only 12 days in early March when inflows were above the 18,000 cfs threshold. This would have allowed 60,102 dsf (under ideal conditions, assuming no flood control impacts) to have been stored, less than 30 percent of the total volume of water required to reach June 1 target levels, see Figure 10.

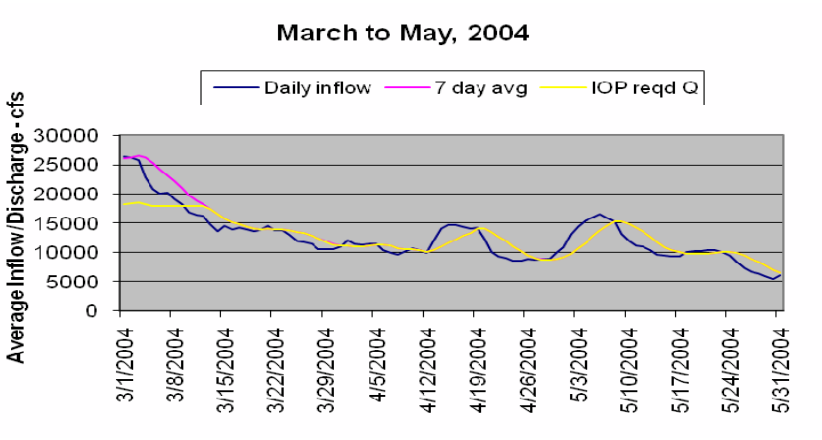


Figure 10

In the year 2000 there would have been 25 days that water could have been stored in the upstream projects. The amount available for storage would have been 133,240 dsf, less than 66 percent of the amount required to fill to June 1 target levels. Also, no water could have been stored after April 14; therefore W. F. George and West Point reservoirs would not have filled in the month of May, unless levels at Lake Lanier were lowered. Another short coming of the IOP would have also occurred in the year 2000. From April 5 to 11, according to the rules of the IOP, the releases from Jim Woodruff would have been above 18,000 cfs with a peak discharge of almost 22,500 cfs. It is hard to fathom how such a short term release could have provided meaningful environmental benefits while storing this additional water would have certainly provided other multi-purpose benefits later in the year, see Figure 11.

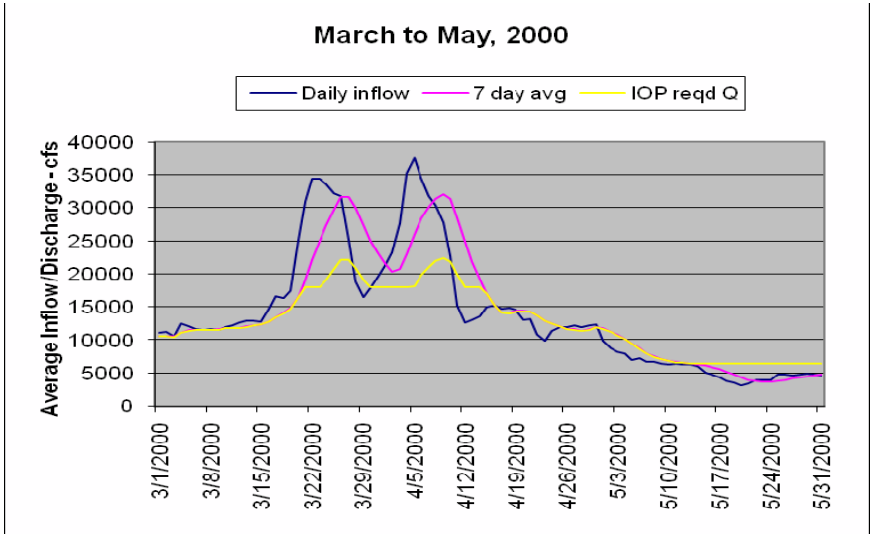


Figure 11

In 2001, pool levels could have been allowed to rise, but only until April 26, thereafter remaining fairly stable through the end of May. This again would result in Buford Dam pool levels being lowered in the month of May in an effort to raise West Point and W. F. George pool levels and balance the three storage projects.

2003 would have been an excellent year for operating under the IOP as there was plenty of water available up until the end of May.

In 2005, pool levels would have remained fairly stable after May 17.

In 2006, when the ACF basin was being operated under the IOP rules, there was essentially no water to store in the upstream projects after April 5 and the actual pool levels reflect this. From March 1 to May 31, 2006 Buford reservoir levels actually fell 2.1 feet, West Point reservoir level was raised only 0.75 foot and W. F. George pool level fell 1.59 feet.

In 2007 the same situation occurred, with March 21 essentially being the last day to store any water (there were 4 days in April with inflows above 18,000 cfs). The total amount of water available to store in 2007 was 104,306 dsf, with just over 3 percent of this water available after March 21. However, as shown in Figure 3, the volume of water actually released in 2007 was 81,100 dsf above what could have been stored, essentially wiping out the opportunity to store water and benefit other project purposes later in the year.

The operating rules under the IOP for June to the following February can also be restrictive at times. The years 1997 and 2001 are prime examples of these restrictions. In these years, there were potential opportunities to store water earlier in the summer and augment flows later in the drier months of August and September. However, the IOP rules could still force unnecessary releases. There was generally ample water in both these years and some of the water stored earlier in the summer could have certainly been used later to augment flows or provide extra hydro power, however the IOP forces the release of 16,000 cfs if the hydrologic inflows are sufficient, see Figures 12 and 13. It could be that high releases would be necessary during these times due to high pool levels, but if high releases are not mandated, then storing water for multi-purpose use would be the prudent water management decision.

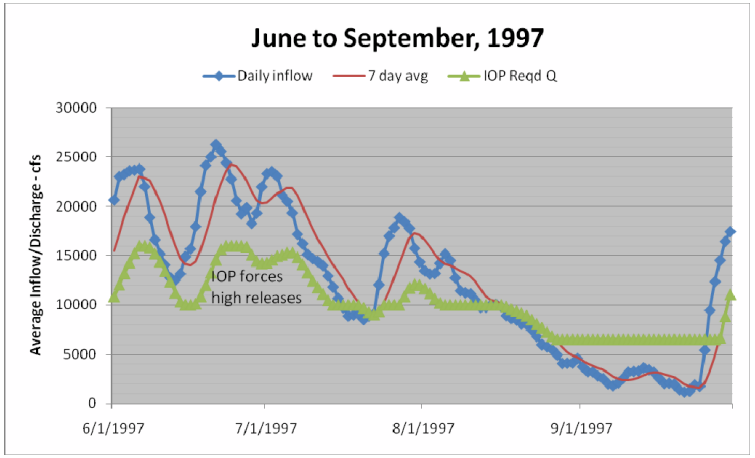


Figure 12

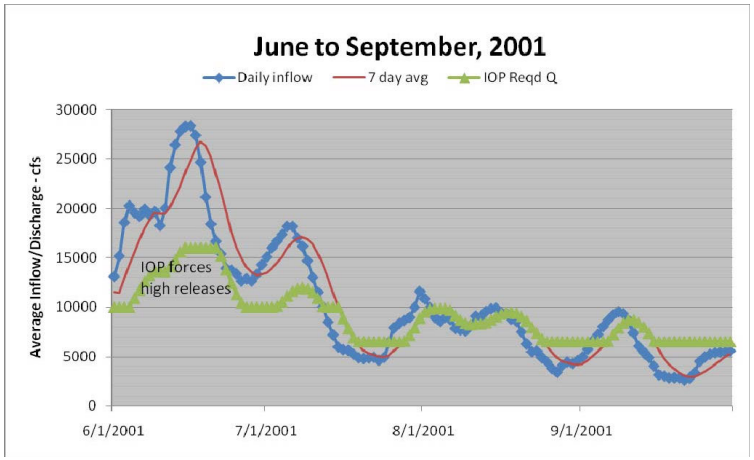


Figure 13

Water management of the ACF basin should allow for more storage under these circumstances for the water to be used later for water quality, water supply or hydropower generation considerations. Storing extra water earlier in the summer for later use also benefits recreation. Releasing 16,000 cfs for short periods of time cannot be very productive to sustained environmental flows and is counterproductive for supporting other multi-purpose objectives. Also, it was stated in the justification that a flow of 16,000 cfs is equivalent to the approximate average monthly flow levels for June to August, see page 4 of the Section 7 Consultation, Jim Woodruff Dam Water Management Operations, Adjustments to the Interim Operations Plan. However, in reviewing the average monthly hydrologic inflows for Jim Woodruff Dam, only two out of the last thirteen years were the average inflows for June to August greater than 16,000 cfs, see Figure 14.

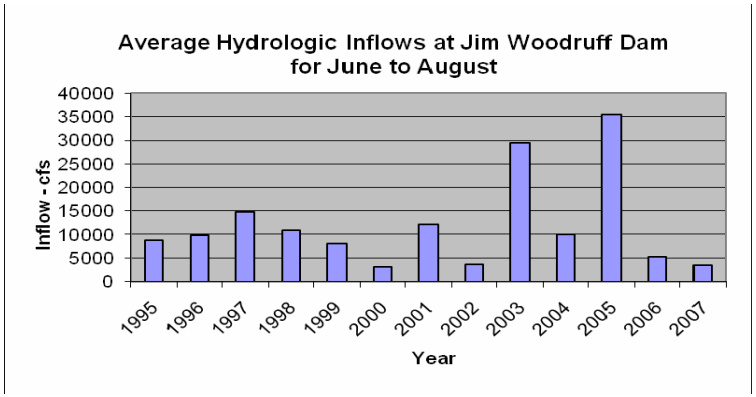


Figure 14

Comparing the IOP to the 1989 draft Water Control Manual

The most recent approved Water Control Plan for the ACF was completed in 1959. From 1989 to 2004, however, operations for the ACF were conducted in accordance with a 1989 draft Water Control Plan, with minor adjustments as necessary in some years to accommodate current needs at the time. The 1989 draft Water Control Plan was not finalized due to ongoing litigation. Following is a comparison of the draft 1989 Water Control Manual operating guidelines to the IOP for the March to May time period (for the years 1999 and 2002).

In 1999 the ACF basin was being operated by the draft 1989 Water Control Manual. From the March to May time period a total of 102,203 dsf of water was stored in the upstream projects, compared to only 61,998 dsf which would have been allowed under the IOP, see Figure 15.

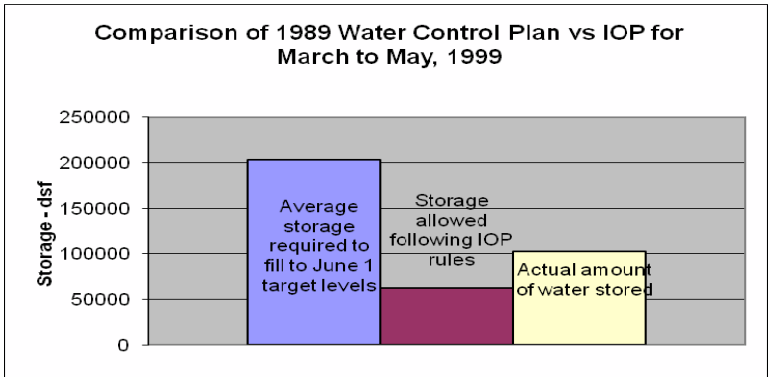


Figure 15

The year 2002 shows a dramatic difference between the two operational procedures. In 2002, the ACF basin was also being operated by the draft 1989 Water Control Manual and from the March to May time period a total of 139,369 dsf of water was stored in the upstream projects, compared to only 17,244 dsf which would have been allowed under the IOP, see Figure 16.

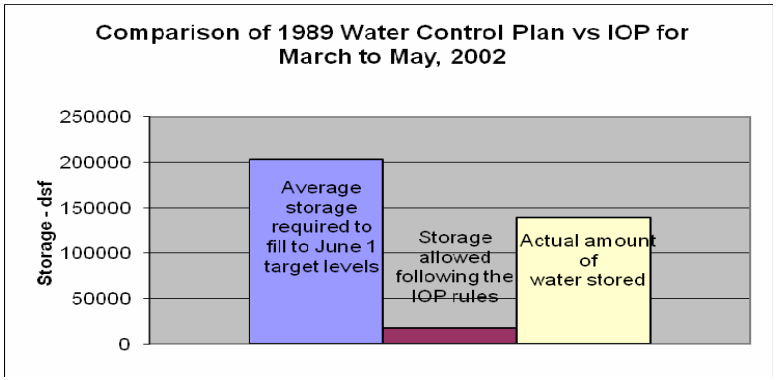


Figure 16

In 2004 and 2005 the ACF basin was operated under a "low flow operations protocols" and in 2006 and 2007 by the rules of the IOP. Following is a comparison of these four years of actual operation to the expected outcome from operations under the draft 1989 Water Control Manual.

From March to May of 2004, a total of 65,979 dsf of water was stored in the upstream storage projects; however the storage at Jim Woodruff Dam was decreased by 27,059 dsf during this period for a total net storage of 38,920 dsf. The low flow protocol operation is different than the guidelines set forth by the draft 1989 Water Control Manual. If the draft Water Control Manual guidelines were followed, a total of 75,300 dsf could have been stored in the upper storage projects without taking storage out of Jim Woodruff Dam, an increase of over 36,000 dsf. See Figure 17.

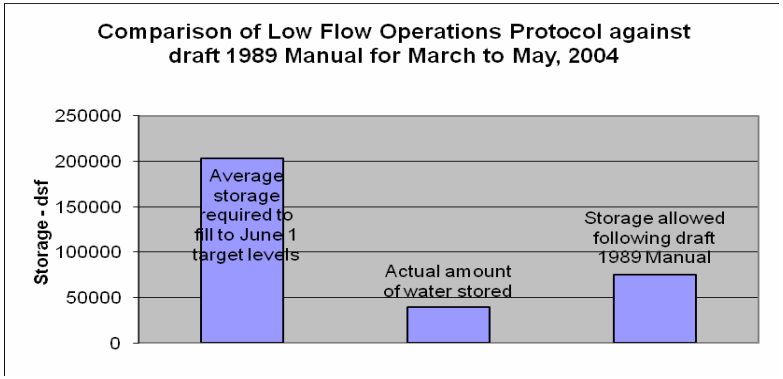


Figure 17

In 2005, hydrologic inflows were sufficient enough that all the storage projects were within 0.5 foot of the June 1 target level by the end of May. However, during May, the pool levels at Buford Dam were actually drawn down 0.5 foot to help fill the reservoir at West Point.

2006 was the first year the ACF basin began to operate under the IOP guidelines. Under the rules of the IOP, almost 267,000 dsf of water could have been stored from March to May in 2006. However, only 14,370 dsf was available for storage after March 31. Due to flood control issues, the storage projects actually were depleted by 1,554 dsf in the month of March 2006 and the total amount of actual water stored from March 1 to May 31 was a negative 64,599 dsf, see Figure 18. Pool levels at Buford Dam actually declined over 2 feet from March 1 to May 31 in 2006 and pool levels at W. F. George fell over 1.5 feet during the same time period. Under the draft 1989 Water Control Manual, the total

amount of water available for storage would have been 590,497 dsf with 114,000 dsf available for storage after March 31.

In 2007 the opportunity existed to store 104,306 dsf of water under the IOP, however only 602 dsf were available for storage after March 15, 2007. The draft 1989 Water Control Manual would have made 240,426 dsf available for storage, with 20,700 dsf after March 15, 2007. The actual amount of water stored from March 1 to May 31 in 2007 was a negative 42,151 dsf, see Figure 18. The reservoir level at W. F. George actually fell 2.3 feet during this time.

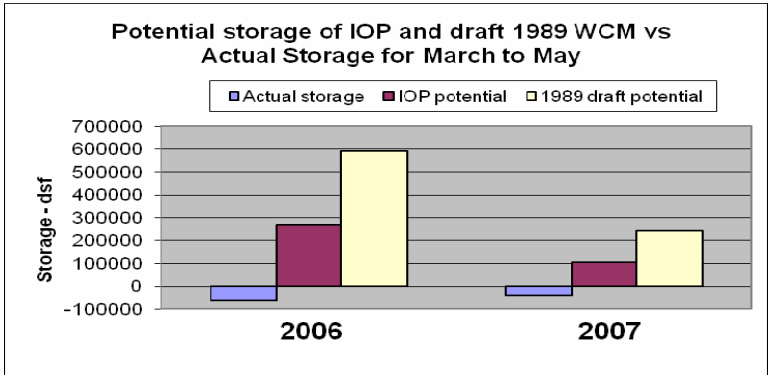


Figure 18

Evaluation of the Modification to the Interim Operations Plan at Jim Woodruff Dam

The MIOP includes a drought plan which would require a temporary waiver from the existing water control plan to provide for minimum releases less than 5,000 cfs from Jim Woodruff Dam when the appropriate triggers are met and would also include provisions to allow temporary storage above the winter pool rule curve at the Walter F. George and West Point projects if the opportunity presents itself and/or begin spring refill operations at an earlier date in order to provide additional conservation storage for future needs.

Like the current IOP, the MIOP specifies two parameters applicable to the daily releases from Jim Woodruff Dam: a minimum discharge and a maximum fall rate. The remaining portion of this report will focus on the minimum discharge requirements. The modifications do not change the basin inflow calculation (7-day moving average daily basin inflow), use of Chattahoochee gage to measure releases/river flow, use of volumetric balancing as described in the May 16, 2007 letter to the USFWS, nor the limited hydropower peaking operations at Jim Woodruff Dam.

Like the current IOP, the proposed MIOP varies minimum discharges from Jim Woodruff Dam by basin inflow and by month and the releases are measured as a daily average flow in cfs at the Chattahoochee gage. Table 1 shows the minimum release from Jim Woodruff Dam prescribed by the proposed action and shows when and how much basin inflow is available for increasing reservoir storage. Except when basin inflow is less than 5,000 cfs, the minimum releases are not required to exceed basin inflow. The current IOP defines three basin inflow threshold levels that vary by two seasons (spawning and non-spawning seasons). The proposed action defines additional basin inflow thresholds that vary by three seasons: spawning season (March to May); non-spawning season (June to November) and winter (December to February). The proposed action further modifies the current IOP by also incorporating composite storage thresholds that factor into minimum release decisions.

Table 1. Proposed Action Modified IOP Releases from Jim Woodruff Dam

Months	Composite Storage Zone	Basin Inflow (BI) (cfs)	JWLD Release	Basin Inflow Available for Storage[1]
March - May	Zones 1 and 2	>= 34,000	>= 25,000	Up to 100% BI > 25,000
		>=16,000 and <34,000	>=16,000 + 50% BI >16,000	Up to 50% BI > 16,000
		>=5,000 and <16,000	>=BI	
		<5,000	>=5,000	
	Zone 3	>=39,000	>= 25,000	Up to 100% BI > 25,000
		>=11,000 and <39,000	>=11,000 + 50% BI >11,000	Up to 50% BI > 11,000
		>=5,000 and <11,000	>=BI	
		<5,000	>=5,000	
June - November	Zones 1, 2 and 3	>=24,000	>=16,000	Up to 100% BI > 16,000
		>=8,000 and <24,000	>=8,000 + 50% BI >8,000	Up to 50% BI > 8,000
		>=5,000 and <8,000	>=BI	
		<5,000	>=5,000	
December -	Zones 1, 2 and 3	>=5,000	>=5,000 (Can store all BI	Up to 100% BI > 5,000

February			>5,000)	
		<5,000	>=5,000	
At all times	Zone 4	NA	>=5,000	Up to 100% BI > 5,000
At all times	Drought Zone	NA	>=4,500[2]	Up to 100% BI > 4,500

[1]Consistent with safety requirements, flood control purposes, and equipment capabilities

[2]Once composite storage falls below the top of the Drought Zone ramp down to 4,500 cfs will occur at a rate of 0.25 ft/day.

MODIFICATION HIGHLIGHTS

On the surface, the proposed MIOP appears to provide better opportunities to store water than those currently available with the IOP. For one, the modifications allow storing up to 50 percent of the inflow above certain thresholds compared to the 30 percent presently allowed. Certain threshold values have also been lowered. The current IOP called for releasing all basin inflow below 18,000 cfs between the months of March to May, while the modified plan sets the threshold at 16,000 cfs.

However, the current IOP keeps the release at 18,000 cfs until the basin inflow is 25,714 cfs. Under the modified IOP, if the basin inflow is 25,714 cfs the minimum release from Jim Woodruff Dam is 16,000 cfs plus 50 percent of the basin inflow above 16,000 cfs (as long as the composite storage is in Zones 1 or 2). This results in a required release of 20,857 cfs, or 2,857 cfs more than required under the current IOP.

See Table 2 below for a comparison of the minimum releases rates from the modified and current IOPs based on time of year, composite storage and basin inflow.

Table 2. Comparison of Minimum Releases

Time of Year	Composite Storage Zone	Basin Inflow (cfs)	Minimum Release Current IOP	Minimum Release Modified IOP
March to May	1, 2	50,000	25,000	25,000
March to May	1, 2	35,000	24,500	25,000
March to May	1, 2	25,000	18,000	20,500
March to May	1, 2	15,000	15,000	15,000
March to May	1, 2	5,000	6,500	5,000
March to May	1, 2	2,500	6,500	5,000
March to May	3	50,000	25,000	25,000
March to May	3	35,000	24,500	23,000
March to May	3	25,000	18,000	18,000
March to May	3	15,000	15,000	13,000
March to May	3	5,000	5,000	5,000
March to May	3	2,500	5,000	5,000
June to November	1, 2	25,000	16,000	16,000
June to November	1, 2	15,000	10,500	11,750
June to November	1, 2	10,000	10,000	9,000
June to November	1, 2	5,000	6,500	5,000
June to November	1, 2	2,500	6,500	5,000
June to November	3	25,000	16,000	16,000
June to November	3	15,000	10,500	11,750
June to November	3	10,000	10,000	9,000
June to November	3	5,000	5,000	5,000
Dec to February	1, 2	25,000	16,000	5,000
Dec to February	1, 2	10,000	10,000	5,000
Dec to February	3	25,000	16,000	5,000
Dec to February	3	10,000	10,000	5,000

Based on the comparison above, the MIOP and IOP appear to be very similar, except for the December to February time period.

Based on the comparison above the MIOP appears to allow more water to be stored in the ACF basin from December to February. In the current IOP, if the basin inflow is above 10,000 cfs, the required release was 70 percent of basin inflow, but not less than 10,000 cfs, while under the MIOP all basin inflow above 5,000 cfs can be stored. However, as seen during the 2007-2008 winter, when the EDO-required minimum was also 5,000 cfs, and storing water upstream was a primary operating strategy, the releases at Jim Woodruff Dam were only around 5,000 cfs until December 19th. Once inflows increased in the ACF basin and the two lower storage projects, West Point and W.F. George, were essentially full, releases at Jim Woodruff had to be increased to maintain flood storage capacity. Even with the ACF basin in full drought recovery mode and operating under the EDO, releases at Jim Woodruff Dam averaged over 13,000 cfs and 25,000 cfs for the months of January and February, respectively. This is largely due to the limited storage capacity downstream of Buford Dam and the lower pool levels required to maintain flood storage capacity. Thus, although the modification to the December to February time frame seems like an opportunity to store a significant amount of water, it really is not, unless the inflow is to Lake Lanier.

Shortcomings of the Modified IOP

As described previously in the IOP evaluation the years 1999, 2002, and 2004 are good examples of years in which the current IOP fails to store sufficient water to provide other multi-purpose benefits. Following is a comparison of the IOP and MIOP's ability to store water for future uses in those years.

From March to May in 1999, the current IOP would have allowed 61,998 dsf of water to be stored in the upstream projects. Under the modified IOP only 59,992 dsf of water could have been stored.

From March to May in 2002, the current IOP would have allowed 17,244 dsf of water to be stored in the upstream projects. Under the modified IOP 31,472 dsf of water could have been stored.

From March to May in 2004, the current IOP would have allowed 60,102 dsf of water to be stored in the upstream projects. Under the modified IOP only 43,690 dsf of water could have been stored.

Also, from March to May in 2007, 81,313 dsf of water could have been stored in the upstream projects under the IOP, while the MIOP would have allowed 93,355 dsf of water to have been stored.

See Figure 26 for a graphical representation of the current IOP to the modified IOP for these years.

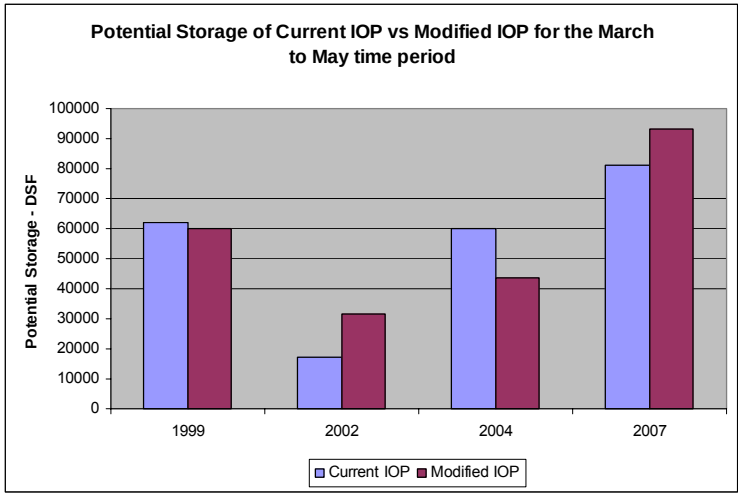


Figure 26

Based on the comparison of the discharges required and the March to May time periods of 1999, 2002, 2004 and 2007 there appears to be no significant difference between the MIOP and IOP. Thus, as shown, both the MIOP and IOP fail to maximize the multi-purpose benefits of the ACF projects.

However, the MIOP does incorporate some of the EDO operating rules. Under the MIOP, when composite storage falls below the bottom of Zone 3 into Zone 4 all previous operating rules are suspended and management decisions are based on the provisions of the drought plan. The drought plan allows temporary storage above the winter rule curve at Walter F. George and West Point projects if the opportunity presents itself and/or to begin spring fill operations at an earlier date. Also included is a provision to reduce the minimum discharge to as low as 4,500 cfs. This minimum discharge is instigated when composite storage is in the "drought zone". The drought zone is an additional zone in Zone 4 which delineates a volume of water roughly equivalent to the inactive storage in lakes Lanier, West Point and Walter F. George plus Zone 4 storage in Lake Lanier. When composite storage is in the drought zone, the minimum release will be reduced to 4,500 cfs and remain at this rate until composite storage is once again in Zone 4 and above the drought zone. At this time the minimum release again becomes 5,000 cfs. The drought plan provisions remain in place until conditions improve such that composite storage reaches a level above the top of Zone 3 (i.e., within Zone 2).

SUMMARY OF MODIFICATIONS TO THE INTERIM OPERATIONS PLAN

In a press release concerning the MIOP, the USACE states "The modified IOP proposal includes provisions to store additional freshwater in the basin during the winter and during drought periods while minimizing harm to the four listed species, the threatened Gulf sturgeon and three mussels, the endangered fat threeridge, the threatened purple bankclimber, and the threatened Chipola slabshell. The additional storage is then available later for continued support of the species as well as other authorized project purposes."

What the USACE fails to mention is that the MIOP does not improve, and in some cases worsen, the very operations which place the ACF basin into drought mode, very much like the current IOP. If the year 2008, or any other year, turns out to be a relatively dry year, then the ACF basin will once again be placed in dire straits with regards of trying to provide the multi-purpose benefits to the stakeholders within the ACF basin. Although the modified IOP does incorporate the intentions of the EDO, neither the current IOP nor the MIOP are reasonable operating plans for the ACF basin. Similar to the current IOP, the modified IOP can worsen a drought situation in the ACF basin due to its inability to store water when the situation presents itself. During drier than normal conditions, the modified IOP will drain the ACF basin and the discharge will be reduced to 4,500 cfs as required by the "drought zone" requirement. This definitely does not benefit the endangered species or downstream water quality in the ACF basin.

Possible Solutions

The main problem with both the IOP and MIOP is the high minimum flow release rates specified in the March to May time period, which do not allow enough water to be stored in relatively dry years. This can severely impact the other multi-purpose benefits which should be provided by the storage reservoirs in the ACF basin. There are relatively simple ways to improve the current IOP and MIOP. For instance, one change would be to require the daily average release to be 1,000 cfs (or more) less (for basin inflows 16,000 cfs or less) than the basin inflow until the 5,000 cfs threshold is met. This would still allow some storing of water in the ACF basin while mimicking natural occurring flows in the basin. The IOP and MIOP need to be modified in a way which will allow the ACF storage projects to store more water. This is particularly true when basin inflows are below normal. The ability to store water during these challenging times would allow the ACF projects to provide more multi-purpose benefits during dry years.

The storage projects in the ACF were designed to "store" water in the wet months and release a greater amount than the natural occurring inflows in the dry months. Both the current IOP and MIOP hinder the basic operating philosophy intended for the ACF basin.

Randy Kerr, Professional Engineer
State of Tennessee Registration No. 20750

Randall Z. Kerr, PE
2109 Madison Grove Lane, Knoxville, TN 37922
(865) 670-0354 (home) rzkerr@bellsouth.net (865) 256-4653 (mobile)

PROFESSIONAL EXPERIENCE

AMEC Earth and Environmental, Nashville, Tennessee
Senior Water Resources Engineer *November 2007 – Present*

- Assisting with Digital Flood Insurance Rate Map (DFIRM) work and Flood Insurance Studies (FIS) for the States of Alabama and Kansas. This includes running various HEC-RAS models for Zone A and Zone AE flood studies.
- Marketing various business development opportunities in the water resources community.

Alabama Power Company, Birmingham, Alabama
Consultant *June 2007 – Present*

- Currently representing APC as an expert witness with regards to reservoir operational concerns on the Apalachicola-Chattahoochee-Flint river basin.
- Assisted with various reservoir management issues including current and ongoing drought situation.

Tennessee Valley Authority, Knoxville, Tennessee

Department Manager *Jan 1997 – April 2007*

- Managed a team of 20 engineers and technicians to develop the operating strategy for TVA's hydro fleet consisting of 3600 megawatt capacity.
  - Average annual hydro generation revenues approximately $750 million
  - Continuously exceeded generation targets
- Directed the day to day duties of a 24/7, 365 days a year operations staff.
  - Average annual flood reduction benefits over $200 million
  - Worked with navigation interests to improve the commercial shipping industry
- Consultant to TVA power generating assets and hydro maintenance organizations providing expertise decision making to maximize revenues and reduce costs.
- Worked with various organizations across a seven state region to ensure communications and information exchanges were up to date.
  - Provided flood level information to the general public and appropriate National Weather Service offices
  - Provided information as necessary to upper management and others throughout TVA to help support business decisions

- Provided numerous newspaper and television interviews

- Served as liaison to Information Systems support staff to improve computer modeling efforts and data collection processes.
- Developed numerous procedures and processes to ensure consistent results or products produced.
- Implemented process improvements to maximize the value of the TVA hydro fleet consisting of 29 generating plants with 109 units.
  - Lead effort to reduce condensing hydro units in 2006, lowering TVA's costs by about $100k per month
- As a developmental assignment, served as manager of Data System and Inspections group responsible for maintaining TVA extensive data collection network across a 40,200 square mile area.
  - Completed rain gage reduction effort, resulting in savings of approximately $75k per year

Lead Civil Engineer *Aug 1990 - Jan 1997*

Team leader for a group of engineers and technicians responsible for the development of operating plans to maximize the water resource available to serve multipurpose benefits.

- Served as main point of contact for all operating decisions with regards to the TVA reservoir system.
- Ensured various hydrologic computer models were run to determine most economic, risk aversive outcome.
- Prepared clear and concise reports on reservoir operations to communicate directly with upper management.

EDUCATION

University of Tennessee, Knoxville, Tennessee

- Master of Science - Environmental Engineering

University of Tennessee, Knoxville, Tennessee

- Bachelor of Science - Civil Engineering
  - Graduated with honors
  - Chi Epsilon honor society president during senior year

University of Vanderbilt, Nashville, Tennessee

- Owen Graduate School of Management, TVA Executive Development Program

LICENSE

- Professional Engineer's license, Tennessee

ATTACHMENT F

A CRITIQUE OF THE BIOLOGICAL OPINION AND AMENDED BIOLOGICAL OPINION

Prepared by
W. Mike Howell, Ph.D., Consultant
Professor of Biology *emeritus*

_____

W. Mike Howell, Ph.D.
23 April 2008

I. THE PURPOSE OF THIS REVIEW

I was asked to review the U. S. Fish and Wildlife Service's (FWS) Biological Opinion (BO) and Amended Biological Opinion (Amended BO) relative to the potential effects that the U. S. Corps of Engineers' Interim Operating Plan (IOP) and Exceptional Drought Operations (EDO) could have on the flow volume of Apalachicola River and the resultant effects on the Critical Habitat and life history requirements of the federally-threatened Gulf sturgeon, *Acipenser oxyrinchus desotoi*.

II. SUMMARY OF EVALUATION

As an ichthyologist for over forty years, and former curator of fishes at Cornell University, I have used my knowledge of fish biology and research in this area to analyze FWS' BO and Amended BO. I have carefully read and analyzed FWS' administrative record, BO and literature cited as utilized in the final BO of September 5, 2006 (as revised on September 22, 2006) and its Amended BO of November 15, 2007. The following are my findings:

1. FWS has inadequately assessed and interpreted the scientific data underlying its BO relating to the effects of water discharges from JWLD on the Gulf sturgeon and its critical habitat.

2. There is no data in the BO, or in any of the cited published studies, indicating any negative effect of the Corps of Engineers IOP (or any pre-IOP discharges) on the Gulf sturgeon either during the sturgeon's spawning months during March-April-May or at any other time of the year. In fact, the findings of a population study done by two university professors from Florida (at the request of FWS) stated, "*Currently, the Apalachicola River population of Gulf sturgeon appears to be slowly increasing over levels observed in the 1980's and 1990's.*" (Pine and Allen, 2005, Doc. No. 260, FWS AR, P. 4955-4956). Thus, the historical water discharges by the COE have not been shown to decrease the Gulf sturgeon population since the 1980's and early 1990's as the population numbers have actually increased during this period. In other words, there is no scientific justification for the increased spring flows mandated by the IOP.

3. FWS' BO is incorrect that flow rates equal to or greater than 20,400 cubic feet per second (cfs) in the Apalachicola River below JWLD are needed for successful spawning of the Gulf sturgeon. The existing record evidence shows that FWS' conclusion on this point is erroneous. For example, the study by Pine et al. (2006) showed FWS' assertion to be incorrect as they found successful spawning at flows of 12,700-22,400 cfs (mean = 15,836 cfs). (Pine et al. 2006, Doc. No. 262, FWS AR).

4. Flows of 20,400 cfs or higher, as proposed by FWS' BO, would likely be detrimental to sturgeon eggs by preventing their attachment to the limestone shelf substratum. Furthermore, the larvae, when they hatch, cannot swim for the first two days post-hatching. Swimless larvae would be swept away by such high river

flows. Lab studies on surrogate sturgeon species have determined that young larvae cannot maintain position or swim against such currents. It is my professional opinion that the data strongly indicate that flows equal to or higher than 20,400 cfs are detrimental to successful Gulf sturgeon reproduction. Furthermore, such flows in fact waste stored water behind JWLD making it unavailable to augment river flow during periods of extreme drought.

5. The Gulf sturgeon's life history requirements and Critical Habitat stability would be harmed by the flow regime as mandated by the FWS in its BO. This opinion is supported by scientific findings produced by FWS' own scientific consultants from the University of Florida and their reports during 2005 and 2006 (Pine and Allen, 2005 and Pine et al., 2006 as cited above).

6. Nothing in FWS' Amended BiOp indicates that there would be any threat to the Gulf sturgeon due to the low flow scenarios analyzed in the Amended BiOp.

III. IOP MINIMUM DISCHARGES FROM WOODRUFF DAM DURING THE GULF STURGEON SPAWNING SEASON

A table is presented in the Biological Opinion (p. 11) detailing the IOP minimum discharge from Woodruff Dam by month and by basin inflow (BI). FWS' BO designated the following discharges to be released by the Corps from March through May during the Gulf sturgeon's spawning season:

1. During March through May, when the Basin Inflow (BI) is equal to or greater than 37,400 cfs, the discharge from Woodruff Dam will not be less than 37, 400 cfs.

2. During March through May, when the BI is between 20,400 cfs and 37,400 cfs, the discharge from Woodruff Dam will not be less than 20, 400 cfs.

3. During March through May, when the BI is less than 20,400 cfs, the discharge from Woodruff Dam will be an amount equal to the BI.

FWS states: " *The IOP operations during March through May are intended to support Gulf sturgeon spawning activities."* (BO, p. 9).

The discharges as outlined in the IOP from March through May are inordinately high and questionable based upon the meager facts known about sturgeon spawning and spawning sites in the Apalachicola River. FWS stated, *"The IOP operations during March through May are intended to support Gulf sturgeon spawning activities."* (BO, p. 9). The truth is, the threshold discharges of 37,400 cfs and 20,400 cfs were established because that was the range of flows during the few days when they found Gulf sturgeon eggs during 2005 (Pine and Allen, 2005). Their reasoning was invalidated in a later study by Pine *et al.* (2006), who collected Gulf sturgeon eggs on 12 specific 2-3 day periods when flows were between 12,700 cfs and 22,400 cfs.

FWS presented a graph (BO, Figure 3.6.1.4.C, p. 104) that shows the relationship between discharge (cfs) and *"area (acres) of hard substrate inundated to depths of 8.5 to 17.8 ft deep at the two known Gulf sturgeon spawning sites on the Apalachicola River (RM 105 and RM 99) at flows of 5,000 to 50,000 cfs, based on cross sections located closest to egg collections during 2005 and 2006."* (BO, p. 104).

The FWS graph referenced above (BO, Figure 3.6.1.4.C, p. 104) was studied in depth by Dr. Wei Zeng. His interpretation was presented at the December 13, 2006 workshop in Columbus, GA to discuss potential alterations of the IOP in response to RPM3 of the BO that the FWS issued on September 5, 2006 (FWS AR p. 10647). I have also studied the graph and concur with Dr. Zeng in his interpretation. The graph shows that as the flow in the Apalachicola River increases from 5,000 cfs to between 10,000 cfs and 11,000 cfs, and then levels off until the flow is in excess of 20,000 cfs, there is an increase in the cumulative amount of available habitat available at known Gulf sturgeon spawning sites. Less than four acres of habitat is gained as the flow increases from 20,000 cfs to about 23,000 cfs. After the flow exceeds around 23,000 cfs, the available habitat actually decreases. At flows of around 27,000 cfs to 38,000 cfs, the amount of available spawning habitat is less than the amount of habitat available when flows are in the range of 10,000-11,000 cfs. Thus, FWS' minimum flow thresholds of 37,400 cfs and 20,400 cfs (during March through May of spawning season) waste water that could be stored for other purposes and may even be detrimental to the Gulf sturgeon.

IV. THE REPORT TO FWS BY DRS. PINE AND ALLEN (2005) ENTITLED, *"ASSESSING THE IMPACT OF REDUCED SPAWNING HABITAT ON GULF STURGEON RECRUITMENT AND POPULATION VIABILITY IN THE APALACHICOLA BAY SYSTEM "* (FWS AR Doc 260)

During 2005, Dr. William E. Pine, III, of Mote Marine Laboratory, and Dr. Mike S. Allen, of the University of Florida, submitted to FWS a report dealing with the use of historical tagging data and population models to simulate how reductions in recruitment via altered spawning habitat could influence population viability of the Gulf sturgeon in the Apalachicola River, Florida. They reported the following:

1. "…decreasing recruitment success for the Gulf sturgeon in the Apalachicola River would have deleterious impacts on the population viability. Increased frequency of recruitment failure as related to alterations in minimum flows on either a 5 or 10-yer interval would lead to population declines for this threatened species." (Pine and Allen, 2005).

2. "The recovery criteria for this species state that in the short-term the population must be stable or trending upwards in 3 of 5 consecutive years and that the long-term goal should be a "self-sustaining" population where mean annual recruitment is equal to the mean natural mortality rate over a 12-year period." (Pine and Allen, 2005).

3. "Our simulations suggest that sturgeon populations will not meet these recovery goals within the Apalachicola River if recruitment declines due to

changes in flow regime." (Pine and Allen, 2005). (The latter part of this sentence shows that the authors are unsure that there will actually be declines due to flow changes).

The above was in the summary by Pine and Allen, 2005. However, the following statements were included from their report to FWS and contain vital information which weighs heavily on the thesis of their research. These statements should never have been omitted from a summary (abstract) of their work because many researchers never read the details, only the summary or abstract of the research. In the details, they stated:

1. *"Based on results from the closed population model estimates and CPUE trends for 1998, 1999 and 2004, it appears that the Gulf sturgeon population below the JWLD in the Apalachicola River has increased from around 100 individuals during the 1980's and early 1990's (Zehfuss et al. 1999) to about 300 individuals now (Figure 2)."* (cited from Pine and Allen, 2005, Doc No. 260, FWS AR, P. 4950; italics and underlining added for emphasis).

2. Drs. Pine and Allen, in first part of their Results Section entitled, "Objective 1: Evaluating population trends", stated: "*Since the end of the intensive sturgeon sampling in 1993, approximately 345 sturgeon were captured, primarily during directed sampling in 1998, 1999, and 2004 when 85, 131, and 116 fish were collected respectively. Population estimates for these three years from model M_t, which allows time dependent capture probability, increased from 253 individuals in 1998 (SE=66), to 270 (SE=44) in 1999, and 355 (SE=80) in 2004."* (cited from Pine and Allen, 2005, Doc No. 260, FWS AR, P. 4947; italics and underlining added for emphasis).

3. Drs. Pine and Allen, in their section on Management Implications stated: "*Currently, the Apalachicola River population of Gulf sturgeon appears to be slowly increasing over levels observed in the 1980's and early 1990's. This trend should be interpreted cautiously as this population is highly dynamic and likely experiences decadal long oscillations in population size related to the frequency of large year-classes being produced and sustained within the population. Whether the frequency or magnitude of these oscillations are affected by anthropogenic disturbances such as historical overfishing or large-scale habitat alteration remains unclear (Sulak and Randall 2002), but this population does appear to be relatively stable over the last 20-years of monitoring.* (Cited from Pine and Allen, 2005, Doc. No. 260, FWS AR, P. 4955-4956; italics and underlining added for emphasis).

4. Drs. Pine and Allen, in their Conclusions, stated, "*Although it is encouraging that each of the two most well-studied Gulf sturgeon population (Apalachicola and Suwanee River systems) are either stable or are growing slowly (Pine et al. 2001), clearly sturgeon populations are likely highly sensitive to changes in recruitment. Even subtle changes in recruitment patterns or early life survival may have large impacts on population viability (Pine et al. 2001) and sturgeon life history attributes do not lend them to be a species that can rapidly rebound in population size (Zehfuss et al. 1999, Zehfuss 2000, Pine et al. 2001, Sulak and Randall 2000)."* (Cited from Pine and Allen, 2005, Doc. No. 260, FWS AR, P. 4959).

In short, Pine and Allen's study shows that the historical water discharges by the COE have not decreased the Gulf sturgeon population since the 1980's and early 1990's as the population numbers have actually increased during this period. In other words, Pine and Allen's study supports the conclusion that there is no scientific justification for the increased spring flows mandated by the IOP.

V. THE STATUS OF THE GULF STURGEON POPULATION IN THE APALACHICOLA RIVER

As stated above, during 2005, Drs. William E. Pine, and Mike S. Allen, submitted to FWS a report entitled, *Assessing the impact of reduced spawning habitat on Gulf sturgeon recruitment and population viability in the Apalachicola Bay system* (Doc. No 260, Pine and Allen, 2005).

The following year, Pine et al. (2006) prepared another report for FWS entitled, *An assessment of Gulf sturgeon movement, spawning site selection, and post-spawn holding areas in the Apalachicola River, Florida* (Doc. No. 262, Pine et al. 2006). The latter study was divided into two tasks: Task 1. Assessing Gulf sturgeon movement and spawning patterns in the Apalachicola River. Here, telemetered Gulf sturgeon were tracked from the bays, distributaries and tributaries to two spawning sites located below JWLD; This first task also included assessing spawning habitat availability and egg collections; and, Task 2. Determining population size estimate in the Brothers River habitats (Doc. No. 262, Pine et al. 2006).

In order to fulfill these tasks, Pine et al 2006 utilized the following: (1) telemetry of radio-tagged adults to determine seasonal and pre-spawning movements, and to track them to their spawning sites; (2) Use of fibrous, circular floor-cleaner pads attached to the river bottom in order to passively collect unattached and drifting eggs. This was to determine when and where a spawning act had taken place; and, (3) Use of mark and recapture techniques in order to estimate the numbers of Gulf sturgeon inhabiting Brothers River.

The pertinent findings of these researchers were as follows:

1. Verification of Gulf sturgeon spawning at 2 sites below JWLD. In a critique of these findings, Dr. Doug Peterson, a professor at the University of Georgia, used egg collection data from this study and used McKenzie's occupancy model to determine the probability that the researchers could detect individual spawning events due to the limitations of their sampling gear and experimental design (FWS AR, Doc. 94). Dr. Peterson's analysis showed that the researchers were only able to detect 2-10% of the total spawning events that occurred in 2006. This suggested that spawning was likely occurring at other sites as well as these two sites.

2. Examination of egg collection mats suggested that spawning occurred between April 3 and May 1. However, the actual spawning dates cannot be verified because the egg collection mats were only checked every 48-72 hours and detection probabilities were low (<10%).

3. Spawning occurred at water temperatures of 20-25^{o} C.

4. Spawning occurred on 12 specific 2-3 day periods.

5. Spawning occurred during discharges from JWLD of 12,700 to 22,400 cfs (mean discharge during sampling periods was 15,836 cfs). These successful Gulf sturgeon spawnings during much lower river flows than those recommended in the BO refute FWS' assumption that higher flows are required for successful reproduction.

6. A judgment that it would take at least 5-10 consecutive years of intensive study in order to determine an optimal flow regime for Gulf sturgeon spawning in the Apalachicola River. I agree with these authors on their estimation of 5 to 10 consecutive years of study in order to determine the best flow regime. This would give adequate data as compared to the one year of data (2005) on which FWS based their recommendations.

Pine et al. (2006) tried to correlate spawning (egg collections) with increases in river discharge from JWLD. They stated: *"Additionally, spawning events were possibly related to increases in river discharge (Figure 14). For example, 80% of eggs were collected on April 7, 12-14, and April 28-May 1 following increases in river discharge from JWLD on April 6, 11, and 27-28."* (Pine et al., 2006, p. 18, paragraph 3).

As noted in the findings above, the egg collection pads were attached ("fished") to the limestone substrate at the spawning sites continuously for 2-3 days before they were checked. However, the researchers did not know the exact days on which spawning actually occurred. Although the river flow had been increasing in the days just before several (but not all) of these sampling events, discharge was actually declining when the egg collection pads were "fished" (*i.e.*, actually in the water and available to collect eggs) but not checked on 5 of the 11 sampling periods when a spawning event was detected. (Peterson, FWS AR, Doc. 94).

These researchers did not obtain a reliable indication of reproductive success for a reason they did not mention. According to the BO, sturgeon eggs hatch within 2 days. These researchers would miss many eggs on their egg collection pads because they would hatch and the swimless larvae would be swept away from the egg collection pad by the river currents. The egg membranes would then be eaten by snails and macroinvertebrates. This would invalidate any data presented on reproductive success. The researchers should have used very fine mesh larval nets to trap drifting larvae so that they could get data on the number of larvae produced per cubic meter of water sampled. The study by Pine et al. (2006) shows only that Gulf sturgeon spawned at two locations and times. It gives no data relative to the success of the spawn, nor does it document whether the spawning was affected by any rate of water discharge from JWLD.

VI. SIGNIFICANT POINTS FOR CONSIDERATION RELATIVE TO RIVER FLOW AND STURGEON LIFE HISTORY

1. USFWS admits to having no evidence linking flow and sturgeon migration. On page 72 of Biological Opinion FWS stated: *"Gulf sturgeon migratory movements within and into/out of the Apalachicola River may be influenced by flow; however, we have no direct evidence that either extreme high-flow events or extreme low-flow events preclude migration." (italics added for emphasis)*

2. USFWS admits to having no data relative to effect of flows above or below that which cause adverse effects to eggs, larvae or young-of-the-year sturgeon. On page 72 of Biological Opinion FWS stated: *"Flow may effect [sic?] habitat availability or suitability for young-of-the-year (YOY) fish in the river; however, we have no data that would describe the relationship or a threshold flow below or above which adverse effects may occur. High flow could conceivably wash away eggs, larvae, and YOY of limited mobility…". (italics added for emphasis)*

3. USFWS admits that they cannot describe spawning habitat availability over a range of flows as a function of velocity, depth, and substrate. On page 71 of Biological Opinion FWS stated: *"A hydraulic simulation capability for the sturgeon spawning is not available to the Service at present to describe spawning habitat availability of a range of flows as a function of velocity, depth, and substrate. At this time, we must use depth and substrate only for that purpose." (italics added for emphasis).*

VII. FWS DOES NOT FULLY UNDERSTAND THE EFFECTS OF RIVERINE FLOW ON THE GULF STURGEON

A detailed reading of FWS' BO demonstrates conclusively that there is a lack of understanding of the role of river flow, if any, in the biology of the Gulf sturgeon. The following examples illustrate this fact:

FWS states, *"River flow <u>may</u> serve as an environmental cue that governs both sturgeon migration and spawning (Chapman and Carr 1995; Ross et al. 2001b). If the flow rate is too high, sturgeon in several life-history stages can be adversely affected. Data describing the sturgeon's swimming ability in the Suwanee River strongly <u>indicates</u> that they cannot continually swim against prevailing currents of greater than 1 to 2 m per second (3.2 to 6.6 ft per second) (K. Sulak, USGS, pers. Comm.. cited in Wakeford 2001). If the flow is too strong, eggs <u>might not be able</u> to settle on and adhere to suitable substrate (Wooley and Crateau 1985). Flows that are too low can cause clumping of eggs, which leads to increased mortality from asphyxiation and fungal infection (Wooley*

and Crateau 1985). Flow velocity requirements for YOY sturgeon may vary depending upon substrate type." (Cited under section 2.1.3.3. Freshwater Habitat, p. 20). (underlining added for emphasis).

In the paragraph above, and in several other places in the BO, FWS attempts to interject a role for river flow that is undocumented by scientific data. Their statement "*River flow may serve as an environmental cue that governs both sturgeon migration and spawning…"* is a guess. Fish biologists and ichthyologists have for years known that migrations and spawnings are regulated almost exclusively by two factors: the photoperiod and water temperature. It is the increasing daylight (day length) relative to that of darkness (night length) and increasing water temperatures during the transition from winter into spring (and early summer) that initiates migrations and spawning of over 90% of our freshwater species in Alabama (see Table 1). For example, applying FWS' assumptions, during an exceptionally dry spring when river flows are significantly below the norm, what do freshwater fishes do? Do they fail to spawn? Certainly not, as already shown by Pine et al. 2006. They migrate (if they are migratory) and they continue to spawn as always. Otherwise, a whole generation of a fish species would be lost for a whole river system in one dry spring (this would be devastating to a species that lived for only one to two years as most of our minnows and darters). The point to be made here is that river flow is a variable environmental parameter, subject to the extremes of flooding and drought. Increasing daylight (associated with increasing day length) is a non-variable environmental parameter at a given geographical point, such as Woodruff Dam. The most astute astronomers (and even the lowliest of farmers) know and depend on the non-variability of this fact. Interaction of increasing daylight with the pineal eye of fishes is a strong cue to initiate spawning in almost all species of temperate freshwater fishes. Increasing water temperatures as the season moves from winter into spring (and early summer) is also a non-variable environmental parameter in areas of the world that experience definitive seasons (such as in Alabama, Georgia, Florida).

Indeed, FWS' BO makes clear that additional information is needed to understand the role of river flow on sturgeon biology:

> *"Data concerning the temperature, oxygen, and current velocity requirements of cultured sturgeon are being collected. Researchers plan to use information gained from these laboratory experiments on hatchery-reared sturgeon to develop detailed information on water flow requirements of wild sturgeon throughout different phases of their freshwater residence (Wakeford 2001)."* (Cited under section 2.1.3.3 Freshwater Habitat, p. 21).

It is scientifically unsound to use information from a laboratory setting to "develop detailed information on water flow requirements of wild sturgeon." A minnow, *Rhinichthys cataractae* can be caught in the wild and brought into the laboratory. In an aquarium with non-moving water and a sand bottom, it will spawn at a given artificial light regime and water temperature. However, this laboratory-gathered information would be useless to extrapolate into the actual field because of the innate behavior of this species. In nature, this minnow lives in swift water and spawns its eggs over gravel and rubble, not sand.

VIII. DOES WATER FLOW HAVE ANYTHING TO DO WITH SPAWNING MIGRATIONS?

FWS presents no scientific data that show that water flow during the spring months actually induce or stimulate Gulf sturgeon spawning migrations. They stated:

> *"Migratory behavior of the Gulf sturgeon seems influenced by sex, reproductive status, water temperature, and possibly river flow."* (cited from BO 2.1.3.5 Migration section, p. 22) . (italics and underlined added for emphasis).

Much further into their report, FWS admits that there is no evidence linking Gulf sturgeon migration to river flow. They stated:

> *"Gulf sturgeon migratory movements within and into/out of the Apalachicola River may be influenced by flow; however, we have not direct evidence that either high-flow events or extreme low-flow events preclude migration."* (cited from BO 3.6.1.4 Flow regime section, p. 72). (italics added for emphasis).

In spite of the statement above, FWS further contradict themselves by stating that the fall migration appears to be initiated by pulses of higher river discharge. They stated:

> *"Downstream migration from fresh to saltwater begins in September (at about $23^0C[73^0F]$) and continues through November (Huff 1975; Wooley and Crateau 1985; Foster and Clugston 1997). During the fall migration from fresh to saltwater, Gulf sturgeon may require a period of physiological acclimation to changing salinity levels, referred to as osmoregulation or staging (Wooley and Crateau 1985). This period may be short (Fox et al., 2002) as sturgeon develop an active mechanism for osmoregulation and ion balance by age 1 (Altinok et al. 1998). On some river systems, timing of the fall migration appears to be associated with pulses of higher river discharge (Heise et al. 1999a and b; Ross et al. 2000 and 2001b; Parauka et al. 2001)."* (Cited under section 2.1.3.5 from BO Migration p. 22). (italics and underlined added for emphasis).

FWS also stated that not all Gulf sturgeon migrate upstream during spawning season. They stated:

> *"In the spring (March to May), most adult and subadult Gulf sturgeon return to their natal river, where sexually mature sturgeon spawn, and then stay until October or November (6 to 8 months) in freshwater (Odenkirk 1991; Foster 1993; Clugston et al. 1995; Fox et al. 2000). Fox et al (2000) found that some individuals in the Choctawhatchee River subpopulation do not enter the river until the summer months." (cited from 2.1.3.5 Migration, p. 22). (italics and underlining added for emphasis).*

If increased water flows during the spring serve as a cue to begin their upstream spawning migrations, then why do some individuals in the Choctawhatchee River fail to migrate and wait until the summer months when water flows are at their lowest? This behavior is in direct contradiction to FWS' hypothesis that increased water flows stimulate upstream migration. It is also contrary to the fact that migratory spawning activities are regulated by increasing day length and water temperatures. Why these individuals should remain behind is an enigma.

M.T. Randall and K.J. Sulak's paper entitled, "Relationship between Recruitment of Gulf Sturgeon and Water Flow in the Suwanee River, Florida" (2007), suggests that there may be a "second minor period of spawning . . . in the fall, during September and October." (Randall & Sulak 2007, Introduction, lines 17-19). Additionally, the initial hypothesis of Randall and Sulak was that Gulf sturgeon recruitment would be linked to high spring flows. Unexpectedly, these authors found that strong year-classes correlated, instead, with years of high water flows during the fall months of September and/or December. Nowhere in either the Biological Opinion or Amended Biological Opinion does the FWS discuss the possibility of a second fall spawning or the possible importance of fall/winter flows.

The possibility of a second fall spawning period is related to another issue unaddressed by FWS in either the Biological Opinion or Amended Biological Opinion. A 1985 report prepared by Wooley & Crateau describes that during the fall, 15 of 17 radio-tagged fish migrated downstream from Jim Walter Lock and Dam over a 40-day period (October-November) as the water temperature in the late fall dropped to 18 degrees C. All 15 fish during mid to late November entered either Apalachicola Bay or the Gulf of Mexico. The authors stated, "The two largest sturgeon overwintered below JWLD, demonstrating the capability for extended freshwater residency." (Wooley & Crateau 1985, Abstract, lines 14-15). Wooley & Crateau (1985) further explain that "[b]y early November, only the two largest sturgeon (38 kg) radio-tagged in 1983 remained in the summer dormant area below JWLD. These fish were captured in early May 1983 in the upper Apalachicola River at a water temperature of 20-21 C. It is not known how long these fish had been in freshwater or if they had spawned during this period. At the time of tagging, sex could not be determined. Both fish spent the entire summer in this area." (Wooley & Crateau 1985, 598-599). The 2 specimens out of 17 represent nearly 12% of this group that did not migrate downstream. As noted earlier, FWS also acknowledges that not all Gulf sturgeon migrate upstream during spring spawning season but wait until the summer months. Additionally, nonmigrating sturgeon are further evidence that high flow is not a trigger for spawning, as mentioned previously in this report. (Heise 1999b)

Nowhere in the Biological Opinion or Amended Biological Opinion is there any discussion of the possible overwintering of gulf sturgeon below JWLD. It would be particularly relevant to know if overwintering Gulf sturgeon participate in the fall spawn mentioned by Randall and Sulak. It is my professional judgment that FWS' failure to address the potential for fall spawning and overwintering below JWLD is a significant omission from the Biological Opinion and Amended Biological Opinion. FWS may have overestimated the importance of the spring spawning period to the detriment of the Gulf sturgeon's summer and fall behavior.

IX. DOWNSTREAM MIGRATION IN THE FALL

FWS stated that upstream migration to spawning sites occurred during early spring. Gulf sturgeon spawn in their natal river mostly during April. They then remain there for three to four months until October to November during which time they begin their downstream fall migration as they head for their wintertime feeding grounds in the brackish and saltwater in the bays, estuaries and Gulf of Mexico.

FWS makes the assumption that high water flows during spring months serve as cues to upstream spawning migrations. Conversely, they state above that on some river systems, the same high water cues during the fall months (September through November) serve to initiate downstream migrations. How and why ***high water flows can initiate both upstream and downstream migrations*** were not addressed by FWS. (cited in paragraphs above). FWS acknowledges the role of water temperature as an environmental cue to migration, when FWS states, *"Downstream migration from fresh to saltwater begins in September (at about $23^0C[73^0F]$) . . . ."*

X. A COMPARATIVE STUDY ON SPAWNING TIMES OF ALABAMA FISHES

In the BO, FWS suggests that river flow, especially high river flow during the spring of the year, is crucial to the recovery of the Gulf sturgeon below Woodruff Dam. FWS states that increased river flow was the stimulus that initiated both spring and fall migrations. I have made the point that it is factual that both increasing water temperature and/or day length are the primary environmental cues that initiate spawning in over 90% of our species in the southeastern United States. The same would be true in Alabama, Georgia or Florida. Indeed, 92.7% of 261 species of Alabama fishes spawn at some time during either March, April and/or May, overlapping their spawning times with that of the Gulf sturgeon (comparative spawning data were compiled from the following source: *Fishes of Alabama and the Mobile Basin, by M. F. Mettee, P. E. O'Neil and J. Malcolm Pierson.* 1996. Oxmoor Press, Birmingham, AL, 820 pages).

It is increasing water temperature and increasing day length rather than high water flow during early spring that stimulates many of the species that spawn during March, April and/or May to shed their eggs or sperm. Obviously, several fish species live in spring basins, lakes and headwaters that do not experience high flows during spring, but also spawn during the same months as the Gulf sturgeon (e.g. Lake sturgeon, pygmy sunfishes, some sculpins, Coldwater darter, Watercress darter, etc.).

XI. IN ORDER TO JUSTIFY A HIGH RIVER FLOW, FWS DOES NOT ATTEMPT TO DUPLICATE THOSE RIVER FLOW CONDITIONS OF THE MOST SUCCESSFUL GULF STURGEON POPULATION, THAT OF THE NEARBY SUWANEE RIVER

A comparison of river size and water flow in the Apalachicola and Suwanee Rivers shows that the Suwanee is a much smaller river with much less water flow. Yet, the Suwanee River contains by far the largest population of Gulf sturgeon. Clugston et al., 1995 studied population dynamics on the Suwanee River, Florida and stated "…the average annual flow is about 305 m^3/sec (Livingston et al. 1974)." Wooley and Crateau (1985) studied the sturgeon population on the Apalachicola River and stated that the river, "…has an average flow rate of 664.4 m^3/sec (Livingston, et al. 1974)… ." They further stated, "Minimum and maximum discharges over the past 15 years were 178 m^3/sec and 4,598 m^3/sec, respectively. The maximum flow on record of 8,292 m^3/sec (U. S. Study Commission 1963) was recorded in March 1929." It would appear that FWS would be trying to match the Suwanee River flow rate as closely as possible. Certainly an increase in flow rate is not in the best interest of the Apalachicola sturgeon if the flow rates in the Suwanee River are any indication of optimal conditions.

Carr et al. (1996) studied the Gulf sturgeon population in the Suwanee River, located just southeast of the Apalachicola River. They studied population size (numbers of specimens), seasonal migratory patterns, etc. During a nine years study (1986-1994), they collected 3,098 Gulf sturgeon and tagged and released 1,957 specimens. The mean population in the Suwanee River was estimated between 1,504 and 3,066 fish. This estimate was based solely on East Pass fishing efforts.

Wooley and Crateau (1985) estimated the population of Gulf sturgeon in the Apalachicola River at only 282 fish! It is of interest that FWS in their BO cited many studies on the Apalachicola and Suwanee River Gulf sturgeon, but they failed to discuss the paucity of sturgeons in the Apalachicola River versus the abundance of sturgeons in the Suwanee River. It would appear that FWS would try to mimic conditions (water quality, water flow, water depth, spawning substrate, etc.) present in the Suwanee River as closely as physically possible in the Apalachicola River in an attempt to increase its threatened sturgeon population.

Dr. Carter Gilbert, the most recognized ichthyologist in Florida, stated the importance of the Gulf sturgeon population in the Suwanee River. Carr et al. (1996) stated that *"Gilbert (1992) suggested that the Suwanee River supports the largest remaining spawning population of the Gulf of Mexico sturgeon. An unpublished manuscript by P. Meylan (Eckerd College, St. Petersburg, FL, 1977) estimated the sturgeon population of the Suwanee River at around 3,500. Our estimates indicated that the Suwanee River supports a population of approximately 2,500 individuals (87 cm TL/3 kg to 211 cm TL/81 kg). Wooley and Crateau (1985) estimated the population of Gulf of Mexico sturgeon in the Apalachicola River at 282 fish (fish >45cm FL). In addition, only small numbers of sturgeon have been sighted in other rivers of the Gulf of Mexico coast (Reynolds 1993). Therefore, we believe Gulf of Mexico sturgeon are not very abundant and the Suwanee River may, indeed, support the largest sturgeon population in the Gulf of Mexico."* (quotation from Carr, S. H., F. Tatman and F. A. Chapman. 1996. Observations on the natural history of the Gulf of Mexico sturgeon [Acipenser oxyrinchus desotoi, Vladykov 1955] in the Suwanee River, southeastern United States. *Ecology of Freshwater Fisheries* 5:169-174).

Clugston et al., 1995, studied the sturgeon population in the Suwanee River, Florida. They stated, "The Suwanee River continues to support the largest and clearly the most viable Gulf sturgeon population in the coastal rivers of the Gulf of Mexico. This river remains undammed and is relatively undeveloped and unpolluted." (cited from Clugston et al. 1995, page 217.)

Clugston et al., 1995, stated, "We are fortunate that the Suwanee River remains relatively unaltered by man and supports a Gulf sturgeon *population that seems to be increasing*. Much has been learned about the Gulf sturgeon population in this river, and *the information gained should be useful in restoration efforts throughout its range*." (cited from Clugston et al., 1995, p. 223; italics added for emphasis).

Despite all of the foregoing information about the optimal concentration of Gulf sturgeon in the Suwanee River, and suggestions by researchers that the information gained in this river system should be useful in restoration efforts throughout its range, FWS never attempted to match the Apalachicola River's flow rates or any other environmental parameter to approach as closely as physically possible to those of the Suwanee River. Nor, did they ever even discuss the possibility of attempting to match conditions.

XII. IMPACT OF THE EDO ON GULF STURGEON SPAWNING

I found no threats to the Gulf sturgeon due to the EDO. In the Amended BO, FWS presented graphs (p. 50, amended BO) that showed the acres of sturgeon spawning habitat inundated to depths of 8.5 to 17.9 ft deep at the two known Gulf sturgeon spawning sites on the river using flows of the 6 modeled scenarios. Under the 10th percentile hydrology, Gulf sturgeon spawning habitat would be reduced from an average of 13.0 acres with the IOP to 10.6 acres under both of the EDO options. This is only a 2.4 acre reduction. (p. 37, amended BO).

Using the 1999-2001 minus 20% hydrology, Gulf sturgeon spawning habitat is reduced from an average of 12.1 acres with the IOP to 10.5 acres under both of the EDO options. This is only a 1.6 acre reduction. (p. 37, amended BO).

My best professional opinion is that a 1.6 to 2.4 acre reduction in spawning habitat will not threaten the Gulf sturgeon's survival within the Apalachicola River. Spawning is not an act that is "willed" by ripe males and gravid females. It is controlled by powerful reproductive hormones and will take place whether the spawning habitat is 13 acres or 10.6 acres. According to population estimates of Gulf sturgeon in the Apalachicola River, only about 300 + individuals exist in that watershed. Assuming that only 50% of these are spawning during the same year (150 individuals), and that not all individuals spawn at the same time (i.e., earlier breeders would spawn during March while late spawners would spawn during May), then 10.6 to 13 acres is more than adequate area for successful spawning to occur at this one site (RM 105). Undoubtedly, numerous other spawning sites will be discovered in the future as FWS and other researchers perform in-depth spawning studies on Gulf sturgeon in the Apalachicola River.

XIII. Floodplain Inundation

Much emphasis has been given by FWS on the importance of floodplain inundation in the Apalachicola River in order to add nutrients to the river and the coastal bays downstream. However, the data collected by Randall and Sulak (1999) indicate that the Suwanee River is nutrient-poor and yet the Gulf sturgeon population does better there than in any other river system. A newborn sturgeon in the Suwanee River spends almost the entire first year of its life as a loner, foraging through a relatively sterile limestone and sand substrate in search of food. Yet, the recruitment in this population is excellent. It is my professional opinion that the additional nutrients added by floodplain inundation have little to do with the success of the Gulf sturgeon's survival in the Apalachicola River.

Additionally, Hupp (2000) explains the negative environmental impacts that can be produced by floodplain inundation. In particular, floodplain inundation increases the amount of suspended sediment in a river. Hupp states that suspended sediment in the rivers may be the most important water quality concern in the United States today. Suspended sediment directly affects aquatic plants and animals by coating vegetation and clogging the gills of fishes and invertebrates. Sediment indirectly changes the habitat from more coarsely grained aquatic environments into highly silted environments. Increased sediments also may lead to high sediment deposition in critical riparian areas, thus damaging living resources through burial and suffocation. More importantly, suspended sediment is a transport medium for hydrophobic forms of nutrients, trace elements, pesticides, poisons, pharmaceuticals, pharmaceutical metabolites, and other contaminants of all sorts. Regular flood plain inundation could lead to increased sedimentation and increased levels of harmful toxins in the river. However, FWS does not address these potentially harmful impacts to the Apalachicola that could occur due to floodplain inundation.

Lastly, while my report does not directly address the threatened and endangered mussels at issue in the Biological Opinion or Amended Biological Opinion, I would like to note that Cailteaux, et al. (DRAFT 2007), explains that stronger year classes of bluegill are associated with less acreage of floodplain inundation. This is significant in my opinion because bluegill are among the most numerous of fishes in the Apalachicola River and are recognized as one of the host fish species for the Fat threeridge and Chipola slabshell mussels.

In sum, significant material in FWS' administrative record suggests that floodplain inundation would have little, if any, positive impact on the Gulf sturgeon or the host fish for the threatened and endangered mussels. In fact, regular floodplain inundation could have substantial negative impacts on the river due to increased sedimentation and higher levels of toxins in the river.

CURRICULUM VITAE

William Mike Howell, Ph. D.

HOME ADDRESS:	1126 Shadesmont Rd. Birmingham, Alabama 35226
PHONE NUMBERS:	(205) 290-0773 - Home (205) 726-2943 - Work
DATE OF BIRTH:	8 June 1940
EDUCATION:	1962 B.S., University of Alabama (Biology) 1964 M.S., University of Alabama (Biology) 1968 Ph.D., University of Alabama (Vertebrate Zoology)
PRESENT POSITION:	Professor of Biology, Department of Biology, Samford University, Birmingham, Alabama 35229 June 1993 – 2007 Professor *emeritus* Retired 2007
PAST POSITIONS:	2007- Present Professor *emeritus* 1993-2007 - Professor of Biology, Samford University 1986-93 - Professor and Chair, Department of Biology, Samford University, Birmingham, Alabama 1984-86 - Professor of Biology, Samford University 1979-84 - Professor and Head, Department of Biology, Samford University 1976-79 - Professor of Biology, Samford University 1974-76 ¥ Associate Professor, Department of Biology, Samford University 1972-74 - Assistant Professor of Ecology & Systematics Cornell University, Ithaca, NY 14850 1969-72 - Associate Professor, Department of Biology, Samford University 1966-69 - Assistant Professor of Biology, Department Samford University 1965-66 - Graduate Teaching Assistant, Department of Biology, University of Alabama 35486 1962-65 - National Defense Education Act Fellow, Department of Biology, University of Alabama

SCHOLASTIC AND HONORARY AWARDS:

1982 ¥ Elected to Omicron Delta Kappa national leadership organization
1979 ¥ Elected to Phi Kappa Phi national honor society
1977 ¥ Buchanan Award for Excellence in Classroom Teaching
1975 ¥ Listed among top five outstanding professors, Cornell University
1967 ¥ Elected to Society of the Sigma Xi scientific honor society
1965 ¥ Beta Beta Beta national biological honorary society
1965 ¥ Graham Prize in Biology
1962-65 ¥ NDEA Title IV Fellowship

TEACHING EXPERIENCE: Forty years of teaching experience.
Six years at Samford University, 1966-72
two years at Cornell University, 1972-74.
Thirty-two years at Samford University, 1974-2007

RESEARCH INTERESTS:

Endangered Fish Species
Vertebrate chromosome structure and function
Systematics of freshwater fishes
Effects of pollutants on freshwater fishes
Silver staining of vertebrate chromosomes
Masculinization of fishes by exposure to biodegraded plant sterols

GRANT AWARDS:

Samford University Research Fund Grant numbers 48, 59, 62, and 64, totaling $1,850 for the years 1974-76 to study the mechanism of silver binding to human chromosomes.

National Science Foundation Grant No. NSF PCM 76-82828. 1976-78. $16,000 grant to study nucleolus organizer regions in human chromosomes.

National Science Foundation Grant No. DEB 76-84195. 1976-78. $34,000 grant to study fish chromosomes.

National Science Foundation Grant No. PCM 79-17344. 1980-82. $38,498 grant to study silver staining patterns in nucleolus organizer regions of human metaphase chromosomes derived directly from solid tumor cells.

Samford University Research Fund Grant No.13. 1985-87. $2,000 grant to study plant sterol-induced changes in secondary sex characteristics of the mosquitofish, *Gambusia affinis*.

EPA Grant #R826130-01 1998-2000. $321,000 grant to develop a short-term in vivo screening system for endocrine disruptors utilizing mosquitofishes (co-investigator with Dr. Rob Angus of UAB).

PROFESSIONAL SOCIETIES:

American Society of Ichthyologists and Herpetologists

Somatic Cell Genetics Conference

Southeastern Fishes Council

Alabama Fisheries Association

Alabama Academy of Sciences

EDITORIAL BOARD:

Appointed to editorial board, *Copeia,* American Society of Ichthyologists and Herpetologists, 1978

Appointed to editorial board, *Brazilian Journal of Genetics,* now renamed, *Genetics and Molecular Biology* 1997

Appointed to editorial board, *Genetics and Molecular Research*, 2002

PEER REVIEWER FOR SCIENTIFIC JOURNALS: I have been a frequent reviewer for manuscripts in the following journals:

American Midland Naturalist
Chromosoma
Copeia
Genetics and Molecular Biology
Jour. Histochemistry & Cytochemistry
Stain Technology
The Brazilian Journal of Genetics
The Southwestern Naturalist
Transactions Americans Fisheries Society

INVITED SPEAKER: The following are select topics on which I have been invited to speak:

"Silver Staining of Chromosomes: Visualization of Ribosomal Gene Activity" Biology - Forum Invited Speaker Series, 18 October 1979 at University of Alabama.

"Bioethics" -Forum on Bioethics, 27 April 1981 at Comer Auditorium, University of Montevallo.

"Silver Staining of Chromosomes and Cell Organelles" Invited talk, September 1982 at Wayne State University, Detroit, Michigan.

Vertebrate Chromosomes Structure ¥ Invited Speaker Series, 23 March 1984 at Department of Biological Sciences, Mississippi State University, Starkville, MS.

"Environmental Formation of Androgens and Fish Masculinization ¥ October 18, 1999. Invited Speaker at The Symposium Marking the 20th Anniversary of the first Meeting on Estrogens in the Environment". Center for Bioenvironmental Research at Tulane and Xavier Universities, New Orleans, LA.

TRAVEL: Served as Professor-in-Residence at Samford University s London Study Centre, London, England, August¥ December 1987. Traveled extensively throughout England, Wales, Scotland, Ireland and France.

COURSES TAUGHT:

General Biology
Zoology
Vertebrate Field Zoology
Invertebrate Field Zoology
Genetics
Man & the Environment
Human Anatomy & Physiology
Speciation (Graduate)
Biology of Fishes
Biogeography (Graduate)
Ichthyology (Graduate)
General Science for School Teachers

LIST OF BOOKS, PUBLICATIONS AND THESIS:

Howell, W. M. 1964. Studies on the variation in a topotypic population of the lancelet, *Branchiostoma floridae* Hubbs, from Tampa Bay, Florida. M.S. Thesis, University of Alabama.

Howell, W. M. and R. D. Caldwell. 1965. *Etheostoma (Oligocephalus) nuchale,* a new darter from a limestone spring in Alabama. *Tulane Studies in Zoology* 12(4):101-108.

Howell, W. M. and H. T. Boschung, Jr. 1966. A natural hybrid darter, *Etheostoma whipplii artesiae* X *Etheostoma stigmaeum* (Pisces, Percidae). *Amer. Midl. Nat.* 76(2):510-514.

Caldwell, R. D. and W. M. Howell. 1966. *Siren intermedia nettingi* from Alabama. *Herpetologica* 22(4):310-311.

Howell, W. M. 1868. Taxonomy and distribution of the percid fish, *Etheostoma stigmaeum* (Jordan), with the validation and redescription of *Etheostoma davisoni* Hay. Ph.D. Dissertation, University of Alabama.

Denton, T. E. and W. M. Howell. 1969. A technique for obtaining chromosomes from the scale epithelium of teleost fishes. *Copeia* 1969(2):393-395.

Howell, W. M. and C. R. Duckett. 1971. Somatic chromosomes of the lamprey, *Ichthyomyzon gagei* (Agnatha: Petromyzonidae). *Experientia* 27(2):222-223.

Howell, W. M. and J. D. Williams. 1971. *Notropis gibbsi, a* new cyprinid fish from the Tallapoosa River system in Alabama and Georgia. *Copeia* 1971(1):55-64.

Howell, W. M. and H. T. Boschung, Jr. 1971. Chromosomes of the lancelet, *Branchiostoma floridae* (Order Amphioxi). *Experientia* 27:1295-1296.

Howell, W. M. 1972. Somatic chromosomes of the Black Ghost Knifefish, *Apteronotus albifrons* (Pisces: Apteronotidae). *Copeia* 1972(1):191-193.

Ramsey, J. S., W. M. Howell and H. T. Boschung, Jr. 1972. Rare and Endangered Fishes of Alabama. Pages 57-86 in Rare and Endangered Vertebrates of Alabama. Alabama Dept. Conservation and Nat. Res., Div. Game and Fish, Montgomery, Alabama, 92 pp.

Denton, T. C. and W. M. Howell. 1972. Chromosomes of the African Polypterid fishes, *Polypterus palmas*, and *Calamoichthys calabaricus* (Pisces: Polypteridae). *Experientia* 29:122-124.

Howell, W. M. and S. E. Bloom. 1973. Sex-associated differential fluorescence of mudminnow chromosomes and spermatozoa. *Nature* 245:261-263.

Barclay, L. A. and W. M. Howell. 1973. Ichthyofauna of the Locust Fork of the Black Warrior River System of Alabama. *J. Ala. Acad. Sci.* 44(2):120-146.

Dycus, D. L. and W. M. Howell. 1974. *Fishes of the Bankhead National Forest of Alabama*. Ala. Dept. of Conservation and Nat. Res., Div. of Game and Fish. 51 pp.

Howell, W. M. and T. E. Denton. 1974. An ammoniacal-silver stain technique specific for satellite III DNA regions on human chromosomes. *Experientia* 30(11):1364-1366.

Howell, W. M., T. E. Denton and J. Diamond. 1975. Differential staining of the satellite regions of human acrocentric chromosomes. *Experientia* 31:260:262.

Kligerman, A. D., S. E. Bloom and W. M. Howell. 1975. *Umbra limi*: A model for the study of chromosome aberrations in fishes. *Mutation Research* 31:225-233.

Diamond, J. R., H. Dunn and W. M. Howell. 1975. Centromeric and telomeric staining regions in the chromosomes of cattle (*Bos taurus*). *Cytogenetics and Cell Genetics* 15:332-337.

Howell, W. M. and J. Villa. 1976. Chromosomal homogeneity in two sympatric cyprinid fishes of the genus *Rhinichthys*. *Copeia* 1976(1):112-116.

Denton, T. E., W. M. Howell and J. V. Barrett. 1976. Human nucleolar organizer chromosomes: satellite associations *Chromosoma* (Berl.) 55:81-84.

Neu, R. L., C. Ortega, G. Barg, W. Pinto, L. I. Gardner, W. M. Howell and T. E. Denton. 1976. Inclusion of satellites in an 18/21 translocation revealed by ammoniacal-silver (Sat-banding) in case of partial trisomy 18. *J. Med. Genet*. 13(6):520-522.

Howell, W. M. and T. E. Denton. 1976. Negative silver staining in A-T and satellite DNA-rich regions of human chromosomes. *Chromosoma* (Berl.) 57:165-169.

Howell, W. M. and A. Black. 1976. Status of the watercress darter. *Proc. Southeastern Fishes Council* 1(3):1-3.

Dingerkus, G. and W. M. Howell. 1976. Karyotypic analysis and evidence of tetraploidy in the North American paddlefish, *Polyodon spathula*. *Science* 194:842-844.

Howell, W. M. 1977. Visualization of ribosomal gene activity: silver stains proteins associated with rRNA transcribed from oocyte chromosomes. *Chromosoma*. (Berl.) 62:361-367.

Denton, T. E. and W. M. Howell. 1977. A technique for the simultaneous staining of both nucleolar organizer regions and kinetochores of human chromosomes with silver. *Stain Technol*. 52:311-313.

Howell, W. M., T. C. Hsu and B. M. Block. 1978. Visualization of centriole bodies using silver stain. *Chromosoma* (Berl.) 65:9-12.

Howell, W. M. and G. Dingerkus. 1978. *Etheostoma neopterum*, a new percid fish from the Tennessee River system in Alabama and Tennessee. *Bull. Ala. Mus. Nat. Hist*. 3:13-26.

Black, D. A. and W. M. Howell. 1978. A distinctive chromosomal race of the cyprinodontid fish, *Fundulus notatus*, from the Tombigbee river system of Alabama and Mississippi. *Copeia* 1978(2):280-288.

Howell, W. M., P. N. Howard-Peebles, B. M. Block and G. Stoddard. 1978. Silver stain reveals nucleolus organizer regions on a satellited Y chromosome. *Hum. Genet*. 42:245-250.

Howell, W. M. and D. A. Black. 1978. A technique for obtaining silver stained nucleolus organizer regions and trypsin-Giemsa bands on human chromosomes. *Hum. Genet*. 43:53-56.

Black, D. A. and W. M. Howell. 1979. The North American mosquitofish, *Gambusia affinis*: a unique case of sex chromosomes evolution. *Copeia* 1979(3):509-513.

Howell, W. M. and D. A. Black. 1979. Location of the nucleolus organizer regions on the sex chromosomes of the banded killifish, *Fundulus diaphanus*. *Copeia* 1979(3):544-546.

Howard-Peebles, P. N. and W. M. Howard. 1979. Mental retardation, marker X chromosomes and silver staining (NORs). *Cytogenet. Cell Genet*. 23:277-278.

Howell, W. M. and T. C. Hsu. 1979. Chromosome core structure revealed by silver staining. *Chromosoma*. (Berl.) 73:61-66.

Howell, W. M., D. A. Black and S. Bortone. 1980. Abnormal expression of secondary sex characters in a population of mosquitofish, *Gambusia affinis holbrooki*: evidence for environmentally-induced masculinization. *Copeia* (4):676-681.

Howell, W. M. and D. A. Black. 1980. controlled silver-staining of nucleolus organizer regions with a protective colloidal developer: a 1-step method. *Experientia* 36:1014.

Howard-Peebles, P. N. and W. M. Howell. 1981. Behavior of chromosome cores at heritable fragile sites: 16q22 and Xq27. *Cytogenet. Cell Genet*. 31:115-119.

Howell, W. M. and D. A. Black. 1981. Karyotypes in populations of the cyprinodontid fishes of the *Fundulus notatus* species-complex: a geographic analysis. *Bull. Ala. Mus. Nat. His*. 6:1-17.

Howell, W. M. 1982. "Selective Staining of Nucleolus Organizer Regions (NORs)", in: The Cell Nucleus rDNA Part B (eds. H. Bush and L. Rothblum), vol. XI, pp. 89-142, Academic Press, Inc., New York.

Howard-Peebles, P. N. and W. M. Howell. 1983. Nucleolus organizer regions of the canine karyotype. *Cytogenet. Cell Genet*. 35:293-294.

Howell, W. M. and D. E. Butts. 1983. Silver staining of spermatozoa form living and preserved museum fishes: a new taxonomic approach. *Copeia* 1983(4):974-978.

Denton, T. E., W. M. Howell, J. J. Allison, J. McCollum and B. Marks. 1985. Masculinization of female mosquitofish by exposure to plant sterols and *Mycobacterium smegmatis. Bull. Environ. Contam. Toxicol*. 35:627-632.

Howell, W. M. 1986. Watercress darter, *Etheostoma nuchale* Howell and Caldwell. pages 5-6 in: Mount, R. H. (ed.), Vertebrate Animals of Alabama in Need of Special Attention. Ala. Agr. Exp. Sta., Auburn Univ., 124 pp.

Sizemore, D. R. and W. M. Howell. 1987. A natural intergeneric hybrid minnow, *Campostoma oligolepis* x *Notropis chrysocephalus* (Pisces: Cyprinidae). *J. Ala. Acad.. Sci*. 58(4):184-191.

Hunsinger, R. N. , B. Byram and W. M. Howell. 1988. Unchanged gonadal morphology of mosquitofish masculinized by exposure to degraded plant sterols. *J. Fish Biol*. 32(5:795.

Howell, W. M. and T. E. Denton. 1989. Gonopodial morphogenesis in female mosquitofish, *Gambusia affinis affinis*, masculinized by exposure to degradation products from plant sterols. *Env. Biol. Fishes* 24(1):43-51.

Sizemore, D. R. and W. M. Howell. 1990. Fishes of springs and spring-fed creeks of Calhoun County, Alabama. *Proc. Southeast Fishes Council* 22:1-16.

Hunsinger, R. N. and W. M. Howell. 1991. Treatment of fish with hormones: solubilization and direct administration of steroids into aquaria water using acetone as a carrier solvent. *Bull. Environ. Contam. Toxicol*. 47(2):272-277.

Howell, W. M., R. N. Hunsinger, and P. D. Blanchard. 1994. Paradoxical masculinization of female western mosquitofish during exposure to Spironolactone. *The Prog. Fish Culturist* 56:51-55.

Bartolucci, A. A., P. D. Blanchard, W. M. Howell and K. P. Singh. 1995. The traditional Behrens-Fisher problem from the Bayesian perspective applied to the Alabama sturgeon controversy. *Proceedings of the Conf. On Modeling and Simulation,* 1995, Newcastle, Australia, 4 pp.

Angus, R. A. and W. M. Howell. 1996. Geographic distributions of eastern and western mosquitofishes (Poeciliidae: *Gambusia*): Delineation of ranges using fin ray counts. *Proceedings Southeastern Fishes Council* No. 33, pp 1-6.

Bartolucci, A. A., P. D. Blanchard, W. M. Howell and K. P. Singh. 1998. A Bayesian Behrens-Fisher solution to a problem in taxonomy. *Environmental Modeling & Software* 13(1998):25-29.

Jenkins, R., R. A. Angus, H. McNatt, W. M. Howell, J. A. Kemppainen, M. Kirk and E. M. Wilson. 2001. Identification of androstenedione in a river containing paper mill effluent. *Environ. Toxicol. Chem.* 20:1325-1331.

Angus, R. A., H. B. McNatt, W. M. Howell and S. D. Peoples. 2001. Gonopodium development in normal male and 11-ketotestosterone-treated female mosquitofish (*Gambusia affinis*): A quantitative study using computer image analysis. *Gen. and Comp. Endocrinology* 123:222-234.

Jenkins, R. L., E. M. Wilson, R. A. Angus, W. Mike Howell, and M. Kirk. 2003. Androstenedione and progesterone in the sediment of a river receiving paper mill effluent. *Toxicological Sciences* 73:53-59.

Jenkins, R. L., W. Mike Howell, L. J. Davenport and Linda F. Wood. 2003. Teaching Field Biology with Photography. *The American Biology Teacher,* vol. 65(6):450-454.

Howell, W. Mike and Ronald L. Jenkins. 2004. ***Spiders of the Eastern United States: A Photographic Guide***. Pearson Education. 363 pages.

Jenkins, R. L., E. M. Wilson, R. A. Angus, W. Mike Howell, M. Kirk, R. Moore, M. Nance and Amber Brown. 2004. Production of androgens by microbial transformation of progesterone *in vitro*: a model for androgen production in rivers receiving paper mill effluent. *Environmental Health Perspectives* 112(15):1508-1511.

Carson, John D., Ronald L. Jenkins, Elizabeth M. Wilson, W. Mike Howell, and Ray Moore. 2008. Naturally occurring progesterone in loblolly pine (*Pinus taeda* L): A Major steroid precursor of environmental androgens. *Environmental Toxicology and Chemistry* 27(6):pp. 000-000 *In press* June 8, 2008.

RECENT POSTER PRESENTATIONS

2004. Hataway, D., Ronald L. Jenkins, W. Mike Howell and Kristen Ramsey. 2004. Correlation of population density of *Arctosa sanctaerosae* to human impact on native beaches along the northern rim of the Gulf of Mexico. Presented to the 2004 annual meetings of the American Association of Arachnologists at University of Oklahoma, Norman, OK, June 2004.

2004. Davenport, L. J. and W. Mike Howell. 2004. A proposed index of biological integrity for aquatic invertebrates. Presented to the 2004 Annual meetings of the Alabama Academy of Science at University of Montevallo, Montevallo, AL, March 17-20, 2004.

ATTACHMENT G

WRITTEN COMMENTS OF DR. TERRY D. RICHARDSON ON THE U.S. FISH AND WILDLIFE SERVICE'S BIOLOGICAL OPINION AND CONFERENCE REPORT ON THE U.S. ARMY CORPS OF ENGINEERS INTERIM OPERATING PLAN AND THE ASSOCIATED RELEASES TO THE APALACHICOLA RIVER

September 25, 2007

I. INTRODUCTION

I am a malacologist and Associate Professor of Biology at the University of North Alabama. I am providing these comments in response to the U. S. Fish and Wildlife Service's Biological Opinion ("BIOP") (as revised on September 22, 2006) relative to the potential effects that the U. S. Corps of Engineers' Interim Operating Plan ("IOP") could have on the flow volume of the Apalachicola River and the resultant effects on the endangered fat threeridge mussel (*Amblema neislerii*), threatened purple bankclimber mussel (*Elliptoideus sloatianus*) and threatened Chipola slabshell (*Eliptio chipolaensis*). My comments reflect my professional opinion, for which I am fully responsible and in no way represent the views of my current employer (The University of North Alabama).

II. COMMENTS ON FWS' BIOP

Sec. 2.2.3.3 Mussel Reproduction

FWS cites Hove and Neves 1994 (Administrative Record [AR] Vol. 6, No. 210) suggesting spawning may be influenced by discharge, but they fail to state how this is so. (BIOP p. 30). Hove and Neves' (1994) data suggest that glochidia release is coincident with low, mean summer discharges (over and order of magnitude less than April/May discharges). This is reasonable since "Host fish density may be a factor in determining where amblemines, which include the three listed mussels addressed in this BIOP, may persist." (BIOP p. 32). By extension, low flows typical of summer and fall, when fat three-ridge release glochidia, may tend to concentrate host fish (out of floodplains and into channels of overall lower volume) making them more likely to be parasitized by mussel glochidia and thus enhancing mussel reproductive success. This also suggests that flows too high in the summer and fall (above what might be normally expected), as advocated by FWS, might adversely affect mussel reproduction by effectively "diluting" the host fish density.

Similarly, high late spring discharges during breeding, not brooding (*i.e.*, during male gamete release), could adversely impact reproduction by diluting male sperm. Male mussels broadcast their sperm into overlying water to then be siphoned in by ripe females thus fertilizing eggs. Excessive late spring discharges during this period could reduce the likelihood of successful fertilization by reducing the concentration of male sperm in the water. Indeed, regarding both successful fertilization and host fish infestation, successful reproductive years may coincide with or follow low flow or drought year conditions. This is supported by qualitative and quantitative samples taken in 2005 and 2006 by the FWS and EnviroScience. Results of these samples indicate the most abundant age classes of fat threeridge to be those produced during drought between 1998 and 2001 (BIOP Figure 2.2.3.2.B, p. 42). This suggests too high flows in the spring could impede fertilization and be detrimental to reproductive success.

Sec. 2.2.4 Status and distribution

The fat threeridge, purple bankclimber, and Chipola slabshell tend to be main channel species. "Records for the fat threeridge are limited to main channels of the Apalachicola, Flint and Chipola rivers and a few tributaries and distributaries . . . ." (BIOP p. 35 sec. 2.2.4.1). "The purple bankclimber is characterized as a species preferring the deeper portions of the main channels (often at depths greater than 3 m) in the larger rivers within its range . . . ." (BIOP sec.

3.5.3.2, p. 66). "The Chipola slabshell inhabits . . . large creeks and the main channel of the Chipola River in slow to moderate current." (BIOP sec. 2.2.3.4.3, p. 35). Essentially, FWS correctly points out that these listed mussels tend to be main channel species and not species typical of sloughs or elevated side channels. Indeed, FWS hypothesizes the listed mussels found in sloughs or elevated side channels like Swift Slough and other "hooks and bays" of the Apalachicola main channel likely came to be in these sites due to extended periods of very high flow during 2005, *i.e.*, "[The FWS] believe that large numbers of mussels were moved from the main channel into these side-channels and sloughs during high flow either in the spring of 2005 or following Hurricane Dennis in July 2005" (BIOP sec. 2.2.4.1, p. 37). In other words, these are aberrant populations with high densities that the FWS believe resulted from "an anomaly related to a substantial export of individuals from the main channel of the Apalachicola during high-flow events . . . ." (BIOP sec. 3.5.2.2, p. 65).

In 2006, FWS conducted a limited surveyed to document mortality and stranding of listed mussels in these aberrant locations. At the nine sites from which data are presented (BIOP Table 3.5.2.1.A, p. 88) only one site had greater than 30% mortality (82.4% at Z142) of all observed mussels and only three sites had 40% or more of the mussels exposed. Most mortality was around 20% or less and most exposure was under 24%. Mortality and exposure at 8 of the 9 sites were at discharges equivalent to 6600 cfs or less; none of the sites were at discharges of over 7200 cfs. FWS contends that "most of the mortality due to low flow we observed . . . was either in elevated side channels along the main channel of the river and Chipola Cutoff, or in Swift Slough" (BIOP sec. 3.5.2.1, p. 62), *i.e.*, not main channel sites, but rather these aberrant locations. Yet, FWS tries to use this 2006 mortality event of listed mussels, mainly of fat threeridge, living in these aberrant locations (Swift Slough, and in hooks and bays off the main

channel) to justify recommending the IOP minimal discharges be increased from 5,000 cfs to 10,000 cfs. While the FWS says they "believe" that the 2006 mortality event had a significant impact on the population, they state that they also "believe that sufficient numbers for recovery likely persist in reaches that were not so strongly affected by the hurricane and subsequent sustained low flows." (BIOP sec. 2.2.4.1, p. 37).

There are essentially two points to make. First, given FWS's suggestion that these are indeed aberrant, abnormal, locales for the listed mussels, and because FWS says the proposed action in the IOP will neither a) jeopardize the continued existence of the fat threeridge, purple bankclimber, and Chipola slabshell, nor b) destroy or adversely modify proposed critical habitat for the fat threeridge, purple bankclimber, and Chipola slabshell, one wonders why they insist that discharge be raised from 5,000 cfs to 10,000 cfs. This is especially true when considering that most of the mortality FWS references occurred at discharges less than 6,600 cfs and most of this in aberrant locations. This seems to argue favorably that flows certainly do not need to be raised to anywhere near 10,000 cfs.

Second, if the individual mussels at these anomalous sites are indeed important to the continued existence of these species (which the FWS clearly thinks they are not), then the FWS should have proposed as a reasonable and prudent measure (RPM) the relocation of these individuals. It cannot be emphasized enough that relocation of mussels is a standard mitigation procedure employed routinely by FWS when members of a listed mussel population may be in harm's way. Since relocation is a standard FWS recommended procedure, it is difficult to understand why FWS recommends an increase in minimal discharge from 5,000 to 10,000 cfs, especially when relocation alone would suffice and remove the issue of detrimental impacts of low discharge (regardless of source) altogether. After all, the vast majority of these mussels, at

least according to FWS, previously lived elsewhere and safely survived the drought of 1999-2002 with low flows similar to those of 2006.

Additional Comments

FWS devotes over two pages (pp. 49-51 & 75-76) to the geomorphic instability of the Apalachicola downstream of Woodruff dam. Conversely, FWS later devotes considerable attention to how the CH PCE of "geomorphic stability" *is* sufficiently present in this same reach. So, is it geomorphically stable or not? It seems the BIOP is trying to argue both ways. Regardless of whether this reach of the Apalachicola is stable or not, FWS does not point out that this is the way it has been since J. Woodruff began operation, yet the mussels persist. Increased flows will only serve to increase any purported geomorphic instability.

Similarly, FWS in trying to emphasize how bad unstable substrate is for these mussels, and suggests that unstable substrate conditions resulted in the mussels being deposited in aberrant areas. However, they fail to point out what is clearly inferred from their presentation--that given the tumultuous event that resulted in the deposition of the mussels in these aberrant locations and the mussels' subsequent success in these areas, these mussels have the demonstrated ability to handle unstable substrate conditions. (see discussion p. 76)

EDO Comments

The EDO once again raises the issue of channel stability. On page 15-16 of the EDO Amended Biological Opinion the FWS is again making a case for channel stability and suggests that the impacts of J. Woodruff Lock and Dam have been reduced through time. However, it is not at all clear from the BiOp or Amended BiOp whether or not operations are affecting stability, and if so, at what flows. These points need to be addressed and clarified with a definitive agency position providing justification for any recommended operating procedure. Knowing whether

operations contribute to channel stability or instability is important in assessing how this will impact critical habitat for listed species.

The EDO Amended BiOp includes recent information on the listed species that was unavailable when the original BiOp was produced. For example, the fat threeridge is far more abundant than previously thought (p. 19). Additionally, the Swift Slough population, where most of the drought-related mortality reported for this species occurred, exists only because of an "extraordinary even" (p. 63) that moved the mussels into that area. As a result, this is an anomalous, aberrant population. If this aberrant population, which does not represent the normal circumstances for this species, is removed from mortality calculations, and we look at mortality based on flow conditions for the normal locations of the mussels, then using the new, more abundant population size estimates, mortality would be more like 12% rather than the purported 18% at low flows. Furthermore, the new population data indicate no fat threeridge were sampled at depths corresponding to flows of $\geq$ 5,000 cfs and mortality did not exceed 5% until depths corresponding to flows of less than 4,600 cfs (Amended BiOp Table 4.2.6.A, p. 53). Similarly, the FWS present additional information suggesting that only after flows fall below 5,000 cfs would problems with DO and temperature exacerbate habitat conditions for the fat threeridge (Amended BiOp p. 25). The additional date reflecting lower mortalities, higher population estimates, and giving a clearer picture of depth and distribution versus flow, need to be used when considering appropriate, allowable flows.

Similar arguments could be made for the Purple Bank Climber. New information appearing in the EDO certainly indicate the Purple Bankclimber to be more common than previously thought (compare Fig. 3.6.1.2.A, p. 102 in BiOp to Fig. 3.5.3.A, p. 31 in Amended BiOp). Also, FWS correctly indentifies the Purple Bankclimber as a species that "prefers deeper

portions of the main channel (often > 3 m)." Yet, only 4.6% of all sampling effort (27 of 583 samples) was done at depths exceeding 3 m (Amended BiOp p. 21). So, even more populations may exist in the deeper channel areas as yet not surveyed. While some populations of Purple Bankclimber are found in shallow areas, these animals do indeed prefer depths more consistent with the main channels, depths unlikely to be impacted by low flow conditions. The new data regarding both Purple Bankclimber and Fat Threeridge need considered for determine appropriate allowable flow conditions.

In conclusion, it seems that data in the EDO thoroughly support the argument that flows as low as 5,000 cfs should have no affect on the listed mussels and flows even lower, down to around 4,500 cfs, would likely have little affect on the mussels.

Terry D. Richardson
University of North Alabama
Department of Biology
Florence, AL 35632-0001
(256)765-4429

CURRICULUM VITAE

Personal:

Born September 11, 1960, Florence, Alabama; single, no children.

Education and Experience:

B.S. in Professional Biology (Chemistry minor), University of North Alabama, 1982.
M.S. in Aquatic Ecology, University of Alabama, 1986. Thesis Title: "Life Histories and Secondary Production of Two Coexisting Pleurocerid Snails"
Ph.D. in Zoology (Physiology minor), Louisiana State University, 1990. Dissertation Title:"Factors Affecting the Foraging Ecology of the Rock Snail, *Stramonita haemastoma*"
Oak Ridge Associated Universities' Postdoctoral Fellow in the Environmental Sciences Division, Aquatic Toxicology Section of Oak Ridge National Laboratory, 1990-91.
Director, Rare and/or Endangered Species Research Center, 1994-2004.
Oxford Round Table, University of Oxford, Saint Anne's College, Oxford, England. August 2007.
Currently Associate Professor of Biology at the University of North Alabama, 1991-present.

Awards:

R. L. Chermock Award for outstanding performance as a graduate assistant. Awarded by the Dept. of Biology, University of Alabama.
W. H. Gates Award for Outstanding Teaching Assistant. Awarded by Dept. of Zoology and Physiology, Louisiana State University.
Honorable mention by the North American Benthological Society for research on subtropical freshwater gastropod production.
Oak Ridge Associated Universities Postdoctoral Fellowship.
Oxford Round Table Member, University of Oxford, Saint Anne's College, Oxford, England.

Funding:

"Foraging ecology of Caribbean spiny lobster"; 1 year UNA Arts and Sciences Research Support. 2008. $2,000.00(research)

"Foraging ecology of Caribbean spiny lobster"; 1 year UNA Arts and Sciences Research Support. 2007. $2,000.00(research)

"Foraging ecology of the Caribbean spiny lobster"; 1 year UNA

Faculty Research Support. 2007. $4,800.00(research)

"Land/water interfaces: regulation of biogeochemical cycles and productivity by organic matter"; 3 year NSF /EPSCoR (1993-96; complete) $62,766.00(research)

"Colonization of Tennessee River bivalves by the invading Zebra Mussel, *Dreissena polymorpha"*; 2 year research contract with the Tennessee Valley Authority (1992-94; complete) $43,367.00(research)

"A survey of the primary tributaries of the Alabama and lower Tombigbee rivers for listed and candidate species o f freshwater mussels, snails, and crayfish,1994-96"; contract for freshwater snail identification with the Alabama Geological Survey (complete) $ 1,500.00(research)

"Bioremediation of oil contaminated freshwater wetland ecosystems: invertebrate recovery"; 1 year research grant with the Environmental Protection Agency and Tennessee Valley Authority (1998-99; awarded, but declined by PI) $26,500.00(research)

"Biochemical adaptations to hypoxic and anoxic conditions in the snail, *Elimia paupercula*"; 1 year UNA (1995; complete) $18,890.00(research)

Coastal Fisheries Institute (complete) $ 800.00(research)

Sigma Xi grant in aid of research (complete) $ 400.00(research)

Consulting with Written Reports:

Paul Yokley, Jr., Florence, AL. T & E Surveys for listed mussels: (1) new bridge crossing over Black Warrior River near Eutaw, AL; (2) new Patton Island bridge crossing over Tennessee River in Sheffield/Florence, AL; (3) proposed City of Florence waste water treatment facility diffuser effluent pipe in Tennessee River. 1992-1995.

Tri-Rivers Mussel Coalition, Dothan, AL. Review of status survey and proposed listing of seven mussels in the Apalachicola River drainage of Alabama, Florida, and Georgia. 1995-96.

F.W. Dougherty Engineers, Birmingham, AL. T & E Survey of listed mussels on the Cahaba River NE of Birmingham for pipeline construction purposes. 1998.

Summit, Inc. Geological and Environmental Consulting. Continuing Contract. Surveyed several proposed pipeline creek crossings for T & E aquatic organisms (listed fish and mussels). Surveyed several pipeline sites for T & E vascular plants. Conducted several wetlands delineations. 1998-present.

Burgreen Construction, Inc. Wetland assessment and delineation. 1999.

Weston, Roy F., Inc., West Chester, PA. Threatened and endangered species biological survey For listed mussels in Tennessee River near Decatur, Alabama. 2000.

Martin Marietta, Auburn, AL. Stream T & E Survey for listed mussel species and water quality. 2000-2001.

Gremminger and Associates, Victoria, TX. T & E Survey listed fish and mussels for 14 proposed gas pipeline crossings. 2000-2001.

Summit, Inc. Geological and Environmental Consulting. T & E Survey for listed mussels and fish. 2000-2001.

Burgreen Construction, Inc. Wetland assessment and delineation. 2001.

Christian and Small, LLP, Birmingham, AL. Lake survey for water quality. Served as expert consultant. 2001-present.

Western Consulting Group, Evergreen, CO. T & E survey in Talledega and Coosa counties, Alabama. 2001-present.

Lamar County, Alabama. T & E survey for mussels in Lamar County for bridge replacement. 2002.

Madison County, Alabama. T & E survey for mussels and fish in Madison County for bridge replacements. 2002.

Murphree Bridge Corporation, AL. T&E survey for mussels in Tuskeegee, AL., for bridge replacement. 2002.

Russellville Sewer and Water Board, Russellville, AL. Wetlands survey for pipeline project. 2002.

E.R. Alley and Associates, Nashville, TN. Wetlands survey. 2002.

Morgan County Engineers, Morgan County, AL. T & E survey for listed fish and mussels. 2003

Alabama-Tombigbee Rivers Coalition; Review of proposed listing of critical habitat for federally listed mussels in the Alabama-Tombigee River drainage. 2003-present

Planning Committee of the Florence City Council, City of Florence. Environmental consultant for the development of the Eddie Frost Commerce Park. 2003-present

E. R. Alley and Associates, Muscle Shoals, AL. Wetlands Survey. November 2004.

Lamar County Commission, Vernon, Lamar County, AL. and Hankins and Reed Civil Engineers. T & E survey for Bald Eagles and Red-Cockaded Woodpeckers. February 2005.

Catoma Contracting Co., Cullman, Cullman County, AL. Wetlands determination. February 2005.

White, Lynn, Collins and Associate, Inc. Threatened and endangered species survey in Colbert County. April 2005.

E. R. Alley and Associates, Muscle Shoals, AL. T & E survey for Red-Cockaded Woodpeckers. February 2005.

Balch and Bingham, Birmingham, AL. Contributions to the Alabama Power Company's Pre-hearing Disclosure, EMC Docket No, 05-14.

Uppacreek Enterprises, Moutlon, AL. T & E Survey for Purple Bankclimber in Lee County, AL. June 2006.

Balch and Bingham, Birmingham, AL. ACF Critical Habitat Review. 2006.

Morgan County Engineers, Morgan County, AL. T & E survey for listed plants. February 2007.

Bear Branch, LLC. Botanical Assessment, Bankhead National Forest. May 2007.

Alabama Department of Transportation. T & E Survey. Baker Branch, Walker Co., AL. bridge replacement. May 2007.

Alabama Department of Transportation. T & E Survey. Kelly Creek Highway 231 crossing. May 2007.

Alabama Department of Transportation. T & E Survey. Fayette Co., AL Deadwater Creek bridge replacement. May 2007.

Thompson Engineering. Hill Property T & E Survey and Wetland Delineation. June 2007.

Thompson Engineering. Lauderdale County Landfill. T & E Survey and Wetland Delineation. June 2007.

Alabama Department of Transportation. T & E Survey. Locust Fork Highway 78 crossing. June 2007.

Limestone County, AL. T & E Survey. Piney Creek. August 2007.

Alabama Department of Transportation. T & E Survey. Little Cahaba bridge replacement crossing. August 2007.

Alabama Department of Transportation. T & E Survey. Madison County, AL. Corridor X Flint River crossing. September 2007.

CH2M Hill Consulting, Atlanta, GA. Colonial Pipeline Project, Talladega National Forest. September 2007.

Thompson Engineering. APAC Project. T & E Survey and Wetland Delineation. December 2007.

Tuscaloosa County, AL. County road bridge project. T & E Survey. December 2007.

Thompson Engineering. APAC Project. T & E Survey and Wetland Delineation. January 2008.

Thompson Engineering. Lauderdale County Landfill. T & E Survey and Wetland Delineation. January 2008.

Balch and Bingham, Birmingham, AL. Alabama Power Company's ACF Water Wars Review and Consultation. September 2007-present.

Wheeler Pointe, LLC, Wetland Mitigation Bank. Wetland consulting. June 2007- present.

Teaching Experience:

General Biology I and II
Introductory Zoology I and II
Invertebrate Zoology
General Ecology
Marine Ecology
Aquatic Ecology
Tropical Marine Ecosystems
Human Anatomy and Physiology
Comparative Anatomy of Vertebrates
Histology
Animal Physiology
Biochemistry
Marine Behavioral Ecology

Publications:

Richardson, T. D. and J. Selby. 2008. Downstream Intrabasin Range Extension for Endangered Plicate Rocksnail, *Leptoxis plicata* (Conrad) (Gastropoda: Pleuroceridae). Submitted to Southeastern Naturalist.

Yost, M. C., L. M. Pote (Mississippi Sate University), D. J. Wise, B. S. Dorr (USDA) and T. D. Richardson. 2008. *Biomphalaria havanensis* identified as a potential intermediate host for the digenetic trematode *Bolbophorus damnificus*. *In press* North American Journal of Aquaculture.

Smith, G.A. and T.D. Richardson. Population dynamics of *Viviparus georgianus* in a temporary wetland. In revision for Southeastern Naturalist.

Brown, K. M. and T. D. Richardson. 2004. Intraspecific variation in life history and secondary production of an intertidal predator, the southern oyster drill, *Stramonita haemastoma.* Journal of Shellfish Research 23: 149-155.

Nichols, A., T. Murray, and T. Richardson. 2002. Mercury Accumulation in Catfish from the Southwestern Tennessee River Valley. Southeastern Naturalist 1(2):159-168.

Benke, A. C., G. M. Ward, and T. D. Richardson. 1999. Beaver-impounded wetlands of the southeastern coastal plain: habitat-specific composition and dynamics of invertebrates. *In* D. Batzer, R. Rader, and S. Wissinger, eds., *Invertebrates in freshwater wetlands of North America.* John Wiley and Sons, Inc., New York. 1100 pp.

McGregor, S. W., T. E. Shepard, T. D. Richardson, and J. F. Fitzpatrick. 1999. A survey of the primary tributaries of the Alabama and lower Tombigbee rivers for freshwater mussels, snails, and crayfish. Circular 196. Alabama Geological Survey, Tuscaloosa, AL.

Richardson, T.D., and P. Yokley. 1996. A Note on Sampling Technique and Evidence of Recruitment in Freshwater Mussels (Unionidae). Archiv für Hydrobiologie 137:135-140.

Painter, M., K. Tennessen, and T.D. Richardson. 1996. Repeated application of B. t. i. to a mosquito predator, *Erythemis simplicollis* (Odonata: Libellulidae), from hatching to final instar. Environmental Entomology 25: 184-191.

Richardson, T. D. and J. F. Scheiring. 1994. Natural history of two coexisting lotic snails (Pleuroceridae: *Elimia*). Veliger 37: 284-289.

Richardson, T. D. and K. M. Brown. 1992. Predation risk and feeding in an intertidal predatory snail. J. Exp. Mar. Biol. Ecol. 163:169-182.

Stewart, A. J. and T. D. Richardson. 1992. Toxicity Monitoring. In M. G. Ryon, (ed.),

Ecological effects of contaminants in McCoy Branch, 1989-1990, ORNL/TM-11926. Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Brown, K. M. and T. D. Richardson. 1992. Phenotypic plasticity in the life histories and production of two warm-temperate viviparid prosobranchs. Veliger 35:1-11.

Richardson, T. D. and K. M. Brown. 1990. Wave exposure and prey size selection in an intertidal predator. J. Exp. Mar. Biol. Ecol. 142: 105-120.

Richardson, T. D. 1990. Factors affecting the foraging ecology of the rock snail, *Stramonita haemastoma*. Ph.D. dissertation, Louisiana State University.

Richardson, T. D. and K. M. Brown. 1989. Secondary production of two subtropical snails (Prosobranchia: Viviparidae). J. N. Amer. Benthol. Soc. 8:229-236.

Brown, K. M., D. E. Varza, and T. D. Richardson. 1989. The life histories and population dynamics of two subtropical snails (Prosobranchia: Viviparidae). J. N. Amer. Benthol. Soc. 8:222-228.

Richardson, T. D., J. F. Scheiring, and K. M. Brown. 1988. Secondary production of two lotic snails (Pleuroceridae: *Elimia*). J. N. Amer. Benthol. Soc. 7(3): 234-245.

Brown, K. M. and T. D. Richardson. 1988. Genetic polymorphism in gastropods: a comparison of methods and habitat scales. Amer. Mala. Bull. 6(1): 9-17.

Brown, K. M. and T. D. Richardson. 1987. Foraging Ecology of the Southern Oyster drill, *Thais haemastoma*: constraints on prey choice. J. Exp. Mar. Biol. Ecol. 114: 123-141.

Stock, M., T. D. Richardson, and A. K. Ward. 1987. Distribution and primary productivity of the epizoic macroalga *Boldia erythrosiphon* (Rhodophyta) in a small Alabama stream. J. N. Amer. Benthol. Soc. 6(3): 168-174.

Richardson, T. D. 1986. Life histories and secondary production of two coexisting pleurocerid snails. M.S. Thesis, University of Alabama.

Invited Seminars and Workshops:

Richardson, T. D. 2008. Foraging ecology of the Caribbean spiny lobster: studies in Belize and the Florida Keys. Audubon Society.

Cengage Publishing Company. 2008. Freshman textbook author workshop. San Francisco, CA.

Richardson, T. D. 2007. Foraging ecology of the Caribbean spiny lobster: studies in Belize and

the Florida Keys. UNA Faculty Brown Bag Seminar.

Richardson, T. D. 2007. Caribbean coral reefs: biology and ecology. SEAS scuba club in Huntsville, AL.

Richardson, T. D. 2004. Marine Biology as a Career Choice. Berry Elementary School, Berry, AL.

Thompson Publishing Company. Freshamn textbook workshop. San Diego, CA.

Richardson, T. D. 1996. Endangered Species Act: The Science and the Peer-review Process. Environmental Science Graduate Program, Samford University.

Richardson, T. D. 1993. The invasion of zebra mussels and the destruction of wetlands: Is there a problem? National Geography Awareness Week, University of North Alabama.

Richardson T. D. 1993. Biotic and abiotic factors affecting optimal foraging behavior of aquatic invertebrates. University of Alabama, Aquatic Biology Section

Richardson T. D. 1990. Life history and secondary production of two coexisting subtropical snails. Oak Ridge National Laboratory, Environmental Science Division.

Abstracts and Oral Presentations:

*Isbell, A. D. and T. D. Richardson. 2008. Risk of mandibular damage in Caribbean spiny lobster, *Panulirus argus*, when foraging on dwarf ceriths, *Cerithium lutosum*. In press, Southeastern Biology, 55.

*McDonald, A. M. and T. D. Richardson. 2008. Prey profitability of Caribbean spiny lobster, *Panulirus argus*, when foraging on dwarf cerithid snail, *Cerithium lutosum*. In press, Southeastern Biology, 55.

Richardson, T. D. and J. Selby. 2008. Intrabasin range extensions for two federally endangered snails, Tulotoma magnifica and Leptoxis plicata. In press, Southeastern Biology, 55.

*Sweda, M. T. and T. D. Richardson. 2008. Prey size selection in Caribbean spiny lobster, *Panulirus argus*, when foraging on dwarf cerithid snail, *Cerithium lutosum*. In press, Southeastern Biology, 55.

Richardson, T. D. and R. C. Thigpen III (Appalachian State University). 2007. Prey size selection in juvenile Caribbean spiny lobster, *Panulirus argus.* Southeastern Biology 54.

*Foronda, Josh and T. Richardson. 2006. Foraging behavior of the Caribbean spiny lobster, *Panulirus argus*. Southeastern Biology 53: 250.

*Bone-Stickland, S., T. Richardson, and F. Romano. 2001. The aestivation physiology of a prosobranch snail, *Viviparus georgianus.* Assoc. Southeast. Biol. 48. Abstract and talk.

*Bone-Stickland, S., T. Richardson, and F. Romano. 2000. The aestivation ecology of a prosobranch snail, *Viviparus georgianus.* Assoc. Southeast. Biol. 47: 149. Abstract and talk.

*Hooker, V. E. and T. D. Richardson. 1999. A life history comparison of *Viviparus georgianus* found in a temporary riparian wetland and a permanent stream. Assoc. Southeast. Biol. 46: 141. Abstract and talk.

*Smith, G. A. and T. D. Richardson. 1998. Population dynamics of *Viviparus subpurpureus* in a temporary riparian wetland. Assoc. Southeast. Biol. 45: 107. Abstract and talk.

Richardson, T. D. 1994. A comparison of sanctuary and non-sanctuary populations of *Fusconaia ebena*, a commercially important bivalve. Bull. N. Amer. Benthol. Soc. 11:194. Abstract and poster.

Richardson, T. D. 1991. Predation risk and feeding in an intertidal predatory snail. Bull. Assoc. Southeast. Biol. 38: 118-119. Abstract and talk.

Richardson, T. D. and A. D. Rosemond. 1991. Food selection in a lotic generalist: effects of nutrient additions on snail foraging behavior. Bull. N. Amer. Benthol. Soc. 8:96. Abstract and talk.

Hinzman, R. L., T. D. Richardson, and A. J. Stewart. 1991. Effects of suspended solids on the feeding rate of a lotic snail. Bull. N. Amer. Benthol. Soc. 8: 95. Abstract and talk.

Richardson, T. D. and K. M. Brown. 1990. Wave exposure and prey size selection in an intertidal predator. Abstract and poster at the Benthic Ecology Meetings.

Richardson, T. D. and K. M. Brown. 1989. Secondary production of two subtropical viviparid snails: maximum and minimum estimates. Bull. Assoc. Southeast. Biol. 36(2): 110. Abstract and talk.

Richardson, T. D. and K. M. Brown. 1989. Causes of intraspecific life history variation in two stream detritivores. Bull. N. Amer. Benthol. Soc. 6(1): 139. Abstract and talk.

Richardson, T. D., E. S. Haight, and K. M. Brown. 1988. Secondary production of two detritivorous viviparid gastropods in a subtropical stream. Bull. N. Amer. Benthol. Soc. 5(1): 73. Abstract and talk.

Richardson, T. D. and J. F. Siebenaller. 1988. Levels of aerobic and anaerobic enzyme activities in two populations of the Southern Oyster Drill, *Thais haemastoma*. Bull. Assoc. Southeast. Biol. 35(2): 52-53. Abstract and talk.

Brown, K. M. and T. D. Richardson. 1987. The effect of predator size and density on the foraging ecology of *Thais haemastoma*. Bull. Assoc. Southeast. Biol. 34: 121. Abstract.

Brown, K. M. and T. D. Richardson. 1987. Foraging ecology of oyster predators along the Louisiana coast. Estuarine Research Federation Annual Meeting. Abstract and poster.

Richardson, T. D. and J. F. Scheiring. 1987. Secondary production dynamics of two lotic gastropods. Bull. Ecolog. Soc. of Amer. 68:398. Abstract and talk.

Richardson, T. D. and J. F. Scheiring. 1987. Life histories of *Elimia clara* and *E. cahawbensis* (Gastropoda: Pleuroceridae). Bull. Assoc. Southeast. Biol. 34:121. Abstract and talk.

Richardson, T. D., and M. Stock. 1986. The differential occurrence of an epizoic red alga on the stream snails, *Elimia clara* and *E. cahawbensis*. Bull. Assoc. Southeast. Biol. 33: 89. Abstract and talk.

Richardson, T. D. and J. F. Scheiring. 1986. Population regulation of the lotic gastropod *Elimia cahawbensis* (Pleuroceridae) by trematodes. Bull. N. Amer. Benthol. Soc. 3: 96. Abstract and talk.

Scheiring, J. F. and T. D. Richardson. 1986. Factors affecting the distribution of insects in low order streams with different geologies. Bull. N. Amer. Benthol. Soc. 3: 105. Abstract.

* Student presentations.

Professional Societies and Service:

Association of Southeastern Biologists—member 1982-present.
Association of Southeastern Biologists—served on Student Awards Committee, Poster Awards Committee, Executive Committee Member-at-Large, Secretary 2000-2006, Associate Editor 2000-2006, Web Editor 2003-2006.

Ecological Society of America—member 1985-2006.
North American Benthological Society—member 1985-2006.

From: James Emery
Sent: Friday, January 29, 2016 3:54 PM
To: ACF-WCM
Subject: [EXTERNAL] ATTN: PD-EI (ACF-DEIS)

Please accept my sincere appreciation for the effort put forth by the US Army Corps of Engineers to analyze closely the operations of the ACF basin, its flows and its impacts on reservoirs such as West Point Lake. In response to your request to the draft Water Control Manual and Environmental Impact Statement, please accept these comments as part of your review and edit process.

First, West Point Lake is a 25,684 acre mainstream Chattahoochee River impoundment that was identified by the US Congress as a ***recreational demonstration project*** and has been in existence since 1974. The Lake was authorized by Congress for five purposes: 1) flood control, 2) general recreation, 3) sport fishing and wildlife development 4) hydroelectric power and 5) navigation. ***These five authorizations should be weighted heavily in the Corps operation of the ACF system.*** A

The recreational impact level of West Point Lake is 632.5. As indicated in the PAA of your proposed manual, West Point Lake would be expected to be at or above 632.5 elevation only 40% of a given year. More likely, West Point Lake would be expected to be at Zone 2 or even Zone 3. This means West Point Lake would not be able to meet its authorized purposes for at least 60% of the year. In 1989, the Corps raised the winter pool rule curve from 625 to 628 which indicates the Corps' authority to make another similar change. Therefore, I strongly ***recommend the Corps raise the winter pool rule curve from 628 to 632.5.*** B

In contrast, Lake Lanier is projected (by your operational manual) to fall below its recreational impact level only 27% for any given period of time. In the PAA, the Corps has proposed the minimum elevation of Lake Lanier will be 1050 even during the most extreme drought events. At this level, there remains 15 feet of active storage in the conservation pool. ***Logically, the Corps should also adopt the same standard for West Point Lake*** (626.5) even in extreme drought. While I understand the water supply of metropolitan Atlanta is critical, this focus is placed ahead of all other authorized purposes, stakeholder needs, and competing uses - even ahead of environmental needs of the basin. To further reinforce the WSSA importance, the Corps not only evaluates the current water supply needs and criteria but also expands their analysis to include the water supply demands as far into the future as 2040. No other authorized purpose, stakeholder need or environmental impact is evaluated with this timeframe in mind. ***This defies the stated collective intent to "balance all of the resources" in the basin.*** C

The stakeholders from West Point Lake, Lake Lanier and others across the states of Alabama, Florida and Georgia were able to balance the needs of the system through the work of the ACF Stakeholders. Beginning in 2009, the ACF Stakeholders came to consensus with a set a recommendations that weighs all of the needs and wants throughout the system. As noted in the recommendations, the increased storage of water in West Point Lake was viewed as a necessary action, especially during periods of drought. ***I strongly recommend the Corps review and adopt the Sustainable Water Management Plan of the ACF Stakeholders.*** D

Lastly, in regards to West Point Lake's authorization for flood control, I appreciate the efforts of the Corps to mitigate flood events in the City of West Point and other downstream communities, even during historic floods of record (September 2009). Our community's scientific modeling of your operations since physical changes to the City's landscape were made have shown that releases of 50,000 cfs or below will cause little or no damage downstream. However, the draft manual references releases of only 40,000 cfs in the river below the dam and does not account for early release of water in anticipation of significant rain events. Proposed raised winter pool rule curve of West Point Lake will not subject the City of West Point or other downstream E

Response to ACF237 – James Emery

A. According to the Master Plan for West Point Lake, dated April 1981, West Point Lake was identified in November 1973 by the Chief of Engineers for development as a recreation demonstration project. The Master Plan also states that this designation meant that a wider variety of recreational facilities and opportunities were made available to the public than was normally provided at USACE reservoir projects. The Master Plan recognizes that the reservoir levels would vary on a seasonal basis in accordance with the project's guide curve. The USACE projects in the ACF Basin, including West Point Dam and Lake, are operated to fulfill all federally authorized purposes in a balanced manner. This comment, however, does not include all of the authorized purposes for the project.

B. The draft EIS considered raising the winter guide curve at West Point Lake as described in section 4.1.3.1.1. An analysis of the effects of raising the winter guide curve concluded that such a change would likely increase the flood risk downstream of the project. Accordingly, the options for changing the guide curve for West Point Lake were eliminated from further consideration.

C. The Buford Dam's entire conservation pool from elevation 1,035 ft to 1,071 ft is available to fulfill authorized project purposes. There is no intent to limit the reservoir drawdown to elevation 1,050 ft. Modeling of the 73-year historic hydrologic period indicated that the reservoir would be drawn down to approximately 1,050 ft, but under more severe drought conditions the reservoir elevation will likely be lower. USACE took into account that West Point and Walter F. George lakes are more likely to refill each year than is Lake Lanier because of reservoir inflow and precipitation. The watershed area that contributes to West Point and Walter F. George lakes is greater than the area contributing to Lake Lanier. The amount of annual precipitation also is greater in the more southerly portions of the ACF Basin. The revised action zones achieve the objectives of putting the greater burden of the system demands on the lower two reservoirs when in the upper action zones and on Lake Lanier when the system reaches drought operation. During extreme droughts similar to those in 2007–2009, there are times when system demands will be met exclusively by storage releases from the Buford Dam.
The purpose of the EIS is to support the update to the WCMs in determining how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws, and to implement those operations through updated water control plans and manuals. Because of the 11th Circuit Court ruling of June 2011 and the USACE legal opinion in 2012, updating the water control plans and manuals includes making a decision on Georgia's water supply request. Accordingly, this EIS considers not only operations for all authorized purposes, but also an expanded range of water supply alternatives associated with the Buford Dam/Lake Lanier project, including current levels of water supply withdrawals and additional amounts that Georgia in 2015 requested from Lake Lanier and downstream for Metro Atlanta. Forecasting water demands for parts of the ACF Basin other than Metro Atlanta is outside the scope of Master WCM update process and this EIS.

D. The ACF Stakeholder's sustainable water management plan (SWMP) was received by USACE in early June 2015. USACE received the report and its recommendations too late to be fully evaluated and considered in the draft EIS. Further, the SWMP, as initially submitted to USACE, did not include the necessary supporting technical documentation and underlying assumptions to fully evaluate the recommended management measures. The SWMP recommendations were considered to the extent possible in the final EIS.

E. Flood risk management operations at West Point Dam are described in section 7-05 of the WCM for West Point Dam and Lake (appendix E to appendix A of the EIS). The prime objective of the operations at the West Point project is to reduce peak flows at West Point, Georgia, based on the downstream U.S. Geological Survey (USGS) gage—Chattahoochee River at West Point, Georgia (no. 02339500). That objective is achieved by regulating releases to maintain the USGS gage within the nondamaging bankfull flow of 40,000 cfs until the induced surcharge schedule calls for greater release. Releases are then made to maintain flows within the bankfull capacity of 40,000 cfs until the induced surcharge schedule calls for an increase in the releases. Releases made under induced surcharge operations could result in downstream flows in excess of 40,000 cfs, depending in the

communities to any additional flood risk provided that the Corps continues to ***release water at 50,000 cfs or below and adapts to anticipated inflow.***

In conclusion, I respectfully request the US Army Corps of Engineers revise the proposed Water Control Manual and Draft Environmental Impact Statement as follows: 1) prioritize original Congressionally authorized purposes ahead of all other stakeholder needs, 2) raise the winter pool rule curve of West Point Lake from 628 to 632.5; 3) adopt the same drought management standards for West Point Lake as set for Lake Lanier to balance the water across the system; 4) review and incorporate the recommendations in the Sustainable Water Management Plan of the ACF Stakeholders, and 5) mitigate the flood risk to the City of West Point and other downstream communities through the release of no more than 50,000 cfs below West Point Dam and adapt to anticipated inflow. F

James R. Emery, Jr., P.E., County Engineer
Troup County Board of Commissioners
100 Sam Walker Drive
LaGrange, Georgia 30241

Response to ACF237 – James Emery

rate of inflow. The induced surcharge operation can cause a damage-inducing release, but it is designed to maximize the flood benefit as much as possible while giving consideration to the integrity of the dam. There should never be an induced surcharge release greater than the current 3-hour average inflow. The West Point project was designed to provide protection from small-to-moderate-sized floods. In the event of an extreme flood, West Point Lake would exhaust its flood storage and pass all inflows as prescribed in the induced surcharge schedule.

F. See responses to comments A-E

From: Shelly Ellerhorst
Sent: Saturday, January 30, 2016 6:37 AM
To: ACF-WCM
Subject: [EXTERNAL] Comments of the State of Georgia: Apalachicola-Chattahoochee-Flint River Basin Water Control Manual and Draft Environmental Impact Statement (October 2015)
Attachments: 20160129 ACF WCM Comment Letter from EPD.pdf; EXHIBIT F Technical Memo.pdf

Colonel Chytka,

Attached please find (1) the comments of the State of Georgia on the Apalachicola-Chattahoochee-Flint River Basin Water Control Manual and Draft Environmental Impact Statement (October 2015); and (2) a memorandum from Wei Zeng, Ph.D., Manager, Hydrology Unit, Georgia Environmental Protection Division, to Judson Turner, Director, Georgia Environmental Protection Division, regarding Technical Evaluation of Georgia's 2015 Update Water Supply Request and Comments on the Army Corps of Engineers Apalachicola-Chattahoochee-Flint (ACF) River Basin Water Control Manual Draft Environmental Impact Statement. Both documents, along with all of the exhibits and appendices, were sent out yesterday in hard copy to your attention for Monday delivery.

Please do not hesitate to contact me with any questions.

Sincerely,
Shelly Jacobs Ellerhorst

Shelly Jacobs Ellerhorst
KAZMAREK MOWREY CLOUD LASETER LLP
1230 Peachtree Street, Suite 3600

NOTICE: This message (including any attachments) from Kazmarek Mowrey Cloud Laseter LLP may constitute an attorney-client communication and may contain information that is PRIVILEGED and CONFIDENTIAL and/or ATTORNEY WORK PRODUCT. If you are not an intended recipient, you are hereby notified that any dissemination of this message is strictly prohibited. If you have received this message in error, please do not read, copy or forward this message. Please permanently delete all copies and any attachments and notify the sender immediately via e-mail or by phone (404-333-0748).

Georgia Department of Natural Resources
Environmental Protection Division
2 Martin Luther King Jr., Drive, Suite 1152 East Tower, Atlanta, Georgia 30334
Judson H. Turner, Director
(404) 656-4713

January 29, 2016

Via U.S. Mail and Electronic Mail
Colonel Jon J. Chytka
District Commander
Mobile District, U.S. Army Corps of Engineers
P.O. Box 2288
Mobile, Alabama 36628

Re: Apalachicola-Chattahoochee-Flint River Basin
Water Control Manual and Draft Environmental Impact Statement (October 2015)
COMMENTS OF THE STATE OF GEORGIA

Dear Colonel Chytka:

In response to the Federal Register Notice of October 2, 2015 (80 Fed. Reg. 59,741), the State of Georgia submits the following comments regarding the U.S. Army Corps of Engineers ("Corps") Water Control Manual ("WCM") and Draft Environmental Impact Statement ("DEIS"), including the Water Supply Storage Assessment Report attached in Volume III as Appendix B (the "WSSAR"), for the Apalachicola-Chattahoochee-Flint River Basin ("ACF Basin").

I. Introduction

Waters within the ACF Basin are critical to the environmental, economic, and social well-being of the citizens of the State of Georgia. The ACF Basin encompasses 20,000 square miles. Approximately 74% of the drainage area of the ACF Basin is in Georgia (15% is in Alabama, and 11% is in Florida), and the ACF Basin covers 50 counties in Georgia (eight in Florida and ten in Alabama). Approximately 72% of the Basin's population resides in Georgia. The State of Georgia's economic output exceeds $400 billion, with metro Atlanta accounting for $270 billion of that amount.

The main stems of the Apalachicola, Chattahoochee, and Flint Rivers house 16 projects (five federal and 11 non-federal). Uses for the rivers and impoundments within the ACF Basin include water supply, hydropower generation, recreation, flood control, agriculture, and environmental amenities and protection, among others. Water supply is a particularly critical function of the rivers and impoundments within the ACF Basin. The population of metro Atlanta (nearly 5.5 million) derives approximately 73% of its water supply from Lake Lanier and the Chattahoochee River. The population of Gwinnett County (approximately 860,000) relies entirely on withdrawals from Lake Lanier. Counties that rely on Lake Lanier for water supply comprise the majority of the population for the Atlanta Metropolitan Statistical Area ("MSA") which, according to the U.S. Census Bureau, is the ninth largest MSA by population in the United States. From 2000 to 2010, the Atlanta MSA grew by 24%, a growth rate exceeded by only two other MSA's in the United States.

Because the ACF Basin is critical to Georgia, commenting throughout the WCM update process has also been critical to Georgia. On January 14, 2013, Georgia submitted comments on the Corps Scoping Memorandum for the Draft EIS for the ACF Basin. Letter from Judson Turner, Director, Georgia Environmental Protection Division, to Tetra-Tech, Inc., regarding State of Georgia's comments on the ACF WCM scoping (Jan. 14, 2013) ("Georgia Scoping Comments," **Exhibit A**). As the Georgia Scoping Comments made clear, in addition to evaluation of Georgia's water supply request (then an estimated 408 mgd from the Chattahoochee River and 297 mgd by direct withdrawal from Lake Lanier), the Draft EIS must fully and completely evaluate the economic, environmental, and social impacts of failing to supply those requested amounts, as well as the economic, environmental, and social impacts of the alternatives that Georgia will be forced to implement if the requested amounts are not available.

At about the same time, on January 11, 2013, the State of Georgia submitted an updated water supply request, providing its estimate of water supply needs from the ACF Basin. Letter from Nathan

Deal, Governor, State of Georgia, to Jo-Ellen Darcy, Assistant Secretary of the Army for Civil Works, regarding State of Georgia's Water Supply Request (Jan. 11, 2013) (the "2013 Request," **Exhibit B**). It is the 2013 Request upon which the Corps based its analysis in the DEIS, although for the reasons stated below, the 2013 Request has been updated by a December 4, 2015 request. Letter from Judson Turner, Director, Georgia Environmental Protection Division, to Col. Jon Chytka, District Commander, Mobile District, U.S. Army Corps of Engineers, regarding State of Georgia's Water Supply Request (Dec. 4, 2015) (the "2015 Request," **Exhibit C**).

In February 2014, the Corps asked Georgia for further information on water supply alternatives, particularly those measures identified by the Governor's Water Contingency Task Force. In response to this request, on May 30, 2014, Georgia provided the Corps with an analysis of the extent of potential alternatives to increased withdrawals from Lake Lanier. Letter from Judson Turner, Director, Georgia Environmental Protection Division, to Col. Jon Chytka, District Commander, Mobile District, U.S. Army Corps of Engineers, providing additional information on 2013 Request (May 30, 2014) (the "Georgia Alternatives Analysis," **Exhibit D**). As that analysis made clear, Lake Lanier is by far the most cost-effective and environmentally protective alternative for the supply of water to those metro governments located around and in proximity to it.

In 2015, after submitting the Georgia Alternatives Analysis, the State received revised population projections and updated per capita water use figures. As a result, Georgia submitted the 2015 Request to the Corps. The 2015 Request reduces the request for withdrawals from Lake Lanier to 242 mgd (down from 297 mgd) and from the Chattahoochee River to 355 to 379 mgd (down from 408 mgd). The effect of the 2015 Request is discussed below.

The revised estimates were based, in part, on the success of Georgia's water conservation initiatives. Recognizing both the critical nature of water supply to the economy of Georgia and the

limited availability of that resource, the State has implemented one of the most aggressive and effective water conservation programs in the country. Consequently, per capita water use declined 30 percent from 2000 to 2015, and total water consumption within the metro Atlanta area declined over 10 percent despite a 20 percent increase in population. The Final EIS, including the WSSAR, should address and respond to the 2015 Request as it contains the most recent and best available water use information.

In the sections that follow, Georgia details two areas that the Corps should address in the Final EIS and WCM. First, Georgia discusses the water supply considerations of the DEIS, including the WSSAR. As is shown below, the Corps can fully meet the 2015 Request because the impacts of the 2015 Request are nearly identical to those the Corps has deemed acceptable in the Proposed Action Alternative (Alternative 7H) ("PAA"). In doing so, the Corps will be abiding by the mandate of the Eleventh Circuit decision. *See In re MDL-1824 Tri-State Water Rights Litigation*, 644 F.3d 1160 (11th Cir. 2011) (per curiam), *cert. denied* 133 S. Ct. 25 (2012). Second, the State addresses several areas of the ACF Basin's proposed water management operations that the Corps should address, including lowering flows at Peachtree Creek during the winter months, modifying its approach to navigation, addressing winter draw-down at West Point Lake, re-evaluating Lake Lanier elevation requirements, using updated information in its Endangered Species analysis, reporting the totality of returns, and properly projecting the effect of conservation measures.

II. The Corps Should Revise the WCM to Provide for Water Supply in the Full Amount of Georgia's 2015 Request.

A. The Corps has the Legal Authority and Factual Basis to Grant All of Georgia's 2015 Request.

The DEIS was prepared, in part, in response to Georgia's 2013 Request. Since that Request was submitted, the Metropolitan North Georgia Water Planning District ("Metro District"), as part of its regular planning process, has updated its water supply projections based on 2015 population and

employment forecasts and recent water use data. In light of these updated numbers, over the weeks and months leading up to the DEIS, the State and Metro District provided information and data to the Corps indicating that the 2013 Request was outdated and would be updated with new, and substantially reduced, demand figures. On December 4, 2015, Georgia submitted the 2015 Request, updating the 2013 Request, extending the planning horizon through the year 2050, and reducing the projected water supply demands.

The 2015 Request reduces the requested amount of water from Lake Lanier from 297 mgd to 242 mgd, and from the Chattahoochee River from 408 mgd to between 355 and 379 mgd. The withdrawals from the River are authorized pursuant to the River and Harbor Act of 1946, Pub. L. No. 79-525 (RHA), thus no contracts with the Corps will be necessary. The Corps has determined that withdrawals from the Lake will occur pursuant to allocations made under the Water Supply Act of 1958, 43 U.S.C. § 390b ("WSA"). Of the total 242 mgd requested from the Lake, however, the Corps is only required to allocate 218.7 mgd to new contracts (208.7 mgd under the WSA and 10 mgd for Gwinnett County under the 1956 Act, Pub. L. No. 84-841). The remaining 23.3 mgd will be provided under the existing relocation contracts for the City of Gainesville and City of Buford.[1]

A

The Corps has both the legal authority and the factual basis to issue a WCM that provides for withdrawals fully meeting the 2015 Request. There are several reasons for this conclusion. First, the Corps has the legal authority to grant the 2015 Request. The question of whether water supply is an authorized purpose of the Buford Project has been litigated and decided. In its 2011 order, the Eleventh Circuit stated that "[t]he language of the RHA clearly indicates that water supply was an authorized purpose of the Buford Project." *Tri-State Water Rights Litigation*, 644 F.3d at 1192. The court further

[1] The City of Buford's relocation contract is for 2 mgd. The City of Gainesville's relocation provides for up to "8,000,000 gallons of water per day from Buford Dam and Reservoir" which has been historically interpreted to mean a net withdrawal of 8 mgd. As provided for in a Supplement to the Relocation Contract, upon execution of a new storage contract, this 8 mgd net withdrawal will become 21.3 mgd.

Responses to ACF238 – Georgia Environmental Protection Division

A. USACE evaluated the updated water demand projections and updated the water supply options analysis in the final EIS.

concluded "that water supply was an authorized purpose of the RHA and that the RHA authorized the Corps to allocate storage in Lake Lanier for water supply storage." *Id*. In that same opinion, the Court ordered the Corps to reconsider its denial of Georgia's then-current 2000 water supply request (the "2000 Request") and provide a timely response.

In response to the Eleventh Circuit's mandate, the Corps prepared a memorandum outlining its authority to grant Georgia's 2000 Request. *See* Memorandum from Earl Stockdale, Chief Counsel, U.S. Army Corps of Engineers, for the Chief of Engineers regarding Authority to Provide for Municipal and Industrial Water Supply from the Buford Dam/Lake Lanier Project, Georgia (June 25, 2012) ("Stockdale III," **Exhibit E**). Stockdale III concluded that "the Corps has the legal authority under the relevant statutes to accommodate Georgia's request." *Id.* at 5. The Corps determined it has this authority because:

> [I]f the Corps were to change its operations of the ACF system to accommodate Georgia's [2000 Request], the changes would not be major, and they would not result in serious effects to project purposes systemwide. In fact, the system would be operated in the manner that Congress expected, to achieve all authorized purposes, and the overall hydropower benefits afforded by those operations would exceed the benefits that Congress anticipated when it authorized the ACF plan of development more than 65 years ago.

Id. at 42.

Second, the water supply quantities in the 2015 Request are well within the bounds of the analysis already undertaken by the Corps in the DEIS. The PAA in the DEIS provides a total of 633 mgd of water, including 185 mgd from Lake Lanier, 40 mgd from a potential Glades Reservoir, and 408 mgd from the Chattahoochee River. DEIS at 6-193, 6-194. Other options considered by the Corps used water withdrawal quantities both higher and lower than those specified in the PAA. Thus, the 2015 Request fits within the range of options considered by the Corps in the DEIS, as shown in the table below:

	Low Value Considered By Corps	High Value Considered By Corps	PAA (Option 7H)	Georgia 2015 Request
Lake Lanier Withdrawals	20 mgd (Options B and C*)	297 mgd (Options D, F, and G)	225 mgd**	242 mgd
Chattahoochee River Withdrawals	277 mgd (Options A and B)	408 mgd (Options C,D,E,F,G, and H)	408 mgd	355-379 mgd

From DEIS Table 5.1-2 at 5-8, and 2015 Request.
* Plus withdrawals of 40 mgd from a potential Glades Reservoir
** Including a withdrawal of 40 mgd from a potential Glades Reservoir

Third, as detailed below in Section II.B, given the volumes specified in the 2015 Request, granting the entire 2015 Request produces nearly identical effects on ACF Basin operations as those accepted by the Corps in the PAA. *See* Memorandum from Wei Zeng, Ph.D., Manager, Hydrology Unit, Georgia Environmental Protection Division, to Judson Turner, Director, Georgia Environmental Protection Division, regarding Technical Evaluation of Georgia's 2015 Update Water Supply Request and Comments on the Army Corps of Engineers Apalachicola-Chattahoochee-Flint (ACF) River Basin Water Control Manual Draft Environmental Impact Statement (Jan. 29, 2016) ("Zeng Memorandum, **Exhibit F**). For example, the PAA modeled impacts with total withdrawals (Lake Lanier and Chattahoochee River) at 633 mgd and determined that the PAA created no consequences that would foreclose its selection.[2] Although the lake-versus-river distribution of the withdrawals under the 2015 Request is somewhat different than that specified under the PAA, the total withdrawal amounts under the 2015 Request is actually 12 mgd *less* than the withdrawal evaluated in the DEIS under the PAA. This is all the more true if the Corps' analysis addresses other water management issues identified herein. Put another way, because the Corps determined a total withdrawal of 633 mgd in the PAA would not have

[2] In addition to impacts considered in the DEIS, there is virtually no impact on flow at Columbus under 2015 Request modelling. *See* Zeng Memorandum at 8.

unacceptable adverse effects, the Corps should be able to determine that it can satisfy the State's 2015 Request for less water.

B. The Corps has No Rational Basis to Grant the PAA Instead of the 2015 Request.

The Corps chose the PAA, including a total of 225 mgd from upstream of Buford Dam (185 mgd from Lake Lanier and 40 mgd from Glades), over the other alternatives evaluated in the DEIS. Because the PAA and the 2015 Request are strikingly similar and produce strikingly similar impacts, there is no rational basis for the Corps to agree to the PAA but not the 2015 Request. The 2015 Request and the PAA present comparably in terms of the total withdrawal amount sought, total returns projected, total consumptive use, and even distribution of the withdrawal, return and consumptive uses. *See* Zeng Memorandum at 3, Table 3. With respect to the area upstream of Buford Dam, the PAA allows for a net withdrawal of 134 mgd (225 mgd gross withdrawal and 91 mgd return rate). The 2015 Request contains a net withdrawal from the Lake of 137.4 mgd (242 mgd gross withdrawal and 104.6 mgd return rate). *Id.* The delta between what the Corps has approved in the PAA upstream of Buford Dam and the 2015 Request is a mere 3.4 mgd net and 17 mgd gross withdrawal. Because the small amount of additional water from upstream of Buford Dam in the 2015 Request does not negatively affect any project purposes or create any additional environmental impacts, the Corps must grant the entirety of the 2015 Request.

In order to evaluate the impacts of the 2015 Request, the State compared the 2015 Request to the PAA in two different scenarios, both focusing on different record drought data. In the first, the State compared the PAA to the 2015 Request using relevant 2011 withdrawal data (the "2011 Comparison") instead of the withdrawal data relied on in the DEIS, referring to each as PAA' and Scenario C, respectively. Zeng Memorandum at 4-5. The epicenter of the 2011 drought was the lower portion of the ACF Basin and resulted in the highest agricultural water use on record. In the second scenario, the State compared the PAA to the 2015 Request using the same withdrawal data as the Corps relied upon in the

B

B. USACE evaluated the updated water demand projections and updated the water supply options analysis in the final EIS.

DEIS, including 2007 municipal and industrial (M&I) withdrawal data (the "2007 Comparison"), referring to each as PAA and Scenario D, respectively. Zeng Memorandum at 5. The 2007 drought had the greatest effects in the upper basin and resulted in one of the highest M&I water uses on record.

Under the 2011 and 2007 Comparisons – both potential worst-case drought years in separate parts of the Basin – the difference between the PAA' and PAA on one side and Scenarios C and D on the other is virtually negligible, and, in some cases, Scenarios C and D produce impacts more beneficial than the PAA' or PAA. *See* Zeng Memorandum at 6-11. This general statement holds true across eight different parameters: (1) average reservoir elevations; (2) minimal reservoir elevations; (3) reservoir elevation duration curves; (4) power generation; (5) recreational impacts; (6) Columbus flow; (7) state line flow; and (8) navigation. *Id.* Because the difference in impacts between the PAA and the 2015 Request is virtually negligible under both scenarios for eight separate ACF Basin parameters, there is no rational basis for granting the PAA instead of the 2015 Request.

C. Allocation of 40 mgd Presently Assigned to the Glades Reservoir Should Remain in Lake Lanier.

The PAA provides that a yet-to-be-constructed or even permitted Glades Reservoir will fulfill part of the State's 2013 Request. Given the revised 2050 needs projections contained in the 2015 Request, it is clear that Glades Reservoir is no longer part of any strategy to meet the water supply needs of the State through 2050.[3] As explained above, because the Corps can grant the entirety of the 2015 Request, including 242 mgd from the Lake, the Corps should not consider water sources outside of the Lake.

[3] Had the State's water supply needs remained at the 2013 Request level (297 from Lake Lanier or something close to that amount), Glades may have remained part of the region's long term water supply strategy. Conversely, had Hall County's, the pending Section 404 permit applicant, population projection through 2050 not decreased as drastically as contained in the new Office of Planning and Budget's projections, there may have remained some additional water supply need for Hall County from Glades Reservoir. Given those two facts, however, the State can say unequivocally that Glades no longer remains part of the region's 2050 water supply strategy.

Because a water-supply Glades is not needed through 2050, the Corps must not assign 40 mgd of the State's water supply request to Glades instead of the Lake. As demonstrated by Georgia EPD hydrologic modeling, the impacts from allocating 40 mgd from Glades compared to an additional 40 mgd from the Lake are virtually identical (i.e., the impacts of allocating 242 mgd from the Lake are nearly identical to the impacts the Corps has already evaluated and accepted in the PAA). *See* Zeng Memorandum at 6-11. The Corps concurs. In the DEIS, Alternatives 7D and 7E both provide for 297 mgd of withdrawals above Buford Dam. The only difference is that in Alternative 7D, all 297 mgd come from Lake Lanier, while Alternative 7E provides 257 mgd from Lake Lanier and 40 mgd from Glades. The DEIS explains that these alternatives are "essentially the same." Draft EIS at 5-26. Based on this alone, the Corps should provide for all 242 mgd to come directly from Lake Lanier.

If, however, the Corps needs an additional reason not to allocate water to Glades, the State asserts that Glades will not be constructed and operated for water supply during the current 2015 Request horizon because it is no longer needed for this purpose. The State is aware of the request from the Savannah District asking Hall County, the current Glades Section 404 permit applicant, to address its current population demand projection in light of the new population numbers. *See* Letter from Richard Morgan, Senior Project Manager, Savannah District, U.S. Army Corps of Engineers, to Richard Mecum, Chairman, Hall County Board of Commissioners, requesting updated Hall County population projection (Dec. 21, 2015) (**Exhibit G**). While the State will be working with Hall County on a revised certification of need, the old certification of need provided by EPD Director Jud Turner on April 9, 2013 is outdated and has been rescinded. Letter from Judson Turner, Director, Georgia Environmental Protection Division, to David Lekson, Chief, Regulatory Division, Savannah District, U.S. Army Corps of Engineers, rescinding prior certification of need (Jan. 22, 2016) (**Exhibit H**).

C

Responses to ACF238 – Georgia Environmental Protection Division

C. USACE evaluated the additional water demand projections and updated the water supply options analysis. Glades Reservoir is no longer being considered as a water supply reservoir given the decertification of the water supply need by the State of Georgia. The final EIS includes the state's 2015 water supply request. USACE evaluated taking 242 mgd directly from Lake Lanier: 20 mgd under the existing relocation contracts and 222 mgd under the 1958 Water Supply Act.

Given Hall County's decreased population and corresponding reduced water supply need, the State was able to account for all of Hall County's projected water supply need through 2050 in the 2015 Request. Given that the Corps can and should meet all of the 2015 Request, there is no outstanding water that would need to come from Glades instead of Lake Lanier. These two points lead to the same inevitable conclusion: there is no need for a water supply Glades through 2050.

If a reservoir in the anticipated Glades location is constructed at all during the current 2050 planning horizon, it will be redesigned[4] and will operate pursuant to a revised Section 404 permit to provide additional basin storage. This additional storage will be used to support downstream needs during times of low flow and drought.[5]

Because a water-supply Glades will not exist, the Corps' allocation of 40 mgd from Glades is unrealistic and would serve to arbitrarily reduce the State's requested water supply allocation by this amount. The Corps is required to evaluate only "reasonable alternatives" (40 C.F.R. § 1502.14(a)) and Glades, as contemplated in the Glades DEIS and the DEIS, is no longer reasonable or even viable. Thus, the Corps cannot use any amount of water from Glades to calculate an allowable allocation of water supply from Lake Lanier. Put another way, the Corps must grant the entirety of the 2015 Request of 242 mgd from the Lake without allocating any of that amount to a reservoir that will not be permitted, constructed or operated for water supply. *See also, N. Buckhead Civic Ass'n v. Skinner*, 903 F.2d 1533, 1541 (11th Cir. 1990) ("consideration need be given only to reasonable, non-speculative alternatives.");

[4] These revised purposes need to be evaluated based on current hydrology, but the State's concept includes storage during high flow times for dispersal downstream during low flow conditions to provide a myriad of benefits, namely support for Lake Lanier and its multiple purposes, including possible downstream environmental flows.

[5] The state recognizes that a facility of the nature described above has not yet been permitted in Georgia and for that type of facility to be permitted in Georgia, extensive work will have to occur pursuant to the revised Partnership Agreement between the State, the Corps, and its federal partners to establish the permitting protocol and parameters to study and, ultimately if justified, permit such a facility.

Utahns for Better Transp. v. U.S. Dep't of Transp., 305 F.3d 1152, 1172 (10th Cir. 2002) ("To be a reasonable alternative, it must be non-speculative.").

D. The Corps Must Correct its Approach To The Calculation of Wastewater Returns.

As discussed above, the Final EIS should analyze whether the Corps can grant the entirety of Georgia's 2015 Request. As part of that analysis, the Corps must use the best available and current data,[6] including the most recent and accurate data related to wastewater return projections. On January 25, 2016, the Metro District released current wastewater return projections stating that 98.96 mgd will be returned to the Lake by the Metro District entities. Memorandum from Katherine Zitsch, Director, Metro District, to Judson Turner, Director, Georgia Environmental Protection Division, regarding Projected Future Treated Wastewater Returns for the Chattahoochee River and Lake Lanier System (Jan. 25, 2016) at 6, Table 3 (**Exhibit I**). EPD projects that another 5.6 mgd will be returned by the upper counties. Zeng Memorandum at 2. The Corps, therefore, should use the Metro District and EPD's wastewater return projections in its Final EIS, as both represent the most accurate data on returns.

The Corps' method of calculating return flows in the DEIS is misdirected. In the 2013 Request, Georgia provided the volume of treated wastewater that the State estimated would be returned to Lake Lanier. The Corps rejected that value and instead developed its own methodology to calculate returns. The fundamental error in the Corps' methodology is that the Corps looked to historical facility utilization rates (namely 58%) and assumed that utilization will remain constant. This is not a reasonable assumption. Rather, standard industry practice dictates that flows are often initially less than the permitted capacity. This results from the fact that municipalities design their facilities looking five, ten,

[6] *See, e.g. Strahan v. Linnon*, 967 F. Supp. 581, 604 (D. Mass. 1997) (the NEPA decision making process "must be based on current data."); *Nw. Ecosystem All. v. Rey*, 380 F. Supp. 2d 1175, 1195 (W.D. Wash. 2005) ("Relying on outdated data or not acknowledging the limitations in a methodology are grounds for setting aside an EIS.").

or even more years into the future. When a new treatment facility is opened, the initial flows may only be a fraction of its design capacity. As the population in the facility's service area grows, the flows coming into the treatment facility necessarily increase. By the end of the design period, flows being treated will begin to approach the treatment facility's permitted capacity. As this occurs, planning and construction begins for new or expanded facilities. The Corps' assumption that utilization will remain constant at 58% over the course of facility operations contradicts general wastewater treatment facility engineering.

D

The Corps then compounds this error by using projected return flows as a basis for calculating permissible withdrawals. Specifically, the Corps stated, "Adding net withdrawals of 134 mgd (a net withdrawal that can be accommodated while satisfying other withdrawals) and returns of 91 mgd (the expected return in 2040) results in a figure of 225 mgd in gross withdrawal that can be supported by some combination of Lake Lanier and Glades Reservoir." DEIS at 5-7. This method of "backing into" permitted water supply withdrawals by adding an artificial return should not form the rationale for something as essential as a region's water supply future. Again, the Corps must use the correct analysis (such as the Metro District's 99 mgd, and the upper counties' 5.6 mgd return flows) in evaluating return flows, and not use inaccurate return flow projections to back into allowable withdrawals.

E. The Corps Failed to Fully Assess the Social, Environmental, and Economic Effects of Failing to Meet Georgia's Water Supply Needs.

As noted in the Georgia Scoping Comments, a failure to fully meet Georgia's water supply needs from Lake Lanier will have substantial adverse consequences within the State, and for that reason the Corps is legally obligated to evaluate the full economic, social, and environmental consequences of failing to meet Georgia's water supply request. Such consequences and costs include loss of jobs,

Responses to ACF238 – Georgia Environmental Protection Division

D. USACE validated the wastewater return rates provided by the State of Georgia. The validated return rates were used to determine impacts and the proposed action.

industry, and limitations on economic growth, on the one hand, and the economic and environmental costs associated with procuring alternative water supplies, on the other.

In the Georgia Alternatives Analysis, the State analyzed a number of alternatives that were theoretically conceivable as sources of water supply, and using the most recent economic data, concluded that "Lake Lanier is by far the most cost-effective and environmentally protective alternative for the supply of water to those metro governments located around and downstream of it." Memorandum from Wei Zeng, Hydrology Unity, to Judson Turner, Director Regarding Response to Corps Request for Additional Information (May 30, 2014), attached to Georgia Alternatives Analysis. Despite this well-reasoned conclusion, the PAA does not grant Georgia the entirety of its 2013 Request from the Lake.

E

The Corps should include the conclusions from and reasoning of the Georgia Alternatives Analysis in the Final EIS, and then either propose a Water Control Manual for Lake Lanier that fully satisfies the 2015 Request or, if that request is not granted in its entirety, fully and completely assess the collective costs of refusing to do so.

F. The Corps Must Abide by the Eleventh Circuit Mandate to Determine How Much of Georgia's Water Supply Request It Can Grant.

As shown above, the State believes the Corps must correct several aspects of the Corps' water supply analysis. Reconsideration along these lines is required by the Eleventh Circuit. In its "Remand Instructions to the Corps," the Eleventh Circuit stated:

> As part of the final, definitive statement of the Corps' water supply analysis, if the agency ultimately concludes that it does not have the authority to grant the Georgia request, it nevertheless should indicate the scope of the authority it thinks it does have, under the RHA, the WSA, and the 1956 Act. This way, the parties will have some further instruction, based on sophisticated analysis, of what the Corps believes to be the limitations on its power.

Tri-State Water Rights Litigation, 644 F.3d at 1201. The DEIS asserts that it can "satisfy a substantial

Responses to ACF238 – Georgia Environmental Protection Division

E. USACE followed current planning and policy guidance and methodology when considering and evaluating water supply reallocations from a multipurpose reservoir.

portion" – but not the entirety – of Georgia's 2013 Request. DEIS at 5-25, 6-193. Since the Corps does not "grant the Georgia request," the Eleventh Circuit requires that the Corps must indicate based on "sophisticated analysis," the amount of Georgia's request that it can grant. *Tri-State Water Rights Litigation*, 644 F.3d at 1201.

The DEIS does not follow the Eleventh Circuit's instructions. Without providing any analysis detailing the Corps' perceived bounds of its authority, the DEIS states that it cannot grant the 2013 Request (combined withdrawals of 705 mgd), but can accommodate withdrawals of 633 mgd as detailed in the PAA. Because the Corps does not explain at which point between 633 mgd and 705 mgd it encounters "limitations on its power," the DEIS is inconsistent with the Eleventh Circuit instructions.

The need to provide this incremental analysis is unnecessary if the Corps grants the entirety of the 2015 Request. If, however, the Corps does not grant the entirety of the 2015 Request, the Corps should provide the Eleventh Circuit's required analysis explaining exactly how many millions of gallons per day, per location, the Corps can allow before it encounters "limitations on its power," and further explain exactly what environmental, hydrologic, or other factors trigger those limitations.

G. The Corps Should Defer to the State on Crediting Return Flows.

The DEIS treats all contributed flows (whether return flows from a wastewater treatment plant or made inflows from a reservoir) in the same manner as all other Lake inflows. Georgia believes that this manner of accounting for return flows is bad policy and an intrusion on its state water rights.

Subject to an allocation by the State, entities that contribute flows to a federal project should receive full credit for the flow, such that withdrawals of such volumes are not debited against the contributor's storage account. Treating contributed flows in this manner not only has no adverse effect on the overall project, but also reflects sound policy in that a refusal to treat contributed flows in this manner significantly lessens the incentive for entities to build storage projects, construct water

Responses to ACF238 – Georgia Environmental Protection Division

F. The Water Supply Act of 1958 is a discretionary authority. In the Master WCM update, USACE committed to examining the state's request. The purpose was not to determine the limits of its water supply authority at Lake Lanier.

reclamation facilities, and otherwise engage in environmentally sound water management practices. Return flows to reservoirs increase the yield of the reservoir by reducing the net withdrawals. As a result, return flows keep reservoir levels higher and mitigate the impact of water supply withdrawals. Return flows to reservoirs are a form of water reuse that Georgia's state-wide water plan favors. The Corps cannot expect billions of dollars to be spent developing infrastructure to generate these return flows if the Corps declines to credit them to the storage account of the entity responsible for the return of that wastewater (or the made inflow as the case may be), and instead simply transfers the benefits they provide to other users.

In addition, the Corp's treatment of return flows in the DEIS is an intrusion on the State's right to allocate water. The Corps has long acknowledged that while federal projects provide storage space for water, it is the states that allocate the rights to the water. Georgia has a rule discussing this specific issue and acknowledging the balance between state and federal rights:

G

> When a user has contracted for the right to utilize storage space within a reservoir that is owned or operated by an agency of the federal government, the Director shall retain authority to allocate any State water rights subject to regulation under O.C.G.A §12-5-31, including the right to withdraw State waters from the project as well as the right to impound made inflow to the reservoir. When the Director allocates to a specific user made inflows to a reservoir, pursuant to the permitting authority and procedure provided by O.C.G.A. §12-5-31, that user will have the right to impound such flows in the storage space for which it has contracted, to the extent storage space is available.

Ga. Comp. R & Regs. 361-3-6-.07(16).

The State has previously exercised this authority by allocating return flows to Allatoona Lake, located in the Alabama-Coosa-Tallapoosa Basin, to the Cobb County-Marietta Water Authority.[7] The State plans to make a similar allocation at Lake Lanier once a storage contract or contracts are executed.

[7] *See* Georgia EPD Permit No. 008-1491-05 (Modified November 7, 2014).

Responses to ACF238 – Georgia Environmental Protection Division

G. USACE continues to recognize the state's right to allocate water rights. Storage in a USACE reservoir, however, requires application of federal law, regulations, policy, and practice. USACE's practice is to consider all return flows as basin inflow. Any change to that practice should occur at the national level and is currently under consideration by the Assistant Secretary of the Army for Civil Works.

The best way for the Corps to abide by the state versus federal balance is for the Corps to include in the Final EIS an acknowledgement of the Georgia rule and propose a return flow policy that credits contributed flows "in whatever manner such flows are handled under state law." To provide otherwise would be an intrusion on Georgia's sovereign rights.

We understand that the Corps is considering a national rulemaking on this topic and thus, at a minimum, the Corps should retain flexibility in any final language regarding return flow credits until such time as a final federal rulemaking becomes effective.

H. The Corps Should Provide its Storage Accounting Methodology and Draft Contracts to the State for Comment.

To effectively operate the ACF Basin – and specifically Lake Lanier – the Corps must establish a storage accounting methodology that tracks multiple water storage accounts. Because the Corps' chosen storage accounting methodology is a critical factor in basin operations, the Corps must provide this methodology to Georgia so the State can evaluate it and make informed comments. This common-sense request aligns with Corps policy: the Corps is required to "identify any methodologies used and [] make explicit reference by footnote to the scientific and other sources relied upon for conclusions in the statement." 40 C.F.R. § 1502.24. Courts have continually held "that any supporting data or studies expressly relied upon in an EIS must be 'available and accessible' to the public." *State of Cal. v. Block*, 690 F.2d 753, 764-65 (9th Cir. 1982). Thus, the Corps must provide the storage accounting methodology and the resources it relied on to reach the methodology.

H

In addition, as required by the Eleventh Circuit, one of the purposes of the DEIS is to address Georgia's request for storage in Lake Lanier to be used for water supply. For direct Lake storage withdrawals (as opposed to releases made from the Lake to the River for water supply), the State assumes

H. The administrative record for the ACF EIS will include the storage accounting tool. The storage accounting process will be defined before USACE enters into any potential water storage contracts.

that this agreement will be memorialized in a contract. The State is left merely guessing, however, as to the contractual terms and provisions because the Corps did not propose draft contracts in the DEIS.

The State requests that the Corps rectify these omissions in the DEIS by providing both the storage accounting methodology and proposed draft contracts in the Final EIS. Once the Corps has done so, the State expressly reserves the right to comment on the chosen methodology and proposed contracts.

III. Water Management Changes

In addition to hydrologic modeling of the 2015 Request, Georgia also modeled the effects of a number of other water management changes the Corps should make in operating the ACF system. The results of that water management modeling show that those changes did not significantly adversely impact any authorized purposes while at the same time enhancing the Corps' ability to fulfill the water supply purpose.

A. The Corps Could Operate Buford Dam for a Flow Target of 550 cfs at Peachtree Creek During Winter Months.

To ensure adequate flows to meet water quality standards downstream of wastewater treatment plant discharges in the metropolitan Atlanta area, the Corps historically operated Buford Dam to provide a minimum flow of 750 cfs at Peachtree Creek throughout the year. The PAA, however, proposes an adjustment in the Peachtree Creek Flow Target to 650 cfs for the cooler winter months of November through April; 750 cfs from May through October. As explained below, (1) reducing the flow target to 550 cfs during the winter months could provide significant benefits to the ACF Basin and these benefits can be obtained (2) without adverse effects on water quality and (3) within the scope of the Corps' operating authority.

1. A 550 cfs Flow Target Has Significant Benefits to the ACF Basin.

Reducing the flow target to 550 cfs during the winter months could provide a significant benefit to Lake Lanier storage. A 550 cfs reduced flow target will provide storage benefits in Lake Lanier that are the equivalent of 1.4 feet of elevation higher than the PAA in the most severe drought (2007-2009) (equivalent to 44,000 acre-feet of storage), and 0.6 to 0.9 feet higher in Lake elevation throughout a history of relatively dry years. Zeng Memorandum at 12-13. Those higher Lake levels then provide system benefits to the entire Basin. In a drought year, when basin inflow is lower than average and competing needs in the basin stretch limited resources, maintaining storage in Lake Lanier, the most upstream storage reservoir, preserves maximum operational flexibility to meet all authorized purposes and reduces the amount of time – by five months – that the Basin is in drought operations. Zeng Memorandum at 13; *see also* Letter from F. Allen Barnes, Director, Georgia Environmental Protection Division, to Col. Steven Roemhildt, District Engineer, Mobile District, U.S. Army Corps of Engineers, regarding reduced flows at Peachtree Creek (Nov. 7, 2011) ("Barnes 2011 Letter," **Exhibit J**).

2. Operating to a Winter Flow Target of 550 cfs Will Not Produce Adverse Water Quality Effects.

I

Georgia analyzed the effect on water quality of reducing the flow target at Peachtree Creek to 550 cfs during the November through April timeframe. Reducing winter flows to 550 cfs does not adversely affect dissolved oxygen (DO) levels, the parameter that has long been tracked as a key indicator of conditions in the upper Chattahoochee River. Zeng Memorandum at 13; Barnes 2011 Letter at Attachment B to Attachment B. Other water quality parameters are either maintained at these lower winter flows or are or will be addressed by current or planned Georgia Environmental Protection Division regulatory programs to assure that all designated uses are achieved and maintained. Zeng

Responses to ACF238 – Georgia Environmental Protection Division

I. USACE conducted an environmental assessment in 2008 and concluded that reducing the minimum flow requirement at Peachtree Creek to 650 cfs from November through April would not have significant adverse effects on water quality. Therefore, the minimum flow considered in this EIS will be 650 cfs.

Memorandum at 14. As a result, there are no water quality impacts that would require flows higher than 550 cfs during the winter months.

3. Operating to a Winter Flow Target of 550 cfs is Within the Corps' Operating Authority and Does Not Violate State Law.

The Corps has previously asserted that the authorizing legislation for the Buford Dam project requires releases sufficient to meet a water quality flow target of 650 cfs at Atlanta. Georgia believes that the Corps is misreading the authorizing documents.

In concluding that there exists a water quality minimum flow of 650 cfs, the Corps has cited language from a report prepared by General Newman, Division Engineer for the South Atlantic Division, (the "Newman Report"). DEIS at 2-76. In paragraph 80 of the Newman Report, General Newman described the total estimated water needs for the Atlanta area as of 1946. He stated,

> In order to meet the estimated present needs of the city, and to prevent damage to fish, riparian owners, and other interests by complete shutdown of the Buford plan during the daily and week-end off-peak periods, varying flows up to a maximum of 600 second-feet should be released from Buford *so as to insure at all times a flow at Atlanta not less than 650 second-feet*.

Report of Gen. James B. Newman, Jr., Division Engineer, *reprinted in* H.R. Doc. No. 80-300, at ¶ 80 (June 6, 1947) (**Exhibit K**) (emphasis added).

The "needs and other interests" of the area at the time included 70 cfs for domestic and industrial purposes and 415 cfs for condensing water for the Georgia Power Atkinson steam plant. Thus, as the sentence makes clear, the value of 650 cfs was not a target for *water quality flow*, but the *total flow* designed to accommodate the sum of all interests, including water quality among other issues.

Focusing, therefore, on the total flow at Atlanta, releases sufficient to meet combined water supply withdrawals and 550 cfs water quality flows will more than meet the 650 cfs threshold specified by General Newman. For example, even under the minimum release of the 2015 Request for water

supply (549 cfs), releasing sufficient quantities to meet that amount plus a water quality flow of 550 cfs would result in a total flow of 1099 cfs, far in excess of the 650 cfs threshold contemplated in the Newman Report.

To the extent the Corps believes that Georgia law prevents it from operating to 550 cfs, that belief is misplaced. The DEIS states that the State has "established a minimum flow standard of 750 cfs downstream of Atlanta's water supply intake and just upstream of Peachtree Creek." DEIS at 2-219. It is important to note that the 750 cfs value is not and was never a "standard." It merely set a flow above which the criteria for the designated use of "fishing" must be met. 750 cfs was used historically for setting waste load allocations and similar purposes, akin to the State's use of 7Q10 values for unregulated streams. As water quality in the Chattahoochee River improved over the decades, the 750 cfs language was no longer needed. Thus, after proper notice and comment, in August 2015, the State amended Rule 391-3-6-.03(14), the rule containing the reference to 750 cfs, to delete any reference to 750 cfs. Accordingly, no reference to a 750 cfs flow exists in Georgia rules and the Corps should not cite to that value in evaluating operation of the ACF system.

For this reason, the Corps can operate Buford Dam to provide for water quality flows, net of water supply withdrawals, of 550 cfs at Peachtree Creek during the months of November through April (with 750 cfs during the rest of the year). There are no water quality or legal impediments to reduced-flow operations on this basis, and there will be considerable benefits to Lake Lanier storage by doing so which will benefit all authorized purposes.

B. The Corps Should Establish a Process for Determining When Navigation is Appropriate.

As part of its evaluation of the DEIS, Georgia studied and modeled the Corps' operation of the ACF system with regard to navigation. That evaluation shows that PAA navigation operations are more

detrimental to other authorized purposes than need be, and are extremely detrimental to the ACF system. *See* Zeng Memorandum at 17-19. As a result, the Corps should consider other operational means to meet the navigation purpose.

EPD modeled two scenarios: (1) the PAA and (2) the PAA No Navigation. For the latter, EPD used the Corps' PAA model and made only one change – it turned navigation operations off. The comparison between the PAA and the PAA No Navigation reveals a number of adverse impacts. First, navigation operations substantially increase the number of days when the ACF system is under drought operation by 33%. Second, over the 73 year period of simulation, PAA navigation operations force the system into Extreme Drought Operations (EDO) on 61 days as opposed to zero days of EDO under the PAA No Navigation. Third, in typical drought years, PAA navigation operations prompt drought operations earlier and make them last longer; in typical non-drought years, navigation operations trigger drought operations. Zeng Memorandum at 17-19.

J

Because of these extreme results, Georgia believes the Corps should re-evaluate its PAA navigation operations. Among other things, the Corps should consider (1) establishing an inflow forecast mechanism that allows the Corps to trigger navigation operations only when system conditions warrant the navigation release; and (2) implementing navigation operations only where there is an express demand for navigation. To that end, Georgia would like the opportunity to work with the Corps to develop a navigation plan containing such appropriate navigation procedures.

C. Flood Control Management at West Point Lake Should be Conducted More Beneficially.

As part of its evaluation of the DEIS, Georgia addressed how the Corps conducts its West Point Reservoir flood control operations. Georgia understands the Corps' concern regarding flood risk management. Results of EPD's modelling indicate that the Corps could operate West Point Reservoir in

Responses to ACF238 – Georgia Environmental Protection Division

J. Drought operations are intended to help the system recover during dry periods and are shown to have an appreciably positive effect in the modeling. This triggered operation allows continued support of the authorized project purpose during anticipated or actual drought conditions. The level of support for project purposes such as navigation and hydropower will be curtailed. Navigation is an authorized project purpose and requires use of storage to support it when local flow is insufficient. Since the NAA does not include an active release rule to support navigation, it is anticipated that the reservoir levels will be lower under the PAA, which includes an active release rule to support navigation during the January–May season.

All comments, including those regarding navigation, were considered for the final EIS. The navigation plan in the final EIS reflects stakeholder input. The periodic navigation concept was considered as an operation measure in section 4.1.2.6.2 of the EIS. The measure was eliminated from detailed evaluation as explained in EIS section 4.1.2.4.1.

a manner which would accomplish both improved flood risk management and minimize actions that would lower reservoir elevations unnecessarily. Among the issues Georgia identified are: (1) the drawdown occurs in what would otherwise be the period used for refill of the reservoir and (2) the need to refill the reservoir after drawdown is in direct competition with the need for higher releases for Sturgeon Spawning Season (March through May). Zeng Memorandum at 14-15.

Georgia requests that the Corps modify the West Point Water Control Manual to incorporate flexible flood storage management practices at the West Point project, based on better real-time and probability-based forecast information, and do the same wherever else such practices provide real water resource benefits without compromising the federal flood risk management purpose.[8]

D. The Corps Improperly Eliminated The Possibility of Changes in Lake Lanier Elevation.

For decades, many Basin interests have encouraged the Corps to raise the elevation of Lake Lanier at full pool, however the DEIS eliminated this option at first screening without any analysis. The Corps' stated reasons for this decision were that it would not consider (1) "management measures that suggest the use of flood storage for purposes other than flood storage" and (2) "measures that would potentially change the existing head limits" of an ACF Basin project. DEIS at 4-7, 4-8. The DEIS, however, presents no data or analysis suggesting that raising the pool elevation would adversely impact flood risk management or affect structural integrity.

Despite acknowledging that the Corps has the authority to allocate flood storage to other purposes, the DEIS dismisses raising the Lake pool stating that the Corps "is not exercising that discretionary authority as part of this Master Manual update." DEIS at 4-7. Without further explanation,

[8] Appropriate modification by the Corps of reservoir operation in the Columbus, Georgia and middle Chattahoochee River region would also help mitigate water quality concerns that arise in extremely low flow periods.

Responses to ACF238 – Georgia Environmental Protection Division

K

K. West Point reservoir refill is designed to occur from mid-February through the end of May. USACE balances the flood operation and refill during the wettest 2 months of the year, February and March. Refill is completed using the spring precipitation in the months of April and May. There are years when spring precipitation is insufficient to completely refill the reservoir, and refill must be delayed until the summer. During extreme dry winter and spring periods, the reservoir might not completely refill to elevation of 635 ft msl. The reservoir drawdown occurs in the fall period, from November through mid-December. Hydrologically, that fall period is contained within the driest time of the year. Typically, the greatest amount of downstream flow augmentation occurs during the fall period. USACE concludes that the project is properly designed to refill and drawdown the reservoir during the appropriate periods of the hydrologic year. USACE developed a provision in the current revised interim operating plan that enables storing of flows to occur while supporting the sturgeon spawning season. That provision remains in the updated WCM where storing a portion of basin inflow supports the refill of the reservoir.

this logic appears circular: the Corps has the authority but cannot exercise it because the Corps has determined it cannot. The State requests that the Corps revisit this decision and consider whether, in light of a WCM update nearly 60 years in the making, it can and should use its authority at this time to raise the Lanier pool.

The DEIS states that "[c]hanges to the existing head [at Buford Dam] ***could*** increase the risk to the structural integrity of the [Dam.]" DEIS at 4-8 (emphasis added). It is also possible that raising the Lake by two feet "could not" affect the structural integrity. The Corps does not know because it did not conduct any study regarding whether a change in the elevation of Lake Lanier at full pool would pose any increased risk to the structural integrity of the project. Because it did no analysis, the Corps has no basis for eliminating that action as a possible alternative.

Instead of eliminating at first screen the option of raising Lake Lanier elevation at full pool, the Corps should analyze this option to determine whether, in fact, it would impact the Corps' flood control operations or Buford Dam's structural integrity. Georgia suggests that raising the Lake elevation would likely have a positive effect on nearly all of the Corps' stated objectives for updating the Master WCM.[9] Because of this and because of the strong ACF Basin support for raising the elevation of Lake Lanier, the State requests that the Corps raise the elevation of Lake Lanier at full pool as part of its water management plan.

[9] Those objectives are to: (1) define action zones on a scientific basis that eliminate a disproportionate impact on reservoirs and address current system needs; (2) develop and implement a basinwide Corps reservoir drought operation plan; (3) reduce or eliminate the chance of prematurely returning to drought operations and reducing flows downstream from Jim Woodruff Dam below 5,000 cfs; (4) reduce or eliminate the adverse effect of system operations on federally listed threatened and endangered species; (5) improve system performance to achieve congressionally authorized project purposes; and (6) increase the reliability of navigation on the ACF system. DEIS at 4-3.

Responses to ACF238 – Georgia Environmental Protection Division

L. As stated in the EIS:

> "Management measures that suggest use of flood storage for purposes other than flood storage (e.g., WM52 and FRM5) were not considered. Thus the management measure to raise Lake Lanier 2 ft to a conservation pool elevation of 1,073 ft was eliminated from consideration. As described in Appendix D, USACE's authority to consider raising the pool at Lake Lanier would reduce the available flood storage and require a reallocation of that storage to some other purpose. USACE is not exercising that discretionary authority as part of this Master Manual update."

E. The Corps' Analysis Regarding Endangered Species is Flawed.

The Corps has not used the most updated and accurate information in connection with its assessment of the effects of various alternatives on endangered species. In addition, the performance measures used by the Corps are inappropriate.[10] For example, the Corps used a metric for effects on mussels based on the number of days of flow between 5,000 cfs and 10,000 cfs. Using the U.S. Fish & Wildlife Service ("USFWS") criteria indicating appropriate conditions for fat threeridge mussels and bathymetric data from the Corps, Georgia analyzed potential habitat for the mussels in the Apalachicola River. The results indicate that the area of fat threeridge mussel habitat does not increase with higher flows. In fact, evidence indicates that the maximum amount of habitat seems to correspond to flows much lower than 5,000 cfs. Zeng Memorandum at 19-20; Memorandum from Wei Zeng, Hydrology Unity, to Judson Turner, Director, Regarding alternative operations in the ACF Basin (Jan. 11, 2013) at 5-6, attached to Georgia Scoping Comments. In addition, USFWS has conducted a more recent unpublished study indicating large amount of mussel habitat and the existence of large populations of fat threeridge mussels, estimated at between five and six million, several times the mussel population upon which its listing as an endangered species was made, with habitats under a low flow of 5,000 cfs. Put another way, the latest study identifying both a large amount of habitat and a large population of mussels does not point to any gains associated with flows above 5,000 cfs. Zeng Memorandum at 19-20. Based on this data, there is no rationale for the Corps to use flows greater than 5,000 cfs as a performance

M

[10] On January 14, 2013, Georgia provided the Corps with a set of suggested modeled operational changes in system management, referenced as the "Georgia Contemplation," along with modeling results on a range of a performance measures. Georgia's modeling demonstrated that performance measures for meeting all authorized purposes, the including biological needs of endangered species in the Apalachicola River, can be met under the operation set in Georgia Contemplation. In addition, the Georgia Contemplation results in better performance regarding desired flows in the Columbus, Georgia area of the Chattahoochee River. *See* Georgia Scoping Comments and attachments.

Responses to ACF238 – Georgia Environmental Protection Division

M. Section 6.4.4.3.2 of the EIS has been updated to include the most recent data collected on fat threeridge mussels and comments received from USFWS. The biological opinion and discussion of the Endangered Species Act consultation are provided in appendix J of the final EIS.

measure for endangered mussels. The Corps should use up-to-date and scientifically valid information in its evaluation of the effects of the 2015 Request on endangered species.

F. The 2015 Request Will Not Have a Material Impact on the Production of Hydropower.

As part of its evaluation of the DEIS, Georgia undertook a study of the effect of the 2015 Request on hydropower production. The 2015 Request will have only minimal impact on hydropower production. Zeng Memorandum at 7. For example, even assuming the 2015 Request water supply demand, the reduction at Lake Lanier in power generation 35 years from today is essentially no different than under the PAA, and the difference would be slighter in the years before Georgia's water demand reaches 621 mgd. A similar result is shown in relation to the total amount of energy production by all the federal reservoirs in the ACF Basin where the difference between the 2015 Request compared to the PAA is very small.

N

G. The Corps Erroneously Calculates Returns on a Reach-by-Reach Basis.

The DEIS indicates that the Corps evaluates returns to the Chattahoochee River on a reach-by-reach basis. DEIS at 5-5 to 5-8. Water supply operation in the metropolitan Atlanta area is a complex process. Most of the withdrawals within the metro district take place in Lake Lanier and in the Chattahoochee River between Buford Dam and the confluence with Peachtree Creek. The majority of the return flow, however, takes place between Peachtree Creek and the USGS Whitesburg gage. This makes comparing withdrawals and returns in any one metro-Atlanta reach unwise. Thus, the State suggests that the Corps report the totality of returns so the public and decision-makers can accurately evaluate return rates to the ACF Basin. The Corps should report the withdrawal as the sum of withdrawal across the Buford, Norcross, Morgan Falls, and Atlanta reaches, and the return as the sum of discharged amounts across the Buford, Norcross, Morgan Falls, Atlanta, and Whitesburg reaches.

O

Responses to ACF238 – Georgia Environmental Protection Division

N. USACE evaluated Georgia's additional water demand projection information, updated the water supply options analysis, and assessed the impacts to hydropower and other resources in the final EIS.

O. The historic and projected water use data used in the modeling effort have been included in the final EIS.

H. The Corps Incorrectly Projected the Effect of Future Conservation Measures.

After correctly noting that Georgia has successfully implemented numerous effective water conservation measures, and that water conservation is the cornerstone of the metro area's water supply plan, the Corps states, "In 2011 per capita water use for the metro area was 148 gpcd (gallons per capita per day). EPD projects water use will decrease to an average of 135 gpcd by 2040. It is unlikely that additional conservation measures would result in a significant reduction in Georgia's 2040 need." DEIS at 5-3 to 5-4.

P

This erroneous conclusion is a specific example of why it is necessary when carrying out its assessment of alternatives that the Corps use the 2015 Request. As shown by the Metro District, not only is a reduction in the 135 gpcd figure possible, it has already occurred. In fact, present per capita water consumption averages 108 gpcd across the Metro District. This is twenty percent lower than the 135 gpcd used by the Corps to define peak efficiency in 2040. Future per capita water consumption in 2050 is projected to decrease even further:

> Water conservation and efficiency measures adopted by the Metro Water District and the State of Georgia have dramatically decreased water demands within the Metro Water District. In fact, per capita water demand use has declined by over 30 percent since 2000. Similarly, total water withdrawals have decreased by over 10 percent, despite a 20-percent increase in total population. … The efficiency measures put in place are expected to drive per capita water use lower into the future.

Memorandum from Katherine Zitsch, Director, Metro District to Judson Turner, Director, Georgia Environmental Protection Division, Regarding projected future water supply demand for the Chattahoochee River and Lake Lanier System (Dec. 2, 2015) at 5, attached to 2015 Request. The effect of these reduced water demand projections was incorporated into the Georgia 2015 Request and these projections confirm that the Corps should use the 2015 Request in the ACF Final EIS.

Responses to ACF238 – Georgia Environmental Protection Division

P. USACE has evaluated the updated water demand projections and updated the water supply options analysis in the final EIS, including the revised conservation measure assumptions.

I. Georgia Wildlife Management Comments

Georgia's Wildlife Resources Division previously submitted comments in November 2008 and January 2013 during WCM development, and also has provided comments to the USFWS in May 2011 and May and June 2015, under the Fish and Wildlife Coordination Act, 16 U.S.C. § 661 *et seq*. These comments document the State's fisheries objectives for the ACF system, operational impacts on fisheries resources in the basin, and operating procedures to mitigate impacts and support fisheries resources. Those comments are included by reference.

IV. Aspects of the DEIS Require Corrections or Clarifications.

In addition to the above discussion, the DEIS contains a number of factual errors or ambiguities that the State requests the Corps address in the FEIS. Some of these are briefly itemized below:

a. Section 2.6.1.5.3 Mead Westvaco: The DEIS states that Mead Westvaco has a permit to withdraw 27.6 mgd from Walter F. George, but does not say who the permitting authority is. The DEIS should include the permitting authority. Q

b. Section 2.6.1.5.5 Farley Nuclear Power Plant: The DEIS states that Southern Nuclear defines 2,000 cfs and 74.5 ft at Jim Woodruff as minimum conditions for operation. The Corps should use observed data to determine that these flows historically have been unnecessary, given the percent of time when flow has been lower than 2,000 cfs. R

c. Page 4-13, Figure 4.1-5: The caption is not consistent with title of the figure. The revised action zones shown in figure should be of Level 1 action zones, rather than Revised Level 1 action zones. S

d. Section 4.1.2.2.2.2 Revised Level 1 action zones: There appears to be insufficient information justifying the selection of Revised Level 1 action zones as opposed to Level 1 action zones. For example, Georgia is unaware of any quantitative work determining that the Revised Level 1 action zones yields better results in comparison to Level 1 action zones. If such work exists, the Corps should include a figure showing these results. T

Q. USACE updated the EIS as appropriate. The statement regarding a withdrawal permit for the Mead Westvaco (now named WestRock) was in error. The state of Alabama does not have a water withdrawal permit program. Water use by WestRock is reported to the Alabama Office of Water Resources.

R. Section 2.6.1.5.5 of the EIS lists the flow and elevation need identified by the water user. The water user is a stakeholder within the basin and provided this criterion during the 2007–2008 drought period. Maintaining the flow and elevation is not an operational requirement (or an authorized project purpose). This information is included as supplemental data related to major municipal and industrial water users in the basin. Section 6.1.1.2 of the EIS provides descriptions and charts on flow duration for George Andrews Lock and Dam, which is representative of flow at the Farley Nuclear Power Plant intake.

S. The caption has been revised in the final EIS as appropriate.

T. The level 1 action zones use the strict proportional sizing of action zones 1 and 2 during the summer period at each project based on the size of the project's contributing watershed. This approach to sizing the action zones led to a narrowing of zones 1, 2, and 3 at Lake Lanier to 0.75, 0.15, and 0.4 ft per zone, respectively, for summer pool levels, compared to zone-level increments of 3.0, 1.0, and 2.0 ft, respectively, under current operations. The zones during the summer months were too narrow for full consideration. No additional analysis exists.

e. Section 4.1.2.3 Drought Operations (Page 4-17) (Lines 7-9): "If recovery…above Zone 4." It is unclear if this is an example of how a drought operation is suspended, or a special case for the months of February and March. It appears that this is an example explaining how a recovery in February would trigger the suspension of a drought operation in March. If this is correct, then the text should say "for example." U

U. This sentence has been revised to clarify that this is a special suspension mechanism.

f. Section 4.1.2.3.2.2 Revised drought operations suspension trigger (Page 4-18): The Corps at different places in the DEIS used the months of February, March, and April as examples to explain how suspension of a drought operation is carried out. However, the Corps did not say that these are examples, which leaves the impression that these are months with a special suspension mechanism. V

V. The last sentence in section 4.1.2.3.2.2 (lines 11-13) of the EIS has been revised to clarify that this is a special suspension mechanism.

g. Section 4.1.2.8.8.4 Revised seasonal flows and Section 4.1.2.8.8.5 Pulse flows: The Corps has incorrectly considered the state line flows prescribed in Georgia Contemplation. W

W. The measures described in sections 4.1.2.8.8.4 and 4.1.2.8.8.5 of the EIS are from a January 11, 2013, memorandum to Jud Turner from Wei Zeng about alternative operations in the ACF River Basin that was provided during the scoping period.

h. Section 4.2.1.2.3 Navigation (Page 4-45, Lines 7-9): "Under this water…of the time." The percentage of time when a 9-foot or a 7-foot channel is available appears to be an objective, rather than what "this alternative" is able to achieve. This language should be clarified on how the percentage numbers have been obtained. X

X. The percent of time is based on the number of years the channel depth is available for the entire season (Jan-May) divided by the number years in the simulation. For example the NAA provides the full 7-ft navigation depth from January through May for 15 of the 73 years in the simulation. This is equivalent to 20.5% (15/73) channel availability. The 7-ft channel availability number presented in the draft EIS is based on HEC-ResSim modeling results using flows at the Blountstown node. The model includes a rule to provide minimum flow of 16,200 cfs at Blountstown from the Jim Woodruff project when the Navigation Season is supported. Model operation for the downstream target is not always a perfect 16,200 cfs and may be 150 cfs lower. Therefore the channel availability was based on a flow value of 16,050 cfs at Blountstown. This is equivalent to a 0.08 ft difference in stage at the Blountstown gage.

i. Section 4.2.6.1 Description of Water Management Alternative 6: The Corps misstates that the PTC flow targets in the Alternative are the same as in Alternative 2. According to an earlier table and description, this Alternative contains PTC flow targets proposed by USFWS (with a 2400+ cfs flow target). Y

Y. The statement has been corrected in the final EIS as suggested.

j. Section 4.3.2 Hydroelectric Power Generation: The Corps incorrectly modeled Georgia Contemplation (Water Management Alternative 5). Even with this mis-modeling, Georgia Contemplation ranks 3rd in system power, 3rd in Buford power, 2nd in West Point power, and 6th in Walter F. George power. The overall ranking for Georgia Contemplation in power generation is 3rd. If correct settings were used in the model, it is expected that the amount of power generation would increase and the rankings in hydropower generation would also increase. Z

Z. Water management alternative 5 includes the modified generation schedule at Buford Dam with drought operations. There was no effort to model the defined Georgia contemplation. As described in sections 4.1 and 4.2 of the EIS, various measures were identified, analyzed, and refined. Measures that passed the initial and second screening criteria were combined to formulate water management alternatives that fulfill all federally authorized project purposes.

k. Section 2.1.2.3 Water Quality Standards (Page 2-129)(Lines 29-30 and 35-37): The DEIS makes inaccurate statements about Georgia's actions regarding U.S. EPA's recommendations for

numeric nutrient criteria for waterbodies. U.S. EPA requested that each State develop a strategy for adopting nutrient water quality criteria to protect waters from the adverse effects of nutrient over-enrichment. Development of nutrient criteria is a highly complex matter because some level of nutrients are necessary for the health of the aquatic ecosystem, but concentrations that are too high can cause an imbalance in the natural flora and fauna. Therefore, in order to protect its natural resources, it is important that a state's criteria not be set too low or too high. Georgia developed a plan for adopting nutrient criteria in 2005, subsequently revising the plan in 2008 and 2013. The revised plan specifies the State's conceptual approach and schedule for development of nutrient criteria for specific waterbody types, and has been reviewed and agreed to by U.S. EPA. AA

l. Executive Summary, Page 12: In discussing revised drought operations the DEIS states that "If recovery conditions are not achieved in February, drought plan provisions will not be suspended until April, provided composite storage remains above Zone 4." The correct reference is to Zone 2. AB

m. Section 2.1.1.1.6.10, Table 2.1-4: The DEIS reports that the yield of the Yahoola Creek Reservoir (Lake Zwerner) is 25.5 mgd. However, the safe yield of the Yahoola Creek Reservoir is 5.7 mgd. AC

n. Section 2.1.1.2.5.2 Current Water Use – Georgia - Groundwater: The DEIS states "There, the close connection between surface water and the Floridan aquifer cause groundwater withdrawals to lower surface water levels in droughts, causing the basin to exceed the safe yield for freshwater mussels (Hook et al. 2005)." Georgia has reviewed the referenced report and no such description was found. AD

o. Section 2.5.3.2 Reservoirs: The DEIS states "Samples from Walter F. George Lake also violated the 15 parts per thousand (ppt) federal standards for total dioxans and furans, with a value of 0.45 ppt." The sentence is contradictory as the cited 0.45 ppt would not violate the cited standard. AE

p. Section 4.2.6.2.4 Fish and Wildlife Conservation: The DEIS states the median fall rate as 0.00 feet per day rather than 0.12. The cited 0.00 feet per day median fall rate appears to be incorrect. AF

q. Section 6.1.1.2.2.4 Alternative 7A: The DEIS incorrectly references Alt1A when discussing a 600 cfs minimum flow. The correct citation is to Alt7A. AG

Responses to ACF238 – Georgia Environmental Protection Division

AA. Section 2.1.2.3 of the EIS and the subsequent tables have been updated to reflect the most recent EPA-approved water quality standards.

AB. The referenced sentence in the Executive Summary and the last sentence in section 4.1.2.3.2.2 (lines 11-13) of the EIS has been revised to clarify that this is a special suspension mechanism.

AC. The EIS has been updated to reflect the correct safe yield value for Yahoola Creek Reservoir (Lake Zwerner).

AD. The incorrect citation for this statement was inserted into the draft EIS. We conducted an extensive search of the references for the correct citation for this statement and were unable to find it. Therefore, we have removed the statement from the final EIS.

AE. The EIS has been updated to address this contradiction.

AF. Section 4.2.6.2.4 of the final EIS has been updated to address this comment.

AG. The correction was made in the final EIS.

r. Section 6.1.1.2.5.1 No Action Alternative: The DEIS states "Downstream of the Chattahoochee gage, basin inflow to the Apalachicola River is essentially uncontrolled. Therefore, flows at the Chattahoochee gage plus the uncontrolled inflows from downstream tributaries to the Appalachicola River comprise virtually all of the freshwater inflow to the Apalachicola Bay." This is incorrect. Freshwater inflow to the Apalachicola Bay is correctly stated as comprising flows at the Chattahoochee gage, uncontrolled inflows from downstream tributaries to the Appalachicola River, other streams draining into the Bay, minus any depletions taking place in the Florida portion of the ACF Basin.

AH

V. Summary and Conclusion

Please give the foregoing comments careful consideration in making necessary revisions to the ACF WCM and DEIS. As shown above, the Proposed ACF WCM and DEIS should be reworked to incorporate the water supply demands of the 2015 Request. The 2013 Request has been updated, and implementation of a Water Control Manual based on the 2013 Request is no longer appropriate. Upon that correction, the State requests that you consider water management changes as discussed in this letter. Once so modified and corrected, the Corps should issue the ACF Final EIS and WCM granting the entire 2015 Request.

Do not hesitate to contact me if you have any questions or if I can be a resource for additional information that would assist you in this process.

Respectfully submitted,



Judson H. Turner
Director
Georgia Environmental Protection Division
On behalf of the State of Georgia

Responses to ACF238 – Georgia Environmental Protection Division

AH. The suggested language correctly defines all freshwater into the Apalachicola Bay. The text from the draft EIS correctly uses the term "virtually all," which means almost all. The sentence will read as follows: "Flows at the Chattahoochee gage plus the uncontrolled inflows from downstream tributaries to the Apalachicola River, minus any depletions occurring in the Florida portion of the ACF Basin, comprise virtually all of the freshwater inflow to the Apalachicola Bay. The remaining balance of freshwater inflow to the bay comes from smaller watersheds that drain directly into the bay."

Memorandum

To: Judson Turner

From: Wei Zeng

Date: January 29, 2016

Re: Technical evaluation of Georgia's 2015 Updated Water Supply Request and comments on the Army Corps of Engineers Apalachicola-Chattahoochee-Flint (ACF) River Basin Water Control Manual Draft Environmental Impact Statement

I. Introduction

On October 2, 2015, the Army Corps of Engineers Mobile District (Corps) released a Draft Environmental Impact Statement (DEIS) on an updated ACF Basin Water Control Manual (WCM). The DEIS addresses two major categories of water resources management in the ACF Basin: (1) meeting Georgia's projected water supply needs through revised operations at Lake Lanier and the Chattahoochee River, and (2) revising the existing Revised Interim Operation Plan (RIOP) to better fulfill authorized purposes of the federal reservoirs in the basin.

The Corps' Proposed Action Alternative (PAA) incorporated a water supply storage assessment (WSSA) that meets part of Georgia's water supply needs from Lake Lanier and all of the needs from the Chattahoochee River. The PAA also incorporated many changes to the current water management in the basin. These changes cover a wide range of aspects, including reservoir rule curves, action zones, peaking power generation, instream flow targets, navigation, endangered species protection, and wildlife conservation.

The purpose of this memorandum is to (1) summarize the impact of Georgia's 2015 Updated Water Supply Request and (2) comment on a few key technical aspects of the Corps' proposed water management operations.

II. Georgia's 2015 Updated Water Supply Request

Updated Water Supply Needs

On December 4, 2015, Georgia sent the Corps an update to the January 2013 ACF Water Supply Request through a planning horizon of 2050. Georgia revised its water supply needs from 297 mgd from Lanier and 408 mgd from the Chattahoochee River down to 242 mgd from Lanier and between 355 and 379 mgd from the Chattahoochee River. The lowered numbers reflect the latest population projected by Georgia Office of Planning and Budget (May 2015) and the latest per capita water use observed in member counties of the Metropolitan North Georgia Water Planning District (Metro District). The latest per capita water use number is much lower than previously estimated, reflecting the beneficial effect of

conservation measures put in place by the Metro District over the past 13 years and initial effects of implementing the 2010 Georgia Water Stewardship Act.

Table 1 contains the Metro District's latest projections of 2050 water supply needs upstream of Buford Dam and between Buford Dam and the Peachtree Creek confluence. Your letter to the Corps dated December 4, 2015 incorporated this information. Instead of seeking water supply in the amount of 297 mgd directly from Lake Lanier, the 2015 Updated Water Supply Request seeks an amount of 242 mgd, including 234 mgd projected for local governments within the Metro District (Appendix A) and 8 mgd projected for Dawson, Lumpkin, White, and Habersham Counties (Appendix B). The 2015 Updated Water Supply Request also contains a revision to the water supply need from the Chattahoochee River between Buford Dam and the Peachtree Creek confluence. The new projection puts this need between 355 and 379 mgd, rather than 408 mgd as sought by Georgia's 2013 Water Supply Request. The range reflects the uncertainty surrounding Cobb County-Marietta Water Authority's water supply operation in the ACF Basin and Alabama-Coosa-Tallapoosa (ACT) River Basin.[1] To model the largest possible impact of the 2015 Updated Water Supply Request, the analysis presented in this memo used 379 mgd as the gross withdrawal in the Chattahoochee River between Buford Dam and Peachtree Creek confluence.

Table 1: 2011 and Projected 2050 Water Withdrawals[2]

Reach	Upstream of Buford Dam		Between Buford Dam and Peachtree Creek
Sub-reach	Upstream of Lanier	Lake Lanier	Atlanta
2011	5.92	116.04	247.48
2050	5.92	242	355 ~ 379

On January 25, 2016, EPD received the Metro District's latest 2050 projection on treated wastewater returns to Lanier and the Chattahoochee River from jurisdictions within the Metro District. In addition, we project that an additional 5.6 mgd will be returned in 2050 by the four upstream counties. 5.6 mgd is calculated based upon a 70% return rate from the 8 mgd additional withdrawal from Lake Lanier by the four riparian counties upstream of Lanier. The 70% return rate is derived from the current return rate of 63% for these four upstream counties, plus additional increases in sewered flow that are anticipated as these jurisdictions develop over the planning period. This and the projected return amount of 98.96 mgd from the Metro District result in a combined return of 104.56 mgd to Lake Lanier. This information is shown in Table 2.

[1] Cobb County-Marietta Water Authority (CCMWA) has two water supply intakes, one of which is located along the Chattahoochee River upstream of the Peachtree Creek confluence. The other one is located in Lake Allatoona in the ACT River Basin. CCMWA's water supply operation depends on the Corps' operation and water supply reallocation in the ACT Basin, which has not been finally resolved. The range of Metro Atlanta withdrawal in the Chattahoochee River reflects this uncertainty.

[2] In the Corps PAA model, there is a newly separated reach upstream of Lake Lanier, breaking the original Lanier reach into two reaches. The 2015 Updated Water Supply Request follows the Corps' approach by identifying current and projected water use at these reaches.

Table 2: Current and Projected 2050 Returns[3]

Reach	Upstream of Buford Dam		Between Buford Dam and Whitesburg	
Sub-reach	Upstream of Lanier	Lake Lanier	Atlanta	Whitesburg
2011	3.72	34.61	38.77	187.38
2050	3.72	104.56	81.94	278.98[4]

Storage accounting of man-made return flows should incentivize municipalities to incur the costs associated with transport and discharge of highly treated wastewater to federal reservoirs. If the Corps incentivizes such returns, the potential for higher than projected return flows into Lake Lanier would be increased – something the State believes to be sound water policy. In that case, the impacts of water supply actions will be less than what are shown in this analysis.

In the DEIS, the Corps considered a number of water supply allocation alternatives, and deemed Alternative 7H as the proposed alternative. This alternative (identified as the PAA in the DEIS) provides 225 mgd of withdrawal from upstream of Buford Dam (40 mgd from the proposed Glades reservoir and 185 mgd from Lake Lanier) and 408 mgd from the Chattahoochee River between Buford Dam and Peachtree Creek confluence. Georgia's 2015 Water Supply Request is very similar to the PAA in terms of the total withdrawal amount sought, total return projected, total consumptive use, and even distribution of the withdrawal, return, and consumptive uses. A comparison of Georgia's 2015 Water Supply Request and the PAA is shown in Table 3.

Table 3. 2015 Georgia Water Supply Request in Comparison to PAA

River Reaches	Withdrawal Needs and Projected Returns	Georgia 2015 Water Supply Request (mgd)	Army Corps of Engineers October 2015 PAA (mgd)
Upstream of Buford Dam	Withdrawal	242	225
	Return	104.6	91
	Consumptive	137.4	134
Between Buford Dam and Peachtree Creek confluence	Withdrawal	379[5]	408
	Return	82	94
	Consumptive	297	314
Between Peachtree Creek confluence and Whitesburg	Withdrawal		
	Return	279	290
	Consumptive	-279	-290
Total (Lanier/Upper Chattahoochee)	Withdrawal	621	633
	Return	465.6	475
	Consumptive	155.4	158

[3] Projected return numbers are based on the best available information and are used to support accurate modeling, but are not intended to indicate a commitment to specific volumes of return flows in the future. Future return flows could be higher or lower depending on relevant circumstances. Differences between the current values listed in Table 2, which reflect 2011returns, and values provided in Georgia's January 2013 Water Supply Request reflect Georgia's continued progress in updating its water use data.

[4] There is a 3.93 mgd of return flow from discharging facilities that have not been included in the Metro District projections. This amount is added to the projected 284 mgd of return flow in the Whitesburg reach in modeling of future water supply conditions.

[5] Using the higher withdrawal number 379 mgd in the Chattahoochee River is more conservative in evaluating the impact of Georgia's 2015 Water Supply Request. The impact of using 355 mgd withdrawal from the Chattahoochee River would be lower than shown in the following section.

Formulation of Two Scenarios

To evaluate the impact of the projected water supply needs, the Hydrology Unit conducted HEC-ResSim modeling of the ACF Basin water resources management. The modeling platform used for this analysis is the Corps HEC-ResSim model version 3.2.1.22[6].

For both scenarios, the base model reflecting basin-wide water management is the PAA in the DEIS. This model contains 225 mgd from upstream of Buford Dam (40 mgd from a proposed Glades reservoir and 185 mgd from Lake Lanier) and 408 mgd from the Chattahoochee River between Buford Dam and Peachtree Creek confluence. For the first scenario comparison, we updated the PAA to reflect 2011 municipal, industrial, agricultural[7], and thermal electric water use conditions in river reaches outside the Metro Atlanta area (i.e., above Lake Lanier and below the USGS Whitesburg gage) (the "2011 Comparison"). We chose 2011 data because water use resulting from the 2011 hydrologic conditions has distinctive characteristics compared to water use in 2007, the data on which the Corps based its PAA (the "2007 Comparison"). Both 2007 and 2011 are notable drought years but the droughts affected different parts of the ACF Basin. For example, the epicenter of 2011's drought condition is in the lower basin, resulting in higher recorded agricultural water use. In comparison, the 2007 drought had greater effects in the northern part of the basin, resulting in higher M&I water use.

The first scenario we discuss incorporates 2011 water use conditions in Georgia and available 2007 Alabama water use in Columbus, Walter F. George, George Andrews, and Jim Woodruff reaches.[8] Using this 2011 and 2007 Alabama data, we created two runs: the PAA' (PAA Prime) and Scenario C.[9]

To isolate the effect of the 2015 Updated Water Supply Request, we did not change any other aspects of the PAA water management operations for the PAA'. This is true notwithstanding Georgia's comments

[6] HEC-ResSim modeling platform version 3.2.1.22 was released with the Final Environmental Impact Statement of ACT River Basin Water Control Manual. It is the latest version of the software that Georgia EPD received from the Corps.

[7] At the time of Georgia's January 2013 Water Supply Request, estimated 2011 agricultural water use was not available. Therefore, estimated 2007 agricultural water use was used instead because 2007 presented the most critical hydrologic conditions in the most recent half a century.

[8] At this time, Georgia EPD does not have 2011 Alabama water use data, and therefore uses Alabama 2007 water use to represent Alabama water use in a drought year such as 2011. Drought conditions in 2007 were the most severe in the ACF Basin and Alabama's consumptive use in 2007 was the highest in the preceding 10 years (the period for which Georgia has data).

[9] To avoid confusion with Georgia's 2013 Water Supply Request, which contained a Scenario A and a Scenario B, we chose to call this new run Scenario C.

on certain aspects of the Corps' water management operations in the following sections of this memorandum.

We formulated Scenario C to represent the 2015 Updated Water Supply Request. Scenario C has the same basin-wide water management operations as in the PAA', but incorporates 2050 water supply needs as projected by the Metro District for the counties within the district and by EPD for Dawson, Lumpkin, White, and Habersham Counties. The details of projected 2050 water supply needs can be found in Appendix A. EPD's projected additional water needs for Dawson, Lumpkin, White, and Habersham Counties can be found in Appendix B.

The HEC-ResSim model containing the PAA' and Scenario C is provided in Appendix C of this memorandum. A spreadsheet file containing reach-by-reach withdrawal and discharge quantities is provided in Appendix D of this memorandum (spreadsheet title: ACF_GA-Reqest_621mgd_Demand_cal_20151223_.xls).

The second scenario we model and discuss is the 2007 Comparison which analyzes the similarity between Georgia's 2015 Water Supply Request and the PAA. For the PAA, we used the Corps' PAA model. We compared that to Scenario D which starts from the Corps' PAA model but only changes the Metro Atlanta area demand settings to reflect Georgia's 2015 Water Supply Request. In other words, for the 2007 Comparison, we keep water use conditions in the rest of the basin the same as in the Corps' PAA model (adjusted 2007 water use).

Similarities Between PAA and 2015 Request

The amount of projected demand from Lanier and the Chattahoochee River in the 2015 Updated Water Supply Request is not materially different from what the Corps considered and proposed in its PAA. For example, Georgia's request of a gross withdrawal from Lake Lanier of 242 mgd is only 17 mgd greater than the 225 mgd (20 mgd[10] for relocation contracts plus 165 mgd reallocated from Lanier storage, plus 40 mgd placed on the potential Glades reservoir) specified by the Corps in the PAA. On the Chattahoochee River, Georgia seeks a sum lower than what the Corps considered in the DEIS. The overall gross withdrawal modeled by Georgia of 621 mgd is 12 mgd lower than the 633 mgd considered by the Corps in the DEIS. The overall metro area return rate in Scenario C used for this technical analysis is 75%, as calculated by (5.6+99+82+279) mgd of total return divided by (242+379) mgd of total withdrawal, virtually the same as the PAA metro return rate of 75%, as calculated by (91+384) mgd of total return divided by (225+408) mgd of total withdrawal.

For this reason, the impact from Scenario C is expected to be similar to that from the PAA' and the impact from Scenario D is expected to be similar to the PAA, notwithstanding the differences between the two in terms of placement of demands.

[10] The correct value of the relocation contracts is 23.3 mgd. The city of Buford's relocation contract is for 2 mgd. The City of Gainesville's relocation provides for up to "8,000,000 gallons of water per day from Buford Dam and Reservoir" which has been historically interrupted to mean to a net withdrawal of 8mgd. As provided for in a Supplement to the Relocation to the Contract, upon execution of new storage contract, this 8 mgd net withdrawal will be come 21.3 mgd.

Comparison Parameters

In the modeling results discussed below, Scenario C is compared to the PAA' and Scenario D is compared to the PAA. The potential impact of Georgia's Request (Scenario C and Scenario D) is described with regard to:

(1) Average elevations in the federal reservoirs of Lanier, West Point, and Walter F. George;
(2) Minimum elevations in these reservoirs;
(3) Elevation duration curves in these reservoirs;
(4) Daily average power generation in the federal reservoirs;
(5) Percentage of time when there is some level of recreational impact;
(6) Flow at Columbus;
(7) State line flow duration curve; and
(8) Navigation.

2011 Comparison

Reservoir Elevations

Using the Res-Sim Model, we determined the average and minimum daily elevations, and the elevation duration curves, of the federal reservoirs in the ACF Basin under the PAA' and Scenario C. The average and minimum daily elevations of a reservoir are obtained by looking at the daily elevation of the period of simulation, from January 1, 1975 to December 31, 2011, and calculating the average and minimum daily value for each of the 365 days in a year. The elevation duration curve shows the percentages of time over the entire 37-year period that the reservoirs will exceed certain elevations.

As shown in Figure 1, the average daily elevation of Lake Lanier under Scenario C will be 0.1 feet higher around May 1 as compared with the PAA'. May 1 is the date on which the top of conservation pool guide curve for Lake Lanier rises to 1071 feet for the first time in the year and is the beginning of the primary recreational season. Similarly, the average daily elevation of Lake Lanier around December 1 under Scenario C is less than 3 inches lower than under the PAA'.

The difference between Scenario C and the PAA' is slightly more pronounced in terms of the daily minimum elevation in Lake Lanier (see Figure 2). At the lowest point on the minimum daily elevation curve, which usually takes place in the month of December, the elevation under Scenario C is approximately 0.8 feet lower than in the PAA'.

The elevation duration curves for Lake Lanier are shown in Figure 3. For the upper 95% of the duration curve (representing all times but the lowest reservoir elevation), the elevation of Lake Lanier is essentially the same in Scenario C and the PAA'. The difference between Scenario C and the PAA' is only slightly greater, up to 0.8 feet, in the lower 5% of the duration curve.

The impact on Lakes West Point and Walter F. George is minor (see Figures 4 through 9). There is very little difference in average daily elevation at both West Point and Walter F. George between Scenario C and the PAA'. In terms of minimum daily elevation, the greatest impact of Scenario C in comparison to

the PAA' is approximately 0.4 feet in West Point (in the month of November), and less than 0.2 feet at Walter F. George (in December). At the point in the year when West Point and Walter F. George typically reach their lowest elevation for the year (usually in November or December), there is little difference between Scenario C and the PAA'. Even less of a change is evident in the elevation duration curves for Lakes West Point and Walter F. George (Figures 6 and 9). In fact, during much of the summer, the modeling indicates a minor beneficial effect of the proposed water supply operation on West Point and Walter F. George daily minimum elevation (Figures 5 and 8).

Power Generation

The projected water withdrawals and Corps' proposed operations necessary to support them will not have a material impact on the production of hydropower at Buford Dam. Under Scenario C, the daily average energy generated at Lake Lanier is modeled to be 316 MWh (Figure 10), and the annual average energy generated at Lake Lanier is modeled to be 115,340 MWh. In comparison, the daily average energy generated under the PAA' is modeled to be 318 MWh and the annual average is 115,922 MWh. Thus, assuming updated 2050 water supply demands in the Lanier and upper Chattahoochee reaches, there would be a 0.5% reduction in power produced at Buford Dam compared to the PAA'.

As shown by Figure 10, Georgia's future water supply demands will have very little impact on the total amount of energy produced by all of the federal reservoirs in the ACF Basin. Under Scenario C, when Georgia has reached demands of 621 mgd, the daily average energy output from all ACF federal reservoirs is modeled to be 2,639 MWh (annual average 963,209 MWh). The daily average energy output under the PAA' is 2,642 MWh, and the annual average is 964,157 MWh. Thus, there will be only a reduction in daily average generation of 3 MWh (annual average reduction of 949 MWh) for all reservoirs combined. For the combined generation of all of the federal reservoirs in the ACF Basin, there is only a 0.1% reduction under Scenario C.

Recreational Impact

We evaluated the recreational impact by looking at the primary recreational season, defined by the DEIS as May through July for Lanier, May through September for West Point, and June through August for Walter F. George, and tallying the percentage of days when elevation of a reservoir is lower than the three levels of recreational impact, which are, in increasing degree of impact, the Initial Impact Line (IIL), Recreational Impact Line (RIL), and Water Access Limitation (WAL). According to the DEIS, the IIL at Lake Lanier is 1066 feet above mean sea level (msl), the RIL is 1063 feet above msl, and the WAL is 1060 feet above msl. For West Point Lake, the IIL is 632.5 feet above msl, RIL is 629 feet above msl, and WAL is 627 feet above msl. For Lake Walter F. George, the IIL is 187 feet above msl, the RIL is 185 feet above msl, and the WAL is 184 feet above msl.

The impact to recreation is shown in Figures 11 through 13. In Scenario C, as compared with the PAA', there is a slight improvement on the percentage of IIL (by roughly 1%) and very little difference on RIL and WAL (Figure 11).

The recreational impact on West Point is either non-existent or slightly beneficial. At West Point, the extent of recreational impact under the IIL is less in Scenario C when compared to the PAA' (by 1%), while the recreational impacts of RIL and WAL are virtually the same (Figure 12). At Walter F. George, there is no difference in the extent of recreational impact under all three impact levels. The elevation of Walter F. George does not fall to the RIL or WAL in either of the two scenarios (Figure 13).

Flow at Columbus

The impact on flow at Columbus, from either projected water supply needs or potential changes sought by Georgia to the Corps' operation of the federal reservoirs (elaborated in following sections of this memorandum), is very small. EPD staff made a comparison of flow exceedance at Columbus between the Scenario C and the PAA'. The two curves are almost identical for the portion below 2,000 cfs. For example, a flow equal to or lower than 1,350 cfs, which is tracked by Columbus stakeholders, occurs 4.4% of the time in both Scenario C and the PAA' (simulated 1975-2011).

From a water quality compliance perspective, the frequency of flows at Columbus below a daily average of 1150 cfs is an important measure for comparison among scenarios. Under both Scenario C and the PAA', this percentage is 2.5% (simulated 1975-2011).

Even though the PAA performs well in terms of this metric, Georgia has advocated in the past that further improvement can be realized in terms of both endangered species act performance measures and flow at Columbus if certain aspects of operating plans as suggested in the Georgia Contemplation are adopted.

State Line Flow

There is no noticeable difference between Scenario C and the PAA' in terms of the flow duration curve at the Georgia/Florida state line, which suggests that the updated water supply needs in the metro Atlanta area will not result in any significant change in state line flow when compared to the PAA'. (See Figure 14.) When we look more closely at the portion of the graph between the 80 and 95 percentiles exceedance, the curve resulting from Scenario C is barely below the curve resulting from the PAA' (see Figure 15). At the very bottom (the lowest 5%) of the duration curve, note that there is no difference between the two scenarios. Georgia's updated 2050 water supply needs, when compared to water supply settings in the PAA', do not have a material effect on the Corps' minimum flow operation and thus do not change the state line flow in this range. Overall, the change in state line flow is minor in comparison to the magnitude of state line flow under the Corps' proposed basin-wide operation.

Navigation

Without the benefit of the Corps' post-processing tools for navigation performance measures (PMs), EPD staff used the Corps' description to formulate navigation performance measures. Using these PMs, we found no difference between Scenario C and the PAA'. Thus Georgia's updated water supply needs will not have any material impact on navigation availability compared with the PAA'.

2007 Comparison

Reservoir Elevations

As shown in Figure 16, the average daily elevation of Lake Lanier under Scenario D will be slightly higher (by about 2 inches) around May 1 as compared with the PAA. The average daily elevation of Lake Lanier around December 1 under Scenario D is slightly lower (also by about 2 inches) than under the PAA.

The difference between Scenario D and the PAA is slightly more pronounced in terms of the daily minimum elevation in Lake Lanier (see Figure 17). At the lowest point on the minimum daily elevation curve, which usually takes place in the month of December, the elevation under Scenario D is less than 0.3 feet lower than in the PAA.

The elevation duration curves for Lake Lanier are shown in Figure 18. The elevation duration curves for Scenario D and the PAA are almost identical for the top 97% of the elevation spectrum. The difference between Scenario D and the PAA is only slightly greater, up to 4 inches, in the lower 3% of the duration curve.

The impact on Lakes West Point and Walter F. George is minor (see Figures 19 through 24). There is very little difference in average daily elevation at West Point between Scenario D and the PAA (Figure 19). The difference in average daily elevation at Walter F. George between Scenario D and the PAA is almost nonexistent (Figure 22). In terms of minimum daily elevation, the greatest impact of Scenario D in comparison to the PAA is less than 0.7 feet in West Point (in the month of October), and less than 0.4 feet at Walter F. George (in December). (See Figures 20 and 23.) At the time when West Point and Walter F. George typically reach their lowest elevation in a year (usually in November or December), there is little difference between Scenario D and the PAA. Even less change is evident in the elevation duration curves for Lakes West Point and Walter F. George (Figures 21 and 24).

Power Generation

The projected water withdrawals and Corps' proposed operations necessary to support them will not have a material impact on the production of hydropower at Buford Dam. Under Scenario D, with water supply needs of 621 mgd for the Metro Atlanta Area and Corps-adjusted 2007 demands elsewhere, the daily average energy generated at Lake Lanier is modeled to be 314 MWh (Figure 25), and the annual average energy generated at Lake Lanier is modeled to be 114,744 MWh. In comparison, the daily average energy generated under the PAA is modeled to be 315 MWh and the annual average is 114,962 MWh. Thus, assuming updated 2050 water supply demands in the Lanier and upper Chattahoochee reaches, there would be a 0.2% reduction in power produced at Buford Dam compared to the PAA.

As shown by Figure 25, Georgia's future water supply demands will have very little impact on the total amount of energy produced by all of the federal reservoirs in the ACF Basin. Under Scenario D, when Georgia has reached demands of 621 mgd, the daily average energy output from all ACF federal reservoirs is modeled to be 2,635 MWh (annual average 961,923 MWh). The daily average energy output under the PAA is 2,637 MWh, and the annual average is 962,511 MWh. Thus, there will only be a

reduction in daily average generation of 2 MWh (annual average reduction of 588 MWh) for all reservoirs combined. For the combined generation of all of the federal reservoirs in the ACF Basin, there is only a 0.1% reduction under Scenario D.

Recreational Impact

The impact to recreation is shown in Figures 26 through 28. In Scenario D as compared with the PAA, there is a slight improvement on the percentage of IIL and RIL (both by roughly 1%) and very little difference on WAL (Figure 26).

The recreational impact on West Point is minor. At West Point, the extent of recreational impacts under the IIL and WAL are about one percent more in Scenario D when compared to the PAA, while the recreational impacts of RIL is the same (Figure 27). At Walter F. George, there is no difference in the extent of recreational impact under all three impact levels. The elevation of Walter F. George does not fall to the RIL or WAL in either of the two scenarios (Figure 28).

Flow at Columbus

Again, flows at Columbus between the two scenarios are very similar. For example, a flow equal to or lower than 1,350 cfs, which is tracked by Columbus stakeholders, occurs 5.2% of the time in the PAA, and 5.3% in Scenario D (simulated 1939-2011). From a water quality compliance perspective, the frequency of flows at Columbus below a daily average of 1150 cfs is an important measure for comparison among scenarios. Under both Scenario D and the PAA, this percentage is 3.2% (simulated 1939-2011).

State Line Flow

There is no noticeable difference between Scenario D and the PAA, in terms of the flow duration curve at the Georgia/Florida state line, which again suggests that the updated water supply needs in the metro Atlanta area will not result in any significant change in state line flow when compared to the PAA. (See Figure 29.) When we look more closely at the portion of the graph between the 80 and 95 percentiles exceedance, the curve resulting from Scenario D is barely below the curve resulting from the PAA (see Figure 30). At the very bottom (the lowest 5%) of the duration curve, note that there is no difference between the two scenarios. When Georgia's updated 2050 water supply needs are evaluated against the PAA with an alternative basin-wide water use (Corps-adjusted 2007 demand), these needs do not have a material effect on the Corps' minimum flow operation and thus do not change the state line flow in this range.

Navigation

Using staff-developed navigation performance measures, we found no difference between Scenario D and the PAA. Thus Georgia's updated water supply needs will not have any material impact on navigation availability compared with the PAA.

In conclusion, Scenario D performs essentially the same as the PAA in all of the performance measures we evaluated. This confirms our finding from the previous sub-section that Georgia's 2015 Water Supply Request is not materially different from what the Corps already considered and proposed in the DEIS.

III. Water Management Evaluation

Peachtree Creek Flow Target

The Corps operates Buford Dam to provide flow to support a flow target just upstream of the confluence of Peachtree Creek and the Chattahoochee River. This location is about two miles downstream from the USGS gaging station of Chattahoochee River at Atlanta, GA (02336000), and almost immediately downstream from the City of Atlanta's raw water intake. Treated wastewater is discharged into the Chattahoochee River just downstream from Peachtree Creek from the Cobb County R.L. Sutton Water Pollution Control Plant (WPCP) and the Atlanta RM Clayton WPCP. These discharges and corresponding water quality in the river are closely associated with the flow target at Peachtree Creek.

Through coordinated operations with the Atlanta Regional Commission and Georgia Power Company, the Corps, after receiving forecast tributary flows between Buford Dam and the Peachtree Creek confluence, ensures that releases from Buford Dam are enough to meet the needs of water withdrawal facilities along the Chattahoochee River and to meet the above-mentioned flow target after the withdrawals take place. The coordination has a mid-week correction mechanism to account for any errors in forecasting water supply needs and tributary flows.

In practice, this flow target is met by Georgia Power Company operating its Morgan Falls project to meet water supply needs downstream of Morgan Falls (Cobb County and the City of Atlanta) and the flow target at the Peachtree Creek confluence. The Corps schedules peaking hour generations at Buford Dam to make sure there is enough water stored at Morgan Falls to meet the combined needs. In water quantity modeling (HEC-ResSim presently and HEC-5 previously), Morgan Falls is treated as a run-of-river project, and the water supply needs and the flow targets are met directly with release from Buford Dam. The modeling is consistent with the practice in the sense that any potential deficit in meeting either water supply or the flow target at Peachtree Creek confluence is eliminated by additional release from storage at Lake Lanier.

Historically, the Corps has operated Buford Dam to provide a flow target of 750 cubic foot per second (cfs) throughout the year. In previous drought years, the State of Georgia has asked the Corps to lower the flow target temporarily during the colder wetter months. The State presented to the Corps the water resource benefits of preserving water during times of relative abundance in a drought year. The State also addressed water quality concerns, demonstrating compliance to water quality standards of both simulated and observed dissolved oxygen concentrations in the Chattahoochee River. After consideration and technical evaluation of the State's requests, the Corps implemented reduced flow support to 650 cfs during the years of 2008, 2009, 2011, and 2012, with no consequent violations of water quality standards.

The Corps' successful implementation of flow target reductions in the wetter periods of the drought years indicates that the operation of Buford Dam can be modified without negative effects on water quality and other aspects of the Chattahoochee River. These successful reductions suggest consideration of further reductions in the flow target at Peachtree Creek in the wetter periods of all years to achieve storage benefits at normal times and reduced probabilities of the system entering drought operations.

The models used to evaluate the benefits of a reduced flow target at the Peachtree Creek confluence on the lake levels are a set of ACF Basin HEC-ResSim models, which were released together with the DEIS in October 2015. We used two alternatives from this set of models. The first one is what the Corps refers to as the No Action Alternative (NAA) reflecting current water use and water management. In this alternative, the Peachtree Creek flow target is set at 750 cfs for the entire year. The second alternative is the PAA, as discussed above. In the PAA, the Corps revised the Peachtree Creek flow target to 650 cfs during the wetter and colder half of the year (November through April). In order to evaluate the effect of further reducing the flow target during the wetter and colder half of the year, we formulated a third alternative, which we refer to as the PAA Reduced or the PAA 550. The PAA Reduced has a November through April Peachtree Creek flow target of 550 cfs, but is otherwise the same as the PAA. In both the PAA and the PAA Reduced scenarios, the flow target remains at 750 from May through October.

Note that the water demand used in the NAA is not the same as that in the PAA. The Corps used Georgia's 2007 recorded water demand (128 mgd of withdrawal from Lake Lanier and 277 mgd from the upper Chattahoochee River) as the basis of the demand set in the NAA. The PAA, however, incorporated 225 mgd of Georgia's request of 297 mgd from Lanier and 408 mgd from the upper Chattahoochee River.[11] The newly formulated PAA Reduced (PAA 550) has the same demand as in the PAA. A comparison between the NAA and the PAA (or the PAA Reduced) therefore does not evaluate the effect of reduced Peachtree Creek flow targets. The beneficial effect of reducing the Peachtree Creek flow target in the wetter and colder time can best be seen in a direct comparison between the PAA and the PAA Reduced (PAA 550).

As can be seen in Figures 31 through 35, there is a persistent Lanier storage benefit through the most severe droughts recorded in history from the reduced winter/spring Peachtree Creek flow target in the PAA Reduced as compared to the PAA. The maximum benefit through the most severe drought, the 2007-2009 period, is 1.4 feet in elevation, or roughly 44,000 acre-feet in storage. The benefits from a reduced Peachtree Creek flow target in other droughts are less substantial, but still evident. For example, the storage benefit from the PAA Reduced (PAA 550) can be as much as 0.9 feet (or almost 30,000 acre-feet) in 1956, 0.9 feet (or more than 29,000 acre-feet) in 1989, 0.7 feet (or more than 22,000 acre-feet) in 1986, and 0.6 feet (or more than 21,000 acre-feet) in 1941.

Those higher Lake levels then provide system benefits to the entire Basin. In a drought year when basin inflow is lower than average and competing needs in the Basin stretch limited resources, maintaining storage in the Lake, the most upstream storage reservoir, preserves maximum operational flexibility to

[11] In the PAA, 40 mgd comes from the Glades Reservoir. In the PAA Reduced (PAA 550), that 40 mgd comes from Lake Lanier.

meet all authorized purposes and reduces the amount of time- by five months – that the Basin is in drought operations.

Looking at flows in the middle Chattahoochee reach, no impact is evident from the change in the Peachtree Creek flow target. A comparison of flow exceedance at Columbus was made among the NAA, the PAA, and the PAA Reduced (PAA 550) scenarios. The difference in flows below 2,000 cfs among the scenarios is almost non-existent.

For flows below a daily average of 1150 cfs in the middle Chattahoochee reach, a measure important from a water quality compliance perspective, there is also little difference between the scenarios. Under the NAA, the PAA, and the PAA Reduced (PAA 550) scenarios, the percentages are 3.1%, 3.2% and 3.2% (simulated 1939-2011).

Looking at water quality parameters specifically, water quality can be protected with a reduced Peachtree Creek flow target in the November-April time period. Based upon dissolved oxygen (DO), the parameter long tracked as a key indicator of conditions in the upper Chattahoochee River, lowering the Peachtree Creek flow target in the winter months does not present a water quality challenge downstream. Given past problems with DO in this reach, the significant improvements that have been made with respect to this parameter, and the significance of DO in determining wasteload allocations, Georgia believes that any changes in the Peachtree Creek flow target must be acceptable from a DO perspective.

The hydrodynamic water quality model GA RIV-1 was used to assess dissolved oxygen in the Chattahoochee River under NAA, the PAA, and the PAA Reduced (PAA 550). Specifically, model results at the DO sag near Dog River, the point of minimum DO concentration in the river below the wastewater discharges in the metro Atlanta area, were assessed for compliance with the instream dissolved oxygen water quality criteria (daily average of 5.0 milligrams per liter [mg/l] and not less than 4.0 mg/l). Specifics on the Metropolitan Chattahoochee River Model used for this evaluation are provided in Appendix E.

Results demonstrate that DO criteria are expected to be met throughout the year under all three alternatives. Table 4 provides the model results for the minimum daily average DO concentrations by year. Figure 36 shows the model results for daily average DO concentrations for each year for the NAA; Figure 37 shows the daily average DO concentrations for each year for the PAA; and Figure 38 shows the daily average DO concentrations for each year for the PAA Reduced (PAA 550). These results show that the DO criteria are met throughout the simulation period for each alternative.

Table 4: Minimum Predicted Dissolved Oxygen Concentrations by Year

	Minimum Daily Average DO Concentration (mg/L)		
Year	NAA	PAA	PAA Reduced (PAA 550)
2000	4.97	4.95	4.96
2001	5.14	5.37	5.46
2002	5.19	5.08	5.18
2003	5.75	5.73	5.83
2004	5.38	5.32	5.45
2005	6.09	5.92	6.04
2006	5.29	5.08	5.14
2007	5.12	5.00	5.02
2008	5.21	5.12	5.20

For other parameters for which water quality standards have been defined, ecosystem response as well as assessment and management, are more complex than for dissolved oxygen. The best available data indicate that, under both the PAA and the PAA Reduced (PAA 550) alternatives, with implementation of the state's ongoing water quality management programs, waters that currently support designated uses would be expected to continue to do so and continued progress toward restoration would be expected for waters that are currently impaired.

West Point Potential Rule Curve Revision and Flood Risk Mitigation Operation

Water Resource Benefit of Rule Curve Revision

West Point Reservoir is the second largest federal storage project in the ACF Basin. It has 306,131 acre-feet of conservation storage at its summer (full) pool level when elevation is maintained at 635 feet MSL. In anticipation of seasonal precipitation and high inflow events, the Corps lowers the top of conservation pool from 635 feet MSL at the end of October to 628 feet MSL in mid-December. This is called a winter drawdown. The Corps keeps the project at 628 feet MSL from mid-December to mid-February, when a gradual rise of the rule curve starts toward a full pool level again in June. The drawdown from 635 feet MSL to 628 feet MSL corresponds to a storage difference of 162,500 acre-feet, or 53% of West Point conservation storage. In the drawdown period, this storage space is available for storing flood water from expected seasonal high precipitation events.

From the water resource management perspective, there are several potential issues with the winter drawdown, especially one as sharp as this one. First, the drawdown causes a large amount of stored water to be released from the federal reservoir system in the late fall, when the biological growing season for biota in the river is over and the need for release to the river is not as much as in the riverine growing season. Second, the Corps defines the period between December and February as the refill season for the federal reservoirs. The winter drawdown contradicts the concept of a refill season, when the amount that can be stored is greatly limited by the depressed winter storage capacity. Third, the rise of rule curve largely corresponds to what is called Sturgeon Spawning Season (March through May)

under the Corps' basin-wide operation scheme. The Sturgeon Spawning Season happens to be the season with the largest minimum flow requirement in the Apalachicola River. The need to refill federal storage, including West Point Reservoir, to the full pool level is in direct competition with calls for higher releases for downstream purposes. Last but not least, the drawdown itself and the potential (as well as real experience) that West Point may not be refilled to its full pool level at the beginning of summer hurts Congressionally-authorized recreational purpose of the West Point project.

Stakeholders in the West Point area have long expressed the need to study the potential for eliminating or limiting the extent of the winter drawdown to improve conditions for the Congressionally-authorized recreation at the project. The Corps has countered that any reduction in winter drawdown, or increase in winter pool levels, would reduce the amount of seasonal flood retaining storage and thus be detrimental to flood risk mitigation operation. For this reason, the Corps did not consider raising the West Point winter rule curve in the Water Control Manual update process.

Georgia EPD has worked with stakeholders in the West Point Reservoir area and understands their positions. Prior work done by the Hydrology Unit and other consultants shows appreciable water resource benefits from raising the winter rule curve, not only at West Point, but also at Lanier and other locations in the basin. EPD's latest modeling based on the Corps' PAA model (with changes made only to increase West Point winter rule curve from 628 feet MSL to 632 feet MSL) again demonstrates such benefits. Figures 39 to 43 show storage benefits to West Point in the years of 1981, 1986, 2000, 2004, and 2006. The maximum elevation benefit to West Point is 4.8 feet in year 1954. Figures 44 to 47 show storage benefits to Lanier in the years of 1981, 2000, 2004, and 2006. The maximum benefit to Lanier is 1.84 feet in year 2004. There is also a slight improvement in recreational impact to both Lanier and West Point (Figures 48 and 49). Looking at flows in the middle Chattahoochee reach, modeling indicates that flows important for water quality compliance would not be affected by the rule curve change, with flows at Columbus equal to or great than 1150 cfs the same percentage of time under the higher rule curve as the current rule curve. Finally, an increase in the winter rule curve is likely to benefit water quality in West Point Lake. Higher water surface elevations generally contribute to lower levels chlorophyll a in reservoirs, and water quality modeling undertaken by Georgia supports that conclusion.

Revision to Flood Risk Mitigation Operation

Georgia EPD understands the reason behind the Corps' reluctance to consider a revised West Point winter rule curve. However, a review of the Corps' flood mitigation operation in the past and a revision to the existing procedure to reduce flood risk would allow the Corps to consider raising West Point's winter rule curve without having negative impacts on flood mitigation operations.

The Corps kindly provided Georgia information regarding its flood risk operations during May 2003, one of the most substantial flood events in recent history. EPD's review suggests that quicker response to high volumes of inflow to the West Point project might have avoided large volumes of water being stored in the reservoir and the project's elevation rising toward the top of the flood mitigation storage (640 feet MSL according to the ACF ResSim model). Figure 50 shows time series of West Point inflow, release, and pool elevation from May 3 to May 10, 2003. It can be seen that, as the 3-hour inflow to the

project rose above West Point's power house capacity of around 16,500 cfs (approximately at 10:00 May 6, 2003) and continued to increase, the project release lagged behind inflow for 54 hours (until 16:00 May 8, 2003). At one point, release was less than inflow by as much as 92,400 cfs.

The Corps has since handled a fast rising flood pool and large volumes of inflow quite effectively in both 2009 and most recently in December 2015, accomplishing this in the face of limitations posed by real-time, incomplete information. To move beyond a focus on past flood events and post-hoc assessments using total knowledge of the incoming flow sequence, EPD worked with the Corps and the National Weather Service Southeast River Forecast Center (SERFC) to test the incorporation of probability-based forecast information in flood risk mitigation operations and seek revised flood mitigation procedures to reflect this incorporation. In this approach, the modeler/operator does not have full knowledge of the incoming flow sequence. Instead, he or she has project information and forecast information one time step at a time. In other words, the modeler/operator is in a virtual flood mitigation operation. The goal is to identify revised procedures with clear rules on when certain actions need to be taken given inflow seen at the project, runoff conditions in the contributing drainage area, and probability of certain levels of precipitation in the near future.

It is reasonable to think that in 2003 the project elevation would not have risen so fast toward the top of flood mitigation storage had the Corps made earlier and higher releases (not exceeding inflow on the rising limb of an event of course) with the beneficial information of "water on the ground" – defined as runoff that has already materialized in the reservoir's contributing drainage area but has not yet reached the storage (and thus remaining temporarily "unaccounted for" to the project inflow) – and "water in the air" or forecast of precipitation in the short term (a few days). Such a forecast of inflow would give the Corps early information on how much water is on its way to the project and with how much certainty. Armed with this information, the Corps can make early releases to "match inflow," even when the "inflow" is still on its way to the project and has not quite reached the reservoir yet, and thus avoid the delayed action that was observed in events such as the May 2003 one.

Georgia EPD contracted with Hydrologics to develop revisions to the West Point flood mitigation operation based on the Corps' flood control procedure as reflected by the Corps' 1989 Draft Water Control Manual[12], the Corps' recorded project operation data (elevation, inflow, and releases), recorded flow sequence by USGS, and flow and precipitation forecast made by SERFC between 2005 and 2015.

The study was designed to evaluate two questions: Is it possible to design a rule or a set of rules, given real-time gage readings from USGS and forecast information from SERFC, that would (1) allow for earlier releases from the West Point project to achieve lower peak release and no worse peak reservoir elevation, and (2) minimize false actions that lower reservoir elevation unnecessarily and have a negative effect on West Point and system storage?

The study demonstrated that both outcomes are achievable. As shown by the Hydrologics Report (Appendix F), the modeler/operator was faced with the same inflow conditions, same real-time gage readings from USGS, and the same SERFC forecast of stream flow and precipitation. After the single

[12] At the time EPD contracted this work, the DEIS was not available.

value SERFC forecast has been transformed into probability-based ensemble forecast, a set of rules designed to help the operators take certain actions, including what we call Inflow Following Rule (IFR), was incorporated into a flood operation model. This revised flood mitigation operation was then tested with real-time conditions between 2005 and 2015. The rules were revised in an iterative manner, and the results show that, during the September 2009 flooding event, substantially lowered peak release (by 15%) from West Point (by extension a lower risk flood operation) could have been achieved with the forecast information and the new rules (Figure 51). This was achieved not at the expense of reservoir storage either, since after-event reservoir elevation barely changed and the long-term reservoir elevation exceedance curve was almost identical to the operation without the new rules. Details of this study can be found in the Hydrologics Report attached to this memorandum in Appendix F.

This study demonstrated that a revised flood mitigation operation based on probability-based forecast information is not only possible but also effective in reducing flood risks and easy to implement. Furthermore, the current formulation of the rules and the parameters in the rules are just examples of what could be implemented. Other parameter values or other forms of rules aimed at reducing flood risks can also be tested. Georgia EPD encourages the Corps to continue to work with the State and SERFC in pursuit of reduced flood risks and increased water resource benefits from West Point Reservoir.

Navigation

The Corps has not implemented any meaningful navigation operation since 1999, mostly because the lack of navigation demand and Corps' inability to obtain necessary 401 water quality certification from the State of Florida for dredging and snagging operations to maintain navigation channels.

In the newly released DEIS, the Corps proposes to resume navigation operation on a regular basis for the wetter period of January through April (or May depending on hydrologic conditions) of each year. The Corps contemplated providing only a seven-foot channel for navigation though, requiring a flow of 16,200 cfs as measured at Apalachicola River at Blountstown, Florida.

Georgia EPD has serious concerns over the proposed navigation for a number of reasons and those concerns are discussed in more detail below.

First, the incorporation of navigation operation substantially increased the number of days when the ACF system is under drought operation. EPD staff took the Corps' PAA model and formulated a PAA No Navigation alternative by turning off the navigation operation. The PAA No Navigation alternative would result in a total drought operation of 3,622 days of the 1939-2011 period of simulation. In comparison, the Corps' PAA alternative with navigation operation would result in a total drought operation of 4,833 days. This is a 33% increase in drought operation. Furthermore, while the PAA No Navigation alternative would not result in any days of Extreme Drought operation, the PAA alternative with navigation operation would cause the system to be in Extreme Drought operation for 61 days.

The effect of PAA navigation operation, in comparison to the no navigation alternative, can be seen in Figures 52 through 60. Navigation triggers and drought triggers are expressed in a binary manner, with the value 1 representing "on" and 0 representing "off" conditions.

In previous analyses of the Corps' operation of the ACF system, EPD staff has seen in general drought operations taking place in the typical drought years of the 1950's (1951, 1954-1956), the 1980's (1981, 1986, and 1988-1989), the turn of the century (1999-2001), and the most recent ones (2006-2008). Upon review of the PAA alternative, however, staff noticed typical non-drought years with drought operation taking place. For example, drought operations closely follow navigation operations in 1940, (Figure 52), in 1985 (Figure 56), in 1992 (Figure 57), and in 2004 (Figure 58).

Even in the typical drought years when drought operations would usually occur, the PAA alternative with navigation operation would bring on drought operation earlier than the one without navigation. Also, the onset of drought operation in these times usually immediately follows the conclusion of a navigation operation, which strongly indicates causation. For example, under 1941 hydrology, a drought operation would occur in May under the PAA alternative without navigation. Under the PAA with navigation, however, the drought operation would take place in March, immediately after a navigation operation from January to February 1941 (Figure 52). Under hydrologic conditions of 1954 to 1956 and the PAA alternative without navigation, there would not be a drought operation until July 1955, and it would only last until May 1956. With the PAA navigation alternative, however, the drought operation would start in June 1954, more than a year earlier, and would linger on and off until early 1957 (Figure 54). Similar situations can be seen with the hydrology of 1981 (Figure 55), 2006-2008 (Figure 59), and 2011 (Figure 60).

Second, in the navigation season of drought or drier years, the system cycles multiple times between the two extremes of a navigation operation, when 16,200 cfs is needed, and a drought operation, when only a 5,000 cfs flow requirement is present. This reversal between two extremes is directly contradictory to the Corps' desire for steady operation and smooth transition.

The reversal can be seen under various hydrologic conditions. For example, under 1942 hydrology, the system would be operated for a month of navigation before it plunges into a drought operation in the next two months, which is then followed by another two months of navigation (Figure 52). Under 1951 conditions, the system would experience almost two months of navigation followed by a month of drought operation, which is then followed by another two months of navigation and another two months of drought operation (Figure 53). Similar bipolar behavior can be seen under 1957 (Figure 54), 2006-2007 (Figure 59), and 2011 (Figure 60) conditions.

Third, the mere prospect that navigation operation, which requires substantial flow support from storage, may take place in a drought year like 1954, 1981, 2006, 2007, and 2011 raises serious concerns. There appears to be no forecast hydrologic conditions used as a threshold for a navigation season to commence. Other than system Composite Storage being healthy at the beginning of a navigation season, there appears to be no hydrologic information that can be used to stop the implementation of

storage-costing navigation operation until that storage plunges into Zone 3 for a reversal to drought operation.

Georgia EPD encourages the Corps to establish an inflow forecast mechanism, one that is not unlike the one discussed in the section titled West Point Potential Rule Curve Revision and Flood Risk Mitigation Operation. Such forecast can help the Corps implement navigation operation only when conditions warrant such and avoid costly navigation operations that aggravate storage burdens in drought years.

Fourth, there appears to be an error in the navigation performance measure for some of the alternatives including the PAA. Staff was not able to replicate the navigation availability of the PAA with an evaluation tool developed using only descriptions provided by the Corps. For example, the Corps stated that the PAA has a 42.5% seven-foot navigation channel availability, while we could only calculate an availability of 21.9%. Using the same understanding and performance measure, the PAA without navigation requirement would have a 19.2% availability of seven-foot channel. This means that there is an increase of only 2.9% or a mere two years of additional navigation availability under the PAA navigation operation in the entire 73-year period. The cost of this gain in navigation, however, can be high as evidenced by a four feet difference in minimum Lanier elevation (between the PAA and the PAA No Navigation alternatives) and by the points above related to impacts on system storage and the increased emergency drought operation of the system.

Fifth, EPD staff has been successful in formulating an alternative to achieve the same level of navigation availability without the impacts on storage seen with the PAA. With minor changes to the navigation parameters, 21.9% navigation availability has been achieved with Lanier elevation virtually unchanged from the PAA No Navigation alternative. We encourage the Corps to work with EPD to further explore implementing more apt and more efficient navigation operations.

Finally, navigation operation should be implemented only when there is demand for navigation, and should not serve as a secondary and implicit flow requirement. In the navigation season of January through May, the flow requirement of 16,200 cfs can be much higher than flow rates determined by the RIOP Jim Woodruff release requirements. The Corps should not treat the 16,200 cfs as a flow that has to take place in the navigation season. This flow should only take place following an established process. Georgia EPD suggests the following as essential elements of such a process: clear declarations of needs from potential users, favorable hydrologic conditions as forecast by established protocols, close coordination among multiple users so the same flow concentrated in a short period can support many users, and an evaluation and declaration of storage impact from the Corps. EPD is willing to work with the Corps in developing this procedure and its elements.

Methodology of Alternative Evaluation/Performance Measures

Performance Measures for Endangered Species

In previous communications with the Corps and the US Fish and Wildlife Service (Service), Georgia EPD advocated developing performance measures based on physical evidence, rather than arbitrary beliefs that are not supported by science. In January 2013, EPD presented in writing the concept of the Georgia

Contemplation, an operation set based on performance measures designed to meet all authorized purposes, including biological needs of endangered species in the Apalachicola River.

EPD staff and contractors developed a spawning season operation to enhance the availability of sturgeon spawning habitat. Using performance measures of spawning habitat availability developed by the Service, the Georgia Contemplation provides better habitat availability than the RIOP does. Using floodplain connectivity performance measures developed by the Service, the Georgia Contemplation provides better continuous floodplain connectivity than the RIOP.[13]

Georgia EPD also pointed out the lack of physical evidence supporting performance measures for flows between 5,000 cfs and 10,000 cfs. In the various Biological Opinions the Service has issued on operation of Jim Woodruff Lock and Dam, enumeration of flows between 5,000 cfs and 10,000 cfs, and percentages based on those counts, served as the performance measures. The 2012 Biological Opinion attributes adverse effects to listed species in the 5,000 to 10,000 cfs range. EPD was able to show that this is not correct.

Using characteristics (depth of inundation and slope) identified by the Service as appropriate habitat in its Biological Opinions and bathymetric data the Corps collected of the Apalachicola River, EPD was able to derive the aggregated amount of potential habitat, suitable for fat threeridge mussels, at more than forty sites along the Apalachicola River, as a function of stage and flow. Contrary to the 2012 Biological Opinion, EPD found that the maximum amount of aggregated mussel habitat occurs at flows much lower than 5,000 cfs. The result clearly indicates that the performance measure of flows between 5,000 and 10,000 cfs as formulated by the Service is inappropriate.

EPD staff has had personal communications with Service staff on field investigations of fat threeridge mussels and their habitat. It is EPD staff's understanding that large areas of habitat and large populations of the endangered mussels have been found when flow was roughly 5,000 cfs. The density of the mussels in the surveyed habitat indicated a newly estimated population to be between 5 and 6 million, several times the original estimate thus, the latest study identifying both large amounts of habitat and large populations of mussels does not support that there are any gains associated with flows above 5,000 cfs. Another prospect of this finding is that the abundance of the mussels makes it possible for the Service to start a delisting process.

Thus, Georgia suggests that the Corps should utilize this new information obtained by EPD and the Service and discontinue using invalid low flow performance measures in evaluating operation alternatives.

Water Supply Performance Measures

Some of the performance measures used in evaluating alternatives appear to be inappropriate. For example, in Table 4.3-12 Water Supply Performance for Water Management at Lake Lanier, Columns 3

[13] Beyond improved biological performance measures, we have also seen better performances in terms of other benefits across the basin, including better storage conditions in the federal reservoirs, better recreation outcomes, similar hydropower benefits, and improved flow conditions at Columbus.

through 5 were used to compare alternatives in terms of the frequency of the reservoir being in different action zones. The problem is that the different alternatives have different action zone definitions, or the conservation storage was divided differently. How can a comparison of storage being in different action zones be achieved in a fair manner when the zones are divided differently?

Hydropower Performance Measures

EPD staff review of the hydropower power performance measures indicates potential errors in the calculation of capacity benefits at West Point and Walter F. George. For example, in Table 4.3-3, the West Point, Lowest Annual Hydropower Capacity seems to have been calculated with long-term average of the annual capacities, rather than the stated "lowest" annual capacity. The same was observed for Walter F. George (Table 4.3-4).

Recreation Performance Measures

There appears to be a double use of the same performance measure in evaluating the alternatives at all three federal reservoirs. For example, in Table 4.3-8, the Column "Number of days below WAL (1,060')" provides the same information as in Column "Percent of time below WAL (1,060')." The latter one appears to contain values in the first one divided by the length of the recreational season. In other words, the same standard has been applied twice in evaluating the alternatives.

Navigation Performance Measures

Following the Corps' description of navigation performance measures, EPD staff tried to evaluate alternatives provided by the Corps as well as additional ones considered by EPD staff. It was found that EPD staff could not replicate performances of all of the alternatives provided by the Corps. The ranking would have been different if staff understanding of the performance measures is correct.

Georgia EPD encourages the Corps to share its performance measure tools with the stakeholders so the alternative evaluation process is transparent and well understood.

Alternative Ranking

To make the alternative evaluation and ranking process transparent and fair, Georgia EPD encourages the Corps to put forward all of the evaluating tools and ranking sheets so all the stakeholders can verify the alternative evaluation process.

Index of Appendices

Appendix A - Memorandum from Katherine Zitsch, Director, Metro District, to Judson Turner, Director, Georgia Environmental Protection Division, regarding Projected Future Treated Wastewater Returns for the Chattahoochee River and Lake Lanier System (Jan. 25, 2016) and Memorandum from Katherine Zitsch, Director, Metro District to Judson Turner, Director, Georgia Environmental Protection Division, Regarding projected future water supply demand for the Chattahoochee River and Lake Lanier System (Dec. 2, 2015)

Appendix B - Memorandum from Nap Caldwell, Water Supply Section, Georgia Environmental Protection Division to Judson Turner, Director, Georgia Environmental Protection Division, regarding 2050 Water Needs of Dawson, Habersham, Lumpkin and White Counties (Dec. 2, 2015)

Appendix C - HEC-ResSim models: PAA', Scenario C, and Scenario D

Appendix D - Georgia 2015 Updated Water Supply Request demand spreadsheet at ACF_GA -2015-Request_621mgd_Demand_20160127_HL.xls.

Appendix E - GA Riv-1 Metropolitan Chattahoochee River Model Overview

Appendix F - Development and Testing of Alternate Forecast-Based Flood Operations Rule for West Point Lake, Georgia, (Sheer, Schaake, Lebherz and Zeng)

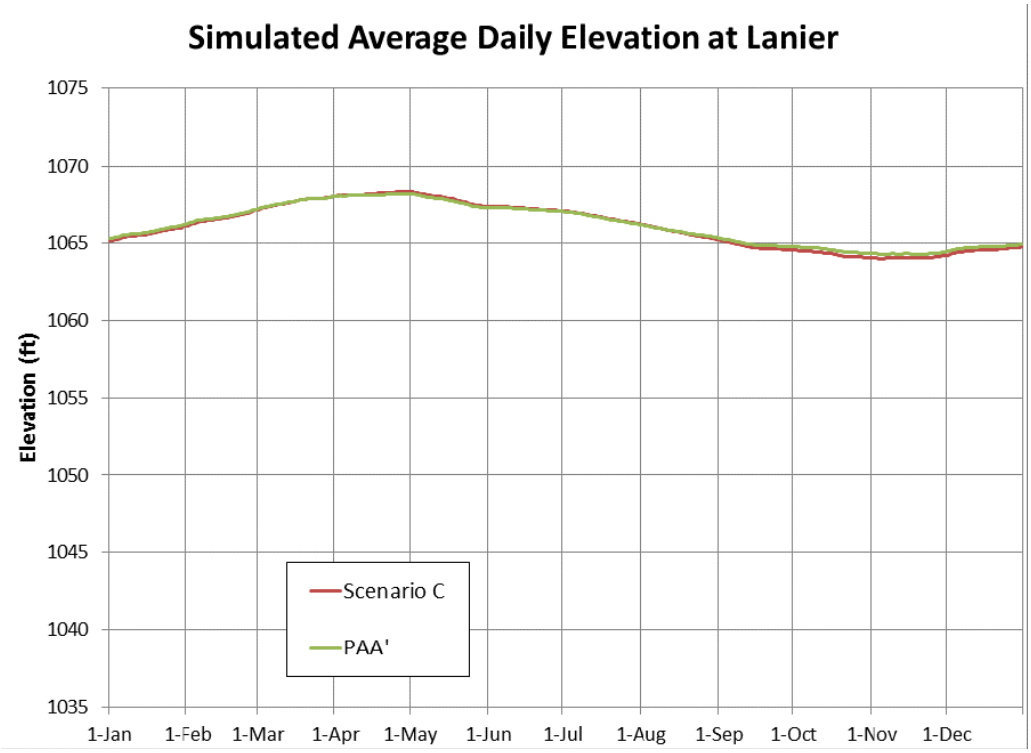


Figure 1. Simulated average daily elevation at Lake Lanier.

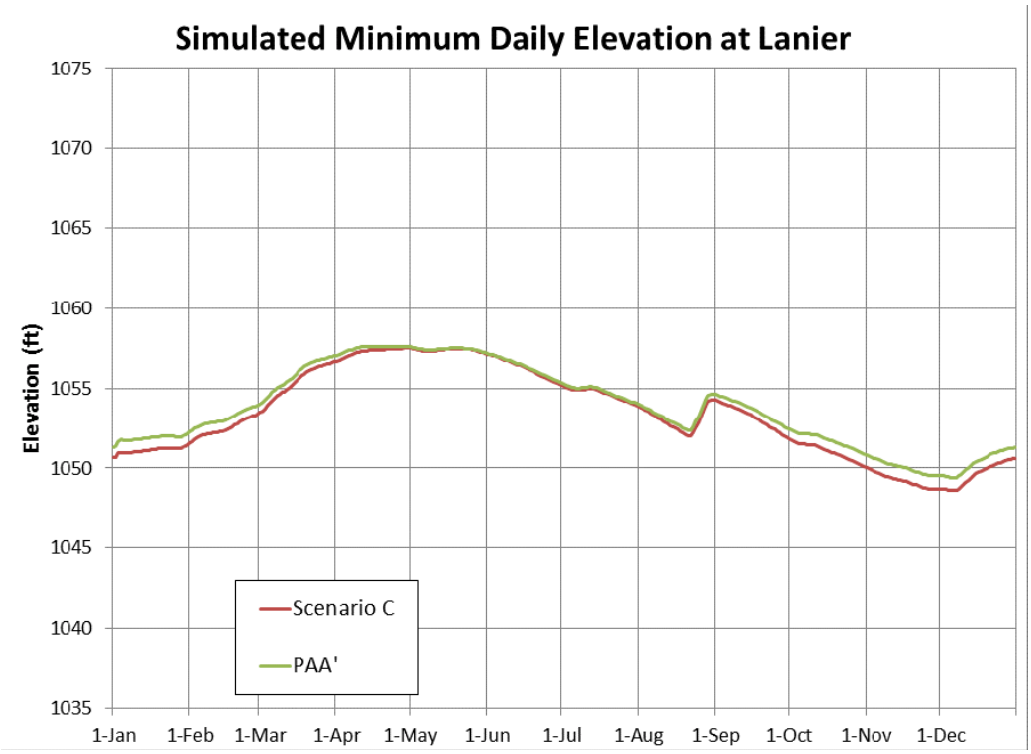


Figure 2. Simulated minimum daily elevation at Lake Lanier.

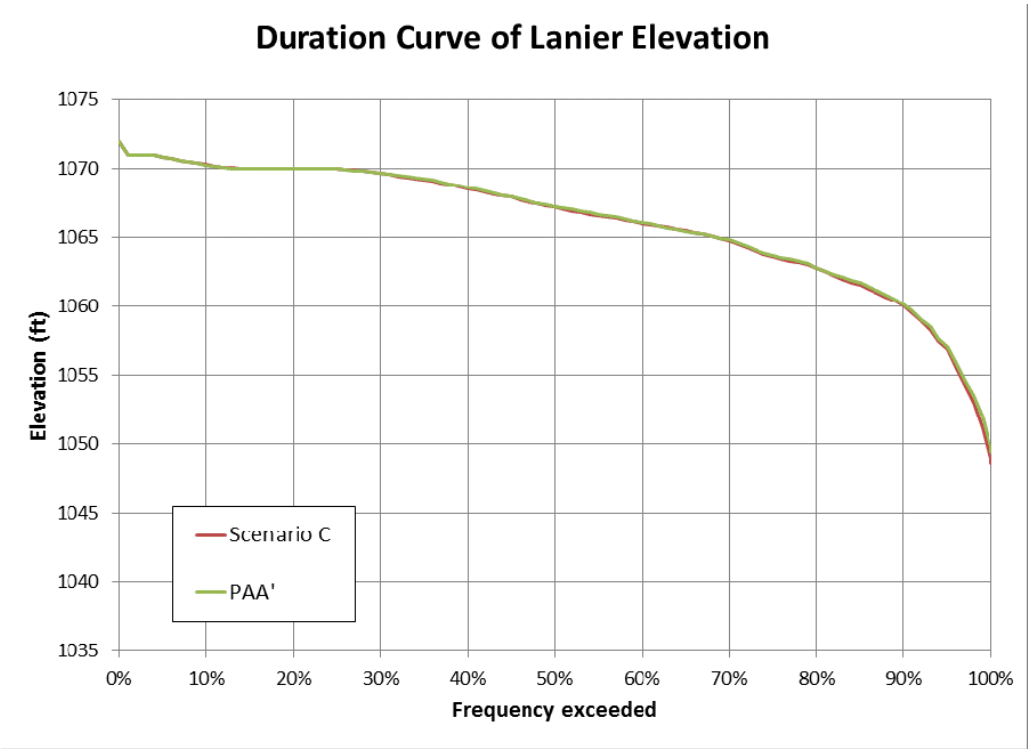


Figure 3. Duration curve of simulated Lanier elevation.

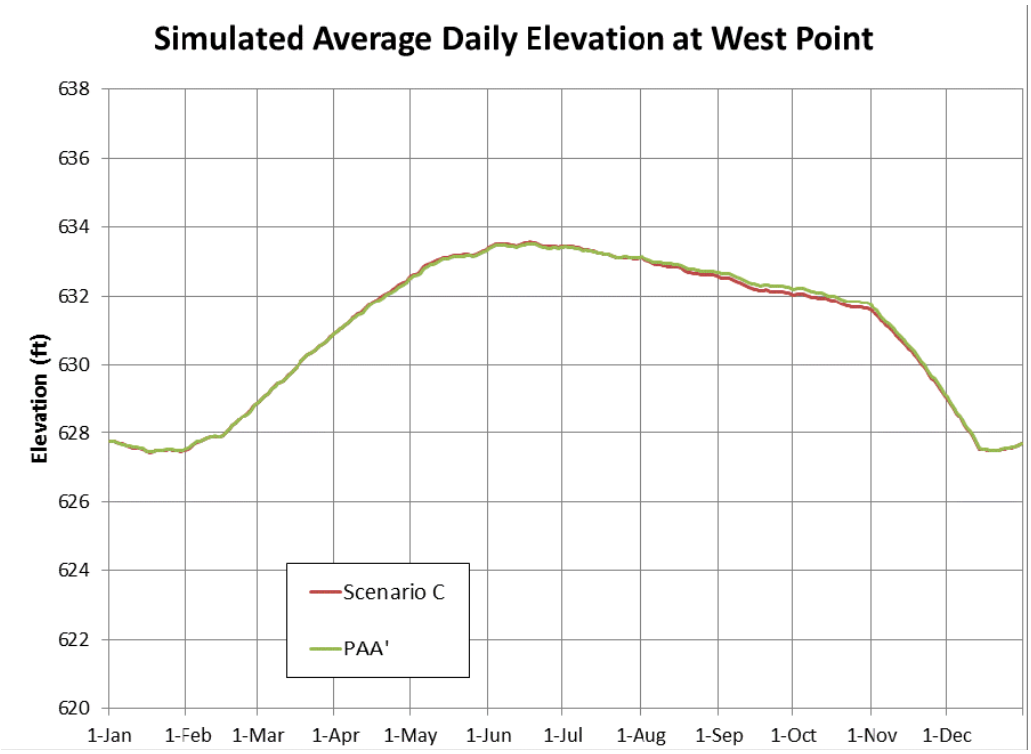


Figure 4. Simulated average daily elevation at West Point Lake.

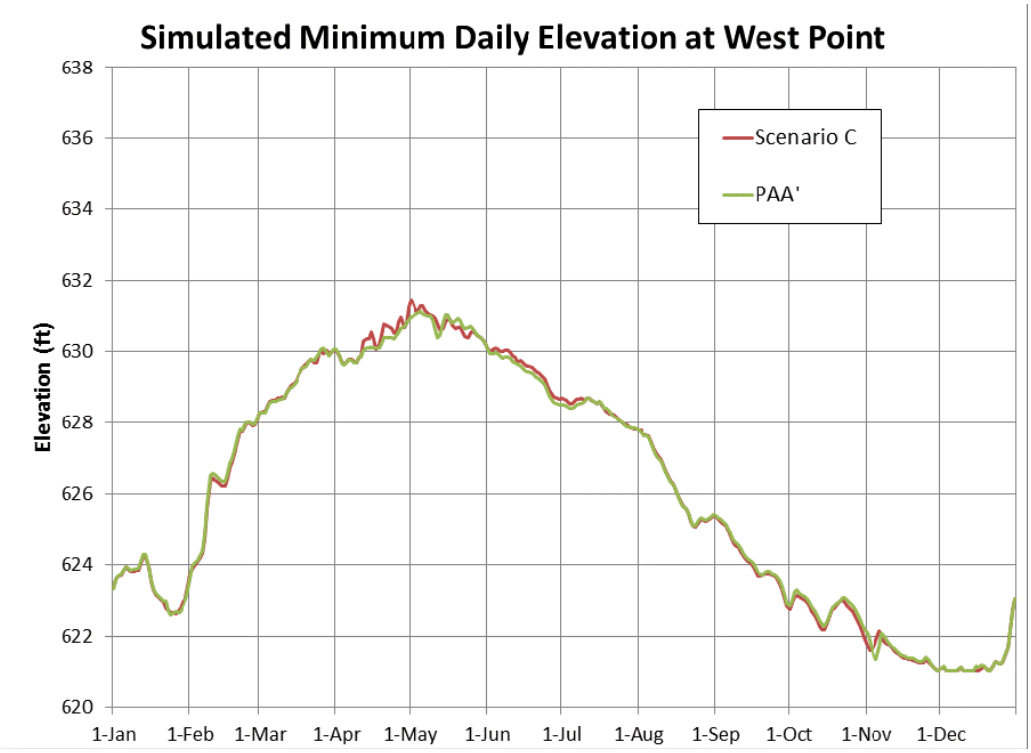


Figure 5. Simulated minimum daily elevation at West Point Lake.

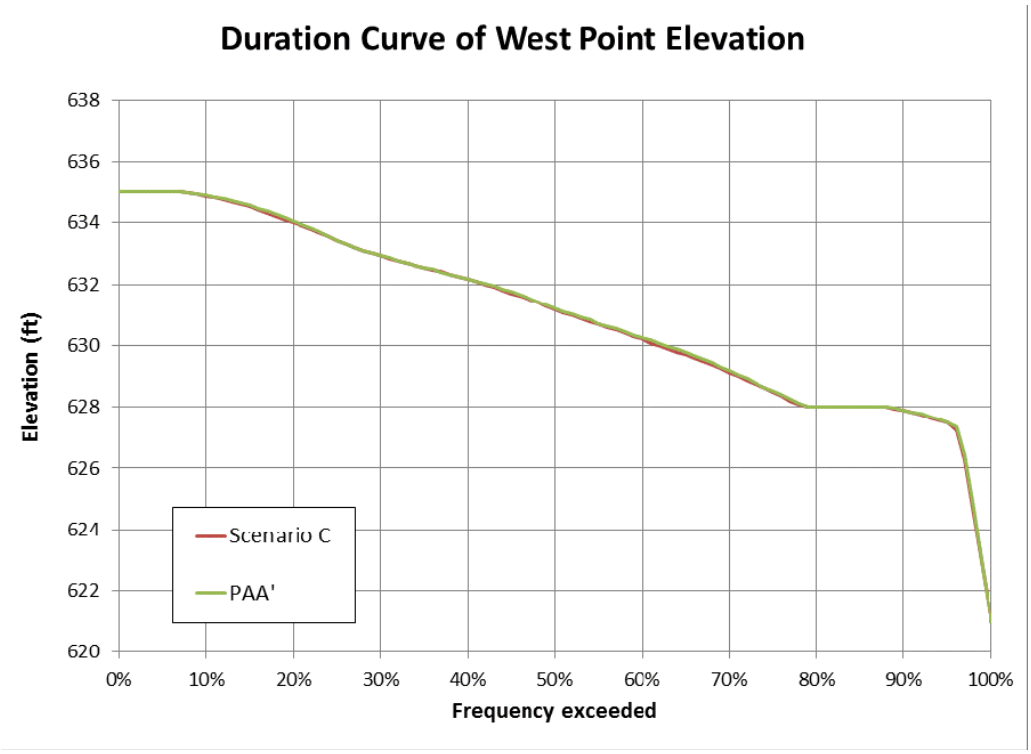


Figure 6. Duration curve of simulated West Point elevation.

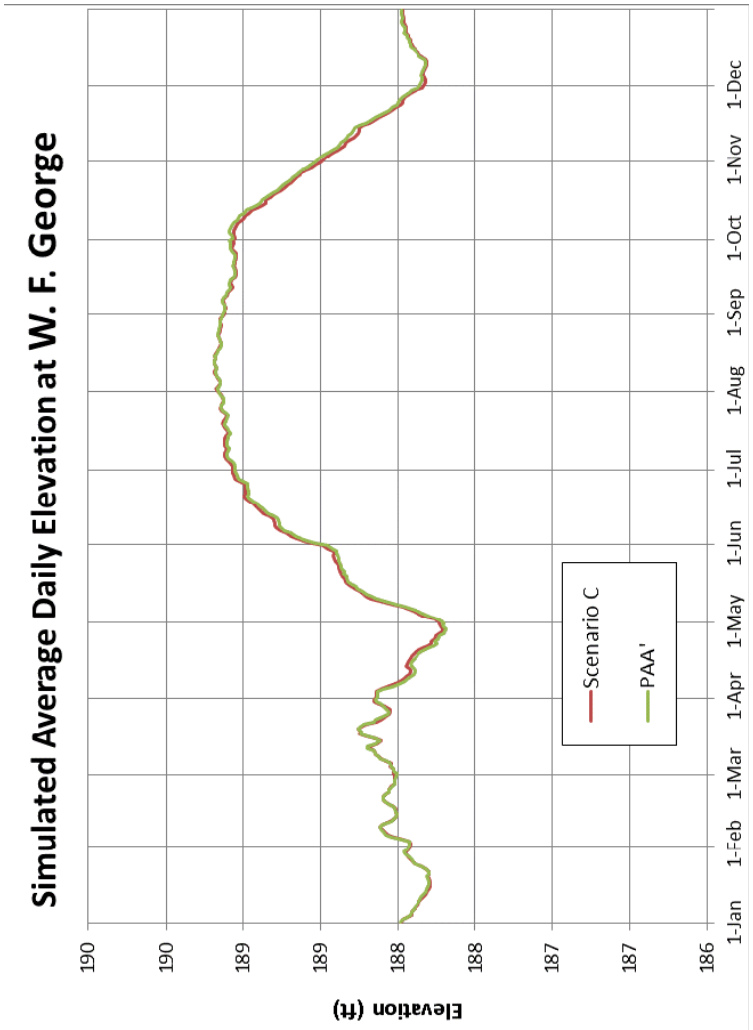


Figure 7. Simulated average daily elevation at Walter F. George Lake.

29

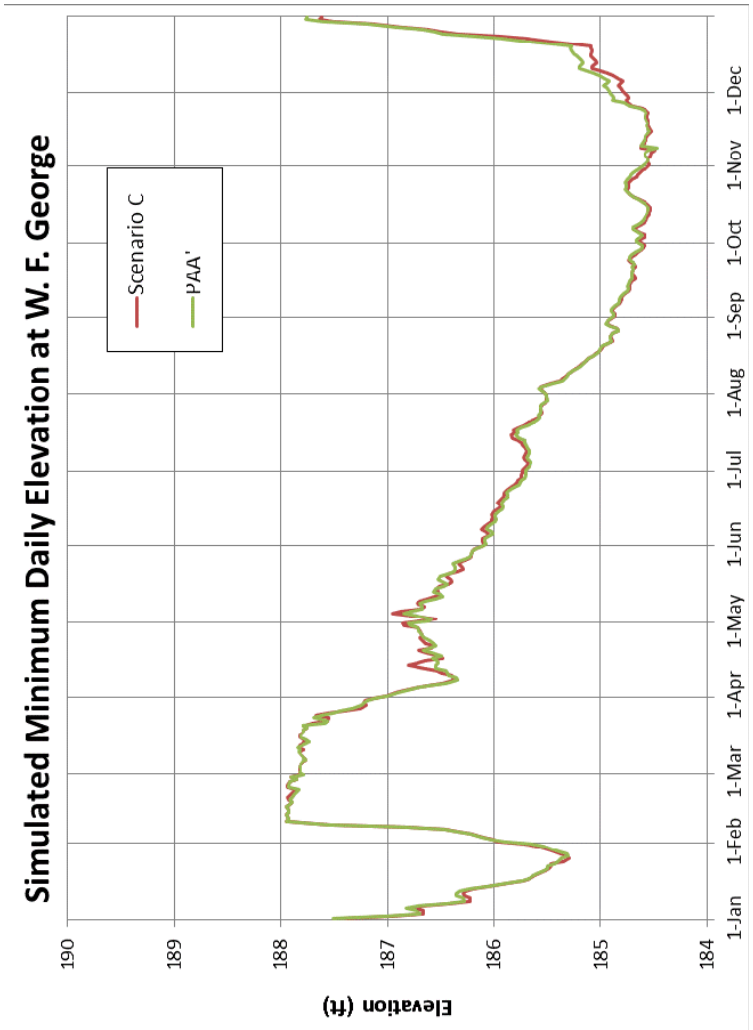


Figure 8. Simulated minimum daily elevation at Walter F. George Lake.

30

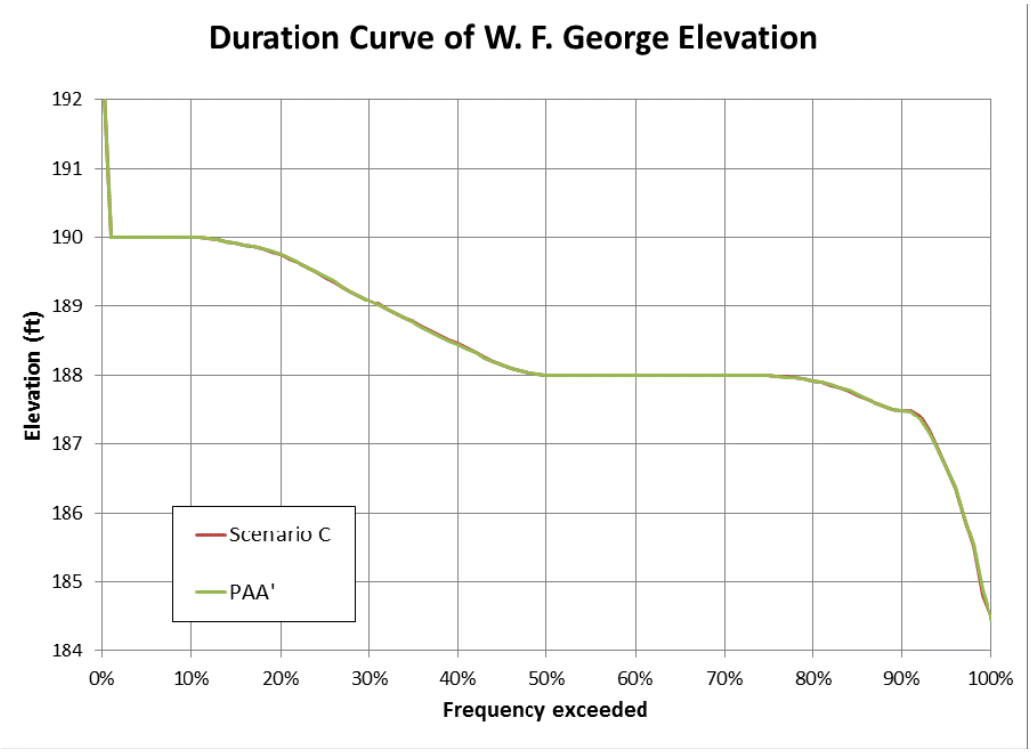


Figure 9. Duration curve of simulated W.F. George elevation.

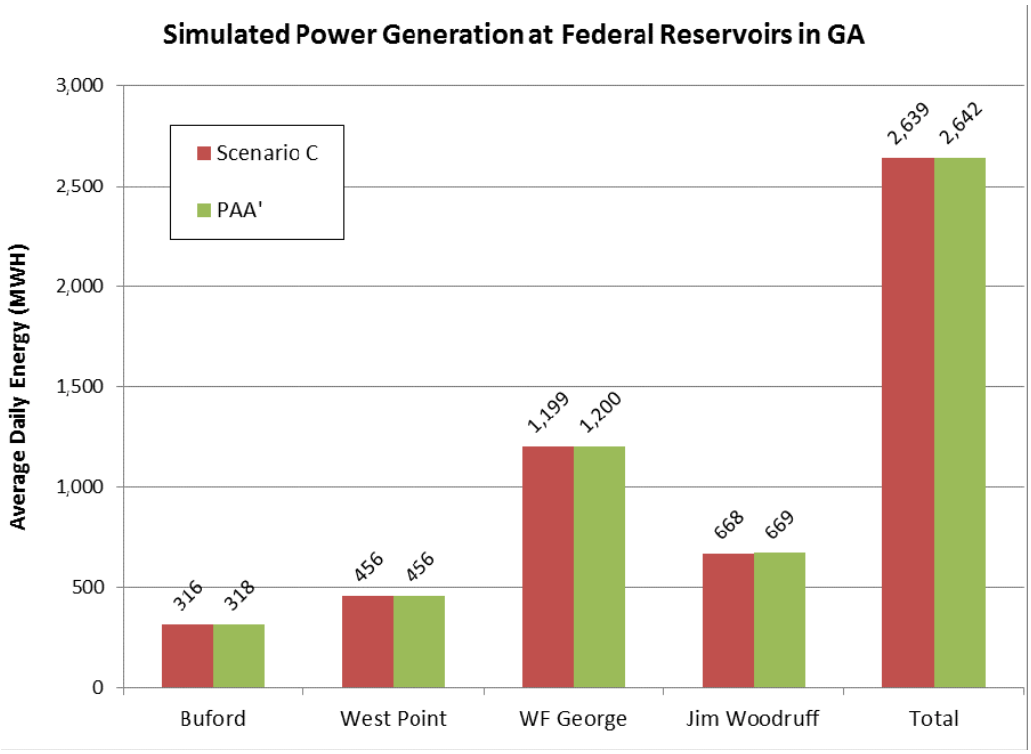


Figure 10. Simulated power generation at Federal reservoirs in Georgia.

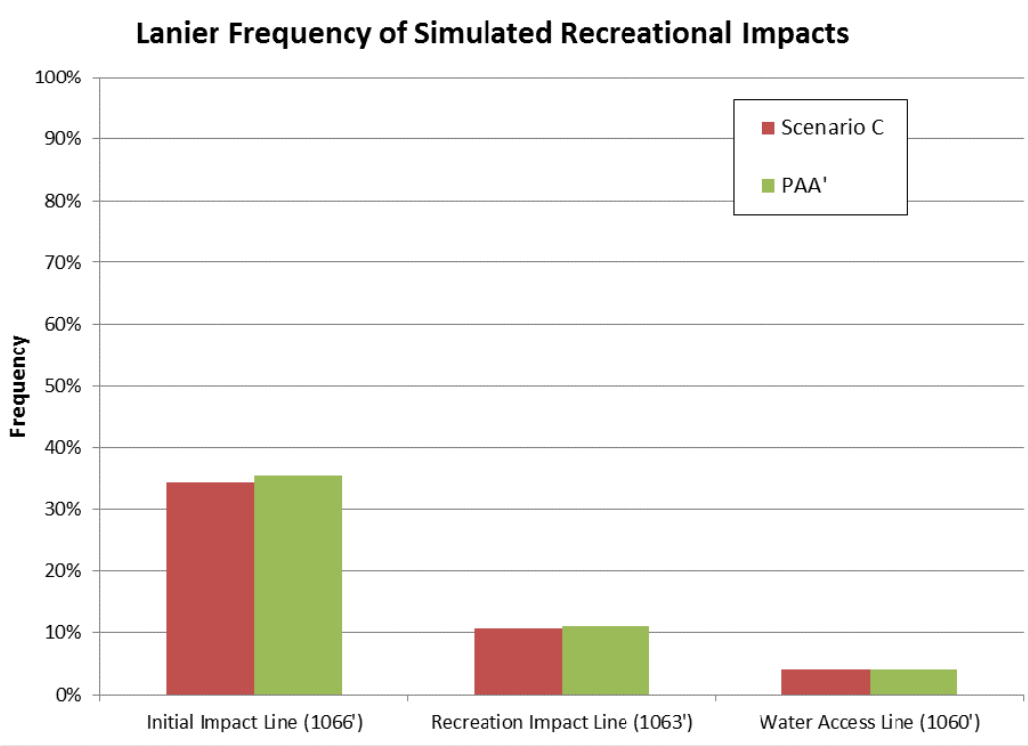


Figure 11. Frequency of simulated recreational impacts at Lanier.

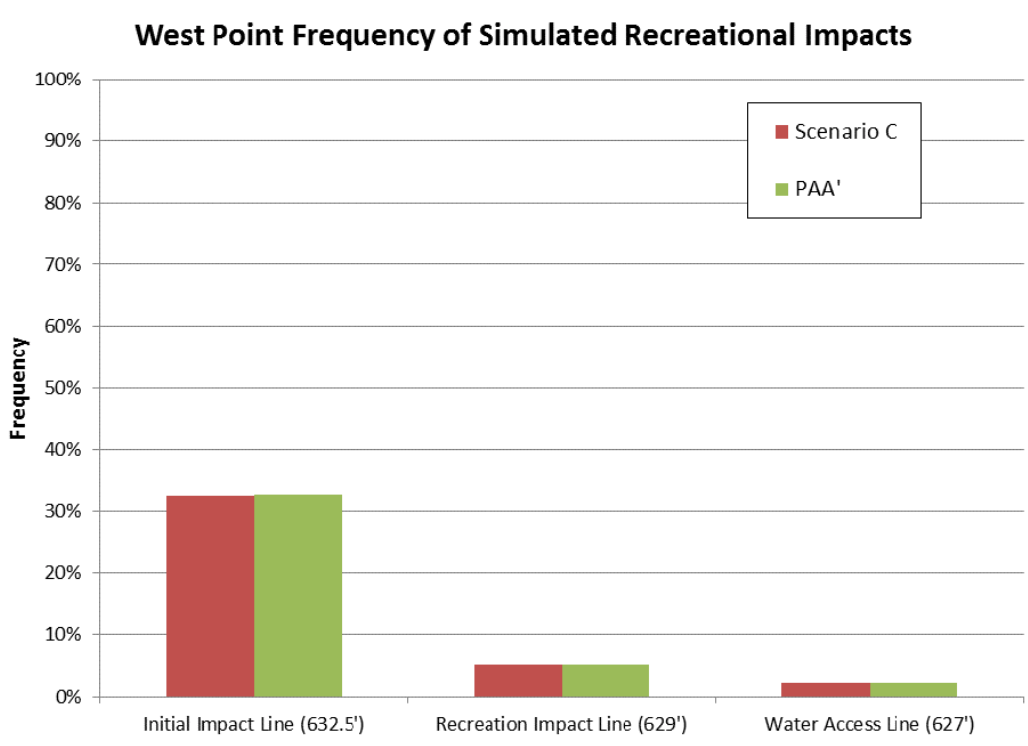


Figure 12. Frequency of simulated recreational impacts at West Point.

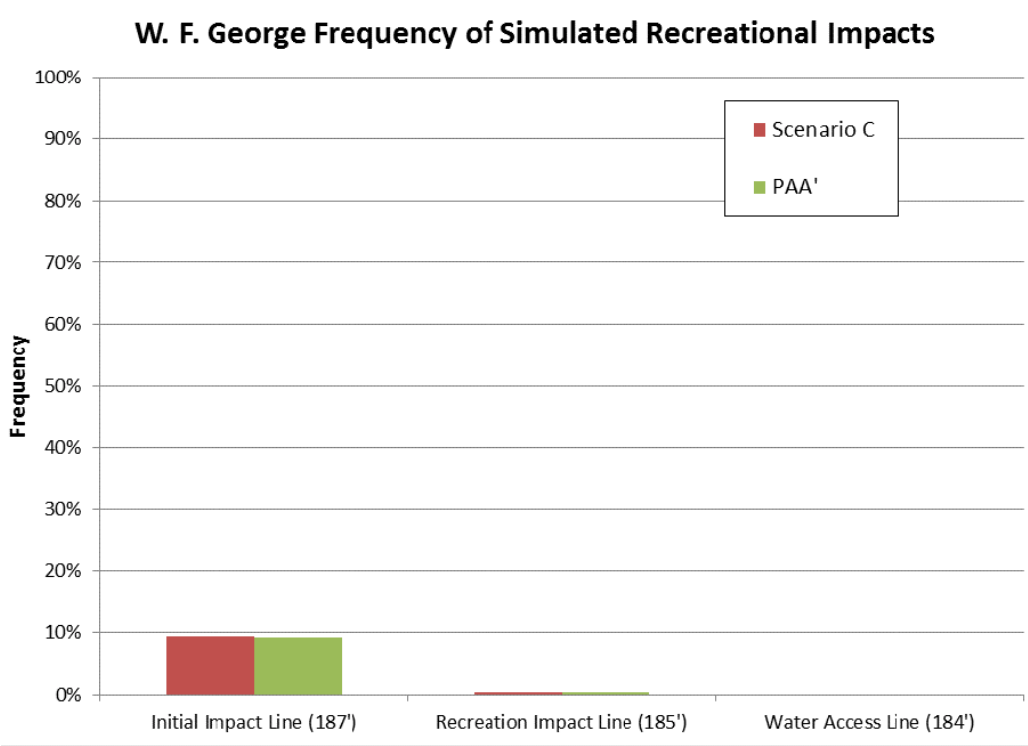


Figure 13. Frequency of simulated recreational impacts at W. F. George.

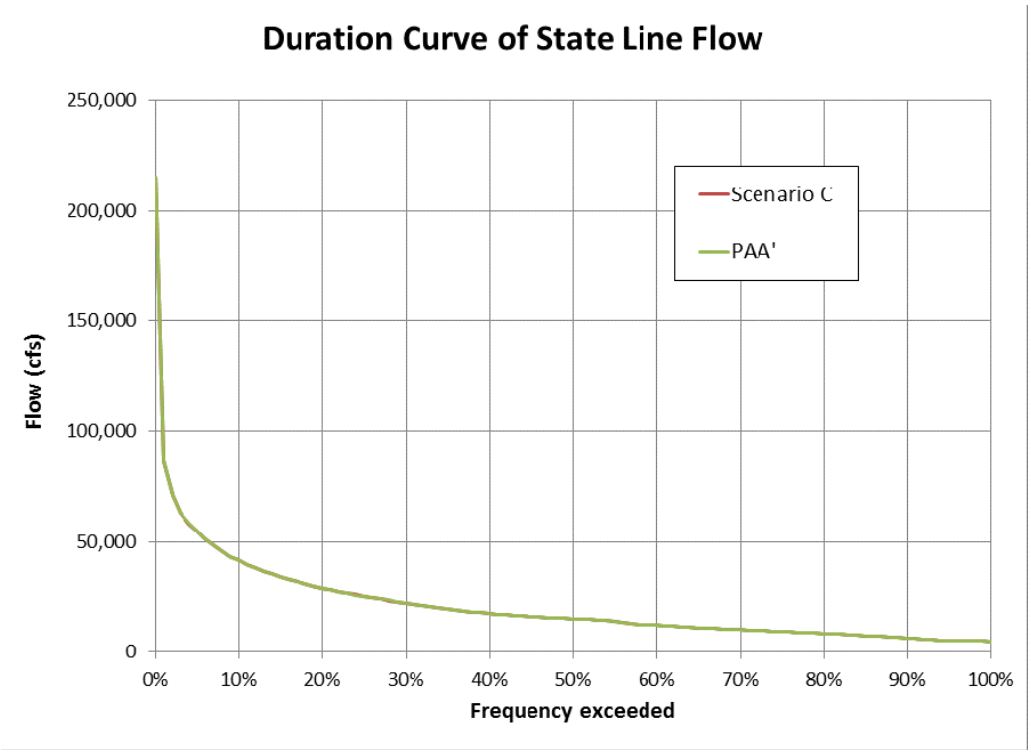


Figure 14. Duration of simulated state line flow.

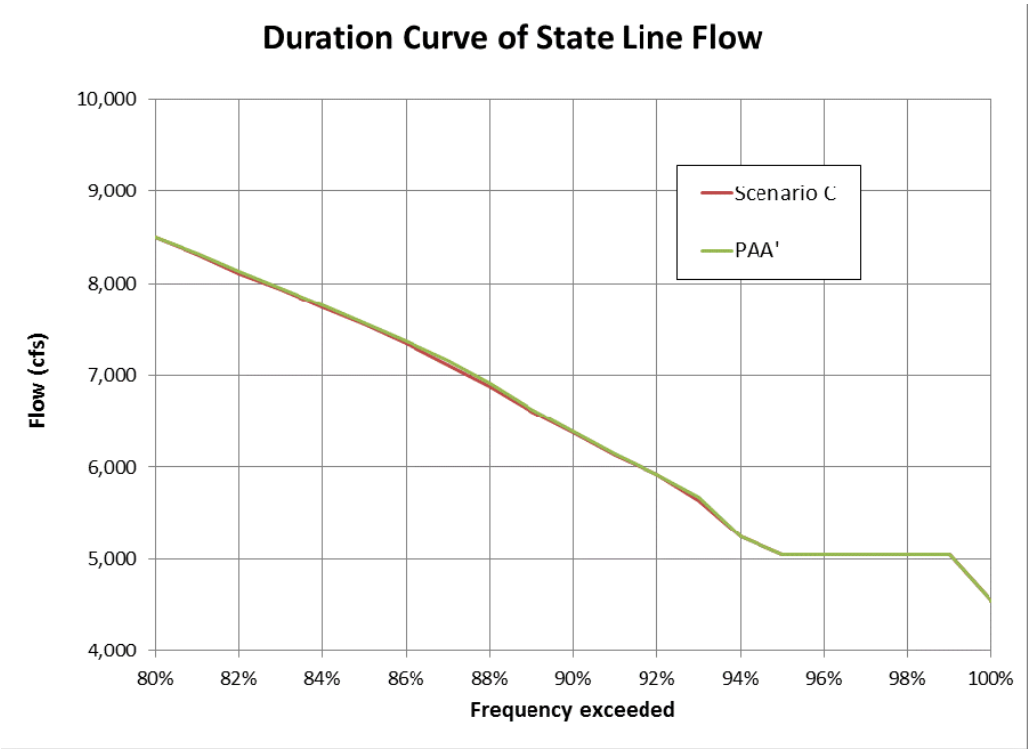


Figure 15. Duration of simulated state line flow (close-up).

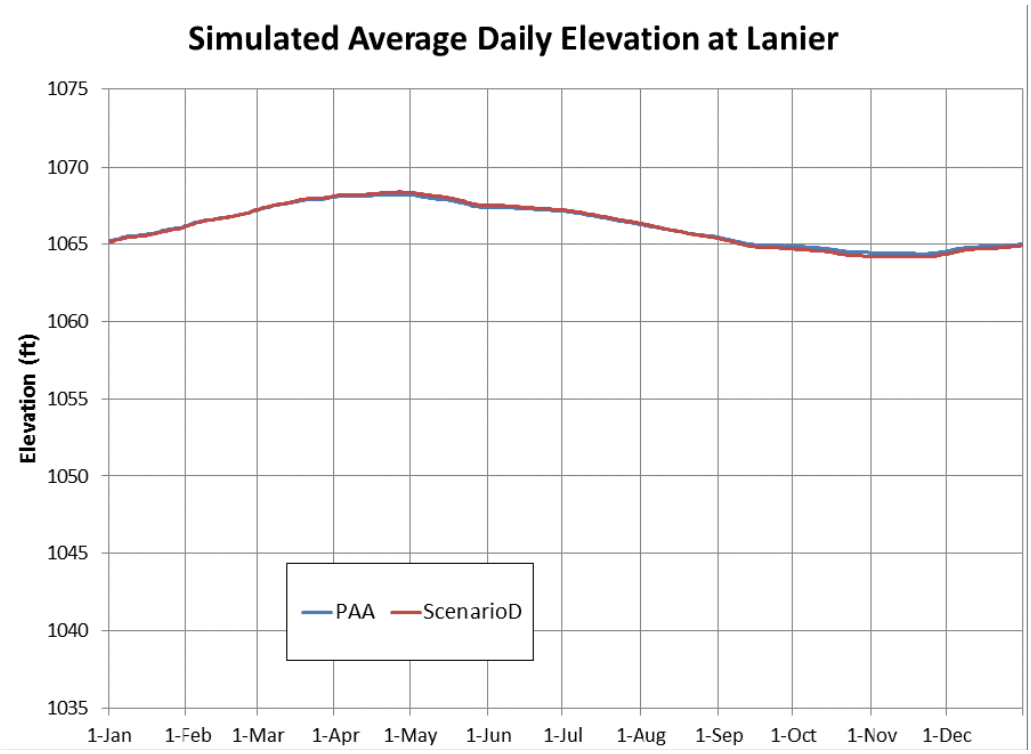


Figure 16. Simulated average daily elevation at Lanier

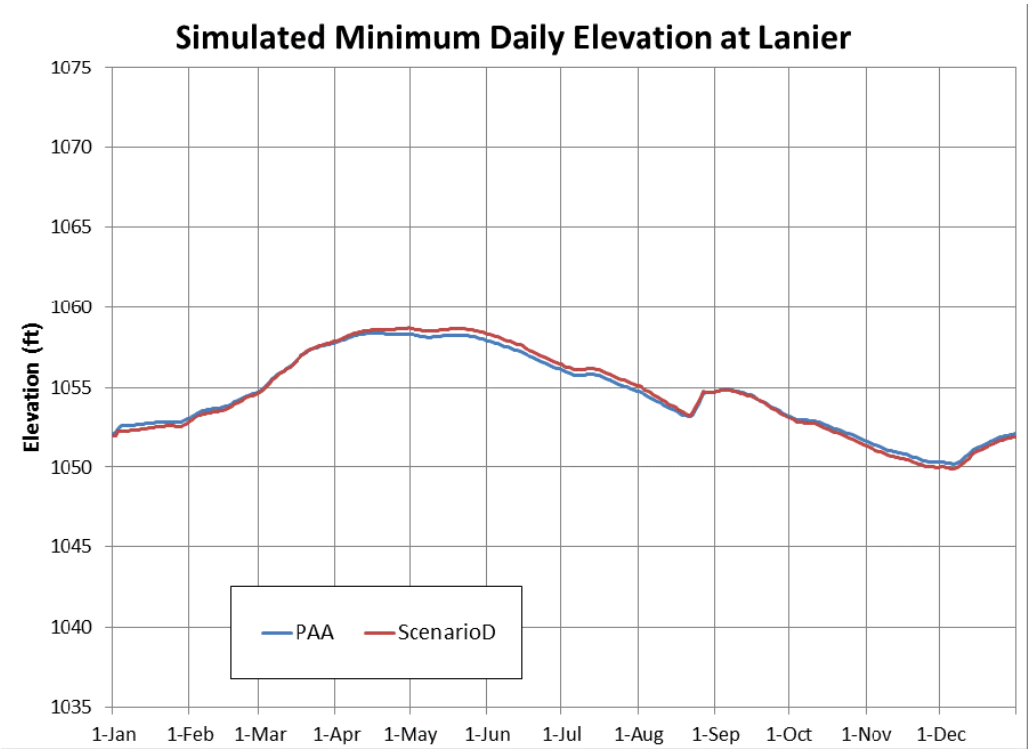


Figure 17. Simulated minimum daily elevation at Lanier

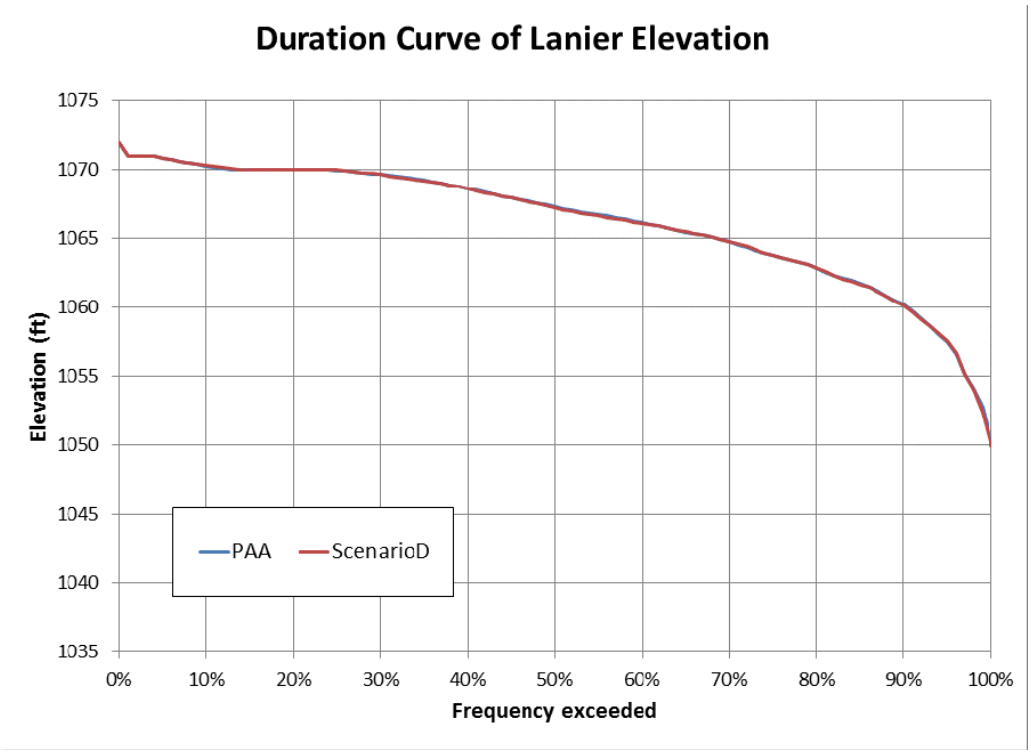


Figure 18. Duration curve of simulated Lanier elevation

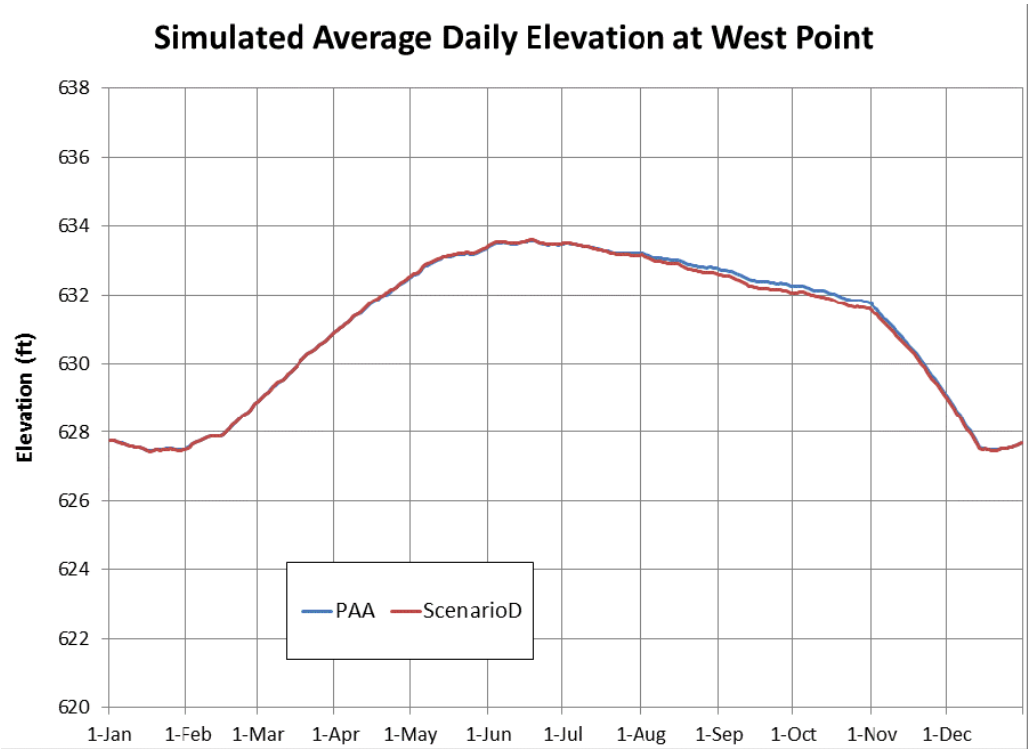


Figure 19. Simulated average daily elevation at West Point Lake

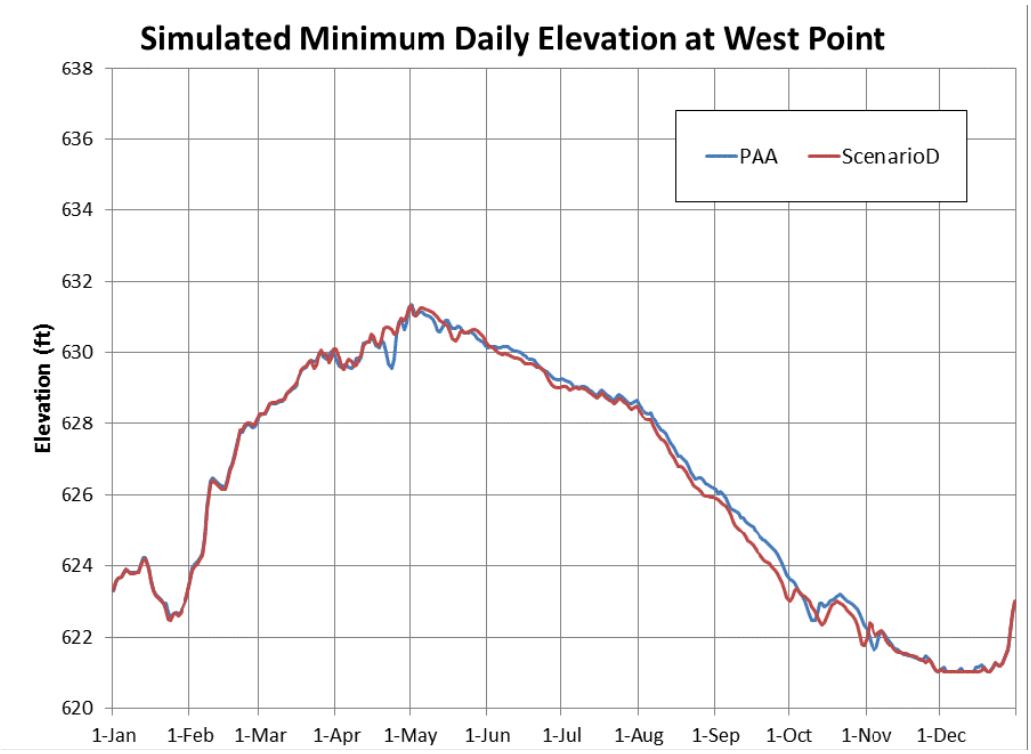


Figure 20. Simulated minimum daily elevation at West Point Lake

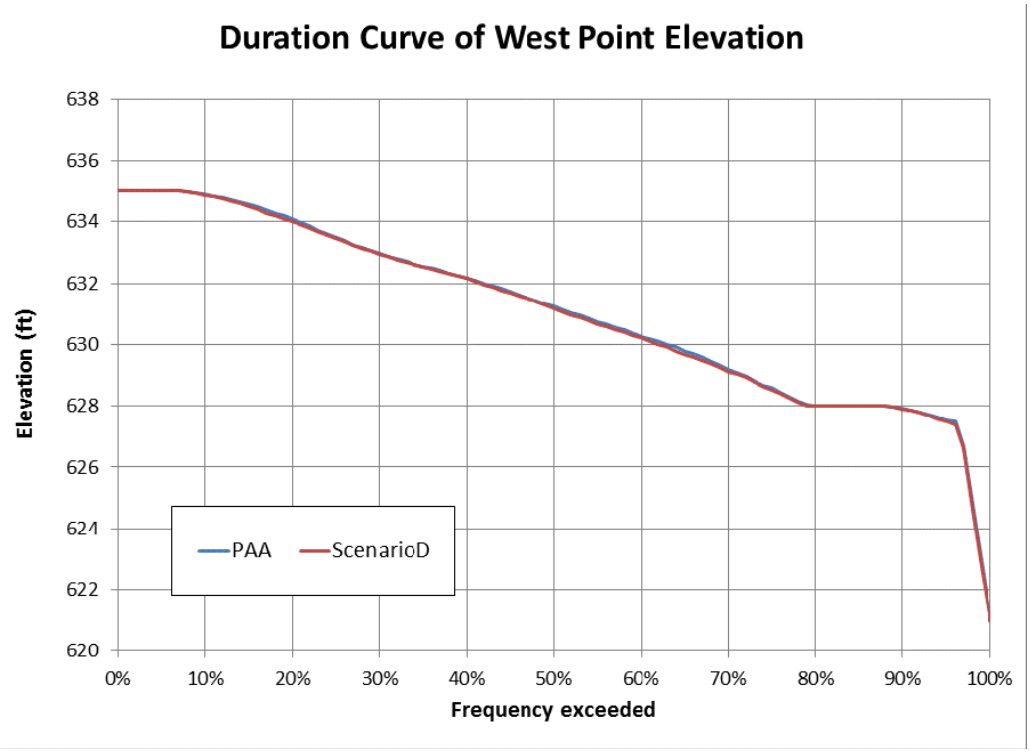


Figure 21. Duration curve of simulated West Point elevation

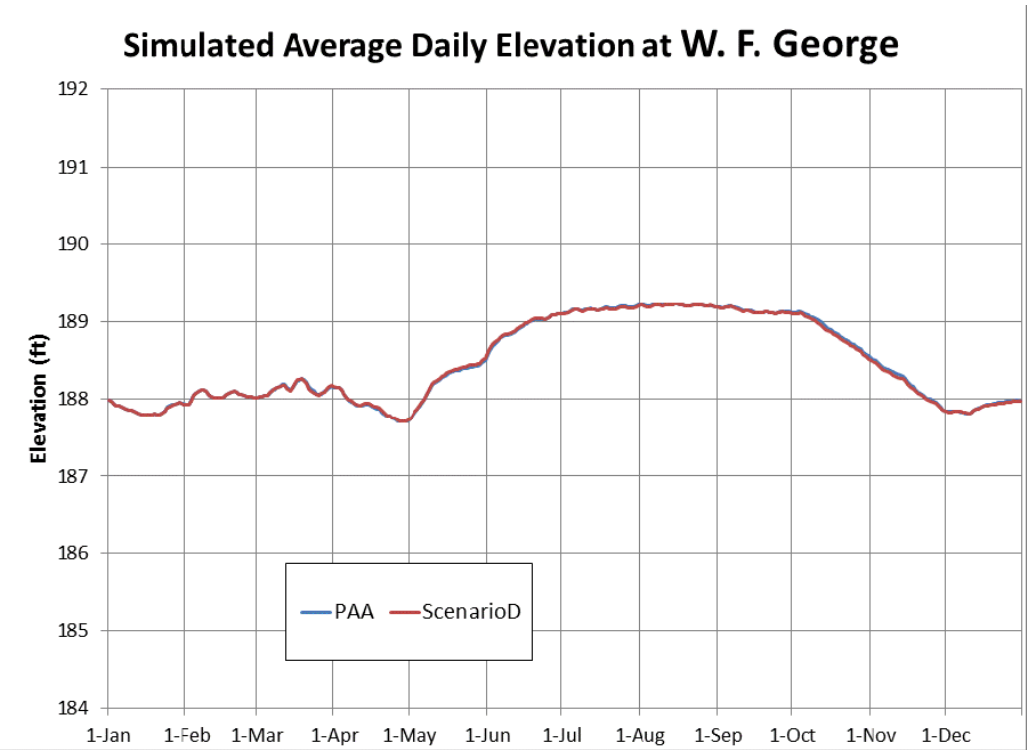


Figure 22. Simulated average daily elevation at Walter F. George Lake

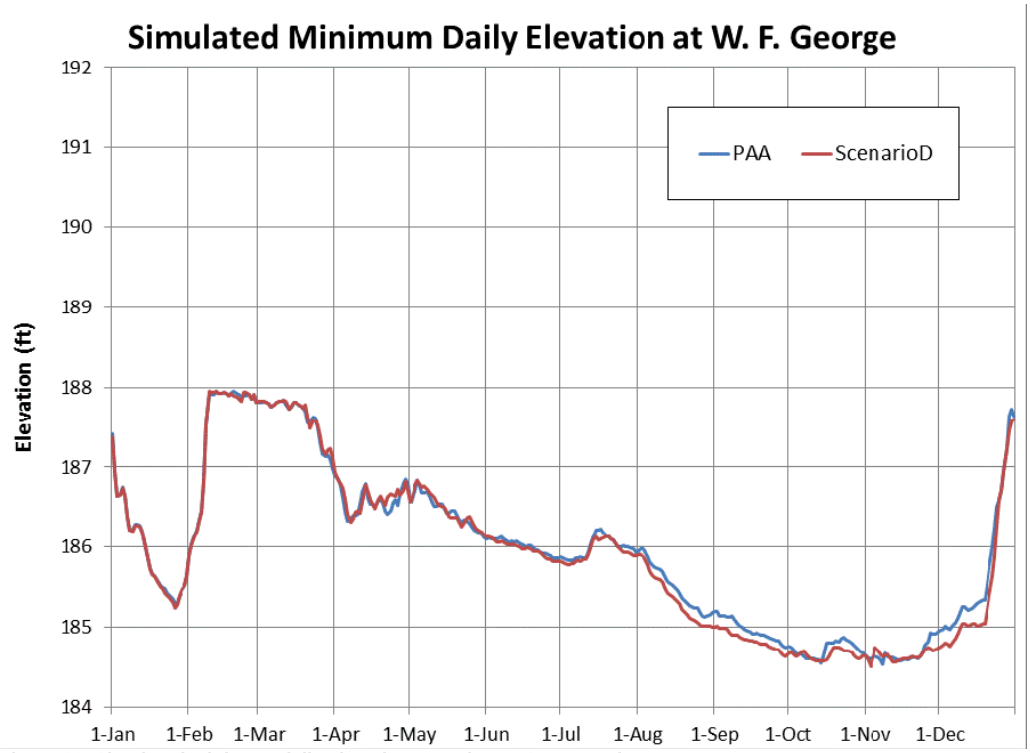


Figure 23. Simulated minimum daily elevation at Walter F. George Lake

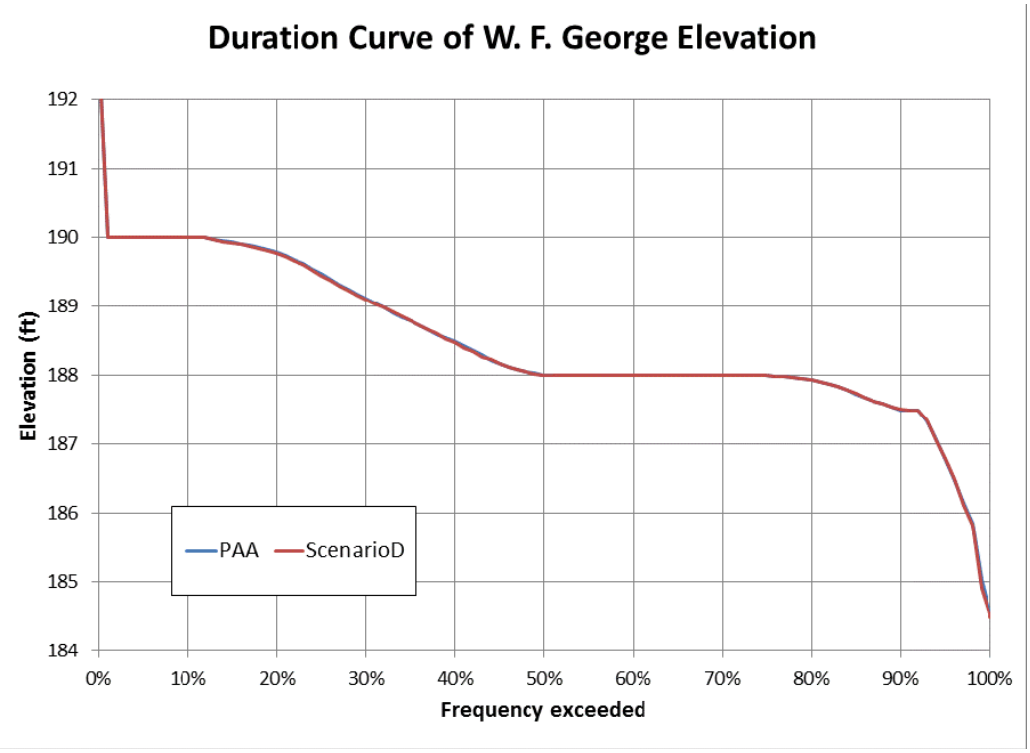


Figure 24. Duration curve of simulated W.F. George elevation

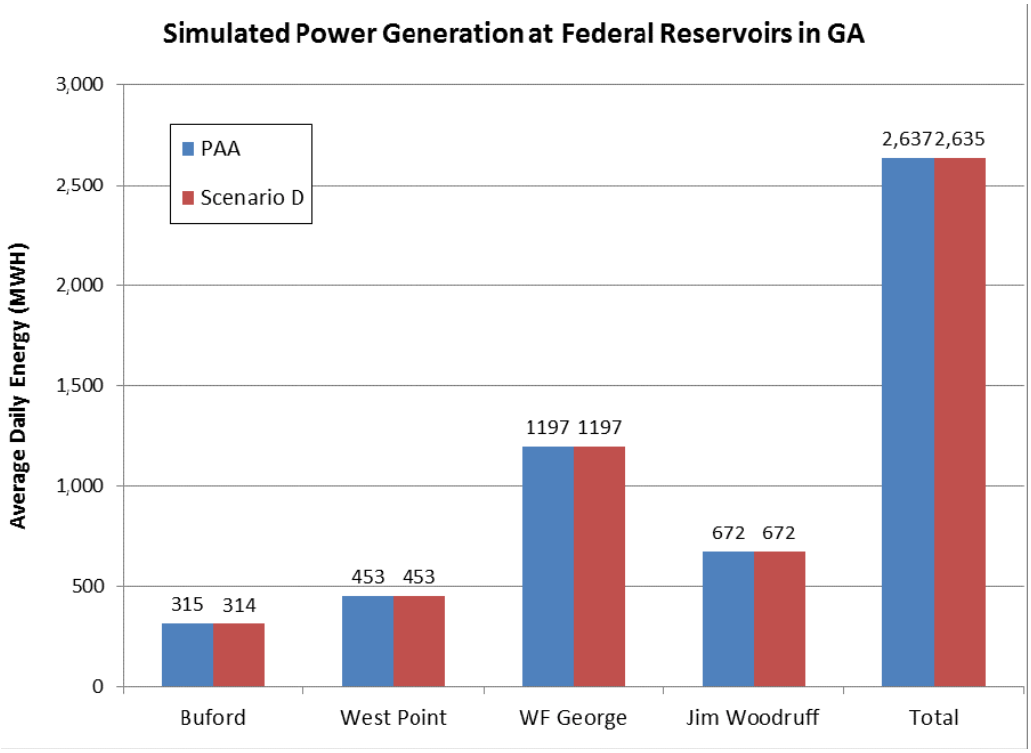


Figure 25. Simulated power generation at Federal reservoirs in Georgia

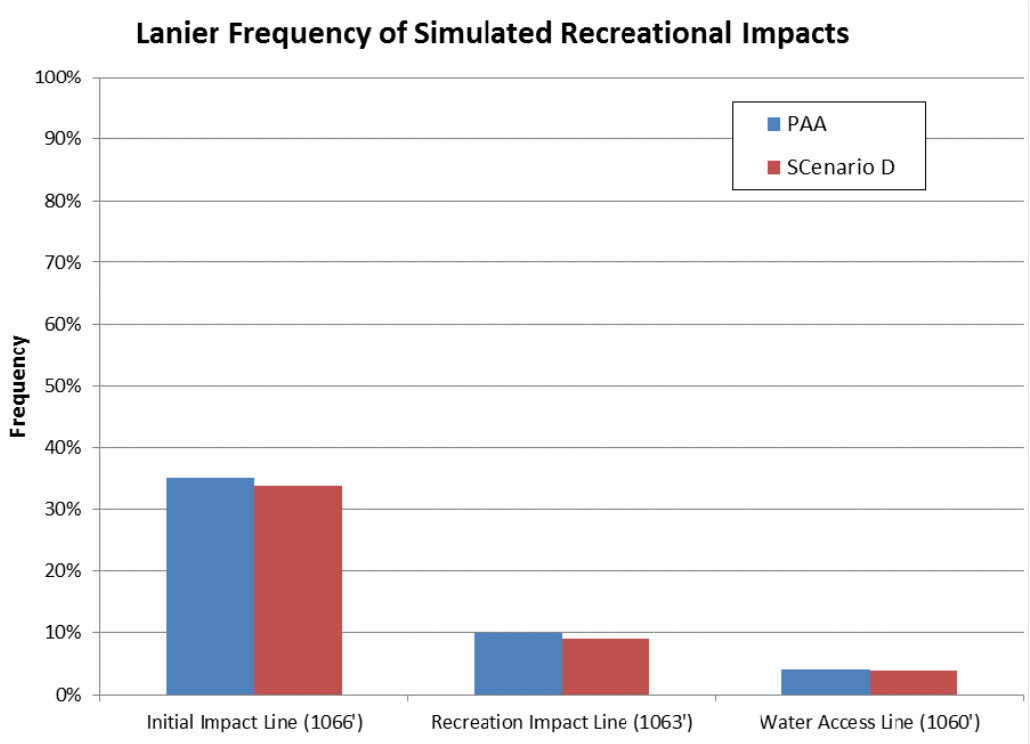


Figure 26, Frequency of simulated recreational impacts at Lanier

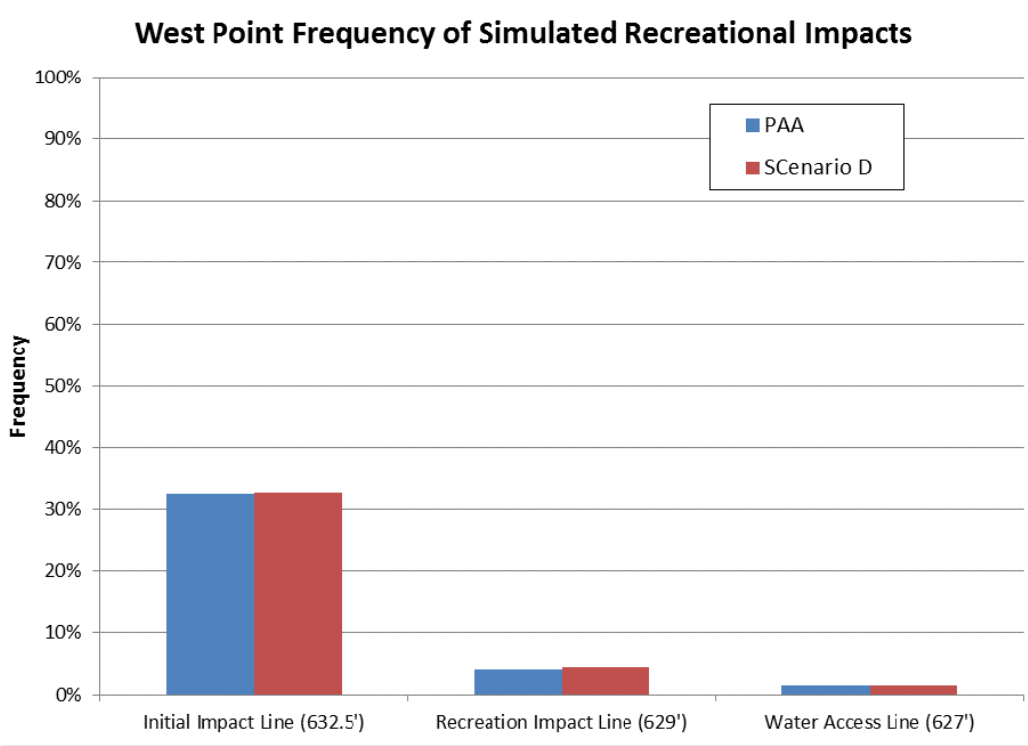


Figure 27. Frequency of simulated recreational impacts at West Point

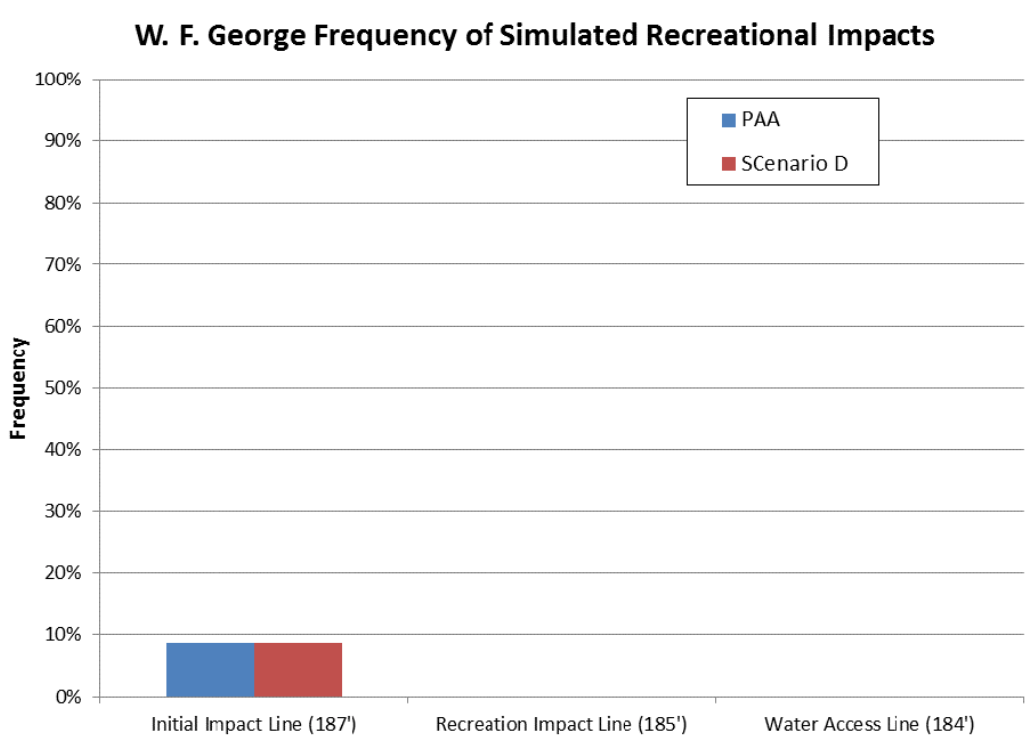


Figure 28. Frequency of simulated recreational impacts at W. F. George

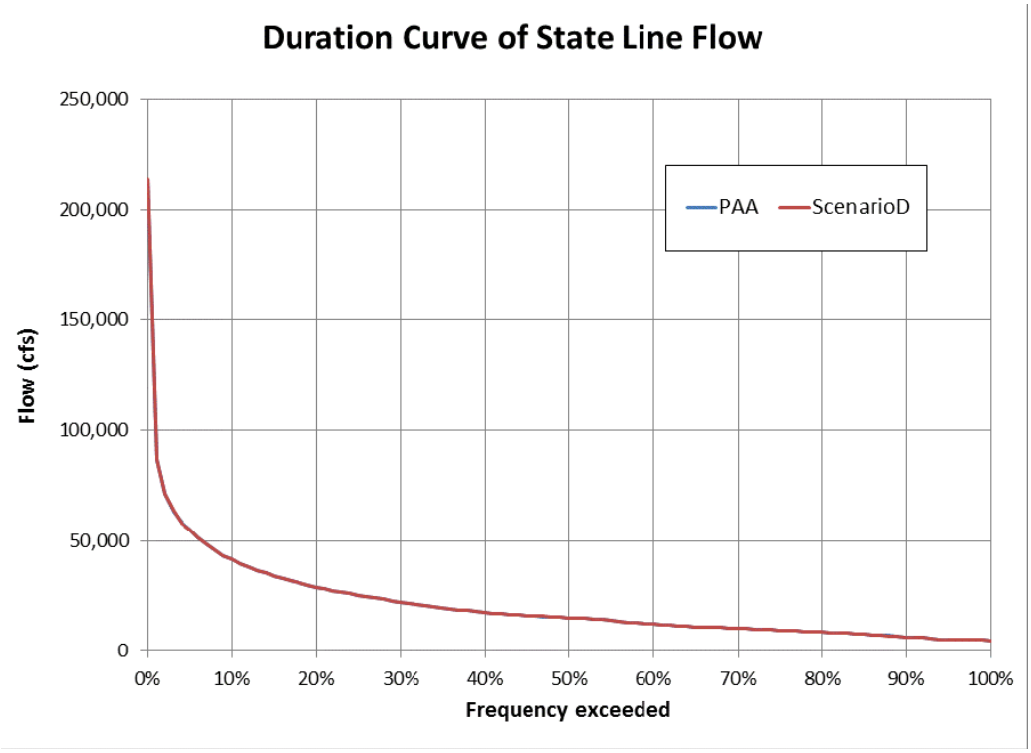


Figure 29. Duration of simulated state line flow

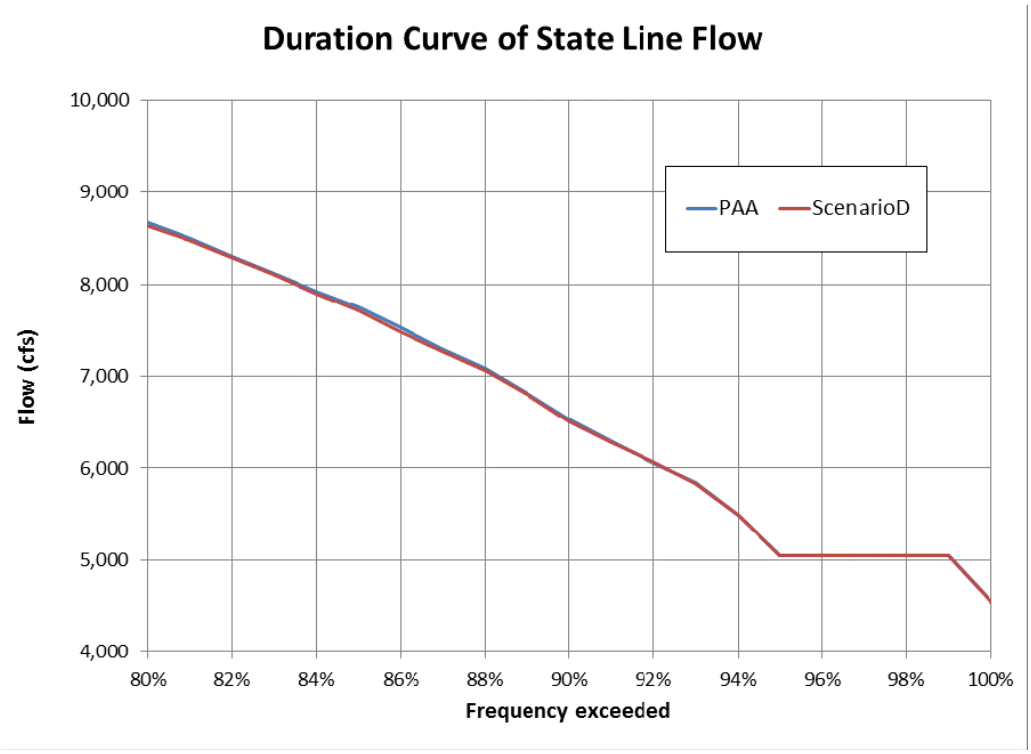


Figure 30. Duration of simulated state line flow (close-up)

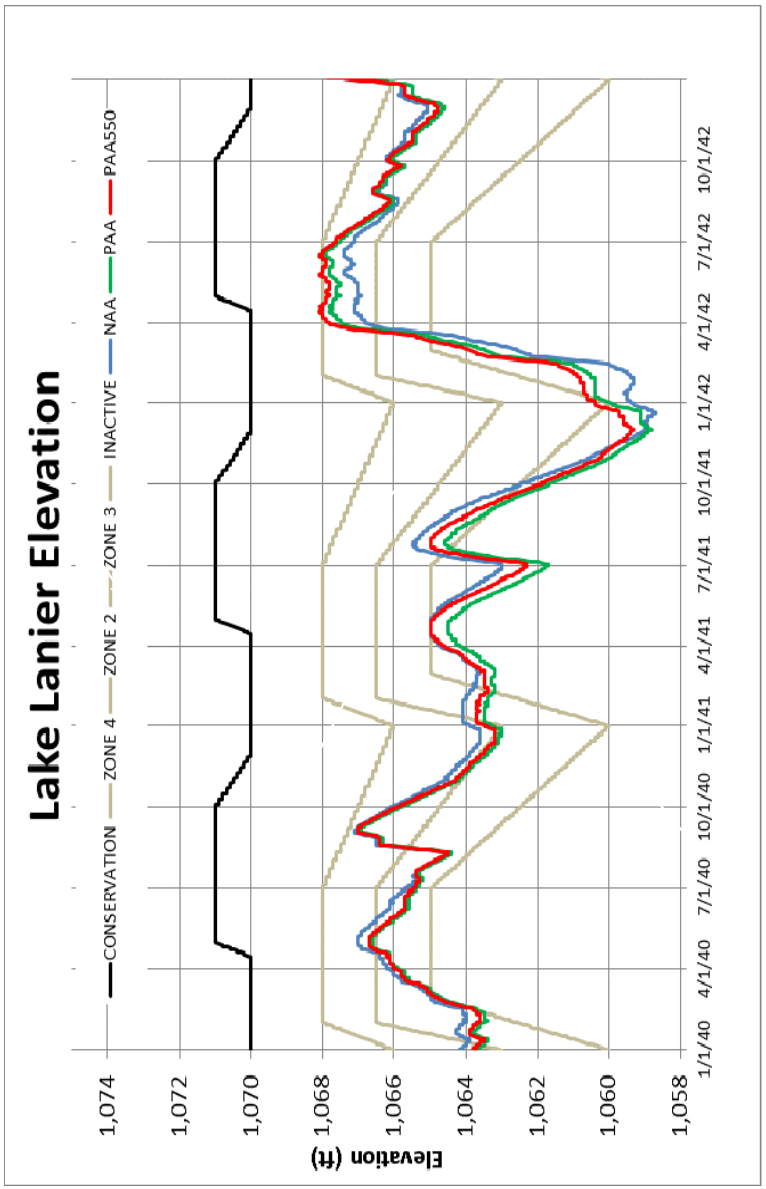


Figure 31. Simulated Lake Lanier Elevations in 1940-1942

53

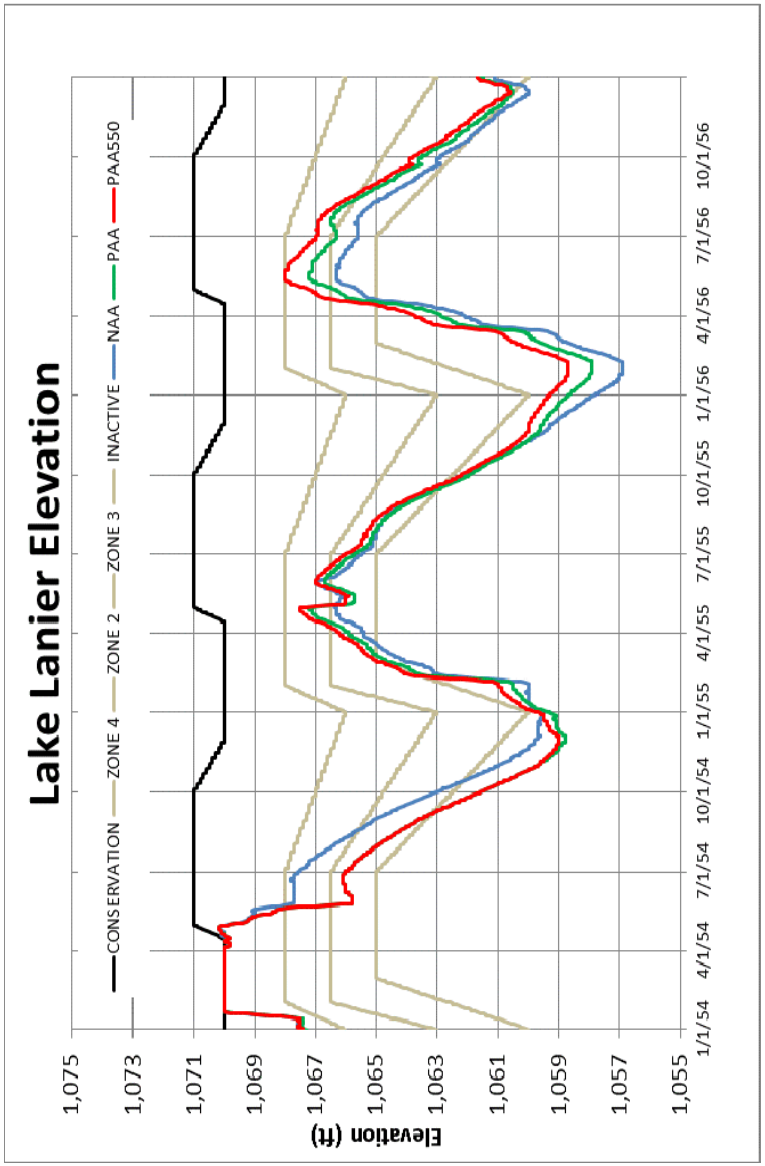


Figure 32. Simulated Lake Lanier Elevations in 1954-1956

54

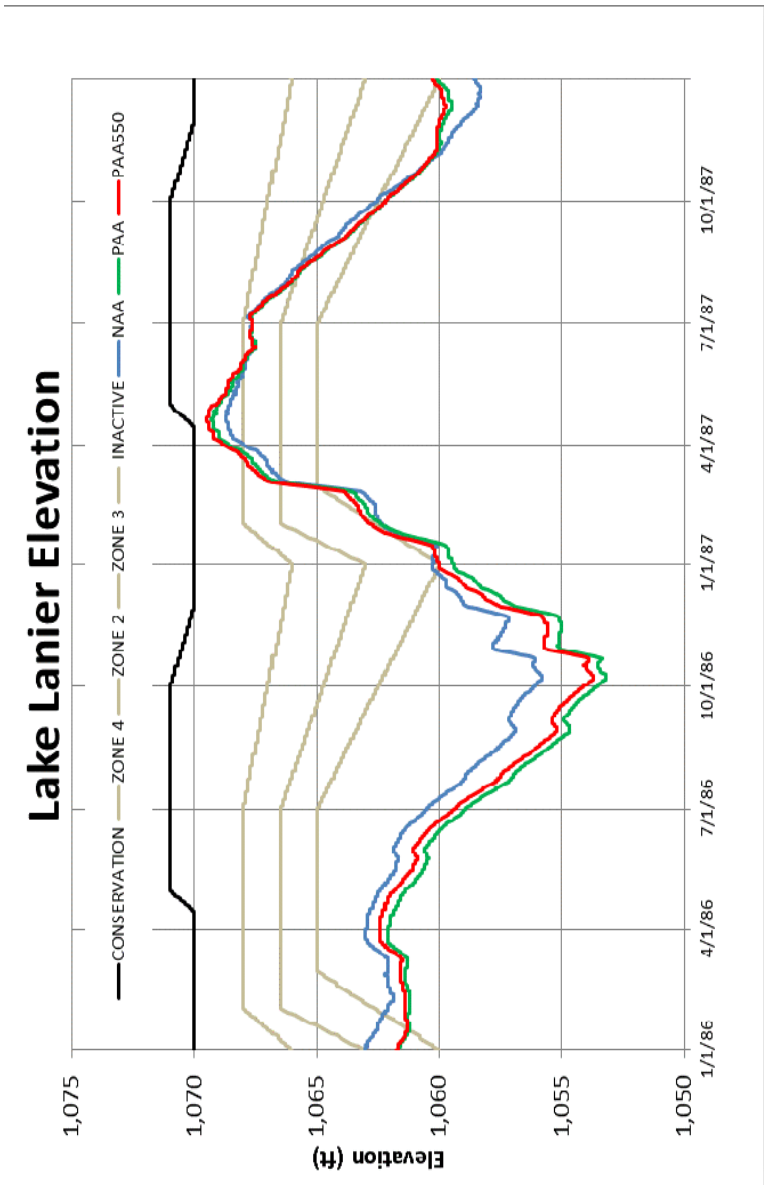


Figure 33. Simulated Lake Lanier Elevations in 1986-1987

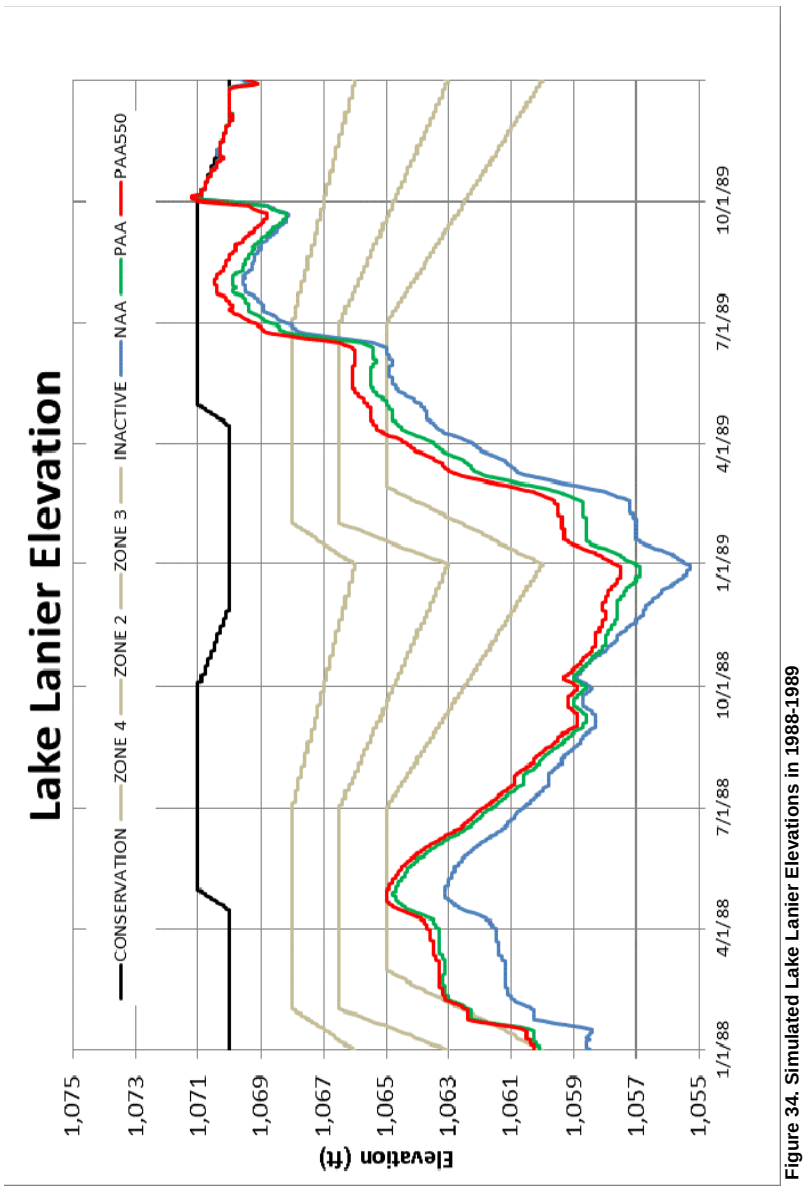


Figure 34. Simulated Lake Lanier Elevations in 1988-1989

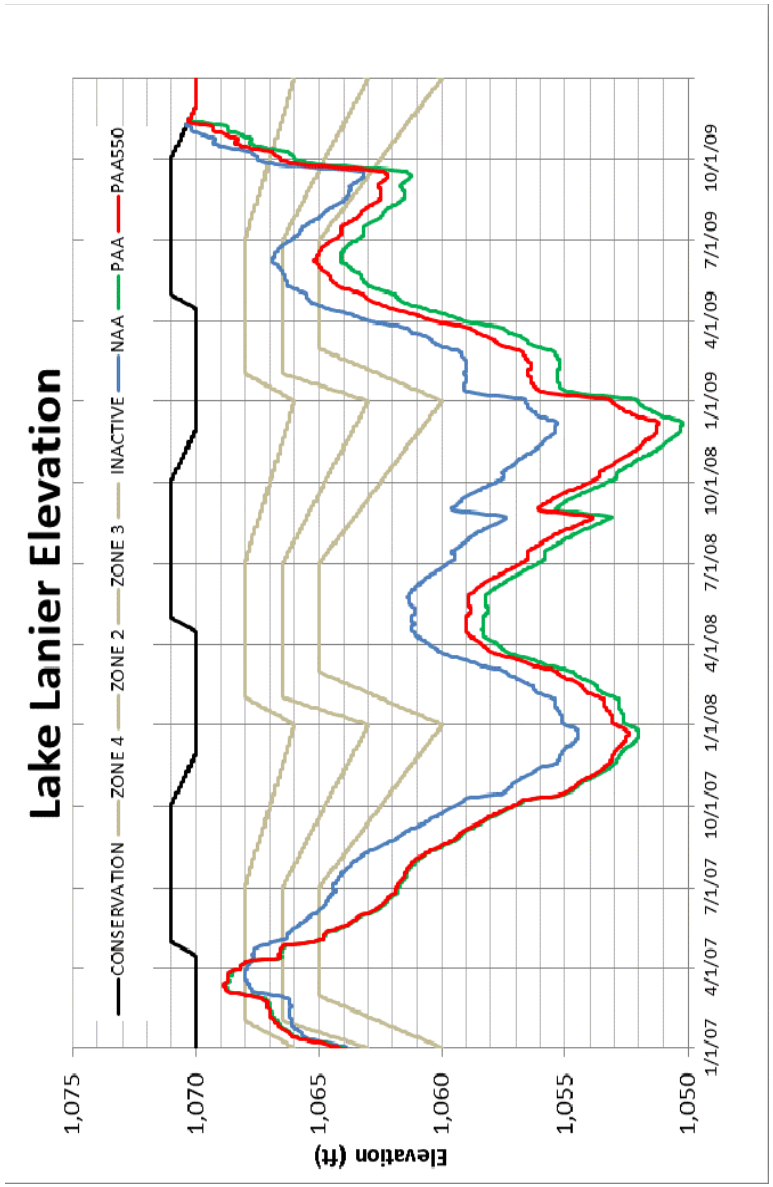


Figure 35. Simulated Lake Lanier Elevations in 2007-2009

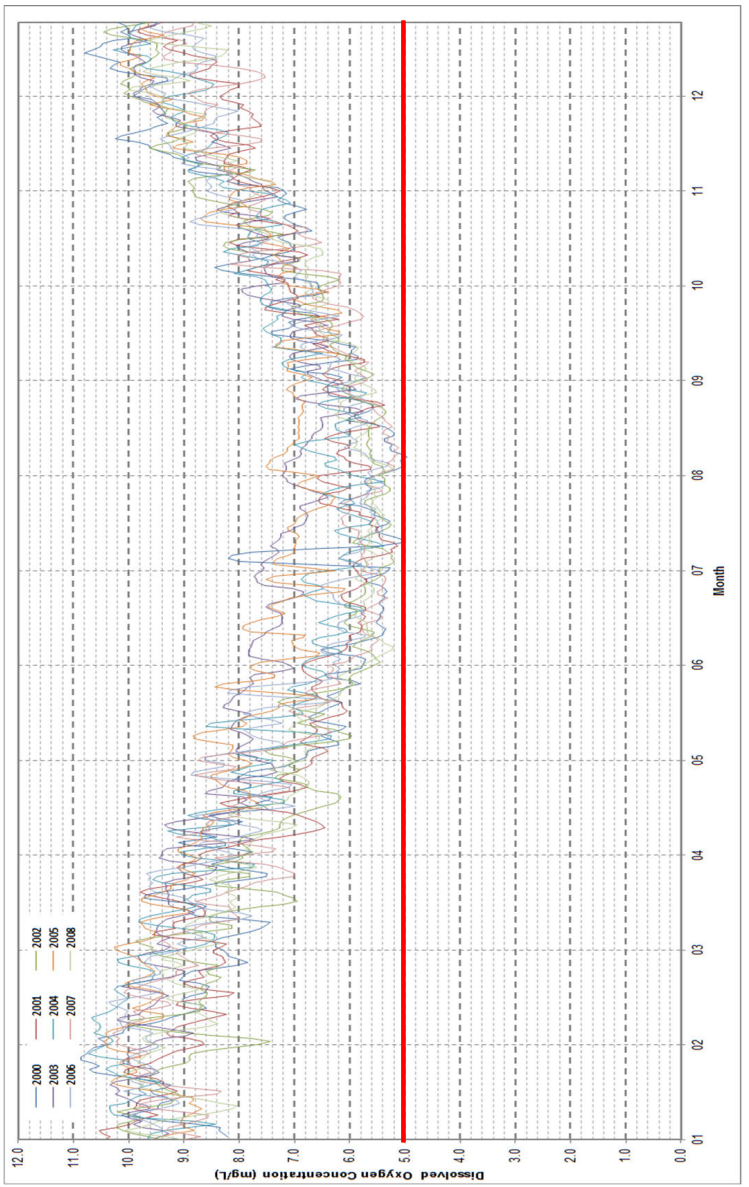


Figure 36: Chattahoochee River Predicted Daily Average Dissolved Oxygen Concentration near Dog River for the NAA

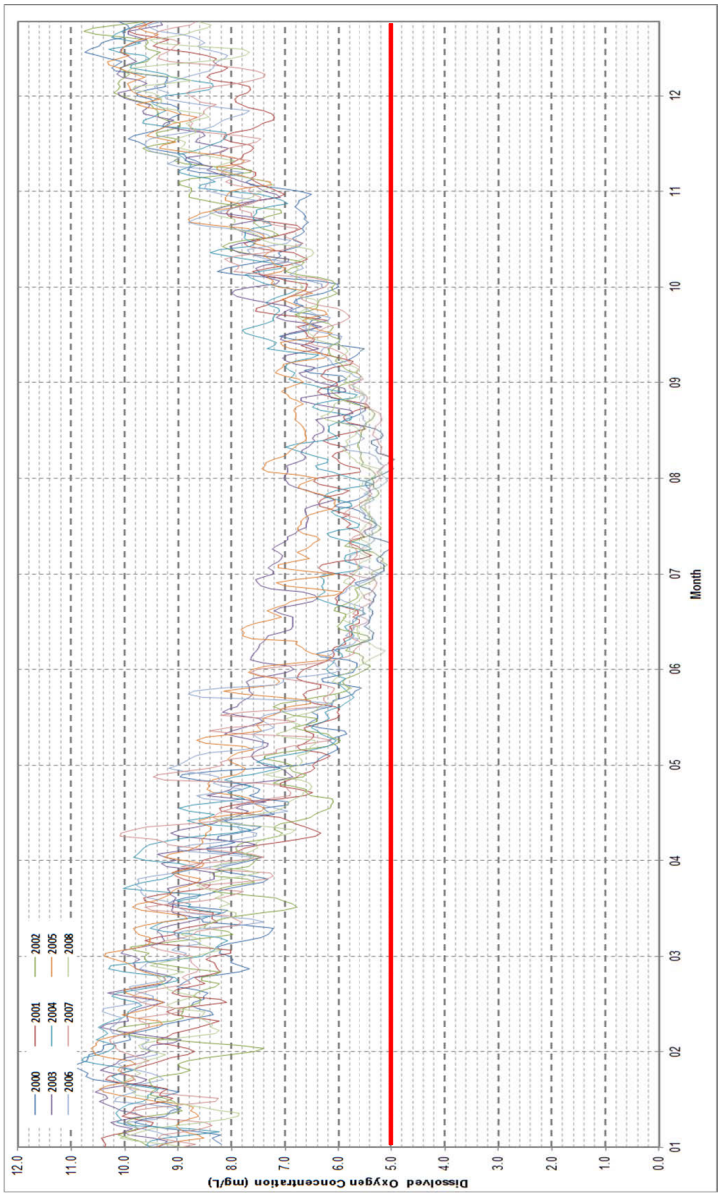


Figure 37: Chattahoochee River Predicted Daily Average Dissolved Oxygen Concentration near Dog River for the PAA

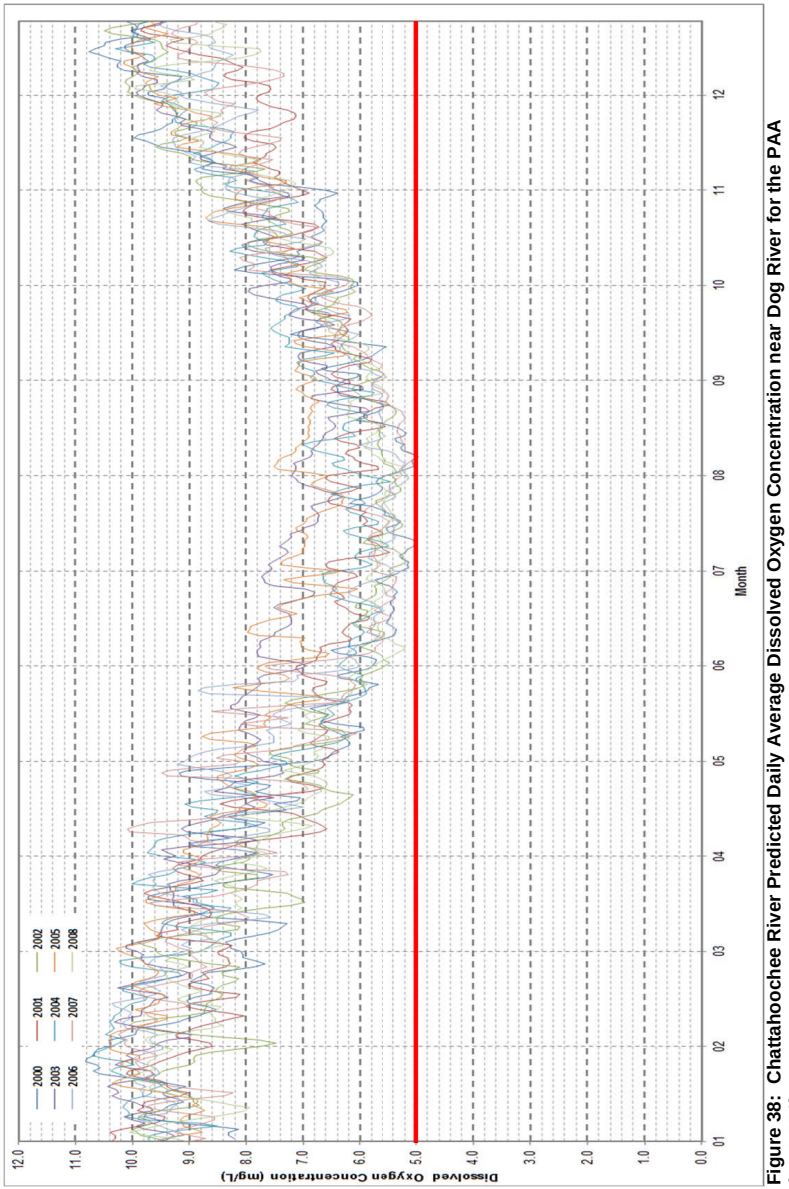


Figure 38: Chattahoochee River Predicted Daily Average Dissolved Oxygen Concentration near Dog River for the PAA (PAA 550)

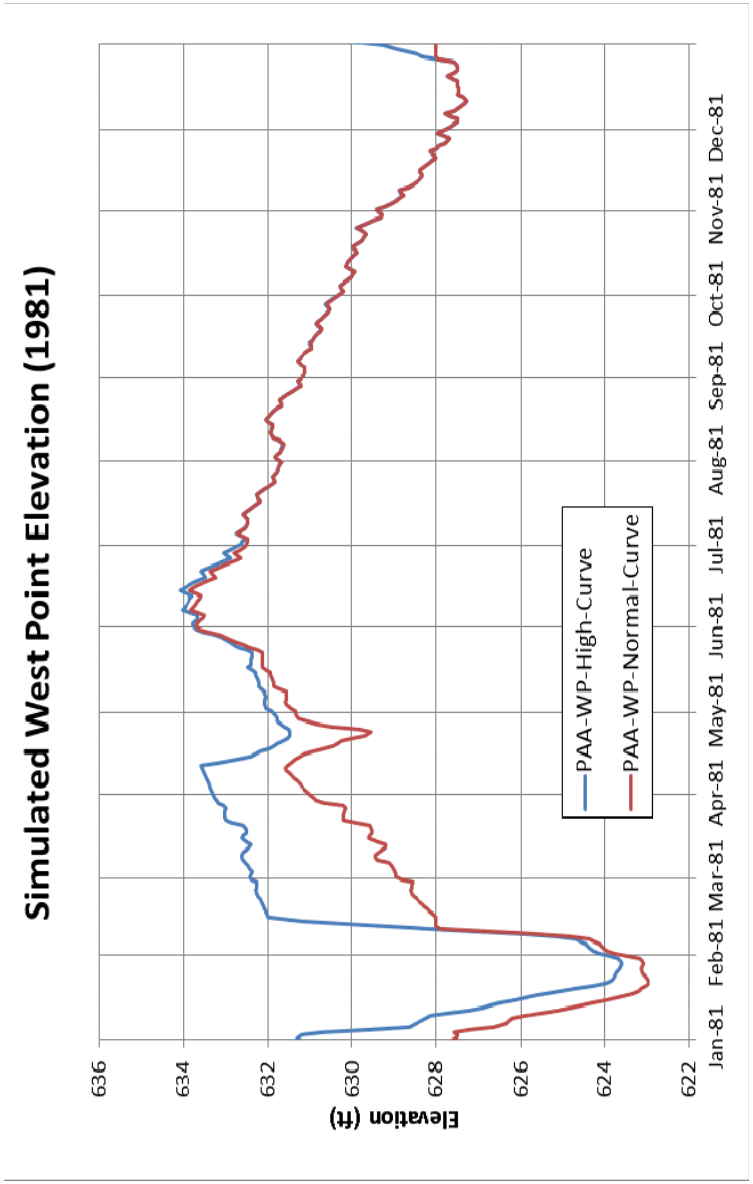


Figure 39. Simulated West Point Lake elevation in 1981.

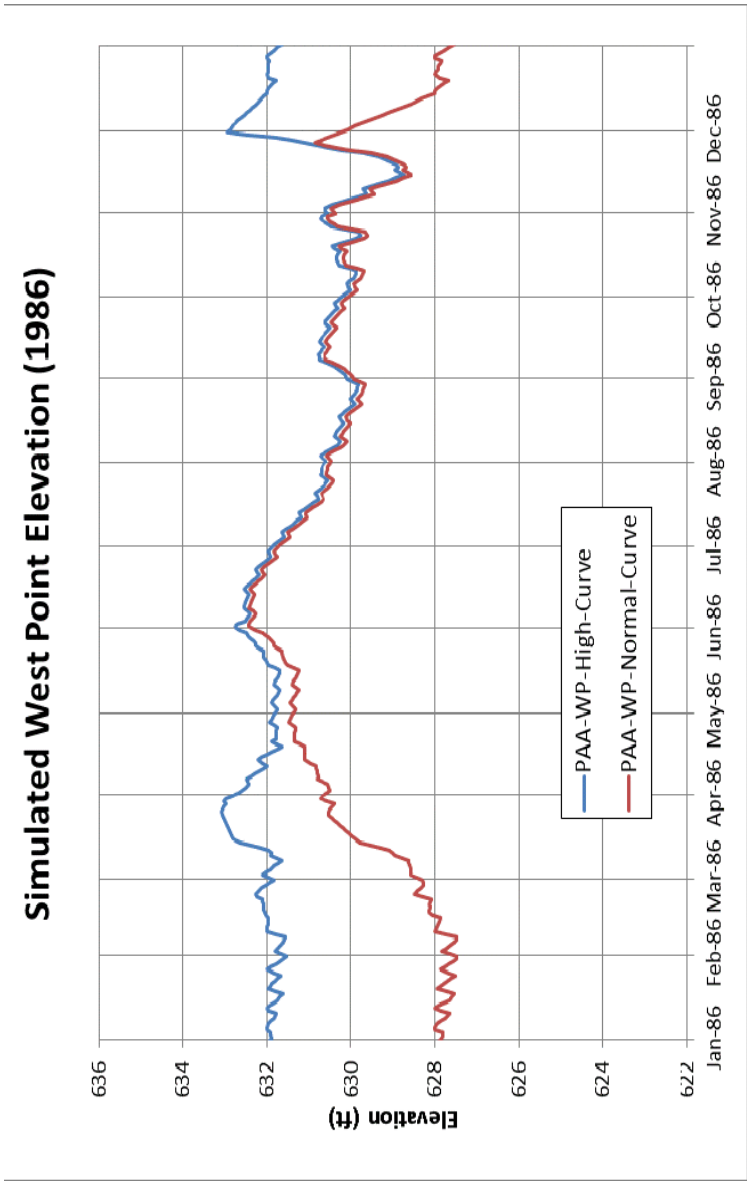


Figure 40. Simulated West Point Lake elevation in 1986.

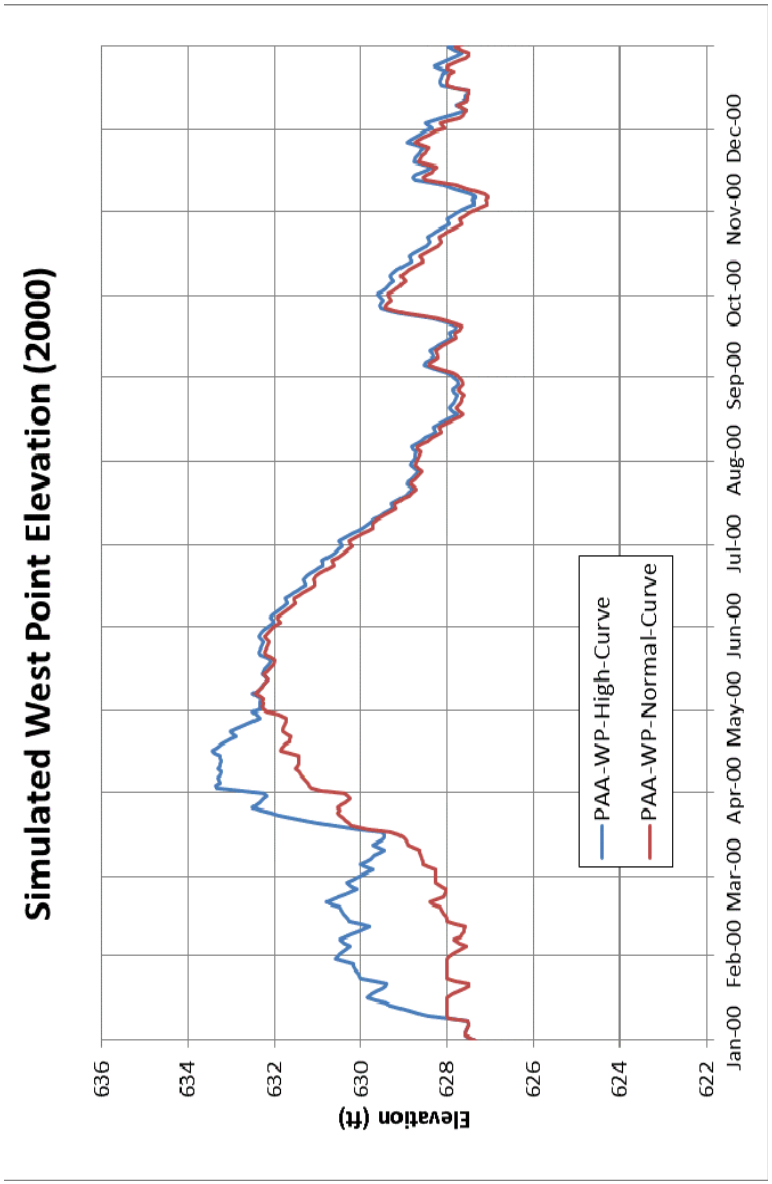


Figure 41. Simulated West Point Lake elevation in 2000.

63

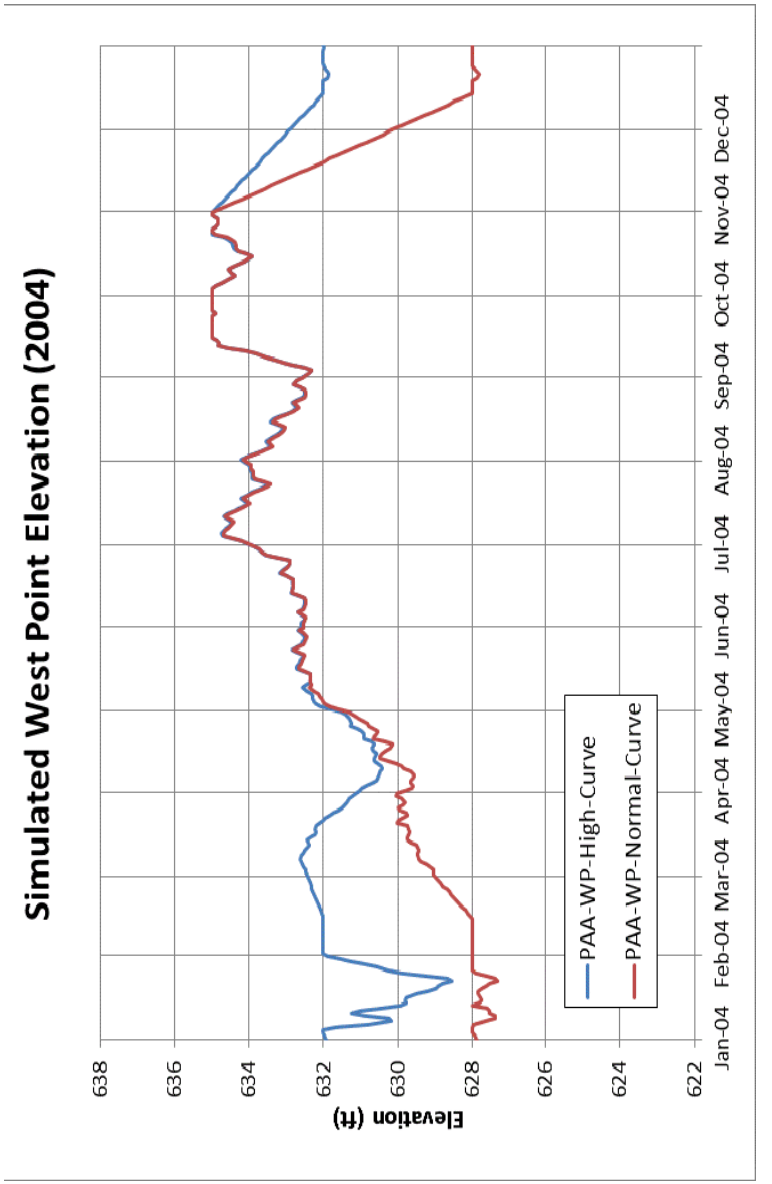


Figure 42. Simulated West Point Lake elevation in 2004.

64

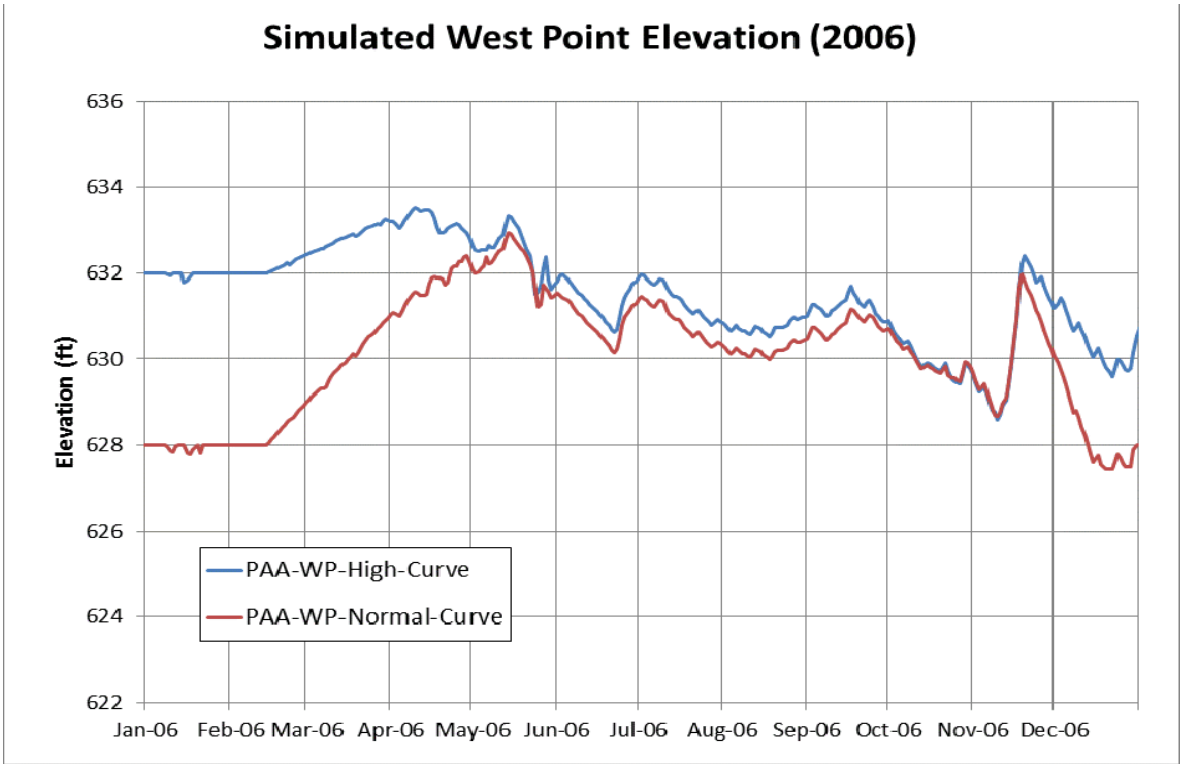


Figure 43. Simulated West Point Lake elevation in 2006.

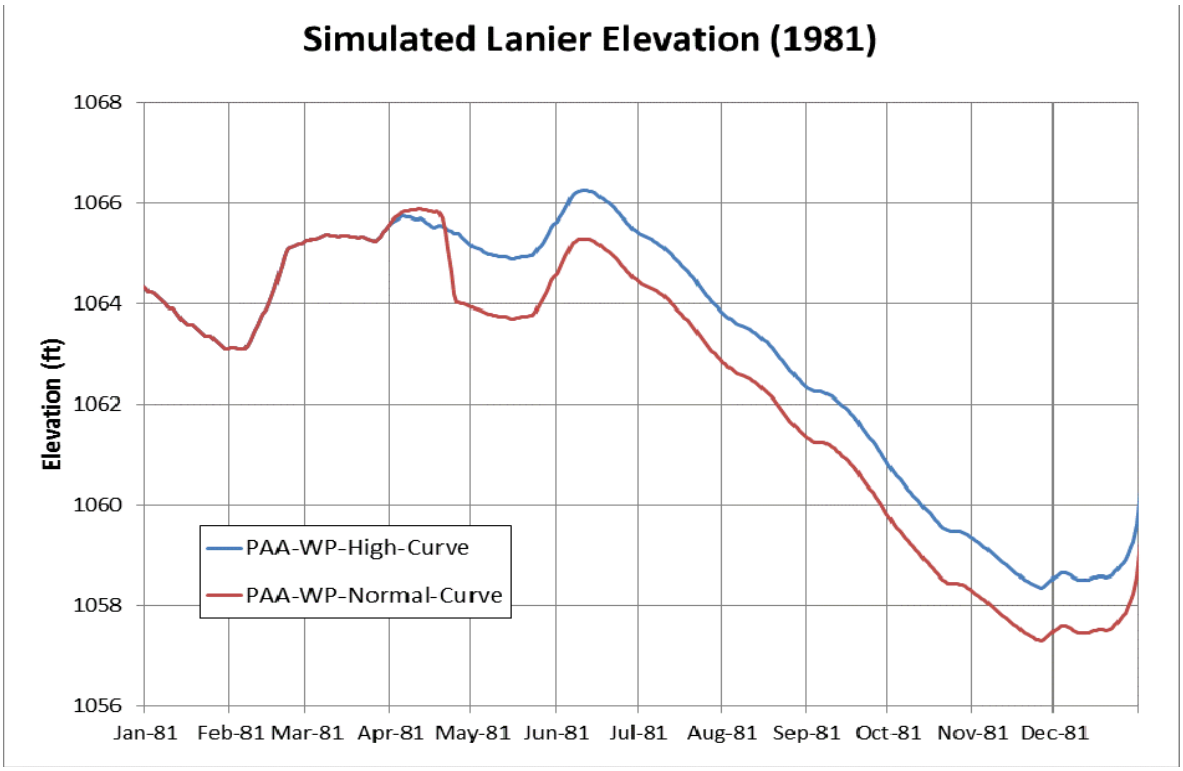


Figure 44. Simulated Lake Lanier elevation in 1981.

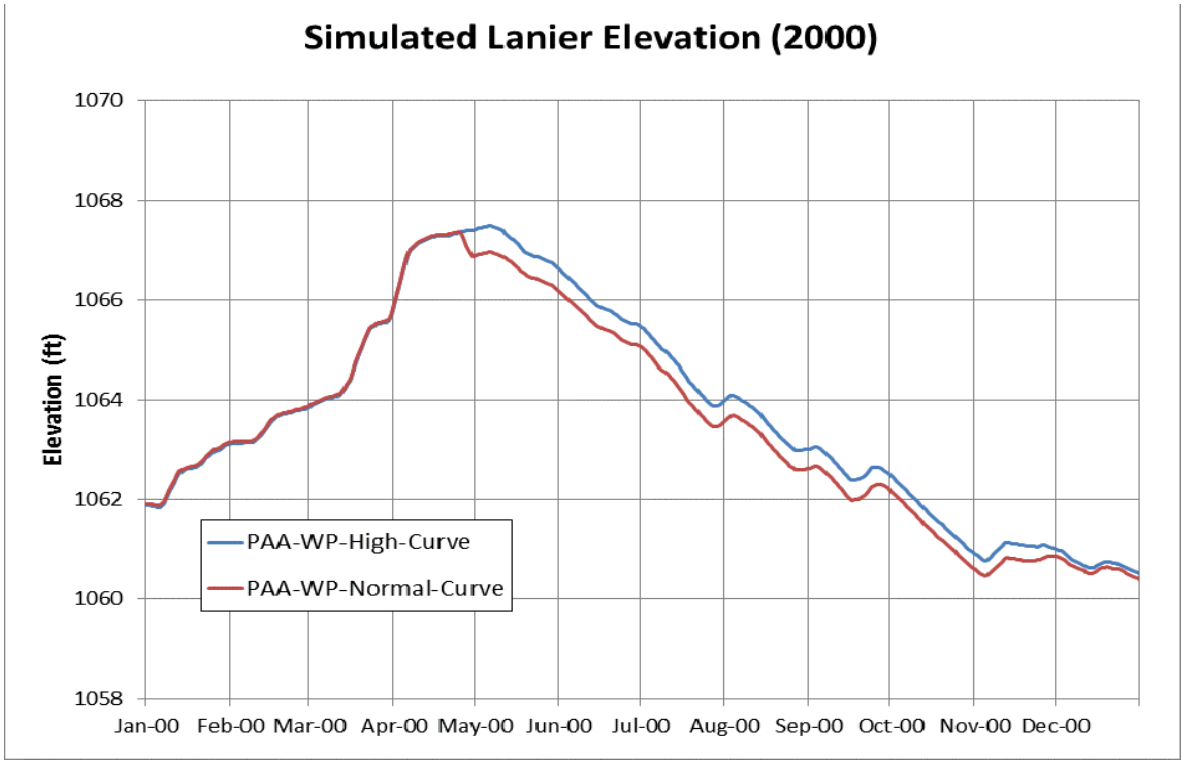


Figure 45. Simulated Lake Lanier elevation in 2000.

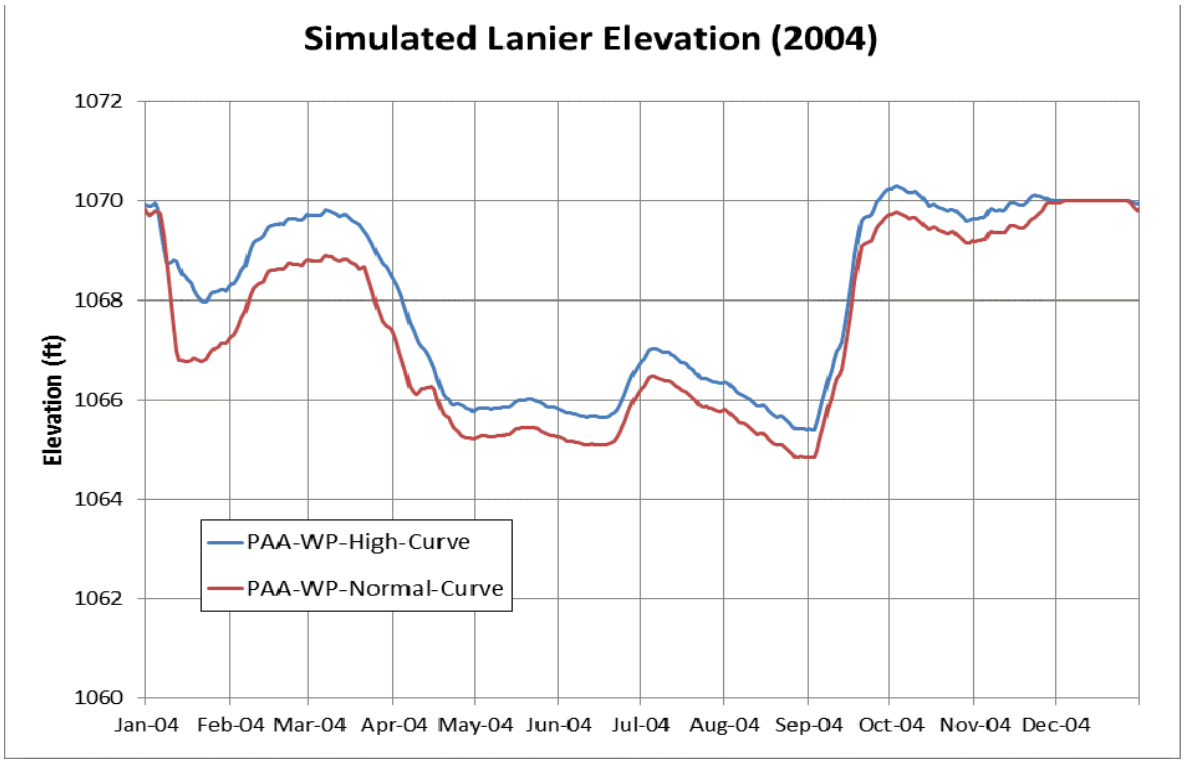


Figure 46. Simulated Lake Lanier elevation in 2004.

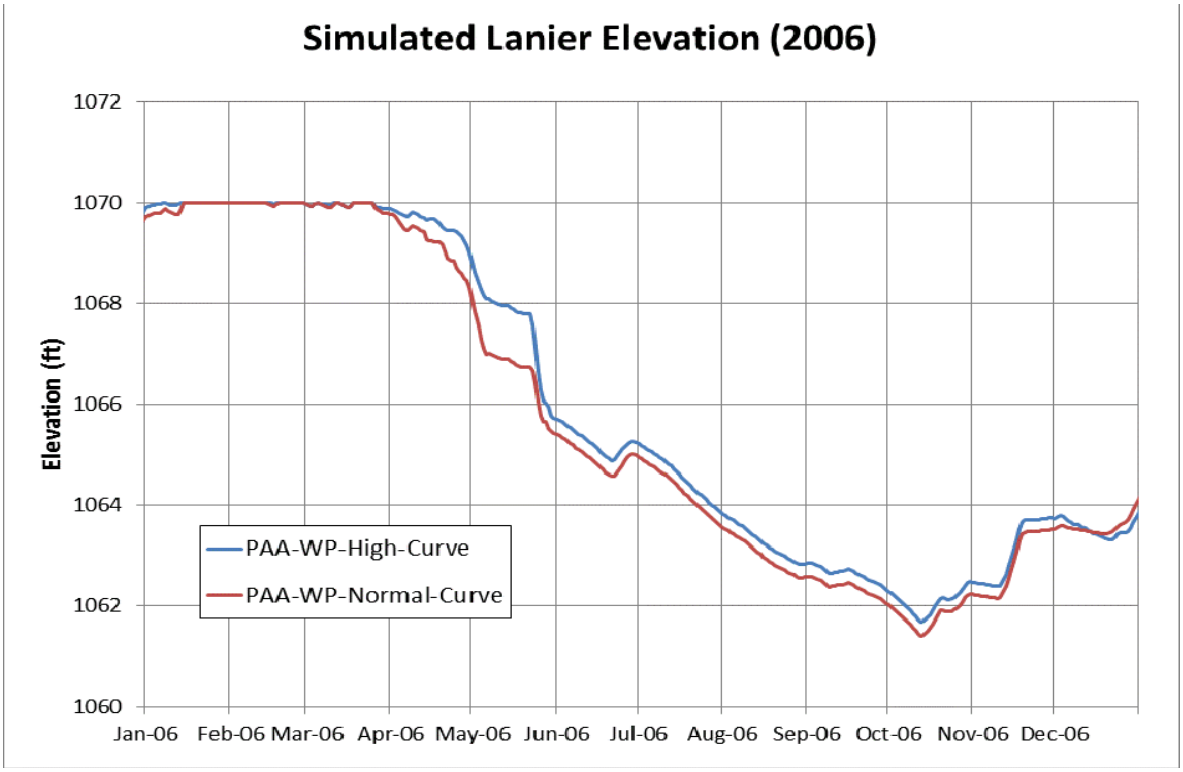


Figure 47. Simulated Lake Lanier elevation in 2006.

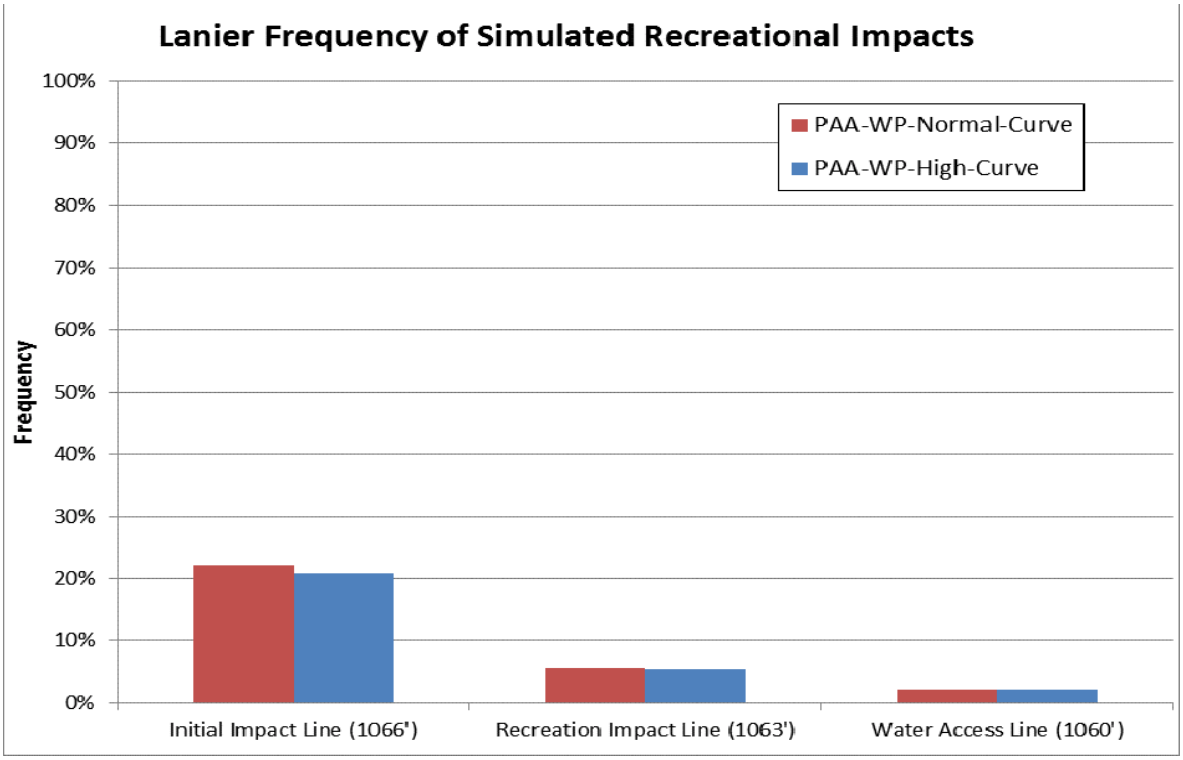


Figure 48. Frequency of simulated recreational impacts at Lanier.

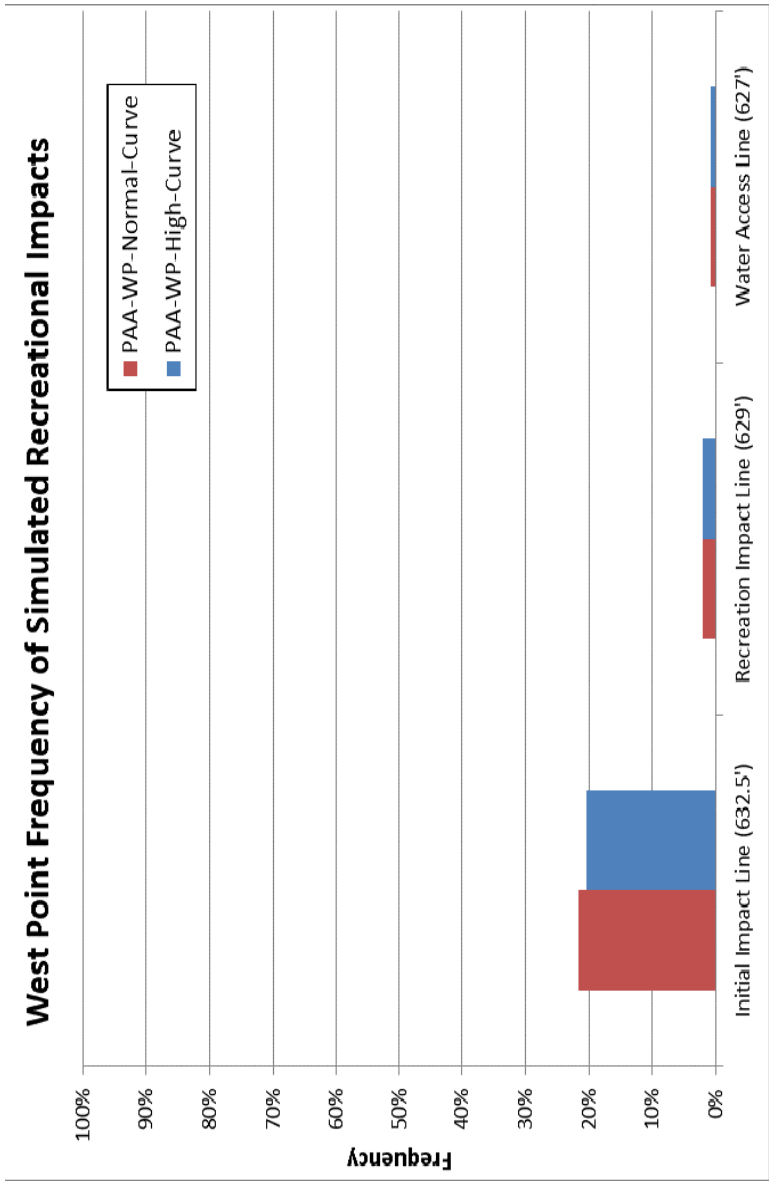


Figure 49. Frequency of simulated recreational impacts at West Point.

71

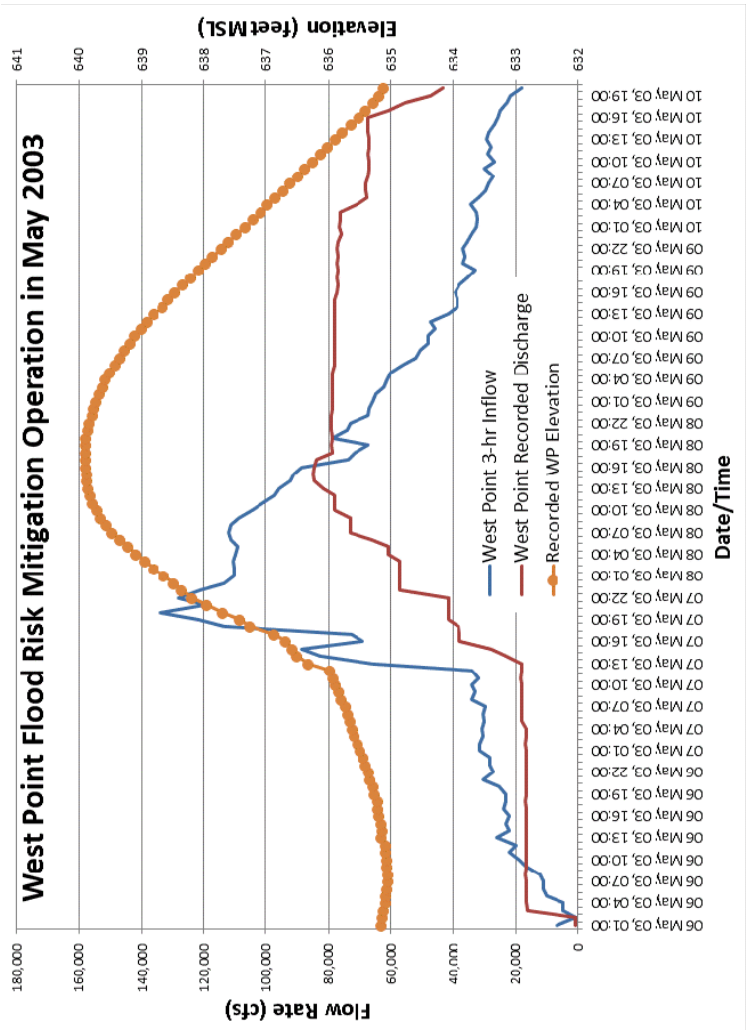


Figure 50. Recorded West Point flood risk mitigation operation in May 2003

72

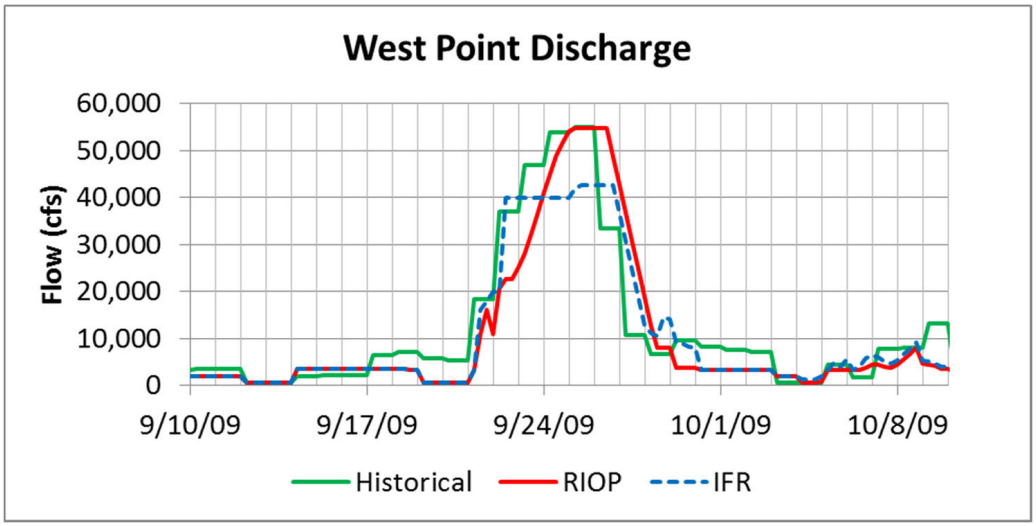


Figure 51. 6-hour West Point Discharge for the IFR and RIOP compared to historical daily discharge for the September 2009 flood event.

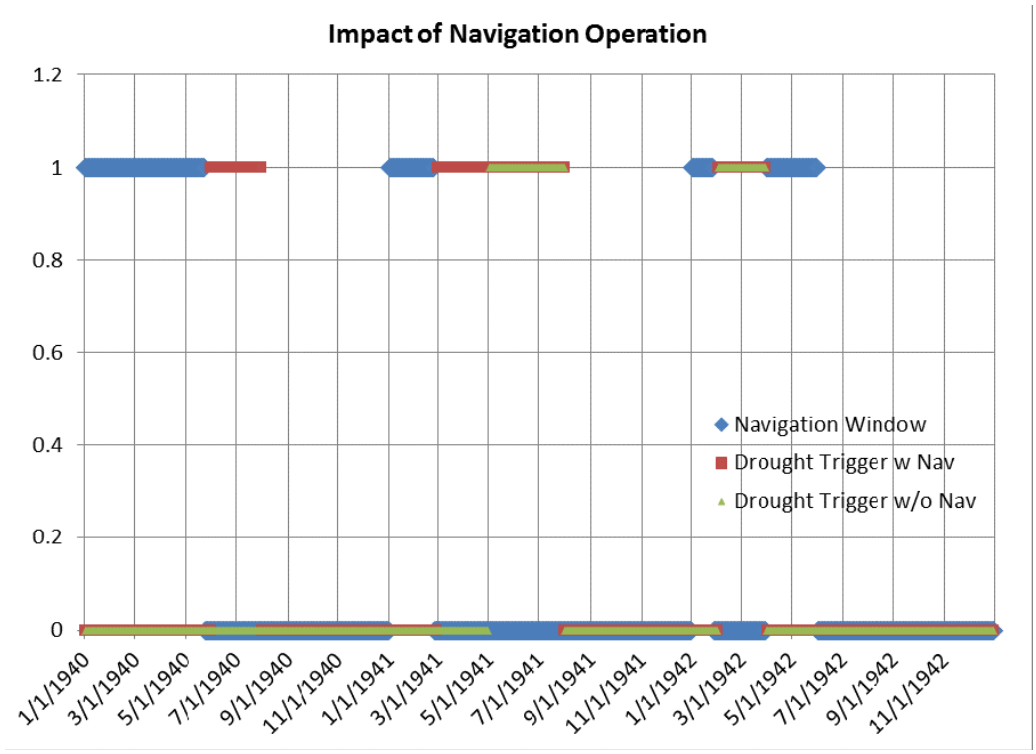


Figure 52. Additional system-wide drought operation resulting from navigation operations – 1940 – 1942

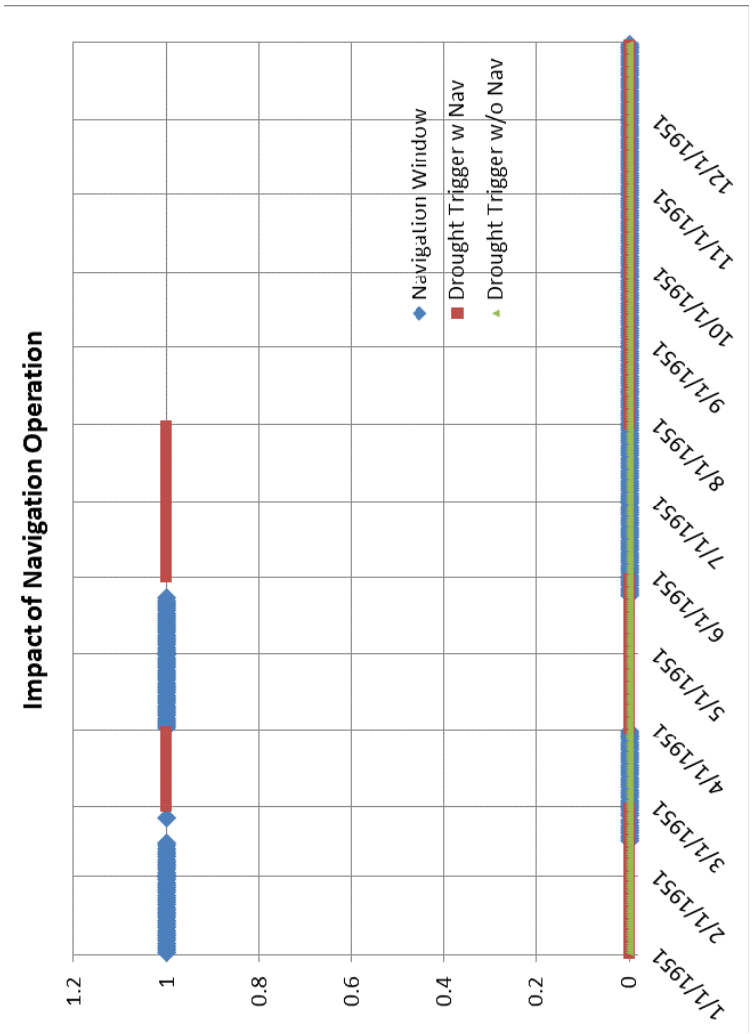


Figure 53. Additional system-wide drought operation resulting from navigation operations – 1951

75

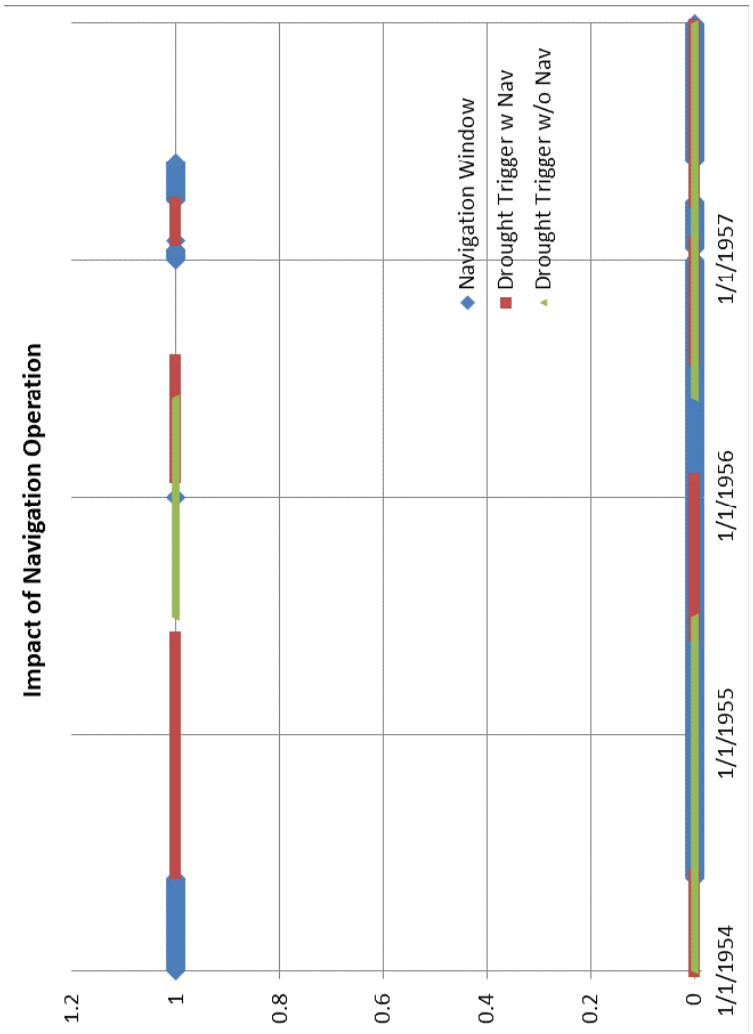


Figure 54. Additional system-wide drought operation resulting from navigation operations – 1954 – 1957

76

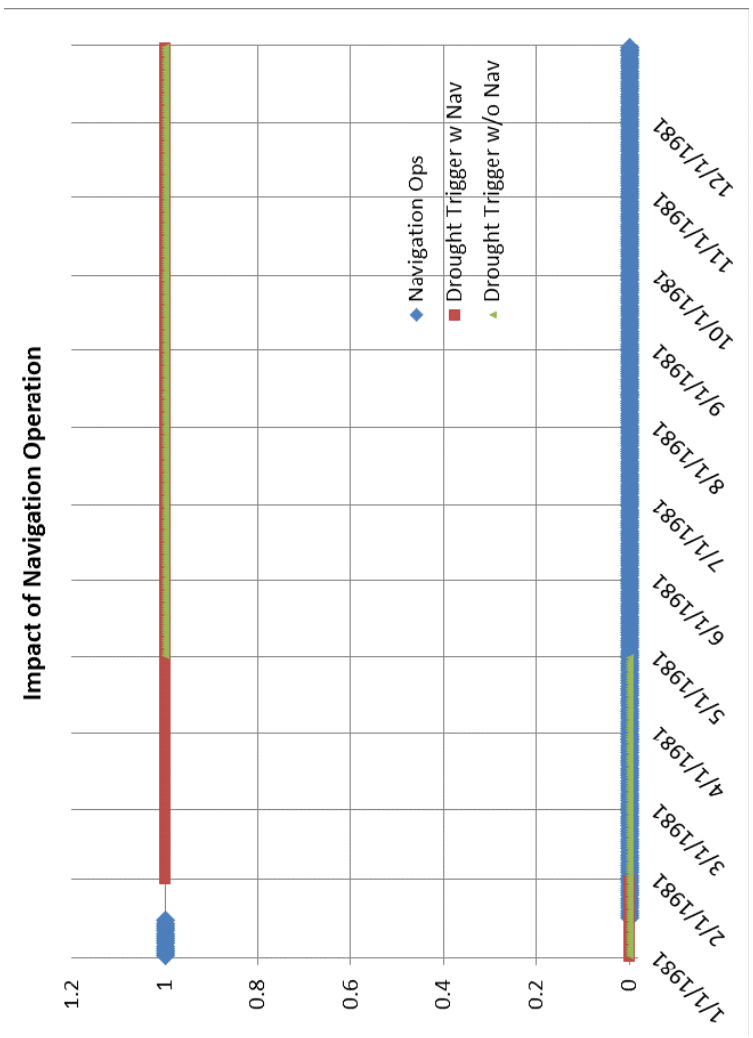


Figure 55. Additional system-wide drought operation resulting from navigation operations – 1981

77

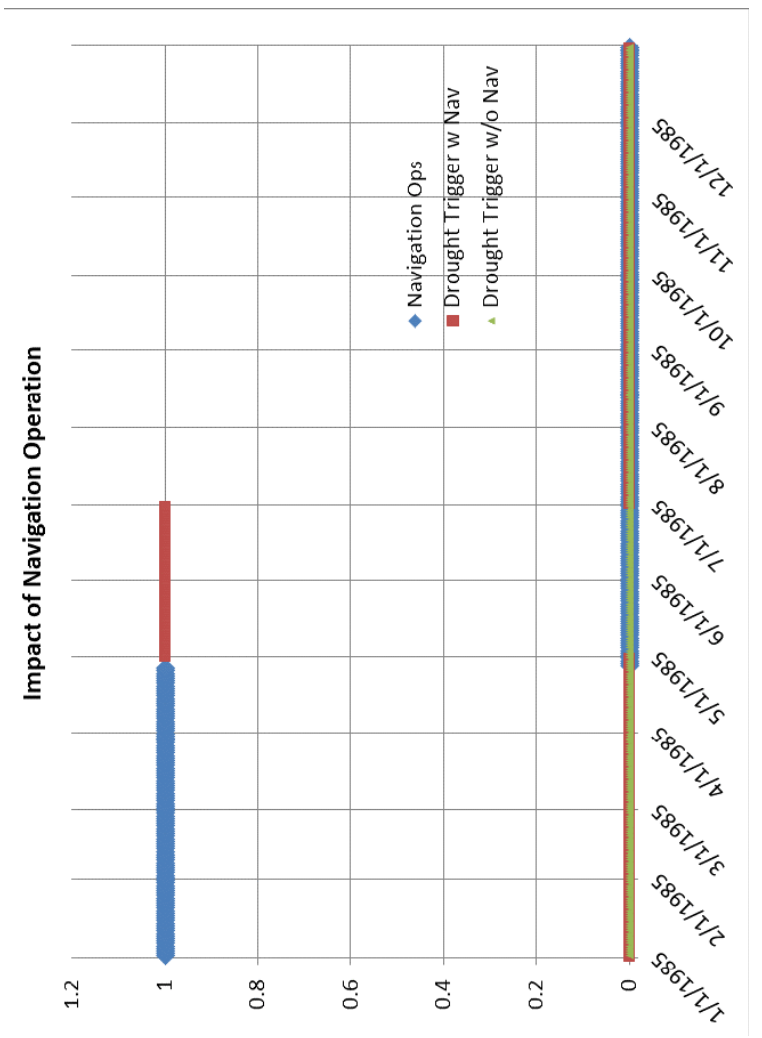


Figure 56. Additional system-wide drought operation resulting from navigation operations – 1985

78

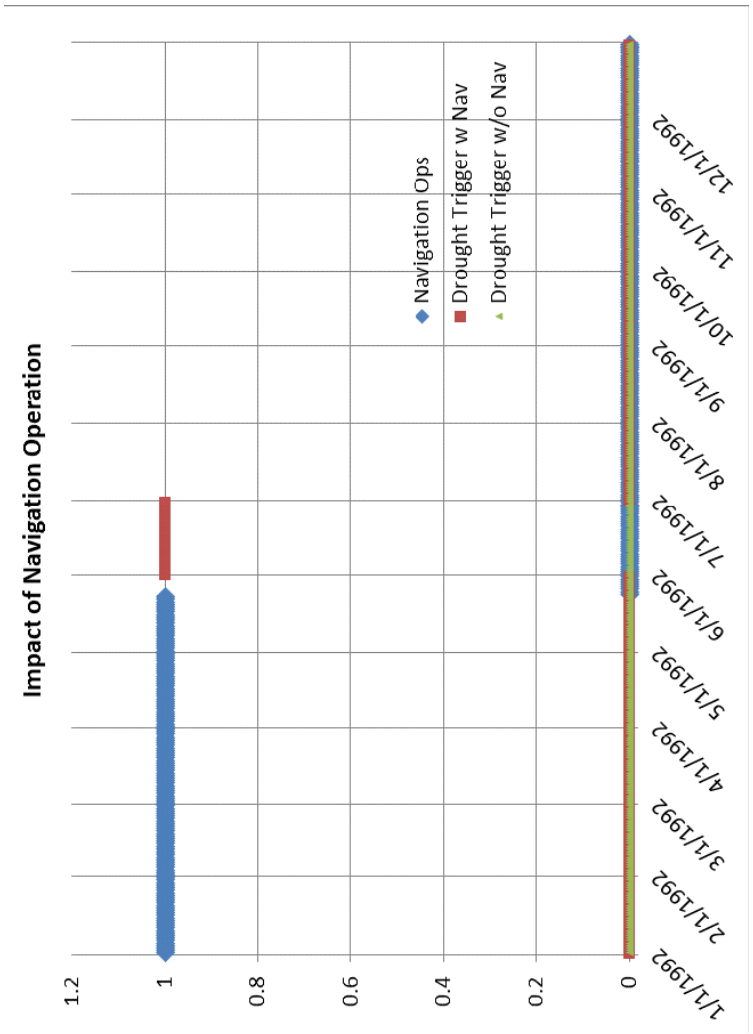


Figure 57. Additional system-wide drought operation resulting from navigation operations – 1992

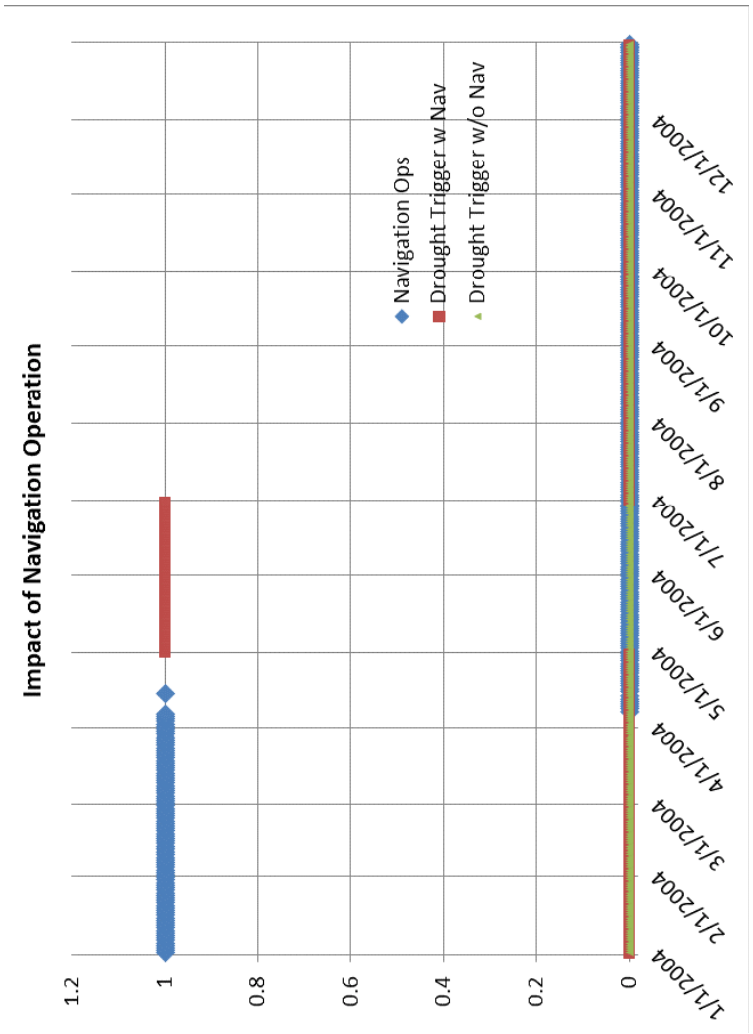


Figure 58. Additional system-wide drought operation resulting from navigation operations – 2004

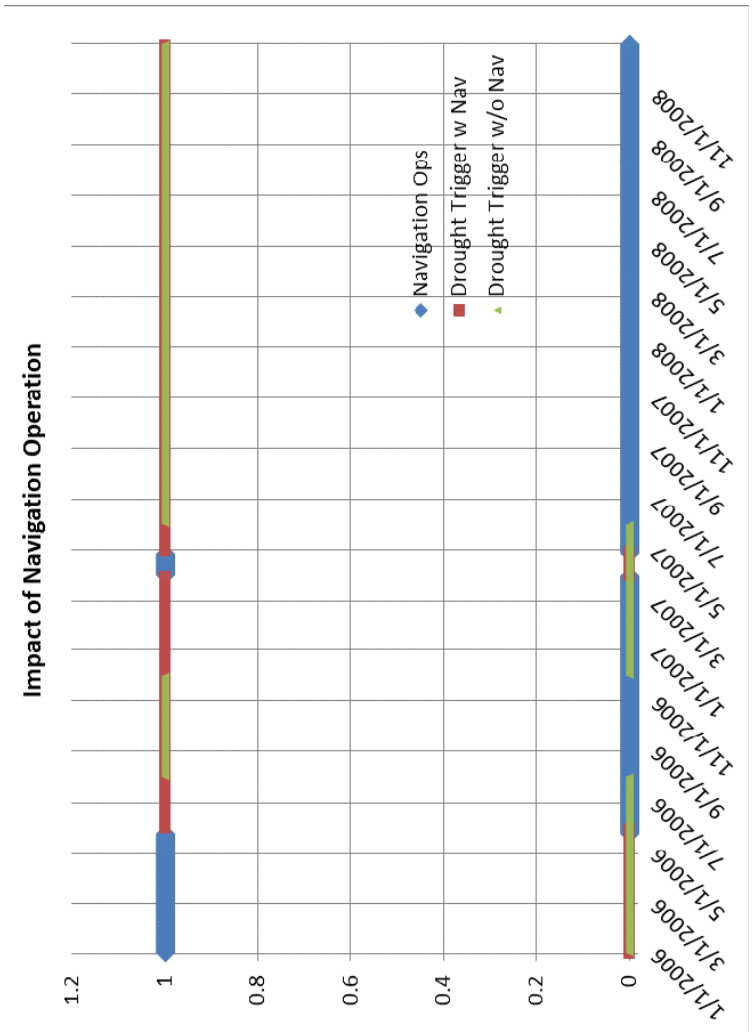


Figure 59. Additional system-wide drought operation resulting from navigation operations – 2006 – 2008

81

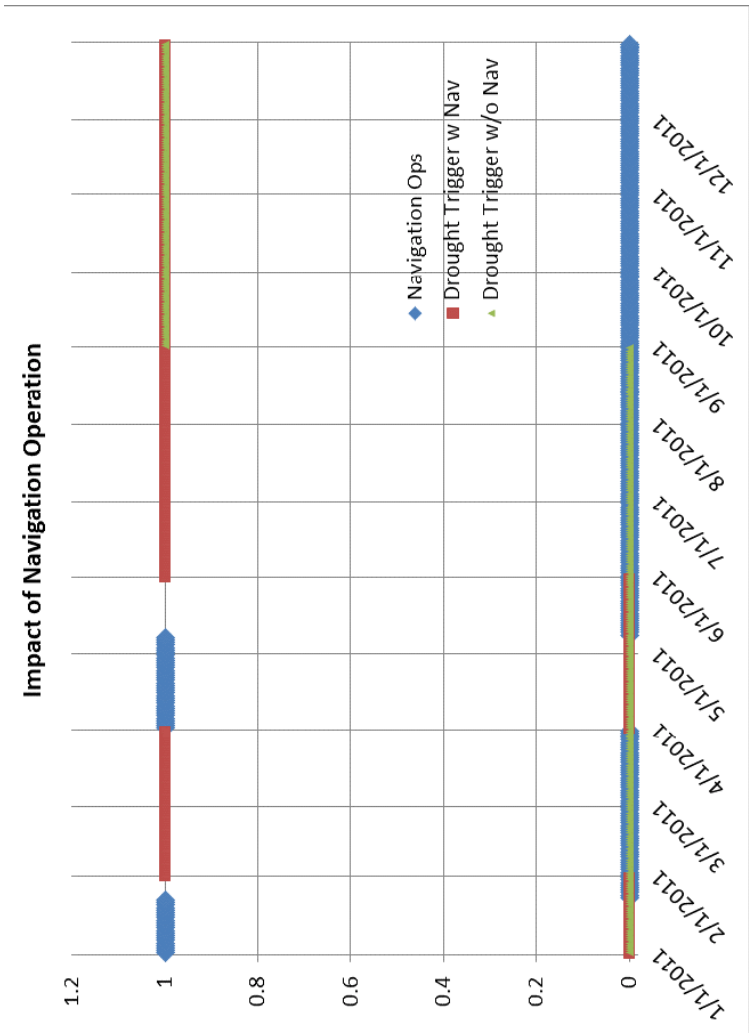


Figure 60. Additional system-wide drought operation resulting from navigation operations – 2011

82

From:
Sent: Friday, January 29, 2016 3:50 PM
To: ACF-WCM
Subject: [EXTERNAL] To The Corp on Lake Lanier GA - regarding the proposed WCM.....

Follow Up Flag: Follow up
Flag Status: Flagged

To Whom It May Concern:

Regarding the proposed WCM, I request that you please consider my following requests -

1. Revise the navigation plan to avoid the severe impact the proposed plan will have on Lanier's water levels. A
2. Incorporate rigorous drought prediction that will trigger changes in reservoir operations to preserve lake levels during drought. B
3. Manage the reservoirs to retain maximum storage levels in the reservoirs so that drought conditions will not have the devastating impact that was experienced in December 2007 and 1982. C
4. Model and plan for raising Lake Lanier's full pool level to 1073. D

Thank you,
Fred Fox
Buford, GA

Responses to ACF239 – Fred Fox

A. As shown in Figure 6.1-6 of the EIS, the PAA would likely result in lake levels at Lake Lanier ranging from about 2 to 4 ft lower than those for the NAA. That condition would be expected to occur less than 2 percent of the days over the entire modeled period of record (73 years) during the worst drought conditions for that period. The differences would be attributable largely to increased water supply withdrawals from the lake as well as increased releases from Buford Dam to meet future water supply demands for Metro Atlanta users (i.e., Cobb, Fulton, and DeKalb counties and the City of Atlanta). It should be noted that navigation is not supported when drought operations are in effect.

B. USACE regulations do not allow use of forecasts in real-time project operations. Forecasted conditions may be used for planning future operations, but releases will follow the water control operations plan based on observed conditions within the watershed to the extent practicable. The Drought Contingency Plan (DCP) sections 3-02 and 3-03 contained as an exhibit in the WCMs in appendix A of the EIS includes discussion of drought identification and National Integrated Drought Information System (NIDIS). An NIDIS pilot program has been established for the ACF River Basin with the goal of developing a regional Drought Early Warning Information System. The system will use key indicators of drought to make timely drought forecast. USACE is a contributor and user of the NIDIS pilot project tools.

C. Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008.

D. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management. Accordingly, raising the conservation pool at Lake Lanier by 2 ft would not meet this criterion and was not carried forward.

Responses to ACF240 – Keith and Charlene Pettigrew

From: Char Pettigrew
Sent: Friday, January 29, 2016 5:43 PM
To: ACF-WCM
Cc: 'KRPettigrew'
Subject: [EXTERNAL] US Army Corp of Engineers - Proposed Navigation Plan Concerns

Commander
U.S. Army Corps of Engineers
Mobile District
Attn: PD-EI (ACF-DEIS)
P.O. Box 2288
Mobile, AL 36628

Dear Commander,

As homeowners on Lake Lanier, it's recently come to our attention that the Corps' proposed navigation plan is quite likely to have a significant impact on lake levels. We moved to Lake Lanier just a year and a half ago in the hopes of retiring and fulfilling a life-long dream. We love it here! But with the changes under consideration, our fear is that our family will be unable to fully enjoy our home and we stand to lose a considerable amount of property value - which we've saved our entire lives to enjoy… A

Still, we recognize that the Corp's task is not an easy one. You have a responsibility not just to lake property homeowners, like us, but also to manage for flooding, provide crucial water for farmers and ensure adequate flow for river traffic downstream – well beyond Georgia.

Recent hard rains and high lake levels may make it hard to remember the drought conditions of past years. But we know that it's very likely that, despite recent rains, we'll again experience those difficult times. And so you should know that for our part, we continue to seek ways to conserve this precious resource and reduce our personal water usage, B

Therefore, we would ask that serious consideration be given revising the proposed plan in order to avoid dropping levels too far and begin the steps necessary to raising full pool levels from 1,071 to 1,073 feet. We know that when the rains fall, there are very few reservoirs in which to capture it. And creating more reservoirs is hugely costly, would take years (decades…), and quite frankly, is unlikely to ever occur. ***So capturing the rainfall we receive when it's plentiful for future use when it's not*** seems to be a practical, cost-effective, way to better prepare for the future while lessening the overall effect on everyone.

Thank you sincerely for your consideration,

Keith & Charlene Pettigrew

1

A. As shown in Figure 6.1-6 of the EIS, the PAA would likely result in lake levels at Lake Lanier ranging from about 2 to 4 ft lower than those for the NAA. That condition would be expected to occur less than 2 percent of the days over the entire modeled period of record (73 years) during the worst drought conditions for that period. The differences would be attributable largely to increased water supply withdrawals from the lake as well as increased releases from Buford Dam to meet future water supply demands for Metro Atlanta users (i.e., Cobb, Fulton, and DeKalb counties and the City of Atlanta). It should be noted that navigation is not supported when drought operations are in effect.

B. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management. Accordingly, raising the conservation pool at Lake Lanier by 2 ft would not meet this criterion and was not carried forward.

From: Mary Thompson
Sent: Friday, January 29, 2016 5:38 PM
To: ACF-WCM
Subject: [EXTERNAL] WCM COMMENTS

To Whom it may Concern,

I would like to add to and support the detailed and factual commentary provided by the Lake Lanier Association in a letter to Colonel Jon J. Chytka Commander USACE. A

I am very concerned about the navigation operations which would lower Lake Lanier by more than four feet in a drought similar to the one in 2007-2008. The impact of this is huge in many ways and I would agree that the following needs to occur: B

1. Revise the navigation plan to avoid the severe impact it will have on Lanier's water levels.

2. Incorporate rigorous drought prediction that will trigger changes in reservoir operations to preserve lake levels during drought. C

3. Manage the reservoirs to retain maximum storage levels in the reservoirs so that drought conditions will not have the devastating impact that was experienced in December 2007. D

4. Plan for raising Lake Lanier's full pool level to 1073 allowing for more water retention especially in cases of drought. E

5. Bring the WMC in line with what is really happening on this Lake now and not base it on decades old theories that do not "hold water" today.

Not only will lack of water prove harmful for the huge financial engine that Lake Lanier has become with millions of yearly visitors to this Lake, I can also tell you as a Lake Lanier Appraiser, the impact on Real Estate values is huge when water levels go down by 4 feet during a drought as is proposed, when we need it the most. F

This will also significantly impact water needed for drinking which has become more evident due to increases in population in and around the lake. This demand will only increase moving forward and cannot be ignored.

I ask that you please weigh all comments you receive very seriously as there are thousands of concerned citizens who live on and around Lake Lanier who will be impacted, including businesses who rely on Lake Lanier for their livelihood.

Respectfully Submitted,

Mary Thompson
Lake Lanier Appraiser and Concerned Citizen

--

Responses to ACF241 – Mary Thompson

A. When complete, the Master WCM update process will result in an updated Master WCM that includes updated water control plans and manuals for the ACF system and each federal project within the system. It will reflect operations under existing congressional authorizations, taking into account changes in basin hydrology and demands from years of growth and development, new/rehabilitated structural features, legal developments, and environmental issues. The effects of climate change on the PAA are discussed in section 6.8 of the draft EIS. Refer to the USACE response to the Lake Lanier Association comment letter (# ACF145) for additional information.

B. As shown in Figure 6.1-6 of the EIS, the PAA would likely result in lake levels at Lake Lanier ranging from about 2 to 4 ft lower than those for the NAA. That condition would be expected to occur less than 2 percent of the days over the entire modeled period of record (73 years) during the worst drought conditions for that period. The differences would be attributable largely to increased water supply withdrawals from the lake as well as increased releases from Buford Dam to meet future water supply demands for Metro Atlanta users (i.e., Cobb, Fulton, and DeKalb counties and the City of Atlanta). It should be noted that navigation is not supported when drought operations are in effect.

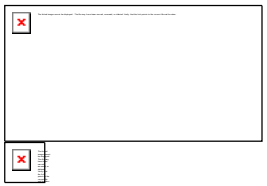
C. USACE regulations do not allow use of forecasts in real-time project operations. Forecasted conditions may be used for planning future operations, but releases will follow the water control operations plan based on observed conditions within the watershed to the extent practicable. The Drought Contingency Plan (DCP) sections 3-02 and 3-03 contained as an exhibit in the WCMs in appendix A of the EIS includes discussion of drought identification and National Integrated Drought Information System (NIDIS). An NIDIS pilot program has been established for the ACF River Basin with the goal of developing a regional Drought Early Warning Information System. The system will use key indicators of drought to make timely drought forecast. USACE is a contributor and user of the NIDIS pilot project tools.

D. Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008.

E. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management. Accordingly, raising the conservation pool at Lake Lanier by 2 ft would not meet this criterion and was not carried forward.

F. Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to drought operations provisions in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008.

USACE considered and addressed all comments regarding the effects of the PAA on Lake Lanier water levels. The final EIS provides an analysis of the impacts to Lake Lanier that would result from lower lake levels (see section 6.1.1.1.1 in the EIS).



Mary T. Thompson
Lanier Appraisal Service-Lake Lanier Specialist
Certified Appraiser

Website: Blockedwww.lanierappraisalservice.com
Blog: Blockedwww.activerain.com/blogs/lakelanierappraiser

The content of this fax/e-mail message and any attachment thereto is confidential nonpublic information intended for the recipients named above.If received in error and you are not one of the above named recipients, kindly forward it back to the sender and then delete and disregard the message.You are further notified that the copying, distribution, or dissemination of this fax/e-mail and any attachment is strictly prohibited unless permission, in writing or by fax/e-mail, is received from the sender.

Furthermore, this e-mail message may contain company-client privileged communications or it may contain company work product, both of which are privileged. The privilege is not waived by fax or electronic transmittal.

From: Michael Brown
Sent: Saturday, January 30, 2016 5:05 AM
To: ACF-WCM
Subject: [EXTERNAL] WCM

To whom it may concern:

We are members of LLA and support their suggestions for the WCM. A
Thank you.

Sincerely,

Mike and Jan Brown

Responses to ACF242 – Mike and Jan Brown

A. When complete, the Master WCM update process will result in an updated Master WCM that includes updated water control plans and manuals for the ACF system and each federal project within the system. It will reflect operations under existing congressional authorizations, taking into account changes in basin hydrology and demands from years of growth and development, new/rehabilitated structural features, legal developments, and environmental issues. The effects of climate change on the PAA are discussed in section 6.8 of the draft EIS. Refer to the USACE response to the Lake Lanier Association comment letter (# ACF145) for additional information.

Responses to ACF243 – John Solomon

From: John C. Solomon
Sent: Saturday, January 30, 2016 10:23 PM
To: ACF-WCM
Subject: [EXTERNAL]
Attachments: george.docx

See attached

The Flows in the Apalachicola River are essential for the environmental health of the river and the economic well-being of the communities located along the river and the Apalachicola Bay. The seafood industry in the Apalachicola Bay, which provides 1/10 of the nation's oyster supply and is also an important source of other seafood, depends on the bay and estuary conditions that require adequate fresh water supply from the Apalachicola River. Citizens and business in and around Apalachicola are working to revive river borne transportation for purposes of commerce, entertainment and tourism. The US army Corp of engineers operates a series of reservoirs in the Apalachicola River Basin. Congress authorized the construction and operation of these reservoirs in support of commercial navigation among other purposes which the Corps has recognized since the enactment in 1945. The Corps is authorized to operate its reservoirs to provide navigation flows and to maintain a navigational channel at a depth of 9 feet and a width of 100 feet which requires dredging and desnagging in the Apalachicola River from time to time. In the Recent years the Corps has stopped providing flow and channel maintenance sufficient to support navigation. Flows in the Apalachicola River were healthier at times when the Corps implemented an active program of navigation support as required. I support the efforts of the Corps to provide for navigation of the Apalachicola River including Dredging the navigational channel to provide increased flow and navigational channel desnagging only.

A

B

John C. Solomon
Executive Director
Apalachicola Bay Chamber of Commerce

Responses to ACF243 – John Solomon

A. The authorized purposes of the federal ACF system do not include a specific directive to provide freshwater inflows to Apalachicola Bay to sustain the resources of the bay. USACE does make releases to limit adverse effects to threatened and endangered species downstream of Jim Woodruff Lock and Dam, including Apalachicola Bay. USACE consulted on the PAA and the results are presented in appendix J of the final EIS. In the biological opinion the USFWS concluded that effects to estuarine invertebrate production are insignificant because the PAA provides slightly beneficial effects from increasing the number of freshwater pulses and increasing the number of days greater than or equal to 16,200 cfs in the winter. USFWS also anticipate only minor changes in salinity regimes and estuarine habitat due to the WCM.

B. The PAA includes provisions for increased flows when sufficient water is available within the basin to support the availability of a 7-ft navigation depth in the Apalachicola River each year between January and May. Increased flows beyond that level to provide opportunity for navigation use of the Apalachicola River would have adverse effects on other authorized purposes of the ACF Basin projects. USACE, Mobile District received a 10-year permit from the Florida Department of Environmental Protection (DEP) on November 27, 2013, to conduct snagging operations on the river to maintain navigability depending on annual availability of operation and maintenance funds. Dredging of the navigation channel in the Apalachicola River has not been conducted since the Florida DEP denied USACE a permit for the work in 2005. Additionally, because the ACF navigation project is considered a low use waterway from a commercial navigation standpoint, USACE has been unable to budget for operation and maintenance funds to conduct maintenance dredging on the river. These constraints will likely continue to exist for the foreseeable future.

Responses to ACF244 – Oglethorpe Power

From: Taylor, George
Sent: Saturday, January 30, 2016 9:03 PM
To: ACF-WCM
Subject: [EXTERNAL] ACF DEIS and WCM Comments
Attachments: ACF WCM Comment Ltr.pdf

Attached please find our comments on the ACF draft water control manual and DEIS.

OglethorpePower
An Electric Membership Corporation

January 30, 2016

Via E-Mail (acf-wcm@usace.army.mil) and U. S. Mail

Commander Jon J. Chytka
U.S. Army Corps of Engineers
Mobile District
Attn: PD-EI (ACF-DEIS)
P. O. Box 2288
Mobile, AL 36628-0001

Dear Colonel Chytka,

Subject: Draft ACF Water Control Manual and Draft EIS

I am writing to comment on the United States Army Corps of Engineers' draft ACF Water Control Manual (WCM) and draft EIS. We are concerned that the Corps' evaluation of the impact of the proposed WCM on hydropower severely understates the true impact.

Oglethorpe Power Corporation is an electric membership corporation whose members are 38 distribution cooperatives that serve over 4 million Georgians in 65% of the land area in Georgia. These member cooperatives each have a contract with the Southeastern Power Administration (SEPA) to purchase capacity and energy from the GA-AL-SC system of projects, including the ACF. SEPA charges our members for the capacity and energy at rates that are sufficient to recover 100% of the cost of the projects allocated to hydropower. That cost allocation was prepared by the Corps in consultation with other agencies based on the original project purposes and expected benefits when authorized by Congress. Thus we have a substantial interest in any revision to Corps operations that reduces the value of hydropower without a commensurate reduction in the cost our members are responsible for repaying.

While it may well be that even if the hydropower impacts shown in the Water Supply Storage Assessment (WSSA) had been properly calculated the Preferred Action Alternative would not have changed, the WSSA explicitly acknowledges that the water storage contracts will be priced pursuant to the Corps' regulations that specify the highest of four methodologies will be used. It is our belief that the replacement cost of power is at least as high as the updated cost of storage for the withdrawal quantities requested. However, we don't have sufficient detail to make the correction to the Corps' calculations. While we can support a reallocation of storage from hydropower to water supply, that support is conditional on one crucial detail – the supply must be placed under storage contracts, and the contracts must be priced using the highest of the four methodologies, and in particular must be at least as high as the true replacement cost of power. A

We fully support the comments submitted by the Southeastern Federal Power Customers, Inc., an organization to which we belong, where our concerns over the valuation of the hydropower impacts are discussed in more detail. B

Oglethorpe Power Corporation • 2100 East Exchange Place • Tucker, GA 30084-5336
Phone: 770-270-7600 • Fax: 770-270-7872
A member of the National Rural Electric Cooperative Association

Responses to ACF244 – Oglethorpe Power

A. The WSSA (appendix B of the EIS) explains the cost of reallocated storage in accordance with USACE regulations as the updated cost of storage (the highest of four alternative methods). The credit to the power marketing agency (Southeastern Power Administration) also is presented in section 5.3 and appendix D of the WSSA.

B. See responses to comment letter ACF262

Oglethorpe is also a member of the ACF Stakeholders, which has produced a "Sustainable Water Management Plan". We believe this plan presents a reasonable alternative, but note the following caveat in the report: "The federal hydropower customers recognize and understand the competitive environment for the use of the waters of the ACF Basin, especially during times of drought. It is this recognition and understanding that has always guided the federal hydropower customers in agreeing to the use of the water storage in the federal reservoirs for a "higher and better" use, as long as the economic impact is not unfairly shouldered by the federal hydropower customers when hydropower operation is curtailed, modified or eliminated in order to support the "higher and better" use." In particular, in this case the anticipated water storage contracts must be priced at no less than the true replacement cost of power in order to achieve this goal.

C

As we look into the future and consider the challenges that we and our members will face in providing power to our retail consumers, the carbon neutral resource provided by the Corps of Engineers hydropower projects remains an important part of our portfolio.

We anticipate that another public process will be required for the contracts suggested by the WSSA, and we look forward to confirming that these contracts are properly priced.

Thank you for the opportunity to comment on the Corps' proposed actions. We look forward to continued participation in the implementation of the proposed WCM.

Very truly yours,

George B. Taylor, Jr.
Deputy General Counsel

Responses to ACF244 – Oglethorpe Power

C. The WSSA (appendix B of the EIS) explains the cost of reallocated storage in accordance with USACE regulations as the updated cost of storage. The credit to the power marketing agency (Southeastern Power Administration) also is presented in section 5.3 and appendix D of the WSSA. In commenting on the draft EIS, the ACF Stakeholders provided information regarding their sustainable water management plan. To the extent that information was available, that plan was evaluated in the final EIS.

Responses to ACF245 – Big Bend Sierra Club

From: Holly Parker
Sent: Saturday, January 30, 2016 6:25 PM
To: ACF-WCM
Subject: [EXTERNAL] ACF EIS Comments
Attachments: BBSC Comments on ACF Water Control Manual and Draft EIS.pdf

Please see attached.

Thank you,
Holly Parker

Responses to ACF245 – Big Bend Sierra Club

Commander
U.S. Army Corps of Engineers, Mobile District
PD-EI (ACF-DEIS)
P.O. Box 2288
Mobie, AL 36628
ACF-WCM@usace.army.mil

January 30, 2016

Re: Apalachicola-Chattahoochee-Flint River Basin Water Control Manual and Draft Environmental Impact Statement.

Dear Commander:

Thank you for the opportunity to comment on the US Army Corps of Engineers ("USACE" or "Corps") Draft EIS and Water Control Manual for the Apalachicola-Chattahoochee-Flint ("ACF") River Basin. In updating its manual, the Corps has the opportunity to begin to alleviate some of the harm that has resulted from mismanagement of the ACF Basin and devastated the Apalachicola Bay in recent years. The Big Bend Sierra Club strongly urges the Corps to consider the future of the Bay in developing its Basin plan.

Big Bend Sierra Club

The Big Bend Sierra Club is the local Group of the National Sierra Club, serving Tallahassee and the Big Bend region of Florida, including Apalachicola. Founded by John Muir in 1892, the Sierra Club is one of America's oldest, largest, and most influential grassroots environmental organizations. The Big Bend Sierra Club ("BBSC") currently has over 250 local members and supporters.

Apalachicola Bay and the Apalachicola River

Apalachicola, Florida, located about 80 miles southwest of Tallahassee along coastal Highway 98, is famous for its oysters. The small Bayside town has fallen on hard times in recent years as decreased freshwater flows in the Apalachicola River have resulted in a myriad of environmental problems, from increased algal growth and water quality pollution exacerbated by low flushing rates to increased sedimentation from upstream development. The most significant problem resulting from decreased freshwater inputs is rising salinity. Periodic salinity fluctuations from marine saltwater to riverine freshwater are essential to the health of oyster reefs because oyster parasites cannot survive in low

A

A. The authorized purposes of the federal ACF system do not include a specific directive to provide freshwater inflows to Apalachicola Bay to sustain the resources of the bay. USACE does make releases to limit adverse effects to threatened and endangered species downstream of Jim Woodruff Lock and Dam, including Apalachicola Bay. USACE consulted on the PAA and the results are presented in appendix J of the final EIS. In the biological opinion the USFWS concluded that effects to estuarine invertebrate production are insignificant because the PAA provides slightly beneficial effects from increasing the number of freshwater pulses and increasing the number of days greater than or equal to 16,200 cfs in the winter. USFWS also anticipate only minor changes in salinity regimes and estuarine habitat due to the WCM.

salinity conditions. In the absence of sufficient freshwater, the oyster reefs have been decimated, and with them an entire way of life in Florida's "forgotten coast."

The ACF River Basin and Master Water Control Manual Update

The Apalachicola-Chattahoochee-Flint River Basin drains 19,600 square miles in Georgia, Alabama, and Florida. The system extends over 385 miles to its terminus in Apalachicola Bay. Five federal reservoirs, managed by USACE's water management section in the Mobile District, are included in the ACF system: Buford Dam/Lake Lanier, West Point Dam, Walter F. George Lock and Dam, George W Andrews Lock and Dam, and Jim Woodruff Lock and Dam/Lake Seminole. The Water Control Manual guides the operation of the reservoir system "to support all authorized project purposes and benefits within the ACF system to the extent practical," through the use of "action zones" to determine the proper balance among hydropower generation, navigation releases from conservation storage, and system-wide balancing. During drought conditions, the water control plan reduces the amount of water available for downstream uses.

B

Engineering Regulation (ER) 1110-2-240, 33 C.F.R. §22.5, directs the Corps to update its master Water Control Plan to prescribe plans of operation for basin projects, "while taking into account private, community, social, and economic needs and sound environmental stewardship," per the project website. The purpose of this comprehensive update to the water control manual is to avoid the risk of not providing sufficient water for authorized project purposes and domestic, municipal, or industrial stakeholders, adversely affecting endangered species, expending water resources too early, and flooding. In particular, the State of Georgia has requested additional water storage to meet its growth needs; this need was addressed in the Draft update by reallocating an additional 165 million gallons per day (mgd) of water to Lake Lanier and releases from Buford Dam sufficient to provide up to 408 mgd for use by the city of Atlanta.

The Draft EIS and ACF Water Control Manual must rigorously assess alternative water sources for ACF population centers and the final manual must consider restoration of the health of the Apalachicola ecosystem as a primary consideration.

The Corps recognizes that primary stakeholder concerns received during the EIS scoping process center on on socioeconomic impacts and impacts to water quantity and quality, and biological resources. In other words, there is substantial public interest in the health of the Apalachicola River and Bay. However, the Corps acknowledges that none of the nine proposed alternatives would significantly address salinity in the Bay. The agency argues that stakeholders have proposed project alternatives not within its jurisdiction, yet also acknowledges that USACE has the authority under the Rivers and Harbors Act to

C

Responses to ACF245 – Big Bend Sierra Club

B. No response is required.

C. The WSSA (appendix B of the EIS) evaluates alternatives to reallocation as a means of satisfying Georgia's water needs and concludes that reallocation of storage in Lake Lanier is the most economically efficient. USACE is not authorized to operate the ACF Basin reservoir projects to provide releases specifically for the benefit of fish and wildlife resources or associated habitat conditions in Apalachicola Bay. The analysis presented in section 6 of the EIS indicates that the PAA would have a minimal effect on flow conditions in the Apalachicola River and into the bay as compared to current reservoir operations under the NAA. Because flow and water quality changes in the Apalachicola River and Bay are not expected under the PAA, no incremental effect on fish and wildlife resources in the bay would be anticipated. In regard to downstream releases to meet the water supply needs of Metro Atlanta, the 11th Circuit Court of Appeals found that the River and Harbor Act of 1946 (RHA) required USACE to ensure the downstream water supply needs of Metro Atlanta. Therefore, USACE makes releases to meet this downstream water supply authority/requirement in the RHA.

balance authorized uses, including water supply, and must increase downstream water supply even at the expense of upstream power generation uses.

We strongly encourage the Corps to take this opportunity to consider the health, productivity and long-term future of the Apalachicola River, Bay and Floodplain ecosystem. A healthy bay means a prosperous and sustainable economic future for Florida's Forgotten Coast. Thank you for your consideration.

Sincerely,



Holly Parker
Chair, Big Bend Group
Sierra Club

From: Ben Emanuel
Sent: Saturday, January 30, 2016 8:09 PM
To: ACF-WCM
Cc: Gordon Rogers
Subject: [EXTERNAL] ACF WCM DEIS Comment
Attachments: ACF WCM DEIS Comment FRK-AR Jan2016.pdf

Please find attached a comment letter submitted jointly by American Rivers and Flint Riverkeeper® as public comment on the Draft Environmental Impact Statement and Water Control Manual for the Apalachicola-Chattahoochee-Flint River Basin.

Please feel free to contact us if there are questions regarding these comments.

Thank you.

Ben Emanuel

Ben Emanuel | Associate Director, Clean Water Supply Programs | American Rivers
108 East Ponce de Leon Ave., Suite 212 | Decatur, GA 30030

American Rivers | Rivers Connect Us | AmericanRivers.org

January 30, 2016

Commander
U.S. Army Corps of Engineers, Mobile District
ATTN: PD-EI (ACF-DEIS)
PO Box 2288
Mobile, AL 36628

RE: Draft Environmental Impact Statement (DEIS) and Water Control Manual (WCM) for the Apalachicola-Chattahoochee-Flint River Basin

To Whom It May Concern:

This letter is submitted jointly by American Rivers and Flint Riverkeeper® (FRk) as public comment on the Draft Environmental Impact Statement (DEIS) and Water Control Manual (WCM) for the Apalachicola-Chattahoochee-Flint (ACF) River Basin, released in October 2015. We appreciate the opportunity to comment on these critically important documents, as well as the extensions of the public comment period regarding this tremendous amount of information.

FRk is a nonprofit organization headquartered in Albany, Georgia. FRk was established in 2008 with the goal of restoring and protecting the Flint River, its tributaries and associated aquifers; FRk is supported by over 500 families, farms and businesses representing over 2,000 citizens of the Flint River watershed. American Rivers is a national nonprofit organization founded in 1973 and headquartered in Washington, DC, with offices across the country (including in Atlanta, Georgia) and more than 200,000 members, supporters, and volunteers.

Our two organizations have been working in close partnership for over four years to promote sustainable water supplies, drought resilience and healthy river flows in the Flint River basin. FRk has been deeply involved, in multiple venues, in research and conservation work regarding water use and streamflows throughout the entire Flint River basin, including agricultural water use issues in the lower Flint River basin.

Our collaboration has included a special focus on the upper Flint River basin in the Piedmont province. In 2013, we published the report *Running Dry: Challenges and Opportunities in Restoring Healthy Flows in Georgia's Upper Flint River Basin* (available at www.AmericanRivers.org/RunningDry).

Our two organizations are members of the Apalachicola-Chattahoochee-Flint Stakeholders, Inc. (ACFS). Gordon Rogers, Executive Director and Riverkeeper at

Flint Riverkeeper, serves on the ACFS Governing Board and on the ACFS Technical Oversight and Coordination Working Group. As ACFS members, we would like to take this opportunity to reiterate that the ACFS Sustainable Water Management Plan (SWMP), published in May 2015, has been submitted to the U.S. Army Corps of Engineers (USACE), Mobile District, as public comment on the ACF WCM and DEIS. We feel that the submittal of the ACFS SWMP is tremendously valuable as public comment on the WCM and DEIS, and we hope the USACE will give full consideration to the SWMP. Our comments in this letter, meanwhile, are submitted on behalf of our two organizations, but not ACFS.

Our comments are brief and can be summarized as follows:

- The USACE must ensure that the WCM reflects accurate projections of water demand from communities relying on the ACF system for water supply.
- The USACE must ensure that interagency coordination on the WCM fully accounts for the important ecosystems present in the ACF basin and their water needs.
- The USACE must re-examine the Unimpaired Flows (UIF) dataset for the Flint River basin utilized in its hydrologic modeling for the ACF system.

The USACE must ensure that the WCM reflects accurate projections of water demand from communities relying on the ACF system for water supply. Although municipal water use in the upper Flint River basin has a relatively small quantitative impact on basin inflows into the ACF system at Jim Woodruff Dam (generally less than 10 percent), our close work with Flint basin water providers both within and outside of the Metropolitan North Georgia Water Planning District (MNGWPD) informs our expectations of future water demand throughout the area. Many water providers throughout the Metro Atlanta area, and indeed throughout the nation, are experiencing declining customer demand trends that have been unanticipated in many cases. These trends can be attributed to a variety of factors (water efficiency and conservation, economic trends and climatic variability among them), many of which will continue to impact water demand into the future. These trends are represented in the past water use data captured by MNGWPD reporting.

As throughout the nation, many Metro Atlanta water systems are experiencing declining per-capita demand. Meanwhile, examples are increasing of communities experiencing declining *total* municipal water demand even during periods of population and economic growth.

A

A. The final EIS includes updated information regarding Georgia's water supply needs.

Meanwhile, 2015 population projections by the Georgia Governor's Office of Planning and Budget anticipate lower population growth rates than previously expected. Combined with declining per-capita water demand, reduced population growth rates call into question the overall water demand projections throughout the Metro Atlanta region. At this critical juncture in determining water management in the ACF basin, and with new trends in water use becoming clearer, it is incumbent upon the USACE to avoid over-estimating municipal water demand.

The USACE must ensure that interagency coordination on the WCM fully accounts for the important ecosystems present in the ACF basin and their water needs. The ACF river system supports globally important biodiversity and highly commercially important aquatic and estuarine ecosystems. Formal consultation between the USACE and natural resource agencies such as the U.S. Fish and Wildlife Service must not only take place, but these consultations must be properly structured in order to ensure that ecosystem water needs are meaningfully accounted for in USACE management plans.

A tremendous body of scientific research has clarified the role of streamflow as the "master variable" in the health of riverine ecosystems and their estuaries, and through meaningful consultation the USACE has the ability to take into account this body of science in order to preserve and maintain both the ecosystems and economies whose survival depends so much on streamflows within the ACF river system.

Mere consideration of individual species, including endangered species as required for consultation under the federal Endangered Species Act, is neither adequate to address the present and future conditions in the ACF, nor does such consideration fulfill the full requirements of the law during interagency consultations. Specifically, merely specifying minimum flows during drought conditions is insufficient consideration; properly structured consultations will address the full flow-curve needs of the ACF ecosystem, especially during (but not limited to) droughts.

The USACE must re-examine the Unimpaired Flows (UIF) dataset for the Flint River basin utilized in its hydrologic modeling for the ACF system. Given the tremendous increase in consumptive water use from the Flint River basin over approximately the past 40 years, the degree of similarity between the unimpaired Flint River basin inflows represented in the draft WCM and observed flows at U.S. Geological Survey gauging stations in the Flint basin calls for a re-examination of the modeled UIF. The UIF does not accurately represent the true "unimpaired" conditions in the Flint. Consumptive water use has increased immensely throughout the Flint River basin since the mid-1970s due to municipal, industrial and

B

B. Updating WCMs for projects is an inherent USACE function. It is important to distinguish this operational update from other feasibility studies performed by USACE. The Master WCM update is not a study and is only a change to operation of existing constructed projects. Alternatives were developed in accordance with USACE authorities. Furthermore, USACE has spent the last 26 years attempting to update its WCMs for the ACF Basin. During that time, USACE has participated in interagency working groups, comprehensive studies, interstate compacts, settlement discussions, meetings between state governors, litigation, and negotiations led by the U.S. Secretary of the Interior. Throughout the NEPA process there has been extensive interagency and public coordination.

agricultural water use and a lack of corresponding return flows, while evaporative loss of water from numerous impoundments of all sizes throughout the Flint basin has increased for decades.

As is widely known, agricultural water use in particular has increased dramatically in the lower Flint River basin over approximately the last 40 years. Water withdrawals from both surface streams in the Flint basin and from groundwater sources (mainly the Floridan aquifer) for agricultural irrigation have had dramatic negative impacts on streamflow at gauging stations throughout the basin, especially in drought years. This water consumption has markedly reduced the inflows from the Flint system, inclusive of Spring Creek, into Lake Seminole and Woodruff Dam. Consumptive patterns have also changed the dynamics of the Floridan Aquifer system, including the timing of recharge/ recovery following drought conditions and associated surface flow curves.

C

Given the major water resource development that has occurred in the Flint basin in recent decades and the fact that the UIF has implications for determining what flows should be released into the Apalachicola River, especially during drought, it is critical that the UIF more accurately represent pre-development conditions. In all climatic conditions and especially in drought years, it is critically important to provide ecosystem flows into the Apalachicola portion of the system, and just as important that management by the USACE and other entities ensures adequate ecosystem flows in drought years throughout the entire ACF basin, inclusive of the Flint and Chattahoochee basins. Failure to do so will likely lead to stark ecological degradation in the Apalachicola River and estuary, as well as elsewhere throughout the ACF basin. Further ecological degradation, in turn, would be tremendously damaging to communities and economies throughout the region.

Further, since the USACE has no control over flows entering the system from its Flint "arm," it is critical to accurately represent those flows in both modeling and in practical, real-time management so that releases from the USACE-controlled impoundments on the Chattahoochee arm are neither "too large" nor "too small," making sure that both water supply and ecological flows in the Chattahoochee River are given the attention they demand.

Finally, we reiterate our support of the ACFS SWMP as official comment to the USACE on the ACF WCM and DEIS. Each of the SWMP's institutional and hydrologic recommendations is key to good management of the ACF ecosystem. There is enough water in the system to provide for an excellent balance of offstream and instream needs. The USACE must play its role in that balance, and the ACFS SWMP contains meaningful measures for accomplishing such.

D

C. The unimpaired flow data set has continued to expand since its initial development and release in 1997 to support USACE's *ACT/ACF Comprehensive Water Resources Study*. Documentation of the updated unimpaired flow data set for the period 1939–2011 is included in appendix O of the final EIS. As stated in Unimpaired Flow Report in Volume I, Surface Water Availability, of USACE's 1997 ACT/ACF Comprehensive Water Resources Study, as with all data sets, development of this data set involved various assumptions and approximations. The analyst must consider those items and judge their effect on any analysis employing the unimpaired flows. Use of the data should be carefully evaluated based on the methods, assumptions, and data irregularities described in the report. Missing data fill-in, correlations, net evaporation calculations, channel routings, withdrawals and returns, leakages, and flow smoothing are some of the many factors considered before using the data. A comparison of the observed and unimpaired flow of the lower Flint U.S. Geological Survey gages at Albany, Newton, and Bainbridge indicates that the August 2011 unimpaired flow of 590 cfs, 680 cfs, and 1,160 cfs, respectively, is greater than observed. That would indicate that flows have been adjusted to account for consumptive water use during the irrigation period.

D. The ACF Stakeholder's sustainable water management plan (SWMP) was received by USACE in early June 2015. USACE received the report and its recommendations too late to be fully evaluated and considered in the draft EIS. Further, the SWMP, as initially submitted to USACE, did not include the necessary supporting technical documentation and underlying assumptions to fully evaluate the recommended management measures. The SWMP recommendations were considered to the extent possible in the final EIS.

We appreciate the opportunity to submit these comments on the ACF WCM and DEIS. If we can clarify any of the comments above, please contact us using the information below.

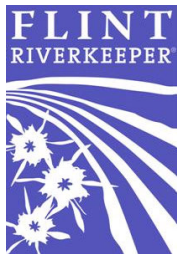
Sincerely,

Gordon Rogers
Executive Director & Flint Riverkeeper®
Flint Riverkeeper®

Ben Emanuel
Associate Director
Clean Water Supply Programs
American Rivers

www.FlintRiverkeeper.org

www.AmericanRivers.org/Flint





From: Joe Piersante
Sent: Saturday, January 30, 2016 4:43 PM
To: ACF-WCM
Subject: [EXTERNAL] Proposed WCM

Importance: High

Gentleman,

Please consider the following points when deciding a proposal that will Affect millions of residents in and around Atlanta.

1. Revise the navigation plan to avoid the severe impact the proposed plan will have on Lanier's water levels. A
2. Incorporate rigorous drought prediction that will trigger changes in reservoir operations to preserve lake levels during drought. B
3. Manage the reservoirs to retain maximum storage levels in the reservoirs so that drought conditions will not have the devastating impact that was experienced in December 2007. C
4. Model and plan for raising Lake Lanier's full pool level to 1073. D

Lake Lanier resident and property owner since 1975

Thank You for your consideration

Joe

Joe Piersante
Realtor

ReMax Paramount Properties

Responses to ACF247 – Joe Piersante

A. Navigation is one of several project purposes for which Congress authorized the ACF Basin project, and USACE considers that purpose along with all other authorized purposes when making operational decisions.

Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations provisions in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008. It should be noted that navigation is not supported when drought operations are in effect.

B. USACE regulations do not allow use of forecasts in real-time project operations. Forecasted conditions may be used for planning future operations, but releases will follow the water control operations plan based on observed conditions within the watershed to the extent practicable. The Drought Contingency Plan (DCP) sections 3-02 and 3-03 contained as an exhibit in the WCMs in appendix A of the EIS includes discussion of drought identification and National Integrated Drought Information System (NIDIS). An NIDIS pilot program has been established for the ACF River Basin with the goal of developing a regional Drought Early Warning Information System. The system will use key indicators of drought to make timely drought forecast. USACE is a contributor and user of the NIDIS pilot project tools.

C. Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008.

D. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management. Accordingly, raising the conservation pool at Lake Lanier by 2 ft would not meet this criterion and was not carried forward.

From: Georgakakos, Aris
Sent: Saturday, January 30, 2016 11:59 PM
To: ACF-WCM
Subject: [EXTERNAL] Re: WCM Update Review Comments--Please use version attached herein
Attachments: GWRI_Comments_to_DEIS_&_Updated_ACF-WCM_Jan2016.pdf

Dear USACE,

If possible, please use the review comments attached herein. The version transmitted earlier contained formatting errors.

Thank you and best regards,
Professor Georgakakos
GWRI

From: Georgakakos, Aris P
Sent: Sunday, January 31, 2016 12:25 AM
To: ACF-WCM@usace.army.mil
Subject: WCM Update Review Comments

Dear USACE Colleagues,

Attached please our review of the DEIS and WCM Update reports. We wish to thank you for the opportunity to review these important documents.

Best regards,
Professor Aris Georgakakos
Director, Georgia Water Resources Institute
Georgia Institute of Technology
Blockedhttp://www.gwri.gatech.edu/



Homepage | Georgia Water Resources Institute

Blockedwww.gwri.gatech.edu

GWRI is developing the technical information and knowledge base necessary to inform stakeholder discussions toward a consensus and sustainable water management plan ...

ACF248

Georgia Institute of Technology

Georgia Water Resources Institute

School of Civil and Environmental Engineering

Memorandum

To: Commander, U.S. Army Corps of Engineers, Mobile District
Attn: PD-EI (ACF-DEIS)

From: Professor A. Georgakakos and Dr. M. Kistenmacher, Georgia Water Resources Institute (GWRI), Georgia Tech

Subject: Comments on the Draft Environmental Impact Assessment for Updating the ACF Master Water Control Manual

Date: 30 January 2016

This communication summarizes our review comments for the Draft Environmental Impact Assessment (DEIS) and Water Control Manual (WCM) Update for the Apalachicola-Chattahoochee-Flint (ACF) River Basin.

The Georgia Water Resources Institute (GWRI) is a member of the National Institutes for Water Resources established by federal law (Water Resources Research Act of 1984). GWRI is a state-federal partnership striving to provide better scientific and policy-relevant information to water resources management agencies, policy makers, and other stakeholders in the southeast and elsewhere. With respect to the ACF, GWRI has extensive, multi-year involvement in basin planning and management investigations in cooperation with most stakeholder groups from Alabama, Florida, and Georgia. Most recently (2012-2015), GWRI provided technical support (including new data, modeling tools, management alternatives, and comprehensive basinwide assessments) to the ACF Stakeholders for the development of a shared-vision basin management plan. ACFS is a 503(c) nonprofit stakeholder group comprising 56 river basin organizations in Alabama, Florida, and Georgia—including cities, farmers, environmental groups, power and water utilities, navigation companies, fishery communities, lake associations, NGO's, and many others.

The Draft EIS is voluminous and addresses various aspects of ACF water management. Our review mainly focuses on the development and evaluation of operational and water supply management alternatives described in Chapters 4 and 5, but it also includes other general comments.

The comments included offered herein are strictly GWRI's and do not reflect views and opinions of any other organization or individual. The review effort was supported by funds provided by GWRI and Georgia Tech.

Our review comments are offered under the assumption that the DEIS and proposed WCM Update represent work in progress, intended to provide an opportunity to incorporate stakeholder input

toward improving the WCM Update process and product in ways that meet stakeholder expectations.

For each comment area, we provide a brief outline of the USACE implementation approach and outcome, identify strengths and possible shortcomings, and suggest ways that may strengthen the proposed WCM Update. Our comment areas are organized and presented in reference to a general planning process that adheres to widely accepted principles of integrated water resources management. This general process is outlined next.

Responses to ACF248a – GWRI

1. A General Planning Process

1.1 Integrated Water Resources Management (IWRM) Principles

Integrated water resources management (IWRM) has been introduced and is being practiced in response to rising water use pressures and the failure of conventional wisdom to provide effective solutions. Integrated Water Resources Management (IWRM) is a process which promotes the coordinated development and management of water, land, and related resources, in ways that promote equitable economic and social welfare without compromising the sustainability of vital ecosystems (Global Water Resources Partnership).

To ensure that basin plans (such as the proposed ACF WCM update) are guided by IWRM principles and thus reflect the shared vision of the basin stakeholders, the planning process should include several key stages. These stages are outlined below as they relate to the WCM updating process:

1. Establish the Purposes and Expectations of the Planning Process. The planning process should first seek to establish broad stakeholder agreement and clarity on IWRM purposes and expectations. These deliberations are important to determine the type of information needed for the assessments, water management alternatives to be assessed, expert knowledge and model(s) needed, and relevant criteria and metrics to be solicited and quantified.

2. Establish Appropriate System Performance Criteria, Metrics, and Evaluation Procedures. Extensive stakeholder consultations should take place to (*a*) solicit potential criteria and metrics responsive to stakeholder interests, (*b*) develop stakeholder agreement on a specific set of criteria and metrics to be used in the assessments, and (*c*) agree on a fair evaluation/ranking system based on these metrics. The criteria and metrics eventually selected should be quantifiable based on existing data and information.

3. Formulate a Comprehensive Set of Relevant Water Management Alternatives (WMAs). Stakeholder input and consultations are required in this stage to determine the type of WMAs to be considered in the IWRM planning and management process.

4. Assess Data and Information Availability and Establish Stakeholder Agreement. Consistent with previous findings and recommendations, all relevant data and information available to support the planning process should be identified, compiled, and agreed upon by the basin stakeholders. Most often, failure to agree on this aspect causes irreconcilable stakeholder disagreements later.

5. Identify and/or Develop Expert Knowledge and Modeling Tools. Due to their inherent nature and water uses, water resources plans eventually lead to value judgements between stakeholder interest tradeoffs. Expert knowledge is needed to inform this process and interpret numerical tradeoffs and differences. Likewise, suitable model(s) and post-processing tools need to be identified, customized, and/or developed to model the river basin resources, uses, and management alternatives; compute the agreed upon metrics; and quantify the benefits, impacts, and tradeoffs underlying various WMA candidates.

6. Assess WMA Candidates, Identify the Most Preferable WMA, and Develop a Shared Vision Action Plan. This is a critical stage aiming to identify the most preferable WMA for inclusion in the Plan. The identification process cannot be linear but must include several *iterative and interactive* cycles offering stakeholders ample opportunity to internalize the assessment results, provide input on WMA refinements, and develop consensus on the most preferable WMA.

7. Monitor IWRM Plan Implementation and Make Necessary Adjustments. This post-planning phase aims to ensure that plan implementation (*a*) proceeds as intended and (*b*) has the anticipated outcomes or is revised to achieve them.

Key features of the above planning stages are that they (*a*) seek to incorporate stakeholder feedback throughout the planning process and (*b*) are iterative and self-tuning to the knowledge and information they generate. For instance, the WMA assessments in Stage 6 are likely to create information that requires further analysis. In such cases, Stage 3 should be revisited to formulate additional WMAs to be assessed in a follow-up round of Stage 6.

We use the general planning process outlined above as a conceptual framework to organize our review comments of the ACF WCM Update. Some comments thus pertain to process-related aspects and some to technical alternatives and assessments. We begin with comments pertaining to overall stakeholder engagement opportunities thus far afforded by the WCM updating process.

1.2 Opportunities for Stakeholder Engagement

It is widely recognized that effective stakeholder involvement is *sine qua non* for the development of sustainable water management plans. This section reviews the extent to which stakeholders were afforded such opportunities and participated in the development of the water management alternatives listed in the Draft EIS.

Basin stakeholders (including primary stakeholders who depend directly on basin resources but also secondary stakeholders who have a role in basin resources management or can provide expert knowledge, information, data, or tools) were provided with opportunities to offer input through three public scoping periods. USACE reviewed, analyzed, and organized the solicited comments, and selectively considered some of these comments in the WCM updating process and the Draft EIS. Beyond these scoping periods, the Draft EIS represents another opportunity for stakeholder input on the proposed action alternatives and the procedures used to derive them.

Comments:

While the stakeholder engagement opportunities are appreciated, we believe that more effective stakeholder involvement opportunities would have been beneficial to the planning process and would have already addressed most comments received in this final review stage. In particular, the formulation and assessment of water management alternatives would have benefitted from a more interactive and iterative process allowing for more stakeholder consultation and guidance.

A

Suggestions:
In our experience with the ACFS and other similar planning processes, the formulation and assessment of water management alternatives is never a linear process. Meaningful WMAs leading to sustainable outcomes always require several interactive iterations helping to refine

Responses to ACF248a – GWRI

A. USACE's public involvement actions comply with the NEPA process. Ample opportunities were provided for public comment during the scoping period and public review of draft documents. USACE also periodically updates its Web site with relevant information for the public.

initially formulated WMAs until all relevant intervention measures are evaluated and stakeholder interests and expectations are explored and addressed. We recommend that USACE adopt a more transparent and participatory process through which stakeholder input (more nuanced preferences, information, tools, and expert knowledge) can more effectively be leveraged to guide the planning process.

2. Establishing the Purposes and Expectations of the WCM Updating Process

The purpose of the Draft EIS and WCM updating process is clearly stated in the document and summarized as follows: "This environmental impact statement (EIS) evaluates proposals by the U.S. Army Corps of Engineers (USACE) to adopt an updated Master Water Control Manual, Apalachicola-Chattahoochee-Flint (ACF) River Basin, Alabama, Florida, Georgia (Master WCM or Master Manual); including a water supply storage assessment (WSSA) addressing reallocation of storage in Lake Sidney Lanier (Lake Lanier)."

Comments:

Water management in the ACF basin occurs in multiple layers. Water management decisions are made by government entities at the municipal, regional, state, and federal levels. Additionally, various non-governmental stakeholders exist throughout the basin including, among others, power utilities, navigation companies, recreation users, agricultural water users, and environmental groups. A broad basin planning effort should seek to involve each of these entities in the planning process. However, USACE's mandate under the WCM updating process, though critically significant, is not all-encompassing and inclusive. Many other planning decisions, such as water withdrawal permits, construction of water storage facilities, rehabilitation of water distribution and drainage systems, and water conservation measures during droughts, are made by state and local entities. Thus, the WCM updating process presented in the Draft EIS has a limited scope with respect to the range of stakeholder interests and management options that it is expected to consider. Given the constraints of the WCM updating process, USACE has adequately defined the purpose of the planning process.

B

Suggestions:

Our suggestion here stems from the realization that the WCM updating process cannot by itself *holistically* address the basin planning needs. Periodic WCM updates in response to piecemeal requests by individual basin stakeholders or court rulings only serve to perpetuate past reactive planning processes that are largely responsible for the chronic and litigious ACF conflicts. We recommend that USACE and other federal, state, and local agencies as well as non-governmental stakeholders coordinate and intensify their efforts toward developing a more comprehensive basin plan that integrates all critical aspects of water management.

Particular attention should be paid to developing a comprehensive *drought management* plan, since droughts present the greatest challenge to basin water users. In this regard, we believe that the WCM updating process provides both the opportunity and the mechanism to establishing a comprehensive drought basin management framework and plan. More detailed comments on this aspect are provided in later sections.

B. USACE has spent 26 years attempting to update its WCMs for the ACF Basin. During that time, USACE has participated in interagency working groups, comprehensive studies, interstate compacts, settlement discussions, meetings between state governors, litigation, and negotiations led by the U.S. Secretary of the Interior. EPA and USFWS were involved in several of those cooperative efforts, and all them were to no avail. USACE does not think another attempt at an interagency working group is needed or that it would improve the current process. The Master WCM update is prepared in accordance with all applicable federal laws and USACE regulations and guidance. The suggestion to pursue an inclusive, coordinated process to develop a comprehensive basin plan is beyond the scope of updating the ACF Master WCM. The update of the WCMs is not intended to be comprehensive study effort.

3. Establishing Appropriate System Performance Criteria, Metrics, and Evaluation Procedures

The WCM updating process relies on performance metrics to measure the relative impacts and benefits of water management alternatives across the basin water uses. Performance metrics are computed from model results and associated statistics, and a ranking system is employed to help choose between different water management alternatives. The ranking system uses the performance metric values and compares them across different alternatives by converting them into ranks—lower ranks indicate more preferred alternatives. Individual ranks associated with each metric are then combined into one composite rank for each alternative. The most favorable alternative is considered to be the one with the lowest composite rank.

Comments:

We maintain that USACE made a sound decision to include quantitative performance metrics in assessing the merits of alternative WMAs. However, the Draft EIS does not clearly state how and why specific performance metrics were chosen, creating doubts as to whether water user interests have been fully and meaningfully considered. Moreover, several metrics used do not adequately capture system performance. For instance, two of the hydropower metrics measure average annual power generation. Unfortunately, these metrics do not sufficiently describe hydropower benefits, because peaking operations and temporally variable electricity pricing imply that hydropower benefits cannot be accurately computed from annual averages. Oddly, an appendix of the Draft EIS (ACF Hydropower Impact Analysis Draft) describes detailed hydropower metrics that should have been used in WMA ranking instead of the metrics chosen. Other examples critical of the metrics used are listed in **Appendix A** of this letter.

Based on our ACFS planning process experience, we also submit that other performance metrics more responsive to and resonating with stakeholder interests should have been considered. Some of these metrics may require the use of more advanced data and tools for their evaluation, but the WCM updating process should not be limited by the capabilities of one particular tool but rather seek to leverage other existing tools, experience, and know-how. For example, there are no metrics assessing the impacts of the various WMAs on the Apalachicola Bay hydrodynamic and salinity conditions, yet such impacts are at the center of the on-going Supreme Court case between Florida and Georgia. If the bay impacts are important enough to be litigated before the Supreme Court, shouldn't they be assessed as part of the WCM updating process?

C

The ranking system used in the Draft EIS combines all of the information contained in the individual metrics to rank the WMAs and identify the one with the lowest rank. The ranking system is intended to provide a fair approach to incorporating and weighing the information from many different metrics. However, the implementation of this approach has various shortcomings and needs to be improved. The rationale of the particular ranking system employed in the Draft EIS is not explained, and its potential biases cast doubts on the fairness of the WMA selection process and the validity of its outcome. For example, ranking is solely based on *absolute* magnitude and does not account for *relative* magnitude differences. For instance, the seven alternatives evaluated in Chapter 4 of the Draft EIS all have Walter F. George Lowest Annual Hydropower Capacity values (page 4-66) that are within 0.03% of each other. Even though these

Responses to ACF248a – GWRI

C. The stakeholder performance measures provided during the scoping period were considered for ranking the water management alternatives and final water supply alternatives. While the selected performance measures are not inclusive of all provided measures, they represent parameters related to the authorized project purposes. The measures evaluate project purpose performance and were created after extensive review of input provided by experts, both internal and external to USACE, in each project field. The measures allowed for direct comparison between alternatives.

metrics values are essentially identical, the ranking system nonetheless assigns them ranks from one to seven. The problem is that the same ranking (from one to seven) is applied to metrics of other water uses (such as navigation, recreation, and environmental management) with much more significant differences. Furthermore, the ranking system is rather sensitive to the number of alternatives being evaluated. Thus, if Alternative 6 were removed, then the navigation performance ranking (in page 4-67) would cause the final rank of Alternative 7 to change from 1 to 3, and some of the remaining alternatives would be preferable to navigation interests than Alternative 7.

Suggestions:

In the Draft EIS, the decision to choose one water management alternative over another depends on (*i*) the metrics that measure WMA performance with respect to the various water uses and (*ii*) the logic of the ranking system. Altering these elements leads to different ranks and different preferred alternatives. This is why the metrics used must be representative of all stakeholder interests and the ranking process must be robust. We recommend that more relevant metrics be included, and a more robust and stakeholder-driven WMA evaluation and ranking process be applied. Performance metrics for individual water uses should be developed using stakeholder consultations and suggestions (including those provided herein) so that stakeholder needs are adequately represented. Furthermore, stakeholders should be called upon to evaluate the information contained in individual metrics and assess the desirability of different alternatives. We note that not all stakeholder interests may be fully captured by metrics or quantified by numerical values. In such cases, we recommend that qualified experts be consulted to judge and rank the desirability of different alternatives with respect to specific water uses. Finally, the robustness of the most preferred WMA should also be assessed to ensure that its selection is not sensitive to small changes of the ranking process.

As part of our involvement in the ACFS planning process, we have compiled and implemented a wide range of relevant and meaningful performance metrics for the ACF river basin. GWRI is very interested and willing to assist the USACE with any relevant data, tools, and information. In particular, we recommend that metrics pertaining to the conditions of the Apalachicola Bay be incorporated. To this end, GWRI has recently developed and applied state-of-the-science hydrodynamic/salinity models that can be used to quantify the bay conditions associated with different WMAs.

4. Formulating a Comprehensive Set of Relevant Water Management Alternatives (WMAs).

4.1 Review of WMA Formulation Process

USACE has solicited and received stakeholder recommendations for water management measures through public scoping. Additional measures were developed based on USACE staff experience. USACE then conducted an internal screening process to consolidate all identified measures to seven alternatives for the water operations assessments and nine alternatives for the water supply assessments.

Comments:

The public scoping process allowed stakeholders to provide input to the WCM updating process. However, the large majority of the recommended water management measures were screened out internally by USACE without detailed explanation in the Draft EIS. The lack of transparency in the screening process undermines the very purpose of public scoping. Additionally, measures seem to have been screened by analyzing their impacts and benefits *individually* and not in conjunction with other proposed measures. Such a process risks the elimination of measures that may not exhibit large benefits for individual water uses but may enhance the basinwide benefits of other measures.

The measures carried forward for alternative analysis are listed on pages 4-40 and 4-41 of the Draft EIS. A range of measures were developed in several different categories. While these measures are a good initial set, many of these categories should be explored and refined further. For instance, only two navigation rules are considered (in addition to no navigation), while in reality navigational flow support could be achieved through many alternative release rules.

D

Once a smaller set of water management measures were identified, water management alternatives were formed by combining one or more of the remaining water management measures. However, only a small set of combinations of the proposed water management measures were evaluated in the form of water management alternatives. It is thus unclear if other measure combinations could have resulted in more beneficial outcomes.

On the other hand, it is unclear why some of the alternatives evaluated as part of the water supply option investigations were modeled in the first place. For example, Alternatives 7A and 7C were eliminated on the basis that the water withdrawal levels were not high enough to meet the established objectives for water supply. Similarly, Alternatives 7D and 7E were eliminated because the associated returns rates were deemed to be unattainable. Thus, HEC-ResSim modeling and detailed discussion of assessment results were unnecessary for these alternatives since they were eliminated based on factors other than model results.

Suggestions:

A more thorough and transparent assessment of the recommended water management alternatives should be performed to ensure that public input was considered and systematically evaluated. USACE should provide more clear justification for why suggested water management measures were eliminated. A larger set of combinations of water management measures should also be created from the USACE chosen measures, as well as from USACE staff expertise.
As discussed in the section related to stakeholder involvement during the development of the Draft EIS, GWRI also suggests that the formulation and assessment of water management alternatives be conducted in an iterative fashion with opportunities for stakeholder consultation and input.

Some of the water supply options evaluated in Chapter 5 do not need to be included in the modeling assessments and discussions since they were eliminated based on factors other than model results.

Responses to ACF248a – GWRI

D. The screening of stakeholder input during the scoping process is documented in appendix D of the final EIS.

4.2 Review of WMA Assumptions and Adequacy

The ACF Draft EIS formulates water management alternatives to achieve two goals: (1) develop new reservoir operating rules and (2) evaluate water supply options for the Metro Atlanta area. This section analyzes whether the formulated alternatives adequately help to achieve these goals.

A two-stage process is used to formulate alternatives and achieve the above-stated goals. The first stage (described in Chapter 4) aims to develop new reservoir operating rules and includes seven alternatives all of which assume a 20 mgd withdrawal level from Lake Lanier.

The second stage (described in Chapter 5) aims to assess proposed water supply options for Metro Atlanta in conjunction with the new reservoir operating rules developed in stage one. This stage considers two different reservoir operating policies—current operations and alternative operations selected in Chapter 4. These policies are then combined with different water supply options to create nine water supply alternatives.

Comments:

The water management alternative proposed in Chapter 4 was selected assuming a fixed demand level (20 mgd) which does not even reflect current withdrawal conditions. However, the proposed water supply alternative presented in Chapter 5 supports authorization of 185 mgd. This inconsistency provides no confidence that the proposed water management alternative (selected under much lower water withdrawal conditions) will continue to be valid under much higher future withdrawals.

When evaluating future water withdrawals, it was assumed that withdrawals outside of Metro Atlanta remain at current levels. This unfortunate assumption may underestimate the true impacts of the evaluated water supply options if the future basin demands outside the Metro Atlanta area increase (as they likely would in the absence of water withdrawal caps) beyond their current levels. It should be noted that, due to the interconnected nature of the basin, increased downstream water withdrawals may impact both the downstream and upstream water uses.

System performance can also change due to infrastructure changes. Many of the USACE assessments (and selected alternatives) assume existence of the Glades and Bear Creek reservoirs. However, the incremental value of these projects with respect to basinwide water uses has not been demonstrated. It would be informative to show that these projects are indeed critical elements of the proposed operational and water supply alternatives and add significant value to basinwide management.

E

The climate and hydrology of the ACF basin are also subject to natural variability and change. USACE used a 73-year time series of historical UIFs as input for the modeling studies to capture the natural variability of the basin. However, it should be noted that the UIFs represent only one plausible sequence of flows that can materialize from the climatic and hydrologic drivers of the ACF basin. Even under a stationary climate, the frequency and severity of droughts may be different than those contained in the UIF time series.

Finally, a changing climate may also alter the long term characteristics of the ACF Basin inflows. The Draft EIS describes a climate change assessment that unfortunately falls short of acceptable

Responses to ACF248a – GWRI

E. The Future without Project Condition Alternative includes 20 mgd from Lake Lanier as a requirement to measure the impact of withdrawals greater than is required under the River and Harbor Act of 1946.

The purpose of the EIS is to support the update to the WCMs in determining how the USACE projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws, and to implement those operations through updated water control plans and manuals. Because of the 11th Circuit Court ruling of June 2011 and the USACE legal opinion in 2012, updating the water control plans and manuals includes making a decision on Georgia's water supply request. Accordingly, the EIS considers not only operations for all authorized purposes, but also an expanded range of water supply alternatives associated with the Buford Dam/Lake Lanier project, including current levels of water supply withdrawals and additional amounts from Lake Lanier and downstream for Metro Atlanta that Georgia requested in 2015. Forecasting water demands for parts of the ACF Basin other than Metro Atlanta is outside the scope of the Master WCM update process and the EIS. The ACF Basin critical yield report (appendix F of the EIS) contains information on benefits and impacts related to the yield of proposed Glades and Bear Creek reservoirs.

The climate change analysis has undergone agency technical review and independent external peer review. Those experts determined that the methods used to adjust the unimpaired flow to reflect a forecast of climate change were adequate. The analysis included in the EIS complies with and exceeds the level of climate change analysis required by USACE WCM update policy (Engineering and Construction Bulletin 2014-10, Guidance for Incorporating Climate Change Impacts to Inland Hydrology in Civil Works Studies, Designs, and Projects).

Responses to ACF248a – GWRI

standards for several reasons. First, as described later in this letter, the methods used to develop projected streamflows are flawed. Second, the results are not informative because the performance metrics used in Chapter 4 and 5 are not evaluated. Finally, this assessment is carried out after alternatives had already been developed and was not used to inform the WCM update in any significant way.

Suggestions:

We recommend that USACE adopt a more comprehensive and systematic approach in formulating and assessing an adequate range of water management alternatives. First, a clear baseline scenario needs to be established based on currently authorized water use, infrastructure, and regulation conditions. Second, new water management alternatives should be formulated reflecting incremental changes of storage infrastructure, basinwide water use levels, and reservoir operating rules. Third, the efficacy of each WMA should be assessed relative to historical as well as future inflow conditions. The assessment results should then be analyzed to identify robust alternatives that perform well across all water uses and for a realistic range of basin conditions.

More specific suggestions for developing water management alternatives are provided in **Appendix C**.

5. Assessing Data and Information Availability and Establishing Stakeholder Agreement

Several datasets were used as part of the water management alternative assessments. A dataset of unimpaired flows from 1939 to 2012 was used as input to the HEC-ResSim models. Additionally, a dataset of current net water withdrawals was also used as input. USACE also estimated future return rates when developing water supply options.

Comments:

The development of the unimpaired flows datasets was described in prior USACE publications. However, the dataset was extended as part of the Draft EIS through a process that has not been documented.

Some of the water supply options used return rates that were provided by the State of Georgia. However, USACE also estimated return rates for other water supply options, including the one that was ultimately adopted. It is unclear from the contents of the Draft EIS whether the Metro Atlanta utilities consider those return rates to be realistic.

F

Suggestions:

We recommend that USACE provide documentation that describes the development of the extended unimpaired flow datasets and water use datasets. We also recommend that USACE work with Metro Atlanta water utilities to confirm that the modelled return rates are plausible. Finally, we recommend that realistic future water use levels be established outside the Metro Atlanta area.

F. Documentation of the updated unimpaired flow data set for the period 1939–2011 is included in appendix O of the EIS.

6. Identifying and/or Developing Expert Knowledge and Modeling Tools

The WCM updating process made use of the HEC-ResSim simulation model to simulate the effects of different reservoir operation policies and water supply options. Outputs of this model include reservoir levels and releases, river flows, and hydropower generation, among others. Additionally, the model HEC-5Q was used to simulate the water quality in portions of the basin. Finally, model results were analyzed and used to compute performance metrics with the help of post-processing tools.

The Draft EIS also contains a climate change assessment that makes use of the VIC Hydrologic model and other computational techniques used to develop projected future unimpaired flow sequences. The Draft EIS did not include any modeling of the Apalachicola Bay.

Comments:

We acknowledge and appreciate USACE's willingness to share some of the HEC-ResSim and HEC-5Q models used in the Draft EIS. Access to the HEC-ResSim models has allowed us to better understand the water management alternatives proposed and evaluated by USACE, replicate the DEIS results, and provide more informed and constructive feedback. Our review did not include the use of the HEC-5Q model or analysis of its results.

We also requested access to the tools used by USACE to post-process model results and develop metrics of system performance. Unfortunately, this request was not granted. We thus attempted to re-compute the performance metrics through post-processing tools we developed for this purpose. As part of this exercise, we identified some inconsistencies and potential errors in the metrics computed by USACE. For instance, the metric of navigation support seems to have been significantly underestimated, and this error could impact the alternative ranking process. We refer USACE to **Appendix A** for more detailed discussion of these discrepancies.

USACE has provided an appendix containing an assessment of how the water resources of the basin may be affected by future climates. There are serious shortcomings with this assessment, some of which are highlighted below:

- The process of thinning down the comprehensive list of 100 climate change projections to a smaller set of 6 projections is flawed. These projections are selected by computing long term average flow ratios. However, long term average flows are not very meaningful for water management since it is the drought and flood periods that stress the system. Two future climate projections may have the same long term average flows but may have very different drought severities, durations, and frequencies and impact water resources in very different ways. The climate assessment should use the full ensemble of future climate conditions, but should distinguish between ensembles of different greenhouse gas concentration conditions.

G

Responses to ACF248a – GWRI

G. As stated in EIS section 4.1:

> USACE selected HEC-ResSim as the tool most capable of faithfully representing District water management practices at the culmination of a 3-year model development and verification process. In accordance with Engineering and Construction Bulletin (ECB) 2007-6, Subject: Model Certification Issues for Engineering Software in Planning Studies, issued April 10, 2007, HEC-ResSim falls under the category of "engineering models used in planning studies," leaving certification to the Science & Engineering Technology (SET) initiative associated with the USACE's Technical Excellence Network (TEN). As of January 2010, the TEN guidance listed HEC-ResSim as "Community of Practice Preferred" for the purpose of reservoir system analysis.

USACE evaluated the performance metric for the entire 73-year simulation period as a measure of impact through the range of hydrologic conditions. Several performance metrics such as pool elevations, flows, water quality parameters, and fish and wildlife conservation make comparisons of wet, normal, and dry hydrology. As the HEC-ResSim model for the ACF Basin was refined and the initial baseline model runs were conducted, USACE conducted two workshops to familiarize stakeholders with the model and its capabilities.

Documentation of the updated unimpaired flow data set for the period 1939–2011 is included in appendix O of the EIS. The report outlines the purpose, need, and use of the data set and identifies its limitations.

USACE can consider only data that has been provided as part of the NEPA process. In updating its WCMs, USACE used the best available science it possessed.

With respect to the climate change analysis, refer to the response to comment E above.

- The VIC hydrologic model was used to generate projected unimpaired flows. However, the calibration and validation of this model was not discussed. As a result, the accuracy of the streamflow projections cannot be ascertained.
- The spatial resolution of the VIC hydrologic model is very coarse and only produces flow sequences at the outlet of the ACF Basin. Flows at other basin locations are then derived via monthly scaling of the historical UIFs. This approach introduces at least two critical errors: (*i*) ignores spatial differences in the changing hydrologic response of individual ACF watersheds and (*ii*) assumes that all future inflows will have the exact same sequence of wet and dry periods as the historical UIFs, albeit scaled up or down according to tentative monthly factors. These errors are critical because (*a*) the ACF basin is known to experience different hydrologic stresses in its northern and southern watersheds and (*b*) future climates are expected to alter the sequence of wet and dry periods. Thus, the generated future inflows are irrelevant and cannot inform the WCM updating process.
- The HEC-ResSim modeling of future projections was not performed consistently. Net evaporation rates from the reservoirs were assumed to remain at historical levels even though increased temperatures are expected to increase evaporation. Even more importantly, the effect of increasing temperatures on water withdrawals, especially agricultural withdrawals, was not considered. This particular aspect is important because it implies that irrigation withdrawals will increase even if irrigated land and crop patterns remain at current conditions.
- The evaluation of climate change with respect to water uses is inadequate. USACE only provides very general graphs of flow and reservoir elevation ranges and does not actually evaluate the effects of climate change on stakeholder performance metrics.

Suggestions:

HEC-ResSim is generally adequate for simulating water management alternatives whose parameters and rules are known beforehand. Some small improvements could still be made such as changing the hydropower generation rules to avoid overestimating the amount of power. Power is overestimated because HEC-ResSim assumes *average* daily flows, even though hydropower is generated based on peaking operations based on instantaneous sub-daily flow conditions. GWRI has developed scripted rules that better approximate peaking hydropower generation within HEC-ResSim. The scripts can be made available to USACE upon request.

USACE formulated alternatives using water management measures provided by the public as well as measures based on the expertise of USACE staff. We suggest that additional promising water management alternatives could be developed through optimization models. Rather than specifying a-priori operation rules that determine reservoir release decisions (as in simulation models), optimization models find release decisions that best meet basinwide water use targets. These release decisions can then be analyzed to develop new operation rules in the form that can be encoded by simulation models like HEC-ResSim. GWRI has developed an optimization model for the ACF basin, ACF-DSS, and has used this approach to identify a range of promising reservoir operation rules as part of the ACFS planning process. We would welcome the opportunity to work with USACE to identify additional water management alternatives that may be of interest to the basin stakeholders.

We recommend that USACE review and correct the metric computation inconsistencies outlined in **Appendix A** to ensure proper alternative evaluation. Other considerations on metric computation include:

- Performance metrics were computed based on the entire UIF series (73 years). This computation does not allow performance assessment separately during wet, normal, or dry years. We recommend that metrics be computed and WMAs assessed separately for drought years since water uses are most stressed during such times.
- The unimpaired flow dataset used to drive HEC-ResSim models is subject to large errors on *daily* time scales (*Georgakakos, A.P., and M. Kistenmacher, 2012: Unimpaired Flow Assessment for the Apalachicola-Chattahoochee-Flint River Basin. Technical Report sponsored by ACFS and GWRI, Georgia Institute of Technology, Atlanta, Georgia, 211 pp.*). Metrics, such as flow maximum fall rate, based on specific daily data values are likely to contain large errors.

The climate change assessment is misleading and should be carefully redone. GWRI has carried out extensive and detailed climate change assessments for the ACF River Basin using CMIP3 climate projections. These assessments are referenced in the 2014 National Climate Assessment (http://nca2014.globalchange.gov/report/sectors/water), leading to drastically different conclusions than those in the DEIS. Our conclusions are very relevant for the WCM updating process, and we highly recommend that the climate change assessment be repeated (using CMIP5 climate projections and more scientifically sound methods). We would welcome the opportunity to work with USACE on this WCM component. As part of this assessment, the Apalachicola Bay hydrodynamic model can also serve to evaluate the combined bay impacts of sea level rise *and* upstream regulation.

7. Assessing WMA Candidates, Identifying the Most Preferable WMA, and Developing a Shared Vision Action Plan

Seven water management alternatives were evaluated for the development of new operating rules, and nine water management alternatives were evaluated for the assessment of different water supply options. The new final operating rules were chosen by using metric values and a ranking system. The proposed water supply option was chosen based on feasibility and the reasonableness of future return rates. The environmental consequences of the proposed updates to the water management operations and the chosen water supply options are then discussed in Chapter 6.

Comments:

The USACE plan for choosing the new operating policy is clear and uses the defined metrics and a ranking system. However, as discussed earlier in this letter, the adequacy of the metric ranking system needs to be re-considered. Additionally, the alternative formulation and assessment process may not have resulted in a comprehensive evaluation of alternatives.

Specifically, the reservoir operation alternatives recommended in Chapter 4 of the Draft EIS makes several changes to the current operations (RIOP). These changes include:

1. Revised Action Zones

2. Revised Drought Operations Triggers
3. Revised Buford Hydropower Operations
4. Revised Minimum Flows in the Upper Chattahoochee
5. Suspended Ramp Rates during Prolonged Low Flows
6. Dedicated Releases for Navigation

H

Unfortunately, the Draft EIS does not assess the individual and incremental effects of each of these changes, and it is difficult to discern the impacts of each proposed change. This information is important because it informs stakeholders about the merits of changing the system operations. As part of this review, we performed our own modeling, based on the HEC-ResSim files made available by USACE, to evaluate the incremental impacts of these changes. The results are presented in **Appendix B**). Our analysis supports the following general comments:

- The change related to suspending ramp rates during low flows was found to have almost no impact on the basin-wide water uses.
- The change related to revising the Upper Chattahoochee minimum flow requirements was found to have negligible impact on water uses downstream of the Atlanta Metro area. However, in the Upper Chattahoochee it was found to reduce flows from 650 to 750 cfs about 9% of the time, while increasing the average and minimum reservoir storages in Lake Lanier by 0.1 and 0.8 feet, respectively.
- Making dedicated releases for navigation results in higher flows out of Jim Woodruff dam from January to May. On the other hand, these releases deplete upstream reservoir storage and result in drought operations being triggered more frequently. Furthermore, the flows during extreme dry periods are decreased at the Chattahoochee gage. Navigation releases, while increasing flows during certain times of the year and flow range, may actually decrease extreme low flows.
- When triggered in Zone 3, drought operations result in higher composite storage. As a consequence of this change, flows at the Chattahoochee gage slightly decrease in the 10,000 to 16,000 cfs range but slightly increase in the range below 6,000 cfs.
- Reducing the hydropower requirements at Buford during drought operations counter-intuitively reduces the lowest composite storages. This peculiar response occurs because drought operations can change abruptly the navigation release requirements. Even though reduced hydropower requirements tend to increase composite storage, these storage increases may subsequently be released for navigation purposes and ultimately lead to lower composite storage.
- The new action zones increase composite storage in the mid and lower ranges relative to the old action zones. However, storage drawdown increases during severe droughts, and minimum downstream flows decrease. This is again a consequence of abrupt drought operations rules.
- The Glades reservoir may slightly increase or decrease Lake Lanier storage during severe droughts, depending on the way it is managed. The Glades reservoir has no appreciable impact on other basinwide water uses.

Some common themes arise out of these sensitivity analyses. First, some of these changes (e.g., reduced ramp rates, revised minimum flows in the upper Chattahoochee, inclusion of the Glades reservoir) seem to have small system-wide impacts but may have local impacts that merit

Responses to ACF248a – GWRI

H. USACE evaluated the merit of each individual reservoir operation change as a component of the screening process. Comparisons were then made to the NAA, or current operation. Numerous model simulations and comparisons were completed to support either the elimination or advancement of an operational measure. The process is summarized in section 4 of the EIS. Details of all model simulations and comparisons are not included.

Suspending ramping rates during prolonged low flow (BI flows less than 7,000 cfs for 30 consecutive days) was recommended to reduce the amount of water released from storage following rainfall events that caused temporary spikes in the basin inflow. Short-term rainfall events can result in a temporary rise in basin inflow. If the required ramping rate is adhered to, there is potential to release water from storage to ensure compliance. The suspension of ramping rates requires the ramping to match the 1-day basin inflow down ramping, which is typically faster than the required ramping rate. Therefore, ramping down at a faster rate requires less use of water from storage.

Both Alt1C, which includes USACE current management operations, and the PAA demonstrate comparable effects on water quality. This shows that the effects would principally be caused by increases in treated wastewater returns to the river system resulting from proposed increases in water supply withdrawals to meet future needs in Metro Atlanta and, for some alternatives, higher assumed return rates for treated wastewater (as a percentage of withdrawals) than presently occurs. As much as 100–160 mgd of additional treated wastewater discharges to the Chattahoochee River would be expected under those alternatives. If GAEPD permits additional discharges, it might require changes to discharge permits for some facilities to ensure that water quality is maintained in this reach of the river. As stated in section 6.10:

As in past years, working closely with states and affected stakeholders, special releases from USACE projects might be made to assist with public health and safety throughout the ACF Basin. USACE will periodically notify users when such releases are made, and water users can also directly notify USACE of their needs for special releases.

Table 6.1-6 in the EIS indicates no change in flows into the Apalachicola River by implementing the revised composite zone drought trigger and supporting the navigation season. Table 6.1-9 lists the exceedance flows of the alternatives with selected flow values. From page 6-72 in the draft EIS:

In addition, proposed revisions to water management operations at Buford Dam, including various water supply options for Lake Lanier and downstream of Buford Dam (all of which would occur in the uppermost 10 percent of the Chattahoochee River basin), would generally have an inconsequential effect on flow conditions into Lake Seminole and downstream of Jim Woodruff Lock and Dam.

The ACF Basin drought contingency plan does not promote a rigid drought operation (appendix A of the EIS):

During the drought contingency operations, a monthly monitoring plan that tracks composite conservation storage to determine water management operations (the first day of each month represents a decision point) is implemented to determine which operational triggers are applied. In addition, recent climatic and hydrological conditions experienced and meteorological forecasts are used when determining the set of operations in the upcoming month.

In addition to the flexibility of using hydrologic conditions, forecast, and experience, interagency and public coordination occurred through meetings, webinars, conference calls, and USACE Web page.

The final WSSA (appendix B of the EIS) includes details on the implementation of the water supply option.

consideration. Additionally, some operational changes (navigation releases and drought triggers) increase Chattahoochee Gage flows at one portion of the flow regime and decreasing it in others. The effect of these changes on the flows of Apalachicola is therefore unclear and may require more detailed expert analysis relative to environmental and ecological objectives. Furthermore, the abruptness of some of the drought operation rules lead to counter-intuitive results whereby alternatives that increase average composite storage (reduced hydropower and changed action zones), are also subject to lower minimum storages and flows.

With respect to the water supply option, the final proposed option (Option H) is based on Metro Atlanta net withdrawals of 134 mgd, an amount that was determined to have no or only slightly adverse environmental effects when compared to the No Action alternative. However, no supporting evidence of this claim is provided in the Draft EIS.

The Draft EIS also does not discuss in depth how the reallocation associated with Option H is to be interpreted and enforced. Page 5-8 lists withdrawal amounts, return amounts (based on estimated return rates), and net withdrawal amounts. Which of these rates will be monitored and enforced? Will the withdrawal amounts limit how much water can be abstracted? Or can more water be withdrawn as long as the returns are increased and the net withdrawal amounts stay within the specified limits? If it is the former, how can USACE ensure that the return flows will correspond to those assumed under Option H? If it is the latter, how would water quality be affected if the return amounts increase substantially?

The Draft EIS also lists a storage amount that would be required to support the reallocation. Is this storage amount purely for informational purposes or will a portion of Lake Lanier be dedicated to meeting the Metro Atlanta water withdrawals? If it is the latter, would this reserved storage go into effect immediately or gradually as Metro Atlanta withdrawals increase? How will reservoir operations be impacted under each option?

Suggestions:

Earlier review sections include several suggestions for improving the process of formulating, assessing, and selecting the final alternatives. In addition, we suggest that USACE evaluate and clearly highlight the merits of each individual measure contained in the proposed action alternatives. With respect to developing new operating rules, several questions need to be answered:

- Why are the changes to the ramp rates during prolonged flows being recommended when they have little to no impact?
- Is gaining some storage in Lake Lanier worth reducing Upper Chattahoochee flows by 13% (i.e., by 100 cfs) during low flow periods, especially in light of the USACE finding that water quality in the Upper Chattahoochee is expected to be adversely impacted as a consequence of increased waste water effluent discharges?
- What are the trade-offs related to Chattahoochee gage flows associated with triggering drought operations in different zones and with different release patterns supporting navigation?
- Is the relatively simple but rigid structure of the drought operations adequate?

We also suggest that USACE provide a more detailed discussion of how they envision implementation of the water supply option.

8. Monitoring IWRM Plan Implementation and Making Necessary Adjustments

The Draft EIS contains a section entitled "Mitigation Considerations" that identify mitigation measures that could be taken to avoid negative impacts of the proposed actions. USACE states that "because adverse effects of the water control plan might occur due to unforeseen conditions, actions would be taken within applicable authority and policies, and in coordination with other interests, to address such conditions when they occur through the implementation of temporary deviations to the water control plan (e.g., interim operation plans)."

Comments:

Water resources management depends on natural processes that are often highly variable and difficult to predict. Additionally, human activity can affect the water resources in the basin. As a result, it is essential that water management policies and procedures be flexible and adaptable to changing conditions. In the past, USACE has worked with other agencies, such as the U.S. Fish and Wildlife Service, to identify problem areas and make adjustments to operations. We hope that USACE will continue to be open to making such adjustments as needed. It is however unclear to what extent adjustments can be made and what conditions would trigger them.

I

Suggestions:

We suggest that USACE develop a program to monitor basin conditions under the proposed actions to ensure that they have their intended effect.

Proper planning may be able to avoid or minimize the need for mitigation measures by selecting water management alternatives that can withstand a range of basin conditions. We believe that consideration of demand, climate, and infrastructure uncertainties, as suggested earlier in this letter, are key to developing robust water management alternatives.

Responses to ACF248a – GWRI

I. Section 3.2 of the EIS includes the following statement: "The Mobile District continually reviews the WCM as needed to ensure that the best use is made of available water resources." In addition, the section refers to USACE, South Atlantic Division Regulation No. RBT-2 (*Water Control Management in South Atlantic Division* [2010]), which mandates that "at a minimum, Districts should review their water control manuals/plans every 5 years." The reviews provide the basis for determining whether formal updates are needed, including any formal or informal input received from agencies and stakeholders. Future WCM updates would include appropriate technical analysis, public involvement, and environmental compliance activities.

Appendix A: Performance Metrics

Comments/Suggestions

USACE formulated several performance metrics to represent stakeholder interests and assess the merits of different water management alternatives. We maintain that several of the metrics could be improved upon.

Hydropower: Performance metrics related to hydropower include average annual hydropower generation, annual average weekday hydropower generation, and lowest annual hydropower capacity. Unfortunately, these metrics may not be appropriate for assessing hydropower benefits because they do not adequately represent how hydropower benefits are derived. Hydropower generation in the ACF basin is based on peaking operations to increase dependable capacity and hydropower revenues and depends on energy prices that vary throughout the day and the year. As a result, two alternatives may have similar annual generation amounts, but different monetary benefits due to the fact that the same average energy can be generated in distinctly different ways throughout the year. The economic methods presented in one of the Appendices (ACF Hydropower Impact Analysis Draft) provide a more direct way of computing hydropower benefits. We recommend that USACE consult with hydropower stakeholders to determine if these methods adequately represent their interest. If yes, the existing hydropower generation metrics should be updated with the economics-based metrics. It should be noted that these metrics are already being used when evaluating the water supply options in Chapter 5. However, it is recommended that they also be used when developing the water management alternatives in Chapter 4.

Recreation: Performance metrics related to recreation measure the times that the reservoirs drop below different levels. USACE again presents a different and more detailed assessment of recreation benefits in one of the Appendices (Recreation Analysis Summary Memorandum). We again suggest that these other metrics, which are based on economic valuation of recreational benefits, be used when developing the water management alternatives in Chapter 4.

J

Navigation: Performance metrics related to navigation measure the number of years that 7 and 9 feet channels (without dredging) can be maintained. The metrics are computed by comparing simulated flows to thresholds at the Blountstown gage, with navigation benefits assumed to occur only if the flows exceed the thresholds during the entire January to May navigation period. We believe that this is slightly misleading since navigation benefits could also be accrued even if the flows are not above the thresholds for the entire January to May period. Furthermore, the inclusion of a metric related to a 9-foot channel is not recommended. Only one of the evaluated alternatives (Alternative 3) actually targets a 9-foot channel and does so only during certain conditions; as a result, the availability of a 9-foot channel is purely incidental, occurs only a small percentage of the time, and cannot be relied upon by navigation stakeholders. Unless one alternative provides a reliable 9-foot channel, this metric should be removed from the ranking procedure. Finally, USACE chose to measure only navigation benefits from January to May, while in reality navigation stakeholders may benefit from flow support during other parts of the year. For instance, Alternative 3, which actually targets navigation flow support during other times of the year, receives no credit for helping navigation interests outside of the January to May window.

Responses to ACF248a – GWRI

J. Appendix A, Performance Metrics—USACE considered the suggested changes to performance metrics for hydropower, recreation, navigation, and water supply during final EIS preparation.

Navigation—(Same response provided to comment ACF238). The percentage of time is based on the number of years the channel depth is available for the entire season (i.e., Jan–May) divided by the number years in the simulation. For example, the NAA provides the full 7-ft navigation depth for 15 of the 73 years in the simulation, which is equivalent to 20.5 percent channel availability (13/73). The 7-ft channel availability number presented in the draft EIS is based on HEC-ResSim modeling results using flows at the Blountstown node. The model includes a rule to provide a minimum flow of 16,200 cfs at Blountstown from the Jim Woodruff project when the navigation season is supported. Model operation for the downstream target is not always a perfect 16,200 cfs and could be 150 cfs lower. Therefore, channel availability was based on a flow value of 16,050 cfs at Blountstown, which is equivalent to a 0.08 difference in stage at Blountstown.

Water Supply—The threshold for Buford project refill by May 1 is an elevation greater than 1,069.8 ft and the reservoir being 95.8 percent full. Text has been added to the EIS for clarification.

FWS Metrics—This comment has been noted, and the necessary correction has been made to the postprocessing spreadsheet.

Appendix B, WMA Sensitivity Analysis—USACE considered the WMA sensitivity analysis during final EIS preparation

Water Supply: Several performance metrics related to water supply were developed, all of which depend on the elevation/storage of Lake Lanier. Since water supply (in the form of withdrawal targets) is always met, these metrics are not a true measure of water supply fulfillment. Instead they denote the amount of water left that could be used if severe droughts were to materialize. It is important to realize that this water does not just have to be used for water supply, but can be used to support any of the other water uses that exist throughout the basin. We recommend that metrics measuring reservoir storage should not be listed under water supply, but rather under a different category entitled "Drought Risk and Vulnerability". Furthermore, the metrics should not be based solely on Lanier elevations, but also account for storages in other major reservoirs or the composite storage.

Metric Computation Inconsistencies

We attempted to re-compute the performance metrics by using the HEC-ResSim model results associated with different alternatives. As part of this exercise, we identified some inconsistencies and potential errors in how USACE computed some of the performance metrics. We suggest that USACE review this information to ensure that the metrics are properly computed since this could affect WMA ranking.

Navigation: The 7-foot navigation metric is computed by determining the number of years that all of the daily Blountstown flows are greater than or equal to 16,200 cfs. Upon experimenting with this metric, we determined that USACE had actually computed this metric based on a lower flow threshold of 16,050 cfs. Furthermore, we determined that just using a simple flow threshold (be it 16,200 or 16,050) leads to significant underestimation of the navigation benefits. This inconsistency arises from the fact that the HEC-ResSim model was not coded to provide a minimum of exactly 16,050 cfs at Blountstown when navigation is supposed to be provided. Instead, a more approximate rule was adopted because explicitly meeting 16,050 cfs through a downstream control function would result in extremely high computational times. We agree with this decision since otherwise the model execution time would increase by almost a factor of 10. And we also performed sensitivity analyses showing that this approximate rule does not significantly change the water balance in the basin. However, if this approximate rule is to be employed, then the metric computation needs to be changed. The reason for this is that, due to the approximate nature of the rule, sometimes the flows at Blountstown would be below 16,050 cfs (by a few %) even though the rule is forcing the Jim Woodruff Dam to release water for navigation. This results in significant underestimation of the number of years that navigation can be provided. A better method would be to compare the minimum reservoir release required by this rule (JIM WOODRUFF-MINREL_NAVIGATION/FLOW-MIN) to the actual Jim Woodruff release. If the actual release exceeds the requirement, then navigation needs can be assumed to have been met. We computed the metric in this fashion and found considerable increases in the number of years that navigation benefits can be provided. For instance, Alternative 7 is able to provide a 7 foot channel 65% of the time, as opposed to the 43% listed in the Draft EIS.

Water Supply: The performance metric that measure the Buford project percent time at full pool by May 1st (1,071 feet) seems to have been calculated using a lower threshold than 1,071 feet. It appears that an elevation closer to 1,069.75 feet was used as the threshold. The metric computation should either be changed or the Draft EIS documentation should be updated to reflect this difference.

FWS Metrics: There is a metric that measures the % of time that the Chattahoochee Gage flow is less than certain flow thresholds. Chapter 4 of the Draft EIS identifies several alternatives as having flows below 5000 cfs for 1.4% of the time, but examination of the HEC-ResSim results reveal that the flows associated with most alternatives never drop below 5000 cfs. It is possible that USACE may have accidentally included data that is actually outside of the simulation horizon. Specifically, the simulation has a starting date of 01/11/1939, but it also has a spin-up period that starts on 01/04/1939. If data before the simulation starting date are included, then the metric values would compute flows of 5000 cfs for 1.4% of the time since the flows prior to the starting date are listed as empty data points that may be considered as 0 in the post-processing tool.

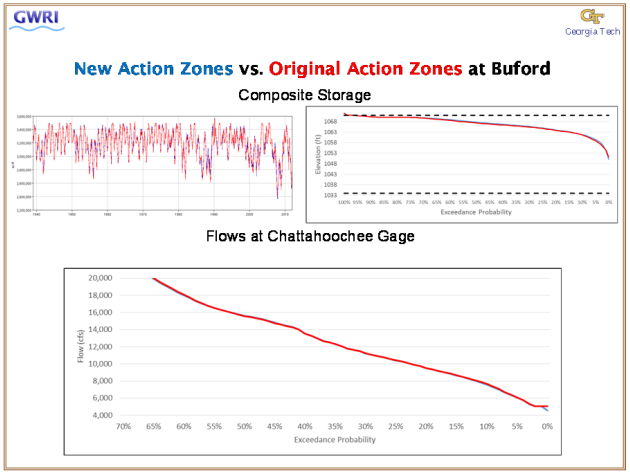
Appendix B: WMA Sensitivity Analysis

This appendix presents sensitivity analyses of the proposed action alternative (Alternative 7 Water Supply Option H, Alt7H). First, the current operations (Alternative 1 Water Supply Option A, Alt1B) and the proposed action alternatives were compared and the following changes from the current operations were identified:

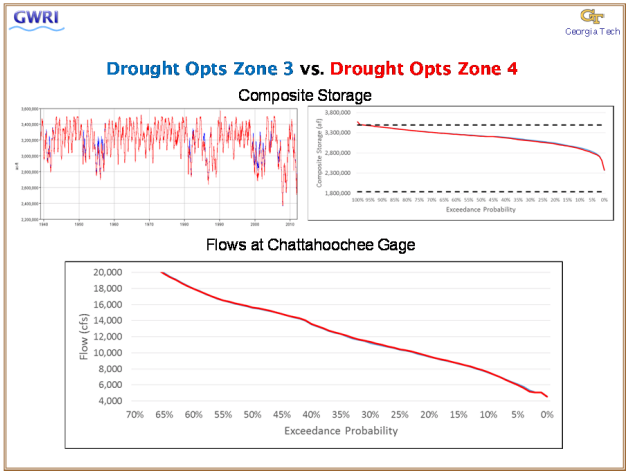
1. Revised Action Zones
2. Revised Drought Operations Triggers
3. Revised Buford Hydropower Operations
4. Revised Minimum Flows in the Upper Chattahoochee
5. Suspended Ramp Rates during Prolonged Low Flows
6. Dedicated Releases for Navigation
7. Increased Metro Atlanta water supply

HEC-ResSim was used to perform additional model runs based on Alt7H by unilaterally reversing each of the changes listed above. The results were then compared to Alt7H to determine the incremental impact that each change has on the water balance in the basin. Due to time constraints, not all of the performance metrics used in the Draft EIS were computed and the differences between these scenarios are highlighted by a few select graphs. Alt7H results are always plotted in blue, while the altered alternatives are plotted in red.

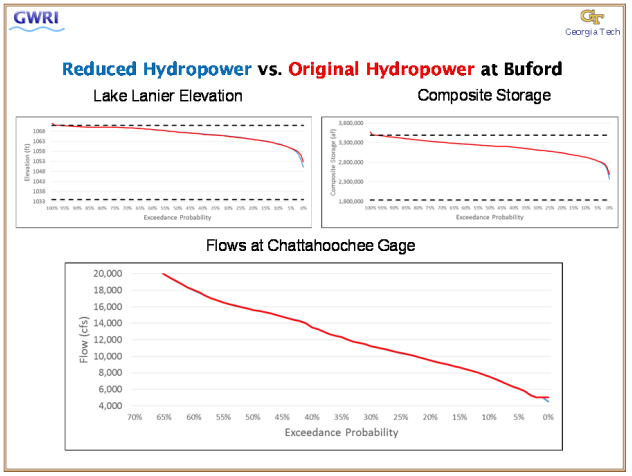
Revised Action Zones

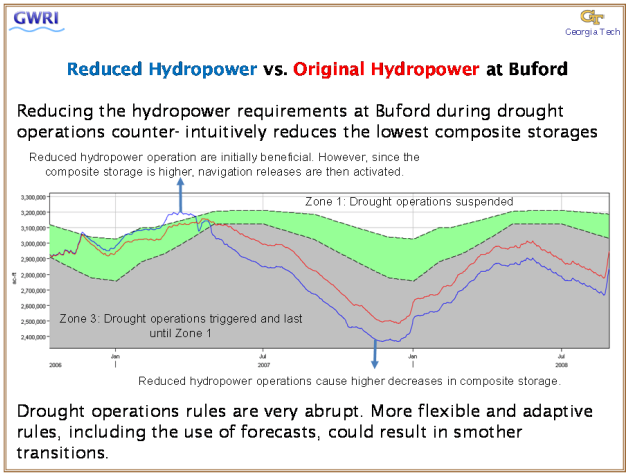


Revised Drought Operations Triggers

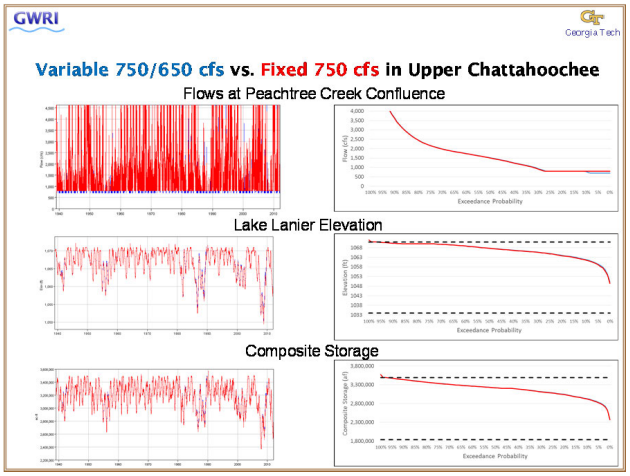


Revised Buford Hydropower Operations (following two graphs)

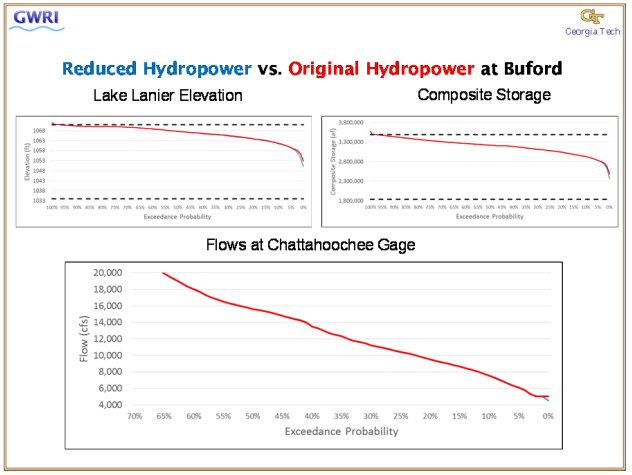




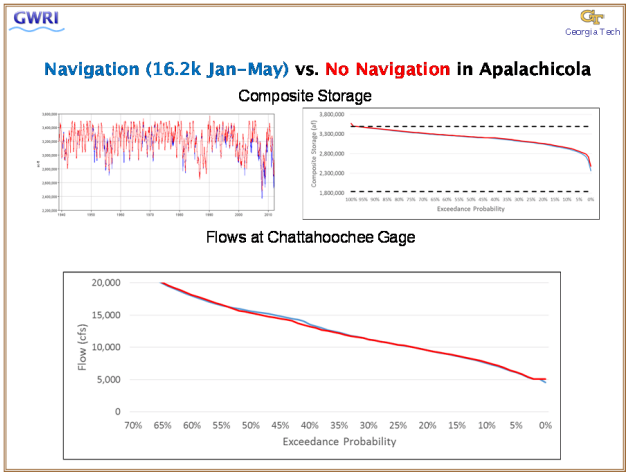
Revised Minimum Flows in the Upper Chattahoochee



Suspended Ramp Rates during Prolonged Low Flows



Dedicated Releases for Navigation



Responses to ACF248a – GWRI

Appendix C: Suggestions for Developing Water Management Alternatives

Managing the water resources of the ACF basin is a challenging task due to the large number of water uses and stakeholders. Below we include suggestions for developing water management alternatives.

We recommend using the following general steps to develop water management alternatives:

1. Severe Drought Risk and Vulnerability Assessment: Attempting to fully meet all water use targets 100% of the time may not be possible or result in very low reservoir storages that increase drought vulnerability. In order to ensure that water management alternatives are robust, it is very important to develop a sense of how much water should be left in the system to avoid serious water shortages during drought events that are more severe than what was encountered in the 73 year historical record. Modeling analysis and stakeholder discussions should be undertaken to identify drought buffer storage that should be left as carry over storage in the reservoirs.
2. Meet all water use targets: Develop a water management alternative that attempts to fully satisfy all of the stakeholder needs. If the resulting storages sequences are higher than the drought buffer storage, no additional work may be needed. This is unlikely for the ACF basin.
3. Adjust Water Use Targets: If all water use targets can be met 100%, develop rules that adjust water uses levels as a function of basin conditions.
4. Drought Management: Develop a drought management plan that contains rules to further adjust water use targets during extreme drought events.

K

The development of operating rules should be based on a clear understanding of the relationships between different water uses. In developing such rules, opportunities for simultaneously meeting multiple water use targets (co-benefits) should be explored. For instance, navigation releases can also provide benefits to downstream environmental interests. The same applies to hydropower releases, which can also be used to help balance reservoirs storages. More flexible operational rules that recognize the inter-play between different uses could help optimize system operations. The ACF Stakeholders Sustainable Water Management Plan includes one such suggestion, where hydropower releases are adjusted depending on the storages in downstream reservoirs and downstream flows.

We also recommend that USACE consider more broadly the usage of action zones in system operations. Action zones play a central role in the current and proposed operations of the ACF reservoir by affecting each of the following operational aspects:

1. Hydropower generations hours
2. Reservoir balancing
3. Definition of composite storage zones, thereby affecting RIOP releases requirements, drought operations triggers, and navigation releases.

L

It is not entirely clear why the same action zones (or composite storage zones) should have to be used for each of the operational rules listed above. For instance, drought operations could instead be initiated by a different set of curves based on a consideration of drought vulnerability, while reservoir balancing could be performed according to another set of zones that attempt to balance

K. USACE's alternative formulation process for achieving the stated objectives is described in section 4.1 of the EIS. While the suggested process uses an application to formulate a water management scenario, it does not comply with fulfilling all of the authorized project purposes or USACE water management regulations. The recommended alternative formulation process is more appropriate for a comprehensive study.

L. USACE considered a larger set of possible zones during the final EIS preparation, but decided not to make changes to the action zones described in the draft EIS.

recreation interests in different reservoirs river segments. *We suggest that USACE consider a larger set of possible zones in developing operational rules.*

Additionally, we recommend that parameters besides the current action zones (of composite storage) be used as part of operation rules. Such parameters are already being used as part of the RIOP release requirements (which are dependent on 7 day average inflows), but could be incorporated into other operational rules. In particular, making navigation rules solely dependent on composite storage zones was found to lead to counter-intuitive operations where water management alternatives that initially conserve storage end up having to release it. The incorporation of other variables, for instance a measure of how much basin inflow occurred during previous months, may result in rules that are more flexible and adaptive. In particular, drought operations triggers should be partly based on hydrologic conditions, as opposed to be based solely on composite storage. M

Finally, we recommend that USACE consider incorporating long-range flow forecasts into system operations. GWRI has recently completed a comprehensive study (as part of the ACFS planning process) demonstrating that up to six month forecasts of basin hydrologic forecasts are possible and able to provide significant benefits for navigation and other water uses if properly incorporated within the reservoir operating rules. We would welcome the opportunity to share this work with USACE and explore ways to use it as part of the WCM updating process. N

Responses to ACF248a – GWRI

M. USACE considered a larger set of possible zones during the final EIS preparation, but decided not to make changes to the action zones described in the draft EIS.

N. USACE policy does not support the use of long-range flow forecast (nonsnow pack) as an operational rule; therefore, no changes were made to the EIS.

From: Madge and Mac Graham
Sent: Saturday, January 30, 2016 10:12 AM
To: ACF-WCM
Subject: [EXTERNAL]

To whom it may concern: I have been told that you are considering a plan that would allow you to drop the Lake Lanier water level by as much as 4 feet in a drought situation similar to 2007-8. This would be a disaster. A
We moved here in 2011 when the water level was not that low, and even then our cove had no water.

Most residents including, myself would like to see full pool at 1073. Please disregard or modify the most recent navagational analysis. B C

Lawson Graham

Responses to ACF249 –Lawson Graham

A. As shown in Figure 6.1-6 of the EIS, the PAA would likely result in lake levels at Lake Lanier ranging from about 2 to 4 ft lower than those for the NAA. That condition would be expected to occur less than 2 percent of the days over the entire modeled period of record (73 years) during the worst drought conditions for that period. The differences would be attributable largely to increased water supply withdrawals from the lake as well as increased releases from Buford Dam to meet future water supply demands for Metro Atlanta users (i.e., Cobb, Fulton, and DeKalb counties and the City of Atlanta).

B. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management. Accordingly, raising the conservation pool at Lake Lanier by 2 ft would not meet this criterion and was not carried forward.

C. Navigation is one of several project purposes for which Congress authorized the ACF Basin project, and USACE considers that purpose along with all other authorized purposes when making operational decisions.

Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations provisions in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008. It should be noted that navigation is not supported when drought operations are in effect.

From: Kathy Mattox
Sent: Saturday, January 30, 2016 9:31 AM
To: ACF-WCM
Subject: [EXTERNAL] Comments on proposed ACF WCM

Colonel Jon J. Chytka
Commander USACE
Mobile District
Attn: PD-EI (ACF-DEIS)
P.O. Box 2288
Mobile, AL 36628

RE: Comments regarding update of ACF Water Control Manual

I am writing to express my concerns regarding your proposed ACF WCM for Lake Lanier. I concur with the comments previously submitted by the Lake Lanier Association:

1. The proposed navigation plan needs to be revised to avoid a severe impact on the lake's water levels. A

2. The Corps has not done enough in the area of drought prediction. Additional work should be done in this area to preserve lake levels during drought conditions. B

3. Lake Lanier needs to be better managed to maintain storage levels so that drought conditions will not have the devastating impact that occurred during the previous drought. This can be achieved by modeling and planning to raise Lake Laniers' full pool level to 1073'. C D

Your consideration of these comments would be appreciated.

Wayne Mattox

Responses to ACF250 –Wayne Mattox

A. Navigation is one of several project purposes for which Congress authorized the ACF Basin project, and USACE considers that purpose along with all other authorized purposes when making operational decisions.

Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations provisions in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008. It should be noted that navigation is not supported when drought operations are in effect.

B. USACE regulations do not allow use of forecasts in real-time project operations. Forecasted conditions may be used for planning future operations, but releases will follow the water control operations plan based on observed conditions within the watershed to the extent practicable. The Drought Contingency Plan (DCP) sections 3-02 and 3-03 contained as an exhibit in the WCMs in appendix A of the EIS includes discussion of drought identification and National Integrated Drought Information System (NIDIS). An NIDIS pilot program has been established for the ACF River Basin with the goal of developing a regional Drought Early Warning Information System. The system will use key indicators of drought to make timely drought forecast. USACE is a contributor and user of the NIDIS pilot project tools.

C. Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008.

D. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management. Accordingly, raising the conservation pool at Lake Lanier by 2 ft would not meet this criterion and was not carried forward.

From: Maddox, Lee
Sent: Saturday, January 30, 2016 7:12 AM
To: ACF-WCM
Subject: [EXTERNAL] update of ACF Water Control Manual

Dear Sirs,

I have read the LLA comments submitted to you on the 28th. I would beg you to consider the impact of low water levels on our local community. They effect more than that address in the Association letter. I understand the need for Lanier levels to fluctuate. However, levels from 2008 need to be avoided at all cost. The lake is dangerous at those levels and people will still use it. The levels effect tourism, safety, local economics, property values, and would also impact fees for the various permits (dock, parking, fishing, ect) collected. A

Thank you for considering the LLA comments. B

Lee Maddox, CPCU
Vice President – Specialty Marine & Transportation Operations | ***National General Adjuster***
Engle Martin & Associates

5565 Glenridge Connector | Suite 900
Atlanta, Georgia 30342
F: 678.553.4425 | TF: 800.818.5619
Blockedwww.englemartin.com |

Responses to ACF251 –Lee Maddox

A. Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations provisions in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008. The impacts resulting from changes in Lake Lanier were considered and captured in the final EIS. See section 6.1.1.1.1 of the final EIS for additional information.

B. When complete, the Master WCM update process will result in an updated Master WCM that includes updated water control plans and manuals for the ACF system and each federal project within the system. It will reflect operations under existing congressional authorizations, taking into account changes in basin hydrology and demands from years of growth and development, new/rehabilitated structural features, legal developments, and environmental issues. The effects of climate change on the PAA are discussed in section 6.8 of the draft EIS. Refer to the USACE response to the Lake Lanier Association comment letter (# ACF145) for additional information.

From: Kenny Kaas
Sent: Saturday, January 30, 2016 9:09 AM
To: ACF-WCM
Subject: [EXTERNAL] wcm

Your views are so far out of line, I cant believe your preposing those ideas.Raise the lake to 1073 and leave the levels alone. Ken w. kaas A

Response to ACF252 – Kenny Kaas

A. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management. Accordingly, raising the conservation pool at Lake Lanier by 2 ft would not meet this criterion and was not carried forward.

From: Margaret Adams
Sent: Saturday, January 30, 2016 7:11 PM
To: ACF-WCM
Subject: [EXTERNAL] Corps Water Control Manual public comments

Dear Commander, U.S. Army Corp of Engineers,

We have a home on Lake Lanier and wish to comment on the proposed Corps' Water Control Manual (":WCM") .

We have understood for years that the Buford Dam and lake itself were constructed such that the reservoir can hold an additional four feet of water. We wish this option would be explored more thoroughly to significantly increase the holding capacity reserve of Lake Lanier. A

We own irrigated farm land in Southwest Georgia in the Flint River basin. And the needs of Lake Lanier, major city use, such as that of Atlanta and other needs, must not supercede and compromise water availability for our croplands. Agriculture is Georgia's largest single industry, and one almost never hears of a farmer becoming rich farming. Southwest Georgia is the most economically deprived portion of this great state. World demands for food for global populations will necessitate the best farming practices in the world. Even now, most banks refuse to finance farmers unless their land is irrigated. B

There are numerous stakeholders whose lives, lifestyles, and livelihoods depend on a balanced approach to multiple considerations. Your consideration of these most important and other issues will be most appreciated.

Sincerely,

Rev. Margaret Adams

Dr. Sam Adams, DVM.

Response to ACF253 – Margaret Adams

A. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management. Accordingly, raising the conservation pool at Lake Lanier by 2 ft would not meet this criterion and was not carried forward.
B. USACE does not have any reservoirs in the Flint River Basin. The use of either surface water or groundwater for irrigation is primarily regulated by the State of Georgia, not USACE.

From: Kathi Kreisler
Sent: Saturday, January 30, 2016 4:31 PM
To: ACF-WCM
Subject: [EXTERNAL] LAKE LANIER water level

Commander, U.S. Army Corps of Engineers
Mobile District
Attn: PD-EI (ACF-DEIS)
P.O. Box 2288
Mobile, AL 36628

Dear Sir:

With respect, I am truly concerned that the Corp are following guidelines that have not changed with the changing climate, population and demands for water. This email is being sent to help reinforce the letter that was sent to Colonel Jon J. Chytka, Commander USACE from Lake Lanier Association dated January 28, 2016 regarding the update of ACF Water Control Manual. A

I would appreciate you giving our position serious consideration. The future is in your hands.

Thank you for your time

Sincerely

Kathi Kreisler

Response to ACF254 – Kathi Kreisler

A. When complete, the Master WCM update process will result in an updated Master WCM that includes updated water control plans and manuals for the ACF system and each federal project within the system. It will reflect operations under existing congressional authorizations, taking into account changes in basin hydrology and demands from years of growth and development, new/rehabilitated structural features, legal developments, and environmental issues. The effects of climate change on the PAA are discussed in section 6.8 of the draft EIS. Refer to the USACE response to the Lake Lanier Association comment letter (# ACF145) for additional information.

From:
Sent: Saturday, January 30, 2016 4:50 PM
To: ACF-WCM
Cc: akeinfo@lakelanier.org
Subject: [EXTERNAL] Water Control Manual Provisions

Gentlemen, As a recreational stake-holder in Lake Lanier and a member of the Lake Lanier Association, I urge you to seriously reevaluate the assumptions underlying your revised WCM. In particular, the basis for the currently proposed navigation plan. Inevitable droughts, in conjunction with the navigation plan, will result in severe impact on both recreation and drinking water availability. The WCM must provide for storage levels sufficient to mitigate negative impacts. I also encourage you to consider the LLA's recommended raising of full pool level to 1073, thereby providing significant increased storage capacity. A B

Respectfully,

James V. M. Hale

1

Response to ACF255 – James Hale

A. Navigation is one of several project purposes for which Congress authorized the ACF Basin project, and USACE considers that purpose along with all other authorized purposes when making operational decisions. Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations provisions in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008. It should be noted that navigation is not supported when drought operations are in effect.

B. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management. Accordingly, raising the conservation pool at Lake Lanier by 2 ft would not meet this criterion and was not carried forward.

From: bill mc manus <>
Sent: Saturday, January 30, 2016 8:58 AM
To: ACF-WCM
Cc: lakeinfo@lakelanier.org
Subject: [EXTERNAL] Corps' Water Control Manual ("WCM") comment

Commander, U.S. Army Corps of Engineers
Mobile District
Attn: PD-EI (ACF-DEIS)
P.O. Box 2288
Mobile, AL 36628

Proposed plan negatively impacts Lake Lanier water level	A
Barge traffic does not benefit the tax paying public welfare as much as lanier recreartion	B
Use weather forecasts to preserve lake lanier water level during drought	C
Plan & manage to maintain maximum storage level	D
Add 1073 full pool level	E
Use eyes not gauges at lake shoreline to add human control to lake level. Uncalibrated gauges in the past took level below 1050	F

bill mc manus > PLEASE BE KIND ENOUGH TO REMOVE ALL E-MAIL ADDRESSES WHEN FORWARDING AN EMAIL TO OTHERS.SECURITY FOR YOUR FRIENDS > USE BCC <blind carbon copy> WHEN ADDRESSING E-MAIL > THIS SAY'S 'NO' TO SPAMMERS

Response to ACF256 – Bill McManus

A. As shown in Figure 6.1-6 of the EIS, the PAA would likely result in lake levels at Lake Lanier ranging from about 2 to 4 ft lower than those for the NAA. That condition would be expected to occur less than 2 percent of the days over the entire modeled period of record (73 years) during the worst drought conditions for that period. The differences would be attributable largely to increased water supply withdrawals from the lake as well as increased releases from Buford Dam to meet future water supply demands for Metro Atlanta users (i.e., Cobb, Fulton, and DeKalb counties and the City of Atlanta).
B. The Master WCM update is not a study and is only a change to operation of existing constructed projects. Therefore, it was not the purpose of the WCM update to compute benefits of the authorized project purposes. Navigation remains an authorized purpose for the ACF system, although it currently faces many challenges. The operations described in the WCM are based on balancing all authorized purposes throughout the system.
C. USACE regulations do not allow use of forecasts in real-time project operations. Forecasted conditions may be used for planning future operations, but releases will follow the water control operations plan based on observed conditions within the watershed to the extent practicable. The Drought Contingency Plan (DCP) sections 3-02 and 3-03 contained as an exhibit in the WCMs in appendix A of the EIS includes discussion of drought identification and National Integrated Drought Information System (NIDIS). An NIDIS pilot program has been established for the ACF River Basin with the goal of developing a regional Drought Early Warning Information System. The system will use key indicators of drought to make timely drought forecast. USACE is a contributor and user of the NIDIS pilot project tools.
D. Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008.
E. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management. Accordingly, raising the conservation pool at Lake Lanier by 2 ft would not meet this criterion and was not carried forward.
F. Comment noted.

Response to ACF257 – Apalachicola Maritime Museum

From: George Kirvin Floyd
Sent: Saturday, January 30, 2016 9:02 PM
To: ACF-WCM
Subject: [EXTERNAL] Resolution by the Apalachicola Maritime Museum providing comments on the ACF Water Control Manual
Attachments: Apalachicola Maritime Museum Resolution with attachment.pdf

Good afternoon,

Please find attached a Resolution unanimously adopted by the Apalachicola Maritime Museum regarding the proposed ACF Water Control Manual.

We submit these documents as a part of the comment period of the ACF Water Control Manual.

Please respond with an email to confirm that this email and the document attached hereto were received in good order and will be incorporated within the comment on the Water Control Manual currently under consideration.

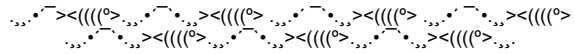
Lastly, we also request that you provide notification of when these comments will be published in the Federal Register with the date and pages referenced therein and any publishing of the comments for all commenters on the USACE web site.

If you have any questions, please do not hesitate to call me.

Respectfully, **George K. Floyd**

Find the best of life is free; Sun, Stars, Sky and Sea.

Visit the Apalachicola Maritime Museum *Web Site*, *Facebook Page* and *YouTube Channel*



CONFIDENTIALITY NOTICE: The information transmitted in this message (including any attachments) is intended only for the person or persons to whom it is addressed, and may contain material that is confidential and/or privileged and is, or may be, covered by electronic communications privacy laws, and is also confidential and proprietary in nature. Any review, retransmission, dissemination, retention, copying, disclosure or other use of the information contained herein by persons or entities other than the intended recipient is prohibited. If you have received this message in error, please notify the sender immediately and delete this message. Thank you in advance for your cooperation.

APALACHICOLA MARITIME MUSEUM
RESOLUTION OF BOARD OF DIRECTORS

A RESOLUTION BY THE APALACHICOLA MARITIME MUSEUM IN SUPPORT OF A COMPLETE PROGRAM, INCLUDING FLOWS AND CHANNEL MAINTENANCE, FOR COMMERCIAL NAVIGATION ON THE APALACHICOLA RIVER.

WHEREAS, the Apalachicola Maritime Museum (AMM) was founded in 2007 as a Federally designated 501(c)(3) Public Charitable Organization registered in the state of Florida whose mission is to celebrate and preserve the maritime history of Apalachicola in the form of a maritime museum, active sailing, boat building and restoration programs, educational programs and stewardship of ecosystems in the Apalachicola Chattahoochee Flint River System, the Apalachicola Bay and the Gulf Coastal regions which rely upon river outflows.

WHEREAS, the AMM operations span a very broad range of river locations including Buford, GA to Chattahoochee, FL and Apalachicola, FL.

WHEREAS, the Founder and Chairman of the Board of Directors of the AMM, George Kirvin Floyd, has a broad experiential history spanning the basin and a broad variety of very pertinent family history and work experience that includes the following.

1. Fifth generation resident of Apalachicola starting with a family history in Apalachicola dating back to his great great grandfather in Samuel Floyd in 1842. Three generations of paddlewheel operations on the Apalachicola and Chattahoochee Rivers ending with grandfather Albert Floyd, boiler engineer on the JW Callahan.
2. Father a 30 year veteran of the Florida Game and Fish Commission starting with Apalachicola River law enforcement transitioning to Director of Information and Education and ultimately retiring as a Major. This followed by employment with the Northwest Florida Water Management District and County Planner for Franklin County Florida.
3. Maternal family operation of a commercial seafood processing operation, Quality Seafood, in Apalachicola FL where he worked in capacities spanning wood boat building and repair, shrimp, oyster, finfish, clam and scallop production.
4. Cadet at United States Military Academy at West Point in the 1970s.
5. Certified Public Accountant for 20 years including 8 years as a management consultant at Ernst & Young Atlanta office and 18 years in founding and building an electronic transaction operation that was sold to Bank of America in 2006.
6. Lived on the shores of Lake Lanier from 1987 through 2006.
7. Has traversed the Chattahoochee River from Buford Dam to Apalachicola.
8. Coordinated NPR documentaries on the ACF water wars produced by WUFT in 2000 which won the Edward R. Murrow award for journalism broadcasting and WFSU in 2003; and

A

WHEREAS, over the most recent five years, the AMM has added nearly 14,000 members and conducted commercial educational excursions on the Apalachicola River for over 6,700 passengers; and

WHEREAS, the AMM operates power and sail vessels to support research and public educational excursions running the entire length of the navigable waterway from Columbus GA to the Gulf of Mexico; and

Response to ACF257 – Apalachicola Maritime Museum

A. Comment noted.

WHEREAS, the vessels operated by the AMM includes 40 passenger commercial passenger catamaran operating under a US Coast Guard administered Certificate of Inspection program (official number 1239162) which has had multiple instances of severe hull damages and injuries due to collisions with snags in the navigable channel of the Apalachicola River that occurred as a direct result of lack of navigable channel maintenance, which further can be readily demonstrated as also affecting other similar operators of recreational vessels in a similar or even more devastating way including severe injury and death; and

WHEREAS, the AMM is completing a nearly 4 year renovation of a 107' paddlewheel vessel, the JEAN MARY, that will soon be arriving into Apalachicola to run multi day commercial passenger trips between Apalachicola, FL and Columbus, GA wherein the lack of navigable channel maintenance presents a clear and present danger to the health, safety and welfare of the passengers aboard; and

WHEREAS, the AMM operated, since inception, paddle sports centers in up to four locations with over 100 canoes, kayaks, SUPs, rowing shells, small sailing craft ranging from Buford, GA to Apalachicola, FL and related support operations which seek to utilize the federally designated blueway trail in single and multi-day trips, where snags in the navigable channel present very hazardous conditions leading to entanglement and death by drowning; and

A

WHEREAS, the maintenance of a navigable channel in the Apalachicola River is a congressional mandate to the Corps of Engineers that must be resumed to protect the health, safety and welfare of recreational, commercial passenger and other commercial operations of the river; and

WHEREAS, the attached Exhibit I, "A Navigational and Safety improvements on the Apalachicola River and leveraging technology to create New River Based Economic Models" is a 17 page document which examines the following topics that demand consideration in the development of a Water Control Manual and navigational channel maintenance program required by emerging economic opportunities born from river travel and life

1. The Apalachicola to Columbus commercial corridor via two attachments (A) historical prominence as a commercial highway into the interior of the Southeast and (B) the fast growing utilization as an educational excursion corridor that will drive new economies and prosperity through the same that the renaissance of inland waterway travel and life is growing internationally.
2. the need for consistent navigational standards to be implemented on the Apalachicola River in the same manner as has been maintained on the Chattahoochee and Flint rivers since inception of the ACF waterway,
3. Economic Development Opportunities along the ACF waterway that require Navigational Improvements which leverage innovative use of technologies and techniques.
4. Identification of 10 most critical choke points that need immediate attention in de snagging and dredging operations.
5. Environmental protections and enhancements; and

WHEREAS, flows in the Apalachicola River are essential for the environmental health of the river and the economic well-being of communities located along the river and Apalachicola Bay; and

WHEREAS, the seafood industry in Apalachicola Bay, which provides one tenth of the nation's oyster supply and is an important source of other seafood, depends on bay and estuary conditions that require adequate fresh water supplies from the Apalachicola River; and

WHEREAS, citizens and businesses in and around Apalachicola, Florida, are working to revive river-borne transportation for purposes of entertainment and tourism; and

WHEREAS, the U.S. Army Corps of Engineers operates a series of reservoirs in Apalachicola-Chattahoochee-Flint River Basin; and

WHEREAS, Congress authorized the construction and operation of these reservoirs in support of commercial navigation, among other purposes, which the Corps has recognized since enactment of the authorizing legislation in 1945 and continuously ever since; and

WHEREAS, in furtherance of Congressional intent, the Corps is authorized to operate its reservoirs to provide navigation flows and to maintain the navigation channel at a depth of 9 feet and a width of 100 feet, which requires dredging and desnagging in the Apalachicola River from time to time; and

WHEREAS, the Corps in recent years has failed to provide flow and channel maintenance sufficient to support commercial navigation in the Apalachicola River; and

WHEREAS, over the same time period, Apalachicola flows have been too low, with negative impacts on the health of the river and bay, which in turn impacts the seafood industry; and

WHEREAS, historically, flows in the Apalachicola River were healthier at times when the Corps implemented an active program of navigation support; and

A

WHEREAS, the Corps has proposed operations under which it reserves storage and maintains water in its upstream Chattahoochee River reservoirs at critical times of year, which necessarily reduces downstream flows in the Chattahoochee and Apalachicola Rivers; and

WHEREAS, by failing to propose operations that will provide sufficient navigation flow and to maintain the Apalachicola River, the Corps has abandoned a program of navigation support that is consistent with Congressional intent, which has negative effects on both the environment and economy in the region served by the Apalachicola River; and

WHEREAS, past failures to desnag and otherwise maintain the Apalachicola River have led to unsafe boating conditions for Florida's citizens; and

WHEREAS, in the past, the Corps' practices for the disposal of material from the dredging of the Apalachicola River have caused negative and unnecessary environmental impacts, including blockages of sloughs that are important for the life cycle of local biota; and

WHEREAS, techniques are available today to conduct channel maintenance in a manner that reduces adverse environmental impacts; and

WHEREAS, sand and other dredged material can be reused locally for construction and other purposes;

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE APALACHICOLA MARITIME MUSEUM, that:

(1) the AMM Board of Directors supports efforts of the Corps to provide for commercial navigation, including both increased flow and such channel dredging and desnagging as may be necessary to support regular barge traffic; and B

(2) the AMM Board of Directors will be pleased to work with the Corps and other stakeholders to identify methods of channel maintenance that respond to environmental concerns and that allow for the beneficial use of dredged sand and other material, including the procurement of appropriate sites to dispose of dredged material and to stage it for beneficial uses. C

AND BE IT FURTHER RESOLVED, that:

the U.S. Army Corps of Engineers is encouraged and requested:

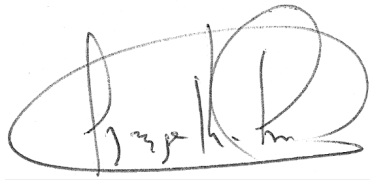
(1) to provide such flows as are necessary to support commercial navigation at the authorized channel depths in the Apalachicola and Chattahoochee Rivers; D

(2) to supplement such flows as may be required for the environmental and economic health of the Apalachicola River and Bay; and

(3) to undertake such dredging and desnagging as may be required to implement and maintain a complete program of navigation support.

ADOPTED, this 29th day of January, 2016, by AMM Board of Directors, by unanimous vote.

FOR THE BOARD OF DIRECTORS OF THE APALACHICOLA MARITIME MUSEUM



George Kirvin Floyd, Chairman of the Board

Response to ACF257 – Apalachicola Maritime Museum

B. The PAA includes provisions for increased flows when sufficient water is available within the basin to support the availability of a 7-ft navigation depth in the Apalachicola River each year between January and May. Increased flows beyond that level to provide opportunity for navigation use of the Apalachicola River would have adverse effects on other authorized purposes of the ACF Basin projects. USACE, Mobile District received a 10-year permit from the Florida Department of Environmental Protection (DEP) on November 27, 2013, to conduct snagging operations on the river to maintain navigability depending on annual availability of operation and maintenance funds. Dredging of the navigation channel in the Apalachicola River has not been conducted since the Florida DEP denied USACE a permit for the work in 2005. Additionally, because the ACF navigation project is considered a low use waterway from a commercial navigation standpoint, USACE has been unable to budget for operation and maintenance funds to conduct maintenance dredging on the river. These constraints will likely continue to exist for the foreseeable future.

C. Current constraints associated with navigation channel maintenance in the Apalachicola River, which are likely to continue for the foreseeable future, are described in detail in section 2.1.1.2.4.3 of the EIS. Accordingly, USACE is unable to pursue alternative methods of channel maintenance, beneficial uses of dredged material, and procurement of new disposal sites at this time.

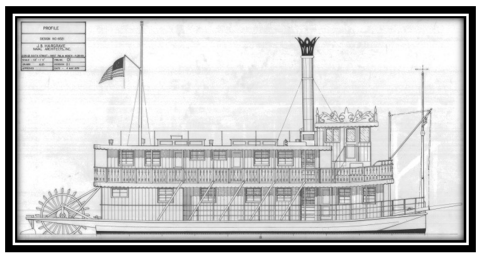
D. Slightly increased releases each year between January and May to support navigation channel depths when sufficient water is available in the basin, as included in the PAA, would provide opportunity for limited navigation use of the project. These slight seasonal increases potentially could provide a collateral incidental benefit to natural resources downstream of Jim Woodruff Lock and Dam. Limited snagging under the current Florida Department of Environmental Protection snagging permit to USACE could provide some relief to users of the navigation channel. Resumption of maintenance dredging in the river is unlikely, as described in section 2.1.1.2.4.3 of the EIS.

Exhibit I
Navigational and Safety improvements on the Apalachicola River and leveraging technology to create New River Based Economic Models



prepared by the

Apalachicola Maritime Museum



The paddlewheel vessel JEAN MARY

Table of Contents

1. Navigational Background 3
A. The Apalachicola to Columbus commercial corridor 3
B. Consistent navigational standards 3
C. Partnership to USACOE and USCG 3
2. Economic Development requires Navigational Improvements 4
A. Economic Development Opportunities 4
B. Improved resource management through innovation 5
3. Environmental protections and enhancements 10
4. Attachment A - River Travel and Life, A glimpse into the past 11
5. Attachment B – River Travel and Life of the Present and Future 15

Note that this document is available online at

http://staff.ammfl.org/acfnav.pdf

1. Navigational Background

A. The Apalachicola to Columbus commercial corridor

i. See attachment A,
River Travel and Life, A glimpse into the past
ii. See attachment B,
River Travel and Life Today, A Case Study by John Moran
iii. Looking into the Crystal Ball
    1. The future is what we make it to be
    2. The past is the future .. catching the wave
    3. Riparian communities NEED improved economic opportunities NOW !!!
    4. Economic opportunity through "selling" the unique experience offered by maritime heritage, ecologic diversity, reconnected communities promotes local pride and "ownership" of the resources

B. Consistent navigational standards

i. Keep up with navigational maintenance activities still active in GA and AL to maintain consistent waterway.
ii. River channel maintenance with snagging and dredging never stopped in the Georgia and Alabama portions of the river system.
iii. Inconsistencies in navigation maintenance standards cause damages, injuries and death on the Apalachicola River.

C. Partnership to USACOE and USCG

i. Teamwork to achieve consensus in a resolution of the elected governmental bodies and NGOs in the basin.

ii. Resolutions to have consistent language to uniformly communicate desires for improved management of the resource for stated objectives of navigational safety, economic opportunity and ecologic protection.

2. Economic Development requires Navigational Improvements

A. Economic Development Opportunities

i. Traditional – History of maritime trades in the ACF merits a case study for future plans of successful commerce
ii. Industrial – regional Growth
    1. Stewart machinery needs and exports
    2. Agri chemicals
    3. Asphalt
iii. New commercial port driven by new Panama Canal Zone influence
    1. Port St. Joe deep water port plan now underway
    2. Commercial distribution and manufacturing to utilize the ACF corridor
iv. Commercial passenger recreational tourism
    1. Commercial multi passenger overnight river transportation
        a. Experiential educational based on authenticity and organized thorough educational content
        b. Soon to arrive … the paddlewheel vessel Jean Mary
    2. Recreational Vehicle barges
    3. Excursions ashore via van filter out visitors into nearby communities
v. Individual recreational tourism

1. Columbus Whitewater park as a case study of emerging significance of recreational opportunities
2. Fishing, Individual and tournaments
3. Bird watching
4. Hunting, guided
5. Photo safari

vi. Paddle trips
1. Blueway designation to connect Appalachian Trail with the Gulf of Mexico

vii. River Lodging
1. Approximately 200 river houses on the Apalachicola today
2. River hotels … why not ? Better wastewater treatment !
3. The model of the Suwanee River .. campgrounds for through paddlers

viii. Marinas, Fish Camps
1. Provides mariners access to the Gulf from as far as Columbus
   a. Connecting the dots for waterway travel
   b. Filling the voids on the long stretches
2. Gateways to those traveling by car

B. Improved resource management through innovation

i. Reduce channel width where significant downward sloping portions exist to reduce flow by hydrologic analysis. Long flat portions can remain full width. E.g. 100' width at 5' depth has the same flow at 50' width at 10' .. thus improving passage making ability. Analogy, a one lane bridge on an two lane road.

ii. Implement bathometric and sea level data in analysis and planning. Commercial Chart chips (navionics, Humminbird, etc) incorporate this on the Chattahoochee and Flint Rivers,

but not the Apalachicola, even though the data is available by the USACE at https://geoplatform.usace.army.mil/home/webmap/viewer.html?webmap=7549a8c49a4f4b98943476a69717bed1

1. Given that GPS technology with digital charts is available at low cost in mainstream marine electronics we should push to get this into commercial chart chips to enhance safety. The web based charts have little value otherwise.
2. This could be distributed similar to how NOAA charts are implemented on many commercial GPS systems

iii. Improve safety of travel through use of AIS satellite technology to allow river traffic information to be sent/received by standard GPS units and mobile handheld devices in the future. This to apply for commercial transponders and recreational receivers. Supports the one lane bridge on a two lane road by allowing a view of oncoming traffic around the bends and in adverse river conditions.

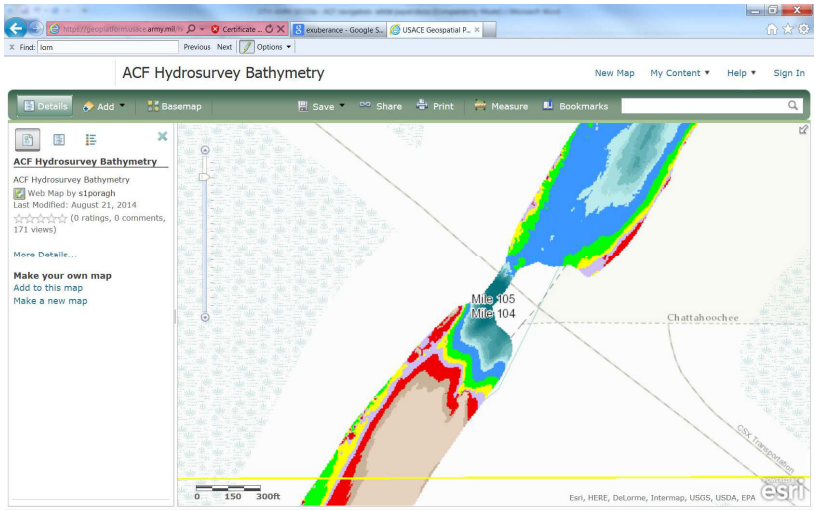
iv. Implement newly emerging look ahead sonar that provides a virtual look ahead spotlight of impending hazards beneath the surface. New Simrad unit and Humminbird 360.

v. Ramping methodology used during water flow rate changes provide criterion which avoid quick rise and fall of river levels which leave aquatic species stranded. Currently utilized to accommodate spawning cycles, may also be utilized during periods of low flow to vary levels below the 2.3 billion gallons (5kCPS) per day which implement wave intermittent high / low flows around the current static release schedule . Concept is to simulate more of the sine wave pulsating pattern more naturally occurring based on periodic rains, lunar tide extremes, etc. Rhythmic schedules for peaks every other week, for instance, would simulate natural patterns while

supporting navigation windows for up / down river transportation.

vi. Web distribution of all information for mariners including, but not limited to

1. planned river levels translated to assured minimum depths at key “choke points” so the passagemaker can plan for round trips
    a. Planned 30 days for minimum flows
    b. Assured minimum flow dates to prevent “stranding” of a deep drafted vessel midway between two bars.
3. Maintenance activities by the US Army Corps of Engineers
    a. Ongoing snag removal with shear and drop method
    b. Dredging the choke points with channel narrowing as necessary to assure minimum depth during periods of low water
        i. With a 4 foot draft at 10K CFS, the Jean Mary will rub bottom in these spots.
            1. MM 36 near Sand Mountain
            2. MM 40.5 near Wewahitchka gage
            3. MM 70.3 Polloway cutoff
            4. MM 77.8 Blountstown
            5. MM 88.2 just above Natural Gas pipeline
            6. MM 96.6 just below Jackson/Calhoun county line
            7. MM104.4 just below CSX RR bridge



    c. Reduce need for maintenance dredging in some areas by repairing damaged and missing dike fields.
    d. Construct new dike fields in areas to minimize erosion and direct flow to improve navigational channel.
    e. Replace missing and damaged multi-pile wood day beacons at dike ends to improve safety.
    f. USCG – navigation aid updates and river patrols to identify perils.
2. User conveniences (as with cruising guide)
    a. Fuel docks
    b. Tow boat services
    c. Pump out services via boat and land station
    d. Recommended anchorages or docking
    e. Establish mooring ball fields

f. Emergency service locations and contact information
g. Accurate bridge height and width information.
h. Contact information for Bridge tenders and lock operators including emergency numbers that will be answered.

3. Environmental protections and enhancements

a. Snag removal technology driven process improvements that benefit river systems ecology, decrease process costs while removing perils to navigation via use of clip and drop methodology.
b. Ramping methodology described earlier for periods of low flow better simulate natural patterns of periodic rainfall and thus natural river cycles much better than a static 5kCFS).
c. Large wakes to be controlled to remove safety hazards for small power craft, paddles and shore fishermen will also minimize bank erosion and related ecologic adverse effects. Noted that small planning craft create little wake and thus less issues than larger trawler style or barge vessels even at low speed.
d. Pump out services for boats, river cabins, etc to be required for all human waste. Prohibition of floating dog kennels.
e. Fueling stations to implement “Clean Marina” standards. Mostly assured through rigorous state regulations. Evaluate options for retail gas boats / barges to minimize land based infrastructure.
f. Charts to identify environmentally critical area to advise mariners caution and appreciation for resources.

4. Attachment A - River Travel and Life, A glimpse into the past

Attachment A

River Travel and Life

A glimpse into the past



The paddlewheel vessel JOHN W CALLAHAN

Come travel through time with me if you will. Close your eyes and release all thought of the here and now, of current tasks to be done, of debts to be paid, of all responsibilities …. and thus open your mind for a journey into the past … where you find yourself on the wharfs of old Apalachicola in December of 1846, a scant 167 years ago. It is a beehive of activity with people and cargo bustling about at all hours of the day and night. With the growing season over, the cotton harvest is flooding into port from the farms upstream, the total will be a staggering 153,386 bales this year. Conversations among residents and visitors are of an international flavor where French, Dutch, Spanish Native American and African American language and dialects mix with English. The records at the

Customs House of ocean going vessels visiting port this year this year will total 95 ships and barks, 61 brigs and 88 schooners. As you walk along the waterfront, you overhear discussion about the arrivals and departures that take place at all hours where tide, winds and river levels are of far greater concern than the clock.

Eleven paddlewheel steamboats navigate the waters between Apalachicola and the upriver ports of Albany on the Flint and Columbus on the Chattahoochee. On the Apalachicola river, there are over eighty landings and on the Chattahoochee there are close to 180 landings. As you drift among conversations, you overhear about how Captain Greer's PEYTONA, the queen of the river in 1846, which made record time in traveling upstream from Apalachicola to Columbus in 34 hours and 30 minutes, a land speed of around 7½ knots which, and when considering current would have been more like 12 to 15. In response you hear a comment about the FLINT, she is as tiny as the PEYTONA IS large. She was built in Albany with engines installed in Apalachicola and only produced 11 horsepower but it is a good bar rather than speed that brings her fame "as she bore her course onward with the dun of waters flowing underneath, there was a flow of fluid above that was of quite a different color, and though the stream was no so broad, its power was much greater. A spirited interest was manifested by some in the success of the craft." (Apalachicola Commercial Advertiser). Drifting along the wharfs you encounter a different conversation about the low water in the Chattahoochee River in early December where the Columbus Enquirer reported that the "River is hardly boatable yet, but with a small sprinkle more in the upcountry, it will come down booming, and our steamboat boys will have an opportunity for making up lost time, warehouses here being full and ready for shipment." Paddlewheel boats running the river this year are the LOTUS, CHAMPION, PEYTONA, VIOLA, MARY ANN MOORE, NOTION, BOSTON, EMILY, COLUMBUS, EUFAULA and ALBANY comprising a total cargo capacity of 2,400 tons. Compare this to the cargo capacity of the ocean going vessels entering port at 71,323 tons which is thirty times that of the paddlewheel river boats. It becomes evident that many upriver trips are required to fill the holds of the international sailing ships bound for European markets. Add to that the limited cotton harvest and shipping season of only half the year and fluctuating river conditions which limit travel, one

quickly realizes that speed and the ability to haul more cotton quicker is a huge financial advantage. The paddlewheel boats run day and night and often operate with a fire on the bow to illuminate the way adding to the adventure and perils of a river journey. In the far off distance you hear the sounding of a steam whistle announcing another arrival into port and the stevedores transition from idle conversation to prepare for the landing. The merchants, inspectors, creditors, master and Customs officer all spring to life to repeat their well-practiced roles with shouted commands as she comes onto the docks. All conversations transition to speculation about the new arrival, her cargo and planning for the offloading and processing into the warehouses or the fleet anchored in the bay.

Let your mind's eye place you at any of the shipyards in Albany, Eufaula, Columbus or Apalachicola where Longleaf Pine planking and Live Oak framing timbers employ hundreds in building new vessels to meet the burgeoning demand for cargo and passenger transportation. Discussions among owner, designer, foreman and the many skilled shipwrights span topics from material supplies from the sawmills, steel fasteners and boiler equipment from northern mills, to use of the adze, saw, chisel, mortise, hammer, caulking iron and cotton caulking used to form the final product. Four boats were launched this year. The ALBANY was launched in January at the city of that name, followed by the FLIN in April and then the SOUTHERNER. The schooner OREGON was built in Apalachicola. She was 70' long with a 24' beam and 5'6" draft .

Your journey continues to find you in the pilot house of the PETONA where the pilot is advising captain Greer of the passage through the shoals at Blountstown, past Alum Bluffs and into Aspalaga landing. On the bow a deckhand uses the lead line for measuring depth heralding to the wheelhouse the depths as captain Greer deftly maneuvers his vessel among the hazards with speed, sounds the steam whistle to announce arrival. With confidence and intensity he orders the boiler engineer to reduce steam and to the deck hands to make fast the lines as she comes alongside the dock to take on passengers and cargo bound for upriver destinations. Making a hasty departure the journey is continued upstream to Coe's, Sampson's, Pank's, Ferrell's landings before arriving at the major port of

Chattahoochee where General Jackson crossed his troops during the Seminole wars along the highland path across North Florida known as the Spanish Trail. A bustle of excitement fills the air as this speedy traveler goes day and night to maximize profit from her travels and to traverse the river while conditions permit.

5. Attachment B – River Travel and Life of the Present and Future

Attachment B

River Travel and Life of the Present and Future

by John Moran



The paddlewheel vessel JEAN MARY

River tourism, a growing pursuit globally, provides a sustainable development opportunity for the Apalachicola River. Because river tourism is almost always grounded in cultural heritage tourism and ecotourism (with the exception of gambling cruises not applicable to the Apalachicola), it is has been shown across a substantial social science literature to contribute to the health of involved communities and even to the ecological health of rivers. River tourism promotes cultural heritage preservation, incentivizes ecological stewardship, integrates with other forms of sustainable tourism, and brings employment, economic stimulation, and restoration efforts often to communities with blighted infrastructures from more prosperous days of commercial river traffic.

Importantly, river tourism is an opportunity that will attract people who seek to learn more about, and enjoy the relatively undeveloped state of, the Apalachicola River from regional, national, and international pools of travelers which already exist and enjoy river cruises in the United States Southeast and globally. An industry report by the Cruise Lines International Association declares in its 2014 survey that 60% of travel agents surveyed reported that their clients had a "high interest" in river cruises, and U.S. rivers especially were seen as a desirable destination (Gerlak 2014). Major world rivers with substantial river tourism include the Nile, Amazon, Rhine, Volga, Danube, Colorado, Mississippi, Ganges, Yangzi, and Mekong. In the United States, tourism and recreation corridors planned along the Mississippi River have improved the livelihood of riverside communities (Prideaux and Cooper 2009) while promoting visitor interest in and spending on local products and services such as the "music, literature, cuisine, and traditions of the South." Other river cruises in the United States, such as tours of the Columbia and Snake Rivers on the paddle wheeler American Express, provide visitors with substantial knowledge of regional history and ecology. These high-end vacation options attract history and nature enthusiasts, and paddle wheelers are often associated with the National Trust for Historic Preservation.

River tourism may positively impact tourism in port cities by revealing to visitors the relevance of the port cities' heritage to a larger regional cultural and natural heritage. A study of heritage tourism in the Port of Echuca on Australia's Murray River, which became a site of heritage and river tourism almost sixty years after the decline of major commercial river traffic, has shown that the value of this tourism can be measured from a number of perspectives: as a provider of employment, as an iconic experience that underpins the sustainability of the regional industry, as an educational experience, and as an activity that has encouraged local participation and maximized local benefits (Prideaux 2009).

A concern in analysis of river tourism by tourism studies scholars is the central dependence of such tourism on nonhuman elements such as river conditions. As recent water contamination events in West Virginia, as well as low water flows California show, river tourism is susceptible to environmental events and to

disruption. However, the literature suggests this may not be a detriment for stakeholders, as responsible river tourism furthers the interest of maintaining and protecting a healthy river. A study in Kruger National Park in South Africa (Turpie and Joubert 2001) further suggests that river tourism increases the valuation of ecosystem services provided by a river, increasing the value of the river for various political and civil society actors and furthering the preservation of the river's ecological health. Such an association between river tourism and river stewardship has also been documented in Malaysia (Chan 2012).

Responsible river tourism along the Apalachicola River is likely to benefit local stakeholders and promote education about, and stewardship of, the river. Studies from various global sites suggest river tourism is a means of promoting cultural, ecological, and economic health.

Chan, Ngai Weng. "Managing urban rivers and water quality in Malaysia for sustainable water resources." International Journal of Water Resources Development 28, no. 2 (2012): 343-354.

Gerlak, Lani. "The State of the Cruise Industry in 2014: Global Growth in Passenger Numbers and Product Offerings."

Prideaux, B. "River Heritage: the Murray–Darling River." River Tourism (2009): 165.

Prideaux, Bruce, and Malcolm Cooper, eds. River tourism. Cabi, 2009.

Turpie, Jane, and Alison Joubert. "Estimating potential impacts of a change in river quality on the tourism value of Kruger National Park: an application of travel cost, contingent, and conjoint valuation methods." Water Sa 27, no. 3 (2001): 387-398.

From: jim southerland
Sent: Sunday, January 31, 2016 1:50 PM
To: ACF-WCM
Subject: [EXTERNAL] Glades Reservoir project

To Whom It May Concern:

My wife and I urge the Corps Mobile District to do the following: (1) incorporate into the ACF Water Control Manual the most recent population data from the Governor's Office of Planning and Budget and reduced water demand information provided by the Metropolitan North Georgia Water Planning District ; (2) eliminate Glades as part of their preferred alternative because it is premature to be included; (3) study the feasibility of raising Lake Lanier two feet as a means of balancing water supply and downstream needs; (4) reinstate the 750 cfs flow requirement year-round to protect water quality and recreation; and (5) evaluate how modifications to the current operations would impact recreation within the ACF basin and in particular the Chattahoochee River National Recreation Area.

Thank you very much for your consideration.

Regina and Jim Southerland1

Sent from my iPad

(1) - A
(2) - B
(3) - C
(4) - D
(5) - E

1

Response to ACF258 – Regina and Jim Southerland

A. The final EIS includes updated information regarding Georgia's water supply needs.
B. In December 2015, the State of Georgia submitted information regarding the water supply needs for Metro Atlanta. The GAEPD letter dated January 29, 2016, stated that Hall County's certification of need for water supply from Glades Reservoir has been rescinded. Accordingly, USACE has revised the water supply options presented in the final EIS to exclude Glades Reservoir as a reasonably foreseeable action with regard to water supply. While Glades Reservoir was carried over in the final EIS to show continuity, no alternatives except the previous PAA in the draft EIS include Glades.
C. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management. Accordingly, raising the conservation pool at Lake Lanier by 2 ft would not meet this criterion and was not carried forward.
D. GAEPD requested that the minimum flow at Peachtree Creek be reduced to 650 cfs during drought periods. In response to that request, USACE investigated reducing the minimum flow value to 650 cfs from November through April. USACE conducted an environmental assessment in 2008 and concluded that reducing the minimum flow requirement at Peachtree Creek to 650 cfs during that period would not have significant adverse effects on water quality. Over the past decade, USACE has reduced the minimum flow seasonally at Peachtree Creek several times. Monitoring data is available from GAEPD during those periods. The State of Georgia has the responsibility for establishing and regulating water quality standards and should conduct any further analysis that might be required. NEPA requires that USACE capture the impacts to the human environment of any change from the NAA. USACE captured any impacts from the change to a season-varying flow at Peachtree Creek. Modeling in support of the final EIS illustrates the impacts that change would have and confirms that the impacts of reducing flows at Peachtree Creek to 650 cfs from November through April would not have significant adverse effects on water quality.
E. Optimum flow regimes for the Chattahoochee River National Recreation Area are displayed in Table 6.1-7 in the final EIS. The flow regimes were developed as part of the MAAWRS in the 1980s. In 2000, CH2M Hill developed a recreational flow preference for the NPS that was similar to the previous effort. Riverine flows were evaluated in various reaches between Buford Dam and West Point Dam as well as in the middle and lower Chattahoochee River. Figure 6.1-24 in the EIS displays flows of the NAA and PAA below Buford Dam. Flows exceeded 1,000 cfs approximately 75 percent of the time under the NAA compared to 73 percent of the time under the PAA. For higher flows that would support kayaking (e.g., 6,000 cfs), there was a negligible difference between the NAA and the PAA over the period of record.)

From: Julie Gordon
Sent: Saturday, January 30, 2016 3:01 PM
To: ACF-WCM
Subject: [EXTERNAL] WCM Comments

Please consider below when implementing and planning the management of Lake Lanier.

1. Revise the navigation plan to avoid the severe impact the proposed plan will have on Lanier's water levels. A
2. Incorporate rigorous drought prediction that will trigger changes in reservoir operations to preserve lake levels during drought. B
3. Manage the reservoirs to retain maximum storage levels in the reservoirs so that drought conditions will not have the devastating impact that was experienced in December 2007. C
4. Model and plan for raising Lake Lanier's full pool level to 1073. D

Thank you!

Julie

BG designs
distinctive interiors

julie gordon
owner / designer

9165 mainsail drive
gainesville, ga 30506

Response to ACF259 – Julie Gordon

A. Navigation is one of several project purposes for which Congress authorized the ACF Basin project, and USACE considers that purpose along with all other authorized purposes when making operational decisions.

Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations provisions in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008. It should be noted that navigation is not supported when drought operations are in effect.

B. USACE regulations do not allow use of forecasts in real-time project operations. Forecasted conditions may be used for planning future operations, but releases will follow the water control operations plan based on observed conditions within the watershed to the extent practicable. The Drought Contingency Plan (DCP) sections 3-02 and 3-03 contained as an exhibit in the WCMs in appendix A of the EIS includes discussion of drought identification and National Integrated Drought Information System (NIDIS). An NIDIS pilot program has been established for the ACF River Basin with the goal of developing a regional Drought Early Warning Information System. The system will use key indicators of drought to make timely drought forecast. USACE is a contributor and user of the NIDIS pilot project tools.

C. Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008.

D. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management. Accordingly, raising the conservation pool at Lake Lanier by 2 ft would not meet this criterion and was not carried forward.

From:
Sent: Saturday, January 30, 2016 1:56 PM
To: ACF-WCM
Subject: [EXTERNAL] Comments to Corps of Engineers Water Contro; Manual (WCM)

I would like to take this opportunity to provide my comments to your draft WCM. I have been living on the lake for about 30 years and have always been frustrated with the way the lake continues to fluctuate. At times, it appears the plan does not properly/correctly reflect all the variables to come up with the best result. This is especially true during major droughts in the region, where all areas have concerns that must be addressed. Which makes it critical all the information and assumptions are correct and valid. To me the major area the Corps should concern itself with is continuously keeping as much water in the reservoirs as possible while meeting the needs of the people and businesses in the respective regions. As a Lake Lanier resident, I feel the concerns about the Southwestern portion of the ACF corridor sometimes outweigh any concerns for the Lake Lanier region. It would seem all areas should be considered fairly when the Corps puts together a plan for the ACF system.

In an effort to keep as much water in Lanier, I feel mean pool for Lanier should be 1073 msl. It is free from Mother Nature when she gives use an additional amount of rain. A good example is this year when the lake was 4 plus feet above msl. Why not keep two feet of that and we would be at 1073, and it was gratis. Mother Nature gave us 26 billion gallons of water free why not use it! Now we we have our new 1073 msl. Part or the WCM should be what is the plan to reset the the msl to 1073 if additional water is provided and how best to maintain it during drought periods. Hopefully, we could better control lake fluctuations - other lakes seem to be able to better maintain their levels. A

Also, I understand the navigation requirement, but it seems it is not as large a component as it was many years ago, so why maintain it to the detriment of lowering Lanier to to preserve the depth for barges that are apparently not being used. It appears the required dredging has not been done over the years to maintain the required navigation depth, so you just put more water in the river to offset what you feel is needed. I understand the dredging cost saving, but is the additional cost to the Lanier economy and recreation even considered or factored in to the equation. Saving the cost of dredging is only a portion of the cost the Lake Lanier's economy suffers and the recreation usage is deminished . B

I keep hoping that if we can better plan for and anticipate the factors, like severe droughts, that effect the level and maintenance of the ACF system, both the Lanier and Apalachicola requirements could, hopefully, be better addressed and solutions provided that would satisfy both groups. Keeping the reservoirs at their full pools should be the goal and everything else should reasonably fall in place. C

The main thing I am trying to say is all things need to be considered when putting your new WCM together for the future of the ACF system and its residents.

Sincerely,
Tom Steusloff

Response to ACF260 – Tom Steusloff

A. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management.

B. Navigation is one of several project purposes for which Congress authorized the ACF Basin project, and USACE considers that purpose along with all other authorized purposes when making operational decisions.

Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations provisions in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008. It should be noted that navigation is not supported when drought operations are in effect.

C. Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008.

From: Ruth Bruner
Sent: Sunday, January 31, 2016 9:32 PM
To: ACF-WCM

Acfwatercontrolmanual
Please eliminate the Glades Farm Reservoir as part of your preferred alternative because it is premature to include it. A
Robert R. Bruner

Sent from my iPad

Response to ACF261 – Robert Bruner

A. In December 2015, the State of Georgia submitted information regarding the water supply needs for Metro Atlanta. The GAEPD letter dated January 29, 2016, stated that Hall County's certification of need for water supply from Glades Reservoir has been rescinded. Accordingly, USACE has revised the water supply options presented in the final EIS to exclude Glades Reservoir as a reasonably foreseeable action with regard to water supply. While Glades Reservoir was carried over in the final EIS to show continuity, no alternatives except the previous PAA in the draft EIS include Glades.

From: Fitzgerald, David A.
To: ACF-WCM
Cc: Feathers, Rick
Subject: [EXTERNAL] Comments of the Southeastern Federal Power Customers, Inc. on the Draft Environmental Impact Statement for the Water Control Manual Update for the Apalachicola-Chattahoochee-Flint River Basin
Date: Saturday, January 30, 2016 3:56:34 PM
Attachments: Final SeFPC Comments on ACF Water Control Manual.PDF

On behalf of Richard M. Feathers, the Chairman of the Water Storage Reallocation Committee of the Southeastern Federal Power Customers, Inc., I am attaching the comments of the Southeastern Federal Power Customers, Inc. on the Draft Environmental Impact Statement for the Water Control Manual Update for the Apalachicola-Chattahoochee-Flint River Basin.

Please let us know if there are any difficulties opening this document.

David A. Fitzgerald
Partner

vCard <>

_____

Schiff Hardin LLP
901 K Street NW
Suite 700
Washington, DC 20001

f 202.778.6460

_____>
w schiffhardin.com <Blockedhttp://www.schiffhardin.com/>

This message and any attachments may contain confidential information protected by the attorney-client or other privilege. If you believe that it has been sent to you in error, please reply to the sender that you received the message in error. Then delete it. Thank you.

Southeastern Federal Power Customers, Inc.

SeFPC,Inc.

Alabama Municipal Electric Authority
Montgomery, AL

Blue Ridge Power Agency
Danville, VA

Central Electric Power Cooperative, Inc
Columbia, SC

Central Virginia Electric Cooperative
Lovingston, VA

East Kentucky Power Cooperative
Winchester, KY

East Mississippi Electric Power Association
Meridian, MS

Electricities of North Carolina, Inc.
Raleigh, NC

Jim Woodruff Customers
Chattahoochee, FL

Municipal Electric Authority of Georgia
Atlanta, GA

Municipal Energy Agency of Mississippi
Jackson, MS

North Carolina Electric Membership Corporation
Raleigh, NC

Oglethorpe Power Corporation
Tucker, GA

Orangeburg Department of Public Utilities
Orangeburg, SC

Piedmont Municipal Power Agency
Greer, SC

PowerSouth Energy Cooperative
Andalusia, AL

Santee Cooper
Moncks Corner, SC

South Mississippi Electric Power Association
Hattiesburg, MS

Virginia Cooperative Preference Power Customers
Harrisonburg, VA

Virginia Municipal Electric Association #1
Harrisonburg, VA

January 30, 2016

VIA EMAIL AND U.S. MAIL

Commander Jon J. Chytka
U.S. Army Corps of Engineers
Mobile District
Attn: PD-EI (ACF-DEIS)
P.O. Box 2288
Mobile, AL 36628-0001

Re: Draft Environmental Statement for the Update of the Water Control Manual for the Apalachicola – Chattahoochee – Flint River Basin

Dear Colonel Chytka:

On behalf of the Southeastern Federal Power Customers, Inc. ("SeFPC" or "Customers") whose members represent the vast majority of electric consumers who benefit from hydropower produced at U.S. Army Corps of Engineers ("Corps ") projects in the Southeast, I am providing comments on the Draft Environmental Impact Statement ("DEIS") for the Update of the Water Control Manual ("WCM") for the Apalachicola-Chattahoochee-Flint ("ACF") River Basin released by the Corps on October 2, 2015. As previously indicated, members of the SeFPC either directly purchase capacity and energy marketed by the Southeastern Power Administration ("SEPA") or represent municipally owned utilities and rural electric cooperatives that have power purchase agreements with SEPA. Many SeFPC members receive the benefit of capacity and energy that is provided by Corps projects located in the ACF River Basin.

As a preliminary matter, the SeFPC thanks the Corps for extending the deadline to provide comments on the WCM and DEIS. As discussed below, several conclusions have been reached in the process that merit correction for purposes of establishing a correct record and arriving at the proper foundation for the WCM.

Representing the Interests of Cooperative and Municipal Systems Serving Over 6 Million Customers

Southeastern Federal Power Customers, Inc.



The SeFPC has voiced previous concern that the Corps does not properly value hydropower resources that SEPA markets to preference customers. After our review of the ACF River basin WCM and DEIS, we are disappointed that the improper valuation of hydropower resources continues. This remains a fundamental concern from several perspectives. First, failure to recognize the full value of the resource could influence future water storage allocation decisions that are intended to be supported by the DEIS. Second, as the analysis supporting the DEIS examines hydropower production over an annual basis, the seasonal and "time of day" value of the existing hydropower resource becomes masked and distorted. Any DEIS prepared for the Corps to support the changes to the WCM should accurately reflect hydropower values and apportion costs to all project purposes accordingly.

I. DEIS Fails to Consider Allocation of Costs

The valuation of hydropower concerns remains a paramount concern for the SeFPC as the Corps moves forward with a WCM that reflects the Order issued by the U.S. Court of Appeals for the Eleventh Circuit ("Eleventh Circuit"), determining whether Congress had authorized the Corps to adjust hydropower production at Lake Lanier to assist future water supply needs for downstream Atlanta. Indeed, we are reminded that nothing in the Eleventh Circuit opinion allows the Corps to unilaterally authorize direct lake withdrawals under the original authorization for Lake Lanier.[1] All water supply withdrawals from Lake Lanier and other Corps projects must fall within the authority provided by the Water Supply Act of 1958 or another specific legislative grant of authority.[2]

A

The SeFPC recognizes that at some point in the future the Corps will reallocate storage at the Buford Project to provide an assured source of water supply under the Water Supply Act of 1958. This does not relieve the Corps of responsibility to properly value the storage that will be conveyed in perpetuity to the water supply interests. Moreover, the Corps bears the fundamental responsibility to adjust the cost allocation studies at each of the Corps projects in the ACF. While the updates to the WCM have lagged in the Southeast, the Corps has already adjusted operations and accommodated new uses and purposes without any change in the cost reallocation studies.

The failure to revise the cost allocation studies has had a real and verifiable impact on hydropower customers over the course of the past three decades. As the Corps has adjusted

[1] The "relocation contracts" for Gainesville and Buford provide the two exceptions to this limitation.
[2] The Eleventh Circuit recognized that Gwinnett has the right to withdraw from 11,000 acre feet of storage pursuant to a right granted by Public Law No. 84-841, 70 Stat. 725. *See In Re: MDL-1824 Tri States Water Rights Litigation* 644 F.3d 1160, 1198 (11th Cir. 2011).

Response to ACF262 – Southeastern Federal Power Customers, Inc.

A. Cost allocation determinations are outside the scope of the Master WCM update and would require a separate study.

releases from Lake Lanier to accommodate downstream water supply needs – a change which the Eleventh Circuit recognized was endorsed by the Newman Report – the cost allocation studies have remained stagnant. To be clear, the Buford Project cost allocation studies continue to allocate all costs to hydropower, flood control and navigation.[3]

Nonetheless, the entire DEIS repeatedly asserts that the Corps must implement a WCM that provides a balance between multiple project purposes including water supply, flood control, navigation, fish and wildlife, recreation, and hydropower. Yet nothing in the DEIS indicates that the cost allocation studies have been or will be adjusted to balance these varied and often competing purposes, notwithstanding the fact that the Army General Counsel indicated in an opinion issued to the Eleventh Circuit that it would be appropriate to revisit the issue of the cost reallocation studies when updating the WCM. [4]

As discussed below, the Corps has a duty to assess the socioeconomic impacts associated with the changes proposed by the WCM. The Corps' ongoing refusal to consider the need to change the cost allocation studies for the four ACF Corps projects is, from the perspective of the hydropower customers, the most fundamental error in the development of the WCM.

This oversight may be cured, however, in issuing the Record of Decision ("ROD") and confirming that the hydropower customers will not be asked to subsidize the Operations and Maintenance ("O&M") and Renewals and Replacement ("R&R") expenses that should be borne by the benefits and uses that are documented in the revised WCM. Indeed, the ROD should express this as a matter of true commitment by the Corps and not a pledge to investigate.

II. Selected Baseline Distorts Impact to Hydropower

As noted below, the SeFPC explains that the Corps' approach does not meet the minimum requirements imposed by the National Environmental Policy Act ("NEPA") because it fails to disclose and analyze the socioeconomic impact of a reduction in peaking hydropower. Further, the baseline used for the No Action Alternative ("NAA") adopts an extreme operational paradigm for hydropower production which does not comply with NEPA requirements. The Customers encourage the Corps to withdraw the proposed WCM and revise the DEIS to comply with NEPA's legal requirements.

B

[3] *See* 2014 Annual Report of the Southeastern Power Administration, page 50. 80.8% of total plant investment is allocated to hydropower.
[4] *See* Memorandum for the Chief of Engineers, Authority to Provide for Municipal and Industrial Water Supply from the Buford Dam/Lake Lanier Project, Georgia, June 25, 2012, Footnote 139.

Response to ACF262 – Southeastern Federal Power Customers, Inc.

B. Council on Environmental Quality (CEQ) regulations for implementation of NEPA require consideration of the NAA (section 1502.14). In the CEQ's memorandum of March 23, 1981, *Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations*, question no. 3 addresses the NAA. The response to question no. 3 states, in part:

> The first situation might involve an action … where ongoing programs initiated under existing legislation and regulations will continue, even as new plans are developed. In these cases, "no action" is "no change" from the current management direction or level of management intensity. To construct an alternative that is based on no management at all would be a useless academic exercise. Therefore, the "no action" alternative may be thought of in terms of continuing with the present course of action until that action is changed.

Consequently, for purposes of the Master WCM update process, the NAA reflects current reservoir operations as they have evolved over time in response to laws, regulations, policy, and new technical information. Basing the NAA for the ACF Basin on a pre-NEPA 1958 WCM or a predam condition to assess the effects of alternative WCM update plans would neither accurately reflect current baseline operations nor be consistent with "no action" as defined in the referenced CEQ memorandum.

The SeFPC has raised concerns with the Corps on numerous occasions regarding the impact that the selected NAA baseline for evaluating changes has on the operations in the ACF. As we have seen since the 1980s, the Corps has looked to a gallery of moving targets[5] to establish a baseline for measuring the Preferred Action Alternative ("PAA") against the established "normal operations."[6] Admittedly, the passage of the long since expired ACF Compact and the adoption of the "live and let live" policy created confusion regarding the proper starting point for determining the NAA as it pertains to water supply and the legal demarcation of the change in hydropower production that was contemplated in the Newman Report as part of the authorizing legislation. [7]

Nonetheless, the NAA is defined by the Corps as the 2007 operating rules. There have been appreciable changes to the operations of the Federal projects on the ACF beginning in 1986, and these changes have not been reviewed in the NEPA process. Indeed, the Draft EIS glosses over major operational changes that accrued over many years of the "live and let live" policy that allowed for increased water withdrawals without vesting any right to water or storage.

For hydropower, the selection of the 2007 operating rules for the NAA establishes an arbitrary and capricious baseline because it captures the year in which the lowest lake level was

[5] The SeFPC notes that there have been numerous efforts to address the water resources in the ACF starting with the Draft ACF Water Control Manual in 1989, project water control manuals for the Buford (1991), West Point (1984), Walter F. George (1993), George Andrews (1996), Jim Woodruff (1985) projects, and the ACF RecSimModeling from 2010. None of these Corps efforts were subjected to NEPA review, yet form the basis of the NAA for the proposed action.

[6] To be clear, to the hydropower customers the term "normal operations" means adhering to the energy production determination in the 1996 Rehabilitation Study and providing the energy during the peak load hours of the day associated with the marketed capacity amount of 105 MW (for the Buford Project) for a minimum of four (4) hours per day during the weekdays of Monday through Friday.

[7] However, in 1996 the Corps completed an economic analysis and started implementation of a rehabilitation plan for Buford Project Powerhouse. The Recommended Plan was to replace the large unit turbines, rewind the generators, and replace the exciters with static excitation. The plan also included the rehabilitation of the small "house unit" or Unit 3. The rehab study established the energy generation post replacement to be approximately 200,000 MWh on an average annual basis. However, the current DEIS for Buford produces an average annual energy basis of 139,000 MWh, a decremented difference of 61,000 MWh. The total rehabilitation cost estimated in 1996 dollars was $27.7 million all of which was assigned to the specific use of hydropower and therefore, paid for 100% by hydropower revenues. The increase in energy produced by the rehab was sufficiently large to justify the cost through the Corps Benefit/Cost analysis (Average Annual Benefits $2,893,996 versus Average Annual Costs of $2,289,114 yields a B/C Ratio of 1.26). However, in the 2015 DEIS analysis, the Corps completely ignores the total energy it determined in the Rehabilitation Study and uses instead the baseless total energy measure of approximately 139,000 MWh. This amounts to a more than 30% reduction from the energy value used to justify the project in 1996. If the Corps reduces the 1996 Average Annual Benefits of $2,893,996 by approximately $868,200 – the decreased value associated with the calculations in the DEIS – there is a resulting negative Net Benefit and Benefit/Cost Ratio of less than 1.0. In other words, if the Corps had anticipated the decreased hydropower operations in 1996, the new investment in power plant would not have been made. However, the record shows that this investment was made in 1996 with an assumption that hydropower flows would continue to support the Benefit/Cost ratios and provide a positive net benefit. By ignoring the investments made, the Corps continues to perpetuate the use of an erroneous baseline.

Southeastern Federal Power Customers, Inc.

recorded at Lake Lanier. Indeed, as set forth in table 7.5 of Appendix A of the DEIS, the year 2007 reflects the lowest hydropower generation for a ten year calendar period in which less than 600,000 Megawatt Hours (MWh) of energy were produced by the four federal multipurpose projects with hydropower capability. In notable contrast, the average generation over the same ten year period was slightly more than 832,000 MWh. In other words, one third of the average annual generation is stripped away from the baseline consideration by the use of the 2007 operating rules.

If the PAA is measured against a year in which the lowest possible hydropower was generated, the proposed operational changes will reflect the smallest incremental impact to hydropower production, an arbitrary and capricious result inconsistent with NEPA requirements. The Buford Project, the largest storage project in the ACF basin, was in 2007 at its lowest recorded point since filling. In December of 2007, more than twenty feet of normal lake elevation was unavailable due to the drought. This translates into more than a fifty five percent reduction in available storage for hydropower generation because hydropower generation generally occurs between the 1070 and 1035. Therefore, if the Corps' starting point for the NAA *begins* at a lake elevation of 1050, the Corps has de facto eliminated more than half of the available storage for hydropower at the Buford Project from its starting analysis. While we acknowledge that the capacity output of Buford would decrease with the reduction of head as the elevation approached 1035, nevertheless there is still a loss of output that would be available between 1035 and 1050. In this context, the use of storage for future water supply would mistakenly appear to have minimal impact on hydropower generation.

This becomes more troubling because the Corps has established through modeling that an elevation of 1050 (the lowest level of record) is the lowest elevation that Lake Lanier will drop, even during the critical drought. Fifteen feet of storage immediately becomes inaccessible for hydropower generation even though it was designed to be used. However, the Corps uses this additional 15 feet to calculate the critical yield. The effect of this reservation of 383,000 ac-ft of storage on limiting hydropower is a reduction in Annual Average Generation of approximately 35% plus the commensurate loss of approximately 105 MW of capacity during the period of time the reservoir may be at or below an elevation of 1050. This amount of lost capacity and energy exceeds what the Corps has predicted in its modeling reflecting a fundamental error in its analysis.

NEPA requires an agency's EIS to "present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public." As part of this analysis, agencies are required to "include the alternative of no action." Courts have explained that "In requiring consideration of a no-action alternative, the Council on Environmental Quality ("CEQ") intended

Representing the Interests of Cooperative and Municipal Systems Serving Over 6 Million Customers

that agencies compare the potential impacts of the proposed major federal action to the known impacts of maintaining the status quo. In other words, the current level of activity is used as a benchmark."[8]

CEQ guidance clarifies that there are two permissible interpretations of "no action alternative." The first interpretation involves actions "such as updating a land management plan where ongoing programs initiated under existing legislation and regulations will continue, even as new plans are developed….the 'no action' alternative may be thought of in terms of continuing with the present course of action until that action is changed." The second interpretation concerns "federal decisions on proposals for projects. 'No action' in such cases would mean the proposed activity would not take place…"

The Corps' DEIS violates this NEPA requirement because the NAA does not represent the status quo with respect to hydropower production in the ACF River Basin. Rather, the NAA is based on operations in 2007 in the ACF River Basin, a year that the Corps acknowledges in the DEIS was (1) the greatest demand year for water in the ACF River Basin and (2) the second highest year for water withdrawals from Lake Lanier in the period between 2000-2011. As such, in 2007 the availability of water in the ACF River Basin for hydropower productions was at an extremely low point. This results in a NAA with an extremely undervalued level of hydropower benefits serving as a baseline for the Corps analysis of all other action alternatives.

Had the Corps' based its NAA on a year where water levels in the ACF River Basin were not at such unusually low levels, the baseline hydropower benefits presented in the NAA would necessarily have been greater than the $173,182,000 figure provided in the DEIS. Furthermore, if this baseline amount were greater, the gap between the Corps' baseline hydropower benefits and the NAA hydropower benefits would have been much greater than the $876,000 difference noted in the DEIS. Providing for such an unusually low baseline of hydropower benefits, premised on an anomalous year in which water levels at Lake Lanier were lowest, allows the Corps to erroneously assert that its PAA only has a minimal impact on hydropower production.

The Corps should revise the DEIS to reflect an appropriate NAA for its analysis of the WCM update's impact on hydropower production. Consistent with NEPA and federal case law, the revised No Action Alternative should be based on existing operations in the ACF River Basin, not operations in 2007. If the Corps fails to make this revision, the DEIS is legally insufficient with

[8] *Custer Cnty. Action Ass'n v. Garvey*, 256 F.3d 1024, 1040 (10th Cir.2001) (internal citations omitted); *see also Association of Public Agency Customers, Inc. v. Bonneville Power Admin.*, 126 F.3d 1158, 1188 (9th Cir.1997) ("CEQ regulations allow the status quo to properly be the no action alternative.").



respect to its analysis of the WCM update's impact on hydropower production in the ACF River Basin.

III. Corps Recognition of Hydropower Function is Inconsistent with Modeling

In reviewing the draft WCM and Draft EIS, we note that the Corps has acknowledged in numerous instances that the Buford, West Point, and Walter F. George multipurpose projects provide peak hydropower. However, in conducting the analysis that reflects the operational and economic impact of diminished peak hydropower operations, the Corps has failed to accurately assess the socioeconomic impacts of the PAA. These oversights raise questions whether the Corps has fully met its NEPA obligations, and in fact we believe that it has not.

Section 6 of the DEIS describes the "environmental and socioeconomic effects of proposed updates to water management operations at USACE reservoirs in the ACF Basin." [9] Among such effects discussed are those on hydroelectric power generation.[10] The Corps asserts that its PAA will result in a total energy and capacity benefit decrease of $867,000, "which represents less than a 1 percent decrease over the NAA." [11]

C

In reaching this conclusion, the Corps has overlooked the benefit of hydropower provided during periods of peak demand. Rather, the Corps has taken an annualized view of hydropower production, which all but eliminates the critical analysis necessary to determine whether the actual benefits provided by the Corps' projects – hydropower availability to meet periods of peak energy demand – are diminished by the WCM. Indeed, in reviewing the proposed WCM and DEIS, the Customers note that the approach that accounts for an overall decrease in hydropower generation over the course of a year does not account for the actual impact on the peaking benefit provided by Corps projects.

NEPA requires federal agencies to consider and disclose the environmental impact of any major federal action. § 102 of NEPA directs an agency to prepare an EIS detailing the environmental impacts of "every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment."[12] The CEQ NEPA regulations state that "[h]uman environment shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment….When an environmental impact statement is prepared and economic or social and

[9] DEIS at 6-1.
[10] *Id.* at 6-196-197.
[11] *Id.* at 6-197.
[12] 42 U.S.C. § 4332(c).

C. The Hydropower Analysis Report, which is part of the WSSA (appendix B of the EIS), provides the determination of the economic impacts resulting from changes in hydropower operations proposed under the updated WCM. It also includes an analysis of peaking operations at each plant, impacts to those plants in terms of energy production and dependable capacity, and replacement values and sources of energy used to determine financial impacts.

natural or physical environmental effects are interrelated, then the environmental impact statement will discuss all of these effects on the human environment." [13]

Accordingly, the Supreme Court and lower courts have held that NEPA obliges a federal agency to analyze and disclose in an EIS all of the socioeconomic effects that are interrelated with the environmental effects of the proposed federal actions. For example, in *Metropolitan Edison Co. v. People Against Nuclear Energy*, 460 U.S. 766 (1983), the Supreme Court stated that "[t]o determine whether § 102 [of NEPA] requires consideration of a particular effect, we must look at the relationship between that effect and the change in the physical environment caused by the major federal action at issue." The Court explained that § 102 of NEPA requires that all effects, including socioeconomic effects, that have "a reasonably close causal relationship" with the environmental effects must be discussed in the EIS. The court compared the "reasonably close" standard to "the familiar doctrine of proximate cause from tort law."[14] Similarly, in *Tongass Conservation Society v. Cheney*, 924 F.2d 1137 (D.C.Cir.1991), the D.C. Circuit explained that § 1508.14 of the CEQ regulations requires an agency to "make reasonable efforts to acquire relevant information concerning socioeconomic impacts, when economic or social and natural or physical environmental effects are interrelated."[15] Furthermore, the court held in Hammond v. Norton, 370 F.Supp.2d 226 (D.D.C.2005) that when socioeconomic effects "result from a project's environmental impact" they must be considered in the EIS.[16]

The Corps' DEIS violates this well-established precedent because it fails to discuss all of the socioeconomic effects that result from the environmental effects of the WCM update. Specifically, the DEIS does not comply with NEPA because it fails to analyze and disclose the reduction in peaking hydropower benefits provided by the Corps' projects. Indeed, the reduction in peaking hydropower availability from the Corps' projects is a direct result of the natural and physical environmental impacts detailed in the DEIS that will result from the changes proposed in the proposed WCM. The use of an annualized energy production is no substitute for the failure to consider the impacts of decreased peaking operations.

The DEIS readily acknowledges that the physical changes to system water control operations will result in a socioeconomic effect on hydropower benefits in the ACF River Basin, and provides an analysis of the impact of the WCM update on energy and capacity benefits from all hydropower generation, including non-federal projects.[17] However, such analysis is flawed because the critical

[13] 40 C.F.R. § 1508.14.
[14] *Metropolitan Edison Co. v. People Against Nuclear Energy,* 460 U.S. 774 (1983).
[15] *Tongass Conservation Society v. Cheney,* 924 F.2d 1137, 1144 (D.C.Cir.1991).
[16] *Hammond v. Norton*, 370 F.Supp.2d 226, 243 (D.D.C.2005).
[17] *See, e.g.*, DEIS at 6-195 and Appendix D of the Water Supply Storage Assessment Report, Appendix B of the DEIS.

benefit provided by the Corps projects in the ACF River Basin is the availability of low-cost hydropower during periods of peak demand when the replacement cost of power is highest. The DEIS contains many acknowledgements by the Corps that the ACF River Basin hydropower resources provide peaking benefits.[18]

Thus, it becomes troublesome that the Corps analysis does not provide a functional breakdown of the value that the peaking resources provide. While peak hydropower operations are acknowledged as a general matter, the DEIS does not specifically illustrate the actual value of changing on-peak hydropower generation to off-peak periods. The SeFPC is left to speculate how the Corps determined a rather de minimis reduction in hydropower values associated with the changes in the DEIS. More importantly, however, it represents a failure by the Corps to execute its fundamental responsibility under NEPA to evaluate the socio-economic impacts associated with the changes contemplated by the WCM.

To address this oversight, the Corps should revise the DEIS to include a comprehensive analysis of the loss of low-cost peaking hydropower to electric consumers. This analysis must reflect the anticipated changes in generation schedules and associated loss of hydropower as determined by a replacement value of the capacity and energy that will no longer be available during peak periods. Such analysis should reflect the deployment of suitable replacement resources, i.e., gas peaking facilities, with appropriate predictions of cost escalators.[19] If the Corps fails to do so, federal case law and the CEQ regulations indicate that such failure constitutes a violation of NEPA and renders the DEIS legally insufficient.

IV. Conclusion

Ultimately, it is the Corps' responsibility to establish a legally sufficient WCM and DEIS that reflects the actual impacts on the benefits provided by peaking hydropower in the ACF River Basin. With the analysis presented, the DEIS fails to comply with the Corps' obligation to analyze and disclose all socioeconomic effects interrelated with the natural and physical environmental effects of the proposed federal action. We recommend revisions to the DEIS and proposed WCM to address the comments raised above.

D

D. Comment noted.

[18] *See* DEIS Vol. 1, Page 2-25: "Much of the hydroelectric power generation in the ACF Basin is peaking power; that is, the generators are turned on when there is the most, or peak, demand for power. *See also* DEIS Vol 2, Page 8-5 "Hydropower generation is provided at Buford Dam, West Point Dam, Walter F. George Dam, and Jim Woodruff Dam. The projects provide peaking power generation, i.e., power is generated during the hours that the demand for electrical power is highest except for the Woodruff Project, which operates as a run-of-river project."

[19] This analysis should refrain from including hydropower output from projects licensed by the Federal Energy Regulatory Commission and not part of the Federal Power Program administered by SEPA. Such sleight of hand modeling distorts the true impact of hydropower production as the SeFPC has already documented for the Corps in comments on the final WCM for the Alabama-Coosa-Tallapoosa ("ACT") River basin.



If you have any questions regarding these comments, please do not hesitate to contact me at wsrc@sefpc.org.

Sincerely,

/S/

Richard M. Feathers
Chairman
Water Storage Reallocation Committee
Southeastern Federal Power Customers, Inc.

From: Fortuna, John
Sent: Saturday, January 30, 2016 1:26 PM
To: ACF-WCM
Subject: [EXTERNAL] PD-EI (ACF-DEIS): Draft Environmental Impact Statement: ACF Water Control Manual
Attachments: Water Supply Providers Comments - Final.pdf

Dear Col. Chytka:

Thank you for the opportunity to comment on the Draft 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 (Oct. 2015). Attached please find comments submitted on behalf of the "Water Supply Providers" in the metropolitan Atlanta area, including: the Atlanta Regional Commission; the City of Atlanta; the Atlanta-Fulton County Water Resources Commission; the Cobb County-Marietta Water Authority; DeKalb County; Forsyth County; Fulton County; Gwinnett County; and the City of Gainesville.

Due to file size limitations, we have omitted exhibits from the attached comment letter. A compiled pdf document including all exhibits is available for download here: https://kslaw.@@@.com/@@@@. In addition, a hard copy of the complete filing has been transmitted to your office by overnight carrier.

Please do not hesitate to contact us if you need any further information.

Sincerely yours,

John L. Fortuna

King & Spalding LLP
1180 Peachtree Street, NE
Atlanta, Georgia 30309D

Fax: 404-572-5136

www.kslaw.com

King & Spalding Confidentiality Notice:

This message is being sent by or on behalf of a lawyer. It is intended exclusively for the individual or entity to which it is addressed. This communication may contain information that is proprietary, privileged or confidential or otherwise legally exempt from disclosure. If you are not the named addressee, you are not authorized to read, print, retain, copy or disseminate this message or any part of it. If you have received this message in error, please notify the sender immediately by e-mail and delete all copies of the message.

KING & SPALDING

King & Spalding LLP
1180 Peachtree Street N.E.
Atlanta, GA 30309-3521
Tel: +1 404 572 4600
Fax: +1 404 572 5100
www.kslaw.com

Lewis B. Jones
Partner

January 30, 2016

BY ELECTRONIC MAIL AND OVERNIGHT COURIER

Col. Jon J. Chytka, Commanding Officer
U.S. Army Corps of Engineers
Mobile District
Attn: PD-EI (ACF-DEIS)
P.O. Box 2288
Mobile, AL 36628

Email: ACF-WCM@usace.army.mil

Re: Draft 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 (Oct. 2015)

Dear Col. Chytka:

Thank you for the opportunity to comment on the Draft 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 (Oct. 2015) (the "Draft EIS"). These comments are submitted on behalf of the water supply providers in the metropolitan Atlanta region including: the Atlanta Regional Commission; the City of Atlanta; the Atlanta-Fulton County Water Resources Commission; the Cobb County-Marietta Water Authority; DeKalb County; Forsyth County; Fulton County; Gwinnett County; and, the City of Gainesville (collectively, the "Water Supply Providers").

Executive Summary 3
1. Lake Lanier Should Be Used to Meet the Entire Projected 2050 Water Supply Demand for the Communities It Serves. 5
1.1 To Meet Georgia's Projected 2050 Demand, the Allocation from Lake Lanier Must Be Increased from 185 MGD to 242 MGD. 5
1.2 If the Army Determines It Cannot Grant the State's Entire Request of 242 MGD, It Must Determine the Maximum Amount that Can Be Supplied. 11
1.3 There Is No Rational Basis for Providing 225 MGD But Not Meeting the Entire Projected Demand of 242 MGD. 12
1.4 The Army Should Defer to the State of Georgia to Balance Local Impacts. 23
2. The Army Should Follow the State of Georgia's Allocation of Return Flows. 24
2.1 Return Flows Should be Incentivized to Maximize Public Benefits Consistent with the Principles and Requirements Applicable to Federal Water Projects. 24
2.2 The Army Should Support the State's Policy of Encouraging Return Flows. 25
2.3 The Water Supply Act Mandates that Return Flows Be Considered in Determining How Much Storage Users Must Buy to Supply a Given Yield. 27
2.4 Return Flows Must Also Be Taken Into Account in Determining How Much Water Is Stored in Each Individual Storage Account. 28
2.5 The Corps Should Not Intrude on the State's Authority to Allocate Water Rights, Including the Right to Store and Utilize Return Flows. 29
2.6 There is No Practical Impediment to Crediting Return Flows 34
3. The Storage Accounting Tool Must Be Released for Public Comment. 35
4. The Proposed Navigation Plan Is Not Feasible. 35
4.1 New Gage Data Show That Navigation Cannot Be Supported If the Channel is Not Maintained. 36
4.2 The Proposed Navigation Plan Will Inflict Serious Harm For Negligible Benefit. 38
4.3 The Proposed Navigation Plan is Too Vague. 42
4.4 A More Specific Navigation Plan Should Be Developed with Stakeholder Input. 43
5. The Army Should Use Its Authority to Develop Rules Based on Realistic Water Supply Assumptions. 44
5.1 The Army Must Consider the Relative Benefits of Water Supply. 44
5.2 The Army Should Develop Operating Plans Based on Realistic Water Supply Assumptions. 45
5.3 The Proposed Operating Rule Is Highly Sensitive to Small Changes in System Condition. 45

6. Errors in the Water Quality Analysis and Storage Computations Must be Corrected. 46
6.1 The Water Quality Model Uses Incorrect Assumptions that Overstate Potential Impacts. 46
6.2 The Draft EIS Uses Outdated Area-Capacity Curves for Lake Lanier. 48
6.3 The Army Should Release Its Analyses of Modeling Outputs. 49
7. Reasonable Alternatives Should Be Considered Before the Draft Is Finalized. 49
7.1 The Army Has Underestimated Its Authority to Consider Alternatives. 49
7.2 Top of Conservation Storage at Lake Lanier Should Be Raised. 51
7.3 The Winter Drawdown at West Point Lake Should Be Reduced. 51
8. Many Parts of the Manual Are Very Good. 53
8.1 The Proposed Operations Correctly Recognize the Army Cannot Drought-Proof the ACF Basin Using Lake Lanier Storage. 53
8.2 The Army Appropriately Considered Drainage Area and Refill Capacity to Revise the Action Zones. 54
8.3 The Seasonal Flow Target at Peachtree Creek Conserves System Storage. 56
8.4 Entering Drought Operations in Zone 3 Conserves Storage and Increases Operational Flexibility During Drought. 58
9. Conclusion 60

Executive Summary

We commend the Army Corps of Engineers for the hard work and careful attention it has put into this Draft. In particular, we are gratified that the Army has proposed to meet all projected water supply needs from the Chattahoochee River downstream of Buford Dam. This decision is obviously correct, both because it will provide tremendous social, economic, and environmental benefits over the construction of alternative supplies, and because it will have no material impacts on downstream flows. We also appreciate the many improvements in the plan, detailed below in Section 8, that we trust will be retained. The plan is not perfect, however, and therefore the bulk of this letter is devoted to problem areas we urge you to address. Please do not hesitate to request additional information or analysis about any of these points.

Our primary concern is to ensure that Lake Lanier will be used to meet the entire projected 2050 water demand for those who withdraw water directly from the lake. This water supply is vitally important to the State of Georgia and the people and businesses who rely on Lake Lanier, and it can be provided at very little cost to other stakeholders or the environment. Given the reduced 2050 water supply demands and updated return flow projections developed by the Metropolitan North Georgia Water Planning District ("Metro District"), the net impact of meeting the region's entire projected need will be just 3.4 million gallons per day ("mgd") greater than the Army's Proposed Action Alternative, which the Army has already deemed

acceptable. The incremental impact of meeting this additional demand will be negligible, and yet the cost of ***not*** meeting it—and thus forcing communities to build new reservoirs that would not be needed otherwise—would be very large indeed. Importantly, the Draft EIS also confirms what we have always known, which is that water use in metropolitan Atlanta has a negligible impact on Florida.

To maximize public benefits and minimize environmental impacts, it should be the policy of the federal government to maximize the use of existing water infrastructure. One way to do this is to encourage users to increase the yield of water supply storage by returning highly-treated, reclaimed water to the existing federal reservoirs. The State of Georgia and the Metro District have identified this strategy as an essential element of the region's long-term water supply plans. It is long past time for the Army to develop a policy expressly authorizing and incentivizing this practice. The draft is silent on this important issue, however, even though the Eleventh Circuit expressly directed the Army to address it. In Section 2 of these comments, we urge the Army to adopt a policy of crediting return flows to water supply users in accordance with the State of Georgia's allocation. In addition to promoting water efficiency and conservation and maximizing public benefits, we believe such deference is also mandated by law and by principles of federal-state comity.

In Section 3, we request that the details on the proposed "storage accounting" spreadsheet for Lake Lanier be released for public comment. It is important to get the accounting right because important property interests are at stake.

In terms of the operating plan itself, the navigation element is by far our biggest concern. As detailed in Section 4, U.S. Geological Survey gage data for the Blountstown gage show that navigation cannot be supported through reservoir releases alone. The irregularities at this gage must be investigated. If our reading of those data is correct—as presented in Section 4 and the attached memorandum—it may not be possible to support navigation until dredging and other channel maintenance activities are restored.

Even if the proposed navigation plan were feasible, such that the benefits projected in the draft could actually be realized, those benefits would pale in comparison to the damage inflicted on other purposes. If navigation is to be restored, a better plan can and must be developed. We suggest one potential alternative that may provide greater benefits to navigation than the Proposed Action Alternative at a mere fraction of the cost.

Section 5 explains that the Army selected its preferred operating rules assuming only 20 mgd of water supply withdrawals from Lake Lanier, despite the fact that current water supply withdrawals are more than 5 times that amount. It makes no sense to develop an operating rule based on false assumptions about water supply use, when a rule developed to reflect actual conditions could perform much better. Further, the Army's Proposed Action Alternative is highly sensitive to model inputs and very small changes in basin conditions, meaning that small changes can have large, unpredictable effects. A more robust rule would be less sensitive to small changes, and more predictable.

In Section 6, we identify errors in the water quality analysis and storage computations that need to be corrected. The major flaw in the water quality analysis is that ***historical*** pollutant loadings were used to project ***future*** water quality impacts; this is not valid because permits are much more stringent today than they were when the loading data were collected. The major flaw in the storage computation is that an outdated area-capacity curve was used.

Section 7 explains that the Army failed to consider reasonable alternatives that would have increased system conservation storage. These alternatives, which include raising the rule curve at Lake Lanier and limiting the winter drawdown at West Point, should be evaluated, as they could provide benefits throughout the basin.

1. Lake Lanier Should Be Used to Meet the Entire Projected 2050 Water Supply Demand for the Communities It Serves.

The Draft EIS should be revised to supply the entire projected demand for communities that draw from Lake Lanier. As it stands, the Draft proposes to meet 100% of the projected demand from the Chattahoochee River, but assumes that only 75% of the projected demand above Buford Dam would be met—225 million gallons per day ("mgd") out of a total projected need of 297 mgd. New projections by the Metro District and the State of Georgia have decreased the projected need to 242 mgd in 2050. This has narrowed the gap between the proposed supply of 225 mgd evaluated in the Draft EIS and the projected demand so that it is now just 17 mgd. That gap can and should be eliminated entirely by increasing the storage allocation in Lake Lanier. A

1.1 To Meet Georgia's Projected 2050 Demand, the Allocation from Lake Lanier Must Be Increased from 185 MGD to 242 MGD.

To meet Georgia's projected 2050 demand, 379 mgd must be supplied by releasing water from Buford Dam into the Chattahoochee River, and 242 mgd must be supplied by allowing withdrawals directly from Lake Lanier. Of the 242 mgd to be withdrawn directly from Lake Lanier, 23.3 mgd will be supplied by relocation contracts for the City of Gainesville and the City of Buford, and the balance of 218.7 mgd should be supplied by a new storage contract or contracts in Lake Lanier (10 mgd under the 1956 Act for Gwinnett County, and the remaining 208.7 mgd under the Water Supply Act). The proposed Glades Farm Reservoir should not be relied upon to supply any part of this demand. These points are explained below. B

a. The Total Projected Need from Lake Lanier is Now 242 mgd.

On December 4, 2015, the State of Georgia lowered its projected demand from Lake Lanier from 297 mgd to 242 mgd.[1] Projected demands from the Chattahoochee River have also been

[1] *See* Letter from Judson Turner, Director, Georgia Environmental Protection Division, to Col. Chytka, District Commander, Mobile District, U.S. Army Corps of Engineers, regarding State of Georgia's Water Supply Request (Dec. 4, 2015) (Exhibit 1). Of this amount, the State of Georgia

Response to ACF263 – Metro Atlanta Water Supply Providers

A. USACE evaluated the additional water supply demand projections and updated the water supply options analysis in the final EIS.

B. USACE evaluated the additional water supply demand projections and updated the water supply options analysis in the final EIS, which includes the 2015 water supply request. USACE examined taking 242 mgd directly from Lake Lanier (20 mgd will be withdrawn under the existing relocation contracts and 222 mgd will be considered under the 1958 Water Supply Act [WSA]). USACE applied the WSA for Gwinnett County because the total amount requested can be reallocated under the WSA.

reduced to between 355 mgd and 379 mgd,[2] down from the prior projection of 408 mgd. At the same time, returns to Lake Lanier are now projected to be 104.6 mgd by 2050.[3, 4]

The new, lower demand projections are the fruits of an aggressive conservation program developed by the Metro District. The program has been highly successful. While the region is expected to grow by almost 3.3 million people and to add more than 1.9 million new jobs by 2050, projected water supply demands for the Metro District from the Chattahoochee-Lanier system have been reduced by as much as 116 mgd.[5]

---

has allocated 8 mgd from Lake Lanier for counties that are outside of the Metropolitan North Georgia Water Planning District. The total request for Metro District jurisdictions is therefore 234 mgd. This is 21.2% less than the 297 mgd originally requested, which was originally intended to meet needs only through 2030.

[2] This range depends on the supply available to Cobb County-Marietta Water Authority from Allatoona Lake in the Alabama-Coosa-Tallapoosa (ACT) River Basin. *See id.*

[3] This includes a projected return of 99 mgd to Lake Lanier from jurisdictions in the Metro District that withdraw water directly from the project. *See* Memorandum from Katherine Zitsch, Director, Metropolitan North Georgia Water Planning District, to Jud Turner, Director, Georgia EPD, Projected Future Treated Wastewater Returns for the Chattahoochee River and Lake Lanier System (Jan. 25, 2016) (Exhibit 2). In addition, Georgia EPD projects that counties upstream of Lake Lanier will return an additional 5.6 mgd by 2050. *See* Memo from Wei Zeng to Jud Turner (Jan. 29, 2016). This is a projected return rate to Lake Lanier of 43.2% for the entire request, and 42.3% for the Metro District counties that withdraw water from Lake Lanier (which also make additional returns to the Chattahoochee River downstream of Buford Dam).

[4] In the Draft EIS, the Army projected returns to Lake Lanier of 91 mgd. This was based on the Army's assumption that future wastewater infrastructure would be designed, constructed, and operated at 58% capacity. Draft EIS at 5-7. This assumption is deeply flawed. Wastewater treatment facilities are not designed—and communities do not spend tens or even hundreds of millions of dollars to construct—facilities that exceed their needs by more than 40%. Rather, they project future wastewater needs based on projected future growth in wastewater flows many years out, and construct facilities designed to meet those needs as flows increase into the future. In any event, the new return-flow projections are far superior to those assumed by the Army in the Draft EIS because they are derived directly from actual projected water demands and the actual projected wastewater flows that will be generated accordingly.

[5] *See* Letter from Judson Turner, Director, Georgia Environmental Protection Division, to Col. Chytka, District Commander, Mobile District, U.S. Army Corps of Engineers, regarding State of Georgia's Water Supply Request (Dec. 4, 2015); Memorandum from Katherine Zitsch, to Jud Turner, Director, Metropolitan North Georgia Water Planning District, Regarding Projected Future Water Supply Demands for the Chattahoochee River and Lake Lanier System (Dec. 2, 2015) (Exhibit 3).

B

There is no dispute that the revised projection of 242 mgd is the best available. Indeed, the Draft EIS concludes the original projected need of 297 mgd was, if anything, too low.[6] Given the Army's determination that the water is actually needed, and having previously determined that it is authorized to reallocate storage in Lake Lanier to supply the full 297 mgd in the original water supply request,[7] none of the analysis in the Draft EIS justifies rejecting this request.

b. <u>The Proposed Glades Farm Reservoir Should Not Be Used to Meet Any Portion of the Projected 2050 Demand.</u>

The Army's proposed action alternative (Alternative 7H) states that 40 mgd of the total projected metro demand will be supplied by the proposed new Glades Farm Reservoir.[8] This water should be supplied directly from Lake Lanier instead.[9]

The Draft EIS shows that impacts to lake levels, river flows, and other measures are the same whether the 40 mgd is supplied from Glades Farm or directly from Lake Lanier.[10] Lake Lanier should be the preferred alternative because it would be far cheaper. Reallocating storage to provide an additional 40 mgd would cost approximately $11.1 million, or about $640,000 per year over 30 years. The Glades Farm Reservoir would cost much more and would also result in unnecessary environmental impacts.[11]

This is not to say that Glades Farm Reservoir could not be constructed to serve some purpose other than water supply, but it does establish that this project is not a viable ***<u>alternative</u>*** to obtaining water supply storage in Lake Lanier. The preferred alternative must be to allocate

B

---

[6] Draft EIS, Vol. 3 Appx. B at 19 & Table 12.

[7] Memorandum from Earl Stockdale, Chief Counsel, for the Chief of Engineers Regarding Authority to Provide for Municipal and Industrial Water Supply from the Buford Dam/Lake Lanier Project, Georgia at 4 (June 25, 2012) ("In addition to downstream withdrawals for water supply under the 1946 RHA, the Corps has authority to accommodate the 190 mgd in net annual average withdrawals that Georgia has requested directly from Lake Lanier (including gross withdrawals of 297 mgd and returns of 107 mgd to Lake Lanier)….") (Exhibit 4).

[8] *E.g.*, Draft EIS at ES-30.

[9] We understand that the State of Georgia has decertified the water supply need for the proposed Glades Farm Reservoir through 2050, and that, if constructed, it will not serve as a source of water supply through 2050. Accordingly, we discuss the Army's proposal as providing 225 mgd from Lake Lanier.

[10] In the Draft EIS, Alternative 7D would provide 297 mgd from Lake Lanier, while Alternative 7E would provide 257 mgd from Lake Lanier, with 40 mgd assumed to come from the proposed Glades Farm Reservoir. The Draft EIS explains that these alternatives are "essentially the same." Draft EIS at 5-26.

[11] *See infra* Section 1.3e.ii.

storage in Lake Lanier to support 100% of the projected demand for communities above Buford Dam, or 242 mgd.

c. Relocation Contracts and the 1956 Act for Gwinnett County Will Provide a Total of 33.3 mgd.

The Draft EIS states that "[w]ithdrawals of 20 mgd from Lake Lanier are authorized under relocation agreements and the 1956 Act (Public Law 84-841)."[12] This is incorrect. The relocation contracts alone provide a total withdrawal of 23.3 mgd (21.3 mgd for Gainesville and 2 mgd for Buford), and the 1956 Act provides an additional 10 mgd for Gwinnett County. The total is thus 33.3 mgd. It is important to get these authorities and amounts right because they affect both the payments owed and the amount that can be supplied under the separate authority of the Water Supply Act of 1958.

i. The 1953 Relocation Contract and 2003 Supplement

B

The City of Gainesville and the City of Buford withdraw water from Lake Lanier pursuant to relocation contracts executed as compensation for properties taken when Lake Lanier was constructed. The City of Buford's agreement is for 2 mgd, while the City of Gainesville's relocation contract allows it to "remove [up to] 8,000,000 gallons of water per day from Buford Dam and Reservoir."[13] As both parties confirmed in a Supplement to the Relocation Contract the parties executed in 2003, Gainesville's relocation contract has historically been interpreted as allowing a ***net*** withdrawal of 8 mgd.[14]

The Draft EIS states, erroneously, that the parties' historical interpretation also included an "overall cap of 18 mgd gross withdrawals."[15] In reality, the 18 mgd limit discussed in the Draft EIS is a product of the same 2003 Supplement to the original relocation contract discussed

[12] Draft EIS at 5-27.

[13] *See* Agreement Between the City of Gainesville and the United States, Art. 1.f (June 22, 1953) (providing that the City of Gainesville "will not … remove more than 8,000,000 gallons of water from the reservoir of Buford Dam within any 24-hour period without prior written approval") (Exhibit 5).

[14] *See* Draft EIS at 2-77 n.1 ("The term 'remove' has been interpreted as 8 mgd net withdrawal during any 24-hour period…"); Supplemental Agreement to the Relocation Contract between the United States of America and the City of Gainesville (Jan. 9, 2003) ("WHEREAS, the term 'remove' has historically been interpreted as creating a limitation on "net" as opposed to "gross" withdrawals.") ("2003 Supplement") (Exhibit 6).

[15] Draft EIS at 2-77 n.1.

above, which imposed an 18 mgd limit for the first time.[16] Because that same 2003 Supplement also provided for the 18 mgd cap to increase to 21.3 mgd upon execution of a new storage contract, the new 21.3 mgd cap will take effect when the proposed storage contract is executed.[17]

If the 2003 Supplement is deemed inoperative for any reason, the relocation contract would simply revert to its original form, which the parties always understood to authorize a net withdrawal of up to 8 mgd. Either option would be acceptable to the City of Gainesville, but a new interpretation capping the withdrawal at 18 mgd would not.[18]

ii. The 1956 Act Provides an Additional 10 mgd for Gwinnett County

Public Law 84-841 (the "1956 Act") authorizes the Army to contract with Gwinnett County "for the use of storage space in the Buford Reservoir for the purpose of providing … a regulated water supply in an amount not to exceed eleven thousand two hundred acre-feet of water annually."[19] This is equivalent to 10 mgd of withdrawal.

B

As the Eleventh Circuit explained, the authority provided by the 1956 Act for Gwinnett County has never been exercised and the 1956 Act remains valid today. This provides the Army "additional water supply authority" to enter a contract to provide the authorized withdrawals.[20]

[16] 2003 Supplement § 1 ("Upon execution of this of this Supplement, the Relocation Contract shall be construed to allow User to withdraw 18 mgd from the Project on an annual average basis Withdrawals pursuant to this agreement will be measured as gross withdrawals.").

[17] 2003 Supplement § 2 ("Upon the execution of a separate water supply agreement providing the User with the right to utilize storage in Lake Lanier for a term of at least ten years, the withdrawal amount stated in Section 1 above shall be increased to 21.3 mgd."). Although not explained in the 2003 Supplement itself, the new gross limits in the 2003 Supplement were based on actual and permitted treatment capacities at Gainesville's two wastewater plants (Flat Creek and Linwood). The combined return from these plants in 2003 was estimated to be about 10 mgd, but the permitted capacity was 13.3 mgd. The phasing of the contract was a compromise between Gainesville's position that the gross limit should be based on the permitted capacity and the United States' position that it should be based on actual returns at the time.

[18] The 2003 Supplement was executed in conjunction with a larger settlement agreement that was ultimately nullified by the United States Court of Appeals for the D.C. Circuit. *See* Settlement Agreement § 3.3; *Se. Fed'l Power Customers, Inc. v. Geren*, 514 F.3d 1316 (D.C. Cir. 2008) (Exhibit 7). The Settlement Agreement expressly provided that the Supplement would survive any termination or voiding of the larger agreement, however. Settlement Agreement § 3.3. Therefore, it is the City of Gainesville's understanding that the 2003 Supplement remains in effect.

[19] Pub. L. No. 84-841, 70 Stat. 725 (July 30, 1956) (Exhibit 8).

[20] *In re MDL-1824 Tri-State Water Rights Litig.*, 644 F.3d 1160, 1197-98 & n.32 (11th Cir. 2011) (Exhibit 9).

The Draft EIS acknowledges the authority provided by the 1956 Act in one sentence but appears to ignore it in the very next, stating that "[a]ny water supply storage volumes evaluated ... will be considered for reallocation solely under the Water Supply Act of 1958."[21] We assume this is an oversight.

This oversight should be corrected because it affects the baseline for the Army's Water Supply Act analysis. As the Eleventh Circuit explained, a contract executed under authority of the 1956 Act will not require "a reallocation of storage under the [Water Supply Act] ... because it is directly authorized by Congress."[22] Further, water provided under the 1956 Act "do[es] not count against" any other perceived limit on the Army's Water Supply Act authority, and it "do[es] not affect the amount of water that the Corps is authorized to supply under the various statutory grants."[23]

d. A New Storage Contract (or Contracts) For 254,170 acre-feet Should Be Executed to Supply the Remaining 218.7 mgd.

B

To meet the total projected 2050 demand of 242 mgd, with 23.3 mgd being supplied by relocation contracts, 254,170 acre-feet (af) of storage should be allocated to water supply to provide 218.7 mgd. These reallocation amounts are shown below in Table 1.

Table 1. Reallocation Amounts and Costs

Scenario	Yield Based on Critical Yield (mgd)	Storage Allocated (af)	Usable Storage (%)	Total Cost of Allocated Storage	Annual Share of O&M	Annual R, R & R	Total Annual Cost
Corrected Draft EIS Without Glades	205	234,706	14.03%	$ 56,704,908	$ 199,789	—	$3,282,911
Updated Water Supply Request	218.7	254,170	15.19%	$ 61,407,405	$ 216,358	—	$3,555,160

Updated Cost of Storage (Lanier)	$404,293,000.00
Estimated O&M (Lanier)	$1,424,453.00

[21] Draft EIS, Vol. 3 Appx. B at 5. ("Public Law No. 84-841 '1956 Act.' Public Law 84-841, enacted July 30, 1956 (1956 Act), granted USACE authority to enter into an agreement with Gwinnett County, Georgia, for the allocation of 11,200 ac-ft of storage for regulated water supply. Any water supply storage volumes evaluated in this assessment will be considered for reallocation solely under the Water Supply Act of 21 1958 described below.").

[22] *In re Tri-State Water Rights Litig.*, 644 F.3d at 1198.

[23] *Id.* at 1202 n.38.

Note that the numbers provided above have been "corrected" to remove errors in the Draft EIS. As explained in Section 6.2, the storage calculations in the Water Supply Storage Assessment Report (Appendix B) were erroneously based on an outdated estimate of storage in Lake Lanier.[24] These calculations will need to be redone. The updated storage-volume curve was used in
Table 1.

1.2 If the Army Determines It Cannot Grant the State's Entire Request of 242 MGD, It Must Determine the Maximum Amount that Can Be Supplied.

If the Army determines that the full projected demand of 242 mgd cannot be supplied, it must determine the maximum amount that ***can*** be supplied and clearly state the basis for its determination. The duty to determine the maximum that can be granted, if less than the entire request, was imposed by the Eleventh Circuit in *In Re: MDL-1824 Tri-State Water Rights Litigation*, 644 F.3d 1160 (11th Cir. 2011)—the legal decision that the Army cites as leading directly to the present reallocation.[25]

In *Tri-State Water Rights*, Georgia challenged the Army's denial of its water supply request. The Eleventh Circuit held that the Army had a duty, not only to determine if the request could be granted in its entirety but, if not, to determine how much could be provided. The Court was explicit about this in its directions to the Army:

> As part of the final, definitive statement of the Corps' water supply analysis, if the agency ultimately concludes that it does not have the authority to grant the Georgia request, it nevertheless should indicate the scope of the authority it thinks it does have, under the RHA [Rivers and Harbors Act], the WSA [Water Supply Act], and the 1956 Act.[26]

C

To comply with this mandate, the Army must do the incremental analysis necessary to state exactly how much water it can supply if the Army refuses to grant the State's entire, revised water supply request.

[24] The Draft EIS states that 189,497 acre-feet of storage in Lake Lanier should be allocated to yield 165 mgd. *See* Draft EIS at 5-8, Table 5.1-2, & Vol. 3, Appx. B at 1. This value is based on assumed conservation storage volume in Lake Lanier of 1,087,600 acre-feet and an assumed total usable storage volume of 1,686,400 acre-feet. *See* Draft EIS, Vol. 3 Appx. B at 6 & Tables 17, 20. However, according to the Army's most recent estimate, there are 1,074,600 acre-feet of conservation storage in Lake Lanier, and 1,673,400 acre-feet of usable storage in the project. Draft EIS, Vol. 3 Appx. F at B-8.

[25] Draft EIS at 1-10.

[26] *In re Tri-State Water Rights Litig.*, 644 F.3d at 1201.

Response to ACF263 – Metro Atlanta Water Supply Providers

C. The 1958 Water Supply Act (WSA) is a discretionary authority. In the Master WCM update, USACE committed to examine Georgia's request. The purpose was not to determine the limits of its water supply authority at Lake Lanier. The Assistant Secretary of the Army for Civil Works will determine how much storage, if any, to reallocate under the discretionary authority of the WSA.

1.3 There Is No Rational Basis for Providing 225 MGD But Not Meeting the Entire Projected Demand of 242 MGD.

Any decision by the Army to limit the supply available from Lake Lanier to 225 mgd, instead of meeting the entire projected demand of 242 mgd, would be arbitrary and capricious. The 225 mgd limit in the Draft EIS is truly arbitrary because it has no relevance to any project purpose or to any environmental impact.

a. The Reason Given in the Draft EIS for Limiting the Supply from Lake Lanier to 225 mgd Is Arbitrary and Capricious.

The explanation provided in the Draft EIS for providing only 225 mgd is clearly inadequate. It states the decision to supply only 225 mgd—as opposed to the requested 297 mgd—was based on the Army's determination that a gross withdrawal of 225 mgd will result in a net withdrawal of 134 mgd. There is no explanation, however, of why the net withdrawal should be capped at 134 mgd. This number just happens to match the net withdrawal in the State's original request. Even if the Army correctly determined that a gross withdrawal in the requested amount would result in a larger net withdrawal than anticipated by the State (because returns will be less than projected), that still does not explain why the net withdrawal in the State's original request is the maximum that can be granted. If a rational basis for drawing the line at this point exists, that explanation should be provided.

D

b. Municipal and Industrial Water Supply Is the Most Valuable Water Use.

The Eleventh Circuit has held that "ensur[ing] an adequate municipal and industrial water supply for the Atlanta area" was one of the "primary" purposes for which Lake Lanier was authorized and constructed.[27] Congress specifically recognized that water supply demands would increase over time and that the value of providing an "assured supply" for municipal and industrial users would far outweigh any minimal impact to other authorized purposes.

There is no question that municipal and industrial uses are the most valuable water uses by far. Indeed, municipal and industrial water supply uses are the "most highly valued" and "inelastic" uses of water.[28] Estimates of the value of water used for this purpose are often orders of magnitude higher than other purposes—reaching as much as $17,940 per acre-foot per year—dwarfing the value of water used for hydropower, navigation, and other purposes.[29] In fact, the

[27] *See id.* at 1190 (quoting H.R. Doc. No. 80–300, ¶ 100); *id.* at 1194 (quoting U.S. Army Corps of Eng'rs: Mobile District, Definite Project Report on Buford Dam Chattahoochee River, Georgia, ¶ 48 (1949))

[28] Brent Boehlert and Robert Unsworth, Industrial Economics, Inc., The Value of Water for Municipal and Industrial Supply and Hydroelectric Power Generation at 2 (Jan. 8, 2016) (Exhibit 10).

[29] *Id.*

Response to ACF263 – Metro Atlanta Water Supply Providers

D. In the draft EIS, USACE determined the gross withdrawal amount stated in the proposed action using net withdrawal information provided by the state, wastewater returns that were supportable given historic utilization of existing wastewater treatment facilities, and facility information presented in the 2009 Metropolitan North Georgia Water Planning District wastewater treatment plan. USACE was charged with also considering Georgia's 2013 water supply request. The evaluation was not to determine the maximum amount available to be reallocated; USACE evaluated the water supply options as outlined by the methodology in USACE Engineer Regulation 1105-2-100 (*Planning Guidance Notebook*) and the *Water Supply Handbook*. As this is not a study seeking authorization or a change to project authorizations, USACE is not prioritizing one project purpose over another. USACE evaluated Georgia's 2015 revised water supply request in the final EIS to determine its potential impacts.

study found that water supply was 14.6 times more valuable than using the same quantity of water to produce hydropower.[30]

c. Water Use in Metro Atlanta Has No Material Impact On Florida

The Draft EIS confirms that water supply withdrawals in metropolitan Atlanta have no material impact on flows at the Florida state line. Indeed, the Draft EIS could not be more clear on this point. The Army summarized the results of its analysis by explaining that the "differences in flow condition in the Apalachicola River" between the No Action Alternative and each alternative considered "would be very small."[31] The Army found that "assumptions for [the Proposed Action Alternative] regarding water supply withdrawal options and return flows associated with Lake Lanier and downstream from Buford Dam to Peachtree Creek ***do not have an appreciable effect on flow conditions in the Apalachicola River***."[32] And the Army found that the Proposed Action Alternative—including the proposed levels of water supply withdrawal—"***would have no appreciable incremental effect on freshwater inflows to Apalachicola Bay***."[33]

D

This conclusion is both correct and unsurprising. Metro Atlanta's net water supply withdrawals in the No Action Alternative (which represent "current" levels of water supply use) are just 141 mgd, or 218 cfs. The net depletion will increase ***by only 14.6 mgd or 22.6 cfs*** by 2050, to a total of 240.6 cfs.[34] This is less than 1% of the average annual discharge of the Apalachicola River to Apalachicola Bay, and only 2.6% of the average discharge under the very lowest flow conditions.[35]

The statistics should not be surprising. The impact is so limited because the vast majority of the ACF Basin flows into the system below Atlanta. Buford Dam controls runoff from 5.6% of the land area and 9% of the flow of the basin. Thus, if metro Atlanta withdrew and consumed ***every single drop*** of water passing through Buford Dam, the flow in the Apalachicola River would be reduced by only 9%. Furthermore, there are four federal reservoirs located between

[30] *Id.* at 6.

[31] Draft EIS at 6-71.

[32] Draft EIS at 6-75 (emphasis added).

[33] Draft EIS at 6-75 (emphasis added); *see also* Georgia Environmental Protection Division, Submission to Record of Committee Hearing on "Effects of Water Flows on Apalachicola Bay: Short and Long Term Perspectives" (Aug. 13, 2013) (Exhibit 11); Florida Fish and Wildlife Conservation Commission, Apalachicola Bay Issues—Oysters, at 6 (Dec. 5, 2012) (Exhibit 12).

[34] *See* Table 2. Net depletions under the Army's No Action Alternative (7A) are 140.9 mgd. Net depletions under the Revised 2050 Demands are 155.5 mgd.

[35] Draft EIS at 2-57 ("Mean annual discharge from the Apalachicola River to the bay is approximately 25,000 cfs, but minimum and maximum flow average 9,300 cfs and 200,000 cfs, respectively.").

metro Atlanta and the Florida line that operate to reregulate flows in the Apalachicola River. This essentially eliminates any effects of timing or seasonality of these withdrawals.

d. The Impacts of Meeting the Entire Projected Demand Would be No Greater Than Impacts the Army Has Already Deemed Acceptable.

As shown below, the marginal impact of meeting Georgia's entire projected demand, as compared to the Army's Proposed Action Alternative ("PAA"), would be negligible. This should not be surprising. One reason the marginal impact is so small is that the difference between the proposed supply and the revised projected demand is also very small. Indeed, based on the most recent updated projected demands and returns, the net withdrawal from Lake Lanier will be just 137.4 mgd, or just 3.4 mgd greater than the net withdrawal of 134 mgd the Army has already deemed to be acceptable. Given this, there is no basis no basis for the Army to refuse to meet full projected need from Lake Lanier.

The Army's ResSim model can be used to assess the marginal impact of increasing the allocation in Lake Lanier to provide this additional 3.4 mgd. The results are shown in Figure 1 through Figure 6 below. In each case the model depicts Water Management Alternative 7, with the only difference being the water supply scenarios detailed in Table 2 below.

D

Table 2. Water Supply Alternatives[36]

SCENARIO	ABOVE BUFORD DAM				BELOW BUFORD DAM			
	Glades Farm		Lake Lanier		Above Peachtree Creek		Below Peachtree Creek	
	Withdraw	Return	Withdraw	Return	Withdraw	Return	Withdraw	Return
Army No Action Alternative (7A)	0	0	128	37.1	277	30.3	0	196.7
Army Proposed Action Alternative (7H)	40	16	185	75 (91 Total)	408	93.7	0	289.8
Revised 2050 Demands	0	0	242	104.6	379	81.9	0	279.0

[36] HydroLogics, Inc., Technical Analysis of the ACF Water Control Manual Update Draft EIS at 3 (Jan. 29, 2016) (hereinafter, "HydroLogics Technical Analysis") (Exhibit 13). Note that the Army's modeling for the Proposed Action Alternative incorrectly projects returns to the Chattahoochee River below Buford Dam because some water withdrawn from Lake Lanier is returned to the Chattahoochee River below Buford Dam. *See* HydroLogics Technical Analysis at 3 n.5. For ease of comparison with the Draft EIS, however, all Proposed Action Alternative model runs include the Army's return assumptions as stated in the Draft EIS.

Before reviewing the results, three caveats should be noted. First, the model results appear more precise than they really are. Small differences in the effects of the various alternatives likely exceed the precision of the model. Therefore, even when the charts show that one alternative would perform slightly better than another, it is probably better to view the effects as being essentially equivalent.

Second, the point is to focus on the ***relative difference*** between different scenarios, as opposed to absolute values or thresholds. This focus is possible because all of the charts presented below use the same management alternative (Alternative 7), with the only difference being the amount provided for water supply. It is important to keep the focus on relative differences, as opposed to absolutes, because the absolute values are affected by many variables, including modeling assumptions and hard thresholds and triggers in the Army's operating rule.

Third, as discussed below, the Army's operating rule can be highly sensitive to very small changes in system storage. This can result in large releases being made (or not made) for certain purposes (e.g., navigation) simply because system storage happens to be slightly above or below a certain threshold on the first of each month, even if only by a few hundred acre-feet. Thus, when large differences are observed between alternatives, it is critical to understand ***why*** the differences appear. Often, these differences are not due to any material difference in system condition, but rather to a specific release made in the model for a specific purpose that happened to occur under the precise hydrologic conditions experienced in a single year in the hydrologic record.

With these caveats in mind, the results could not be more clear: the marginal impact of meeting Georgia's entire projected need is trivial, and the total impact is no greater than what the Army has already determined to be acceptable.

i. Negligible Impact to Lake Levels.

Across the board, lake levels would be about the same when the Revised 2050 Demand is met than under the Army's Proposed Action Alternative in the Draft EIS.[37] Results for Lake Lanier—the reservoir most likely to be affected by increased water supply demands—are shown below in Figure 1 and Figure 2. As can be seen, the difference is almost imperceptible (Figure 1). The percent of time Lake Lanier would be in Zone 1 is unchanged under the Revised Demands - 2050 scenario, compared to the Army's Proposed Action Alternative. Further, according to the Army's model, the minimum stage under the worst droughts in the hydrologic record would actually be slightly higher (Figure 2) (1050.8 for the Revised Demands – 2050 scenario, compared to 1050.2 for the Army's PAA reported in the Draft EIS).

Reservoir levels at West Point and Walter F. George are essentially equivalent under all scenarios in most conditions. It is notable, however, that both reservoirs would be higher when

[37] *See* HydroLogics Technical Analysis at 6 to 12.

D

the Revised 2050 Demands are met compared to the Army's baseline (Army No Action Alternative (7A)), especially under drought conditions (Figure 3, Figure 4). This is because additional water withdrawn or released upstream from Lake Lanier to meet increased future water supply needs is returned to the system and flows downstream, where it benefits storage in the lower reservoirs.

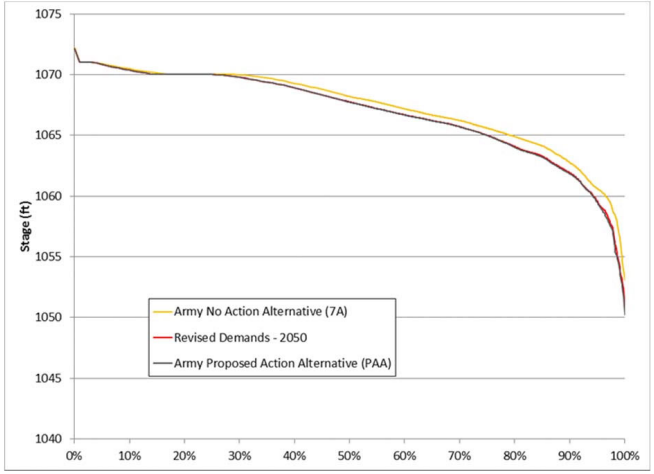


Figure 1. Lake Lanier Stage:
Revised 2050 Demands v. Army PAA

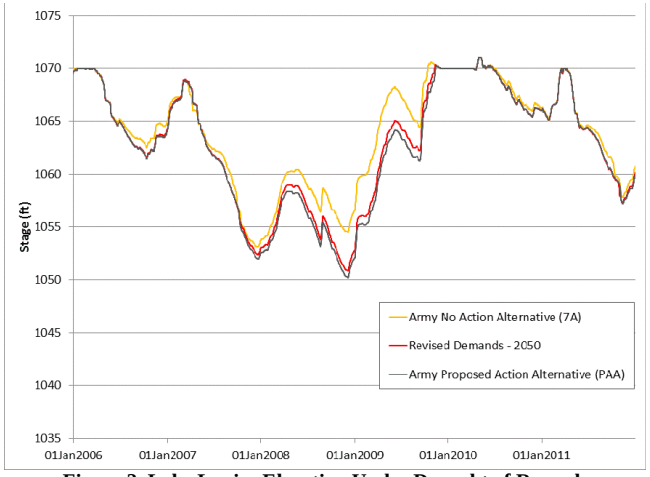


Figure 2. Lake Lanier Elevation Under Drought of Record: Revised 2050 Demands v. Army PAA

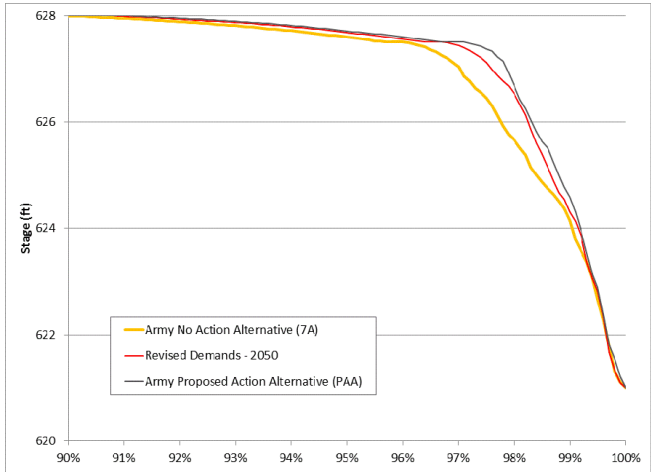


Figure 3. West Point Stage During Drought: Revised 2050 Demands vs. Army PAA

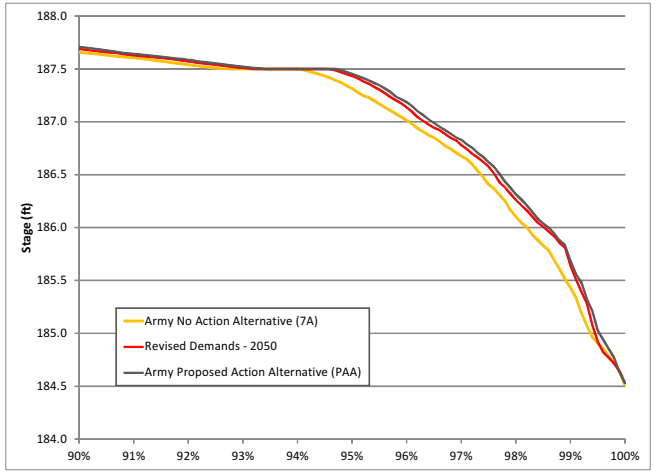


Figure 4. Walter F George Stage During Drought: Revised 2050 Demands vs. Army PAA

i. No Effect on Drought Operations Or Apalachicola River Flows.

The system would be in drought operations slightly fewer days when the Revised 2050 Demands are met than under the Army's Proposed Action Alternative in the Draft EIS.[38] The system would be in drought operations on 17.6% of days under the Revised Demands – 2050 scenario, compared to 18.1% of days under the Army's Proposed Action Alternative. Either scenario would represent only a slight increase over the Army's Baseline No Action Alternative. D

Consistent with the Army's conclusion that water supply operations "do not have an appreciable effect on flow conditions in the Apalachicola River,"[39] flows at the Chattahoochee gage in Florida are virtually identical when the Revised 2050 Demands are met. As the figures below show, flows would increase slightly in the 5,000 cfs to 8,000 cfs range, while the number of days with flows less than 5,000 cfs would increase by just one tenth of one percent—0.3% of days when the Revised 2050 Demands are met, compared to 0.2% under the Army's Proposed Action Alternative (Figure 5). Even under the worst drought in history, Apalachicola River discharges at the Chattahoochee gage under each scenario are essentially equivalent when the Revised 2050 Demands are met (Figure 6).

---

[38] *See* HydroLogics Technical Analysis at 12 to 13.

[39] Draft EIS at 6-75.

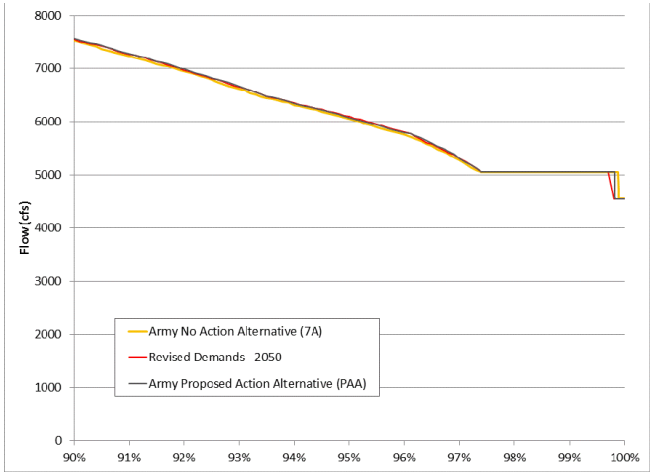


Figure 5. Chattahoochee Gage Flows: Revised 2050 Demands vs Army PAA

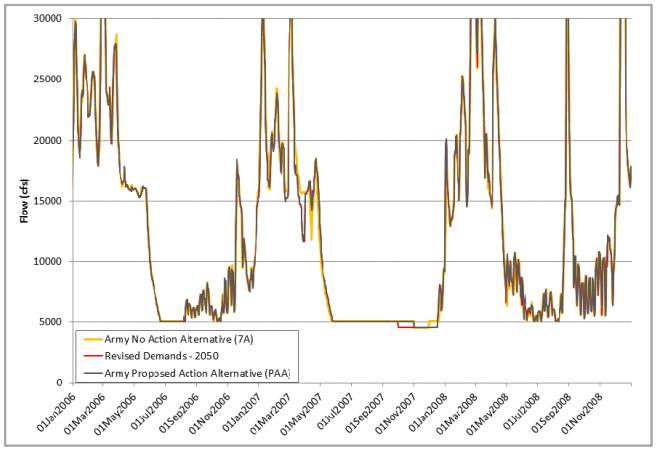


Figure 6. Apalachicola River Flows Under Drought of Record: Revised 2050 Demands vs. Army PAA

ii. Hydropower Impacts are Minimal.

Before turning to hydropower generation under the Revised Demands – 2050 Scenario, we note that the Draft EIS appears to incorrectly report the amount of hydropower that would be generated under the Army's Proposed Action Alternative. For Alternative 7H, Table 5.2-18 projects annual generation at Buford Dam of 136,243 MWh, and annual weekday generation of 107,873 MWh. These values are identical to those reported for Alternative 7C in Table 5.2-10. This appears to be a "cut-and-paste" mistake that slightly overstates hydropower benefits.[40]

Corrected hydropower generation values for the Army's Proposed Action Alternative are provided below in

Table 3. As can be seen, hydropower generation at Buford Dam with the Revised 2050 Demands met would be 119,046 MWh, or 0.4% less than the 119,553 MWh that would be produced under the Army's Proposed Action Alternative. Across all projects, however, annual system hydropower generation would be expected to be 1,804,644 MWh, which represents a decrease of only 0.3% over the Army's Proposed Action Alternative.

D

Table 3. Hydropower Generation: Water Supply Alternatives vs. Army Proposed Action Alternative

Buford Water Management Alternative	Annual Hydropower Generation MWh	Annual Weekday Hydropower Generation MWh	Difference from Army PAA MWh	Difference from Army PAA %
Army No Action Alternative (7A)	126,410	103,144	6,768	5.7%
Revised Demands – 2050	119,046	96,048	-506	-0.4%
Army Proposed Action Alternative	119,553	96,120	—	—

All Projects Water Management Alternative	Annual Hydropower Generation MWh	Annual Weekday Hydropower Generation MWh	Difference from Army PAA MWh	Difference from Army PAA %
Army No Action Alternative (7A)	1,825,729	1,368,953	15,943	0.9%
Revised Demands – 2050	1,804,644	1,350,970	-5,142	-0.3%
Army Proposed Action Alternative	1,809,786	1,354,314	—	—

[40] *See* HydroLogics Technical Analysis at 16 to 17.

e. The Benefits of Supplying Georgia's Entire Projected Demand from Lake Lanier Far Exceed the Costs.

Any justification for not meeting Georgia's projected 2050 demand would need to include a demonstration that the impact of meeting the projected need would exceed the impacts that would result if the need were not met. It is difficult to conceive such a demonstration given the negligible impacts shown above.

In fact, such a demonstration is impossible if the right baseline is used. As explained in the Guide to Constructing the Without Project Scenario (Condition) (IWR, May 2012), a common mistake is to assume that no action will be taken by anyone if there is no ***federal*** action.[41] Assuming that Georgia's entire projected demand will not be met from Lake Lanier "is not the same as assuming no action will be taken to solve the problems and attain the opportunities" identified in the State's request.[42] To the contrary, experience teaches that communities will go to great lengths and spend vast sums to eliminate water supply shortages.

D

As is recognized in the Draft EIS, the projected demands already assume that aggressive conservation measures will be implemented. The most likely "future without project" scenario, therefore, is that new projects will be undertaken to increase supply— which means building new reservoirs.[43] The Glades Farm Reservoir Project is just one of several likely alternatives. As shown below, however, environmental and financial impact of ***any*** new reservoir—or any other water project for that matter—would almost certainly exceed the trivial impact of allocating additional storage in Lake Lanier. Using Lake Lanier to supply Georgia's entire projected demand of 242 mgd would also avoid the substantial environmental impacts that would occur from constructing alternative water supplies.

i. Avoided Costs

The costs of constructing new reservoir storage to fill a 17 mgd gap (the difference between 225 mgd and 242 mgd) far exceed the costs of storage in Lake Lanier. This is clear from the cost allocation in the Draft EIS. The additional storage needed to supply 17 mgd would cost about

[41] U.S. Army Corps of Engineers, Institute for Water Resources, Guide to Constructing the Without Project Scenario (Condition) at 24 (May 2012).

[42] *Id.* at 30.

[43] Draft EIS, Vol. 3 Appx. B at 23 (explaining that "several new water supply reservoirs would need to be developed upstream of Lake Lanier or on a tributary to Lake Lanier" to meet demands that the Army refused to provide from Lake Lanier).

$4.7 million, or roughly $250,000 annually.[44] In contrast, the Draft EIS projects the cost of constructing new reservoir storage to be ***$8.57 million per mgd***, or a total of $145.7 million.[45]

ii. Avoided Environmental Impacts

The environmental impact of any new reservoir would also vastly exceed the impact of allocating additional storage in Lake Lanier. As EPA explained in its comments on the Army's recent update of the water control for the Alabama-Coosa-Tallapoosa (ACT) River Basin:

> Impoundments can fragment aquatic ecosystems, with impacts on many aspects of environmental integrity, particularly when the cumulative effects of multiple impoundments across a system are taken into account. Although the projects subject to the [water control manual] are already in place, the allocation and uses allowed and established through the [water control manual] revision can have a significant influence on overall [basin] health by preventing or minimizing further fragmentation. If managed to make the best use of these existing resources, further impacts of additional supply infrastructure development could be avoided or at least minimized.[46]

D

In light of these trade-offs, EPA specifically advised the Corps to maximize the use of existing infrastructure in the basin to meet water supply needs: "If allowing additional uses avoids impacts of new impoundments and additional infrastructure, overall impacts to the basin could be minimized with holistic management."[47]

EPA's comments on the Army's ACT water control manual apply with equal force in the ACF Basin. By declining to meet the full projected need, the Army would force water suppliers to construct new impoundments with their own inherent environmental impacts. These impacts could be avoided entirely, however, simply by maximizing the use of Lake Lanier and the infrastructure that has already been constructed.

[44] *Supra* Section 1.1d & Table 1.

[45] Draft EIS, Vol. 3 Appx. B at 34 & Table 19.

[46] U.S. Environmental Protection Agency, EPA Comments on the Draft Environmental Impact Statement (DEIS) for the Update of the Water Control Manual for the Alabama-Coosa-Tallapoosa (ACT) River Basin; Alabama and Georgia at 2 (May 31, 2013) (Exhibit 14).

[47] *Id.*

f. Downstream Users Will Not Benefit From a Decision to Deny Any Part of Georgia's Request, Because the Water Will Still Be Withdrawn.

The Army does not allocate water between users in the basin, and it cannot control water uses outside of the federal projects. The Army recognizes this in the Draft EIS when it states that "several new water supply reservoirs would need to be developed upstream of Lake Lanier or on a tributary to Lake Lanier" to meet any demand not supplied through storage in Lake Lanier.[48] Thus, the question here is not whether Georgia will get the water it needs, but whether it will come from Lake Lanier.[49]

Consider, for example, the proposed Glades Farm Reservoir. Because it is in the same drainage basin as Lake Lanier, it will make little if any difference to downstream flow whether the water is taken from the Glades Farm Reservoir or Lake Lanier. The Draft EIS confirms this, explaining that the effects of scenarios that include supplies from the proposed Glades Farm Reservoir are "essentially the same as" those in which the full demand is met by Lake Lanier.[50] It follows that granting the State's full request for water supply storage in Lake Lanier will not result in ***any*** environmental impact in comparison to the most likely alternative. To the contrary, it is the alternative of constructing a new reservoir to supply the same demand that would have negative impacts on the environment, because in that scenario a new reservoir would be constructed.

1.4 The Army Should Defer to the State of Georgia to Balance Local Impacts.

Even if the asserted impacts of meeting the entire projected demand were real—and even if they were ***still*** real at the lower request for 242 mgd to be withdrawn from the lake—these small local impacts would not justify a decision to deny the request. The federal government should defer to the State of Georgia to balance any minor local impacts that might be implicated here. The Draft EIS states the decision to deny Georgia's request was based on impacts felt entirely within the State of Georgia including alleged adverse flow conditions in the Chattahoochee River above West Point Lake. The State of Georgia should be the one to balance these types of local impacts, not the Army.

E

[48] Draft EIS, Vol. 3 Appx. B at 23.

[49] Given this, the effects of alternatives in the Draft EIS that leave demands unmet are inaccurate because they assume that water will not be taken to meet acknowledged water supply needs.

[50] Draft EIS at 5-26 (comparing Alternative 7D (providing 297 mgd from Lake Lanier) with Alternative 7E (providing 257 mgd from Lake Lanier, with 40 mgd assumed to come from the proposed Glades Farm Reservoir), explaining: "The effects of Alt7E are essentially the same as Alt 7D").

Response to ACF263 – Metro Atlanta Water Supply Providers

E. In the final EIS, USACE performed additional modeling and impact analysis to determine exact impacts with the entire water supply amount coming out of Lake Lanier instead of a portion coming out of Lake Lanier and a portion coming out of Glades Reservoir. USACE used this information for its PAA.

2. The Army Should Follow the State of Georgia's Allocation of Return Flows.

The Draft EIS does not say how the Army intends to account for return flows. This needs to be addressed in the Final EIS, as it has a direct bearing on the size and price of the proposed water supply storage contracts. The Army has stated its current practice is to allocate return flows to all users *pro rata* based on the percentage of storage allocated to each account. A better policy would allocate return flows and other "made inflows" to the users that make them. The Army should not mandate such accounting in all cases, because doing so would intrude on the State's authority to allocate water rights, but it should adopt a policy of deferring to States to determine how return flows and other made inflows should be allocated. Where the State has allocated return flows to a particular user, the Army should honor the allocation. F

Return flows should be encouraged because they increase yield. The concept is easy to understand. The "firm yield" of a storage reservoir—the amount of water that can reliably be supplied at all times—can be increased either by increasing inflow or by increasing storage capacity. Less storage space is needed to provide the same firm yield when inflow is increased, because more of the demand can be supplied directly from inflow. In other words, less water needs to be stored to supplement inflow, and thus less storage capacity is required. This basic principle is not disputed. The only question is whether the Army's policies will help or hinder this practice.

2.1 Return Flows Should be Incentivized to Maximize Public Benefits Consistent with the Principles and Requirements Applicable to Federal Water Projects.

It has been stated that Army "policy" prohibits accounting for return flows in the manner advocated by the State. The Chief Counsel determined in 2012, however, that no such policy exists.[51] Because "the Corps has no official policy" regarding the accounting for return flows, none can be cited as a basis to deny credit for return flows at Lake Lanier. G

In considering which new policy to adopt, the Army should be guided by the new Principles and Requirements[52] that apply to all federal investments in water projects. These new requirements direct federal agencies to strive to ensure federal investments in water resources

[51] Memorandum from Earl Stockdale, Chief Counsel, for the Chief of Engineers Regarding Authority to Provide for Municipal and Industrial Water Supply from the Buford Dam/Lake Lanier Project, Georgia at 37 (June 25, 2012).

[52] *See* Principles and Requirements for Federal Investments in Water Resources (Mar. 2013) ("Principles and Requirements") (Exhibit 15). The Principles and Requirements apply to Federal investments relating to water resources, including "operational plans for existing Federal water resources infrastructure." *See* Principles and Requirements, Final Interagency Implementation Guidelines at 4 (Dec. 2014) (Exhibit 16).

Response to ACF263 – Metro Atlanta Water Supply Providers

F. USACE's practice is to consider all return flows as basin inflow. Any changes to that methodology would require a national change. The Assistant Secretary of the Army for Civil Works is currently considering return flows as part of a national rule making.

G. USACE's practice is to consider all return flows as basin inflow. Any changes to that methodology would require a national change. The Assistant Secretary of the Army for Civil Works is currently considering return flows as part of a national rule making.

"maximize public benefits, with appropriate consideration of costs."[53] Return flows should be encouraged because they maximize public benefits at no cost. In the case of Lake Lanier, return flows will increase to the total yield of the federal project by 104.6 mgd at no additional cost to the Federal government.

The Principles and Requirements also expressly recognize the need to promote water reuse and reclamation. They acknowledge that it is "critical … to promote water efficiency with all Federal investments in water resources."[54] But "when efficiency alone will not suffice"—as the Draft EIS acknowledges to be the case here—the Principles and Requirements state that "reuse and reclamation of water should be promoted."[55]

G

The Principles and Requirements also mandate a "watershed approach" that considers the best means to achieve multiple goals over an entire watershed, including the goal of providing water supply to the people and businesses that need it.[56] In considering how to achieve this goal while minimizing environmental impacts and protecting the functions of ecosystems, a guiding principle should be to maximize the use of existing water infrastructure and to minimize the need for state and local entities to develop new raw water supplies or to construct new reservoirs within watersheds already dominated by federal impoundments. Consistent with this objective, users should be permitted to use federal facilities to store any return flows allocated to them by the State. This is the best result from a watershed perspective, because the alternative is to cause users to construct new, single-purpose reservoirs to capture the flows that just as easily could be stored in the existing impoundment.

The policy of incentivizing return flows, rather than discouraging them, also happens to be a "non-structural alternative" of the type the Principles and Requirements mandate be given full consideration. Non-structural alternatives include "modifications to public policy, regulatory policy, and pricing policy, as well as management practices."[57] Allowing return flows to be stored in existing Federal reservoirs is a perfect example.

2.2 The Army Should Support the State's Policy of Encouraging Return Flows.

The State of Georgia has determined that return flows to Lake Lanier are a critical component of its strategy to meet long-term water demands.[58] This emphasis on return flows and

H

[53] *See* Principles and Requirements at 5 ("Federal investments in water resources as a whole should strive to maximize public benefits, with appropriate consideration of costs.")

[54] Principles and Requirements at 10.

[55] Principles and Requirements at 11.

[56] Principles and Requirements at 5.

[57] Principles and Requirements at 11.

[58] *See* Metropolitan North Georgia Water Planning District Water Supply and Conservation Plan at ES-8 (2009) (Exhibit 17). The Water District is a state agency created by the Georgia General

Response to ACF263 – Metro Atlanta Water Supply Providers

H. USACE's practice is to consider all return flows as basin inflow. Any changes to that methodology would require a national change. The Assistant Secretary of the Army for Civil Works is currently considering return flows as part of a national rule making.

indirect potable reuse is incorporated into the Metro District's water supply and water conservation plans.[59]

The State's water supply strategy will fail if returns are not credited according to the State's directive. Incentives are necessary because tremendous investments are required to generate return flows. It is extremely expensive to pump water upstream and then to treat it to the levels necessary to discharge it into a reservoir used for drinking water, recreation, and other purposes. If users are not allowed to store the water generated by these projects, they will not pay for them and the returns to the system will not materialize.

Metro Atlanta water suppliers have already taken extraordinary measures to return water to Lake Lanier. Gwinnett County, for example, is a national leader in water reuse. It has constructed and operates the F. Wayne Hill Water Resources Center, a state-of-the-art water reclamation facility, that is presently permitted to return up to 40 mgd of highly treated reclaimed water to Lake Lanier—an amount that is projected to increase to 60 mgd by 2050. This innovative facility has become a demonstration site for cutting edge water reclamation technologies, hosting experts and researchers from around the world and bringing first-of-its-kind wastewater treatment technologies into reality.

H

Gwinnett County has invested more than $1 billion to construct the F. Wayne Hill Water Resources Center to return water to Lake Lanier. However, costs and investments are not limited to construction—operating a facility to return water to Lake Lanier also carries significant day-

---

Assembly. *See* O.C.G.A. § 12-5-572. The Metro District was created "to establish policy, create plans, and promote intergovernmental coordination for all water issues in the district; to facilitate multi-jurisdictional water related projects; and to enhance access to funding for water related projects among local governments in the district area." *Id.* § 12-5-572(b). The Metro District was thus charged with a specific mandate to "develop regional and watershed-specific plans for storm-water management, waste-water treatment, water supply, water conservation, and the general protection of water quality." *Id.* § 572(c); *see also id.* §§ 574, 582-584. The plans prepared by the Metro District, including in particular the Water Supply and Conservation Plans, have been accepted and approved by the Federal Energy Regulatory Commission as Comprehensive Plans entitled to deference in relicensing proceedings under Section 10(a)(2)(A) of the Federal Power Act, 16 U.S.C. § 803(a)(2)(A).

[59] The Metro District, which covers 15 counties centered on the metropolitan area, was created in 2001 to address substantial water quality and water supply issues facing the metropolitan area. The District counties are Bartow, Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Hall, Henry, Paulding, and Rockdale. *See* O.C.G.A. § 12-5-573(4). Among other responsibilities, the District is responsible for creating long-term (30-year) plans for stormwater management, wastewater treatment, water supply, water conservation, and the general protection of water quality. These plans are required to be implemented by local governments in the District. O.C.G.A. § 12-5-572 (b) and (c).

to-day costs, both in terms of increased treatment costs and increased pumping costs. In Gwinnett County's case, for instance, gravity would naturally cause wastewater to flow away from Lake Lanier. Yet Gwinnett County has elected to pay to reverse this flow of water—and to pump this water back uphill—simply so it can be returned to storage in Lake Lanier for reuse. Thus, Gwinnett County continues to invest in returning water to Lake Lanier on a daily basis, even when far cheaper and far easier options might be available.

These investments to return water to Lake Lanier have been made on the assumption that return flows would be credited to the users that make them. Indeed, the strategy of promoting return flows to a federal reservoir makes sense from a water supply perspective *only* if the additional water is credited to the water supply purpose. The Metro District made this clear in its very first water supply plan in 2003 by invoking the credit to explain the policy: "*The water withdrawal credit is 100 percent when the reclaimed water is discharged to a lake or reservoir, assuming that these water bodies are capable of storing the discharge*."[60]

H

Additional water can be returned to Lake Lanier *if, but only if*, the Army adopts policies that credit these returns. For example, water providers could in the future transfer additional flows from other water treatment facilities and pump those flows uphill to Lake Lanier so they could be returned to storage. Likewise, measures like active septic tank mining— that is intentional, directed, and expensive efforts to convert existing septic tanks to sewer service—could further increase return flows to Lake Lanier. Collectively, these and other measures could return up to an additional 75 mgd to Lake Lanier by 2050.

As the investments made to date clearly show, however, the costs of returning this additional water would be substantial. No rational water supplier would willingly absorb the costs of undertaking these efforts if the Army were able to override an allocation by the State and simply transfer the benefits of returning this water to other users.

2.3 The Water Supply Act Mandates that Return Flows Be Considered in Determining How Much Storage Users Must Buy to Supply a Given Yield.

The principle of the Water Supply Act of 1958 that water supply users are entitled to "share equitably in the benefits of multiple purpose construction."[61] The Corps has traditionally interpreted the "benefits of multipurpose construction" to mean "the savings in costs of a multiple-purpose project over the combined costs of single-purpose projects serving the same purposes."[62] It follows that water-supply users should not have to purchase more storage in a

I

[60] Metropolitan North Georgia Water Planning District, Water Supply and Water Conservation Plan at 6-20 (Sept. 2003) (Exhibit 18).

[61] 43 U.S.C. § 390b(b).

[62] *See* Letter from Major General William Cassidy, Asst. Chief of Eng's for Civil Works, to Major General Albrecht, Division Commander, South Atlantic Division at 2 (Dec. 29, 1959) (Exhibit 19).

Response to ACF263 – Metro Atlanta Water Supply Providers

I. USACE used its existing methodology to determine the gross amount of storage required. USACE's practice is to consider all return flows as basin inflow. Any change to that practice should occur at the national level and is currently under consideration by the Assistant Secretary of the Army for Civil Works.

multiple purpose project than they would need to supply the same yield in a single purpose project.

The effect of this penalty at Lake Lanier is significant: given the projected return of 99 mgd to Lake Lanier by just the three Metro District counties, only 174,136 acre-feet should be needed to yield 242 mgd, while 254,170 acre-feet would be needed if nothing were returned. The cost would be reduced by $19,336,288, or $1,119,467 per year. The effect of this penalty, then, is simply to create benefits for other users that they did not pay for, creating a windfall for everyone but water supply users that create the returns.

2.4 Return Flows Must Also Be Taken Into Account in Determining How Much Water Is Stored in Each Individual Storage Account.

In addition to taking return flows into account in determining how much storage a user must buy to supply a given firm yield, return flows must ***also*** be taken into account in determining how much storage a user can withdraw from storage at any given point in time. The Draft EIS states that a "storage accounting" system will be used to administer contracts and determine the amount of water that may be withdrawn.[63]

Again, the concept is simple: an account is established for each user, and the "balance" is kept by monitoring debits (evaporation and withdrawals) and credits (inflow). In accounting for return flows, the credits—the water added to the reservoir through return flows—should be credited the users to whom the State has allocated those flows.

J

In 2013, the Department of Natural Resources of the State of Georgia promulgated a rule to reaffirm the authority of the State to allocate the right to store and utilize return flows:

> When a user has contracted for the right to utilize storage space within a reservoir that is owned or operated by an agency of the federal government, the Director [of the Environmental Protection Division] shall retain authority to allocate any State water rights subject to regulation under O.C.G.A § 12-5-31, including the right to withdraw State waters from the project as well as the right to impound made inflow to the reservoir. When the Director allocates to a specific user made inflows to a reservoir, pursuant to the permitting authority and procedure provided by O.C.G.A. § 12-5-31, that user will have the right to impound such flows in the

[63] Draft EIS at 5-37 ("USACE would employ a storage accounting methodology that applies a proportion of inflows and losses, as well as direct withdrawals by specific users, to each account. The amount of water that may actually be withdrawn is ultimately dependent on the amount of water available in the storage account, which will naturally change over time.").

Response to ACF263 – Metro Atlanta Water Supply Providers

J. USACE used its existing methodology to determine the gross amount of storage required. USACE's practice is to consider all return flows as basin inflow. Any change to that practice should occur at the national level and is currently under consideration by the Assistant Secretary of the Army for Civil Works.

storage space for which it has contracted, to the extent storage space is available.[64]

The State has now exercised this authority by allocating return flows to Allatoona Lake to the Cobb County-Marietta Water Authority.[65] We anticipate a similar allocation will be made when storage contracts are executed for Lake Lanier. Any Army policy that refuses to recognize this allocation would exceed the Army's authority, render these investments wasted, and create a windfall for users that have done nothing to return water to Lake Lanier.

2.5 The Corps Should Not Intrude on the State's Authority to Allocate Water Rights, Including the Right to Store and Utilize Return Flows.

When the Army first denied a request by Cobb County-Marietta Water Authority to credit its return flows in 1989, the Chief of Engineers stated that the Army could not grant the requested credit because doing so would intrude on the State's authority to allocate water rights. We agree with that rationale, and our argument today is based on it. The difference between 1989 and today is that, today, the State of Georgia has asserted its authority to make the allocation, and the Army merely needs to recognize it. Additional historical background is provided below.

a. The Corps Has Previously Acknowledged that it Must Defer to the State to Allocate Return Flows.

K

On July 27, 1989, the Commander of the Mobile District wrote to the Commander of the South Atlantic Division for guidance on the accounting for "made inflows," which he defined as inflows to the Army's reservoirs originating with users of storage. He recommended that such inflows be allocated to the users that make them, reasoning as follows:

1. The Water Supply Act of 1958, as amended, authorized the Corps to enter into contracts with states and other local interests for water storage space.

2. The storage required to provide a certain amount of water for withdrawal is determined by the storage-yield relationship of the reservoir. The storage-yield relationship is determined in part by inflows to the reservoir.

[64] *See* GA. COMP. R. AND REGS. R. 391-3-6-.07(16)(a) (Exhibit 20). "Made inflow to a reservoir" is defined as follows: "water that flows into a reservoir (1) after having been released from a storage project upstream of the reservoir as part of a plan approved by the Director; or (2) after having been discharged from a wastewater reclamation plant as part of a plan approved by the Director to increase flows into the reservoir." *Id.* (2)(o).

[65] *See* Georgia EPD Permit No. 008-1491-05 (Modified November 7, 2014) (Exhibit 21).

Response to ACF263 – Metro Atlanta Water Supply Providers

K. USACE continues to recognize the state's right to allocate water rights. Storage in a USACE reservoir, however, requires application of federal law, regulations, policy, and practice. USACE's practice is to consider all return flows as basin inflow. Any change to that practice should occur at the national level and is currently under consideration by the Assistant Secretary of the Army for Civil Works.

> 3. Inflows may be of two types, those occurring naturally and those that are made. Made inflows are subject to change by those controlling the source. Inflows by users primarily originate at wastewater treatment plants, thus they are made. Made inflows normally are not used in determining the storage-yield relationship of a reservoir.
>
> 4. A user has a contractual right to utilize an undivided percent of the project for the storage and water and, in effect, becomes a co-owner of the project; thus, they have a reasonable right to expect their inflows to the reservoir to be used exclusively in determining the storage-yield relationship of the reservoir as it relates to them.
>
> 5. In determining the storage-yield relationship for a user providing flows into the reservoir, the net effect of those flows would be subject to the same criteria as naturally occurring flows such as evaporation and seepage. The user would be required to meter their inflows and provide the Corps with readings at predetermined intervals in the same manner as used under water withdrawal contracts.
>
> 6. From an administrative view, it would be in the interest of the Government to use inflows originating with a user exclusively in determining the storage-yield relationship of that user. If the inflow is used in determining the storage-yield relationship for the entire project, and the inflow diminishes at some time in the future, then the contracts of all users would have to be amended. If, however, the inflow is used exclusively in determining the storage-yield relationship for the user originating the inflow, then only that contract would have to be amended should the inflow diminish.[66]

K

The South Atlantic Division forwarded this memorandum to Headquarters with a recommendation that it be approved.[67] Headquarters disagreed. While recognizing that return flows do indeed increase yield, the Chief of the Policy and Planning Division stated: "The Corps' authority to control water is limited to its presence within the Federal project. The Corps has no authority to grant rights to water that has been withdrawn, used, and then released. The States

[66] *See* Memo from Mobile District Commander to South Atlantic Division Commander regarding Disposition of Inflows to Corps Reservoirs Originating with Users of Storage in Those Reservoirs (July 27, 1989) (Exhibit 22).

[67] *See* Memo from South Atlantic Division Commander to Headquarters regarding Disposition of Inflows to Corps Reservoirs Originating with Users of Storage in Those Reservoirs (Aug. 11, 1989) (Exhibit 23).

grant water rights and regulate water use…. Control over return flows would place the Corps in the position of indirectly conferring property rights which is beyond its authorities."[68]

The same logic applies today, the only difference being that the State of Georgia has now made the allocation, and we are merely asking the Army not to adopt a policy that would improperly (even if inadvertently) override it. The stated fear of interfering in the State's authority to "grant water rights and regulate water use" is thus implicated only if the Army ***refuses*** to recognize the State's allocation.

K

b. The Army Has a Long History of Deferring to States on Allocation Issues.

The policy of deferring to States on issues relating to the allocation of water rights reflects a long-standing Army policy. Indeed, the Army's policies uniformly acknowledge that the Army does not own the water stored in its reservoirs and that it defers to States to allocate and administer water rights. The Army's role, instead, is to provide a beneficial service by storing water and by regulating flows to facilitate the exercise of water rights granted by States.[69]

The Army has understood this since the earliest days of its involvement in water supply, as evidenced by a 1959 memorandum from Assistant Chief of Engineers for Civil Works discussing the Army's administration of the Water Supply Act of 1958. The memorandum emphasized that "the Corps provides only a beneficial storage service under [the Water Supply Act] and that

[68] *See* Memo from Planning and Policy Division Chief to Commander to South Atlantic Division Commander (Oct. 17, 1989) (Exhibit 24). Notwithstanding this direction, final action was never taken. Alabama filed suit (prematurely) before either document was finalized.

[69] *See, e.g.*, USACE, Digest of Policies and Authorities, EP 1165-2-1 at 18-7 (Jul. 1999) ("The parties desiring to use the waters impounded by a reservoir must acquire the necessary water rights under the provisions of state laws, and regulations, and resolve conflicts among users at the local or state level. The Corps provides flow regulation service or storage space within the reservoir to water users as authorized and is not involved in adequacy or timing of the acquisition of water rights.") (Exhibit 25); Earl H. Stockdale & Daniel Inkelas, *Accommodation of State and Local Water Supply Needs through the Operation of Multipurpose Federal Reservoir Projects by the U.S. Army Corps of Engineers*, ABA, 31st Annual Water Law Conference, at 5 (June 6, 2013) ("In exercising its authority under [the surplus water provisions of the Flood Control Act of 1944 and the Water Supply Act of 1958], the Corps does not allocate water rights, or sell water; rather, when acting pursuant to either statute, the Corps enables non-federal entities to benefit from the Corps' regulation and impoundment of navigable waters pursuant to the congressional power to regulate interstate commerce, in order to exercise water rights that such non-federal entities may hold under state, tribal, or other law.") (Exhibit 26).

matters pertaining to the use and distribution of the additional water made available from the storage have always been and should remain responsibilities of the State concerned."[70]

Another example is provided by the Army's "Water Supply Handbook," which explains that "[w]ater supply agreements under the 1958 Water Supply Act are for storage space only," and that a storage contract merely "conveys the right to store a resource (water) in a Corps reservoir project without guaranteeing that the resource will be available."[71] "This acquisition of water rights is a responsibility of water supply users."[72]

K

This description of the Army's role has also been endorsed by the United States Court of Appeals for the Tenth Circuit:

> The Corps of Engineers … has no water rights and no authority to allocate water among users as this is a state function, and it has no control over the water rights of others. Thus the Corps' contract with Tulsa must be very narrow in scope. It is for money and for storage space in the lake.[73]

In short, the Army has long understood that it owns and operates the physical project but lays no claim to the water itself, which is controlled and allocated by States. Consistent with this division of responsibility, the Army should defer to the State's allocation of made inflows to the users who receive them.

---

[70] *See* Letter from William Cassidy, Asst. Chief of Eng'rs for Civil Works, to Major General Albrecht, Division Commander, South Atlantic Division at 1 (Dec. 29, 1959).

[71] Institute for Water Resources, Water Supply Handbook: A Handbook on Water Supply Planning and Resource Management, at 2-5, 2-3 (Dec. 1998) (Revised IWR Report 96-PS-4) (Exhibit 27).

[72] *Id.* at 2-5.

[73] *League of Women Voters of Tulsa, Inc. v. U.S. Corps of Engineers*, 730 F.2d 579, 583 (10th Cir. 1984), overruled as to standard of review, *Village of Los Ranchos De Albuquerque v. Marsh*, 956 F.2d 970 (10th Cir. 1992). *See also* Memorandum from Earl Stockdale, Chief Counsel, for the Chief of Engineers Regarding Authority to Provide for Municipal and Industrial Water Supply from the Buford Dam/Lake Lanier Project, Georgia at 36 (June 25, 2012):

> Under the Water Supply Act, the Corps contracts for the use of storage, not for the sale of water or water rights, and because the Corps does not own or sell the water stored in its reservoirs, it cannot guarantee, and specifically disclaims, any set yield, or the availability of water at all, from the storage it grants rights to in a Water Supply Act agreement.

c. <u>The Army is Constitutionally Required to Defer to States to Allocate Water Rights.</u>

The Army's traditional practice deferring to States is not just good policy—it is mandated by law. As "sovereign entities," "States possess an 'absolute right to all their navigable waters and the soils under them for their own common use.'"[74] These rights are absolute, "subject only to the rights since surrendered by the constitution to the general government."[75]

It is clear the States have not surrendered their control over water to the federal government. The Supreme Court has held that State powers in areas such as water law that are traditionally occupied by the States are not preempted "'unless that was the clear and manifest purpose of Congress.'"[76] In this case, the only federal law in question is the legislation that authorized construction of Buford Dam, but that law merely authorized the Secretary of the Army to construct certain facilities to serve certain purposes. It says nothing about overriding the States' traditional authority to allocate water within their boundaries, much less that doing so was "the clear and manifest purpose of Congress."

K

Indeed, Congress has repeatedly expressed its intention to defer to the States in the management of the waters within their borders.[77] The Supreme Court has acknowledged that, "where Congress has expressly addressed the question of whether federal entities must abide by state water law, it has almost invariably deferred to the state law."[78] Given this general policy of deferring to States in the area of water resources, clear evidence of congressional intent to occupy this field is needed.

A statute merely authorizing construction of a dam does not rise to this level. This position is bolstered by the long history of divided federal-state authority at federal water projects and the clear Congressional understanding that the authorization of federal water projects does not override the States' traditional authority to allocate water. For example, the Reclamation Act of 1902, which established a program to construct federal reservoirs across the West, "expressly preserve[s] State's control over reclamation within their borders."[79] In passing the Act, Congress explained that the "reservoirs in which the water is stored belong to the [federal] Government,

---

[74] *Tarrant Regional Water Dist. v. Hermann*, 133 S. Ct. 2120, 2132 (2013) (quoting *Martin v. Waddell's Lessee*, 41 U.S. 367, 410 (1842)).

[75] *Martin v. Waddell's Lessee*, 41 U.S. 367 (1842).

[76] *Arizona v. United States*, 132 S. Ct. 2492, 2501, 567 U.S. __ (2012) (quoting *Rice v. Santa Fe Elevator Corp.*, 331 U. S. 218, 230 (1947)).

[77] *Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers*, 531 U.S. 159, 174 (2001); *California v. United States*, 438 U.S. 645, 667 & 669 (1978).

[78] *United States v. New Mexico*, 438 U.S. 696, 701 (1978).

[79] *California v. United States*, 438 U.S. at 662.

but the water belongs to the States and will be controlled by them."[80] Indeed, Congress explained that its express preservation of State authority was unnecessary because there could be "no doubt" of "the right of the States and Territories to regulate and control the management ... of the water."[81]

While these statements were made in the context of a different statute, they negate any presumption that Congressional authorization to construct a reservoir necessarily reveals Congressional intent to preempt State water rights. Because Congress clearly believed that federal reservoirs could be constructed ***without*** preempting State laws and authorities relating to water rights—and because this has always been the paradigm in the Western states—there is no basis for presuming that Congress intended to do so when it authorized construction of Lake Lanier.

K

In short, preemption will be found only if the water allocations made by the State "actually conflict" with federal law in the sense that it is "impossible to comply with both state and federal law" or where state law "stands as an obstacle to the accomplishment of the full purposes and objectives of Congress."[82] This requires a case-by-case analysis of the conditions "actually imposed" by the State.[83] Furthermore, in light of the States' traditional sovereign authority, preemption principles "require the United States, at a minimum, to attempt to reconcile its interests with [State] law before a court can override the state's position as conflicting with federal policy."[84]

In sum, for the State's allocation of the right to impound return flows to be preempted by federal law, there would need to be a direct conflict between the allocation and the purposes for which Lake Lanier was authorized. Given that return flows are flows that have already been removed from the project, and thus would not be available to any user absent the return, there is no possibility that any allocation by the State could actually frustrate any federal purpose.

2.6 There is No Practical Impediment to Crediting Return Flows

A policy of crediting return flows to the users to whom they have been allocated by the State would be easy to implement in practice, because State law requires that all such flows be metered and monitored and reported both to Georgia EPD and the Army. The Army has already

L

[80] 29 Cong. Rec. 1952 (1897) (cited in *California v. United States*, 438 U.S. at 662).

[81] *Id.*

[82] *See Silkwood v. Kerr-McGee Corp.*, 464 U.S. 238, 248 (1984).

[83] *California v. United States*, 438 U.S. at 679*; Rice v. Santa Fe Elevator Corp.*, 331 U.S. 218, 232 (1947) ("until it is known what the [State] will do, no conflict with the Federal Act can be shown").

[84] *United States v. State of Cal., State Water Resources Control Bd.*, 694 F.2d 1171, 1178 (9th Cir. 1982).

Response to ACF263 – Metro Atlanta Water Supply Providers

L. As stated in the draft and final EIS, USACE's practice is to consider all return flows as basin inflow. Any change to that practice should occur at the national level and is currently under consideration by the Assistant Secretary of the Army for Civil Works.

shown that this can be done by producing a draft storage accounting spreadsheet for use at Allatoona Lake with a simple switch that can be turned "on" or "off" to credit return flows, or not, depending on the policy that is applied. The Allatoona spreadsheet has many other problems that will need to be corrected before it is finalized, but it at least shows that there is no practical impediment to a policy of crediting returns.

3. The Storage Accounting Tool Must Be Released for Public Comment.

The Draft EIS states that the Army will use "storage accounting" to track the amount of water each user has in storage at any given time,[85] however, the Army has not released a draft of the storage accounting tool or provided any details. This needs to be done. It is important to get the accounting right because important property interests are at stake.

M

4. The Proposed Navigation Plan Is Not Feasible.

The Army has proposed to restore navigation as a purpose of the ACF reservoir system, but there are numerous problems with the proposed plan. Most fundamentally, as described below, it will not be possible to provide a reliable navigation channel through reservoir releases alone; any attempt to support navigation without routine dredging, channel maintenance, and gage calibration will be doomed to fail and will be wasteful in the extreme. But even if the proposed plan would accomplish the objective of providing a 7-foot navigation channel during the designated season, it would still not make sense. As shown below, the statement in the Draft EIS that this can be done "without an appreciable effect on other upstream water uses or project purposes" is false. The cost to system storage would be staggering, far exceeding even the most optimistic projection of benefits.

N

Because the costs of this plan exceed the potential benefits by so much, it is possible the navigation plan is desired—not for its navigation benefits—but because it will cause a great deal of water to be released for other purposes. Other stakeholders have suggested the Army provide navigation releases for just that reason. This would be inappropriate, however, as the Army is required to plainly state the reasons for its actions and to justify those actions on the basis it has stated.[86]

[85] Draft EIS at 5-37.

[86] *Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) ("[T]he agency must examine the relevant data and articulate a satisfactory explanation for its action including a rational connection between the facts found and the choice made.") (quotations and citations omitted); *Defs. of Wildlife v. U.S. Dep't of Navy*, 733 F.3d 1106, 1115 (11th Cir. 2013) (agency action is "arbitrary and capricious 'where the agency has ... offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency

Response to ACF263 – Metro Atlanta Water Supply Providers

M. The administrative record for the ACF EIS will include the storage accounting tool. The storage accounting process will be defined before USACE enters into any potential water storage contracts.

N. Navigation is an authorized project purpose for USACE ACF Basin projects for which releases are justified. An analysis of the 2009 Apalachicola River bathymetric survey indicates that flows of approximately 16,200 cfs would provide a 7-ft channel depth and flows of 20,600 cfs would provide a 9-ft depth. USACE's analysis of HEC-ResSim modeling results indicate that the 7-ft channel availability under the PAA improves from 20.5 percent to 42.5 percent compared to the NAA, which would have a beneficial effect on commercial navigation. The flow requirement is based on current channel conditions and assumes no additional maintenance. The occurrence of the selected navigation season coincides with the wet season and uses the greatest availability of flow in the system. Releases from USACE reservoirs can benefit multiple authorized purposes, which was an intentional design of the system.

4.1 New Gage Data Show That Navigation Cannot Be Supported If the Channel is Not Maintained.

The most fundamental problem with the navigation plan is that the State of Florida does not support dredging and has refused to grant the permits necessary to maintain the channel. As a result, the plan proposes to support navigation through reservoir releases alone. This will not work, and it should not be tried. Unless and until Florida agrees to allow channel maintenance—or the Army determines that it will dredge the channel over Florida's objection—the Army's plan to reintroduce navigation must be abandoned.

The plan assumes that a 7-foot channel will be available whenever the flow at the Blountstown gage is at least 16,200 cfs. A close look at the data from that gage reveals why the plan will not work. Figure 7 shows the cumulative flow at the Blountstown gage compared to other gages in the area.

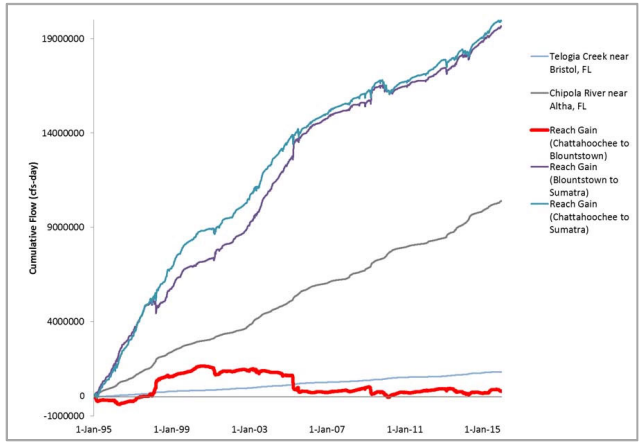


Figure 7. Cumulative Flow at the Blountstown Gage Compared to Comparable Area Gages

"Cumulative flow" is the sum total of all water flowing past a gage. So long as tributary inflow to a given stream reach exceeds withdrawals and other losses, this number should always increase over time. It should also be roughly linear, with the slope over a given period being equal to the average inflow over that same period. Other gages near Blountstown show the

expertise.'") (quoting *Miccosukee Tribe of Indians of Fla. v. United States*, 566 F.3d 1257, 1264 (11th Cir. 2009)).

O

Response to ACF263 – Metro Atlanta Water Supply Providers

O. The target flow to accommodate the 7-ft and 9-ft channels are based on 2009 bathymetry survey data and represents the best available data. The stage discharge relationship for the three U.S. Geological Survey gages on the Apalachicola River (Chattahoochee, Blountstown, and Sumatra) will vary through the year because of the alluvial nature of the river. Various shifts have been applied through the years because the stage discharge relationship has remained stable since 2009. This information does not support deteriorating channel conditions.

The modeling effort is based on using the historic local flow throughout the basin and includes changing conditions in the basin. Each alternative uses the same hydrology as input and provides a proper basis for comparisons due to changes in reservoir operation and water consumption. The hydrologic periods selected to compare the Chattahoochee-to-Sumatra flow reach change over time and might not be representative of the same hydrologic conditions. The 1977–1990 period had an abundance of high flow periods that are not equally reflected in the 2002–2015 period. Therefore, the change in reach gain could be more reflective of the hydrologic conditions than of a change in channel condition.

expected pattern, but the Blountstown gage (the red line) does not. Rather, cumulative flows at Blountstown oscillate between negative and positive values, hovering around zero since 2005. If believed, this would suggest there was no inflow to the Blountstown reach for several years on end, but this is almost certainly false.

The most plausible explanation for the erratic relationship between flows and gage height in the Blountstown reach is that water is bypassing the Blountstown gage outside of the gaged river channel. This might be caused by any number of conditions, including changes in river channel morphology, breaches in natural levies, and/or the silting in of bypass channels. But whatever the cause, it means that the Army cannot ensure that releases intended to provide a certain flow will be contained within the navigable channel, or that the channel depth the Army intends to provide will actually be present. This issue must be thoroughly investigated before any decision to support navigation is made.

O

These problems are not limited to the areas around the Blountstown gage. Rather, reach gains between the Chattahoochee and Sumatra gages—that is, the amount of water entering the Apalachicola River ***from Florida*** below the Chattahoochee gage—have been declining steadily over time.[87] This is consistent with shoaling observed in the channel, especially in the absence of channel maintenance, which gradually reduces the channel capacity and causes more and more flow to leave the channel.

This problem is particularly acute in the range of flows the Army intends to provide for navigation. For example, we have compared the period from 1977 to 1990 (when navigation and channel maintenance were occurring and the earliest period for which we have data) to the period from 2002 to 2015 (when channel maintenance was discontinued). As can be seen in Figure 8, the average reach gain between Chattahoochee and Sumatra was 9,300 cfs during the period from 1977 to 1990. During the current period, this had been reduced to less than 5,300 cfs—a decrease of about 4,400 cfs.

[87] HydroLogics Technical Analysis at 32 to 34.

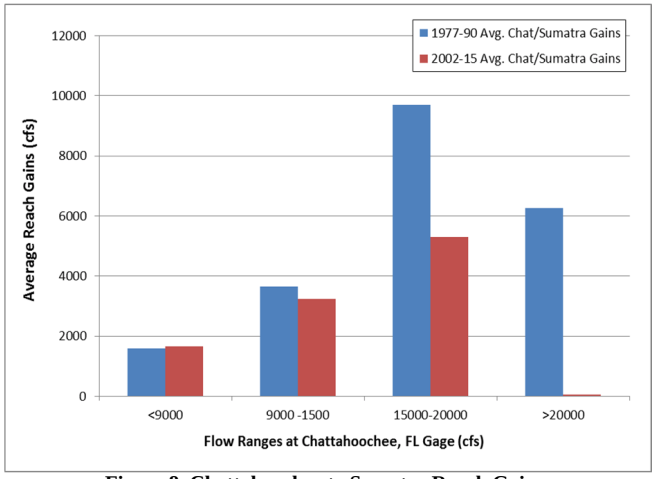


Figure 8. Chattahoochee to Sumatra Reach Gains: 1977-1990 vs. 2002-2015

O

All of the Army's navigation modeling assumes that historical flow patterns will be representative of future flow patterns. This is obviously a flawed assumption for these downstream reaches, where clear trends suggest that future inflows will be far lower than those experienced previously.

At a minimum, the gage data show that far more water may need to be released to support a 7-foot channel than the Draft EIS anticipates. At worst, the data show structural problems that must be fixed before navigation can be supported. Any attempt to support navigation through reservoir releases alone, without first addressing these problems, could result in the Army releasing huge volumes of water to maintain a channel that will never fill. The situation will get worse over time as the channel continues to deteriorate.

4.2 The Proposed Navigation Plan Will Inflict Serious Harm For Negligible Benefit.

Channel issues aside, the proposed navigation operations would cause severe impacts to upstream uses to achieve a negligible benefit.

a. The Proposed Navigation Plan Will Produce Negligible Benefits.

Based on the attached study by Industrial Economics, the maximum potential benefit of a reliable 9-foot channel would be about $10 million per year.[88] This is the ***maximum*** potential benefit of a navigation channel two feet deeper and far more reliable than is currently being proposed. There is no reason to believe the proposed plan will produce benefits anywhere near this large. But even the maximum potential benefit is far smaller than the impact to other project purposes.

The Draft EIS vastly overstates the degree to which the proposed plan will improve conditions for navigation. The Draft EIS states that the Army evaluated "[s]ystem performance of each water management alternative in providing for navigation" based on two criteria: (1) "Percent of time a 9-foot channel would be available (January-May) in the Apalachicola River based on exceeding a flow of 20,050 cfs at Blountstown," and (2) "Percent of time a 7-foot channel would be available (January-May) in the Apalachicola River based on exceeding a flow of 16,200 cfs at Blountstown."[89] The Army then calculated that its preferred alternative would provide a 7-foot and 9-foot channel on 42.5% and 2.7% of days, respectively,[90] and that it would more than double the availability of a 7-foot channel.[91] The Draft EIS also states the Proposed Action Alternative "would meet the 90-percent standard in 54 of 73 years compared 36 of 73 years for the [No Action Alternative], an improvement of 50 percent."[92]

As detailed in the attached memorandum by HydroLogics, Inc., it appears the numbers reported in the Draft EIS are wrong and substantially overstated.[93] The correct values, which have been tabulated directly from outputs from the Army's ResSim model, are presented in below in Table 4.

P

[88] Brent Boehlert and Robert Unsworth, Industrial Economics, Inc., Assessment of the Potential Benefits and Costs of Changes to River Flows to Improve Navigation Conditions in the ACF River Basin at 1 (Jan. 28, 2016) (Exhibit 28).

[89] Draft EIS at 4-67.

[90] Draft EIS at 5-23.

[91] Draft EIS at 6-196 to 6-197.

[92] Draft EIS at 6-85.

[93] HydroLogics Technical Analysis at 36-38.

Response to ACF263 – Metro Atlanta Water Supply Providers

P. The 7-ft channel availability presented in the EIS is based on HEC-ResSim modeling results using flows at the Blountstown node. The model includes a rule to provide a minimum flow of 16,200 cfs at Blountstown from the Jim Woodruff project when the navigation season is supported. Model operation for the downstream target is not always a perfect 16,200 cfs and could be 150 cfs lower. As a result, the channel availability was based on a flow value of 16,050 cfs at Blountstown, which is equivalent to a 0.08-ft difference in stage at the Blountstown gage. USACE stands by the channel availability.

Drought operations are intended to help the system recover during dry periods and are shown in the HEC-ResSim modeling to have an appreciable positive effect. This triggered operation allows continued support of the authorized project purpose during anticipated or actual drought conditions. The level of support for project purposes such as navigation and hydropower will be curtailed. Navigation is an authorized project purpose and requires use of storage to support it when local flow is insufficient. Since the NAA does not include an active release rule to support navigation, it is anticipated that the reservoir levels will be lower under the PAA, which includes an active release rule to support navigation during the January–May season.

According to model results, drought operations would have been triggered in May 2007 and suspended in May 2009. Therefore, navigation support would have been suspended on May 1, 2007. The difference in Lake Lanier pool elevation between the NAA (1,066.70 ft) and the PAA (1,065.00 ft) is 1.7 ft. The difference is attributed to a change in system operation and an increase in water supply demand. The increasing difference shown in Figure 1 that occurs during the remainder of the drought most likely results from increased water demands from Lake Lanier. Figure 1 shows the simulated pool elevation for the NAA (green) and the PAA (red).

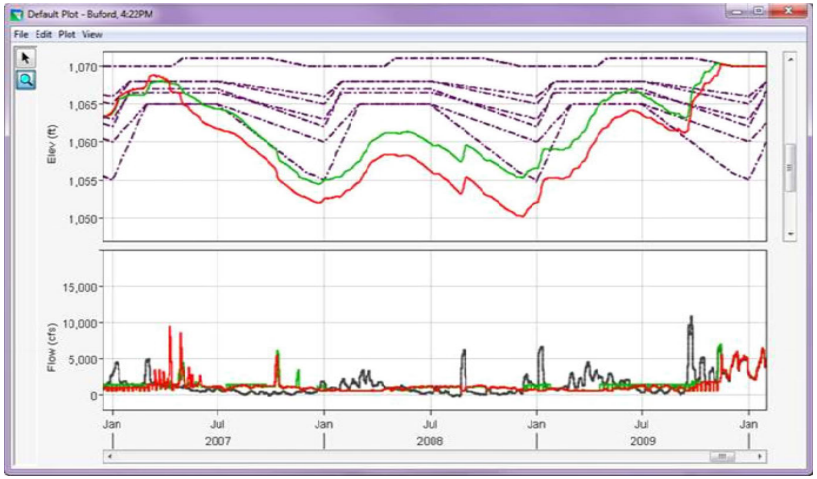


Table 4. Navigation Benefits Claimed in Draft EIS Compared to Actual Values from Army ResSim Model

	Percent Available	No Action Alternative		Proposed Action Alternative		Increase in Navigation Benefit	
		Draft EIS	Actual Value	Draft EIS	Actual Value	Draft EIS	Actual Increase
7-Foot Channel	100	15	15	31	16	107%	6.7%
	90	36	34	54	43	50%	26.5%

Given the limited economic benefit of even a 9-foot channel in the Apalachicola River, these very slight improvements achieved by the Proposed Action Alternative cannot possibly justify the impacts to Lake Lanier and West Point.

P

b. <u>The Proposed Navigation Plan Will Have Severe Impacts on Other Purposes.</u>

As shown below, the navigation plan in the Proposed Action Alternative will cause reservoirs to be significantly lower during droughts and nearly double the frequency of drought operations. The Army's own ResSim model confirms that navigation releases would be made during the most severe droughts in history, with predictable results. In 2007-2008, for example, as depicted in Figure 9 below, the ResSim model shows a 4.1-foot impact to Lake Lanier. West Point Lake would also be lowered by 1.7 feet. The impact under 2011 conditions would be even more pronounced system-wide, reducing Lake Lanier by 3.6 feet and West Point by 5.1 feet (Figure 10). The proposed navigation plan would almost double the number of times the drought operations are triggered—from 13 to 22—compared to operations when navigation support is removed.

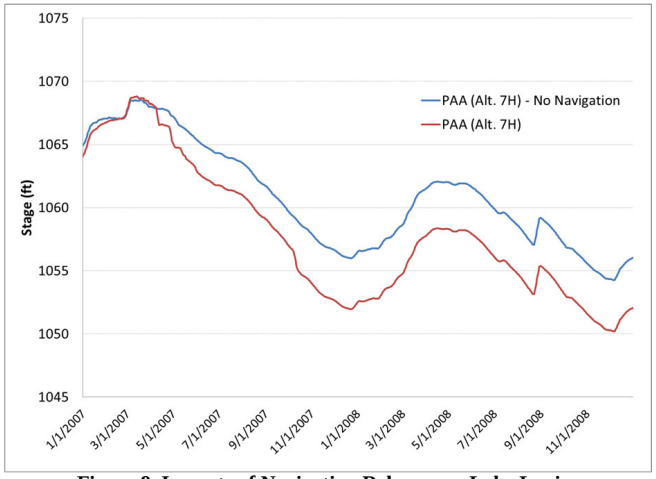


Figure 9. Impacts of Navigation Releases on Lake Lanier

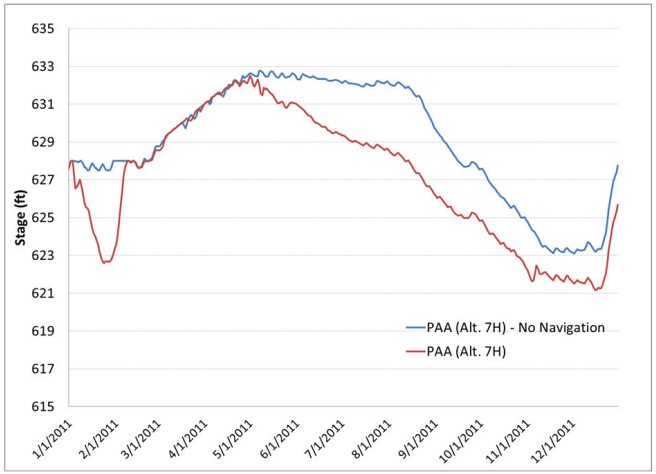


Figure 10. Impacts of Navigation Releases on West Point

c. Impacts Caused by Navigation Releases Are Far More Extreme Than Those Caused by Meeting Georgia's Projected 2050 Water Demand.

The analysis above shows that impacts attributable to the proposed navigation plan are far larger, and the benefits far smaller, than the impact of granting Georgia's entire water supply request. To show this, compare with "with and without" water supply scenarios with the "with and without" navigation scenarios. These show the impact of meeting Georgia's entire water supply demand to be trivial compared to the impact of the proposed navigation plan.

P

The Army's own ResSim model shows the lowest reservoir elevations in Lake Lanier are caused, not by the increased water supply withdrawals when Georgia's projected 2050 demand is met, but by navigation releases. If the navigation releases were discontinued during the 2007 drought, but Georgia's entire demand was met, Lake Lanier would remain 3.3 feet higher than the historical minimum of 1050.5 feet. The system would also enter Emergency Drought Operations less often without navigation, even under the 2050 demand scenario.

4.3 The Proposed Navigation Plan is Too Vague.

The Army may respond to our analysis by stating that it does not intend to operate in the manner shown by its own models. The manual does suggest the Army intends to retain discretion to curtail navigation releases and thus to mitigate the worst impacts shown above. If that is the Army's intent, however, the language of the Master Manual must be tightened to be absolutely clear.

Clear rules are needed to avoid disputes. Indeed, the State of Alabama in the past has cited discretionary provisions of the Alabama-Coosa-Tallapoosa Water Control Manual to insist that any releases that ***could*** be made ***had*** to be made.[94] It even sued when the Army invoked the discretion expressly retained in the manual to curtail releases to preserve storage during an extraordinary drought.[95] This controversy could have been avoided if the manual had been more clear. To avoid making this mistake again, the Army should tighten the navigation plan before adopting it to provide clear guidance about the circumstances in which navigation releases will be made.

Q

[94] *See, e.g.*, Letter from Governor Bob Riley, Alabama, to Secretary Pete Geren, Department of the Army (July 16, 2007) (Exhibit 29). In this letter, Alabama asserted that the releases from Allatoona Lake were less than the minimum release required by the operative manual. In reality, as Georgia Governor Perdue noted in response, the manual in effect at that time established a ***maximum*** release, not a minimum as Governor Riley claimed. It also expressly emphasized the need for flexibility to curtail releases during abnormal drought periods. *See* Letter from Governor Sonny Perdue, Georgia, to Secretary Pete Geren, Department of the Army (July 19, 2007) (Exhibit 30).

[95] *See, e.g.*, State of Alabama's Sixth Amended and Supplemented Complaint, Doc. 598, Civil Action 90-1331 ¶ 66 (N.D. Ala., filed Oct. 16, 2007) (Exhibit 31).

Response to ACF263 – Metro Atlanta Water Supply Providers

Q. The proposed navigation plan in the Master WCM provides the appropriate clarity at this time. If addition clarity is warranted after experience is gained administering the plan, USACE will submit an administrative update to the Master Manual for approval by the South Atlantic Division.

The HEC-ResSim model captures the intent of the Navigation Plan as presented in the WCM.

Clear rules are also needed to evaluate the proposed plan and to ensure discretionary decisions do not result in releases being made that cause tremendous damage to achieve trivial benefits. If the Army does not intend to make the releases under the conditions shown in the ResSim model, the model needs to be corrected to enable a reliable comparison of benefits and costs. Otherwise it will not be possible to determine the extent to which other purposes can be supported during those periods when the model currently *incorrectly* shows that reservoir storage will be depleted by navigation releases.

4.4 A More Specific Navigation Plan Should Be Developed with Stakeholder Input.

If the purpose of the proposed navigation plan is really to benefit navigation, a better plan can and should be developed. As described below, equivalent or superior navigation benefits can be achieved at a much lower cost to system storage by thinking more carefully about the specific features of a navigation plan that would make it most useful.

To be clear, we are not suggesting that this plan be adopted. There is no point in even discussing a plan until the channel is fixed, and we have keyed the alternative navigation plan to the Blountstown gage solely to allow comparisons with the Army's proposed plan. When and if the determination is made to maintain the channel and restore this purpose, however, we suggest this as a starting point that can be refined based on stakeholder feedback.

R

The key to the demonstration plan is to emphasize reliability and notice. A navigation channel is most useful if it is reliable. Therefore a better metric for evaluating navigation benefits would be the number of days that a 7-foot channel can be reasonably guaranteed with sufficient advance notice to ensure barge traffic can actually use it.

Like the preferred alternative, the demonstration plan would provide a 7-foot navigation channel from January 1 through May 31, but would improve on the Army's proposal by using standard forecasting tools (the Palmer Drought Index and antecedent flows) to determine when a two-week navigation season can be supported. The Army would then provide notice to navigation interests at least 30-days in advance of each such period, thus allowing barge companies to prepare and position assets to capitalize on the navigation release. For example, the Army would evaluate system conditions on December 1 to determine whether a two-week navigation window could be guaranteed commencing January 1. The Army would repeat this process every two weeks, committing to as many subsequent navigation windows as basin conditions allow. Further details about this demonstration plan are provided in the attached memorandum from HydroLogics, Inc.[96]

[96] *See* HydroLogics Technical Analysis at 42 to 50.

Response to ACF263 – Metro Atlanta Water Supply Providers

R. All comments, including those regarding navigation, were considered for the final EIS. The navigation plan in the final EIS reflects stakeholder input.

The periodic navigation concept discussed in section 4.1.2.6.2 of the draft EIS was considered as an operational measure. The measure was eliminated from detailed evaluation as explained in EIS section 4.1.2.4.1.

Compared to the Army's proposal, this alternative navigation plan would provide navigation benefits that "are essentially equivalent with regard to predictability and reliability."[97] A 7-foot channel would be available under the alternative plan approximately 80% of the time, compared to approximately 85% of the time under the Army's Proposal. But, unlike the Army's proposal, these windows would be ***guaranteed*** 30-days in advance, making them much more valuable. Barges are far more likely to utilize a channel if it is guaranteed 30-days in advance because this will give them time to put assets in place; and they will also be more inclined to use it if it is guaranteed to be available for at least two weeks, eliminating the risk that their assets will get stuck up river if conditions change, as might happen under the proposed plan.

These substantial benefits to navigation could be achieved at much ***less*** cost to system storage. Under the alternative navigation demonstration, Lake Lanier would be 4.1 feet higher than the Army's proposal under 2008 drought conditions[98], and 3.6 feet higher than the Army's proposal under 2011 drought conditions.[99] West Point and Walter F. George would be significantly higher as well.[100] And the system would go into drought operations substantially less often than under the Army's proposal—22 times under the Army's proposal compared to 13 times under the alternative navigation plan.[101] In short, the entire system would benefit.

5. The Army Should Use Its Authority to Develop Rules Based on Realistic Water Supply Assumptions.

As discussed above, the Army has failed either to evaluate or to justify its proposal to decline to meet demonstrated water supply needs from Lake Lanier. And the Army has proposed a navigation rule that would impose exorbitant demands on system storage while providing little if any real benefit. Given this, it is clear the Army must revisit the operating rules it has proposed. When it does, the Army should consider the following.

S

5.1 The Army Must Consider the Relative Benefits of Water Supply.

The Army's method for selecting its Proposed Action Alternative fails to account for the relative economic, social, and environmental benefits of providing the full amount of water supply from Lake Lanier compared to other objectives. When these comparisons are made — as

T

[97] Memorandum from Jena Gilman, COWI Marine North America, ACF Water Control Manual (Jan. 25, 2016) (Exhibit 32).

[98] HydroLogics Technical Analysis, Figure 32.

[99] HydroLogics Technical Analysis, Figure 33.

[100] HydroLogics Technical Analysis, Figure 34 and Figure 35, respectively.

[101] HydroLogics Technical Analysis at 45-50. Note that this difference in the frequency of drought operations is identical to scenarios when navigation is not supported, because the alternative navigation demonstration avoids navigation releases during the critical droughts.

Response to ACF263 – Metro Atlanta Water Supply Providers

S. The PAA in the final EIS contains the USACE recommendation on reallocation of water supply storage. That recommendation was based on the review of all of the impacts from the alternatives in the final EIS. USACE made the recommendation and drafted the EIS so that the Assistant Secretary of the Army for Civil Works could make an informed decision on how to exercise their discretionary authority. Furthermore, navigation is an authorized purpose and must be considered in proposed operation plans.

T. USACE followed the applicable federal regulations and guidance when considering and evaluating water supply reallocations from a multipurpose reservoir.

they must be — no rational plan could decline to meet demonstrated water supply needs from Lake Lanier.

For example, the Army sites hydropower and recreation impacts as a reason for rejecting Alternative 7F, which would have provided 297 mgd for water supply from Lake Lanier. The impacts of Alternative 7F (which would provide 297 mgd from Lake Lanier) compared to the Proposed Action Alternative (which would provide only 185 mgd) are estimated at $3 million for hydropower and $1.2 million for recreation. This equates to $4.25 million total, with over 95% of the recreation impact at Lake Lanier.

The water supply benefits dwarf this amount. According to the Draft EIS, the avoided costs of constructing the 112 mgd of storage that would have been required to provide the 297 mgd Alternative 7F would have provided exceed $960 million, or about 226 times the stated annual hydropower and recreation impacts. The Army never compares these relative benefits, however, because it never weighs the benefits of providing water supply against the impacts to hydropower and other objectives.

5.2 The Army Should Develop Operating Plans Based on Realistic Water Supply Assumptions.

In selecting its water management alternative, the Army conducted all modeling and analysis assuming that only 20 mgd of water would be withdrawn from Lake Lanier for water supply.[102] It did so based on the assertion that only 20 mgd of withdrawal is currently authorized. As the Draft EIS acknowledges elsewhere, however, this in no way reflects the reality of water supply withdrawals today. In other words, the Army has based its decision to select one water management alternative over another on modeling that is wholly divorced from reality. U

The Army should correct this error and account for future water supply as it finalizes its operating rules for the ACF Basin. Simply put, it makes no sense to develop an operating rule assuming only 20 mgd of withdrawal when the future water supply need is 242 mgd. Any changes to water supply levels can and should be evaluated in selecting the level of water supply storage the Army intends to provide (including an evaluation of the economic, social, and environmental impacts of any reduction in water supply withdrawals from current levels).

5.3 The Proposed Operating Rule Is Highly Sensitive to Small Changes in System Condition.

The operating rules the Army has proposed in Alternative 7 are "brittle" in the sense that small changes in basin conditions can produce major changes in system storage. The navigation switch is just one example. In many cases the end result is counter-intuitive, as rules designed to save water may have the opposite effect. For example, a rule that saves water might push system V

[102] Draft EIS at 4-41 (describing the "current water supply operations" as including "20 mgd water withdrawals from Lake Lanier relocation contracts (50 percent return rate)" and "[r]eleases from Buford Dam to support current withdrawals (277 mgd) (82 percent return rate)").

Response to ACF263 – Metro Atlanta Water Supply Providers

U. USACE held water supply constant at 20 mgd to support selection of a water management alternative that was not influenced by water supply withdrawals not currently under water supply agreements. Holding the water supply constant had no impact on the effects changes would have on operational schemes. That method also isolated the impacts to the system that are a direct result of increasing water storage at Lake Lanier. After water supply alternatives were formulated, the water management operating plans were reexamined to determine if improvements were required.

V. Rules used in the reservoir simulation model are rigid. The day-to-day operation of the system by qualified basin managers provides some flexibility when thresholds are crossed by small amounts. For example, the basin manager would not initiate the navigation season if the reservoir levels are hovering in the boundary between Zone 2 and Zone 3. Engineering judgment will be used to operate the system in an efficient manner.

storage over the threshold that triggers a navigation season, resulting in much more storage being lost to navigation releases than is saved overall. Small changes in the assumptions used to run the model can have similar effects.

Given this, the Army must carefully examine instances where large differences between modeled alternatives occur to understand ***why*** the effects of the alternatives are different. In many instances, these differences may be due to identifiable instances where thresholds in the Army's proposed rule have been crossed by a ***very small*** amount, and not material differences in the health of the system. Where that occurs, the differences in projected effects suggest that the Army should refine its rule rather than using the results to make substantive decisions.

6. Errors in the Water Quality Analysis and Storage Computations Must be Corrected.

6.1 The Water Quality Model Uses Incorrect Assumptions that Overstate Potential Impacts.

The Draft EIS erroneously states that some water supply scenarios (including the Proposed Action Alternative) would cause "significantly adverse" water quality impacts to the Chattahoochee River in the reach above West Point Lake. This erroneous conclusion is based in part on a misunderstanding of the applicable state water quality standard and in part on flaws in the model input that significantly overstate future pollutant loadings. Because the water quality impacts were not decisive in selecting the preferred alternative, it might not be necessary to correct these modeling errors for that purpose, but the Final EIS should disclose that the projected impacts are over-stated.

W

The model overstates water quality impacts because it used ***historical*** pollutant loadings to project ***future*** water quality impacts. Projected future loadings should have been used. This is not just a theoretical point: based on an initiative by Georgia EPD to address assimilative capacity issues in this reach, existing pollutant loadings are already much less than those used to calibrate the model. Most dischargers in this area are already subject to a new, more stringent regime called the "Metro Chattahoochee Limits," which are set forth in Table 5 below. It is Georgia EPD's policy to include these effluent limits in NPDES permits for any new or expanded discharge within the metro area.

Response to ACF263 – Metro Atlanta Water Supply Providers

W. USACE used the best available data provided to us. The assumptions used to define return loads from point sources are described in section 2.3.2 of appendix K of the EIS (HEC-5Q Water Quality Modeling Report). That analysis focused on evaluating the water quality impacts resulting from alternative operating plans by comparing each alternative to the NAA and used the same data sets and assumptions for all alternatives. Using projected instead of historical pollutant loadings would introduce uncertainty into the water quality impacts analysis, making it impossible to assess whether any computed differences in water quality resulted from a change in operations or a change in loadings.

Table 5. Metro Chattahoochee Effluent Limits

Parameter	Location of Discharge	
	Mainstem	Tributary
Total Phosphorus	0.3 mg/l	0.18 mg/l
CBOD5	2.9 mg/l	2.9 mg/l
Ammonia	0.5 mg/l	0.5 mg/l
Organic Nitrogen[103]	1.5 mg/l	1.5 mg/l
Dissolved Oxygen (DO)	7.0 mg/l	7.0 mg/l

Furthermore, actual loadings are always much less than the permitted maximums—wastewater plants rarely operate at the maximum permitted effluent limit because the consequences of exceeding a limit are extremely severe. Although beyond the scope of this letter, it appears that the data used to calibrate the model in the Draft EIS could be used to establish a relationship between actual discharges and the maximum permitted limits.

W

Relatedly, many of the permits issued to metro-area dischargers include seasonal limits that were not used in the current model. These seasonal variations do make a difference, and therefore need to be included in the model.

Finally, even if the over-stated results could be taken at face value, the waterbody would still support its designated use under all scenarios. The statement to the contrary in the Draft EIS is based on a misinterpretation of the Georgia water quality standard for total phosphorus. The standard for "total phosphorus" entering West Point Lake is 1.4 million pounds per year, but a five-year rolling average is used to determine if the designated use is supported.[104] Even with substantially overstated loadings, the model predicts the 1.4 million pound threshold would be exceeded by a few thousand pounds in one year. The five-year average would always be substantially less than 1.4 million pounds.

[103] Though not in NPDES Permits, it was determined that highly treated wastewater can expect an organic nitrogen concentration less than 1.5 mg/l in the discharge.

[104] *See* Georgia's 2014 305(b)/303(d) Listing Assessment Methodology, page 10, *available at* https://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/303d_Listing_Methodology_Y2014.pdf.

6.2 The Draft EIS Uses Outdated Area-Capacity Curves for Lake Lanier.

Throughout the Draft EIS and Water Control Manual, the Army reports storage volumes for Lake Lanier that are based on area-capacity curves created in 1959.[105] These same area-capacity curves and storage volumes are also used in all of the Army's ResSim modeling.[106]

Yet, as discussed above, the Draft EIS also explains that the Army conducted a sedimentation survey of Lake Lanier in 2011, which showed a minor reduction in storage at Lake Lanier.[107] Based on the results of that survey, the revised conservation storage at Lake Lanier is 1,074,600 acre-feet at elevation 1071, while total useable storage is now estimated at 1,673,400 acre-feet.[108] The Army used these revised estimates in calculating the critical yield of Lake Lanier.[109]

While the difference in storage volumes is small and unlikely to materially affect the results, it is not appropriate to use different volumes of storage in Lake Lanier for different purposes. Rather, the Army's storage calculations for its reallocation study and its analysis of impacts from changed operations and water supply alternatives should be corrected to use a single storage volume for Lake Lanier. This should reflect the best available information about the usable storage in the project, so that the Army's modeling can most closely mirror operations as they will occur in reality.

[105] *E.g.*, Draft EIS at 2-28 ("Lake Lanier has a storage capacity (at the top of the conservation pool elevation 1,071 ft) of 1,955,200 ac-ft. Of that, 1,087,600 ac-ft is conservation storage and 867,600 ac-ft is inactive storage (Figure 2.1-21)."); Draft EIS, Vol. 2 Appx. B at 6 (same); Draft EIS, Vol. 2 Appx B (Buford Water Control Plan) at Plate 2-5 (explaining that the area-capacity curves and storage volumes in water control manual are taken from "the December 1959 Buford water control").

[106] *E.g.*, Draft EIS, Vol. 3 Appx. E (HEC ResSim Modeling Report) at 6 ("Lake Lanier (Buford) is a large federal reservoir with 1,087,600 AF of active storage, or about 65% of the total active storage in the ACF basin.").

[107] Draft EIS, Vol. 3 Appx. F at 9 & Figure E-1 (showing a 0.32% reduction in conservation storage and a 0.11% reduction in flood storage, stating: "Existing area capacity curves as shown in the current water control manuals were used for all reservoirs but Lake Sidney Lanier. In 2011, a Sedimentation and Erosion Analysis for Lake Sidney Lanier was completed and new area capacity curves were recommended. This new curve was used in the critical yield analysis model.").

[108] Draft EIS, Vol. 3 Appx. F at B-13. At elevation 1070, the revised conservation storage of Lake Lanier is 1,036,500 acre-feet. *Id.*

[109] Draft EIS, Vol. 3 Appx. F at 9.

Response to ACF263 – Metro Atlanta Water Supply Providers

X

X. The updated Buford area-capacity table is included in the final EIS. USACE reran the previous models using the updated data.

6.3 The Army Should Release Its Analyses of Modeling Outputs.

The Draft EIS includes numerous performance measures used by the Army to evaluate various alternatives in the Draft EIS, including metrics such as recreation impacts, hydropower generation, and the availability of a navigable channel in the Apalachicola River measured at the Blountstown gage. Each of these metrics is calculated by "post-processing" the ResSim model outputs—that is, by taking the simulated flows and analyzing them separately to calculate the desired performance metrics.

We have tried to replicate the Army's calculation of the various performance metrics using the output from the ResSim model the Army provided. For many performance metrics, however, we have been unable to replicate the Army's results reported in the Draft EIS. Indeed, as is discussed elsewhere, the performance measures calculated by our experts using the Army's own model output differ dramatically from the results the Army reports.[110]

Unfortunately, the Army has not released the post-processing spreadsheets it used to calculate the various performance measures it reported in the Draft EIS. As a result, we cannot determine why the Army's reported results diverge from our own, when the measures should be identical and relatively simple to replicate.

Given these significant differences we have observed and the very real possibility that the Army's methods are flawed, the Army should make its post-processing analyses immediately available and provide an opportunity for stakeholders to comment on the Army's methods and results. The performance metrics used by the Army lie at the heart of its environmental impacts analysis and its evaluation of alternatives. It is critical that the Army's results be fully vetted and confirmed through an open and transparent process.

7. Reasonable Alternatives Should Be Considered Before the Draft Is Finalized.

Notwithstanding its legal duty to consider all reasonable alternatives to the proposed action, the Army has excluded certain alternatives for reasons that do not bear scrutiny. These alternatives should be considered and incorporated into the final version of the plan.

7.1 The Army Has Underestimated Its Authority to Consider Alternatives.

History—and the United States Court of Appeals for Eleventh Circuit—teach that the Army has more authority than it is wont to claim when confronted with difficult decisions. The scope of the Corps' authority must be accurately determined, and all reasonable alternatives within the Corps' authority must be considered. Otherwise, the Army cannot possibly meet the stated "purpose and need," which is to "determine how federal projects in the ACF Basin should

[110] *See, e.g., infra* Section 4.1; HydroLogics Technical Analysis at 25.

Response to ACF263 – Metro Atlanta Water Supply Providers

Y

Y. An analysis of the modeling outputs is provided in appendix E of the final EIS. Additional modeling data and information is available on the USACE Web site.

Z

Z. The suggested alternatives were considered to be outside the scope of the Master WCM update process. Any measure or alternative that would seriously adversely affect authorized project purposes were not considered. The purpose of this effort is to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws, and to implement those operations through updated water control plans and manuals.

be operated for their authorized purposes, in light of current conditions and applicable law, and to implement those operations through updated water control plans and manuals."[111]

In view of the applicable law, the alternatives rejected in the Draft EIS like raising the conservation pool at Lake Lanier are actually well within the Army's existing authority. Numerous examples exist in which modifications of a similar scale have been approved by courts when challenged. In a case that is binding precedent in the Eleventh Circuit, for example, *United States v. 2,606.84 Acres of Land in Tarrant County, Texas*, the Fifth Circuit reversed a trial court for holding the Army lacked authority to modify a water project.[112] The controversy arose from an eminent domain proceeding in which the trial court held a taking to be invalid because "the dam as built differed significantly" from the project documents approved by Congress.[113] The Fifth Circuit reversed, explaining that "[t]he source of the trial court's misconception is found in the finality and binding effect which it gave [the project documents]."[114] The court noted the project documents "were never intended to be the final plans for the…project."[115] The Fifth Circuit further noted that the report of the Chief of Engineers, which Congress approved, recommended the project be constructed "generally in accordance" with the plans contained in the report, "as modified herein, and with such future modifications thereof as in the discretion of the Secretary of War and the Chief of Engineers may be advisable."[116] The project documents for Buford Dam contain precisely the same language.[117] Therefore the Army possesses similar discretion to modify project operations at Lake Lanier to achieve its water supply purpose.

A subsequent decision of the Fifth Circuit interpreted *United States v. 2,606.84 Acres of Land* to mean the Army can modify a project approved by Congress "unless this action is so foreign to the original purpose as to be arbitrary and capricious."[118] As the Fifth Circuit stated, "[i]t imparts both stupidity and impracticality to Congress to conclude that the statute impliedly forbids any change in a project once approved, and thus prevents the agency official . . . from accommodating newly discovered facts, or from adjusting for changes in physical or legal

---

[111] Draft EIS at ES-4.

[112] 432 F.2d 1286 (5th Cir. 1970).

[113] *Id.* at 1292.

[114] *Id.*

[115] *Id.*

[116] *Id.*

[117] *See* Letter from Lt. Gen. Wheeler, Chief of Engineers, to the Secretary of War (May 13, 1946), *reprinted in* in H.R. Doc. No. 80-300 (1947) ("House Doc. 300") at 7.

[118] *See Creppel v. U.S. Army Corps of Engineers*, 670 F.2d 564, 572 (5th Cir. 1982).

conditions."[119] The only caveat noted by the Fifth Circuit in *Creppel* is that any change must "serve the original purpose of the project."[120]

In short, the alternatives discussed below should be considered and accepted or rejected on their merits—not because of any claimed lack of authority.

7.2 Top of Conservation Storage at Lake Lanier Should Be Raised.

Stakeholders throughout the basin have urged the Army to revise the rule curve at Lake Lanier, increasing the top of conservation storage by 2 feet. This would provide additional storage that could be used to benefit multiple purposes, including recreation, hydropower, water supply, and even downstream flow augmentation during drought.[121] The Army refused to even consider this alternative, however, asserting that it lacked authority to do so. AA

As explained elsewhere, the Army has underestimated its authority to modify project operations to meet changing needs within the basin. And the Army has failed to consider operational revisions that it could make to limit flood control impacts from increasing conservation storage at its reservoirs. This option, like the revisions to the West Point rule curve, can and should be evaluated and implemented in the final manual.

7.3 The Winter Drawdown at West Point Lake Should Be Reduced.

The Army refused to consider reducing the winter drawdown at West Point on grounds that the alternative "is not consistent with the screening criteria that any alternative considered by USACE should not increase flood risk above the current level," stating: "It is not the purpose of this EIS to investigate the feasibility of eliminating or reducing the level of flood protection afforded downstream communities by West Point Lake."[122] AB

The premise of the Army's decision to exclude this alternative is doubly flawed. As to the first point, work performed for the State of Georgia demonstrates that project operations can be adjusted so the winter drawdown can be reduced without increasing flood risk above current levels. As to the second, the very purpose of updating the water control plans and manual is "to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable law."[123] Determining how to operate West Point—and how to maximize the conservation storage available while providing flood protection

[119] *Id.* at 572-73.

[120] *Id.* at 573.

[121] HydroLogics Technical Analysis at 51.

[122] Draft EIS at 4-7.

[123] Draft EIS at 1-3.

Response to ACF263 – Metro Atlanta Water Supply Providers

AA. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management. Accordingly, raising the conservation pool at Lake Lanier by 2 ft would not meet this criterion and was not carried forward.

AB. Flood risk management at West Point Lake is an authorized purpose. Raising the winter pool at West Point Lake would reduce the seasonal flood storage and increase the risk of flooding downstream. This suggestion is not consistent with the screening criteria (see draft EIS section 1.4.4) that any alternative considered by USACE should not increase flood risk above the current level.

below the project—is entirely consistent with this objective. As such, there is no basis to exclude this alternative from consideration.

a. The Winter Draw-Down Can be Reduced Without Increasing Flood Risk Above Current Levels.

Work performed for Georgia EPD has shown that existing flood storage in West Point can be operated more effectively, allowing the Army to provide equivalent flood protection with less available flood storage.[124] This is achieved by incorporating readily available forecasts to adjust releases from the reservoir in advance of flood events. This allows the Army to anticipate inflows to the project and to release water accordingly, thereby preserving available flood storage to store flood waters when they enter the project.

Figure 11 below shows the modeled flood peaks at West Point compared to actual reservoir levels during the 2009 flood event. As can be seen, the projected flood peak is reduced in the "IFR" (or "inflow following rule") run compared to both the Army's historical operations and its modeled operations under the Revised Interim Operating Plan. This demonstrates that the flood protection provided by a given volume of flood storage can be improved with better operating rules. It follows that the winter drawdown could be reduced—thus, reducing the quantity of flood storage available—without necessarily increasing flood risks, as the Army assumed in refusing to consider this alternative.

AB

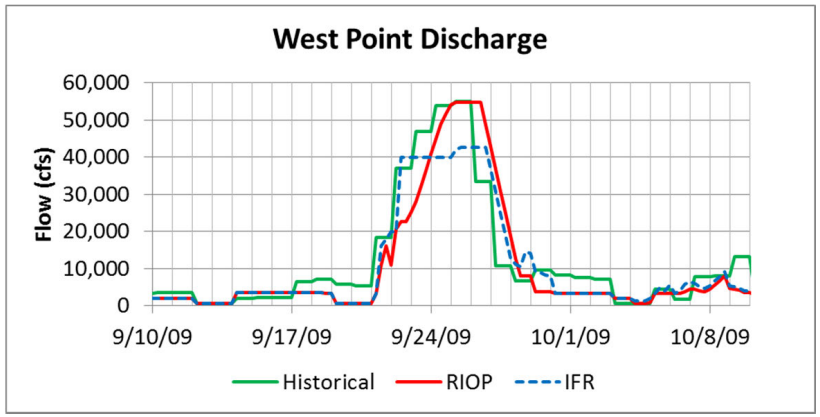


Figure 11. Potential Reductions in Flood Peak at West Point from Operational Changes

[124] *See* HydroLogics Technical Analysis at 51 to 52.

Response to ACF263 – Metro Atlanta Water Supply Providers

b. Reducing the Winter Draw-Down Would Increase Conservation Storage and Improve Basin Conditions with Appropriate Operating Rules.

Decreasing the West Point winter drawdown from 628 ft to 632.1 ft would provide an additional 91,000 af of conservation storage in the project. This additional storage could be used to provide benefits for the entire system, including higher lake levels, increased recreation opportunities, more hydropower generation—especially during low-flow periods—and more storage available for flow augmentation during drought.

AB

Now is the time to consider this change. While the potential benefits are substantial, the Army's operational rules must be developed from the outset to take this storage into account. Otherwise, the potential benefits of this additional storage will either be wasted or inequitably distributed. In the case of the Proposed Action Alternative, for example, adding the extra conservation storage to the Proposed Action Alternative as currently written would simply result in the saved water being released to augment flows for only about two weeks in March 2007, for the benefit of navigation.

Further, operations must be tuned to account for this storage to prevent counterintuitive and adverse impacts. These can occur when preconceived rules formulated and tested with one set of assumptions (e.g., the amount of usable conservation storage) are implemented under different conditions. Especially when the Army revisits certain operational decision-points only once per month, thresholds can be crossed (or not crossed, as is the case with drought operations) at critical periods, causing a suite of operational decisions to be made and potential adverse impacts to result.

8. Many Parts of the Manual Are Very Good.

AC. Comment noted.

Although the Water Supply Providers disagree with many aspects of the Army's proposal, as explained above, there are also many positives in proposed plan and the Army's technical analysis.

8.1 The Proposed Operations Correctly Recognize the Army Cannot Drought-Proof the ACF Basin Using Lake Lanier Storage.

AC

The Water Supply Providers support the Army's decision to continue aspects of the current operations, such as expanded opportunities for reservoir refill and storage and more conservative drought operations, that are intended to avoid the catastrophic effects experienced under earlier versions of the Army's operating rules. We all recall the devastating effects of the Army's original Interim Operations Plan, watching as the Army drained Lake Lanier in a futile attempt to drought-proof the entire basin.[125] This not only placed metropolitan Atlanta's principal source of

[125] Atlanta Regional Commission, Request for Immediate Alterations to Interim Operations Plan Releases (Oct. 25, 2007); Atlanta Regional Commission, Modifications to the Interim Operations

Response to ACF263 – Metro Atlanta Water Supply Providers

water supply in jeopardy, and resulted in tremendous economic harm to North Georgia, but also wasted critical reservoir storage that could have been used to support all of the various project purposes through an extended, multi-year drought.

This is not to say that system operations could not be improved. They could. The changes to West Point and Lake Lanier rule curves, flood control operations at West Point, and the alternative navigation operations proposed above are examples of improvements that could be made. We also believe further improvements could be made if the Army were willing to evaluate more flexible, forecast-based operations. Nevertheless, the drought operations included in the Proposed Action Alternative protect the system from the worst effects of extraordinary drought conditions, while meeting critical water supply needs and providing flows downstream that are both reasonable and, in many cases, more than nature would have otherwise provided.

8.2 The Army Appropriately Considered Drainage Area and Refill Capacity to Revise the Action Zones.

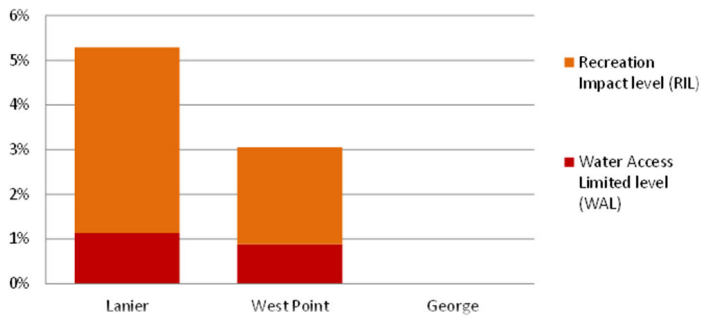
We support the Army's proposal to redefine the reservoir action zones based on each reservoir's drainage area. The Water Supply Providers have long explained that the current action zones disproportionately impact Lake Lanier and fail to recognize its unique character as a large headwaters reservoir with just 5.6% of the ACF Basin's drainage area. This is clear from Figure 12 below which shows recreation impacts under the current action zones (RIOP, 2011 demands).[126] As can be seen, the current action zones subject Lake Lanier to Level 2 or 3 recreation impact (below Recreation Impact Level, RIL) substantially more than either West Point or Walter F. George.

AD

AD. Comment noted.

and Exceptional Drought Operations Plans (April 14, 2008); Atlanta Regional Commission, Proposed Modifications to Interim Operations Plan for ACF Reservoirs (May 29, 2008).

[126] *See* HydroLogics Technical Analysis at 52 to 54.



AD

Figure 12. Disproportionate Recreation Impacts Under Current Action Zones

Further, the Army's current action zones failed to acknowledge real differences between the federal reservoirs, namely Lake Lanier's comparatively limited refill capacity relative to the lower reservoirs due to its large storage volume and small drainage area. This is clear from the 2007 drought, when the lower projects recovered almost immediately due to a rain event and their large drainage areas while Lake Lanier languished at low levels and entered the second year of the drought at very low levels.

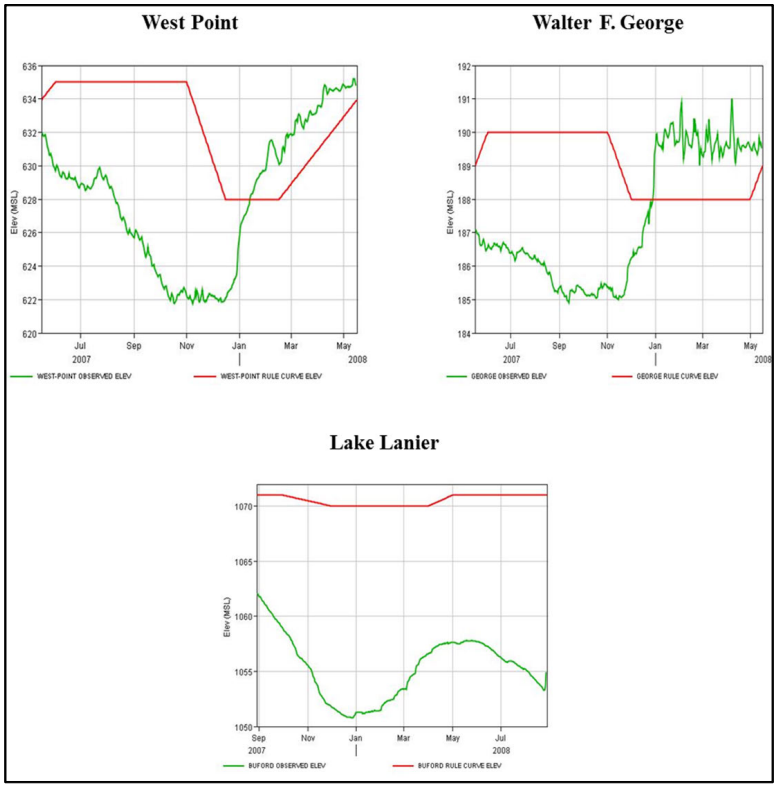


Figure 13. Refill Response of Federal Reservoirs During 2007 Drought

Lower lake levels in Lanier are not just a problem for Lanier-based interests. Because West Point and Walter F. George refill every year, the volume of storage in Lake Lanier alone determines the storage available for the second and subsequent years of a drought. The revisions to the action zones included in the Proposed Action Alternative more equitably distribute lake level impacts between the projects and preserve composite storage during multi-year drought to the benefit of all interests.

8.3 <u>The Seasonal Flow Target at Peachtree Creek Conserves System Storage.</u>

AE

To conserve system storage, the Army has proposed to vary the flow target at Peachtree Creek seasonally, providing 750 cfs during the warmer months and 650 cfs during the cooler

months when water quality considerations are not an issue. This is possible, of course, because of the increasingly stringent discharge limits imposed by the State of Georgia and the outstanding work done by metropolitan Atlanta dischargers, who return water to the Chattahoochee River.

Although the Army has proposed to reduce the flow at Peachtree Creek to some extent, it has suggested that 650 cfs is an absolute minimum established by the Congressional authorization. While the Army is not suggesting a lower target to evaluate, this suggestion that 650 is an absolute minimum is plainly wrong, given that the 1958 Reservoir Regulation Manual established a target of 600 cfs[127]—not 650—and the Chief of Engineers also described the goal as being to provide flows at Atlanta of "about 600" cfs.[128]

AE

More generally, the clear purpose of the minimum flow—as understood by Congress—was to release enough water to meet projected water supply and water quality needs, as calculated by General Newman.[129] That the release was never intended to be fixed, and never viewed as being fixed, is shown by the Army's decision to commission additional post-authorization studies by the Public Health Department to determine how much was really needed.[130] The Army should take the same approach today: instead of adhering to estimates produced in 1946 as if they were legally binding, the Army should make today's decision about how to operate in the future by considering the best available estimate of the minimum flow that is actually needed to meet water supply, water quality and other needs.

As discussed elsewhere, the Water Supply Providers strongly support measures to conserve system storage. This is especially true when storage can be preserved in Lake Lanier (the furthest upstream reservoir) without materially affecting downstream flows. Past modeling by Georgia EPD during the 2007 drought showed that the Peachtree Creek flow target can be reduced seasonally without impacting water quality, and the Army has implemented a seasonal reduction to conserve storage during prior droughts without adverse water quality impacts. That being so, we strongly support a balanced, seasonally variable flow target at Peachtree Creek set in consultation with Georgia EPD as a measure to preserve storage in Lake Lanier for uses up and down the basin during drought.

[127] Apalachicola River Basin Reservoir Regulation Manual, Appendix B: Buford Reservoir at B-22 ¶ 47 (December 1959).

[128] *See* Letter from Chief of Engineers, Lt. General Wheeler, to Chairman Nelson Smith, Federal Power Commission (Feb. 6, 1947), House Doc. 300 at ix.

[129] *See* Newman Report, House Doc. 300 at 34 ¶ 79-80.

[130] *See* Definite Project Report on Buford Dam, Chattahoochee River, Georgia, at I-22 (Dec. 1, 1949) (reprinting U.S. Public Health Service, Environmental Health Center, Flow Requirements for Pollution Abatement Below Atlanta, Georgia (Feb. 1949).

Response to ACF263 – Metro Atlanta Water Supply Providers

AE. Comment noted.

Col. Jon J. Chytka
Water Supply Providers Comments on Draft ACF Manual
Page 58

Response to ACF263 – Metro Atlanta Water Supply Providers

8.4 Entering Drought Operations in Zone 3 Conserves Storage and Increases Operational Flexibility During Drought.

The PAA also changes the threshold at which drought contingency operations begin from Composite Storage Zone 4 to Composite Storage Zone 3. This change allows the Army to respond to drought conditions sooner, before the system reaches critical levels. The additional storage reserve early in a drought, especially in Lake Lanier, which does not refill during multi-year droughts, provides critical provisions during severe drought. Such reserves become all the more essential when accounting for possible future hydrologic conditions that may be different from those experienced in the hydrologic record.

AF

AF. Comment noted

Entering drought contingency operations sooner does not necessarily mean that flows will be lower over the long term. Additional savings early in a drought can cause the system to recover sooner, allowing flows to return to normal levels earlier. Flow frequency curves for the PAA and the PAA with drought operations triggered in Zone 4 are shown in Figure 14. Over the full period of record (1939-2011) there is no difference in the flows. Similarly, there is no appreciable difference in the timing of flows under droughts (Figure 15, Figure 16, showing flows at the Chattahoochee gage when drought operations are commenced in Zone 3).

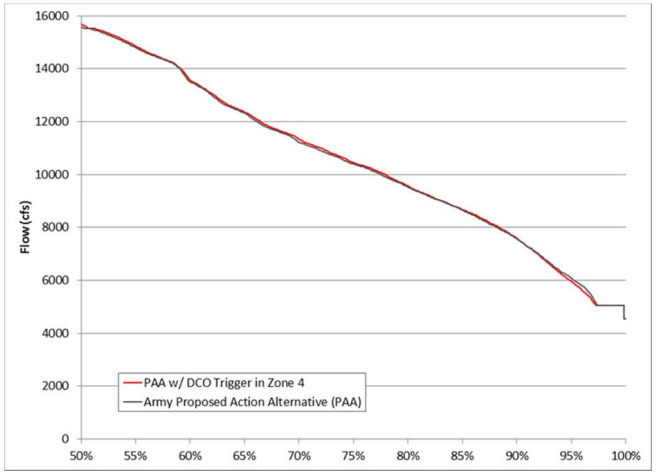


Figure 14. Chattahoochee Gage Flows:
Army PAA vs. Zone 4 Drought Contingency Operations

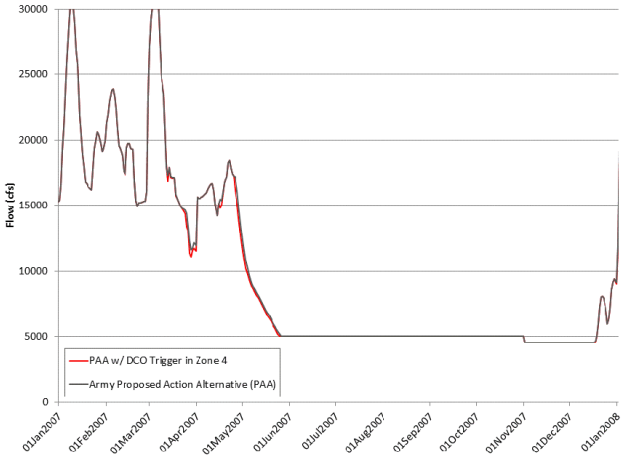


Figure 15. Chattahoochee Gage Flows — 2007 Drought: Army PAA vs. Zone 4 Drought Contingency Operations

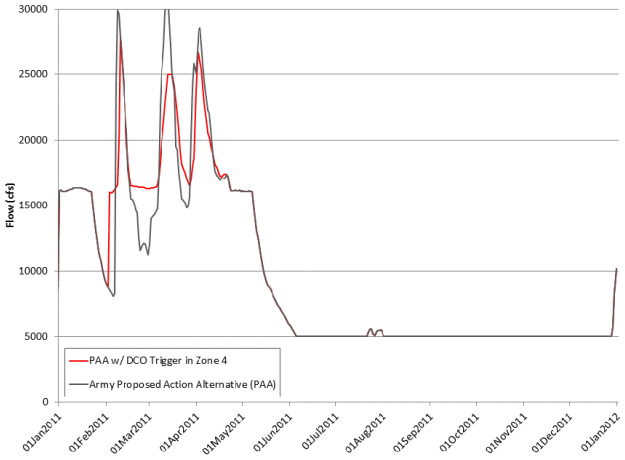


Figure 16. Chattahoochee Gage Flows — 2008 Drought: Army PAA vs. Zone 4 Drought Contingency Operations

AF

This analysis also demonstrates that using drought operations, either the amount of time in drought operations or number of times triggered, as is done in Chapter 6 (see Table 6.1-11) can be misleading and is certainly not a good surrogate for flows. For the two scenarios shown above—the PAA and the PAA with drought operations triggered in Zone 4—the flows are not significantly different but the drought operations measures are: the PAA is in drought operations 18% of the time, compared to 10% for the PAA with Zone 4 trigger; drought operations are triggered 22 times in the PAA, compared to 8 times in the PAA with Zone 4 trigger.

9. Conclusion

In closing, water supply is the highest and best use of storage at Lake Lanier. Given the revised 2050 demand and return projections, the long-term water supply needs of the metropolitan Atlanta region can be met without causing any material impacts downstream in Florida and without any environmental effects that the Army has not already deemed acceptable in the Draft EIS. Furthermore, meeting this demonstrated water supply need will avoid the substantial economic and environmental costs that would necessarily result from developing alternative supplies. In short, meeting the long-term water supply needs in metropolitan Atlanta is the only reasonable and rational choice.

We appreciate your attention to these comments, as well as the Army's effort in developing the Draft Water Control Manual and Draft EIS. We look forward to working with the Army to bring the long-overdue process of updating the Army's operations to address water supply and other needs to a close.

Please do not hesitate to contact me if you need any additional information.

Sincerely yours,

/s/ Lewis B. Jones

Lewis B. Jones

From:
Sent: Saturday, January 30, 2016 11:55 AM
To: ACF-WCM
Cc: lakeinfo@lakelanier.org
Subject: [EXTERNAL] Corps of Engineers' Water Control Manual ("WCM") comment

Dear Colonel Chytka,

As home owners on lake Lanier and members of the Lake Lanier Association we appreciate the Corps of Engineers' efforts to maintain the high quality of this beautiful resource for all to enjoy. We know that there are great demands on this lake from many sources both local and from neighboring states, and we hope that you will continue to preserve keeping both the level and quality of the water at the highest standards.

Val Perry, president of the LLA, has sent a letter dated January 28, 2016, detailing the concerns of many about Lake Lanier. The major points we hope that you will address that affect home owners, fishermen, and visitors alike are the following:

1. Please consider revising the navigation plan to avoid a severe impact the proposed plan can have on Lanier's water levels. A
2. Incorporate rigorous drought prediction that will trigger changes in reservoir operations to preserve lake levels during drought. B
3. Manage the reservoirs to retain maximum storage levels in the reservoirs so that drought conditions will not have the devastating impact that was experienced in December 2007. C
4. Model and plan for raising Lake Lanier's full pool level to 1073. D

Thank you for your dedicated service in the management of this unique lake.

Yours truly,

Lou and Lilli Meier

Response to ACF264 – Lou and Lilli Meier

A. Navigation is one of several project purposes for which Congress authorized the ACF Basin project, and USACE considers that purpose along with all other authorized purposes when making operational decisions.

Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations provisions in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008. It should be noted that navigation is not supported when drought operations are in effect.

B. USACE regulations do not allow use of forecasts in real-time project operations. Forecasted conditions may be used for planning future operations, but releases will follow the water control operations plan based on observed conditions within the watershed to the extent practicable. The Drought Contingency Plan (DCP) sections 3-02 and 3-03 contained as an exhibit in the WCMs in appendix A of the EIS includes discussion of drought identification and National Integrated Drought Information System (NIDIS). An NIDIS pilot program has been established for the ACF River Basin with the goal of developing a regional Drought Early Warning Information System. The system will use key indicators of drought to make timely drought forecast. USACE is a contributor and user of the NIDIS pilot project tools.

C. Under the drought operations provisions in the PAA, USACE would more proactively manage water resources in the reservoirs as drier conditions emerge in the basin. In the early stages of drought operations, the water management constraints on the projects would be subtle and the effects in the system barely noticeable. Operations would become progressively more constrained as drought conditions become more severe. Conserving storage in that way would enable the projects to continue meeting all authorized project purposes and needs in the basin until drought conditions improve and would promote faster recovery of the reservoirs. Compared to the drought operations in the NAA, the provisions in the PAA would result in improved conditions in Lake Lanier under extreme drought conditions such as occurred in 2007–2008.

D. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management. Accordingly, raising the conservation pool at Lake Lanier by 2 ft would not meet this criterion and was not carried forward.

From: Trammell, Bob
Sent: Friday, January 29, 2016 5:14 PM
To: ACF-WCM
Subject: [EXTERNAL] Comments on Apalachicola-Chattahoochee-Flint (ACF) River Basin water control manual and draft Environmental Impact Statement (EIS)

Dear US Army Corps of Engineers,

Please accept this email and the comments therein as part of your review and edit process to the proposed ACF River Basin Water Control Manual and Draft EIS.

First, I am honored and privileged to represent Troup County in the State House of Representatives in Georgia's General Assembly. West Point Lake is critically important not only to Troup County, but to our entire region of the State. I therefore join in the comments made in that certain Memorandum to the Army Corps of Engineers dated January 28, 2016, by the Mayor James Thornton of LaGrange, Mayor Bill Stankiewicz of Hogansville, Chairman Patrick Crews of the Troup County Board of Commissioners, Page Estes (President) of the LaGrange-Troup County Chamber, and James Emery as Chairman of the West Point Lake Advisory Council.

I specifically ask the US Army Corps of Engineers to revise the proposed Water Control Manual and EIS as follows:

1) prioritize original Congressionally authorized purposes ahead of all other stakeholder needs; A
2) raise the winter pool rule curve of West Point Lake from 628 to 632.5; B
3) adopt the same drought management standards for West Point Lake as set for Lake Lanier to balance the water across the system; C
4) review and incorporate the recommendations in the Sustainable Water Management Plan of the ACF Stakeholders; and D
5) mitigate the flood risk to the City of West Point and other downstream communities through the release of no more than 50,000 cfs below West Point Dam and adapt to anticipated inflow. E

Thank you for the opportunity to provide these comments. It is my sincere hope that the US Army Corps of Engineers will give serious consideration to these comments and making revisions consistent with the comments, particularly in light of the work and effort put in by all stakeholders to the Sustainable Water Management Plan of the ACF Stakeholders.

Sincerely,

Bob Trammell
State Representative
House District 132

Response to ACF265 – State Representative Bob Trammell

A. USACE operates the projects in the basin as a system and in a balanced manner to fulfill all authorized purposes, regardless of when Congress added each authorized purpose.

B. Flood risk management at West Point Lake is an authorized purpose. Raising the winter pool at West Point Lake would reduce the seasonal flood storage and increase the risk of flooding downstream. This suggestion is not consistent with the screening criteria (see draft EIS section 1.4.4) that any alternative considered by USACE should not increase flood risk above the current level.

C. The only difference between the Buford (Lake Lanier) and West Point drought operation is the reduced hydropower at Buford during drought operation. The West Point and Walter F. George reservoirs refill at three times the rate of Lake Lanier, primarily because of the disparity in contributing drainage area (watershed area), which provides the source of runoff to refill the reservoirs. The amount of annual precipitation also is greater in the more southerly portions of the ACF Basin. Consequently, the two lower reservoirs are able to refill while maintaining typical peak generation hours.

D. The ACF Stakeholder's sustainable water management plan (SWMP) was received by USACE in early June 2015. USACE received the report and its recommendations too late to be fully evaluated and considered in the draft EIS. Further, the SWMP, as initially submitted to USACE, did not include the necessary supporting technical documentation and underlying assumptions to fully evaluate the recommended management measures. The SWMP recommendations were considered to the extent possible in the final EIS.

E. Flood risk management operations at West Point Dam are described in section 7-05 of the WCM for West Point Dam and Lake (appendix E to appendix A of the EIS). The prime objective of the operations at the West Point project is to reduce peak flows at West Point, Georgia, based on the downstream U.S. Geological Survey (USGS) gage—Chattahoochee River at West Point, Georgia (no. 02339500). That objective is achieved by regulating releases to maintain the USGS gage within the nondamaging bankfull flow of 40,000 cfs until the induced surcharge schedule calls for greater release. Releases are then made to maintain flows within the bankfull capacity of 40,000 cfs until the induced surcharge schedule calls for an increase in the releases. Releases made under induced surcharge operations could result in downstream flows in excess of 40,000 cfs, depending in the rate of inflow. The induced surcharge operation can cause a damage-inducing release, but it is designed to maximize the flood benefit as much as possible while giving consideration to the integrity of the dam. There should never be an induced surcharge release greater than the current 3-hour average inflow. The West Point project was designed to provide protection from small-to-moderate-sized floods. In the event of an extreme flood, West Point Lake would exhaust its flood storage and pass all inflows as prescribed in the induced surcharge schedule.

-----Original Message-----
From: Sara McGinnes
Sent: Wednesday, February 03, 2016 10:46 AM
To: ACF-WCM <ACF-WCM@usace.army.mil>
Cc: riverkeeper@apalachicolariverkeeper.org
Subject: [EXTERNAL] ACF River System Environmental Impact Statement

Please consider my opinion and add them to the record as you draft the Environmental Impact Statement and give the same weight to the Apalachicola River ecosystem as you do to other uses of this valuable resource.

A

The health and productivity of the Apalach are an important part of the economy and culture of the entire Gulf Coast. We who value this irreplaceable resource are depending on you to manage the ACF river system to protect the extraordinary richness and productivity of the river, bay and floodplain.

I would appreciate a response to my comments.

Sincerely,

Sara McGinnes

Response to ACF266 – Sara McGinnes

A. The PAA includes fish and wildlife conservation operations throughout the basin (e.g., the reservoir fish spawn operations, minimum flow provisions in the Apalachicola River, and fish passage at Jim Woodruff Lock and Dam). Section 5 of the EIS provides additional information on the PAA. The EIS considered and disclosed the expected impacts that the PAA could have on fish and wildlife resources in the Apalachicola River and Bay (or elsewhere in the system). If expected impacts to significant resources would be adverse as a result of revised operations, USACE must consider potential measures to mitigate those effects. The analysis presented in section 6 of the EIS indicates that the PAA would have a minimal effect on flow conditions in the Apalachicola River and into the Bay, compared to current reservoir operations under the NAA. Because flow and water quality changes in the Apalachicola River and Bay are not expected under the PAA, no anticipated incremental effect would be expected on fish and wildlife resources in the bay.

U.S. Army Corps of Engineers Mobile District

Subject: ACF Water Control Manual Draft EIS: Ensure Freshwater Flows for Fish and Wildlife

Dear U.S. Army Corps of Engineers Mobile District,

I urge you to develop and select a new water management plan for the Apalachicola-Chattahoochee-Flint system that mimics natural freshwater flows as much as possible.

The Apalachicola River is home to an incredible array of fish and wildlife, supports one of the most diverse floodplain forests in North America, and is the lifeblood of the productive Apalachicola Bay. But this ecosystem has been starved of vitally important freshwater flows for decades, pushing it to the brink. A

Instead of protecting the Apalachicola River ecosystem and its fish and wildlife, the draft Environmental Impact Statement (EIS) recommends an alternative that would hold even more water back for upstream users. Ignoring basic legal requirements, the EIS fails to analyze the impacts of the resulting decrease in river flow on the system's fish and wildlife. B

I urge you to fully assess impacts to fish and wildlife, and develop and select a new alternative that will mimic natural water flows in the Apalachicola River.

Response to ACF267 – Petition NWF

A. The authorized purposes of the federal ACF system do not include a specific directive to provide freshwater inflows to Apalachicola Bay to sustain the resources of the bay. USACE does make releases to limit adverse effects to threatened and endangered species downstream of Jim Woodruff Lock and Dam, including Apalachicola Bay. USACE consulted on the PAA and the results are presented in appendix J of the final EIS. In the biological opinion the USFWS concluded that effects to estuarine invertebrate production are insignificant because the PAA provides slightly beneficial effects from increasing the number of freshwater pulses and increasing the number of days greater than or equal to 16,200 cfs in the winter. USFWS also anticipate only minor changes in salinity regimes and estuarine habitat due to the WCM.

B. Potential adverse effects on hydrodynamic, ecological, and socio-economic conditions in Apalachicola Bay that are associated with the PAA, compared to the NAA (current operations), are addressed in section 6 of the EIS. The analysis concludes that the PAA would have little to no effect on these conditions in the bay compared to the NAA.

TSYS®
One TSYS Way,
Post Office Box 1755
Columbus, Georgia 31902-1755

M. Troy Woods
President &
Chief Operating Officer

January 25, 2016

Commander, U.S. Army Corps of Engineers
Mobile District
P. O. Box 2288
Mobile, AL 36628

Attn: PD-EI (ACF0DEIS)

Dear Col. Chytka:

The Corps' efforts in compiling the draft Environmental Impact Statement associated with the revised Apalachicola-Chattahoochee-Flint (ACF) Water Control Manual are appreciated, and we recognize the challenges of balancing water needs within the framework of federal authorizations.

As you are aware, our area needs a reliable and sustainable river flow to meet our current and future water needs for recreation; municipal and industrial water supply; and water quality for wastewater assimilation and health of the aquatic environment. To this end, we would encourage the Corps to include in its Water Control Manual a flow control node for Columbus, with the minimum flows of 800 cfs (instantaneous), 1350 cfs (daily) and 1850 cfs (weekly). A

We understand that this is not a request for additional water allocation, but simply a confirmation of sustaining flows that have been achieved consistently since 1975. These flows have a long history of widespread support throughout the basin (AL-FL-GA 2003 Compact, AL and GA scoping comments to the Corps, ACF Stakeholders' Sustainable Water Management Plan, numerous public and private entity comments). B

It is also our understanding that the Corps has appropriate authorization under the Clean Water Act to release these minimum flows, such that the EPA delegated authority to the states can be fulfilled through issuance of NPDES permits with assurances of minimum flows to assimilate waste load allocations. C

Thank you again for your efforts. Our community is looking forward to a prosperous future with a sustainable supply of clean water and an ongoing cooperative relationship with the Corps.

Sincerely,

M. Troy Woods

Response to ACF268 – TSYS

A. A node for Columbus, Georgia, was included in the HEC-ResSim model (see Figure 2 of appendix E) and HEC-5Q model (See Figure 2.1 of appendix K) of the draft EIS. The authorized purposes of the federal ACF system do not include a specific directive to meet flow targets at Columbus. Nonetheless, USACE's modelling of the PAA over the 73-year hydrologic period of record indicate that a daily average flow of 1,350 cfs at Columbus would be achieved on 94 percent of the days for the PAA compared to 95 percent under the NAA (refer to section 6.1.1.2.3.9). Flows at Columbus for the various alternative considered are discussed in section 6.1.1.2.3 of the draft EIS and water quality is discussed in various portions of section 6.1.2 of the draft EIS.

B. The authorized purposes of the federal ACF system do not include a specific directive to meet flow targets at Columbus, Georgia.

Any purported agreements made between the governors of the states of Alabama, Georgia, and Florida in 2003 have never been approved by the U.S. Congress; therefore, USACE has no authority to operate to support those agreements.

C. The authorized purposes of the federal ACF system do not include a specific directive to meet flow targets at Columbus, Georgia. Flows at Columbus for the various alternatives considered are discussed in section 6.1.1.2.3 of the draft EIS and water quality is discussed in various portions of section 6.1.2 of the draft EIS. As described in section 6.1.1.2.3.9 of the EIS, model results over the 73-year hydrologic period of record indicate that a daily average flow of 1,350 cfs at Columbus would be achieved on 94 percent of the days for the PAA compared to 95 percent for the NAA (reflecting current operations).

1/24/2016

Commander, U.S. Army Corps of Engineers
Mobile District
Attn: PD – EI (ACF – DEIS)

My husband & I live on Little River section of Lake Lanier. We moved here over 23 years ago from northern Ohio. We love living on the lake, the fact that we can walk to our dock & go for a boat ride, fish if we want & swim in the summer. Our children & grandchildren vacation here every summer.

We very much want water supply to remain an authorized purpose for Lake Lanier & that recreation would be an important reason for Lake Lanier.

We are very much in favor of raising full pool two feet to 1073. With the future bringing more demands on our waters it just makes good sense to store more water when we can. There will be more droughts I'm sure & it would be great not to be 22 feet below full pool ever again. A

I certainly don't know or understand all the issues that make up the ACF Master Water Control Manual Update. I just know that hopefully by writing to you this might help in protecting a lake that I have grown to love. I would like to see that steps be taken to make Lake Lanier cleaner & for water levels to be kept higher so that many will continue to enjoy this great lake.

Thank you for reading my letter. I don't know if this will help with my concerns for our lake but I can say that I have tried.

Sincerely,

Marilyn Haight

Response to ACF269 – Marilyn Haight

A. As stated in section 4.1.1, the Master WCM update has been conducted to determine how the federal projects in the ACF Basin should be operated for their authorized purposes, in light of current conditions and applicable laws. Raising the top of the conservation pool at Lake Lanier would require reallocating storage from the flood control pool and would adversely affect the level of flood risk management provided by the project. One of the screening criteria described in EIS section 1.4.4 was to maintain at least the current level of flood risk management. Accordingly, raising the conservation pool at Lake Lanier by 2 ft would not meet this criterion and was not carried forward.

From:
Sent: Thursday, August 18, 2016 9:27 AM
To:
Subject: FW: Master Water Control Manual Update Environmental Impact Statement for the Apalachicola – Chattahoochee – Flint River Basin
Attachments: image001.gif; image002.jpg

-----Original Message-----
From: Kent Wimmer
Sent: Wednesday, June 01, 2016 4:03 PM
To: ACF-WCM <ACF-WCM@usace.army.mil>

Subject: [EXTERNAL] Master Water Control Manual Update Environmental Impact Statement for the Apalachicola – Chattahoochee – Flint River Basin

Dear Commander of the U.S. Army Corps of Engineers' Mobile District,

On behalf of the Defenders of Wildlife, we join with the Apalachicola Riverkeeper and American Rivers in requesting that the U.S. Army Corps of Engineers revise the Draft Environmental Impact Statement (EIS) for the Apalachicola-Chattahoochee-Flint (ACF) River Basin Water Control Manual Update. The 2015 Draft EIS failed to incorporate current and relevant information and does not use the best available science when evaluating environmental impacts, proposing action alternatives and identifying the Corps' Preferred Action Alternative. As a result:

(1) The Draft EIS relies on outdated population projections that inflate future water demands, significantly overestimating the water supply needs for metropolitan Atlanta. As a result, the Corps proposes holding more water in Lake Lanier while further depleting Chattahoochee and Apalachicola river flows. A

(2) The Draft EIS, especially the Corps' Preferred Action Alternative, hinges on completion of Glades Reservoir (Hall County, Georgia), a project that both Hall County and the State of Georgia have withdrawn from consideration, acknowledging Glades is not needed for water supply. On this basis alone, the draft EIS is obsolete. B

(3) The Draft EIS fails to ensure that the amount, timing and variability of river flows will protect water quality, recreation, fish, wildlife and ecosystem health throughout the ACF basin. C

Response to ACF270 – Defenders of Wildlife

A. In December 2015, the State of Georgia submitted additional information regarding the water supply needs in Metro Atlanta. Among other things, it provided revised water supply needs for Metro Atlanta. Accordingly, the final EIS considers additional alternatives based on the updated information provided by GAEPD.
B. In December 2015, the State of Georgia submitted additional information regarding the water supply needs in Metro Atlanta. Among other things, it indicated that the certificate of need for Glades Reservoir has been rescinded. Accordingly, the final EIS does not include Glades Reservoir as a reasonably foreseeable action.
C. The PAA was selected to maintain the health of the ACF Basin within USACE's authorities. The scope of USACE's authorities to manage projects in the ACF Basin limits the Agency's ability to mimic natural flows to the Chattahoochee and Apalachicola rivers. Its authorities include the responsibility to produce peaking hydropower, operate for flood damage reduction, and release minimum flows from Jim Woodruff Dam for threatened and endangered species to comply with the terms and conditions in the biological opinion.

   This EIS compares the PAA to current operations (represented by the NAA). The NAA does not represent conditions before construction of Jim Woodruff Dam, therefore, mitigation to restore the river's natural channel would not apply in this action.

   USACE water management staff work closely with meteorologists and consider the drought indicator index, real-time weather forecasting, and/or satellite imagery to adapt real-time operations to actual weather conditions.

D

(4) The Draft EIS, especially the Corps' Preferred Action Alternative, proposes seasonal reductions in the minimum flow requirement for the Chattahoochee River near its confluence with Atlanta's Peachtree Creek. Maintaining sufficient minimum flow is necessary to provide enough water to dilute assimilated wastewater in order to protect human health, recreational opportunities and aquatic life.

E

(5) The Draft EIS ignores the need for restoring flows down the Apalachicola River to reconnect the river to the floodplain and to ensure enough freshwater reaches Apalachicola Bay. Corps operations on the Chattahoochee and consumptive use upstream along the Chattahoochee and Flint rivers are having disastrous consequences for the Apalachicola River, floodplain and Bay. In 2012, oyster, crab, shrimp and finfish populations crashed and have yet to recover. Until recently, Apalachicola Bay yielded 10 percent of the nation's oysters. The Corps must stop ignoring the needs of the Apalachicola River, floodplain and Bay and place restoration of these natural resources on equal footing with other needs in the basin.

The ACF is one of America's Most Endangered Rivers due in part to the Corps' ongoing failure to manage the ACF basin in a sustainable way. This is bad news for everyone – human and wildlife alike – that rely on this river for survival. The Apalachicola River is one of the nation's most important biological hotspots. The habitat that it provides is so important to so many species that the Apalachicola River and Bay have been named as a UNESCO "Man and the Biosphere Reserve." The Apalachicola National Estuarine Research Reserve and the Florida aquatic preserves were also established to protect one of the northern hemisphere's most productive estuarine systems.

F

The Apalachicola River basin has the highest density of amphibian (44) and reptile (64) species north of Mexico. The river and its floodplain are also home to more than 1,000 species of plants, 52 species of mammals, 60 species of snails and clams, five federally listed mussels, 315 bird species, and 86 species of fish. And those are just the permanent residents. This river basin is also an important stopping point for migratory birds from both the Atlantic and Mississippi flyways.

To protect these species, the Corps must coordinate and consult with other federal natural resource management agencies including the U.S. Fish and Wildlife Service, the Environmental Protection Agency, the National Park Service and the National Oceanic and Atmospheric Administration. The Corps' ability to comply with environmental laws and regulations depends upon proper coordination and consultation.

G

Given the substantial comments and the changes in the basin since the Draft EIS was released, we request that the Corps revise the Draft EIS for the ACF Water Control Manual Update to reflect new information and the best available science and address the needs of the Chattahoochee River and Apalachicola River and Bay. Defenders of Wildlife also requests the Corps provide the public with a meaningful opportunity to comment on a new draft plan for the basin. Please take this opportunity to develop a plan that encompasses the entire basin including the river's estuary, Apalachicola Bay.

Thank you for your consideration. Please add my contact information below to your public distribution list.

Response to ACF270 – Defenders of Wildlife

D. GAEPD requested that the minimum flow at Peachtree Creek be reduced to 650 cfs during drought periods. In response to that request, USACE investigated reducing the minimum flow value to 650 cfs from November through April. USACE conducted an environmental assessment in 2008 and concluded that reducing the minimum flow requirement at Peachtree Creek to 650 cfs during that period would not have significant adverse effects on water quality. Over the past decade, USACE has reduced the minimum flow seasonally at Peachtree Creek several times. Monitoring data is available from GAEPD during those periods. The State of Georgia has the responsibility for establishing and regulating water quality standards and should conduct any further analysis that might be required. NEPA requires that USACE capture the impacts to the human environment of any change from the NAA. USACE captured any impacts from the change to a season-varying flow at Peachtree Creek. Modeling in support of the final EIS illustrates the impacts that change would have and confirms that the impacts of reducing flows at Peachtree Creek to 650 cfs from November through April would not have significant adverse effects on water quality. The State of Georgia has indicated its intention to ensure that water quality standards are met at all flows based on revisions in their 2013 triennial review.

E. The authorized purposes of the federal ACF system do not include a specific directive to provide freshwater inflows to Apalachicola Bay to sustain the resources of the Bay. However, the environmental effects of the PAA on the Apalachicola River and Bay, when compared to the NAA (i.e., current reservoir operations), are considered in the EIS. The analysis in the EIS demonstrates that the PAA would result in little to no change in flow and water quality conditions in the Apalachicola River and Bay, and consequently there would be little to no effect on biological, cultural, and other resources in the river and bay.

F. USACE has worked extensively with the USFWS staff to fully comply with the requirements of the Fish and Wildlife Coordination Act (FWCA) and the Endangered Species Act (ESA) for water management activities in the ACF Basin for many years. Relative to ongoing work to update the Master WCM, the USFWS and District staff have engaged in formal consultation under section 7 of the ESA and have cooperated to develop several USFWS Planning Aid Letters and draft reports prepared in accordance with the FWCA. These consultation and coordination activities are summarized in section 6.4 of the EIS, and all pertinent documents are compiled in appendix J of the EIS.

G. USACE's public involvement actions comply with the NEPA process. Ample opportunities were provided for public comment during the scoping period and public review of draft documents. USACE also periodically updates its Web site with relevant information for the public.

Kent L. Wimmer

Kent L. Wimmer, AICP

Northwest Florida Representative

Defenders of Wildlife

1294 Avondale Way, Tallahassee, FL 32317-8451