Appendix O
2013 Original Scoping Comments

COMMENT DOCUMENTS

This appendix contains the original letters received by the U.S. Army Corps of Engineers, Mobile District in response to the NOI posted in the Federal Register on October 12, 2012 regarding the intent of the Corps to revise the scope of the Environmental Impact Statement for the Water Control Manual updates for the Apalachicola-Chattahoochee-Flint River Basin in Alabama, Florida, and Georgia in light of a June 2011 decision of the U.S. Court of Appeals for the Eleventh Circuit and a June 2012 legal opinion of the Corps' Chief Counsel regarding authority to accommodate municipal and industrial water supply from the Buford Dam/Lake Lanier project. For this document a "letter" is defined as the original comment document submitted by an author containing comments related to the revised scope posted in the Federal Register Notice.

The letters are organized by the last name of the author signing or submitting the letter. If the letter was submitted by an author on behalf of an organization or group the letter will be found organized by the last name of the letter writer – letters are not organized by organization or group. Each letter is presented in full and in its original state. Some letters were sent with attached supporting documentation. If this supporting documentation was not included in the original letter document it is not presented in this appendix. However, this documentation will be made available to those requesting it. In the case that supporting documentation is copyrighted material (journal articles, etc) a citation will be provided to allow interested parties to find this material.

Aalderks, Paul

Page 1 of 1

12/19/2012

COMMENTER: Paul Aalderks
5716 Vinings Place Dr
Mableton, GA 30126

ORGANIZATION:

COMMENTS: Hello,
I recently heard that the Army Corps is proposing that the winter pool draw down start in September instead of November. I cannot understand how this would do anything but hurt water conservation, West Point Lake, and the local area economies. I had hoped that when the Corps was entrusted with coming up with a viable and responsible water management plan that it would be better than the current plan. It does not appear this is the direction the Corps is taking. I can understand drought conditions and low lake levels but I cannot understand the numerous times we've had significant rainfall only to watch the Corps pour EXTEREME amounts of water over the damn in the name of flood control... or 'winter pool'.

Abbott, Wayne

Page 1 of 2

ajk

Abbott, Jordan & Koon, LLC
Certified Public Accountants
133 MAIN STREET
LAGRANGE, GA 30240
706.882.9226 *Phone*
706.883.6153 *Fax*

Wayne Abbott
133 Main Street
LaGrange, GA 30240
December 3, 2012

Tetra Tech, Inc.
Attention: ACF-WCM
61 St. Joseph Street
Suite 550
Mobile, Alabama 36602-3521

RE: **Scoping Comments for Water Control Manual**

To Whom It May Concern:

On behalf of the City of LaGrange, and in accordance with our responsibilities under the National Environmental Policy Act of 1969 (NEPA), I submit and request to have the following comments carefully considered and added to the public record for the Apalachicola Chattahoochee Flint River basin Master Water Control Manual Environmental Impact Statement (EIS). As part of the process for determining the scope of issues to be addressed in the EIS and for identifying the important issues related to the proposed actions, we request that the following important issues be thoroughly considered by your agency:

- West Point Lake is a key and critical economic driver for the City of LaGrange, and all of Troup County and surrounding area. Each year over 2.2 million visitors come to West Point Lake for recreational purposes, accounting for $112 million in local economic impact. Without adequate lake levels, these economic opportunities are lost. Over the past few years fishing tournaments have been cancelled resulting in more lost income to an already economically stressed region. According to the 2010 U.S. Census, much of Troup County is contained in "less developed census tracts".
- In addition to the direct economic harm of low fish spawns, and lost fishing tournaments, the larger economic damage to the area is evident in the lack of any new developments that are in any way dependent upon the lake. Many other regional lake communities enjoy the year-round benefits of hotels, conference centers, and other developments on their properties. Examples of this type of development can be observed at Lake Martin, Alabama. The residents and potential visitors to West Point Lake demand similar treatment.

Abbott, Wayne

Page 2 of 2

- As you are aware, West Point Lake was the first USACE project to have a specific authorization by the Congress of the United States of America for recreation as well as sport fishing, and wildlife development. The constant fluctuation of winter and spring lake levels over the past several years has had devastating impacts on the annual bass spawn, as well as other fish populations. The reduction of fish spawn directly affects the fish take, and therefore the reputation of West Point Lake as a sport fishing destination. We feel strongly that this authorization has not been upheld by the USACE.
- A change to the West Point Lake rule curve for the winter months to an elevation of 632.5 MSL. This change would provide many advantages for the region, and ACF basin as a whole. The additional storage provided would enhance and support the congressional authorizations of the lake, in particular recreation, sport fishing, and wildlife development. The availability of additional water could also support navigation windows as deemed necessary by the USACE. Studies completed by Global Energy and Water Consulting, LLC support the safety and flood control capabilities of the lake at the increased winter pool level of 632.5. This information has been submitted to the USACE, Mobile office under separate cover.
- Further study is requested for the requirement of 5000 cubic feet per second of water (CFS) at the Florida line, as is currently mandated by the Endangered Species Act and U.S. Fish and Wildlife Service. This study should include accurate population counts of the three endangered species of mussels to determine if each should still be included on the endangered species list. If inclusion is still directed, then a comprehensive recovery plan for each should be an integral part of the study.

As your agency begins the process associated with the new EIS for the Water Control Manual for the ACF basin, we respectfully ask that the congressional authorizations for West Point Lake be carefully and thoroughly considered. West Point Lake has been consistently used as the "work horse" of the ACF basin to the detriment of any Lake-related economic development in Troup County for many years. We are hopeful of positive change in the WCM that will allow our community to move forward economically.

Our community is prepared to work with the USACE in any way necessary to facilitate the EIS and WCM for the basin. If there is anything I can do to help the process, please do not hesitate to contact me.

Best regards,

Wayne Abbott

Wayne Abbott, CPA

Abernathy, Brittney

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11/16/12

Tetra Tech
Attention: ACF-WCM
61 St. Joseph Street
Suite 550
Mobile, AL 36602-3521

Scoping Comments for ACF Water Control Manual

I submit the following comments in the recently reopened public scoping period:

1) **There is a definitive need for additional storage in the ACF Basin; and that storage is readily and safely available in West Point Lake. Recent studies submitted to the USACE demonstrate that West Point Lake (WPL) can be maintained at a minimum 632.5 MSL year round; and if managed differently, the risk of downstream flooding during major rain events can actually be reduced! The trifecta is there to be won: Increased storage + Better management = Reduced flooding!**

2) **WPL is specifically authorized by Congress for Recreation and Sport Fishing/Wildlife Development in addition to Flood Control, Navigation, and Hydropower. Flood Control can be improved as outlined in the Operations Study referred to in #1 above and which study has been previously submitted to the USACE. Hydropower and Navigation both benefit from the availability of increased storage. The USACE must deliver and honor the Recreation and Sport Fishing/Wildlife Development Authorizations stipulated under law by Congress.**

3) **In order to accomplish #1 and #2 above, the Rule Curve needs to be adjusted upward to a minimum 632.5 MSL and the Action Zones need to be modified upward as well to a minimum 630.0 at the bottom of Action Zone 4. The parameters of 632.5 and 630.0 MSL are significant because they represent the initial and second recreation impact levels respectively as defined by the USACE.**

Abernathy, Brittney

Page 2 of 2

4) **The economic damages to the WPL communities and the lack of economic development due to unnecessarily low and undependable lake levels need to be assessed and stopped. Small businesses have gone bankrupt and others have been stretched to keep their doors open. Major fishing tournaments have been cancelled damaging hotels, restaurants, marinas, and lake related businesses. Visitation is down and campgrounds have been closed. Land specifically set aside for a hotel, conference center, golf course, etc. has never been developed. We are blessed with a moderate climate and WPL should be managed as a 52 week a year lake with the corresponding benefit of a 52 week a year lake related economy! WPL needs a dependable and reliable lake level to provide for economic development and stop the economic harm.**

5) **Environmental harm to WPL needs to be documented. Due to wildly vacillating lake levels, the fish spawn has suffered significantly in 3 of the last 5 years and the quality of the fishery, specifically the bass and crappie, has declined. Thousands, if not hundreds of thousands of mussels have been killed threatening water quality; erosion has increased the cost of water treatment; and siltation continues to eliminate valuable storage.**

6) **USFWS needs to be challenged to provide their science and document the need for 5,000 cfs for endangered species. Why 5,000 cfs? Why not 2,000 cfs? How many of each endangered species are there? Do they exist in deeper water than previously thought? What is the Recovery Plan? Are they still endangered, threatened, or neither? Can they be relocated to other areas where water is more plentiful and the economic damages are less. Who is looking out for the welfare of the small businessman? Common sense would seem to dictate that the needs of man should be balanced with the needs of the critters. <u>The RIOP needs close analysis as part of the EIS to see what changes can be made to avoid destroying the economic, environmental, and recreational value of WPL during all times other than "extreme" drought!</u>**

I thank you for the opportunity to comment and ask that the above issues be submitted and studied during the EIS period.

Sincerely,

Brittney Abernathy

Abruscato, Denise

Page 1 of 1

1/15/2013

COMMENTER: Denise Abruscato
3365 Lake Shore Drive
Cumming, GA 30041

ORGANIZATION: homeowner

COMMENTS: Lake Lanier needs a new study based upon current population and current weather trends. The lake and its purposes can be reviewed for the best use of land and resources. The lake is most importantly an ATL resource for water as the primary function. The residents and land surrounding the lake and the impact of shallow water, taxes, etc. is also an important consideration. Many North Lake Lanier homes were reduced over -$100K in value due to shallow water. This impacts real estate taxes as well as county interests.

Ackeman, Georgia

Page 1 of 1

1/8/2013

COMMENTER: Georgia Ackeman
8794 Megans Ln
Tallahassee, AS 32309

ORGANIZATION: citizen

COMMENTS: Dear Corps,
I am greatly concerned about the on-going drought and low flow on the Apalachicola River. We must find a sustainable water consumption long term plan for this basin.

Please consider the negative environmental and economic impact of the low flow. Greater release levels of water are needed for the survival of the Apalachicola River and Bay.

Thank you.

Ackerman, Joel

Page 1 of 1

1/14/2013

COMMENTER: Joel Ackerman
4348 Pilgrim Mill Rd.
Cumming, GA 30041

ORGANIZATION:

COMMENTS: The Corps should commit to using currently available and future technology to model and predict water flows and to control much more closely the volume of water being released from each dam in the system.

For example, heavy rain south of Atlanta will become predictable flow at all downstream points. Measuring this rainfall and applying it to an accurate model will allow water release to be reduced at Buford and other dams as (or even before) the rain falls.

Ake, Robert

Page 1 of 1

1/13/2013

COMMENTER: Robert Ake
6603 Catherine Street
Norfolk, VA 23505

ORGANIZATION:

COMMENTS: I spent two weeks under the aegis of Emory University searching for Ivory-billed Woodpeckers in the area currently being considered for water management. It is an area with enormous wildlife potential. Water management is a key component. I urge you to weigh the interests of the natural environment as much as is reasonable in your deliberations.

Alderson, Doug

Page 1 of 1

1/14/2013

COMMENTER: Doug Alderson
960 Towhee Road
Tallahassee, FL 32305

ORGANIZATION:

COMMENTS: Being someone who has kayaked the entire Apalachicola River twice and has seen the environmental effects of low water first-hand, I would urge the Corps to take the following actions:
1. An assessment and consideration of the freshwater needs that will sustain the health of the Apalachicola River and Bay.
2 Increased water release from Woodruff Dam at appropriate timing and duration to sustain Apalachicola River and Bay
3. An ACF basin wide sustainable water management plan that protects the Apalachicola River and Bay and equitably shares the water of this basin.

Alford, Peter

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11 / 13 /2012

Tetra Tech
Attention: ACF-WCM
61 St. Joseph Street
Suite 550
Mobile, AL 36602-3521

Scoping Comments for ACF Water Control Manual

I submit the following comments in the recently reopened public scoping period:

1) There is a definitive need for additional storage in the ACF Basin; and that storage is readily and safely available in West Point Lake. Recent studies submitted to the USACE demonstrate that West Point Lake (WPL) can be maintained at a minimum 632.5 MSL year round; and if managed differently, the risk of downstream flooding during major rain events can actually be reduced! The trifecta is there to be won: Increased storage + Better management = Reduced flooding!

2) WPL is specifically authorized by Congress for Recreation and Sport Fishing/Wildlife Development in addition to Flood Control, Navigation, and Hydropower. Flood Control can be improved as outlined in the Operations Study referred to in #1 above and which study has been previously submitted to the USACE. Hydropower and Navigation both benefit from the availability of increased storage. The USACE must deliver and honor the Recreation and Sport Fishing/Wildlife Development Authorizations stipulated under law by Congress.

3) In order to accomplish #1 and #2 above, the Rule Curve needs to be adjusted upward to a minimum 632.5 MSL and the Action Zones need to be modified upward as well to a minimum 630.0 at the bottom of Action Zone 4. The parameters of 632.5 and 630.0 MSL are significant because they represent the initial and second recreation impact levels respectively as defined by the USACE.

Alford, Peter

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2.

4) The economic damages to the WPL communities and the lack of economic development due to unnecessarily low and undependable lake levels need to be assessed and stopped. Small businesses have gone bankrupt and others have been stretched to keep their doors open. Major fishing tournaments have been cancelled damaging hotels, restaurants, marinas, and lake related businesses. Visitation is down and campgrounds have been closed. Land specifically set aside for a hotel, conference center, golf course, etc. has never been developed. We are blessed with a moderate climate and WPL should be managed as a 52 week a year lake with the corresponding benefit of a 52 week a year lake related economy! WPL needs a dependable and reliable lake level to provide for economic development and stop the economic harm.

5) Environmental harm to WPL needs to be documented. Due to wildly vacillating lake levels, the fish spawn has suffered significantly in 3 of the last 5 years and the quality of the fishery, specifically the bass and crappie, has declined. Thousands, if not hundreds of thousands of mussels have been killed threatening water quality; erosion has increased the cost of water treatment; and siltation continues to eliminate valuable storage.

6) USFWS needs to be challenged to provide their science and document the need for 5,000 cfs for endangered species. Why 5,000 cfs? Why not 2,000 cfs? How many of each endangered species are there? Do they exist in deeper water than previously thought? What is the Recovery Plan? Are they still endangered, threatened, or neither? Can they be relocated to other areas where water is more plentiful and the economic damages are less. Who is looking out for the welfare of the small businessman? Common sense would seem to dictate that the needs of man should be balanced with the needs of the critters. The RIOP needs close analysis as part of the EIS to see what changes can be made to avoid destroying the economic, environmental, and recreational value of WPL during all times other than "extreme" drought!

I thank you for the opportunity to comment and ask that the above issues be submitted and studied during the EIS period.

Sincerely,

Peter T. Alford, Esquire
Daniel, Haddon & Alford, P.C.
P.O. Box 2249
LaGrange, GA 30241
(706) 882-9261
(706) 845-7916 Facsimile

Amos, Ralph

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Forsyth County Board of Commissioners

January 14, 2013

U.S. Army Corps of Engineers
Email: acf-wcm@usace.army.mil

Re: Master Water Control Manual

As chairman of the Forsyth County Board of Commissioners, I urge the U.S. Army Corps of Engineers to diligently work to complete the necessary steps to finalize the update of the Master Water Control Manual for the Apalachicola-Chattahoochee-Flint River Basin. While 20 square miles of Lake Lanier are located in Forsyth County, the county has been denied access to the lake for an intake for more than 25 years, despite our best efforts. Numerous requests for a drinking water intake have been made with the support of both state and federal officials, but unfortunately the Corps has been unable to grant our request. We are thankful to see the Corps once again working on an update to the manual.

Forsyth County has consistently been ranked among the fastest growing counties in the nation – a designation that continues despite the challenging economic climate. It is ironic that construction of Lake Lanier, along with the associated tourism, is a major contributor to the county's growth, and yet it has also blocked the county from exercising our riparian rights to water from Lake Lanier and the Chattahoochee River to meet the needs related to that growth. Currently, even though the county has the necessary state permits, our lack of an intake structure requires us to obtain our raw water through the city of Cumming's intake.

We support all efforts to protect and increase water supply for the region while maintaining safe lake levels for recreational use. We also support the study of raising the lake level to the benefit of the region. We strongly believe that water supply should be given top priority. We request that the Corps grant our request, as an existing user of water, and approve a new Forsyth County withdrawal intake structure and storage allocation contract as quickly as possible. Delays in solidifying our water supply's future could force the unnecessary spending of tens to hundreds of millions of dollars.

110 EAST MAIN STREET • SUITE 210 • CUMMING, GEORGIA 30040 • (770) 781-2101 • FAX (770) 781-2199

Amos, Ralph

Page 2 of 2

Once again, we support your efforts toward completing this as a top priority.

Sincerely,

Ralph J. Amos
Chairman
Forsyth County Board of Commissioners

Anderson, Wayne

Page 1 of 4

From: wayne Anderson <waynea43@gmail.com>
Sent: Monday, December 10, 2012 2:39 PM
To: ACF-WCM
Subject: ACF River Basin Public Comments
Attachments: Lake West Point letter.pdf

Please consider the attached letter as serious concerns from a West Point Lake property owner and a tax paying citizen of Georgia.

Thank you,

Wayne Anderson
5001 Riverside lane
LaGrange, GA 30240
waynea43@gmail.com
707-302-0499

1

Anderson, Wayne

Page 2 of 4

Lake West Point Operating Manual Citizen Comments

December 8, 2012

In 1978, I purchased Lake Front property on Lake West Point base on the Congressional Mandate to develop Lake West Point for Flood Control, Recreation and Fishing, and Hydroelectric Power generation. Shortly thereafter, we built a modest home to raise our children in a beautiful and safe residential area and to enjoy the terrific water sports and recreational activities provided by this lake. We immediately paid for several dock & land usage permits from the Corps. These permits have been paid for since 1978. We also invested in a recreational boat and a well-built and attractive boat dock. Later our Grandchildren were to find Lake West Point a wonderful place to visit and enjoy.

With a few minor exceptions, we enjoyed full or almost full pool water levels except in late winter. The lake was drawn down to accommodate expected spring rains and until early 1990, to accommodate Barge traffic 1-2 times a year. In every case, the Lake was refilled very quickly.

As you are aware, the current Operating Manual dictated Operating Protocol developed in the early 1960's. Over the past 8 years, the water levels in West Point have fluctuated drastically. A supposed concern for the habitat of several Northern Florida clam species and the desire to provide an over abundant supply of fresh water for oyster growth has turned West Point Lake into a cess-pool of mud, stumps, shore erosion, and the elimination of a healthy mollusk species. Additionally, the lake is not useable for many property and dock owners after July 4th. due to reckless and unconcerned water level management.

FLOOD CONTROL (# 1 Congressional Mandate):
A full level of 635 feet is the only acceptable management control point. The lake has a 6-foot safety buffer above 635 feet. Modern day weather forecasting, lake level and river flow monitors are capable of ample water control information allowing 3-6 days of warning for flood control action.

Recreation (# 2 Congressional Mandate):
Multiple campgrounds, fishing activities and pleasure boating activities require a safe water level. A full pool is mandatory for boating safety and adequate recreation options. The West point Lake Coalition has funded solar powered navigation buoys throughout the lake, but the safety issues created by low water levels are impossible to avoid.

Environmental Issues:
I have provided photos, 1-4, showing a small portion of the devastated shoreline of West Point Lake. These photos were made in September 2012. The massive erosion is criminal and if a private citizen had inflected even 4-wheeler tracks along the shoreline, they would have been prosecuted, fined, or even jailed. Yet the Army Corps of Engineers faces no such consequences. 1000's of Trees and millions of tons of silt wash into the lake each year due to the low water levels.

Page 1

Anderson, Wayne

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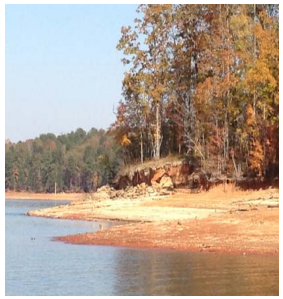
1.

2.



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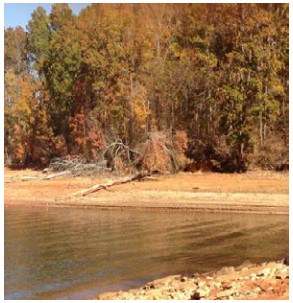

4.

Additionally, **Photos 5 & 6** show a small collection of large Mollusk shells found along a 100 ft area of shoreline in 2007 when we first experienced super low lake levels. Today, I have searched many miles of shoreline and have found **NO** such shells remaining. I can only assume that this species has been decimated. The environmental collapse of this fresh water filtration mollusk has had a profound negative effect on the water and wild life quality in West Point Lake.

Anderson, Wayne

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5

6

Economic Issues:

Locally funded Economic Studies show that a full pool of 635 at West Point Lake equates to over $750,000,000 per year of local economical impact for West Georgia and East Alabama. Levels below 633 drastically reduce recreational and sporting activities and local revenue drops dramatically. Over the past 10 years, I have seen dozens of small businesses fail as the lake levels fluctuate and disappear. Residential home values have fallen 30-40% and desirability has dropped 50%. Significant residential & commercial development has stopped due to the uncertainty of lake usability and has cost the local economy additional millions of dollars in growth and job creation. My personal residence, located on a prime lake front location in a well-established private residential development, has lost 36% appraised value due to low desirability and lake level fluctuations.

Lake West Point should be managed at full pool using a Run of the River format.

Clams and oysters have survived for millions of years with fluctuating river levels. Flood control options are multiple and Hydroelectric generation is much more efficient at full pool levels.

Public electric power companies, such as Georgia Power, The Southern Company, and Duke Power Company have successfully maintained fresh water reservoirs for many years using a Run of the River Operating protocol. Shorelines, property values, wildlife and fisheries are protected, recreational use is excellent, and hydroelectric options are met. Plus flood control is always achieved.

Additionally, water quality during low river flow is dramatically lowered and full pool level should be maintained to properly dilute the increased contamination of the inflow.

The Corps of Engineers should take a page from private industry when it relates to fresh water reservoir management. If the lake level can be stabilized at 628, or 625, or 622, all of which have occurred for multiple times for several weeks, WHY can it not be stabilized at 635---- (Full Pool)? Hydroelectric generation is much more efficient, water storage is much cheaper than building additional storage facilities, water quality is dramatically improved, and economic conditions are greatly enhanced. Please consider the users and tax payers of West Georgia and East Alabama in the update of your ACF River Basin Water Control Manual..

Wayne Anderson
5001 Riverside Lane
LaGrange, GA 30240
Waynea43@gmail.com
706-302-0499

Annette, Orlando

Page 1 of 1

1/14/2013

COMMENTER: Orlando Annette
3010 Heatherstone Dr.
Cumming, GA 30041

ORGANIZATION:

COMMENTS: I recently (3 yrs. ago)purchased a home on the lake ADVERTISED to be at the belly of the lake where the water rarely if ever get to low to use. The water level has cost me tremendous amt. of money to maintain boat and dock. If there's no reason to drain the lake as much as it is then why do you want to cost the consumers so much money. In NY where I'm from you are not allowed to sell homes based on false pretenses. The economy will never get better if those in charge continuously rip off the consumer. I want to retire in this house I bout but it doesn't seem like things are getting any better with Lake Lanier- only worse. A shame since I know New Yorkers are looking to relocate- I would not recommend it to my friends and family anymore- again a shame

Anonymous, Anonymous

Page 1 of 1

1/5/2013

COMMENTER: Love The Low lake levels
keep up the good work
Hogansville, GA 30230

ORGANIZATION:

COMMENTS: I just want to say that west point lake winter water level of 628 ft. is a perfect goal for the corps to try and keep. The water level just rose 5 ft due to recent rains. if not for the low lake levels due to drought west point could have had flooding problems. I like the lakes lower levels in the winter. it makes the hunting and fishing around the lake better. Just to let you know the fishing is alot better when the lake has a lower level so i'm sure the BASSMASTERS fishermen will like it lower than full summer pool too. If the lakes fishing is better due to lower lake levels that means more people fishing which means more money to our local economy in TROUP county GA. Keep up the good work i love to walk around the lake in the winter time. I didn't go to college but I know yall cant control droughts, as some people think you can.

Anselmo, Wayne

Page 1 of 1

1/14/2013

COMMENTER: Wayne Anselmo
3540 southlake court
Cumming, GA 30041

ORGANIZATION:

COMMENTS: It is obvious that the current regulations require modification due to drought conditions that have plagued the area and mismanagement of lake levels by Corp personnel. The financial impact to my residential home has been greatly affected in a negative way. I am hard pressed to sell my home at anywhere near its original cost. One of the purposes of purchasing lakefront property was to find an instrument that would retain value and perhaps increase modestly in value. It has not and I believe in part due to rules and regulations that do not address current day requirements.

Antekeier, Andy and Susan

Page 1 of 1

1/12/2013

COMMENTER: Andy Susan Antekeier
41 S. Bayshore Dr.
Eastpoint, FL 32328

ORGANIZATION: Resident Franklin Co. FL

COMMENTS: The way water is allocated by the Corps to the Atlanta metro area from Lake Lanier regardless of downstream impacts allow the residents of Georgia to avoid thinking about water as a limited shared resource. There should be in place permanent water restrictions in all of the heavily populated counties for lawn irrigation, car washing etc. similar to those in Florida counties which have water shortage issues due to unrestrained growth & development. As long as they have plentiful cheap water,local officials have no reason to act on restrictions & the downstream smaller population areas suffer. Apalachicola Bay is suffering now, and not a single county in Georgia has water restrictions in place that we know of. That is wrong.

Atkins, J.

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OFFICE OF THE GOVERNOR

ROBERT BENTLEY
GOVERNOR

STATE OF ALABAMA

ALABAMA DEPARTMENT OF ECONOMIC AND COMMUNITY AFFAIRS

JIM BYARD, JR.
DIRECTOR

January 14, 2013

Via Electronic Mail & U.S. Mail

Tetra Tech, Inc.
61 St. Joseph St., Suite 550
Mobile, Alabama 36628-3521

Re: Apalachicola-Chattahoochee-Flint (ACF) River Basin Water Control Manual Update Scoping Comments

To Whom It May Concern:

I submit these comments in my capacity as Director of the Alabama Office of Water Resources on behalf of the State of Alabama in response to the Notice of Intent ("NOI") published at 77 Fed. Reg. 62224 (Oct. 12, 2012). The comments concern the revised scoping process for the ACF River Basin Water Control Manual Update. Alabama has previously submitted comments in connection with the scoping for this manual update, and these comments supplement those previous comments.

1. Use of Accurate Model, Data, and Critical-Yield Calculation

At the outset of the manual-update process, it is essential that the Corps utilize an accurate model, accurate data, and an accurate critical-yield calculation. If any of these are flawed, the outcome of the process will be flawed. Alabama is concerned that there are major problems with the model, the underlying data, and the critical-yield calculation.

a. Accuracy of ResSim Model and Underlying Data

Alabama has previously noted that the ResSim model should be used in developing the EIS and the Water Control Manual only if the three States and the Corps of Engineers have confidence that the model and data can replicate the historical observations. Alabama's analysis of the output of the ResSim model being used by the Corps raises serious concerns about its accuracy.

Alabama attempted to validate the ResSim model by using historical data as inputs to see if the model results conform to historical observations. Specifically, to perform this test, Alabama removed all operations for Buford and set the rule curve equal to observed lake elevations at Lake Lanier. Alabama also set the demands equal to actual historical demands contained in the ACFHEC_10.dss data file. Alabama did this for the portion of the model above Atlanta and

401 ADAMS AVENUE • SUITE 580 • P.O. BOX 5690 • MONTGOMERY, ALABAMA 36103-5690 • (334) 242-5100

Atkins, J.

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simulated the 1980-2008 period. Using that approach, Alabama believes that the results of the model should have matched the conditions that occurred historically.

While the model did create daily elevations and monthly average discharges at Buford that matched closely with the historical values, the model did not produce flows at Atlanta that matched the historical values. In fact, the model produced daily flows at Atlanta that were an average of 117 cfs lower than what occurred historically. This is a significant deviation that totals approximately 2.4 million acre-feet over the simulated period.

Alabama believes that there are issues in the model between Buford and Atlanta either with the unimpaired flows or with data related to demands contained in ACFHEC_10.dss that were used as model inputs. Once these serious discrepancies with the model are resolved, a similar analysis will need to be undertaken to assess the model's accuracy for the area downstream of Atlanta.

Until a model can be run that replicates historical observations, it should not be employed in developing the EIS or the Water Control Manual.

Alabama also believes that the data used as inputs for the model should be agreed upon by the three States. The three States worked together though a very deliberate and transparent process on the development of the input data that covers the period 1939-1993. Data used by the Corps for 1994-2008, however, has not been similarly vetted by the three States. In fact, the data used for that period has varied without the Corps providing a full explanation of the changes. Until the input data's accuracy is the subject of consensus, it should not be used in the model.

b. Need to Recalculate Critical Yield

Alabama has significant concerns about the Corps' preferred method to calculate critical yield in the Corps' 2010 Critical Yield Report. "Method B," which the Corps has identified as its preferred manner of calculating critical yield for the ACF projects, removes water withdrawals from the system, even if those withdrawals require augmentation from the federal projects. Thus, the Atlanta Regional Commission's withdrawals between Lake Lanier and West Point Lake were subtracted from the inflow that was used in the calculation of the critical yield of West Point Lake and Lake Walter F. George. Similarly, Method B removes Lake Lanier's critical yield from the system, thereby reducing the yields of the downstream projects. That is based on the apparent assumption that the upstream project's yield is lost entirely to diversions and thus is unavailable to downstream users. That, however, is not an accurate assumption.

This flawed methodology resulted in a lower-than-actual yield calculation for the downstream projects, and results in an improper allocation of the yield of the federal projects to Atlanta-area water-supply interests instead of to the projects located in Alabama. In other words, this methodology is an attempt to "grandfather" water-supply withdrawals by calculating critical yield by assuming current water-withdrawal levels. Alabama is unaware of the Corps ever utilizing this "Method B" in calculating the critical yield at any other project. In fact, at page 6 of the 2010 Report, the Corps makes the remarkable assertion that "[m]aximizing the yield of the upstream reservoir is consistent with current state-issued water withdrawal permits and may not apply in other regions of the United States." That is an admission that Method B is a result-

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oriented methodology created for the sole purpose of favoring Atlanta-area water-supply interests over downstream interests.

The fact that the Corps' selection of Method B is designed to favor Atlanta-area interests is underscored by the fact that while the method assumes that downstream withdrawals are occurring and should be deducted from the critical-yield calculation for the downstream projects, the direct water-supply withdrawals from Lake Lanier are not deducted for purposes of calculating Lake Lanier's critical yield. This results in a higher critical yield for Lake Lanier, thereby suggesting that more water is available for water-supply uses. The EIS should not be started until a neutral methodology for the critical-yield calculation is adopted.

In addition to the methodological problems with the Corps' critical-yield calculation, there also are concerns about the input data used in the calculation. Following the issuance of the 2010 Critical Yield Report, Alabama identified a data problem between the ACFCUM_8.dss file and the ACFCUM_9.dss file. While Alabama believes that some changes were made to address that issue in ACFCUM_10.dss, the details of those changes have not been documented or discussed. More importantly, the Corps never recalculated the yield of the reservoirs based on the new data set. Nor has the Corps ever released the model used to calculate the critical yield in 2010. The Corps must conduct an updated critical-yield analysis using an agreed upon input data set, and it must provide transparency in the process of doing so.

The EIS and the Water Control Manual should not be completed until an accurate, neutral critical-yield analysis is performed.

2. Appropriate NEPA Baseline

In order to develop a valid EIS under NEPA, the Corps must use an appropriate baseline for purposes of determining the effects of the proposed action and any alternatives. The only baseline that is appropriate here is one based on the existing ACF manual promulgated in 1958. Current operations in the basin, including the use of action zones as defined in the 1989 Draft Water Control Plan, should not be included in the baseline because they were never subjected to a complete NEPA analysis. Utilization of a baseline that includes current operations will render the EIS fatally flawed from the outset.

3. Compliance with Existing Environmental Laws

The manual update process should also evaluate the Corps' compliance with existing environmental laws. Since the federal reservoirs in the basin were constructed, Congress, Alabama, Florida, and Georgia have enacted a number of laws and regulations designed to protect and enhance the quality of the environment. In operating the federal projects in the basin, the Corps must avoid operations that will violate or lead to violations of federal- or state-imposed water-quality standards. This is a serious and ongoing concern as minimum water-quality standards have often been violated in the Chattahoochee River. For example, in 2009, Alabama sent correspondence to the Corps expressing concern about water-quality issues in the ACF Basin. (Copies of that correspondence are attached.) The Corps should ensure that even

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under drought conditions, sufficient flow is maintained below each dam so that water-quality standards are met.

4. Assessment of Impacts on Middle Chattahoochee

It is essential that the Corps include in the EIS a complete assessment of the impacts of operations pursuant to the revised manual on the Middle Chattahoochee region. That region has often been given little attention in determination of Corps operations in the ACF Basin. Instead, most of the attention has been focused on the Atlanta area and on the Apalachicola River.

In periods when flows from the Flint River are high and able to meet most or all of the flow needs in the Apalachicola River, the Corps has had a tendency to significantly curtail releases from Lake Lanier. This has resulted in inadequate flows in the Middle Chattahoochee region. These diminished flows have caused problems for water-supply providers in that region, and they have resulted in diminished water quality.

5. Consideration of Instream Flow Needs in the Middle Chattahoochee

Any operating regime must be created to ensure that certain minimum flows are maintained at all times in the Middle Chattahoochee region. Specifically, the operating regime should include a weekly average of 1850 cfs and a daily average of 1,350 cfs at the Columbus, GA USGS gage. A daily average of 2,000 cfs at the Columbia, AL USGS gage should also be included in any operating regime.

6. Consideration of Municipal and Industrial Water Supply

The EIS must consider the municipal and industrial water-supply needs of entities in the Alabama portion of the basin. Based on the 2005 Alabama Water Use Report published by the USGS and the State of Alabama, Alabama estimates that M&I water demand in its portion to be approximately 50 mgd, excluding thermoelectric demands. Domestic water supply in the area of southeast Alabama that is part of the basin will be a growing water-resource demand. That region has seen the groundwater table drop significantly in the last few decades. Alabama projects that some water-supply systems in that region will have to transition to the use of surface water as a source of supply in the future. Alabama estimates that approximately 55 mgd of additional water may be utilized for M&I supply in its portion of the basin by 2040.

Industrial need for reliable flows will only to continue to grow in that part of the basin. The Farley Nuclear Plant is located near Columbia, Alabama, and it a vital component of the region's electric supply. The Plant utilizes the Chattahoochee River for cooling and make-up water and is dependent in its operations on the availability of water of acceptable quantity and quality. Any Corps operating plan for the Basin that reduces the elevation or flow rates of the river adjacent to the Plant could adversely impact the ability of the Plant to maintain regular operations. Such restrictions on operations could impose significant costs in terms of replacement electric power and could cause environmental concerns.

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The ability of other industries in the region to operate normally is also imperiled by reduced flows due to a diminution in wastewater assimilative capacity. Such a diminution also limits the ability of the region to meet its industrial-development potential. In addition, the impacts of upstream discharges and low flows also have the potential to impose higher costs on downstream industry as the downstream users will incur higher treatment costs to treat pollutant-laden water before it is used and higher costs to treat used water before it can be returned to a stream with reduced assimilative capacity.

7. Consideration of Agricultural Water Supply

Alabama's needs related to agricultural water supply must also be taken into account in the EIS. Alabama's agricultural water demand in the ACF Basin was 18.6 MGD in 1992 for crop irrigation of all types. In 1995, agricultural water usage in the Alabama portion of the ACF Basin was estimated at 22.5 MGD. That usage has been projected to increase to 74.8 MGD by the year 2050. Agricultural water use in the ACF Basin is expected to steadily increase throughout the basin, but is expected to increase most rapidly in the Alabama portion of the ACF Basin.

8. Consideration of Navigation

The EIS must take account of impacts of Corps operations on navigation in the Chattahoochee River. Navigation is one of the purposes for which Lake Lanier was constructed, but the current action-zone regime under which Buford Dam is operated largely ignores navigation interests except when the reservoir is nearly full.

Alabama constructed three state docks in the Chattahoochee River in reliance on consistent navigation flows. Those docks are located at Columbia (River Mile 49.1), Eufaula (River Mile 91), and Phenix City (Rive Mile 153). Alabama made significant investments in those facilities, but each has been rendered virtually useless by the lack of flows necessary for navigation during extended periods of time. The EIS and water control manual must take into account the economic issues related to these navigation-based facilities.

In addition, there are certain critical pieces of equipment for the Farley Nuclear Plant that can only be delivered by barge, so the water control manual must maintain the ability for releases to be made from upstream federal projects for navigation when such parts are required on an emergency basis.

9. Consideration of Recreation

It is essential that the EIS and water control manual take account of the effects of fluctuating and declining pool levels on recreation at the reservoirs below Lake Lanier in the ACF Basin.

The Corps' impoundments at Lake G.W. Andrews, Lake Walter F. George, and West Point Lake inundate land within Alabama's borders, and those impoundments provide significant recreational opportunities to the citizens of Alabama and other states. Recreation at these projects is a major industry, with the Corps having estimated the economic impact of the

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recreation industry at Walter F. George as exceeding $25 million per year and at West Point Lake as exceeding $16 million per year. Alabama has constructed Lakepoint Resort State Park on Walter F. George, and lower pool levels in that reservoir have a negative impact on tourism at the facilities in that state park.

Adverse recreational impacts occur in Walter F. George when the lake is one foot below normal pool elevation, and a four-foot drawdown results in 80% of the boat ramps at the lake being unusable.

Both West Point Lake and Lake Walter F. George support popular sport fisheries. Water level fluctuations substantially changing the area of shallow-water habitats and shoreline vegetation inundated can significantly influence the reproductive success of resident fish populations. Low or declining water levels can adversely affect reproductive success for largemouth bass, spotted bass, bluegill, crappie, and other littoral species by reducing the area of available spawning and rearing habitats.

Alabama believes that it is critical for the Corps to focus on the adverse effects of wildly fluctuating pool levels and catastrophic drawdowns at Lake Walter F. George. Because of that project's relatively small size and its location at the bottom of the system, the Corps has operated the system in a way that puts a great deal of stress on that project. The EIS should look to ways to smooth out the operational effects at Walter F. George.

Alabama also provides several public boat ramps on the Chattahoochee River. Low river flows in the river causes those ramps to become unusable, thereby negatively affecting recreational opportunities. That too should be considered in the EIS.

10. Consideration of Public Safety Issues

The Corps must also consider public safety needs as part of the EIS. Alabama maintains a marine patrol in the portion of West Point Lake located in the State. The ability of the patrol to reach several areas of the lake is precluded if lake levels drop due to low inflows.

11. Consideration of Impacts on Eufaula National Wildlife Refuge

The EIS also needs to take into account the impact of Corps operations in the basin on the Eufaula National Wildlife Refuge (ENWR). ENWR was established in 1964 on Walter F. George Lake. ENWR provides habitat for migratory waterfowl and other birds, provides habitat and protection for endangered and threatened species, and provides recreation and environmental education to the public. The refuge, which contains 4,260 acres of open water and 3,025 acres of wetlands, has 281 documented bird species, 36 mammal species, 95 reptile species, and roughly 30 fish species. Federally listed species that use the refuge are the bald eagle, peregrine falcon, American alligator, and wood stork.

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12. Evaluation of Other Potential Water-Supply Projects

The EIS must also evaluate the cumulative impacts of other planned sources for water-supply in the basin, especially in the Atlanta area. According to the 2009 North Georgia Water Supply and Water Conservation Management Plan, there are two reservoirs (Glades and Bear Creek) planned to be constructed in the upper part of the ACF Basin to meet the region's 2035 water needs. The plan states that four more reservoirs are proposed for construction to meet the region's post-2035 needs.

The Glades Reservoir, which is currently the subject of a Section 404 permit application being considered by the Savannah District, merits special consideration. That project is planned for the portion of the basin above Lake Lanier, so it could have a significant negative impact on flows into and the yield of Lake Lanier.

13. Evaluation of Alternatives

An important aspect of the NEPA process is the evaluation of alternatives. In fact, NEPA requires the Corps to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. § 4332(2)(E). The implementing regulations for NEPA require the Corps to "rigorously explore and objectively evaluate all reasonable alternatives." 40 C.F.R. § 1502.14(a).

In undertaking the evaluation of alternatives, the Corps should not reward the failure of Atlanta-area entities to engage in water-supply planning over the last fifty years. Atlanta-area entities seem to have assumed that they would have access to ever-increasing amounts of water from Lake Lanier, and have failed to develop other alternatives. The mere fact that other water-supply options for the Atlanta-area are more expensive should not preordain a conclusion that those other alternatives are not better as a whole, especially when the interests of the entire ACF Basin are taken into account. Nor should the future water needs of the Atlanta-area take precedence over the needs of downstream communities in the basin. The Corps must also recognize that water-supply accommodation for the Atlanta area is not an "all-or-nothing" proposition where all of the area's water-supply needs to be met out of the federal reservoirs or none at all.

Instead of just including all of Atlanta's future water supply needs in the models, the Corps should consider a range of Atlanta-area water-supply alternatives. These include much more aggressive conservation measures and desalination. One other water-supply option that should be evaluated is lower population growth for Metropolitan Atlanta. If the hydrology of the region will not reasonably support the population-growth estimates for Metropolitan Atlanta without substantial harm to other interests, then the population estimates should be deemed infeasible and unattainable. Lake Lanier should not be regarded as available at all costs to meet unreasonable population growth in the region.

Another important area in which the Corps must consider alternatives is with regard to the action zones utilized at the federal projects. The current actions zones have approximately 80% of the conservation storage pool at Lake Lanier in Zone 4. In Zone 4, the emphasis is placed on water

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supply, and hydropower is typically only generated when releases are made for water-supply purposes. This is not appropriate in light of the Eleventh Circuit's recognition that any accommodation of water supply must be balanced with the hydropower purpose. In no reasonable person's view can the essential elimination of hydropower operations except as an ancillary benefit of releases for water supply be deemed to be consistent with congressional intent. The Corps must consider alternative action zones that reflect a more balanced pursuit of the project's multiple purposes. In addition, the Corps must consider adjusting the action zones so that a significantly lesser percentage of the conservations storage pool is in Zone 4.

14. Concerns Arising Out of June 2012 Legal Opinion

The stated purpose for the revised scoping as described in the NOI is to take account of the opinion issued by the Eleventh Circuit and the subsequent June 2012 Legal Opinion issued by the Corps' Chief Counsel ("Legal Opinion"). Alabama believes that there are several fundamental errors in the Legal Opinion, especially with regard to its analysis of the Corps' authority to accommodate current and increased levels of water withdrawals from Lake Lanier and downstream at Atlanta. If the EIS and water control manual are based on the Legal Opinion as written, then those documents will be fatally flawed. Without attempting to provide an exhaustive list of all of the errors contained in the Legal Opinion, Alabama expresses its concern about the following points:

a. Necessity of Storage Reallocation for Downstream Water Supply

The Legal Opinion incorrectly concludes that no reallocation of storage will be required for current and increased releases from Buford Dam to accommodate downstream water supply. The Legal Opinion bases this conclusion on the fact that Lake Lanier is a multi-purpose project. If the Corps were going to maintain complete flexibility to alter its operations to serve the various purposes, then the Legal Opinion's conclusion might have some validity. But the 2000 Georgia Water Supply Request that prompted the Legal Opinion seeks a firm commitment that certain flows will be available downstream to satisfy water-supply demands. Any municipal and industrial water-supply entity requires that sort of commitment so that it will know that it has the supply that it needs. It is simply inconceivable that the Corps will alter any decision it makes to accommodate downstream water supply, and the point of the Legal Opinion is to analyze whether the Corps has the authority to grant the Georgia Water Supply Request.

The Corps must not engage in the charade that its commitment to make releases for downstream water supply will not be firm. The Corps' own generally applicable documents discussing water-supply operations at federal projects makes clear that a reallocation will be required for a water-supply commitment. In Section 2-7 of EM 1110-2-1430, the Corps states, "Regulation of reservoirs for municipal and industrial (M&I) water supply is performed in accordance with contractual arrangements. Storage rights of the user are defined in terms of acre-feet of stored water and/or the use of storage space between fixed limits of reservoir levels." Section 3-3 of that same document makes clear that such a reallocation in a multi-purpose reservoir is permissible: "When several purposes are to be served from a single reservoir, it is possible to allocate storage space within certain regions of the reservoir storage for each of the purposes."

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The Corps' Water Supply Handbook (at Ch. 4) similarly makes clear that the conservation storage pool at a multi-purpose reservoir can "consist of dedicated storage" for water supply.

In preparing the EIS and the revised water control manual, the Corps must proceed on the basis that an allocation of part of the conservation storage pool at Lake Lanier will be required if releases from the dam are going to be made for downstream water supply.

b. Flawed Evaluation of Balance Between Hydropower and Water Supply

Alabama also believes that the Legal Opinion contains a flawed evaluation of the effects on hydropower from increased water-supply operations at Lake Lanier. In assessing the appropriate balance between hydropower and releases for downstream water supply, the Legal Opinion abandons the longstanding Corps focus on how increased water-supply operations would affect the amount of conservation storage at Lake Lanier being dedicated to water-supply use. Instead, the Legal Opinion shifts its focus to the effects of increased water-supply operations on system hydropower.

The Eleventh Circuit's opinion stated that Congress intended, through adoption of the Newman Report, to allow for increased water-supply uses if they caused only a slight decrease in system power value. The Legal Opinion completely ignores the fact that the Corps concluded in 1961 that all authority contained in the 1946 Rivers & Harbors Act to increase water-supply operations at Lake Lanier had been exhausted and that all future increases would have to be the subject of a storage reallocation pursuant to the Water Supply Act of 1958.

Contrary to the Legal Opinion's focus only on system hydropower effects, Alabama believes that the effects on Lake Lanier alone are also relevant to the analysis. If one applies the same methodology to Lake Lanier that the Corps uses for its system analysis, it shows a decrease in hydropower value of greater than 20% at Lake Lanier, compared to the 4% value quoted in the opinion for the impact on the entire system.

There are also serious methodological flaws in the Legal Opinion's evaluation of the system impacts, and those flaws result in a significant understatement of the system impacts. First, the comparison is not made with a baseline of operations reflected in the 1958 ACF Manual or even of current operations. Instead, the Corps assumed 2030 projected demands as part of the baseline as well as altered rule curves, thereby seriously understating the system effects. Second, while the Corps assumed future demands for Atlanta in the calculation, it did not take account of increased future demands below Atlanta in the basin. If those are taken into account (as they must be), then the effect is much greater. Third, the use of average hydropower energy values masks the effects during critical time periods. Unless the Corps is willing to lower elevations at Lake Lanier to historically low levels, the effects on hydropower will be much greater than the average suggests during critical drought periods.

Alabama believes that it is essential for these flaws in the Corps' methodology be corrected in order for a valid EIS and water control manual to be produced.

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c. Flawed Interpretation of the Water Supply Act of 1958

The Legal Opinion's analysis of the Water Supply Act of 1958 cannot be reconciled with the plain language of the statute. In the Act, Congress required that its approval be obtained for a reallocation of storage for water supply at an existing reservoir if the modification would "seriously affect the purposes for which the project was authorized . . . or would involve major structural or operational changes." 43 U.S.C. § 390b(d). The Legal Opinion, however, stated, "Under the Water Supply Act, operational changes to include additional water supply withdrawals from Lake Lanier are authorized, so long as system operations contemplated under the 1946 RHA can be maintained, and so long as the system purposes authorized in the 1946 RHA continue to be achieved, in keeping with Congressional expectations." The plain language of the statute does not support the interpretation that the assessment of whether major operational changes will occur with a modification should be based on system operations. If the modification would involve major operational changes at the project in question, then the Act requires congressional approval.

The Legal Opinion fails to take account of the two separate triggers for congressional approval under the Act. Rather than assess whether a modification seriously affects the authorized project purposes and then separately assess whether it involves major structural or operational changes, the Legal Opinion collapses the inquiry into a single examination as to Congress's intent as to purposes reflected in the 1946 RHA. The failure to give distinct meaning to the second trigger violates the fundamental principle that two separate terms in a statute should not be deemed to have the same meaning.

The EIS and water control plan must take account of the actual language of the Act if the process is going to reach a valid conclusion.

Even if the Legal Opinion were applying the correct interpretation of the Act's triggers, its conclusion that congressional approval is not required is still flawed. The notion that direct withdrawals totaling 297 mgd would not fundamentally depart from Congress's intent is absurd. The fact that Congress required a separate authorization in the 1956 Act for a mere 10 mgd in direct withdrawals disproves the conclusion reached in the Legal Opinion. Moreover, the testimony of Corps' officers in the 1950s recited in footnote 143 of the Legal Opinion also undercuts any argument that substantial direct withdrawals of water comport with the intent of Congress as reflected by its adoption of the Newman Report.

The Legal Opinion also fails to give appropriate consideration to the binding decision of the United States Court of Appeals for the D.C. Circuit in *Se. Fed. Power Customers, Inc. v. Geren*, 514 F.3d 1316 (D.C. Cir. 2008). That decision considered a settlement agreement whereby a total of 22% of the conservation storage pool (approximately 240,000 acre-feet) would be dedicated to local consumption, including both direct withdrawals and releases for downstream water supply. That represented an increase of 9% over the amount of the conservation storage pool that was then being utilized for local water-supply. The D.C. Circuit determined that the allocation of 22% of Lake Lanier's conservation storage for local consumption purposes constitutes major operational change within the meaning of the WSA "[o]n its face." 514 F.3d at

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1324. The Court went on to state that the allocation of 9% of Lake Lanier's conservation storage pool unambiguously amounts to major operational change within the meaning of the WSA.

The Legal Opinion indicates that the Corps has authority under the WSA to contract to provide 277 mgd for direct withdrawals for water supply without congressional approval. That amounts to 29% of the conservation storage pool. Notwithstanding the Legal Opinion's flimsy efforts to criticize the D.C. Circuit's opinion, that ruling is binding on the Corps. Accordingly, that ruling conclusively requires congressional approval for a reallocation to accommodate 297 mgd in gross withdrawals.[1]

In preparing the EIS and the water control manual, the Corps should not proceed on the mistaken assumption that congressional approval will not be required.

15. Flawed Baseline for Water Supply Act of 1958 Analysis

The Legal Opinion also utilizes an incorrect baseline in determining whether either of the WSA triggers for congressional approval of a reallocation requires such approval in this case. The D.C. Circuit's opinion made clear that the correct baseline at Lake Lanier for purposes of performing the trigger analysis is the amount of storage originally allocated to water supply at Lake Lanier, which is zero. 514 F.3d at 1324. The D.C. Circuit rejected the Corps' position that any prior water-supply accommodations could be included in the baseline.

Notwithstanding that binding determination, the Legal Opinion relied upon a baseline that included current operations as well as some future demands and some future operational changes. The Corps must not repeat that mistake in preparing the EIS or the water control manual.

16. Flawed Assumption Concerning Returns

In evaluating the Corps' authority to allow direct withdrawals from Lake Lanier, the Legal Opinion assumed that 107 mgd out of the withdrawals of 297 mgd would be returned to Lake Lanier. The Legal Opinion conceded that, if those returns are not made, then the direct withdrawals may exhaust all of Lake Lanier's conservation storage pool during a critical drought.

[1] Even if one looks only to the 170 mgd of storage that the Corps states that it has authority to allocate for net direct withdrawals under the WSA, that still amounts to 18% of Lake Lanier's conservation storage pool and thus must be deemed major operational change under the D.C. Circuit's decision. Of course, since the Corps enters into a contracts for water-supply reallocation on the basis of gross withdrawals and there is no guarantee that returns will be made, the WSA analysis must focus on the gross withdrawal amount.

Alabama also believes that the allocation that will be required in connection with downstream releases will also involve major operational change and thus require congressional approval. It is beyond dispute that the size of that reallocation exceeds the 22% figure that the D.C. Circuit held to be major operational change on its face.

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Alabama is concerned that the assumption of 107 mgd in returns indefinitely into the future is unrealistic. Alabama is unaware of any operational history that supports the assumption even in the present. Increasing reuse and recycling technologies may diminish in the future whatever returns are actually made in the short term.

Alabama also has a concern about the ability of the Corps to enforce the assumed level of returns. Alabama is unaware of any contract that has been entered into by the Corps for storage for water supply at any federal project that is based upon net withdrawals. In fact, the Corps has repeatedly stated that it does not take returns into account when entering into such contracts and accordingly bases the terms of such contracts on gross withdrawals. Even if a provision could be included in a contract requiring returns, Alabama has concerns about the ability and willingness of the Corps to enforce such a contractual term. In the Alabama-Coosa-Tallapoosa Basin, the Corps has a contract with the Cobb County Marietta Authority with a hard limit on the allocated storage for water supply. Even though that limit has been exceeded for more than 20 years, the Corps has taken no action to enforce it. There is no reason to believe that the Corps would act any differently if there were a contractual returns requirement at Lake Lanier.

In preparing the EIS and revised water control manual, the Corps should not assume that any direct withdrawals will be returned to Lake Lanier.

17. Flawed Operational Assumptions

In assessing the limits of the Corps' authority to accommodate releases for downstream water supply and direct withdrawals for water supply, the Legal Opinion concludes that the Georgia Water Supply Request can be met while maintaining system operations for all other purposes. But the Legal Opinion states that, if the Water Supply Request were granted, Lake Lanier would be drawn down to elevation 1040 during the most severe drought of record, which is 31 feet below the top of the conservation storage pool and just 5 feet above the bottom of that pool. There is nothing in the operational history of the project to suggest that the Corps would really draw the reservoir down that low. The current action zone 4, which corresponds to serious drought conditions, begins at a level as high as elevation 1065. During the 2007 drought, the Corps and Atlanta-area stakeholders expressed alarm when the reservoir's elevation dropped below elevation 1060.

Alabama does not believe it is credible to assume that the Corps would allow the reservoir's elevation to fall to 1040. Given that water-supply has been the preeminent concern during past drought conditions at Lake Lanier, Alabama believes that other project purposes will likely be sacrificed rather than allow the elevation to drop that low. In preparing the EIS and the Water Control Manual, the Corps must rely on realistic assumptions concerning how far the reservoir's elevation will be allowed to drop during the drought of record, rather than the unrealistic assumptions reflected in the Legal Opinion.

Alabama has concerns about other incorrect operational assumptions reflected in the Legal Opinion and its supporting technical analysis. First, the flow requirement at Peachtree creek was modeled at 800 cfs when it is actually 750 cfs. Second, the model assumed a 76% return percentage downstream, which is extremely high and not guaranteed.

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January 14, 2013
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18. Conclusion

Should you have any questions about any of the points raised by Alabama in this letter, please contact me at (334) 242-5497 or via email at Brian.Atkins@adeca.alabama.gov.

Alabama reserves the right to submit additional comments regarding the scope of the EIS.

Sincerely,

J. Brian Atkins

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

Enclosures

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STATE OF ALABAMA

September 8, 2009

Honorable Jo-Ellen Darcy
Office of the Assistant Secretary (Civil Works)
Department of the Army
108 Army Pentagon
Washington, D.C. 20310-0108

Lt. General Robert L. Van Antwerp, Jr.
Chief of Engineers
Headquarters
U.S. Army Corps of Engineers
441 G Street, N.W.
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Re: Apalachicola-Chattahoochee-Flint River Basin

Dear Secretary Darcy and General Van Antwerp:

I am writing to express Alabama's concerns pertaining to the Corps' operations in the Apalachicola-Chattahoochee-Flint (ACF) River Basin this summer. In particular, I want to call your attention to water quality problems arising due to inadequate river flow in the Chattahoochee River between West Point Lake and Lake Walter F. George. These problems affect not only Alabama citizens and businesses on the west bank of the river, but also Georgia citizens and businesses on the east bank.

On numerous occasions this summer, the Corps has reduced the amount of flow out of West Point Lake in order to fill that reservoir above the top of the rule curve that the Corps follows in operating that project. The Corps' South Atlantic Division approved this deviation from its standard operations, notwithstanding that this is causing a portion of the project dedicated to flood control to be filled in the midst of hurricane season. This is part of a recurring pattern this summer of diminished releases from West Point Lake, notwithstanding that the reservoir has been at or above full pool.

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Secretary Darcy and General Van Antwerp
September 8, 2009
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The result of the recently authorized overfilling of West Point Lake is that flows in the Chattahoochee River have fallen precipitously. On repeated occasions, the daily average flow at Columbus has fallen below 1350 cfs, which has been generally accepted as the minimal level to ensure adequate water quality in that portion of the river. Those low flows have caused levels of dissolved oxygen to plummet. This has caused Alabama industries to be unable to discharge their process wastewater— the flows are so low that those industries cannot meet their discharge permit limits. If this situation is not resolved, then those Alabama industries may be forced to suspend operations, throwing hundreds of employees out of work in the midst of difficult economic conditions.

On the most recent monthly ACF teleconference hosted by the Corps, Corps officials admitted a disturbing fact: while the Corps will make whatever releases from Lake Lanier are necessary to ensure that Atlanta-area entities can meet water quality requirements for their discharge at Peachtree Creek, the Corps is unwilling to make the releases necessary so that Columbus, Phenix City, and other downstream interests can meet water quality requirements for their discharges. While the Corps contends that water quality is an authorized purpose for West Point Lake, the Corps apparently takes an exceedingly narrow view of whose water quality it is willing to support.

There can be little doubt about what is really going on with the Corps' operations. The Corps is overfilling West Point Lake now in order to protect the level of Lake Lanier later this fall. Any water that is stored now at West Point Lake, and thus not released to meet critical current needs in the Middle Chattahoochee, will be available later this fall to meet downstream flow requirements. If the water were not stored now at West Point Lake, then the flow requirements later in the year would have to be met by releases from Lake Lanier.

I hope you will explain to me why the current needs of the Middle Chattahoochee take a backseat to the interests of the Atlanta area. I also hope you will explain to me why you are willing to compromise the current flood protection of downstream residents of Alabama and Georgia in order to keep Lake Lanier's elevation high later in the year. I am deeply concerned that the Corps's willingness to allow the overfilling of West Point Lake signals its view that the Atlanta area is more important than downstream communities in Alabama and Georgia.

I look forward to your prompt reply.

Sincerely,

Bob Riley
Governor

cc: Governor Sonny Perdue
Alabama Congressional Delegation

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ONIS "TREY" GLENN, III
DIRECTOR

ADEM
Alabama Department of Environmental Management
adem.alabama.gov
1400 Coliseum Blvd. 36110-2059 • Post Office Box 301463
Montgomery, Alabama 36130-1463
(334) 271-7700
FAX (334) 271-7950

BOB RILEY
GOVERNOR

September 9, 2009

Brigadier General Todd T. Semonite
South Atlantic Division Commander
USACE South Atlantic Division
60 Forsyth Street SW
Atlanta, Georgia 30303

RE: Water Quality Impacts to Alabama

Dear General Semonite:

The Alabama Department of Environmental Management (ADEM) is responsible for the protection and management of the quality of Alabama's surface waters. Recent data raises significant issues regarding water quality. By this letter, I am requesting action by your organization to protect water quality.

In 1996, the ADEM identified five of the six reservoirs on the Coosa River within the State of Alabama's borders as being impaired, namely Weiss Lake, Neely Henry Lake, Logan Martin Lake, Lay Lake and Mitchell Lake. In October 2008, ADEM and EPA Region 4 established Final Nutrient and Organic Enrichment/Dissolved Oxygen (OE/DO) Total Maximum Daily Loads (TMDLs) for the aforementioned reservoirs. The 2008 TMDLs were based on protection of water quality standards, namely dissolved oxygen and chlorophyll a criteria/targets specific to each of the five reservoirs. The TMDLs for total phosphorus (TP) were based on critical flow conditions during a specific period of record. More specifically, the Weiss Lake TMDL established TP reductions of 30% at the AL/GA Stateline for both the Chattooga and Coosa rivers.

Water quality modeling conducted as part of the TMDL process demonstrated that retention time is directly correlated to increased algal production in Weiss Lake as well as in the downstream reservoirs. Therefore, if flows in the Coosa River are decreased as a result of decreased releases from Carters and Allatoona reservoirs and/or other proposed withdrawals within the Coosa River Basin in Georgia, impacts to water quality are imminent. In addition, modeling demonstrates that if flows into Weiss Lake are reduced from the critical condition flows used in the TMDL, then allowable phosphorus loads from Georgia must be further reduced in order to maintain applicable water quality standards.

Based on water quality monitoring data collected by ADEM, there are documented cases of degraded water quality during past drought years in the Coosa and Tallapoosa system. These impacts resulted in reduced levels of dissolved oxygen and increased algal biomass. Such water quality conditions during drought conditions can cause considerable stress on aquatic communities in the river and reservoir systems. This can even include increased fish & mussel kills. The diminished water quality also creates greater challenges to industries and municipalities in meeting the conditions of their permits and complying with applicable water quality standards. Diminished water quality also has adverse impacts on water treatment costs for public water supply systems.

Birmingham Branch
110 Vulcan Road
Birmingham, AL 35209-4702
(205) 942-6168
(205) 941-1603 (Fax)

Decatur Branch
2715 Sandlin Road, S.W.
Decatur, AL 35603-1333
(256) 353-1713
(256) 340-9359 (Fax)

Mobile Branch
2204 Perimeter Road
Mobile, AL 36615-1131
(251) 450-3400
(251) 479-2593 (Fax)

Mobile - Coastal
4171 Commanders Drive
Mobile, AL 36615-1421
(251) 432-6533
(251) 432-6598 (Fax)

Atkins, J.

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Brigadier General Todd T. Semonite
9/9/2009
Page 2 of 2

In addition, continued economic development within these river basins is dependent upon a reliable and adequate supply of clean water. Decreased water quantity and quality in the ACT restricts the ability of local communities to attract new businesses or expand existing businesses and affects the quality of life of Alabama citizens living, working and recreating along these rivers.

The Department is committed to protecting Alabama's water resources for the citizens of Alabama. With that said, we are deeply concerned that historical and current actions of the USACE-SAD with respect to reservoir operations have and will continue to directly impact waters of the State of Alabama. By this letter I am asking for the Corps to ensure that its operations of Lake Allatoona and Carters Lake include releases that will result in stream flows entering Alabama that are consistent with those flows used in setting the water quality standards described in this letter. For your convenience I have attached a graph depicting the Coosa River flow used in setting the water quality needs.

Lastly, the NPDES discharge permits issued to facilities in Alabama for discharges to the Chattahoochee River in the Phenix City area are based on a seven-day average river flow of 1,386 cfs. Since January of 2009 seven-day average flows from the West Point Dam have been less than 1,386 cfs on 68 occasions and 57 of those occurrences were between June 1 and August 31. Between June 16 and July 16 dissolved oxygen levels in the Chattahoochee River upstream of the MeadWestvaco facility declined to less than 5.0 mg/l on at least 9 days (see the attached chart). Each time the dissolved oxygen concentration declined to less than 5.0 mg/l the seven-day average flow released from the West Point Dam was less than 1,386 cfs. Therefore the COE should ensure that at least 1,386 cfs passes by Phenix City on a 7 day average to ensure compliance with Alabama's water quality standards.

Sincerely,

Onis "Trey" Glenn, III
Director

Attachments

cc: Stan Meiburg, US EPA Region 4

Atkins, J.

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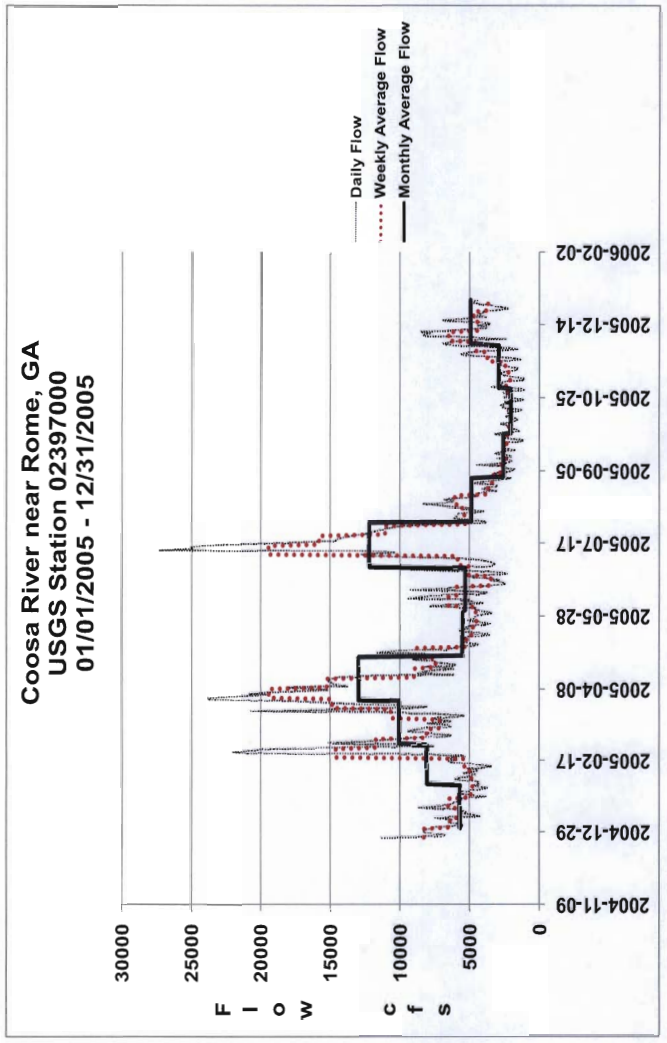

Atkins, J.

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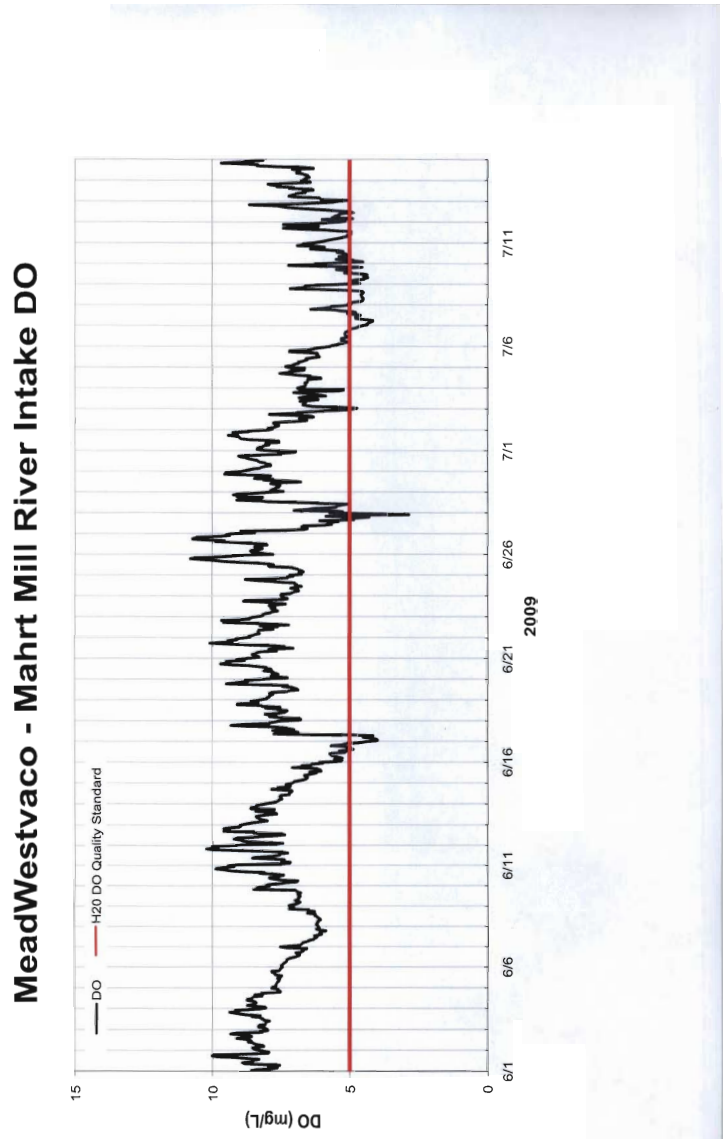

Atz, Gary

Page 1 of 1

1/15/2013

COMMENTER: Gary Atz
3345 Lake Shore Dr
Cumming, GA 30041

ORGANIZATION:

COMMENTS: You are headed for a class action law suit for diminished property values as a result of your actions in maintaining the water level at Lake Lanier. Is this what it is going to take??

Austin, Mayor

Page 1 of 3

January 11, 2013

Tetra Tech, Inc.
Attention: ACF-WCM
61 St. Joseph Street, Suite 550
Mobile, AL 36602–3521

To Whom It May Concern:

The U.S. Army Corps of Engineers published a notice in the *Federal Register* on October 12, 2012, announcing its solicitation of scoping comments concerning the update of its Water Control Manual for the Apalachicola-Chattahoochee-Flint ("ACF") River Basin. We are pleased that the Corps is providing this opportunity for input to the process and that it is considering water supply operations in its Manual update, consistent with Eleventh Circuit's ruling, the Corps' NEPA obligations, and its June 2012 authority determination.

The Metropolitan North Georgia Water Planning District ("District") was created by the Georgia General Assembly in 2001 to establish policy, create plans and promote intergovernmental coordination of all water issues in the metropolitan Atlanta area from a regional perspective. As such, the District has an enormous stake in the outcome of the update of the ACF Water Control Manual process.

The primary purpose of the District is to develop regional water resources management plans, which are enforced by the Georgia Environmental Protection Division ("GAEPD") and used for water resources permitting and state-wide planning purposes. The District's comprehensive water supply plans were adopted in 2003 and updated in 2009. These plans rely on Lake Lanier and the Chattahoochee River as the primary source of water supply for the District through the 2035 planning horizon.

Given the lack of other economically or environmentally viable alternatives, the District respectfully requests that the Corps considers the full Georgia water supply request when evaluating an expanded range of water supply alternatives associated with the Buford Dam/Lake Lanier project. This analysis should include a full and complete analysis of alternative supply sources available to meet water supply needs within the District, and a robust analysis of shortages to the metro Atlanta area that would result from granting anything less than the full request. In addition, the Corps should perform a complete economic analysis to determine the NED and RED benefits of granting the Georgia request.

40 Courtland Street, NE ♦ Atlanta, Georgia 30303-2538
Telephone: 404-463-3256 ♦ Facsimile 404-463-3254
www.northgeorgiawater.org

Austin, Mayor

Page 2 of 3

The District would ask the Corps to consider operational alternatives and contemplations presented by GAEPD on November 29, 2012 at the technical seminar convened by the U.S. Fish & Wildlife Service ("USFWS") in Eufala, Alabama. Some of the key considerations that the District would like to see the Corps include in its WCM development include: (1) evaluation of alternative levels for the rule curves and action zones in the ACF projects; (2) reconsideration of its policy of balancing the volume of water stored among the reservoirs based on percent of action zone; (3) reconsideration of Woodruff Dam release requirements, including minimum flows; and (4) the development of forecast-based operating rules which can improve the benefits derived from reservoir operating rules for all purposes.

All potential operational alternatives should be evaluated using a set of basin-wide performance measures that is as complete as possible to demonstrate trade-offs and help ensure that additional gains for one purpose cannot be achieved without substantial impact on other management objectives. We strongly encourage the Corps to focus on development of alternative performance measures which can assess the direct measures of benefits rather than rely on surrogates of impact. This is particularly important for the assessment of benefits and impacts to endangered species and other environmental considerations, including the health of the Apalachicola Bay. In addition, we would ask that specific performance measures be included that can evaluate the performance of various alternatives for water supply in the metro Atlanta area.

The member local governments and utilities of the District realize that we share a common destiny with the entire ACF basin, and desire to work with other basin stakeholders to cooperate and collaborate on how best to share our precious water resources. During the past decade, the metro Atlanta region has become a national leader in water stewardship. The District's Water Supply and Water Conservation Management Plan includes an aggressive water conservation program that includes 19 measures that are implemented by local systems (provided as an attachment to this letter). The Atlanta region is the only major metropolitan area in the country with more than 100 jurisdictions that are implementing such a comprehensive water conservation program. Further, through the District's Wastewater Management Plan, we remain committed to responsible and sustainable water management through the goal of minimizing net consumptive use and maximizing reclaimed water returns back to the ACF basin.

We appreciate the Corps' leadership and management of the ACF River Basin. If you have any questions about this request, please contact me at (770) 443-8110.

Sincerely yours,

Mayor Boyd Austin
District Chair

40 Courtland Street, NE ♦ Atlanta, Georgia 30303-2538
Telephone: 404-463-3256 ♦ Facsimile 404-463-3254
www.northgeorgiawater.org

Austin, Mayor

Page 3 of 3

The Metropolitan North Georgia Water Planning District (Metro Water District) is a leader in water conservation planning. The Metro Water District's *Water Supply and Water Conservation Management Plan* includes an aggressive water conservation program that includes 19 measures that are implemented by local systems. The Metro Water District is the only major metropolitan area in the country with more than 100 jurisdictions that are implementing such a comprehensive water conservation program.

The following is a list of the 19 water conservation measures required by the Plan. The first 12 measures are described in Section 5 of the 2009 Water Supply and Water Conservation Plan. The most recent measures (13 - 19) were added to the plan as an amendment in December 2010.

1. **Conservation pricing**
2. **Replace older, inefficient plumbing fixtures**
3. **Pre-rinse spray valve retrofit education program**
4. **Rain sensor shut-off switches on new irrigation systems**
5. **Sub-unit meters in new multi-family buildings**
6. **Assess and reduce water system leakage**
7. **Residential water audits**
8. **Low-flow retrofit kits for residential users**
9. **Commercial water audits**
10. **Education and public awareness**
11. **Install high efficiency toilets and high efficiency urinals in government buildings**
12. **New car washes to recycle water**
13. **Expedite existing programs to identify and reduce both real and apparent water losses***
14. **Multi-family high efficiency toilet rebate program***
15. **Install meters with point of use leak detection***
16. **Require private fire lines to be metered***
17. **Maintain a water conservation program***
18. **Water waste policy to reduce outdoor water waste**
19. **High efficiency plumbing fixtures consistent with state legislation**

**Indicates that implementation of this measure is only required by the water systems that receive their water supply directly from Lake Lanier or the Chattahoochee River; this includes all of the water systems in Cobb, DeKalb, Forsyth, Gwinnett, and Hall Counties and those systems in Fulton County except for the cities of Palmetto, College Park, and East Point.*

40 Courtland Street, NE ♦ Atlanta, Georgia 30303-2538
Telephone: 404-463-3256 ♦ Facsimile 404-463-3254
www.northgeorgiawater.org

B. (did not provide full name), Don

Page 1 of 1

From: DIV.ACF.EIS
Subject: FW: Our Water Control Manual Revision Public Comments

From: tab [mailto:tabtool@bellsouth.net]
Sent: Monday, January 14, 2013 12:33 PM
To: ACF-WCM
Subject: Our Water Control Manual Revision Public Comments

We whole heartedly concur w Lake Lanier Association's assertions below, as they are well founded on commercial feasibility and practicality. Please update your practices similarly—using guidelines based on flawed and dated information is poor business and hurts the State of GA, who is unfairly being asked to carry the burden for others despite struggling w a perpetually re occurring drought as well as compensating for really poor decisions in Ala & Fla.

- The 5,000 cfs minimum flow required at the state line is not representative of the true lowest historical flows in the ACF and is not sustainable.

- Lanier was never designed to support ALL downstream demands and can't be expected to because the dams originally proposed on the Flint River were never built.

- The Corps' current operating rules require more water to be released from Lanier than is necessary and do not allow as much to be stored as is possible. These draw the lake down more than necessary and make it less likely to refill to full pool under contemporary climatic conditions.

- The Endangered Species Act does not require the Corps to augment Apalachicola River flows above run-of-river levels and the practice should not be required because it depletes Lanier unnecessarily.

- Regular navigation is no longer feasible on the ACF and the Corps should not try to support it in view of the other demands on Lanier as a resource of last resort.

DonB, Forsyth County, GA

1

Baker, Donald

Page 1 of 1

From: Realkiller <Realkiller@Mindspring.com>
Sent: Sunday, November 04, 2012 3:21 PM
To: ACF-WCM
Subject: West Point Lake comment

Years ago I moved to West Point Lake area to have an enjoyable retirement since the Lake was supposed to be used for recreational purposes.

I invested quite a bit of money into a nice dock and get very little use out of it with the fluctuating water level. Last year the water drops so rapidly over a short period of time that a log got caught under by dock and caused my boatlift to twist the frame and tore the walkway away from the embankment.
By the time the dock was repaired it had cost me $2000 and the water was low again and I have not been able to use the dock for two years.
For the last two years I have had to take my houseboat out of the slip as Southern Harbor Marina and move it to deeper water. This should not have been necessary.

I had planned on relocating my company from Atlanta to the LaGrange area as my employees very much enjoy boating and the outdoors along with a lower cost of living. Needless to say that is not possible on West Point Lake.

The Corps of Engineers blames the low Lake level on the drought. However, the lake was never brought the full pool in the Spring.

It seems that the Corps of Engineers in conjunction with Fish and Game are more interested in the mussels and sturgeons, or should I say the oyster industry in Apalachicola (it appears that the Endangered Species Act is just something to hide behind).

It seems when the Lake starts to fill up it is stopped in reference to the proposed Lake level graph. Why is it not possible to go to 635 as soon as possible to give us a little more breathing room at the end of the season. This magical graph is treated as if it was a commandment from God.

There was a period two years that the Lake was held between 635 and 636 with the exception of one month each year where was dropped for maintenance. This just proves that it can be done. The Col. in charge in Mobile was going to retire and was not looking for promotion so common sense was used.

People from out of the area do not come to the West Point Lake area because they do not know if there is going to be sand or mud at the beaches. Nor do they know if they will be able to launch their boats due to the water level. Consequently revenue is lost for the area.

Hopefully, common sense will start prevail.

Cordially,

Donald L. Baker
Five Points, Alabama

1

Baker, Donald

Page 1 of 2

11/06/2012

Tetra Tech
Attention: ACF-WCM
61 St. Joseph Street
Suite 550
Mobile, AL 36602-3521

Scoping Comments for ACF Water Control Manual

I submit the following comments in the recently reopened public scoping period:

1) **There is a definitive need for additional storage in the ACF Basin; and that storage is readily and safely available in West Point Lake. Recent studies submitted to the USACE demonstrate that West Point Lake (WPL) can be maintained at a minimum 632.5 MSL year round; and if managed differently, the risk of downstream flooding during major rain events can actually be reduced! The trifecta is there to be won: Increased storage + Better management = Reduced flooding!**

2) **WPL is specifically authorized by Congress for Recreation and Sport Fishing/Wildlife Development in addition to Flood Control, Navigation, and Hydropower. Flood Control can be improved as outlined in the Operations Study referred to in #1 above and which study has been previously submitted to the USACE. Hydropower and Navigation both benefit from the availability of increased storage. The USACE must deliver and honor the Recreation and Sport Fishing/Wildlife Development Authorizations stipulated under law by Congress.**

3) **In order to accomplish #1 and #2 above, the Rule Curve needs to be adjusted upward to a minimum 632.5 MSL and the Action Zones need to be modified upward as well to a minimum 630.0 at the bottom of Action Zone 4. The parameters of 632.5 and 630.0 MSL are significant because they represent the initial and second recreation impact levels respectively as defined by the USACE.**

Baker, Donald

Page 2 of 2

2.

4) The economic damages to the WPL communities and the lack of economic development due to unnecessarily low and undependable lake levels need to be assessed and stopped. Small businesses have gone bankrupt and others have been stretched to keep their doors open. Major fishing tournaments have been cancelled damaging hotels, restaurants, marinas, and lake related businesses. Visitation is down and campgrounds have been closed. Land specifically set aside for a hotel, conference center, golf course, etc. has never been developed. We are blessed with a moderate climate and WPL should be managed as a 52 week a year lake with the corresponding benefit of a 52 week a year lake related economy! WPL needs a dependable and reliable lake level to provide for economic development and stop the economic harm.

5) Environmental harm to WPL needs to be documented. Due to wildly vacillating lake levels, the fish spawn has suffered significantly in 3 of the last 5 years and the quality of the fishery, specifically the bass and crappie, has declined. Thousands, if not hundreds of thousands of mussels have been killed threatening water quality; erosion has increased the cost of water treatment; and siltation continues to eliminate valuable storage.

6) USFWS needs to be challenged to provide their science and document the need for 5,000 cfs for endangered species. Why 5,000 cfs? Why not 2,000 cfs? How many of each endangered species are there? Do they exist in deeper water than previously thought? What is the Recovery Plan? Are they still endangered, threatened, or neither? Can they be relocated to other areas where water is more plentiful and the economic damages are less. Who is looking out for the welfare of the small businessman? Common sense would seem to dictate that the needs of man should be balanced with the needs of the critters. The RIOP needs close analysis as part of the EIS to see what changes can be made to avoid destroying the economic, environmental, and recreational value of WPL during all times other than "extreme" drought!

I thank you for the opportunity to comment and ask that the above issues be submitted and studied during the EIS period.

Sincerely,

Donald Baker
6234 County Road 266
Five Points, AL 36855

Baker, Sophronia

Page 1 of 2

11/07/12

Tetra Tech
Attention: ACF-WCM
61 St. Joseph Street
Suite 550
Mobile, AL 36602-3521

Scoping Comments for ACF Water Control Manual

I submit the following comments in the recently reopened public scoping period:

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2) WPL is specifically authorized by Congress for Recreation and Sport Fishing/Wildlife Development in addition to Flood Control, Navigation, and Hydropower. Flood Control can be improved as outlined in the Operations Study referred to in #1 above and which study has been previously submitted to the USACE. Hydropower and Navigation both benefit from the availability of increased storage. The USACE must deliver and honor the Recreation and Sport Fishing/Wildlife Development Authorizations stipulated under law by Congress.

3) In order to accomplish #1 and #2 above, the Rule Curve needs to be adjusted upward to a minimum 632.5 MSL and the Action Zones need to be modified upward as well to a minimum 630.0 at the bottom of Action Zone 4. The parameters of 632.5 and 630.0 MSL are significant because they represent the initial and second recreation impact levels respectively as defined by the USACE.

Baker, Sophronia

Page 2 of 2

2.

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I thank you for the opportunity to comment and ask that the above issues be submitted and studied during the EIS period.

Sincerely,

Sophronia W. Baker

SOPHRONIA W. BAKER
6234 County Road 266
Five Points, AL 36855

Baldino, Mark

Page 1 of 1

1/12/2013

COMMENTER: Mark Baldino
1632 Forsythia Way
St. George Island, FL 32328

ORGANIZATION:

COMMENTS: 1. An assessment and consideration of the freshwater needs that will sustain the health of the Apalachicola River and Bay. 2 Increased water release from Woodruff Dam at appropriate timing and duration to sustain Apalachicola River and Bay 3. An ACF basin wide sustainable water management plan that protects the Apalachicola River and Bay and equitably shares the water of this basin.

Barfield, Tommy and Olga

From: Olga <otbarfield@charter.net>
Sent: Tuesday, December 11, 2012 11:57 AM
To: ACF-WCM
Subject: draining of Lake West Point, GA

I moved here 12 years ago to live on and enjoy Lake West Point. Of those years I have been able to enjoy very few of them because the corp is releasing the water. I believe this lake was established for recreational pursuits and that is all. Also, I had to do some upgrade on my dock. Why? Ever since I had it upgraded (at a cost of several thousand dollars, by the way) the dock has been sitting on dry land. A ranger came and took a picture when the work was completed to make sure I did it. I also think that this note will fall on deaf ears; that you will
do just as you please disregarding the wishes of all who live here. I am frankly disgusted and thinking of moving away but I would I know I would have trouble selling this lake (?) house.

Tommy and Olga Barfield
391 South River Run Road
Hogansville, GA 30230

Barr, Douglas

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

Barr, Douglas

Page 2 of 24

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.

Barr, Douglas

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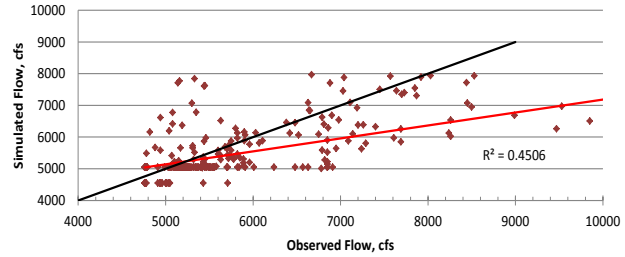
Previous analysis suggests that the COE began operating the reservoirs in a manner similar to the original Interim Operating Procedures in 2007. This is confirmed by correspondence transmitting comments by the Northwest Florida Water Management District to the Mobile District COE and U.S. Fish and Wildlife 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.

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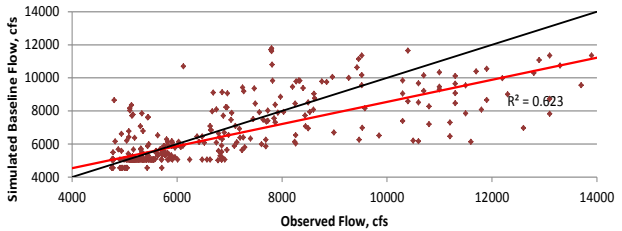
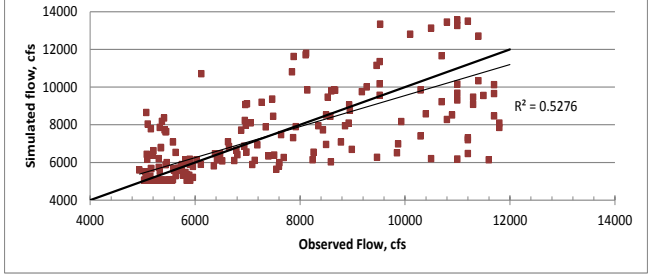
Figure 2 illustrates the actual flow (reservoir releases) in 2007-08 when the simulated releases were 12,000 cfs or less. Again, observed flows vary over a wide range when the simulated flows are less than 12,000 cfs. The trend line deviates considerably from the line representing a one to one correspondence 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.

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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

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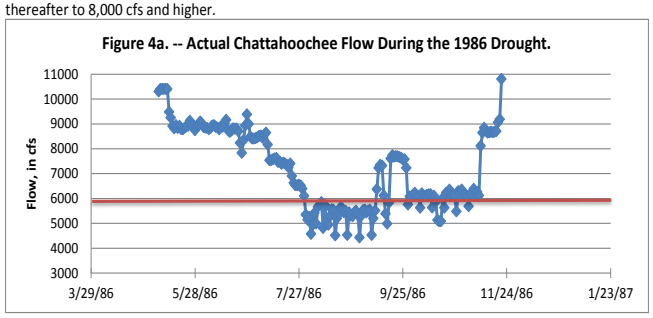
drought the COE was using the Chattahoochee streamflow station to measure compliance with the 5,000 cfs minimum. When the streamflow station was at or slightly above 5,000 cfs, the measured Woodruff discharge was significantly below this value from 1999 to 2002. Unfortunately, the COE did not reset the 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.



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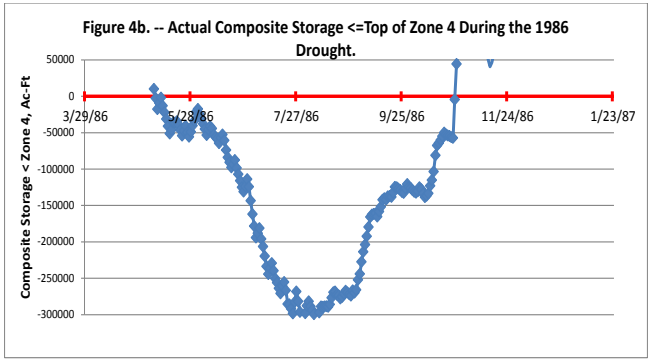

Beginning in 2007, the COE formalized conditions under which "Emergency Drought Operations (EDO) would automatically take effect when the composite storage of the reservoirs declined below the bottom of composite zone 4. The EDO was subsequently modified in the2008 and May 2012 interim procedures. The 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

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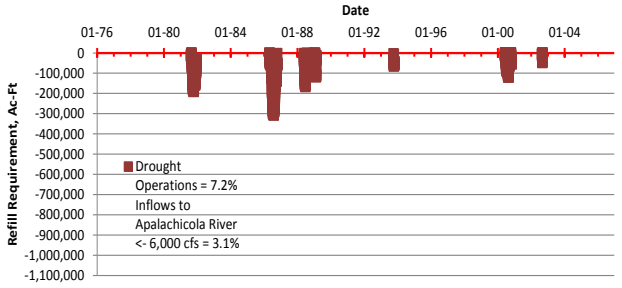
the top of composite storage Zone 4 in January, February and August - December of each year. As a result, Emergency Drought Operations and the 5,000 cfs release limit begin earlier than in the previous interim operations. Similarly, the top of Zone 2 was increased in January through April and October 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.

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Figure 6. -- Occurrence of Drought Operations and Reservoir Refill Required to End Limits on Releases to Apalachicola River, BASELINE Operations.

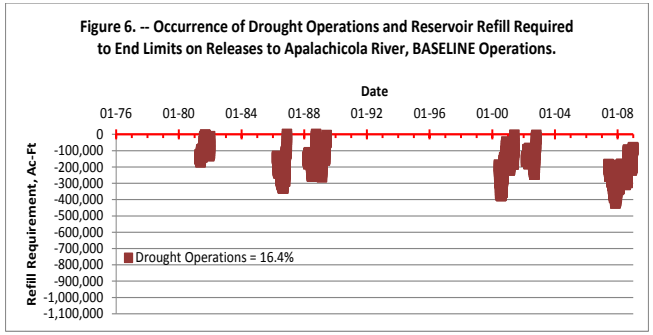
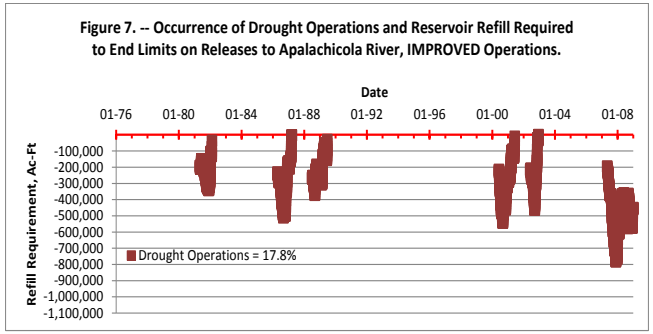


Figure 7. -- Occurrence of Drought Operations and Reservoir Refill Required to End Limits on Releases to Apalachicola River, IMPROVED Operations.



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).

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Figure 8. -- Occurrence of Drought Operations and Reservoir Refill Required to End Limits on Releases to Apalachicola River, 2020 Georgia Demands.

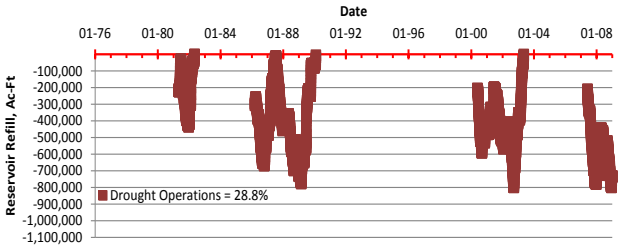
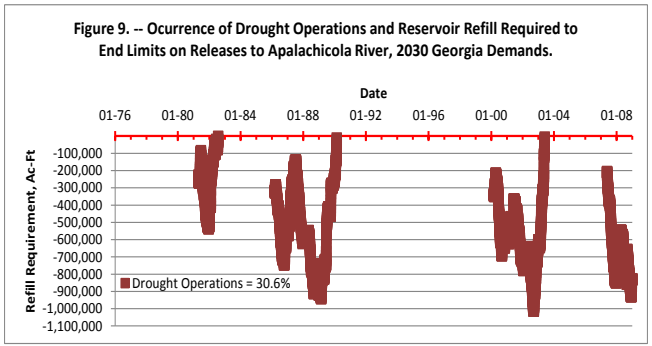


Figure 9. -- Ocurrence of Drought Operations and Reservoir Refill Required to End Limits on Releases to Apalachicola River, 2030 Georgia Demands.



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.

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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

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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.

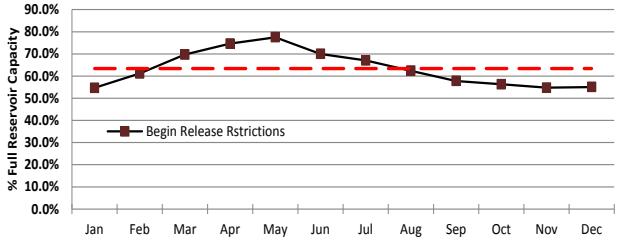
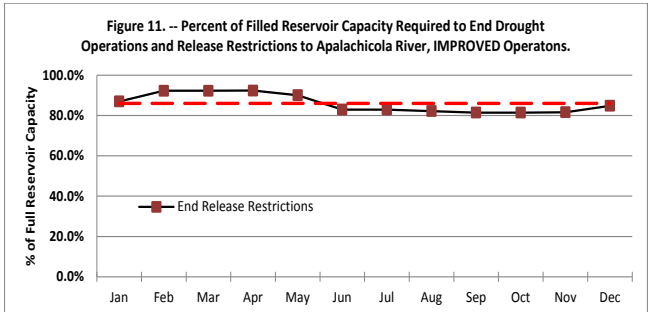


Figure 11. -- Percent of Filled Reservoir Capacity Required to End Drought Operations and Release Restrictions to Apalachicola River, IMPROVED Operatons.



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.

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Figure 12. -- Actual Lake Lanier Elevations, 1976-2008.

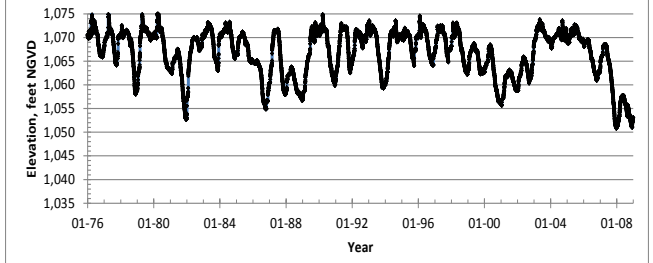
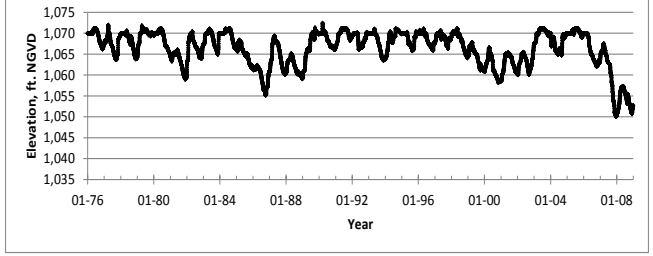


Figure 13. -- Simulated Lake Lanier Elevation, IMPROVED Operations, 2007 Georiga Demands, 1976-2008.



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.

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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.

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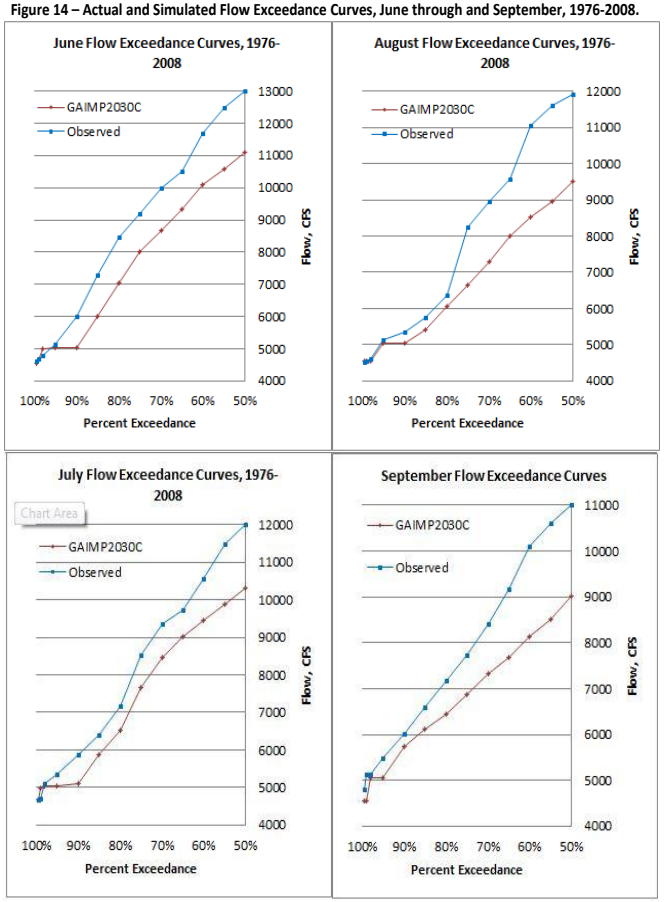
Figure 14 – Actual and Simulated Flow Exceedance Curves, June through and September, 1976-2008.



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

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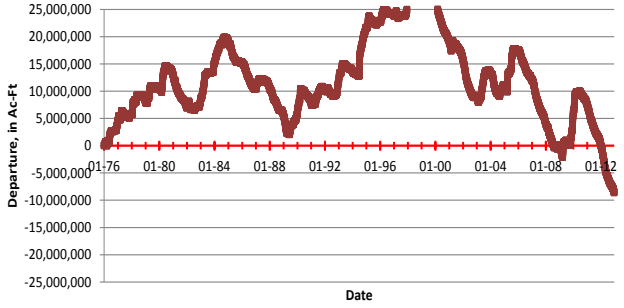
daily inflow over the period from 1976-2008 and losses that extend over a greater proportion of the historical flow regime of Apalachicola River.

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.

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Figure 16. -- Cumulative Departure of Simulated Daily Inflows to Apalachicola River from Actual Inflows, 1976-2008. Improved Operations, 2010 Demands.

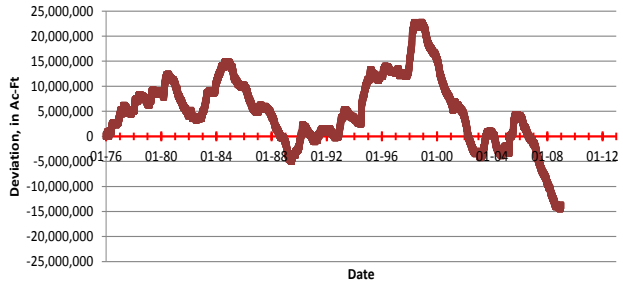
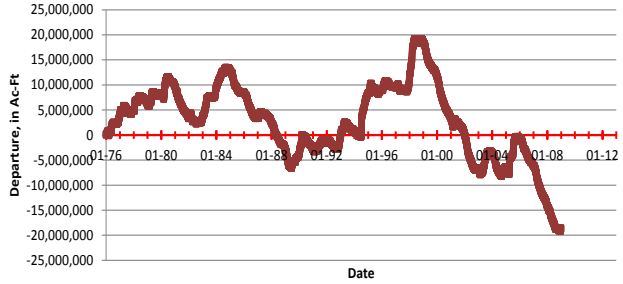


Figure 17. -- Cumulative Departure of Simulated Daily Inflows to Apalachicola River from Actual Inflows, 1976-2008. Improved Operations, 2030 Demands.



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.

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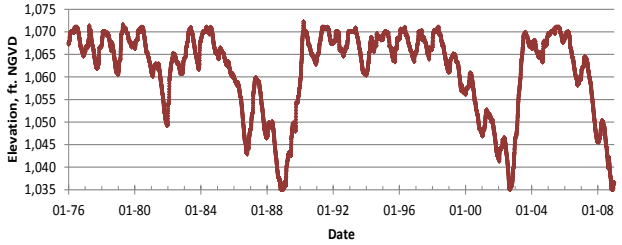
Additional Impacts to Apalachicola River resulting from unrealistic depletion of Lake Lanier Conservation Storage

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

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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.

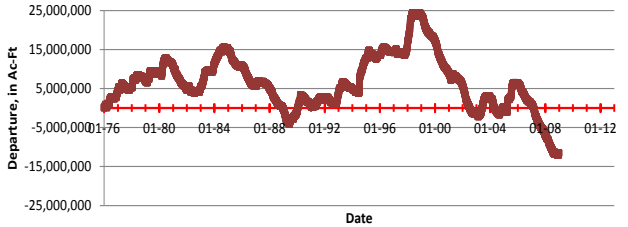
Simulated Lake Lanier declines to at or near the bottom of conservation storage is not unique to alternative GAIMP2030C. The simulated Lake Lanier elevation for alternative GAIMP2030P also depletes conservation storage by allowing Lanier to decline to an elevation of 1,035'. Alternative GAIMP2030R allows 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.



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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*

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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

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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

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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)

Barr, Douglas

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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.

Barton, Cameron

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1/14/2013

COMMENTER: Cameron Lewis Barton
302 Buteo Court
TALLAHASSEE, FL 32312

ORGANIZATION: Maclay School

COMMENTS: Please protect our River and Bay! I advocate for the scope of the Water Control Management Plan EIS to include:
1. An assessment and consideration of the freshwater needs that will sustain the health of the Apalachicola River and Bay. 2 Increased water release from Woodruff Dam at appropriate timing and duration to sustain Apalachicola River and Bay 3. An ACF basin wide sustainable water management plan that protects the Apalachicola River and Bay and equitably shares the water of this basin.
It matters.
For our "ONGOINGNESS".

Beard, Scott

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From: Scott Beard <hitide92@gmail.com>
Sent: Wednesday, December 19, 2012 6:55 PM
To: ACF-WCM
Subject: West Point Lake Water Management

US Army Corp of Engineers,

I am writing this message in response to the current scoping period to gather public feedback on the water control manual for the Chattahoochee River Basin, specifically West Point Lake.

I feel that the needs of West Point and Lagrange citizens are not being met with the current water control practices. West Point lake levels are kept too low to allow for recreational purposes even though the lake has been recognized as a recreational lake by Congress. Extremely low lake levels also negatively impact our local economy. Lagrange is in danger of losing a Bass Masters
Elite tournament planned for May due to the current mismanagement of lake water levels.

- I request that the water control policy be revised to maintain the lake at 635 feet during the summer season.

- I request that the water control policy be revised to maintain the lake at 632 feet during the winter season.

- I request that the winter season continue to begin in November, not September as is currently being discussed.

I respect the fact that the Corps has a difficult task to balance the needs of all interested parties however I feel very strongly that as Engineers a more viable solution can be found than simply using West Point lake as the work horse for the entire CRB.

Thank you for the opportunity to express my opinion.

Sincerely,
Scott Beard
Lagrange, GA

Beason, Thomas

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FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

MARJORY STONEMAN DOUGLAS BUILDING
3900 COMMONWEALTH BOULEVARD
TALLAHASSEE, FLORIDA 32399-3000

RICK SCOTT
GOVERNOR

JENNIFER CARROLL
LT. GOVERNOR

HERSCHEL T. VINYARD JR.
SECRETARY

January 14, 2013

VIA EMAIL to: acf-wcm@usace.army.mil
And US Mail to:
Tetra Tech, Attention ACF-WCM
61 Saint Joseph Street, Suite 550
Mobile, AL 36602-3521

RE: Comments on ACF Master Water Control Manual

These comments are provided on the U.S. Army Corps of Engineers' ("Corps") proposed update of the Master Water Control Manual for the Apalachicola-Chattahoochee-Flint River Basin ("ACF") in Alabama, Florida and Georgia.[1]

At the outset, the Corps must understand that Florida's earlier predictions about the impact of low flows in the Apalachicola River on the surrounding environment and way of life in the River and Apalachicola Bay (predictions long ignored by the Corps) have – unfortunately – turned out to be correct. Last year set a record for the least amount of water delivered to the Bay since records were started in 1923. This record is in spite of the fact that 2012 was not the year with the least rainfall.[2] Another unfortunate record produced last year was lowest recorded oyster harvest in the Bay. The occurrence of these records over the same time period is no accident and is only a harbinger of further environmental, economic, and cultural loss to come if the Corps fails to correctly revise its water control manuals.

Given that Florida's Governor Scott has requested a disaster declaration of the Bay on account of the oyster harvest, the Corps' update of its water control manuals is both timely and necessary. Florida recognizes that the Corps must manage the system in accordance with its authorized

[1] *See* 77 Fed. Reg. 62,224, *Notice of Intent To Revise Scope of Draft Environmental Impact Statement for Updating the Water Control Manual for the Apalachicola-Chattahoochee-Flint River Basin To Account for the U.S. Court of Appeals for the Eleventh Circuit Ruling and a June 2012 Legal Opinion of the Corps' Chief Counsel Regarding Authority To Accommodate Municipal and Industrial Water Supply From the Buford Dam/Lake Lanier Project* (Oct. 12, 2012).

[2] We recognize that the final six months of 2012 rainfall data remain provisional. However, final data from the first six months show that 2012 had the lowest average January-June flow in the 90-year period of record (by far), but ranked just tenth lowest in total January-June rainfall. The annual data, which include some provisional data, show exactly the same rankings. (*See* FDEP, 2013 in supporting documents).

www.dep.state.fl.us

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purposes. Increased upstream consumption coupled with reduced inflows to Corps reservoirs have predisposed the Corps to maximize upstream storage. However, this predisposition is neither justifiable nor equitable based on the historical record.

Under no circumstance since the reservoirs were filled has total conservation storage dropped below 500,000 acre feet. Lake Lanier, where most of the system's storage is located, has never fallen below 1,050' despite having the bottom of the conservation pool located at 1,035'. In short, since Lanier first filled, the Corps has maintained an operational "cushion" of over 400,000 acre feet (or about 130 *billion* gallons) in the conservation pool at Lake Lanier. Of course there is well over one million additional acre-feet of storage available to meet water supply demands below the bottom of the conservation pool, which the Corps has ignored entirely in its water supply analyses to date.

Meanwhile, downstream users face devastation as river levels have seen a steady erosion as each new demand placed on the system upstream is absorbed, not from the reservoir levels, but entirely from downstream river flows. After six decades steadfastly holding Lake Lanier above 1050', and in view of the predictable and avoidable devastation visited upon Florida, the Corps must now be less conservative in guarding that level and sharing the adversity of low flows at both ends of the river system. In addition, the Corps can no longer assume that all needs can be met without proactively insisting on more aggressive upstream conservation, as it is upstream use that has compromised the Corps' ability to meet its various obligations and contributed to the steady drop in river levels over the past three decades.

Florida understands the Corps is resuming prior efforts to revise the Master Manual largely as a result of the Eleventh Circuit Court of Appeals' June 2011 ruling and subsequent Army Chief Counsel's 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) ("Counsel's Opinion") addressing the Corps' authority to accommodate municipal and industrial water supply demands from Lake Lanier. Notwithstanding the narrow justification for additional Corps review, these comments are offered with the further understanding that, as part of the update process, the Corps still intends to review all reservoir regulation schedules, policies, data protocols and procedures as applied to all authorized operating purposes (e.g., recreation, navigation, hydropower, water quality, fish and wildlife, etc…).

Since the Corps is engaged in "scoping" under the National Environmental Policy Act ("NEPA"), these comments will help focus the draft Environmental Impact Statement ("EIS") on significant areas of concern and proposed alternatives that should be considered in the final EIS. Scoping comments are necessarily general in nature, and we anticipate significant additional comments of a more technical and direct nature as the Corps' proposed action crystallizes over time. At this point, since no particular action has been proposed, we seek merely to ensure the issues of concern to Florida, as well as its proposed operating alternative, are taken into account.

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Florida has previously submitted comments on issues material to the update process, which include:

- January 12, 2007 (RE: Response to Request for Comments on the Notice of Intent to Prepare Draft Environmental Impact Statement for the Proposed Implementation of Interim Water Storage Contracts Associated with the Southeastern Federal Power Customers Settlement Agreement, at Lake Sidney Lanier/Buford Dam, GA)
- November 20, 2008 (RE: Draft Environmental Impact Statement for Updated Water Control Manual for the Apalachicola-Chattahoochee-Flint River Basin)
- January 4, 2010 (RE: Revision of Scope of Environmental Impact Statement for Updated Water Control Manual for the Apalachicola-Chattahoochee-Flint River Basin)
- February 22, 2011 (RE: ACF Master Water Control Manual Update; Fish and Wildlife Coordination Act Comments)
- May 23, 2011 (RE: Florida Fish and Wildlife Conservation Commission's Comments on Draft Fish and Wildlife Coordination Act Report)
- January 6, 2012 (RE: ESA Section 7 Consultation Concerning "Modified Revised Interim Operations Plan")

The Corps has explained: "Any comments previously submitted will be reviewed and addressed in the current re-scoping so comments previously provided do not need to be resubmitted." *See* News Release, *Water Control Manuals; USACE extends public scoping to next year* (Dec. 6, 2012). Therefore, Florida simply incorporates its prior comments by this reference.

Today's comments are intended to identify what the Corps can do to help arrest continuing degradation in the Apalachicola River and Bay ecosystem. Florida has long advocated operational changes that would seek to restore the pre-dam hydrograph under which the sensitive Apalachicola River and Bay ecosystem and related socioeconomic infrastructure evolved. Unfortunately, upstream consumption and related depletions have rendered a complete return to the pre-dam hydrograph infeasible. The most important thing the Corps can do now, given this reality, is to utilize all available authorities, programs and policies to curb consumption, which threatens not only to imperil Florida's interests, but to compromise all Corps operations and the myriad interests that rely on those operations.

Given existing constraints, Florida has developed an alternative reservoir operating regime, which was presented last November at the U.S. Fish and Wildlife Service ("FWS") Workshop in Eufaula, Alabama. That presentation and related work forms the foundation of what follows. For completeness of the Administrative Record, copies of Florida's presentation at the Eufaula workshop, Florida's earlier comments, and various supporting materials have been uploaded to a private ftp site, which the Corps will be able to access for seven days. The ftp site may be accessed as follows:

1. In the address bar type ftp://ftp.myfwc.com, press the Enter key.
2. From the View Menu select "Open FTP site in 0Windows Explorer".
3. From File menu select "Login As".
4. Type in username "fwcpub", password "wecare". Press the Logon button.
5. Folder where information is located is titled "COE_WCP".

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SUMMARY OF FLORIDA'S FINDINGS

Increasing consumption and drought frequency have reduced inflows to the Corps reservoirs in recent decades. In response, Corps operations have favored elevated lake levels at the expense of river flows. This bias was clearly evident in 2012, as total composite conservation storage remained above Zone 4 nearly the entire year, while Apalachicola River flows generally flatlined at 5,000 cfs after early May. The Corps' continued insistence on elevating storage levels, irrespective of increasing demands, and without regard to empirical evidence that such operations devastated Apalachicola Bay and its oyster population is unacceptable.

Florida's modeling, notably conducted with the Corps' own ResSim Model, indicates that increased demands have taken the reservoir system to its limits. However, the Corps can improve downstream ecological and economic conditions using Florida's alternative operations to seek a better balance between lake levels and flow support. While Florida's alternative operations can have a positive effect on river flows, opportunities to improve conditions in the river and bay are rigidly limited by upstream consumption. Alternative operations must be coupled with reductions in upstream consumption to prevent further degradation of the Apalachicola River and Bay. Perpetuation of the status quo is not a sustainable option for either the lakes or the river.

Again, it does not help that the Corps has effectively shelved about 25% of total conservation storage in Lake Lanier, all but removing it from the Corps' daily operating protocol. The Counsel's Opinion makes abundantly clear that the Corps may drop Lake Lanier to 1035' as necessary to accomplish tomorrow's "water supply" mission. But the Corps has refused even to consider a similar approach to recover the Apalachicola River and offset devastation in Apalachicola Bay today. The Corps has traditionally relied on the specter of unknowable, unprecedented future droughts as reason to hold back stored water. But, given the adversity Florida *is now suffering*, this justification no longer resonates. By the time the Corps gets around to using water available to it, the damage will likely be irreparable.

THE PROBLEM OF UPSTREAM CONSUMPTION

As shown in Figure 1, upstream depletions during droughts account for approximately 3,365 cfs in the May through September time frame. Considering that these depletion amounts represent *two-thirds* of the current minimum flow of 5,000 cfs under the Revised Interim Operations Plan ("RIOP"), the ACF system is clearly overallocated. Modeling conducted by Florida has demonstrated that increasing demands can have a disproportionately large negative effect on lake storage during severe drought periods. This is particularly true in the most severe drought of the modeling period in 2007. Reservoir operating rules in the Corps models are predisposed to maximize lake levels during the 2007 drought. Yet the large demands shown in Figure 1 drove lake storage down in 2007, resulting in a situation in which the magnitude of demands during this single drought event are directly controlling the amount of flow releases in the Apalachicola River during *all dry years in the entire period of record*.

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In simple terms, this means that the Corps must draw substantially on reservoir storage to make up for upstream depletions simply to meet the minimum flow floor at the Chattahoochee gage. But for these substantial depletions, reservoir levels would not be impacted as dramatically in drought years. Nevertheless, the Corps has emphasized maintaining high lake levels but done nothing to promote conservation, leaving that matter entirely to the State of Georgia. Rather than continuing to accept the impact of upstream consumption on Federal reservoirs (and corresponding lake level and river flow reductions), it is time for the Corps to take a proactive role to promote conservation in the Basin.[3]

[3] Unfortunately, it is not a simple matter of increasing reservoir storage capacity because evaporation is maximized in the summer months, so its impact is felt at the worst possible time. The structure, location and purpose of any increased storage needs to be carefully weighed against the large evaporative losses that will occur during droughts.

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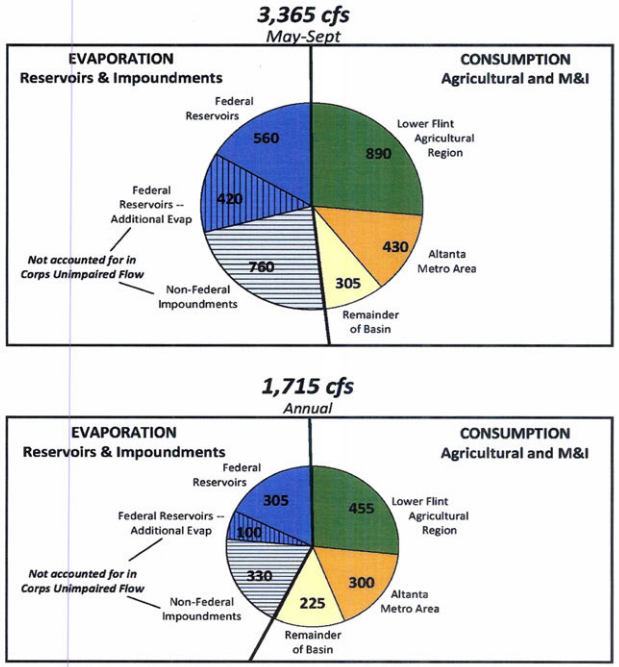
Figure 1. 2007 Depletions

Net 2007 depletions, in cfs, upstream of Woodruff Dam. Cross-hatched depletions (not accounted for in Corps Unimpaired Flow) were visually estimated from preliminary data in Figs 3.19.7 and B.2 in Draft UIF Report by GWRI/GT (2012). All other numbers are from Corps ProAction2 model, May 2012. Depletions may be higher than shown because of underestimated agricultural withdrawals in dry years and other uncertainties in Corps model (GWRI/GT, 2012), and large increases in impervious surfaces and other land use changes.



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FLORIDA'S ALTERNATIVE OPERATIONS

Applicable Operating Goals and Objectives

The Corps' "water management goals include environmental and social aspects of project regulation." EM 1110-2-3600, Ch. 3 (Development of Water Control Plans) § 3-6.c. These goals are based on laws that "require inclusion of certain aspects of environmental, fish and wildlife, and recreational uses in the management of the projects, or improvement of the environment of the rivers downstream through project regulation." *Id.* This includes ensuring water quality downstream of Corps facilities is maintained. *Id.* § 3.6.d. *See also* ER 1165-2-119, § 8.e (Modifications to Completed Projects) ("Existing projects should be evaluated and reported in accordance with ER 1130-2-334, and those found incompatible with state standards (or which otherwise are not meeting their potential to best serve downstream water quality needs) should be studied in detail to determine the justification for upgrading releases and to establish an appropriate course of action.").

The Corps has elaborated on these issues in ER 1110-2-8154 (Water Quality and Environmental Management for Corps Civil Works Projects). Water quality issues include all aspects of the "physical, chemical, and biological characteristics of water … including its quantity, distribution, movement, sediments, and biological community… ." *Id.* § 5.c. Therein the Corps explains "[w]here the quality of a water resource supports a productive, diverse, and ecologically sound habitat, those waters will be maintained and protected, unless there is compelling evidence that to do so will cause significant national economic and social harm." More importantly, in the case of the Apalachicola River and Bay, "[n]o degradation is allowed without substantial proof that the integrity of the stream will not diminish", *Id.* § 6.a, and "where degradation has occurred, it is the Corps' policy *to restore the resource to a biologically productive, diverse, and ecologically robust condition*." *Id.* § 6.b. (Emphasis supplied).

Finally, it is Corps policy to "develop and implement a holistic, environmentally sound water quality management strategy" which is "in concert with other authorized project purposes" to ensure "*the environment will be addressed as equal in value and importance to other project purposes[.]*" *Id.* (Emphasis supplied). To this end, the Corps will "[e]nsure that the project and its operation offer the lowest stress possible to the aquatic environment."

Alternative Operating Regime

In the spirit of the foregoing, Florida has developed an alternative operating regime based on five core principles:

1. Release triggers based on Revised Basin Inflow (RBI)[4] instead of the Corps' net Basin Inflow (net-BI) which is quantified only after all consumptive use is made upstream[5];

[4] As defined on Slide 16 of Florida's 11-29-2012 Eufala Workshop presentation.
[5] *Id.,* Slide 15.

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2. Rather than a handful of minimum flow floors, a full suite of minimum flows based on historic exceedance values that vary with seasons, lake storage zones, and general inflow conditions (dry or normal/wet);
3. A sharing of RBI in the form of additional releases of 50% of available RBI over the minimum release, unless storage is in drought zone (except under certain conditions when storm spillage is available);
4. Elimination of "Drought Operations" (5,000 cfs minimum) and "Exceptional Drought Operations (4,500 cfs minimum); and
5. Full use of conservation storage according to design operating range.

Florida contends that the Corps, while meeting its various obligations, must draw more heavily upon storage to minimize departures from the natural hydrograph. The natural hydrograph, which formed the foundation upon which the downstream ecosystem and economy depends, is based on a relatively long period (33 years) of flow records prior to the completion of the first Federal reservoirs.

Florida modeling, however, demonstrates that upstream consumption since the mid-1970s precludes the Corps from obtaining, solely through modified reservoir operations, pre-dam flows in model years 2000 and 2007. When we reset demands at lower levels, it became clear that these demands were the limiting factor. In light of that reality, Florida created a set of "compromised minimum flows" that are achievable within the constraints of existing demands. The compromised flows model (FL□CompAlt) worked in all years, but benefits were limited. Changing operations to use storage more aggressively definitely improves flows, but that improvement is rigidly constrained by increased demands that are severely taxing the reservoir system.[6] Thus, it should be clear that the compromised flows are not what the system requires, but merely an improvement over current operations that better reflect the pre-dam environment.

Florida urges the Corps to carefully study the proposed alternative operating regime and evaluate all available authorities the Corps has to use substantially more of their available conservation storage to augment flows during droughts and promote additional conservation upstream so that both river flows and reservoir levels can be adequately protected.[7] Florida's water needs today should not be subservient to Georgia's water needs tomorrow.

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[6] Notably, at its Eufala Workshop, FWS used a different approach to improve river flows by changing the Corps' action zones and establishing flow targets, minimum flows, and augmentation limits. Although FWS did not explore the impacts of changes in demands when they modeled their proposed alternative, they reached a conclusion similar to Florida's regarding the limited ability of the reservoir system to improve flows in the Apalachicola River given the existing demands and depletions throughout the basin.

[7] An incidental benefit of Florida's proposed alternative is to encourage upstream conservation as a means to mitigate the impact of reduced lake levels resulting from robust use of reservoir storage.

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Caveats

While Florida has attempted to design an effective operating protocol, Florida's efforts assume the validity of the Corps' underlying Model, which we have used to conduct all of our modeling analyses. To the extent any aspect of the Model is unsound, our conclusions and recommendations could be affected. The State of Alabama has raised legitimate concerns with the underlying tools the Corps is employing to analyze its alternative operating scenarios. Those concerns should be addressed and corrected, and a new version of the Model distributed to the States for their use.

Florida is aware of several major concerns with the Unimpaired Flow ("UIF") data set, which provides the basis for the Corps models. Contrary to prior claims from Georgia, the UIF data set does not represent "natural" flows that would occur absent the activities of man. Agricultural demands appear to be underestimated and a substantial amount of evaporation from thousands of non-federal reservoirs within the Basin has been entirely unaccounted for in the UIF (Figure 1).

Recent information developed for the ACF Stakeholders indicates that net evaporative losses from non-federal reservoirs exceeds 800 cfs during the spring of nearly all drought years.[8] At the Eufaula workshop, the United States Geological Survey ("USGS") indicated in addition to evaporative losses, there is also a potentially large impact on flow timing because of the large amount of precipitation that can be captured and stored by these small ponds and impoundments when their water levels are low during droughts.

Evaporation from the large federal reservoirs within the Basin also may be substantially underestimated in the UIF. Information presented by the ACF Stakeholders suggests that net evaporative losses in the federal reservoirs in the spring of drought years could be underestimated by as much as 500 cfs or more.[9]

The USGS also indicated that natural flows determined by USGS PRMS (Precipitation Runoff Modeling System) matched Corps UIF relatively well from 1951-1999. But from 2000-2008, PRMS flows appear to be 26% higher than Corps UIF. This new information from USGS supports various previous analyses indicating that the magnitude of underestimated and missing depletions in the UIF is significant and must be corrected.

THE CORPS' "REMAND ANALYSIS" AND FUTURE DEPLETIONS

A major question the Corps must address is the extent to which it should serve further water supply demands in the Atlanta metro-region. In light of its extensive modeling efforts, Florida has concluded further upstream consumption unchecked by aggressive conservation efforts will

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[8] Figure B.2 (p. 200) in Unimpaired Flow Assessment for the ACF River Basin, Draft Technical Report, Oct. 2012.

[9] Figure 3.19.7 (p. 123) in Unimpaired Flow Assessment for the ACF River Basin, Draft Technical Report, Oct. 2012.

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continue to reduce *both* river flows and reservoir levels. This raises serious concerns about the analyses contained in Corps' ACF Remand Modeling Technical Report (June 2012) ("Remand Analysis"), prepared to support the Counsel's Opinion. Current demands have already resulted in devastatingly low river flows, and reservoir levels will also drop to unacceptably low levels if demands continue to increase as projected. Aggressive conservation efforts are essential to maintaining the integrity of the river and reservoir system.

The Corps' ability to maintain the reservoir system is at risk, yet this issue was not addressed in the Remand Analysis. Possible strategies to require or encourage aggressive conservation should have been discussed. Because the river system is overallocated, any serious analysis of ACF reservoir operations must address this challenge and evaluate available mechanisms to protect inflows to federal reservoirs.

The information presented herein (and in our Eufaula presentation) demonstrates that the Apalachicola River and Bay cannot tolerate any additional depletions, and that current depletions must be reduced, through conservation, or permanent demand reduction. While it may be appropriate to evaluate the effect of unchecked consumption on Corps reservoirs, the Corps should reject any alternative that has the effect identified in the Remand Analysis. The needs of the River and Bay cannot be fully satisfied even under existing conditions.

As a purely technical matter, the Remand Analysis cannot be relied on to inform decisions about the Master Manual update because the Corps did not provide a realistic depiction of future operations and demands in this model. A new analysis is required and an updated model is needed for the States to evaluate flow and storage that could be expected if Atlanta's 2030 demands were accommodated.

Specifically, the June 2008 RIOP was assumed to be in place, even though a new RIOP was approved within a week of the Remand Analysis (May 2012). Thus the operational changes implemented by the 2012 RIOP have not been taken into account in the Remand Analysis. Moreover, the demand data employed in the Remand Analysis is incomplete because 2030 demands included increases for the Atlanta area only. Agricultural demands and other demands outside the Atlanta metro region are fixed at 2007 levels.

Finally, the 2030 demand data is based on outdated numbers that were estimated 12 years ago.[10] Updated numbers must be used in this analysis to more accurately reflect the latest estimates of Atlanta's projected water use.

Regardless of the specific problems with the Remand model itself, however, the Corps needs to address the extreme low flows that currently exist in the Apalachicola River and include

[10] The source of the 2030 demand amounts are described on page A-12 of Remand Modeling Technical Report, as follows: "The State of Georgia through the office of Governor Roy Barnes submitted a letter dated May16, 2000 to the Assistant Secretary of the Army (Civil Works) indentifying Georgia's projected Chattahoochee River and Lake Lanier water withdrawals and returns thru the year 2030.

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proposed solutions in their analysis that will prevent these unacceptable conditions from being exacerbated by the accommodation of further water supply withdrawals.

To this end, the Remand Analysis reinforces Florida's long-held position that the Corps has discretion to utilize the entire conservation pool as necessary to meet authorized project purposes. To date, the Corps has never used conservation storage capacity in Lake Lanier between elevations 1035 and 1050. The Counsel Opinion clearly states that the full conservation pool at Lake Lanier is available for project operations, including, (at least in the Army General Counsel's view) to meet Georgia water supply demands. Moreover, as noted above, there is over one million acre feet of water in inactive storage from which water supply needs might be met. Thus, the Corps should dispel the apparent myth that Atlanta's water supply will be compromised if Lake Lanier were taken to 1035'.

The question squarely before the Corps in light of the Remand Analysis is whether it will sacrifice the needs of the Apalachicola River and Bay *today*, by setting aside upstream storage in its reservoirs to accommodate *potential* 2030 demands in Georgia. Florida maintains that any operating regime based on such an inequitable principle is indefensible.

ADDITIONAL CONCERNS

Flow Metrics

In determining the appropriate flow regime in the Apalachicola River, we are aware that some Basin interests are advocating operations designed solely to meet arbitrarily selected habitat "metrics" such as the amount of spawning habitat for a single species inundated at a particular flow. This approach is untenable. There are nearly 1,000 fish, benthic macroinvertebrates, and plant species affected by low and medium flows in the Apalachicola River and floodplain alone; this number would be much more than 1,000 if amphibians, reptiles, mammals, and avian species were included along with fish, shellfish, or macroinvertebrates in Apalachicola Bay.[11] It is not possible to handpick a random assortment of select species and assume that the broader ecosystem will be supported by flows designed to satisfy their limited needs.[12] Moreover, as explained below, arbitrarily selected species-specific metrics can be misused to justify even greater departures from the natural flow regime with even less water being provided to an already distressed environment. Such a result is counter to riverine science and common sense.

A holistic approach to flow metrics is required to protect the overwhelming biological complexity of a large, productive river-floodplain-estuary ecosystem like the Apalachicola. Too many interests, including Apalachicola Bay oysters, will go unprotected if flows are designed to

[11] See FDEP, 2013 in supporting documents.
[12] For example, the maintenance of minimal connections between the River and Swift Slough, while critical for the survival and recovery of endangered mussel species, does little to alleviate adverse salinity conditions in Apalachicola Bay. Should conditions experienced in 2012 be repeated this year, a complete collapse of the oyster population is within the realm of possibility. More must be done to prevent such an outcome.

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support a select few threatened or endangered species. In that regard, Atkins (2012) used what appears to be a sound approach by setting a percent reduction limit on the area of connected aquatic floodplain habitat to inform their percent-of-flow (POF) reduction recommendation. This approach effectively addresses the entire flow regime because it protects all aquatic habitats in the floodplain from the river and slough banks covered at minimum flow up to the high bottomland hardwoods inundated only during annual floods.

Recommended minimum flows proposed by Atkins were determined using a 15 percent reduction in connected aquatic habitat in the floodplain. Atkins noted that a 15 percent allowable reduction in habitat from the historic baseline condition has been used to limit impacts on many waterbodies in Florida over the years, and is recognized as a reasonable threshold beyond which damage to the ecosystem becomes significant. As the Corps' analysis proceeds, this aspect of the Atkins approach should be examined carefully to determine if this is acceptable.
A final comment is needed to provide perspective regarding the holistic habitat metric and POF recommendations proposed by Atkins. Such an approach could result in minimum flow standards that may not be achievable in some years because of existing demands, even if reservoir operations are changed to balance flow augmentation and lake storage more equitably. However, setting minimums that represent what the system needs, not what it can get under current demands, is the only appropriate and responsible strategy for protecting this system.

Considering the devastating oyster mortality in the Bay that occurred this summer as well as declines in shrimp and crab harvests and freshwater fisheries, massive die-offs of endangered mussels, and drying of the floodplain forest that has occurred in recent years, there is no question that the system has suffered severe adverse impacts under current conditions. The extreme low spring flows and extended durations of minimum flows in summer and fall that have occurred frequently since 2000 have obviously crossed a threshold with regard to impacts on the ecosystem. The magnitude of upstream depletions indicates that the river is seriously overallocated and the Corps is not increasing augmentation from the reservoirs to help mitigate this problem. Recovery is needed, and some of the flows that have been depleted by water consumption need to be restored through aggressive conservation throughout the basin and greater use of available conservation storage in the reservoirs. Environmental flow standards that protect the basic flow needs of the ecosystem, regardless whether or not they can be met with existing demands, will provide an appropriate guide for this recovery process.

Georgia's Proposal

Presentations by USGS, FWS, Alabama, and the ACF stakeholders at the Eufaula workshop last month provided many positive contributions to the ongoing dialogue. Florida takes exception, however, to Georgia's presentation, which included a proposed operation based on narrowly considered metrics for limited species. Simply stated, Georgia misused Apalachicola River and Bay metrics to support a proposed operating regime that resulted in Lake Lanier levels about 3-4 feet higher than current operations most of the time, and lower flows in the Apalachicola River nearly half the time with the duration of flatline minimum flows almost doubled.

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It is clear that the Apalachicola River needs more flow, not less, to help recover from the devastating mortality in the Bay that occurred this summer as well as previous massive die-offs of endangered mussels, decline in fisheries, and drying of the floodplain forest that has occurred in recent years. Using incorrect and/or uninformative Apalachicola River and Bay metrics to support a proposed operating regime that results in lower river flows defies common sense and is wholly unacceptable.

Sincerely,

Thomas M. Beason
General Counsel

Bennett, Tammy

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From: Tammy B Bennett <tabennett@coca-cola.com>
Sent: Thursday, November 15, 2012 1:28 PM
To: ACF-WCM
Subject: Response to NOI posting Oct 12, 2012

As a resident on lake Lanier (16 years), I have the following issues/concerns with the dramatic rise and fall of lake levels and the unintended consequences:

- Significant soil erosion occurring as a result of excessively low water levels; there is too much unprotected and vulnerable shoreline exposed. The last heavy rain resulted in a four foot (4') deep by three feet (3') wide gulley, adjacent to our dock, which poured mega-gallons of silt into the lake. At the end of the cycle, our dock was on beached and our cove was smaller.
- Continual erosion is filling-up the lake with silt.
- The rip-rap that home owners install does not help the problem because the lake level rarely reaches rip-rap levels.
- Dredging is not an option for the average family, like us.
- Consider alternatives to stop the erosion on shorelines for lakefront homeowners. Such as:
  - Planting grass (winter rye)
  - Laying/dumping gravel
  - Etc.

Best regards,

Tammy Bennett
9230 Hawks Nest Drive
Gainesville, 30506

Bethea, Sally

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3 Puritan Mill 916 Joseph Lowery Blvd. Atlanta, GA 30318 404-352-9828 www.chattahoochee.org

Tetra Tech, Inc.
61 St. Joseph Street
Suite 550
Mobile, AL 36602-3521

January 11, 2013

RE: Notice of Intent to Revise Scope of Draft Environmental Impact Statement for Updating the Water Control Manual for the Apalachicola-Chattahoochee-Flint River Basin to Account for the U.S. Court of Appeals for the Eleventh Circuit Ruling and a June 2012 Legal Opinion of the Corps' Chief Counsel Regarding Authority to Accommodate Municipal and Industrial Water Supply from the Buford Dam/Lake Lanier Project (Fed. Reg. Notice 77(198): 62224 (Oct. 12, 2012))

To whom it may concern:

On behalf of Chattahoochee Riverkeeper (CRK), I submit the enclosed comments in response to the October 12, 2012 public notice concerning the U.S. Army Corps of Engineers (Corps) update of the Water Control Manual for the Apalachicola-Chattahoochee-Flint (ACF) river basin. CRK is a non-profit, environmental advocacy organization consisting of more than 6,000 members dedicated solely to the protection and restoration of the Chattahoochee River to ensure we have enough clean water for people and wildlife. These comments are supplemental to comments CRK has submitted previously on the issue, including those submitted November 21, 2008 and December 23, 2009 (both letters, attached). Our comments focus on three aspects of the Environmental Impact Statement (EIS) the Corps will prepare in conjunction with the Water Control Manual update: the (1) baseline and affected environment, (2) alternatives analysis, and (3) direct, indirect, and cumulative impacts.

(1) **Baseline and Affected Environment**

Any NEPA analysis should establish the magnitude and significance of impacts to the human environment by comparing the environment in its naturally occurring state with the expected impacts of other actions. Use of a baseline for comparing predicted effects of the proposed action and its reasonable alternatives is an essential part of the NEPA process. A description of the baseline condition should address "…how conditions have changed over time and how they are likely to change in the future without the proposed action." If unable to establish a "naturally occurring" condition, a description of a modified but ecologically sustainable condition can be used instead. "Ecologically sustainable" means the artificial system supports biological processes, maintains its level of biological productivity, functions with minimal external management, and repairs itself when stressed. (*See* EPA, 1999, Consideration of Cumulative Impacts in EPA Review of NEPA Documents, 315-R-99-002).

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We have concerns over the validity of two baseline datasets which will feature prominently in the Corps decision making: (a) metro Atlanta water demands generated by the North Georgia Metropolitan Water Planning District and (b) unimpaired flow data developed by the Corps. We urge the Corps to carefully scrutinize both of these data sets before relying on them to any extent during the EIS process. In both cases, we recommend correcting the data prior to proceeding.

(A) Current & Future Water Demand Data

Before determining a reasonable range of alternatives for managing the ACF in general and Lake Lanier in particular for water supply and other authorized purposes, we strongly urge the Corps to ensure that all baseline data is based on the most recent and scientific information available. In particular, CRK remains strongly concerned over the inflated estimates of future water supply needs for metro Atlanta. We have raised this issue previously, but it is so critical to allocation of the ACF that we believe it bears repeating.

In fact, we have carefully analyzed the projected water demands published by the North Georgia Metropolitan Water Planning District (Metro District) in our new report: "Filling the Water Gap: Conservation Successes and Missed Opportunities in Metro Atlanta." See http://www.ucriverkeeper.org/enews/documents/FTWG12.pdf. As we noted in our report, "In 2009, the Metropolitan North Georgia Water Planning District (Metro District) projected future water demand out to 2035, relying on outdated data and invalid assumptions. As a result, those projections overstate the region's future water need." Our report identified the following flaws in the current and future water demand data:

(i) **Economic Forecast**

In 2009, the Metro District used a model to project 2035 water demand, assuming high population and employment growth.[1] Those projections ignored the last severe economic recession (December 2007-June 2009), from which the nation is still recovering.[2] In fact, between 2006 and 2010, the 15-county Metro District area *lost* more than 148,000 jobs.[3]

To reach the number of jobs forecasted in the Metro District's 2009 plan, the 15-county region would have to add more than 650,000 jobs by 2015, 1,270,000 jobs by 2025, and 1,918,000 jobs by 2035. That amounts to 32%, 62%, and 93% job growth, respectively, a highly unlikely scenario.

(ii) **Population Forecast**

The Metro District's water demand projections also are overly optimistic with respect to population growth. The latest U.S. Census data reveals a population of roughly 4.8 million in 2010 for the 15-county Metro District area. This estimate is approximately 200,000 (or 4%) *less* than the 2009 forecasts generated by the state based on the 2000 U.S. Census.[4]

[1] Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009).
[2] Data from National Bureau of Economic Research, http://www.nber.org/.
[3] Data from U.S. Department of Labor, Bureau of Labor Statistics, http://www.bls.gov/data/.
[4] Data from the U.S. Census Bureau, http://2010.census.gov/2010census/.

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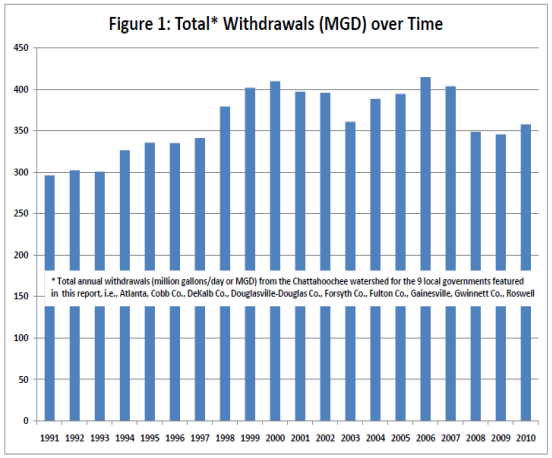
To reach the population sizes forecasted in the Metro District's 2009 plan, the 15-county region would have to add more than 460,000 people by 2015, 1.45 million people by 2025, 2.66 million people by 2035, and 4.17 million people by 2050. That amounts to 10%, 30%, 55%, and 86% population growth, respectively.

(iii) **Water Use**

The Metro District's 2035 projections also used 2006 as the baseline year for estimating future water demand. Water use in 2006 then was "adjusted" upward on the presumption that use in 2006 was "unnaturally depressed" due to the drought.[5] In fact, the 2006 data preceded the drought and proved to be the second highest year of water use over a 17-year period.[6]

2010 data from Georgia's Environmental Protection Division (EPD)[7] shows that the total annual Chattahoochee water withdrawals for the nine utilities featured in our report have dropped to pre-drought levels. *See* Figure 1. Whether reduced water use is sustained in spite of our current drought remains an open question.



[5] Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009).
[6] http://water.sam.usace.army.mil/Buford_Dam_Water_Supply_Analysis_23_Nov_08.pdf.
[7] Data provided by W. Zeng, Hydrological Unit, Georgia Environmental Protection Division (EPD) (May 2012).

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(iv) Conservation Savings Potential

Finally, the Metro District's 2035 water demand projections underestimated the region's ability and commitment to reduce water use. The 2009 plan estimates that by 2035 the region will reduce water use 8% through water conservation efforts and an additional 5% simply due to natural retrofitting in compliance with the latest plumbing code.[8] The Metro District estimates that the approved 2010 amendments to the plan will save an additional 23 million gallons of water day (MGD),[9] amounting to just slightly more than 2% of the region's projected 2035 water demand.[10] In other words, the Metro District estimates the region can reduce water use by only 15% by 2035.

For the nine utilities featured in our report, we see that water use already has declined by more than 14% since 2006. If this reduced water use is sustainable following our current drought, then greater water savings through conservation must be feasible.

To summarize our findings, the Metro District projections rely on economic forecasts that pre-date the recent, severe economic recession. The Metro District projections also rely on population projections that pre-date the 2010 U.S. Census. Moreover, the Metro District projections use a high water use year as the initial condition for generating the forecasts, and adjust that initial condition upward on the erroneous assumption that water use was depressed when in fact it was a high use year. Finally, the Metro District vastly underestimates current and future water conservation efforts to assume a high rate of increase in water use over time. Any one of these invalid assumptions standing alone is enough to call into doubt the future demands the Metro District has generated. Before the Corps considers how to operate the ACF for future water supply, the Corps must require the Metro District to provide updated and scientifically defensible projections of future water demand.

(B) Unimpaired Flow Data

Through our involvement with the ACF Stakeholders, CRK has become more aware of some of the flaws and gaps in the unimpaired flows (UIF) data set which the Corps relies on to evaluate operation scenarios. Last year, the ACF Stakeholders commissioned an analysis of the UIF and provided the analysis to the Corps last November (Georgia Water Resources Institute/Georgia Tech, *Unimpaired Flow Assessment for the Apalachicola-Chattahoochee-Flint River Basin, Draft Technical Report* (Oct. 2012)). That report identified significant flaws and gaps in the UIF data set such as missing and negative stream flow values. There also appears to be insufficient adjustments made for consumptive uses in the UIF data set, particularly with respect to municipal and industrial withdrawals, agricultural withdrawals, and evaporative losses from reservoirs. As a result, the UIF data set includes stream flows that are lower than they might be if all consumptive uses were incorporated fully. In other words, the model suggests that historical flows were lower than they most likely were, thereby underestimating the impacts of

[8] Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009).
[9] K. Shorter (AECOM) Memorandum to P. Stevens (Metro North Georgia Water Planning District), *Additional Conservation Measure Analysis* (Aug. 2, 2010).
[10] Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009).

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consumptive use on the ACF basin and biasing efforts to set informed ecological flow targets. An additional problem arises from the extreme variability in the data set, where stream flows may vary by thousands or tens of thousands of cubic feet per second, in some cases in the negative direction.

The Corps has publically acknowledged these flaws and gaps but has dismissed them largely on the basis that the data is still valid for comparative purposes. While this may be true to some extent, we emphasize that reliance on a flawed or deficient UIF data set for purposes of either evaluating environmental impacts or establishing flow targets protective of the environment is ill-advised, particularly during low flow periods when greater confidence in the data is needed. We concur with U.S. Fish & Wildlife Service (FWS), who recommends using pre-dam flows for evaluating the impacts of operations on fish and wildlife in the Chattahoochee River. We direct the Corps to the FWS' *ACF Planning Aid Letter and Addendum* (attached) for further guidance. *See* letter from S. Tucker, Field Supervisor (FWS) to Colonel B. Jorns (Mobile District, Corps) (April 2, 2010) and letter from S. Tucker, Field Supervisor (FWS) to Colonel S.J. Roemhildt (Mobile District, Corps) (March 1, 2011).

We also strongly urge the Corps to work with the three states (Georgia, Alabama, and Florida) to correct the UIF. The October 2012 Georgia Water Resources Institute/Georgia Tech UIF report referenced above provides several recommendations for improvements, and we suggest the Corps review that document to gain further insight into how the dataset might be corrected. We further urge the Corps to work with the three states to improve transparency surrounding water use throughout the basin.

(2) Alternatives Analysis

The alternatives analysis is "the heart of the environmental impact statement." 40 CFR § 1502.14. Its purpose is to "[provide] a clear basis for choice among options by the decisionmaker and the public." *Id.* The analysis should include a thorough discussion of available alternatives to a project that fulfills the project's underlying purpose and need, including "reasonable alternatives not within the jurisdiction of the lead agency." *Id.* at § 1502.14(c). Some reasonable alternatives outside the Corps' jurisdiction ought to be considered, including more aggressive water conservation and efficiency measures adopted at both the Metropolitan North Georgia Water Planning District ("Metro District") and the state level. Our 2012 report, "Filling the Water Gap: Conservation Successes and Missed Opportunities" (attached) describes several such measures. In our report, we outline a set of modest water conservation measures that if implemented have the potential to supply water for up to 2.6 million Georgians annually.

During recent droughts, ACF management has focused on maintaining high reservoir levels in Lake Lanier in order to maximize water supply options for metro Atlanta to the detriment of downstream and lake communities. During the scoping phase, we strongly urge the Corps to explore other options that are more equitable in terms of drought mitigation. Specifically, the Corps should consider whether emergency conservation measures and/or reallocating more of the composite conservation storage to West Point Lake and the other downstream reservoirs could better alleviate adverse drought impacts.

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Of course, water supply is not the only authorized purpose of the Corps ACF projects, nor is water supply superior to other purposes. Hydropower and recreation are other purposes for which the ACF is managed. In recent years, there have been repeated instances of large, rapid releases from Buford Dam in order to meet peak power demands which have posed serious risks to recreational safety at times leading to tragic results. There is also a new class-5 whitewater course near Columbus, which will pose additional river safety challenges. We strongly urge the Corps to reevaluate its operations, placing public safety at the forefront. CRK has worked closely with the National Park Service (NPS) and the local rowing community on this issue, and we strongly urge the Corps to consult with these and other key stakeholders (boaters, paddlers, fishers, waders) as well as Georgia Power as your agency continues to reevaluate and adjust its operations.

(3) Direct, Indirect, & Cumulative Impacts

During the EIS process, the Corps will have to examine the effects of its proposed actions on the human environment. We are most concerned about potential adverse impacts to ACF ecology, recreation, public safety, and water quality. Specifically, with respect to ecology, we urge the Corps to ensure that the preferred alternative does not adversely impact river flows and riparian habitat needed along the mainstem, headwaters, and tributaries for fish and wildlife. We strongly urge the Corps to work closely with the FWS and other federal agencies to avoid adverse impacts to fish, wildlife, and habitat throughout the ACF basin. To the extent that data may be lacking, we urge the Corps to support and collaborate with its sister agencies, including FWS, NPS, U.S. Geological Survey, and U.S. Environmental Protection Agency (EPA), to collect and compile the necessary data to monitor the ecological impacts of ACF operations and to develop an adaptive management plan that protects the ACF ecosystem.

With respect to recreation, we strongly urge the Corps to work closely with the NPS to determine what flows are needed to support park purposes within the Chattahoochee River National Recreation Area. Regarding public safety, large, rapid releases coming out of Buford Dam continue to pose a lethal risk to river users. Low flows through Bull Sluice Reservoir also have proven dangerous to users above Morgan Falls Dam. We again urge the Corps to work with the NPS, Georgia Power, and the local rowing, paddling, boating, fishing, and wading community to improve its operations to maximize public safety. The Corps also should take this opportunity to assess its safety outreach programs as well as the efficacy of the warning system for protecting all users.

With respect to water quality, unless and until the state of Georgia institutes a new flow requirement for wastewater assimilation and all Chattahoochee withdrawal and discharge limits are adjusted to reflect that new requirement, the Corps must continue to operate the ACF system so as to achieve an instantaneous flow in the Chattahoochee River at Peachtree Creek of 750 cubic feet per second in order to ensure adequate wastewater dilution. We urge the Corps to work with the state, local governments, EPA, and Georgia Power to ensure this standard is met and water quality is monitored at all times.

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We further note that West Point Lake suffers from chronic low lake levels and faces ongoing water quality challenges. We urge the Corps to carefully scrutinize the impacts its operations are having on West Point Lake water quality and recreation.

Finally, we remind the Corps of current and future proposed activities in the ACF basin that undoubtedly will lead to adverse cumulative impacts on the ACF basin and the Corps ability to operate the system for all uses. These activities include the proposed Glades Farm reservoir in Lake Lanier's headwaters, the proposed Bear Creek Reservoir in South Fulton County, Bartlett's Ferry hydroelectric (FERC) relicensing, and Georgia's regional water planning efforts. We strongly urge the Corps' Mobile District to coordinate with the Corps' Savannah District (Glades Farm & Bear Creek reservoirs), Federal Energy Regulatory Commission (Bartlett's Ferry), Georgia Environmental Protection Division (statewide water planning), and the Metro District (metro Atlanta water planning) as it evaluates the cumulative impacts of its proposed operations on the ACF basin.

Thank you for allowing us this opportunity to comment again on the scope of the EIS for the ACF Water Control Manual update. If you have any questions or concerns with our comments, please do not hesitate to contact Laura Hartt, CRK Water Policy Director at lhartt@chattahoochee.org or 404-352-9828, x15.

Sincerely,

Sally Bethea
Executive Director and Riverkeeper
Chattahoochee Riverkeeper
916 Joseph Lowery Blvd.
3 Puritan Mill
Atlanta, GA 30318

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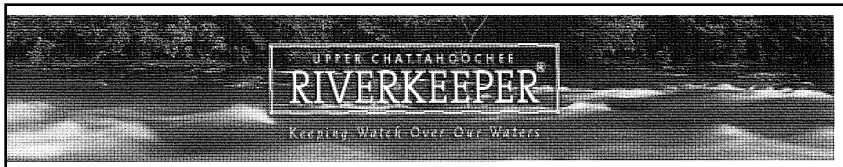

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November 21, 2008

Colonel Byron Jorns
US Army Corps of Engineers - Mobile District
PO Box 2288
Mobile AL 36628-0001

RE: Scope of Environmental Impact Statement (EIS) for the Update of the Water Control Manual for the Apalachicola–Chattahoochee–Flint (ACF) River Basin in Georgia, Florida, and Alabama

Dear Colonel Jorns:

The Upper Chattahoochee Riverkeeper submits these comments on behalf of the Southern Environmental Law Center and Georgia River Network. We are writing in response to the September 19, 2008 Public Notice published in the Federal Register (FR Doc. E8–21912) concerning the Water Control Manual Update for the Apalachicola-Chattahoochee-Flint ("ACF") River Basin.

Upper Chattahoochee Riverkeeper ("UCR") is a non-profit environmental advocacy organization dedicated to the protection and restoration of the Chattahoochee River, its tributaries, and watershed. UCR represents more than 5,000 members who use and enjoy the river and its resources and depend on the Chattahoochee River and its lakes as a source of drinking water and for recreation. The Southern Environmental Law Center ("SELC") is a regional nonprofit legal organization whose mission is to protect and restore the natural resources of the Southeastern United States. The Georgia River Network works to ensure a clean water legacy by engaging and empowering Georgians to protect and restore our rivers from the mountains to the coast.

Our comments focus primarily on the operation of Buford Dam and its impacts on water quality, recreation, fishing, and water supply downstream from the Lake Lanier project on the Chattahoochee River.

Background

The Chattahoochee River is the most heavily-used water resource in Georgia. *See* USGS, Influences of Environmental Settings on Aquatic Ecosystems in the Apalachicola-Chattahoochee-Flint River Basin, Water Resources Investigations Report 95-4278 (1995). The quality of the water is a result of the complex interaction of natural and human influences on land and water. Metro Atlanta, the largest and fastest growing metro area in the Southeast, is in

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the river basin's headwaters. *Id.* The basin's growing population presents challenges to balancing human and ecosystem needs for water of sufficient quantity and quality. *Id.*

Urban runoff and other nonpoint sources, such as eroded soil from construction activities, constitute approximately 75% of the pollution problems. *Id.* Various state and federal laws mandate the control of stormwater runoff in order to protect downstream water quality and property values; however, enforcement is severely lacking at all levels of government. *Id.* Silvicultural and agricultural activities can also influence aquatic ecosystems primarily through nonpoint source inputs of pesticides, nutrients and sediment, and by physical alteration of riparian and stream margin habitats. *Id.* The cumulative effect of these activities has not been systematically evaluated in the ACF basin. *Id.* UCR urges the Corps to take the requisite hard look at these factors as well as those issues outlined below.

Purpose and Need

The statement of purpose and need must "specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action." 40 CFR § 1502.13. At the outset, we note that a decision from Judge Paul Magnuson in the U.S. District Court for the Middle District of Florida is pending. In all likelihood, his decision will address the key issue of whether any of Lake Lanier can be used for water supply, and if so, how much. Until we know the judicial outcome, we believe it is premature to move forward with drafting of the EIS, and encourage the Corps to either provide for another scoping period in response to that pending decision or to include reasonable alternatives that explore all the potential water supply allocation outcomes.

Alternatives Analysis

The alternatives analysis is "the heart of the environmental impact statement." 40 CFR § 1502.14. Its purpose is to "[provide] a clear basis for choice among options by the decisionmaker and the public." *Id.* The analysis should include a thorough discussion of available alternatives to a project that fulfills the project's underlying purpose and need, including "reasonable alternatives not within the jurisdiction of the lead agency." *Id.* at § 1502.14(c). One required alternative to consider is the alternative of taking no action. *Id.* at § 1502.14(d). Some reasonable alternatives outside the Corps' jurisdiction ought to be considered, including more aggressive water conservation and efficiency measures adopted at both the Metropolitan North Georgia Water Planning District ("Metro District") and the state level.

UCR has been an active participant in the Metro District's water planning effort. Unfortunately, we remain concerned over what appears to be a lack of commitment to meaningful water conservation and efficiency and a determination to rely on dedication of more storage in Lake Lanier for water supply, more impoundments on the Chattahoochee and Flint Rivers, and more interbasin transfers. For example, the draft 2008 update to the District's Water Supply and Water Conservation Management Plan continues to rely on securing maximum (i.e., 22%) water supply from Lanier to meet projected water demand, while setting weak conservation goals that amount to an active water savings of at most 8% by 2035. *See* attached letter from S. Bethea,

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UCR, to J. Hinkle, Metro Water Planning District, Re: Metro District's draft 2008 District-Wide Water Supply & Water Conservation Management Plan (Aug. 29, 2008).

In contrast to the Metro District, both Georgia Environmental Protection Division (EPD) Director Dr. Carol Couch and Georgia Governor Sonny Perdue acknowledge that 25-33% water savings over the next 25 years is feasible. *See* interview of Dr. C. Couch by Georgia Public Broadcasting, Re: Georgia's Water Crisis, available at http://www.gpb.org/georgiaweekly/2008/09/28l; press release from Gov. S. Perdue, Re: Governor highlights the conservation benefits of fall planting (Oct. 31, 2008), available at http://gov.georgia.gov/00/press/detail/0,2668,78006749_101951868_126635478,00.html.

We have been active participants in Georgia's statewide water planning effort, which now seems to be slowly entering the implementation phase. We await the long overdue draft Water Conservation Implementation Plan (WCIP), noting that delay and deliberation over finalizing the draft WCIP stem from concerns that concrete water savings goals may or may not be included in the final plan. *See* attached notes from A. Murphy, GA EPD, Re: August 4, 2008 Stakeholder Meeting Convened by Dr. C. Couch to Discuss the WCIP; attached email from D. Denion, GA EPD, to WCIP Sectors, Re: WCIP Meeting on Aug 4 (Aug. 6, 2008).

We strongly urge the Corps to consider more aggressive water conservation and efficiency measures at regional and state levels during its alternatives analysis, including exploring existing and potential conservation efforts in Florida and Alabama as well as Georgia.

Baseline and Affected Environment

Any NEPA analysis should establish the magnitude and significance of impacts to the human environment by comparing the environment in its naturally occurring state with the expected impacts of other actions. Use of a baseline for comparing predicted effects of the proposed action and its reasonable alternatives is an essential part of the NEPA process. A description of the baseline condition should address "…how conditions have changed over time and how they are likely to change in the future without the proposed action." If unable to establish a "naturally occurring" condition, a description of a modified but ecologically sustainable condition can be used instead. "Ecologically sustainable" means the artificial system supports biological processes, maintains its level of biological productivity, functions with minimal external management, and repairs itself when stressed. (*See* EPA, 1999, Consideration of Cumulative Impacts in EPA Review of NEPA Documents, 315-R-99-002).

We believe there are several basic questions that must be addressed in this section of the EIS. Namely,

- How will the Corps model pre-dam, post-dam, and alternative regimes in the context of ecological, hydrological, and water quality response? How will the Corps ensure integration of ecological variables into the ResSim's hydrological and water quality models?

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- How will the Corps capture temporal and spatial variation? How will the Corps address uncertainty, including that due to drought, flooding, and climate change? What sensitivity analyses will the Corps perform?
- What does current data suggest regarding inflow into Lake Lanier? To what extent is the current drought impacting the Upper Chattahoochee River's watershed?
- Will the Corps develop a "budget" for the ACF River Basin that finally tells us how much instream flow is needed to maintain the ecological integrity of the natural system?
- If the National Research Council (NRC) proceeds with the ACF study proposed by Florida's U.S. Congressional leaders, what is its timeline relative to this EIS process? How will the Corps include the NRC's findings in the draft/final EIS? To the extent the NRC study ignores the ecological and hydrological needs of the Chattahoochee and Flint rivers, will the Corps support and/or commit to a similar study to address the two upper ACF Basin rivers?

Direct Effects

Direct effects are defined as those impacts which are caused by the action and occur at the same time and place. 40 CFR § 1508.8(a). We are concerned about several potential effects that past and ongoing Corps operations of reservoirs in the ACF River Basin have had and will continue to have on the Chattahoochee River's water quality, wetlands, riparian buffers, fish habitat, recreational opportunities, and water supply for these and other uses. We strongly encourage the Corps to consider the following during preparation of the EIS:

Water Quality—We are concerned that current and future Corps operations in the ACF River Basin may adversely affect water quality preventing attainment of the Chattahoochee River's designated uses (fishing, recreation, and drinking), particularly at low flow conditions. As the Corps is well aware, we have repeatedly shared our concerns over the lack of real-time water quality monitoring in conjunction with instantaneous flow monitoring on the Chattahoochee River at Peachtree Creek. *See* attached letter from S. Bethea, UCR, to E.P. Robbins, Corps, Re: Release No. 08-053—Corps reviews request for reductions from Lake Lanier (Oct. 27, 2008). Our water quality concerns do not end there.

Elsewhere along much of the Chattahoochee River, water quality standards are not being met, designated uses are not being achieved, and numerous segments have been designated as impaired. Moreover, Georgia EPD is slow to develop total maximum daily loads (TMDLs) to address these water quality deficiencies. These water quality problems appear to be chronic and intensifying.

In 1991, the ACF River Basin was selected by the U.S. Geological Survey (USGS) for investigation in the National Water Quality Assessment (NAWQA) Program. *See* USGS, Influences of Environmental Settings on Aquatic Ecosystems in the Apalachicola-Chattahoochee-Flint River Basin, Water Resources Investigations Report 95-4278 (1995). The objective was to provide a broad synthesis of topics relevant to understanding the health of the aquatic ecosystem and water quality conditions in the ACF River Basin. *Id.*

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Among other conclusions, the USGS NAWQA study determined that two-thirds of the 938 stream miles in the Georgia portion of the ACF River Basin had water quality that did not meet or only partially met the designated use criteria. *Id.* In particular, fishing as a designated use went unmet in more than 80 percent of impaired stream miles. *Id.* EPA's National Study of Chemical Residues in Fish (1991) revealed that tissue in fish caught in the Chattahoochee River below Atlanta contained chemical concentrations that were among the highest in the nation. *See* USGS, Influences of Environmental Settings on Aquatic Ecosystems in the Apalachicola-Chattahoochee-Flint River Basin, Water Resources Investigations Report 95-4278 (1995).

A review of Georgia's 2008 list of impaired surface waters shows little if any signs of improvement over the 20-plus years elapsing since completion of the USGS NAWQA study; today, numerous segments of the Chattahoochee River below Buford Dam remain impaired for fecal coliform bacteria, biota, pH, PCBs, dissolved oxygen (DO), and temperature. (Georgia 2008 305(b)/303(d) List Documents, Appendix A Waters Assessed for Compliance with Designated Uses, at A-4-7).

The most recent TMDLs were issued in January 2008 for biota and fecal coliform. The TMDL analysis shows that 25 stream segments located in the Chattahoochee River Basin were biota impacted due to sedimentation. (*See* GA EPD, Evaluation for Twenty Five Stream Segments in the Chattahoochee River Basin for Sediment (Biota Impacted), iv (Jan. 2008)). The TMDL analysis also identified seven stream segments located below Buford Dam in the Chattahoochee River Basin as water quality limited due to fecal coliform bacteria. (*See* GA EPD, Total Maximum Daily Load Evaluation for Nine Stream Segments in the Chattahoochee River Basin for Fecal Coliform, January 2008, iv (Jan. 2008)).

With respect to the lakes in the Chattahoochee River Basin, at least three separate locations in Lake Lanier have been classified as 'impaired" for violating the chlorophyll *a* criteria. (2006 Lakes/Reservoirs Not Fully Supporting Designated Uses, GA EPD, available at http://www.gaepd.org/Files_PDF/305b/Y2006_303d/Y2006_Lakes_Not_Fully_Supporting.pdf). West Point Lake was also designated as impaired for Fish Consumption Guidance and PCBs. *Id.* Nevertheless, GA EPD is attempting to further weaken water quality standards—particularly for chlorophyll *a*—in all of Georgia's lakes including Lake Lanier and West Point Lake, a change that is contrary to the federal Clean Water Act. 33 U.S.C. § 1313(b)(2); 40 C.F.R. § 131.5(a)(1); *see* Notice of Public Hearing and Proposed Amendments to Rules and Regulations for Water Quality Control, Chapter 391-3-6, GA EPD, October 1, 2008).

Most recently, the City of LaGrange has documented nutrient problems in West Point Lake including elevated nitrogen levels that exceed the water quality standards for the lake. *See* attached letter from Mayor W. Lukken, City of LaGrange, to Colonel B. Jorns, Corps, Re: GA EPD's request for reduced flows in the Chattahoochee River at Peachtree Creek (Oct. 15, 2008).

We strongly urge the Corps to evaluate the effects ACF River Basin operations have on water quality in the Chattahoochee River below Buford Dam, particularly during summer drought conditions and periods of low flow.

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Wetlands & Riparian Buffers—In addition to considering effects on water quality standards, we also urge the Corps to carefully consider the effects ACF River Basin operations may have on wetlands and riparian buffers. Wetlands and riparian buffers are important features that provide beneficial ecological services including protecting and improving water quality, providing fish and wildlife habitat, storing floodwater, reducing stormwater runoff, maintaining stream channel integrity, and maintaining surface water flows during dry periods. *See* J. Meyer et al., Implications of Changes in Riparian Buffer Protection for Georgia's Trout Streams (Oct. 2005), available at http://www.rivercenter.uga.edu/publications.htm.

Fish Habitat--Changes in Corps operations in the ACF River Basin have the potential to affect fish habitat in the Chattahoochee River. We note in particular the importance of preserving the disappearing trout habitat in the Chattahoochee River below Buford Dam as well as providing sufficient, healthy flows for the Buford Trout Hatchery. *See* J.P. Runge *et al.*, Survival and dispersal of hatchery-raised rainbow trout in a river basin undergoing urbanization, North American J. of Fisheries Management, 2008 (28): 745-757.

Recreation—UCR shares the concerns of the National Park Service with respect to boating prospects in the Chattahoochee River National Recreation Area during low flows. See attached letter from D. Brown, NPS, to District Engineer, Corps, Re: GA EPD's request for reduced flows in the Chattahoochee River at Peachtree Creek (Nov. 4, 2008). Moreover, during UCR's river patrol trips, we have observed firsthand that when the flow in the river at Peachtree Creek is less than 750 cfs, the Chattahoochee River is virtually impassible by motor boats from Buford Dam to West Point Lake.

We strongly urge the Corps to evaluate the effects ACR River Basin operations have on recreational opportunities in the Chattahoochee River below Buford Dam to, and including, West Point Lake, particularly during times of low flow.

Downstream water supply—UCR notes that ACF River Basin operations tend to be largely driven by Metro Atlanta's demand for Lanier as a water supply. As the Corps knows, water supply is not the primary purpose of Lanier; in fact, current water supply allocation may be in excess of that authorized by Congress. We strongly urge the Corps to evaluate water supply needs for all downstream purposes, including drinking water, fish habitat, recreation, agricultural, and power supply. With respect to the latter, we strongly urge the Corps to secure, analyze, and provide for public scrutiny water consumption data pertaining to coal-fired and nuclear power plants along the Chattahoochee River.

Indirect Effects

NEPA's implementing regulations define indirect effects as those effects that are later in time or farther removed in distance from a given project, but still reasonably foreseeable. They may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. 40 CFR § 1508.8(b).

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Again, we are concerned about several potential impacts Corps operations of reservoirs in the ACF River Basin have had and will continue to have on the Chattahoochee River. Those indirect impacts of greatest concern include those due to population growth and development facilitated by increasing water supply.

Such impacts include water quality degradation, wetland loss and destruction, riparian buffer loss and destruction, fish habitat degradation, and impaired recreational opportunities, outlined above. Additionally, we are concerned that Corps ACF River Basin operations will result in further impaired headwater stream habitat for imperiled species; reduced base flow, degraded water quality, and impaired fish habitat and survivorship due to increased impervious surfaces; reduced instream flows due to additional and/or modified reservoirs; and increased reliance on ecologically damaging interbasin transfers. We strongly encourage the Corps to consider all of these indirect effects during preparation of the EIS.

The uses of both the Chattahoochee and Flint River Basins for increased water supply will unquestionably result in more growth and the attendant impacts described above. The Corps must consider the direct, indirect, and cumulative impacts of all current and proposed water supply reservoirs and intakes in the ACF Basin, including those listed in the Metro District's water supply plans and those included in studies by the Georgia Environmental Facilities Authority, as described below.

Increased Impervious Surfaces--Using satellite data from 2005, we see that the 15-county Metro Atlanta region has lost over 6,000 acres of tree canopy while adding nearly 4,000 acres of hard (impervious) pavement. Data available at http://narsal.uga.edu/glut/. Impervious surfaces, including roads, parking lots, and building rooftops, reduce the ability of the Chattahoochee River's watershed to absorb rain. As a result, base flow is reduced and the river receives diminished recharge. Instead, runoff collects and dumps oil, bacteria, sediment, grease and other pollutants into our rivers and streams, contaminating drinking water sources.

The amount of impervious surface in a watershed is directly related to the health of that watershed, and whether or not it will be able to continue to supply clean water to communities. Generally, when 10-15 percent of a watershed is covered by impervious surfaces, the increased sediment and chemical pollutants in runoff have a measurable affect on water quality. Center for Watershed Protection, Impacts of Impervious Cover on Aquatic Systems (Mar. 2003), available at http://www.cwp.org/Resource_Library/Center_Docs/BSD/ELC_BSDpart2.pdf.

These impervious surfaces also may impair fish habitat and survival. *See* J.P. Runge *et al.*, Survival and dispersal of hatchery-raised rainbow trout in a river basin undergoing urbanization, North American J. of Fisheries Management, 2008 (28): 745-757; S. Wenger et al., Stream fish occurrence in response to impervious cover, historic land use, and hydrogeomorphic factors, Can. J. Fish. Aquat. Sci. 65: 1250-1264 (2008).

Degraded Headwater Stream Habitat for Imperiled Species—We are concerned that continuing efforts to increase storage in Lake Lanier serves to facilitate more growth and development not only for the Metro Atlanta area but also locally in the Chattahoochee River's headwaters. *See*

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attached UCR, Chattahoochee Headwaters Aquatic Biodiversity Assessment and Conservation Project (Sept. 30, 2004).

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We strongly urge the Corps to carefully examine the potentially adverse indirect effects Corps existing and future ACF River Basin operations will have on listed and sensitive species in headwater streams feeding the Upper Chattahoochee River's watershed.

Future Impoundments—The Metro District is proposing four new reservoirs in the Chattahoochee River Basin to meet 2035 projected water demand for the region. *See* Metropolitan North Georgia Water Planning District, Preliminary Draft, Water Supply & Water Conservation Management Plan, 2-4 (July 2008). The Metro District is also considering an additional two to three reservoirs on the Chattahoochee River and two reservoirs on the Flint River for meeting post-2035 projected water demand. *See id.* at 6-10 & 6-13. These reservoirs are in addition to the assumed maximum water supply allocation out of Lake Lanier.

However, as we note in our comments on the draft 2008 update for the Metro District's Water Supply & Water Conservation Management Plan, those water projections are deeply flawed—driven by improperly selected and adjusted initial conditions as well as high population and economic growth scenarios. *See* attached letter from S. Bethea, UCR, to J. Hinkle, Metro Water Planning District, Re: Metro District's draft 2008 District-Wide Water Supply & Water Conservation Management Plan (Aug. 29, 2008).

Furthermore, the Georgia Environmental Facilities Authority (GEFA) has surveyed and inventoried feasible sites for the purpose of water supply. GEFA, Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs (Nov. 3, 2008), available at http://www.gefa.org/Index.aspx?page=465. Notably, that study concluded that the more cost-effective and least ecologically-damaging and therefore preferred alternative is to expand existing reservoirs rather than to build new ones or raise Lake Lanier. *Id.*

Consistent with this GEFA study, we strongly urge the Corps to reject the Metro District's approach to assessing and meeting future water demands, instead considering reasonable alternatives to building more reservoirs or raising Lake Lanier levels.

Interbasin Transfer (IBT)—Whether involving diversion of water from the Coosa River Basin into the Chattahoochee River Basin to meet Metro District water supply needs, or the diversion of water out of the Chattahoochee River into the Ocmulgee River Basin to meet other water demands, Corps ACF River Basin operations are likely to indirectly affect the degree to which these and other IBTs impact the Chattahoochee River. We strongly urge the Corps to carefully consider reasonable and ecologically less destructive alternatives to IBTs during preparation of the EIS. Furthermore, because of existing and planned transfers between the Coosa and Chattahoochee River Basins, the Corps must also consider the connections between the ACF water control manual and the concurrent revisions to the Alabama-Coosa-Tallapoosa water control manual. Any decisions about dam management and interbasin transfers in one basin will have significant effects on the other basin.

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Cumulative Impacts

Cumulative impacts result from the incremental impacts on the environment from a project when added to past, present, and reasonably foreseeable future actions in the same area. These impacts can arise from individually minor but collectively significant actions taking place over a period of time. 40 C.F.R. § 1508.7. Ongoing and future Corps operations within the ACF River Basin have potentially significant cumulative impacts on the human environment, including incremental changes in water quality, fish habitat, recreational opportunities, water storage, interbasin transfers, and ACT River Basin operations. Moreover, these impacts will be further exacerbated by future reservoirs, prolonged drought, and climate change.

The Water Control Manual for the Corps ACF River Basin operations should contain a long-term, comprehensive, science-based drought management plan. GA EPD's continuing ad hoc requests for temporary flow reductions in the Chattahoochee River at Peachtree Creek during heightened drought conditions is having unknown cumulative impact on the Chattahoochee River's water quality and instream flows. One reason that it is difficult to determine impacts on the river downstream of Peachtree Creek in Atlanta is the lack of adequate *real time* flow and water quality monitoring data. In fact, the lack of adequate flow and water quality monitoring throughout the ACF Basin is a significant problem that the Corps must address in its EIS.

The Corps must consider the cumulative effects of all proposed and existing withdrawals on the ACF system. These should particularly include the significant withdrawals for agricultural water use in the Lower Flint Basin, the proposed coal-fired power plant on the Chattahoochee River in Early County, GA, and the existing and future needs of the Farley Nuclear Plant in southeastern Alabama. We strongly encourage the Corps to consider these cumulative impacts as it drafts the EIS.

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Conclusion

Thank you for the opportunity to help frame the EIS for the Water Control Manual Update pertaining to the ACF River Basin. We look forward to further participation in the NEPA process as it continues to unfold. Please don't hesitate to contact us if you have any questions.

Sincerely,

Sally Bethea

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December 23, 2009

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Colonel Byron Jorns
US Army Corps of Engineers - Mobile District
PO Box 2288
Mobile AL 36628-0001

RE: Notice of Intent to Revise Scope of Draft Environmental Impact Statement (EIS) for Updating the Water Control Manual for the Apalachicola–Chattahoochee–Flint (ACF) River Basin to Account for Federal District Court Ruling

Dear Colonel Jorns:

I am writing on behalf of the Upper Chattahoochee Riverkeeper in response to the November 19, 2009 Public Notice published in the Federal Register (FR Doc. E9–27787) concerning the Water Control Manual Update for the Apalachicola-Chattahoochee-Flint ("ACF") River Basin. These comments are supplemental to those we submitted on November 21, 2008 in response to the September 19, 2008 Public Notice (FR Doc. E8–21912).

Upper Chattahoochee Riverkeeper ("UCR") is a non-profit environmental advocacy organization dedicated to the protection and restoration of the Chattahoochee River, its tributaries, and watershed. UCR represents more than 5,000 members who use and enjoy the river and its resources and depend on the Chattahoochee River and its lakes as a source of drinking water and for recreation.

In our November 2008 letter, our comments focused primarily on the operation of Buford Dam and its impacts on water quality, recreation, fishing, and water supply downstream from the Lake Lanier project on the Chattahoochee River. In light of the July 17, 2009 federal judicial ruling significantly curtailing metro Atlanta's access to Lake Lanier for water supply, we make the following additional comments.

While the ruling clarifies the limited degree to which Lanier can be operated for water supply, the response of the three states, Georgia in particular, will have a significant impact on the ACF Basin. For instance, we note the array of water supply options recently proposed by Georgia's Water Contingency Task Force, which include

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- **Pump-Storage Reservoirs along Tributaries to the Chattahoochee River**—We have serious concerns with at least two of these—Glades Farm, South Fulton Bear Creek. I have attached comment letters UCR has submitted to the Corps' Savannah District that highlight both our site-specific as well as our ACF River Basin-wide concerns.
- **Deviation from Georgia's Interim Instream Flow Policy and Peachtree Creek Flow Target**—We further note that the Task Force has proposed significant deviations from the state's Interim Instream Flow Policy as well as the 750 cfs flow target Peachtree Creek presumably to increase yield within these water supply reservoirs. These proposals will have devastating impacts on water quality, recreation, habitat, and other key instream needs throughout the ACF Basin. I have attached a comment letter UCR submitted to the Task Force which also raises these concerns.
- **Inter-Basin, Intra-Basin, and Interstate Water Transfers**—The Task force has proposed everything from inter-basin transfers (moving water from Lake Burton and Lake Hartwell/Savannah River Basin to Gwinnett County's water treatment plant on Lake Lanier) to intra-basin transfers (moving water from West Point Lake up into Metro Atlanta) to even interstate transfers (from Alabama's Tennessee River to "somewhere" in the Metro District). Of course, because of widespread use of septic systems, any transfer of treated water into Gwinnett County may ultimately end up in the Ocmulgee Basin, not the Chattahoochee. As for West Point Lake, there are serious concerns over inadequate flows to maintain current water quality conditions let alone restore water quality to meet designated uses.
- **Aquifer Storage and Recovery (ASR)**—Finally, the Task Force has proposed at least one ASR site in northwest Georgia that, if implemented, may adversely impact the surface hydrology and water quality of the ACF River Basin.

Although still in the planning stages, each of these options is undergoing serious scrutiny by the state of Georgia and a decision on implementation is imminent. If any or all of these above options are implemented, they will significantly impact the Corps ACF operations, which must accommodate authorized uses of navigation, hydropower, and flood control. With respect to the latter, the recent historic 500-year flood is a good indicator of the management challenges the Corps will continue to face as metro Atlanta's rapid, unchecked development leads to more and more impervious surfaces throughout the ACF Basin.

Along with highly engineered, unsustainable options that will adversely impact the ACF River Basin if pursued, the Task Force has proposed a handful of relatively modest conservation measures to help address the 2012 water "gap" left by the federal judicial ruling. In conjunction with the Georgia Water Coalition (GWC), UCR submitted extensive comments (attached) detailing the true potential of water conservation to meet water supply needs. The region's ongoing reluctance to readily embrace water conservation means that more demands will be placed on the ACF system. These foreseeable future demands will cumulative and adversely impact Corps ACF operations.

Finally, we also want to emphasize the need for the Corps to consider the ongoing Federal Energy Regulatory Commission (FERC) relicensing of the Bartlett's Ferry facility and the operations of other non-Corps facilities during the Water Control Manual update. Notably, some 60,000 acre-feet of storage is available in Lake Harding, which could provide roughly 1,000 cfs

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of water for 40 or more days. One alternative that the Corps ought to consider is the integration of non-Corps, federally-licensed reservoirs into a meaningful drought contingency plan.

Thank you very much for this opportunity to comment again on the update to the ACF Water Control Manual.

Sincerely,

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April 2, 2010

Colonel Byron Jorns
US Army Corps of Engineers, Mobile District
P.O. Box 2288
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Dear Colonel Jorns:

We are providing your agency with a Planning Aid Letter (PAL) for the proposed Water Control Manual (WCM) Updates for the Apalachicola-Chattahoochee-Flint (ACF) River Basin in Georgia, Alabama, and Florida. The purpose of the updates is to identify operating criteria and guidelines for managing water storage and release of water from Corps reservoirs. In the National Environmental Policy Act (NEPA) review, the Corps will address current operations, proposed changes in water management operations at the reservoir projects within the limits of the existing authorities, as well as potential impacts throughout the basin that would result from implementation of the updated manual.

The purpose of the PAL is to identify resource values and issues, identify endangered species issues, and propose preliminary changes, mitigation, or enhancement opportunities to facilitate your decision-making as it relates to equal consideration of fish and wildlife resources. We submit the following comments and recommendations under the ESA, the Migratory Bird Treaty Act (MBTA)(49 Stat. 755, as amended; 16 U.S.C. § 702 *et seq.*), and the FWCA (48 Stat. 401, as amended; 16 U.S.C. § 661 *et seq.*). These comments are based on previous studies and government documents as well as new datasets and information provided by State and Federal agencies. Although all of the comments from the Florida Fish and Wildlife Conservation Commission (FFWCC) have not been integrated, this final version of the PAL addresses many of the issues that FFWCC raised. We will continue to provide additional expertise and information in the form of another PAL and/or the draft Fish and Wildlife Coordination Act report. A separate consultation will occur regarding the potential impacts of the Corp's proposal on federally-listed threatened and endangered fish and wildlife species protected under the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1531 *et seq.*).

1. Development of Corps Alternatives and Mitigation

We have identified data needs and assessment methods that can help you in developing alternatives that maximize fish and wildlife benefits, and avoid, minimize and compensate for impacts to fish and wildlife resources, where appropriate.

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1.1 Flow Regime

The WCM update should include a thorough evaluation of project-related flow regime alterations and the potential to restore flow regime components that have ecological and geomorphic significance. We recommend the Corps develop alternatives that would maximize benefits to fish and wildlife resources in light of other project purposes. To support this effort, we have provided preliminary ecosystem flow guidelines for four river sections; below Buford, West Point, Walter F. George, and Jim Woodruff dams. These flow regime guidelines are guided by the principle that ecosystems evolved as a response to the natural flow regime. Thus, we analyzed river flows and developed flow guidelines based on United States Geological Survey (USGS) flow data that were collected prior to Buford Dam construction in the mid 1950's, a benchmark of the first major river regulation source in the upper Chattahoochee River. Reliance on pre-regulation datasets to derive ecosystem flows is particularly useful for locations where empirically derived ecology-flow relationships are scant (such as the upper Chattahoochee River).

We recognize that complete implementation of all guidelines presented herein is not feasible given the expansive flow alteration and consumptive demands in the ACF River Basin that have occurred since Buford Dam construction. However, restoration of some natural flow regime components presented in these guidelines can restore structural and functional ecosystem elements that were lost or reduced as a consequence of flow regulation. For example, provision of stable flow windows (*sensu* Freeman et al. 2001) in the spring may increase riverine fish recruitment, even though restoration of other naturally occurring flow regime components may not be attainable. Relatively small discharge changes can have substantial ecological effects. For example, the Tennessee Valley Authority's (TVA's) strategy to increase baseflows below Normandy Dam (Figure 1) during the spring and summer mussel recruitment months resulted in biologically and statistically significant increases in mussel diversity and density (Figure 2, Ahlstedt and Johnson 2004).

Development of environmental flow alternatives would include an evaluation of the operational feasibility, constraints, and tradeoffs to providing the different aspects of environmental flow measures that are captured in our guidelines. Explicit magnitude, frequency, duration, timing, and rate of change guidelines are provided to illustrate the types of flow modifications that are likely to benefit the ecosystem and to help inform the development of Corps flow alternatives. However, should the magnitude of a flow guideline be deemed unattainable, we request that the Corps identify a flow magnitude that is attainable or recommend an attainable frequency for the recommended flow magnitude. An explanation for the change also will be helpful. We recognize these guidelines do not define whether the basin is entering a dry, average, or wet month, which are the lines between the lower and upper limits on the flow prescription graphs. We recommend that you work with us to develop appropriate hydrological and meteorological criteria (e.g., basin inflow, precipitation, and reservoir levels) needed to classify the coming month as a dry, average, or wet month.

Successful implementation of ecosystem flows in the Chattahoochee River is challenged by water demand increases, reduced operational flexibility imposed by meeting minimum discharge requirements at downstream locations, and the importance of minimizing high discharge-related

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damage to infrastructure. To address these challenges, we considered only the range of flows that were likely to be above minimum flow requirements and less than flows that could cause major infrastructure damage as identified by information provided by the National Weather Service (NWS) Advanced Hydrologic Prediction Service (NWS 2010; Table 1). The ecosystem flow guidelines are preliminary because in instances where water is diverted from the channel, or the channel is anthropogenically altered, natural flows may be insufficient to meet ecological needs.

Successful implementation of ecosystem flows in the Apalachicola River is challenged by the same types of limitations described for the Chattahoochee River. The degree of Apalachicola River channel entrenchment and widening, caused largely by Corps reservoir and dredging operations, varies spatially, but the discharge that is now required to reach bankfull elevation and cause floodplain inundation in the upper portion of the river is generally greater than the discharge that was historically required. However, datasets are available that quantify the amount of floodplain habitat inundated with the current level of entrenchment and over a range of discharges. These datasets, in combination with those that describe flow effects on sturgeon spawning and mussel habitats, will help to inform the development of future ecosystem flow guidelines and the evaluation of alternatives.

Thorough explanations of the physical, chemical, and ecological benefits from base flows, pulses, stable flow windows for spawning, and intra- and interannual flow variation are outside the scope of this letter; however, we refer the reader to Junk et al. 1989, Poff et al. 1997, Richter et al. 1998, Freeman et al. 2001, Postel and Richter 2003, and Mathews and Richter 2007 for fuller descriptions. The importance of baseflows, pulses, and flood flows are described within these resources, and they are quantitatively evaluated using the recently developed Environmental Flow Components (EFCs) in Indicators of Hydrologic Alteration (IHA)(Mathews and Richter 2007). General descriptions of the baseflow, pulse, and high pulse flow guidelines are provided below with general descriptions of the ecological significance of those flow guidelines.

Similar to the Instream Flow Guidelines provided to the ACF Compact's Federal Commissioner (USFWS 1999), the guidelines provided in this letter were developed using IHA, use the pre-dam period of record as a benchmark for comparison of flow alternatives, and rely on percentiles to define the frequency of high and low flow extremes. Using EFCs is recommended because the analysis separates ecologically-relevant hydrograph components (e.g., baseflows from pulses) allowing computation of magnitude, frequency, duration, timing, and rate of change statistics on individual hydrograph components rather than on the entire dataset. Consequently, these hydrograph summary statistics are easily developed, interpreted, and communicated, and have been used successfully to inform flow management downstream from hydropower dams.

1.1.1 Baseflow and small pulses

Baseflows determine the amount of habitat that is available for forage, reproduction, and rearing, which has a substantial influence on the abundance, diversity, and distribution of aquatic fauna. We have provided explicit base flow recommendations for every month in dry, average, and wet water years. Small pulses that do not exceed bankfull elevation provide influxes of upstream

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trophic subsidies, and reprieves from low dissolved oxygen and high temperature that sometimes occur during summer months. Small pulses are included in the guidelines with explicit magnitude, frequency, duration, timing, and rate of change recommendations (Figures 3-6).

The flow guidelines were based on average daily flows (Figures 3-6). Average daily flows obscure the diel streamflow variation imposed by hydropower generation. Consequently, hydropower generation at Buford, West Point, Walter F. George, and to a lesser extent, Woodruff Dam, may change discharge two orders of magnitude, and change river stage significantly within a few hours. As a result, habitat availability is limited to periods that are too brief for the completion of essential life history requirements. To mitigate this impact, the provision of non-hydropower peaking "windows" should be evaluated during critical reproductive and rearing periods in order to reestablish native plant, fish, and invertebrate abundance and diversity in river reaches downstream from Corps-operated projects. Generally, this period corresponds to March – May when water temperatures increase. The timing, duration, and magnitude of this window should vary interannually in order to optimize the reproductive requirements of each species every few years. However, the duration of the non-peaking window requires additional research, but we expect that a minimum of 4-6 weeks between March and May are required.

The dry, average, and wet year baseflow guidelines are based on a retrospective analysis of the pre-dam hydrograph (Figures 3-6). It will be necessary to use appropriate hydrological and meteorological criteria to classify the coming month into dry, average, or wet categories. However, average daily baseflows should remain near the dry, average, and wet year flow guidelines depending on the category, and should not fall below the lower limit on any day of any year.

1.1.2 High flow pulses

High flow pulses that exceed bankfull elevation provide important ecological services. A large proportion of sport and non-game fishes rely on floodplain habitats to spawn, rear young, and forage. High flow pulses are also major forces that control nutrient and organic matter dynamics in large rivers, create new habitats, and ultimately affect riverine animal biomass (Junk et al. 1989). However, the spring reservoir refill period extends into the principal spawning season for a high proportion of fishes, meaning that spring flows and floodplain inundation are reduced. Thus, ensuring seasonal high flows and river-floodplain connectivity with the timing, frequency, duration, magnitude, and rate of change necessary to sustain ecological functions and wildlife populations are essential flow management objectives for dams on large rivers.

To provide flows that inundate the floodplain, the potential for reducing the magnitude of the autumn drawdown, changing the order of refill, and/or beginning the spring refill earlier in order to provide fish access to and inundation of the floodplain should be evaluated. Similarly, the Savannah District Corps has operated the Savannah River reservoir system in recent years with reduced winter drawdown to provide spring pulses that meet multiple downriver ecosystem objectives. This evaluation should separately consider flow conditions in wet, average, and dry climatic years. Additionally, it should be noted that relatively small changes in river stage can significantly increase the amount of river-floodplain connectivity. Consequently, minor changes

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in dam operation could have large and positive effects on the river-floodplain ecosystem.

Recognizing that there are limits on operational flexibility due to the presence of infrastructure in some floodplains, methods should be evaluated to provide the operational flexibility necessary for floodplain inundation, which falls under the Corps' coequal project purpose of "Fish and Wildlife Resources." Such methods could include 1) protecting structures (e.g. moving to locations of higher elevations or elevating structures using stilts as is done in coastal communities) that may be impacted by 2, 10, 50, and 100-year recurrence interval pre-dam flows during periods of floodplain inundation; and/or 2) the purchase of structures built in the historic floodplain so that the Corps can intentionally provide flows that inundate the floodplain. These analyses should be simple to conduct, and would include acquisition of floodplain maps and identification of anthropogenic structures within the 2, 10, 50, and 100-year floodplains.

1.2 Floodplain inundation assessments

The relationships among the areal extent of Apalachicola River floodplain inundation, channel entrenchment effects, and water releases from Jim Woodruff Lock and Dam were previously assessed and related to discharge using the datasets and summaries provided by Light et al. 1998 and Light et al. 2006. These datasets have informed biologists and the Corps of the effects of flow releases on river-floodplain resources. Due to the difficulty of surveying all floodplain streams, lakes, and forests, Light et al. 1998 used intensive surveys at a subset of sites, general surveys at approximately 300 sites, and Geographic Information Systems (GIS) to assess the effects of hydrogeomorphic alteration on floodplain inundation areal extent. Light et al. 2006 compared pre-dam stage (prior to 1954) and recent stage (1995–2004) at five streamflow gaging stations in relation to discharge at the Chattahoochee gage (USGS gage number 02358000, Apalachicola River at Chattahoochee, FL). These stage-discharge relationships can also be used to calculate area (acres) of aquatic habitat connected to the main channel of the non-tidal Apalachicola River at different discharges for the pre-Lanier (1929-1955) and post-West Point (1975-2007) periods.

More recently, floodplain elevation maps have been generated using Light Detection and Ranging (LIDAR) remote sensing data with <1 ft accuracy and related to Apalachicola River stage-discharge relationships developed by Light et al. 2006 (Ron Bartel, Northwest Florida Water Management District [NWFWMD], 2010, pers. comm.). Stage-based LIDAR data may provide a more thorough and accurate evaluation of river flow effects on river-floodplain connectivity and habitat availability. We recommend that the Corps contact the NWFWMD to confirm that these datasets exist, request permission to access and use these new datasets, or invite collaboration between the Corps and the NWFWMD to evaluate effects of flow alternatives on floodplain resources. Operations in the environmental flow alternatives should be developed that will use reservoir storage at certain times to augment flow and increase Apalachicola floodplain inundation.

1.3 Water Quality

The effects of reservoir operations on water quality should be closely examined in the WCM update, including ongoing and potential future effects to dissolved oxygen (DO), temperature, nutrient and organic material dynamics, and capacity to assimilate industrial and municipal

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discharges. We request that the Mobile District use the WCM update to make necessary modifications that will improve water quality downstream of Corps projects, as is being done by TVA and other Corps districts.

1.3.1 Dissolved Oxygen

The Service is most concerned about low DO in project tailwaters. We recommend that the Corps make a concerted effort to ensure that releases from all five ACF dams meet or exceed DO and other applicable water quality standards. An appropriate effort would include first monitoring DO upstream and downstream of Corps reservoirs, experimenting with operational and/or structural modifications to Corps projects to improve DO levels, and conducting post-modification DO monitoring to ensure that DO levels have been improved to State water quality standards. Examples of low DO releases from Buford, West Point, and Walter F. George dams are detailed below.

We urge the Corps to 1) monitor DO upstream and downstream of Lanier Reservoir, West Point Reservoir, Walter F. George Reservoir, and Jim Woodruff Reservoir and 2) experiment with operational and/or structural modifications to improve DO levels, and conduct post-modification DO monitoring to ensure that DO levels increase to state water quality standards. Simple weighted averages that formulate the amount of sluicing necessary to achieve the required downstream dissolved oxygen requirements may be particularly useful. The DO that results from the mixing of two water bodies (DO_{mx}) is a function of the dissolved oxygen (DO_1 and DO_2) and volumes (Q_1 and Q_2) of the two water bodies and is calculated using the following equation:

$$DO_{mx} = \frac{Q_1 * DO_1 + Q_2 * DO_2}{Q_1 + Q_2}$$

1.3.1.1. Buford Dam tailwaters

Low DO levels were recorded by the Georgia Department of Natural Resources-Wildlife Resources Division (GDNR-WRD) just below Buford Dam during 1996-2006. These DO levels affect angler success, GDNR-WRD's stocking rates, and the native aquatic community. Periodic measurements taken during this period resulted in monthly minimum instantaneous $\leq$ 1.0 mg/L in September through December. Monthly average values were < 5.0 mg/L from August through November (Figure 7; Chris Martin, GDNR-WRD, 2010, pers. comm.). Low DO levels persisted downriver, depending on operational and climatic factors. For example, based on GDNR-WRD measurements on November 5, 2005, DO increased to 5.0 mg/L three miles downriver, and increased to 6.0 mg/L 5.2 miles downriver when releases from Buford Dam were < 2.0 mg/L (Chris Martin, GDNR-WRD, 2010, pers. comm.).

The Corps upgraded the venting capabilities of the Buford Dam turbines over the past few years. However, the upgrades resulted in < 1.0 mg/L increase over previous conditions (Chris Martin, GDNR-WRD, 2010, pers. comm.). The Corps should thoroughly evaluate the effectiveness of these upgrades.

Useful tools to improve DO levels to State standards in Georgia trout waters (6.0 mg/L daily average, 5.0 mg/L instantaneous) include sluicing instead of running discharge through the

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penstocks and units, or to use a combination of the two routing methods. For example, on September 15, 2000, GDNR-WRD recorded a DO level of 1.5 mg/L at Buford Dam during a minimum flow release through the house unit. In contrast, DO levels measured on the same date during sluicing indicate that DO remained above 6.0 mg/L (Chris Martin, GDNR-WRD, 2010, pers. comm.). Thus, the Corps has demonstrated that sluicing below Buford Dam is an effective tool to mitigate low DO effects associated with hypolimnetic releases.

1.3.1.2. West Point Dam tailwaters

Dissolved oxygen data collected by the Corps downstream from West Point Dam from 1999 through 2001 indicate that DO levels met or exceeded the Georgia instantaneous standard (4 mg/L) 35% of the monitoring period in 1999, (monitoring from 6/15-9/14), 30% of the monitoring period in 2000 (monitoring from 7/25-9/30), and 4% of the monitoring period in 2001 (monitoring from 6/8-10/5; Georgia Power Company 2002). GDNR-WRD has investigated multiple fish kills below West Point Dam and has concluded that these fish kills are attributable to low dissolved oxygen levels (GDNR-WRD letter to the Corps, November 20, 2008).

1.3.1.3 Walter F. George Dam tailwaters

Low DO levels were associated with minor fish and mussel kills downstream of Walter F. George Dam (Rob Weller, GDNR-WRD, 2008, pers. comm.).

1.3.2 Temperature

The water temperatures of hypolimnetic releases below large dams are lower than would naturally occur during spring and summer months. Low water temperatures negatively affect warmwater fishes that require warmer water temperatures necessary for spawning and growth of young-of-year fishes. Thermal alteration can be ameliorated by structural modification of penstock location in the water column. Another option to moderate thermal alteration is to release (via sluicing) warmer water from a higher elevation in the reservoir's water column. Once this water mixes with the cold hypolimnetic release, water temperatures more closely approximate natural water temperatures. A recent example of sluicing effects in the Mobile District comes from measurements taken during summer 2009 below Allatoona Dam. Sluicing in June caused water temperatures to increase approximately10ºC (Figure 8). Temperature increases were observed many miles downriver (USFWS 2009 unpublished data).

Similar to DO recommendations, we urge the Corps to monitor water temperature upstream and downstream of the five ACF Corps impoundments, and 1) experiment with operational and/or structural modifications to improve temperature levels, as needed, and 2) conduct post-modification monitoring to ensure that temperatures have been improved. Simple weighted averages that formulate the amount of sluicing necessary to achieve the required downstream temperature requirements may be useful. The seasonal timing of such releases exhibiting modified temperatures is of great importance. For example, the current summer thermal regime on the Etowah River, created by operations at Allatoona Dam, provides cool thermal refuge for striped bass in the upper Coosa River system. A thermal modification during the summer months below Allatoona Dam could be detrimental to fishes such as striped bass and lake sturgeon (Matt Thomas, GDNR-WRD, 2010, pers. comm.). Because the Service and GDNR-

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WRD have responsibilities to protect native aquatic communities as well as recreational fisheries, we recommend the Corps explore methods for temperature modifications below their facilities, but coordinate closely with State and Federal agencies to determine the appropriate timing of such alterations.

In addition, it should be noted that the current thermal regime of Lanier Reservoir's tailwater is critical to the Chattahoochee River trout fishery and trout production at GDNR-WRD's Buford Hatchery. The tailwater trout fishery in the Chattahoochee, one of Georgia's premier fisheries, is dependent upon cold, well-oxygenated water releases for the survival of trout. The Buford Trout Hatchery produces 400,000 catchable trout annually and is dependent on Lanier Reservoir coldwater storage to maintain this production. Potential impacts to Chattahoochee River trout waters should be considered when making WCM decisions (Matt Thomas, GDNR-WRD, 2010, pers. comm.). The coldwater trout fishery below Buford Dam is of great importance to GDNR-WRD, and is also a responsibility for the Service as an important recreational fishery. Discussions between GDNR-WRD and the Corps should occur to determine if modifications are possible that avoid trout fishery impacts but also provide benefits to native warmwater fisheries below Buford Dam.

1.4 Fish Passage

Corps ACF dams impede the migration of diadromous and potadromous fishes including striped bass, Alabama shad, American eel, and Gulf sturgeon. Jim Woodruff Dam's impact on diadromous fish passage is large compared to dams on other southeastern rivers because it is located in the lower part of a large river basin. Consequently, there is significant interest in improving fish passage at this facility, as well as the two next upstream Corps facilities, George W. Andrews Lock and Dam and Walter F. George Lock and Dam. We appreciate the Corps' willingness and cooperation to modify operations thus far at Jim Woodruff to maximize fish passage for Alabama shad. Support and facilitation of fish passage research at Woodruff Dam, as well as other ACF Federal dams (notably George W. Andrews Lock and Dam and Walter F. George Lock and Dam) should continue with a goal of identifying and implementing operations and/or modifications that would allow riverine species to travel their historic migratory pathways. Provisions for fish passage should be incorporated in the WCM for Jim Woodruff Lock and Dam, George W. Andrews Lock and Dam, and Walter F. George Lock and Dam, while maintaining the need for operational flexibility.

1.5 Climate Change

The effects of climate change to ACF flow regimes and how to best adapt reservoir operations to the most likely foreseeable changes should be evaluated. It is our understanding that the Corps will be considering sea level rise when developing alternatives (Corps 2009). However, climate change will also affect river flows and the effects of a given set of operating rules will vary depending on whether the basin's climate becomes drier, wetter, more variable, or less variable. In particular, it is vitally important to adapt the level set as the top of conservation (TOC) pool to the long-term hydrology of the basin and the essential purposes the projects serve. In a scenario with greater variability between annual high flows and low flows, for example, it may not be feasible for these projects to simultaneously serve their existing levels of flood control protection and minimum flow support without adapting TOC pool levels to prevailing weather conditions.

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The Corps already practices this concept with the multiple action zones and the occasional variances from the rule curves to store water above the TOC pool elevation during dry periods. Several models are developed that will be useful in this analysis and are briefly described in section 2.2 *Evaluation of Alternative Models*. In addition to including multiple future climate scenarios into modeled discharge scenarios and Corps alternatives, flow provisions should be created for dry, average, and wet years in order to account for current climate variability.

1.6 Navigation

Navigation is an authorized project purpose for all five ACF Corps dams and the Corps has used reservoir storage in the past to support navigation. In recent years, however, lacking water quality certification to maintain the channel in Florida, we have seen only occasional flow management for the navigation purpose. Current physical channel dimensions dictate the flows that are necessary for navigability. Without providing flows to meet channel depth authorizations, dredging would be necessary to maintain channel navigability. Dredging has significant adverse effects to fish and wildlife. If flows for navigation are included in the WCM update, we recommend that dredging needs, dredging impacts on fish and wildlife, and a cost-benefit analysis be included in an evaluation of the effects of the channel maintenance activities required for navigation flow support. If flows for navigation are not included in the WCM update, improvement or simplification of the four-zone reservoir operational scheme that governs current operation should be considered.

1.7 Reservoir and Riverine Fisheries Management

The Corps follows a draft Standard Operating Procedure (SOP) for "Lake Regulations and Coordination for Fish Management Purposes." The "fish spawn" SOP goal is to manage for generally stable or rising reservoir levels and for generally stable or gradually declining river levels for about 4 to 6 weeks in the spring months at Corps' reservoirs. These draft SOPs are protective of reservoir fish spawning; however, stable or rising river levels are also beneficial for riverine sport fisheries. We understand it is not feasible to have stable and/or rising water levels in both the reservoirs and river during times of declining basin inflow. To address this issue, recent reservoir and riverine fisheries literature should be reviewed to evaluate whether a 4-6 week stable or rising reservoir window is supported for reservoir fish spawning and/or potentially detrimental to riverine fish spawning. We also recommend development of an alternative that includes modifying the draft SOPs to occasionally emphasize river spawning over reservoir spawning and define those circumstances where this would occur without unreasonably compromising other project purposes. Finally, we recommend that the Corps identify fish and wildlife recreation facilities that need infrastructure improvements to operate at a wider range of flows and/or reservoir elevations.

1.8 National Wildlife Refuges

The Service previously recommended to the Corps that a seasonal pattern of reservoir levels at W.F. George Reservoir would best accommodate the needs of Eufaula National Wildlife Refuge. Water levels that provide seasonal habitat for a large number of migratory bird species, control the spread of undesirable aquatic vegetation, and allow the manipulation of off-reservoir impoundments for waterfowl are principal concerns of the Refuge. These recommendations, which we included in the draft FWCA report for the Corps' 1998 Draft EIS on ACF water

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allocation, were to manage the reservoir so that it behaves more like a river. Reservoir elevations that cycle between the highest levels (190 ft) in the late winter and early spring to the lowest levels (185 ft) in the late summer were recommended. These recommendations remain valid. How the benefits and impacts of such a scheme compare with the existing operating regime and other alternatives should be considered.

1.9 Apalachicola Bay

The predicted levels of freshwater inflow into Apalachicola Bay resulting from Corps alternatives will be of importance to the Service because they may affect salinity levels. Freshwater inflow reductions cause salinity increases and indirectly increase oyster mortality through increased colonization of marine oyster bed predators (Corps 1998). Additionally, juvenile Gulf sturgeons have optimal growth rates at relatively low salinity (9-10 ppt), and periods of extended higher salinities would likely limit feeding habitat availability.

As part of the Comprehensive Study for the Corps' DEIS (1998), the National Ocean Service (NOS) examined the freshwater inflow effects on the water circulation and salinity changes in Apalachicola Bay. Oysters were selected as a biological response variable because of their commercial fishery importance, habitat requirements, and expected response to salinity fluctuations (Corps 1998). A three-dimensional hydrodynamic model produced output that was used in an integrated biological model to assess the effects of potential freshwater inflow changes to Apalachicola Bay salinities and oysters. Predicted oyster mortality and oyster bed growth rates were compared for the various Corps' alternatives.

More recently, Livingston et al. (2000) developed a spatially-explicit hydrodynamic circulation model of the bay that predicts salinity, among other variables, as a function of freshwater inflow. This model has been used to model oyster mortality and growth in relation to freshwater inputs. The Service has used the results of this model to make inferences on the availability of low-salinity bay habitat for Gulf sturgeon. In addition, an alternative Apalachicola Bay salinity model was recently developed by Peter Sheng at the University of Florida (Sheng and Kim 2009). By using the Corps' daily average discharge output from the ResSim model for the Sumatra gage for the various alternatives, the model can compare the spatial extent and temporal duration of low- and high-salinity conditions among the alternative freshwater inflow scenarios. This information can be used to make inferences on the availability of bay habitat for Gulf sturgeon and to model oyster mortality and growth.

We recommend that the Corps or the Corps' consultants (Tetra Tech) contact the NWFWMD and/or the Florida Department of Environmental Protection (FDEP) to request permission to access and use the Livingston et al. models, or invite a collaboration between the Corps and NWFWMD/FDEP to evaluate effects of flow alternatives on Apalachicola Bay resources. The Sheng and Kim (2009) model should also be incorporated in the WCM update process to predict effects to Gulf sturgeon feeding habitat and potentially oyster mortality and growth. If all models are made available to the Corps and the Service, we recommend that the strengths and limitations of each model be evaluated to determine the model that will best suit the assessment requirements. In addition, coordination should occur with FFWCC's Fish and Wildlife Research

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Institute to complete analyses of the relationship of freshwater inflow to the benthic communities of Apalachicola Bay and changes in fish and shellfish abundance.

1.10 Decision Support Model to Evaluate Changes to Corps' Operations

It is important to evaluate the effects of management strategies on the riverine ecosystem, recreation, navigation, hydropower, and other uses of Federal dams. Because of the numerous and sometimes competing demands for water, it is difficult to evaluate the effects of proposed management alternatives and to make the evaluation transparent. However, multiple free decision support tools (e.g., Netica) are available to facilitate the evaluation of alternatives. These tools are versatile in the sense that new information that results from monitoring the effects of management strategies is easily integrated into the analysis and decision process. Consequently, a better and more transparent understanding of how Corps operations affect the ecology and use of the ACF system can lead to improved future management. Therefore, a decision support model should be incorporated into the WCM update process.

1.11 Adaptive Management

An adaptive management program should be developed, consistent with the authorized purposes of the ACF reservoirs, for achieving specific ecological and social goals for the management of the ACF system including specific releases for Woodruff Dam. The program would formulate hypotheses about how such benefits might be achieved through dam operations, implement those operations, monitor ecosystem responses, and revise the operations based upon lessons learned.

2. Recommendations for Corps Hydrologic Modeling

2.1 Increasing Consumptive Demands

The impacts of increasing consumptive (municipal, industrial, and agricultural) water demands in the basin should be recognized and considered. This is a variable that an analysis of operational alternatives should incorporate along with climate-driven hydrologic variability. The relationship between increasing consumptive demands in the ACF Basin and effects on various project purposes should be quantified. For example, how is sustainable minimum flow release from Woodruff Dam affected if consumptive demands increase by 25, 50 or 100 percent by the years 2020, 2050, and 2080? We recognize the order made by Judge Magnuson limits operational alternatives for the express purposes of water supply. However, we also recognize that surface and groundwater withdrawals will continue to be made at various points in the system. The Corps alternative analysis must include metrics regarding water supply withdrawals including potential increases. The volume of storage that is being provided for water supply and has been proposed in each project and any limitations due to hydrologic conditions of meeting the water supply storage volume should be documented, as well as any potential changes in agricultural irrigation due to expanded irrigated acres or changes in crop composition.

2.2 Evaluation of Alternative Models

The Corps' unimpaired flows dataset that was used in the 1998 draft EIS was compared to 1) the unimpaired flows dataset that the Corps expects to use for the WCM update and 2) to the pre-Buford Dam USGS streamflow gage data. Aside from the addition of recent flow records, the most recent Corps-modeled unimpaired dataset is essentially unchanged from the 1998 version.

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Compared to the USGS gage data, these datasets do not accurately represent the magnitude, duration, timing, and rate of change of flow extremes (i.e., minimum and maximum flows). Because flow extremes play important roles in reservoir operational decisions and in riverine, estuarine, and floodplain ecology, efforts should be made to develop unimpaired flow and alternative flow datasets that more accurately reflect flow extremes. We recommend that the use of alternative models be investigated to develop better unimpaired flow and alternative flow datasets.

Similarly, land cover has changed significantly since the early 20th century in the upper and middle portions of the ACF basin. Prior to both mainstem damming and discharge gaging, expansive agriculture, chestnut blight, fire suppression, and other factors affected land cover in the southern Appalachians, Piedmont, Fall-line Sandhills, and upper Coastal Plain regions. The hydrological consequences of land cover changes could have been manifested in the flow extremes observed during droughts and heavy rain. Nevertheless, the pre-dam hydrologic period of record is presently the best available hydrologic dataset to characterize pre-dam streamflows, develop ecosystem flow alternatives, and with which to compare flow alternatives. Models that predict hydrological alteration that occurs in response to land cover changes could be particularly useful in the development and assessment of flow alternatives.

The United States Geological Survey (USGS) is developing a Precipitation-Runoff Modeling System (PRMS, http://water.usgs.gov/software/PRMS) for the ACF. This watershed model will facilitate the inclusion of impacts of precipitation, climate, and land use changes on streamflow, sediment yields, and basin hydrology. If the PRMS is developed specifically for the ACF in a timeframe useful for the ACF WCM update process, it should be used as an additional evaluation tool. The PRMS output potentially could be used to 1) check the precision of the Corps' unimpaired flows datasets, and 2) supply an alternative unimpaired flow dataset to use based on informed climate and land use change predictions. Use of this model is based on the assumption that the PRMS model results reflect average flows and flow extremes better than existing datasets and other models. The latter analysis may be particularly useful to determine if reservoirs can maintain downstream flows through droughts.

National Oceanic and Atmospheric Administration (NOAA) funded the Georgia Water Resources Institute (GWRI) to complete a historical and future assessment of precipitation, evapotranspiration, soil moisture, and run-off trends in the ACF Basin to support ongoing water resources planning in the region. This method used both historical gage data and the Corps unimpaired flows dataset in a Joint Variable Spatial Downscaling model that incorporated climate change effects. Future stream flow, river flow, reservoir level, and power generation forecasts were made at the sub-basin level for the next 100 years. Coordination with USGS and GWRI should occur regarding these new models to explicitly address climate-based operational flexibility during the development and evaluation of flow alternatives, the WCM update, and the EIS analyses.

Lastly, the Corps' HEC-5Q water quality analyses rely on average daily flow to predict water quality parameters (e.g., temperature and dissolved oxygen) in six hour time steps and at 0.5 mile intervals. Although these model outputs can be used to compare among flow alternatives, they are not expected to accurately predict either the water quality values or the range of values that

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are likely to occur in response to hourly discharge changes. Alternative water quality models exist and State resource agencies should be contacted to determine whether water quality models are developed for the ACF Basin. Additionally, regression models that accurately predict water quality parameters (e.g., water temperature and dissolved oxygen) can be developed using a combination of water quality datasets, hourly discharge, and other environmental parameters (e.g., weather and solar exposure). Alternative water quality assessment methods should be considered to accurately evaluate effects of flow alternatives on water quality.

3. Evaluation of Corps Alternatives for FWCA Report

3.1 ResSim Model Output Analyses

It is our understanding that ResSim will be used for the Corps' flow analyses. The flow statistics used by the Service in the past to analyze the resulting datasets were derived by using the Indicators of Hydrologic Alteration (IHA) and the Range of Variability Approach (RVA). Because flow is a master variable in fluvial systems, and because the ecology of fish and wildlife is closely linked to the flow regimes in which they evolved, the current evaluation should continue to rely on tools such as IHA, RVA, and Environmental Flow Components (EFCs) (Mathews and Richter 2007). Specific 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), should also be considered.

3.2 HEC-5Q Water Quality Model Output Analyses

It is our understanding that HEC-5Q will be used for the Corps' water quality analyses. We understand that this model predicts water quality parameters in six hour time intervals in river and reservoirs. Similar to the analyses contained in the Corps' 1998 draft EIS (Corps 1998), the analyzed data should be composed of summer values (May through October), separated by drought, dry, average, and wet year types for each alternative. The following information should be developed for each alternative to evaluate the effects on water quality and aquatic resources in the modeled tailrace and riverine locations:

- Total number of days with dissolved oxygen below a daily average of 6 milligrams per liter (mg/L) in locations within Georgia trout waters, and below a daily average of 5 mg/L in non-trout waters;
- Total number of instantaneous "measurements" less than 4 mg/L;
- Monthly exceedance figures and box plots with outliers for dissolved oxygen (mg/L);
- Monthly exceedance figures and box plots with outliers for water temperature; and
- Average stream percent wastewater.

For each alternative, the following information should be developed to evaluate the effects on water quality and aquatic resources for the modeled ACF reservoir locations:

- Average values of summer Chlorophyll a (ug/L);
- Average summer retention time (days); and

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- Average summer phosphorus loading (pounds/acre/month).

3.3 Floodplain Connectivity Analyses

Assessing the extent of floodplain inundation will be a critical component of the alternatives analysis assessment. The Apalachicola River floodplain analysis should be decided following the Corps' attempt to access the river stage-based LIDAR data collected and housed by the NWFWMD. If the data are made available, the Corps should provide these data to the Service and an analysis of the area of aquatic habitat (separated by aquatic habitat type) connected to the Apalachicola River under the range of discharges for the period of record should be evaluated. If LIDAR data are not provided, the magnitude, duration, timing, frequency, and rate of change of Apalachicola River floodplain inundation should be evaluated using the relationships quantified by Light et al. 1998 and Light et al. 2006.

Although the areal extent of the Chattahoochee River floodplain is one-fifth that of the Apalachicola River floodplain (Davis 1997), it likely served multiple important ecological roles prior to flow alteration by multiple mainstem reservoirs. To our knowledge, the Tri-State Comprehensive Study Riparian Wetland Element (Davis 1997) houses the best available dataset for assessing the effects of flow alternatives on the Chattahoochee River floodplain. These data should be used to evaluate the probable extent of floodplain inundation for each flow alternative. However, data are only available for one riverine site in the Chattahoochee River Basin positioned between Jim Woodruff Lock and Dam and G.W. Andrews Lock and Dam. At unsurveyed locations, known river stages at which floodplain inundations occurs should be used to evaluate the frequency, duration, and timing of floodplain inundation for flow alternatives provided by the Corps (see Table 1 and associated information provided by NWS 2010). At sites without this information, the 2-year recurrence interval discharge to approximate the incipient point of flooding should be used to evaluate the frequency, duration, and timing of floodplain inundation. Because channel alteration (e.g., channel incision) can increase the recurrence interval at which flooding occurs and because we have little information on channel alteration, other data sources should be investigated to aid in the floodplain inundation assessment.

3.4 Reservoir Fisheries Analyses

Sport fisheries are important recreational and economic resources in all of the Federal ACF reservoirs. Important sport fishes in all five reservoirs include largemouth bass and crappie, but each reservoir supports a mix of several additional species, including walleye (Lanier Reservoir only), striped bass, bluegill, redear sunfish, and others. Based on interviews of fisheries managers and researchers in the basin, Ryder et al. (1995) identified the species considered critical in an evaluation of operating alternatives and the relative acceptability of reservoir levels for these species. A Delphi technique was used to obtain expert opinion for select reservoirs on reservoir fish guilds, important seasonal periods for those species, and acceptability ratings for various reservoir levels in the ACF and ACT (Ryder et al. 1995). The Service cooperated with the Corps for the 1998 draft EIS for ACF water allocation to develop a reservoir fisheries performance measure using the findings of Ryder et al. (1996). This information was used to create a reservoir fisheries performance measure by looking at the critical spawning and rearing periods, reservoir elevations during these times, and assigning a greater weight to stable or rising elevations during those time periods. The performance measures were then compared for the various alternatives.

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The reservoir fisheries performance measure should be updated with additional information, literature, and/or relevant datasets that have been developed in the past ten years, and used to evaluate the relative impacts of the Corps' alternatives on reservoir sport fisheries. Potential new datasets to be included that have been indentified to date include largemouth bass young-of-year data in West Point Reservoir (Brent Hess, GDNR-WRD, 2010, pers. comm.), as well as black basses and crappie data in relation to reservoir retention times and year-class strength in Walter F. George, West Point, and Bartletts Ferry reservoirs (Mike Maceina, Auburn University, 2010, pers. comm.).

3.5 Riverine Fisheries Analyses

Sport fisheries are also important recreational and economic resources in the riverine portions of the ACF project, especially in the Apalachicola River. Reproduction of many fishes is intricately tied to the floodplain, and alteration of flow regimes can affect reproductive success, year-class strength, growth, condition, and other life-history attributes. Data identified to date will be provided by the FFWCC and the USGS and used to evaluate the relative impacts of the Corps' alternatives on riverine sport fisheries. Specific measures to be evaluated include year-class strength versus acres of inundated floodplain spawning habitat, changes in catch rates of sportfishes in various water years, and changes in relative weight (condition) of sportfishes in various water years.

3.6 Apalachicola Bay Salinity Analyses

If a salinity model is incorporated in the WCM update process, as described in Section 1.8 above, the model output should be incorporated in the FWCA evaluation. A list of data needs should be developed to be produced as a result of these analyses. These data should include the spatial extent and temporal duration of low- and high-salinity conditions among the alternative freshwater inflow scenarios and possibly the percent oyster mortality and oyster growth rates.

3.7 Federally-protected Species Analyses

It is our understanding that the Corps will be conducting certain analyses to evaluate the effects of the various alternatives on federally-protected species. These analyses will be contained in the Corps' Biological Assessment (BA) accompanying the draft EIS. The Service will include these analyses in our FWCA evaluation, assuming they are available for us to do so. The types of analyses that should be evaluated are contained in the "*Analyses for the Effects of the Action*" section of the Service's June 1, 2008, RIOP Biological Opinion (USFWS 2008) and are listed below:

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

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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.

Freshwater mussels
- Lowest daily flow for each year;
- Inter-annual frequency of flows less than 5,000-10,000 cfs;
- Maximum number of days per year with flows less than 5,000 – 10,000 cfs;
- Maximum number of consecutive days less than 5,000 – 10,000 cfs;
- Median number of days per year less than 5,000 – 10,000 cfs;
- Frequency (percent of days) of daily stage changes (ft/day); and
- Frequency (percent of days) of daily stage changes (ft/day) when releases at Woodruff Dam are less than 10,000 cfs.

Floodplain connectivity
- Frequency (% of days) of growing season (April-October) floodplain connectivity (acres) to the main channel using Light et al. (1998);
- Frequency (% of years) of growing season (April-October) floodplain connectivity (acres) to the main channel using Light et al. (1998).

4.0 Recommendations for Additional Coordination

This PAL includes comments from the State wildlife agencies in the basin. As is encouraged under the FWCA, we will continue to coordinate with these agencies, and will coordinate with NOAA Fisheries, as we move forward.

To assist in the development of alternatives and mitigation, we have suggested evaluations and analyses that address flow, water quality, fish passage, climate change, navigation, reservoir and riverine fisheries management, impacts to Eufaula National Wildlife Refuge, Apalachicola Bay resources, as well as the inclusion of a decision support model and adaptive management. Our recommendations for hydrologic modeling include addressing the impacts of increasing consumptive demands and evaluating alternative models to reflect flow extremes and climate change. We have identified analyses to evaluate Corps alternatives with respect to flow, water quality, floodplain connectivity, reservoir and riverine fisheries, Apalachicola Bay resources, and federally-protected species. We anticipate that the next step will be for the Corps and the Service to work together to update the interagency SOW to reflect Corps and Service responsibilities for the evaluations and analyses contained in this PAL. As you know, such a division of labor occurred to produce the prior DEIS and FWCA Report (Corps 1998).

We would like to be involved in the development of alternatives, including the development of environmental flows alternatives. The Service would like to assist in the development of such

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alternatives to maximize benefits to ecological resources and to gain a better understanding of the consequences of implementing such alternatives on other authorized project purposes and operational constraints. Once all of the alternatives have been analyzed, we anticipate working with the Corps to identify opportunities for restoration, compensation, and enhancement.

We appreciate the opportunity to participate in the planning stages of your project. We would like to stress the Corps water management is not just about avoiding adverse affects, but also to look at opportunities to restore and improve habitat. If you have any questions, please contact Georgia Ecological Services staff biologists Alice Lawrence or Will Duncan at (706) 613-9493, or Panama City Ecological Services staff biologist Karen Herrington at (850) 769-0552 ext. 250.

Sincerely,

Sandra S. Tucker

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Table 1. Locations and river stages in the Chattahoochee River where the National Weather Service Advanced Hydrologic Prediction Service predicts damage to occur. Discharges were calculated using stage-discharge relationships at USGS streamflow gages. Only damage to manmade structures was considered as damage. Flooding of riverwalks, riverwalk structures, yards, and moving of equipment or livestock to avoid inundation was not considered to be damage.

Location (upstream to downstream order	Stage at which damage occurs	Discharge at which damage occurs
Chattahoochee at Norcross	16	20631
Chattahoochee at Roswell	14	29846
Chattahoochee at Atlanta	18	22023
Chattahoochee at Whitesburg	26	49379
Chattahoochee at West Point	21	62530
Chattahoochee at Columbus	41	261407

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Figure 1. Histogram of mean + standard error daily discharge values reported in cubic feet per second (cfs) obtained from river gauges on the Duck River at Shelbyville (top) and Columbia (bottom), Tennessee by season. Means represent daily discharge values for each month for 10 years pre and 10 years post Reservoir Release Discharge Initiative (RRI) completed at Normandy Dam beginning in late 1991. Letters atop standard error bars indicate significantly different means as determined by Tukey's a-posteriori test. Results of analysis of variance (F values and p values) are indicated below each graph. Graphs and figure title taken directly from Alstedht and Johnson 2004, and used with permission from Dr. Paul Johnson.

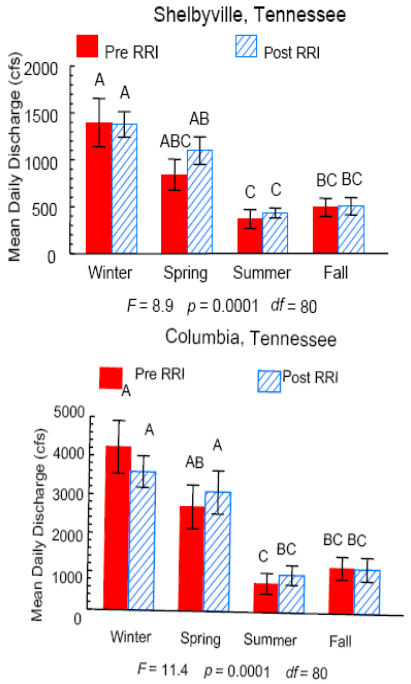

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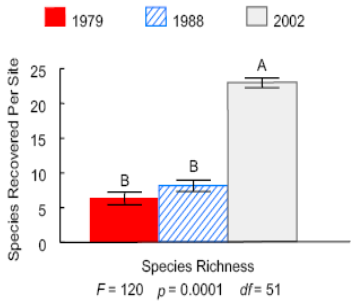
Figure 2. Comparative mean + s.e. of mussel species (top) and mussel number (bottom) sampled from 17 sites in the Duck River in 1977, 1988, and 2002. Letters atop standard error bars indicate statistically different means determined by Tukey's HSD a-posteriori test. Results of analysis of variance (F values and p values) are indicated below each graph. Graphs and figure title taken directly from Alstedht and Johnson 2004, and used with permission from Dr. Paul Johnson.



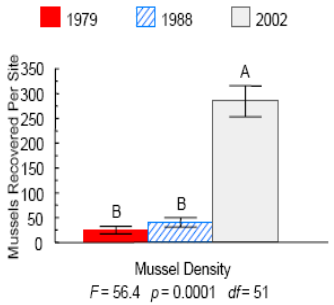


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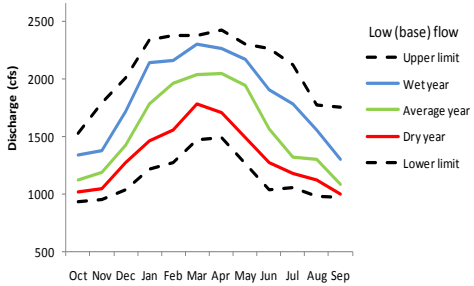
Figure 3. Preliminary a) low (base) flow and b) low and pulse flow guidelines and description for the Chattahoochee River USGS Norcross gage.

a)



b)

Data analyzed: The only pre-Buford dam data that were available for this analysis extended between 1903 and 1946 (44 years) at the Chattahoochee River gage (02335000) at Norcross.

Base flow description
Low (base) flows are defined as all flows that fall below the lower 25th percentile of flows for the pre-Buford dam period at the USGS Norcross gage. The 10th, 25th, 50th, 75th, and 90th percentiles for low flows for each month were then calculated to quantitatively describe the monthly lower and upper base flow limit, and dry, average, and wet year low flow recommendations. Most calculations were derived from Environmental Flow Components in Indicators of Hydrologic Alteration (Version 7-1).

Pulse flow description
High flows were defined as flows that exceeded 75% of the average daily flows for the period of record. Small pulses were defined as all high flows that were lower than the 2-year recurrence interval, and high pulses were defined as high flows that fall between the 2 and 10-year recurrence interval. The 2-year recurrence interval discharge was used as an indication of bankfull discharge because the discharge that corresponds to the incipient point of flooding was unknown. Consequently, small pulses are not expected to exceed bankfull elevation, but high pulses are expected to exceed bankfull elevation and cause floodplain inundation. The recommendations for small and high pulses correspond to the 25th and 75th percentiles of magnitude, frequency, duration, timing, and rise and fall rate values. High pulse recommendations were made only for wet years because more than half of pre-dam years did not contain pulses based on the parameters used to define high pulses in this analysis.

Small pulses
At the Chattahoochee River USGS Norcross gage, 9-18 flow pulses per year should be between 3,658 and 4,980 cfs, should last between 2-3 days, and should occur between mid-March and early June. Rise and fall rates can range between 1,260-2,054 cfs and 1,178-733 cfs, respectively.

High pulses
In wet years, a pulse of 17,650-28,080 cfs should last 9-80 days, should occur between early January and early May. Rise rates should range between 697-7518 cfs/day, and fall rates should range between 3376-460 cfs/day.

Non-hydropower peaking window
We recommend that the Corps evaluate the provision of non-hydropower peaking "windows" during critical reproductive and rearing periods for a minimum of 4-6 weeks from March – May.

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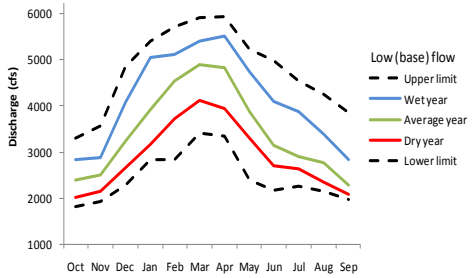
Figure 4. Preliminary a) low (base) flow and b) low and pulse flow guidelines and description for the Chattahoochee River at the USGS gage below West Point Dam.

a)



b)

Data analyzed: The pre-Buford dam data that were available for this analysis extended between 1896 and 1955 (60 years) at the Chattahoochee River gage (02339500) below West Point Dam.

Base flow description
Low (base) flows are defined as all flows that fall below the lower 25th percentile of flows for the pre-Buford dam period at the USGS West Point gage. The 10th, 25th, 50th, 75th, and 90th percentiles for low flows for each month were then calculated to quantitatively describe the monthly lower and upper base flow limit, and dry, average, and wet year low flow recommendations. Most calculations were derived from Environmental Flow Components in Indicators of Hydrologic Alteration (Version 7-1).

Pulse flow description
High flows were defined as flows that exceeded 75% of the average daily flows for the period of record. Small pulses were defined as all high flows that were lower than the 2-year recurrence interval, and high pulses were defined as high flows that fall between the 2 and 10-year recurrence interval. The 2-year recurrence interval discharge was used as an indication of bankfull discharge because the discharge that corresponds to the incipient point of flooding was unknown. Consequently, small pulses are not expected to exceed bankfull elevation, but high pulses are expected to exceed bankfull elevation and cause floodplain inundation. The recommendations for small and high pulses correspond to the 25th and 75th percentiles of magnitude, frequency, duration, timing, and rise and fall rate values. High pulse recommendations were made only for wet years because more than half of pre-dam years did not contain pulses based on the parameters used to define high pulses in this analysis.

Small Pulses
At the Chattahoochee River gage below West Point, 9-16 flow pulses per year should peak between 8,853 and 11,580 cfs, should last between 3-4 days, and should occur between early March and mid-June. Rise and fall rates can range between 2,483-3,698 cfs/day and 2,256-1,536 cfs/day, respectively.

High Pulses
In wet years, a pulse that peaks between 48,830 - 58,950 cfs should last between 19-38 days, and should occur between mid-January and early April. Rise and fall rates can range between 5,563-13,170 cfs/day and 4,230-1787 cfs/day, respectively.

Non-hydropower peaking window
We recommend that the Corps evaluate the provision of non-hydropower peaking "windows" during critical reproductive and rearing periods for a minimum of 4-6 weeks from March – May.

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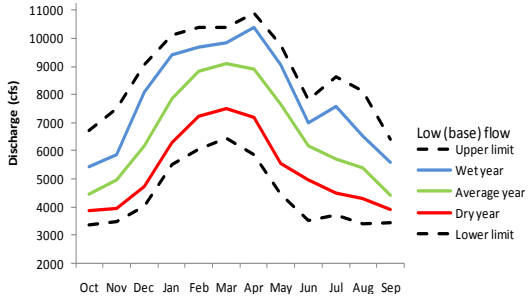
Figure 5. Preliminary a) low (base) flow and b) low and pulse flow guidelines and description for the Chattahoochee River at the Walter F. George Corpsnode.

a)



b)

Data analyzed: ACOE unimpaired flows dataset at the Walter F. George node and inferences from West Point analysis results.

Base flow description
No USGS discharge data for the pre-Buford dam period are available at Walter F. George. However, comparisons between pre-Buford USGS gage data and Corps-modeled "unimpaired flows" data show similar median monthly flows. Thus, we used median monthly flows in the Corps-modeled unimpaired dataset (1936-2006) to calculate the predicted low (base) flows that should occur at the W.F. George node. We excluded 103 negative flow values from the Corps dataset in this analysis.

Low (base) flows are defined as all flows that fall below the lower 25th percentile of flows for the pre-Buford Dam period at the USGS West Point gage. The 10th, 25th, 50th, 75th, and 90th percentiles for low flows for each month were then calculated to quantitatively describe the monthly lower and upper base flow limit, and dry, average, and wet year low flow recommendations. Most calculations were derived from Environmental Flow Components in Indicators of Hydrologic Alteration (Version 7-1).

Pulse flow description
Again, no USGS discharge data for the pre-Buford dam period are available at Walter F. George. Corps-modeled unimpaired flows do not represent the flow extremes (minimum and maximum flow duration, magnitude, timing, frequency, and rate of change) that were observed at USGS gages during the pre-Buford Dam period. Consequently, using the Corps-modeled data to make high pulse recommendations cannot be justified.

Small pulses
We infer from the West Point analysis that used real pre-Buford Dam USGS data, that 9-16 flow pulses per year should peak between 1.8-2.4 times higher than the baseflow river stage (approximately 16,369-21,535 cfs) in March for an average flow year. Pulses should last between 3-4 days, and should occur between early March and mid-June. Rise and fall rates should not exceed rates from other site recommendations.

High pulses
Development of a wet year flow guidelines is complicated by the fact that no stage-discharge relationships are presently known for the river segment between Walter F. George Dam and Woodruff Dam. However, the National Weather Service Advanced Hydrologic Prediction Service indicates that extensive floodplain inundation occurs at a river stage of 150 ft, although no significant damage is predicted to occur up to 160 ft. Consequently, we recommend that the ACOE evaluate wet year releases from Walter F. George that range between 150 and 160 ft. Duration, timing, and rates of change should be similar to the recommendations for West Point Dam.

Non-hydropower peaking window
We recommend that the Corps evaluate the provision of non-hydropower peaking "windows" during critical reproductive and rearing periods for a minimum of 4-6 weeks from March – May.

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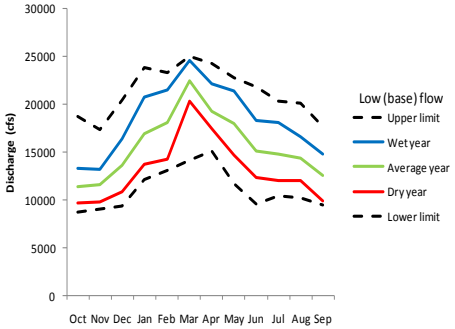
Figure 6. Preliminary a) low (base) flow and b) low and pulse flow guidelines and description for the Apalachicola River USGS gage at Chattahoochee, FL.

a)



b)

Data analyzed: The pre-Buford dam data that were available for this analysis extended between 1922 and 1955 (34 years) at the Apalachicola River gage (02358000) at Chattahoochee, FL.

Base flow description

Low (base) flows are defined as all flows that fall below the lower 25th percentile of flows for the pre-Buford dam period at the USGS West Point gage. The 10th, 25th, 50th, 75th, and 90th percentiles for low flows for each month were then calculated to quantitatively describe the monthly lower and upper base flow limit, and dry, average, and wet year low flow recommendations. Most calculations were derived from Environmental Flow Components in Indicators of Hydrologic Alteration (Version 7-1).

Pulse flow description

High flows were defined as flows that exceeded 75% of the average daily flows for the period of record. Small pulses were defined as all high flows that were lower than the 2-year recurrence interval, and high pulses were defined as high flows that fall between the 2 and 10-year recurrence interval. The 2-year recurrence interval discharge was used as an indication of bankfull discharge because the discharge that corresponds to the incipient point of flooding was unknown. Consequently, small pulses are not expected to exceed bankfull elevation, but high pulses are expected to exceed bankfull elevation and cause floodplain inundation. The recommendations for small and high pulses correspond to the 25th and 75th percentiles of magnitude, frequency, duration, timing, and rise and fall rate values. High pulse recommendations were made only for wet years because more than half of pre-dam years did not contain pulses based on the parameters used to define high pulses in this analysis.

Small Pulses

At the Apalachicola River gage at Chattahoochee, FL, 3-6 flow pulses per year should peak between 30,950 and 41,110 cfs, should last between 4-13 days, and should occur between mid-February and mid-May. Rise and fall rates can range between 2,493-5,356 cfs/day and 2,353-1,473 cfs/day, respectively.

High Pulses

In wet years, a pulse that peaks between 86,630-122,800 cfs should last between 28-68 days, and should occur between late-February and early April. Rise and fall rates can range between 2,544-8,108 cfs/day and 4,236-2,330 cfs/day, respectively.

Non-hydropower peaking window

We recommend that the Corps evaluate the provision of non-hydropower peaking “windows" during critical reproductive and rearing periods for a minimum of 4-6 weeks from March – May.

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Figure 7. Monthly maximum, average, and minimum dissolved oxygen concentrations in the Chattahoochee River at Buford Dam. Data courtesy of Georgia Department of Natural Resources-Wildlife Resources Division.

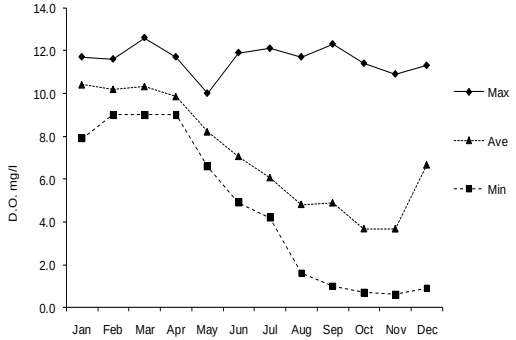

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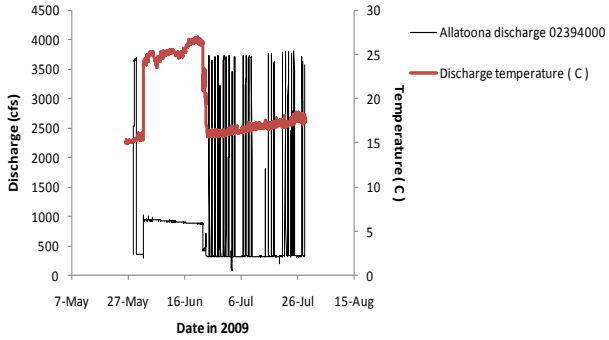
Figure 8. Discharge and water temperature measurements below Allatoona Dam on the Etowah River, Georgia. Sluicing from a location higher in the reservoir's water column occurred in June, causing the observed downriver temperature increases.



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Coastal Sub Office
4980 Wildlife Drive
Townsend, Georgia 31331
Phone: (912) 832-8739
Fax: (912) 832-8744

March 1, 2011

Colonel Steven J. Roemhildt
US Army Corps of Engineers, Mobile District
P.O. Box 2288
Mobile, AL 36628-0001

Dear Colonel Roemhildt:

We are providing an Addendum to the U.S. Fish and Wildlife Service (Service)'s April 2, 2010, Planning Aid Letter (PAL) for the proposed Water Control Manual (WCM) Updates for the Apalachicola-Chattahoochee-Flint (ACF) River Basin in Georgia, Alabama, and Florida. The purpose of the WCM Updates is to identify operating criteria and guidelines for managing water storage and release of water from United States Army Corps of Engineers (Corps) reservoirs. In the National Environmental Policy Act (NEPA) review, the Corps will address current operations, proposed changes in water management operations at the reservoir projects within the limits of the existing authorities, as well as potential impacts throughout the basin that would result from implementation of the updated manual.

The purpose of the Service's 2010 PAL was to identify resource values and issues, identify endangered species issues, and propose preliminary changes, mitigation, or enhancement opportunities to facilitate your decision-making as it relates to equal consideration of fish and wildlife resources. Based on recent analyses conducted by the Service, we submit the following addendum under the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. § 661 *et seq.*). This addendum solely addresses ecosystem flow guidelines -- all other information and recommendations in the PAL are still applicable. In the future, we will provide additional information in the form of a draft Fish and Wildlife Coordination Act report. A separate consultation will occur regarding the potential impacts of the Corps' proposal on federally-listed fish and wildlife species protected under the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1531 *et seq.*).

Rationale for revision of ecosystem flow guidelines
The ecosystem flow guidelines that were delivered in the PAL were developed with the aid of Indicators of Hydrologic Alteration (IHA; TNC 2007). Although the IHA methodology is scientifically defensible, subsequent examination of IHA methodology and output revealed several concerns that could affect possible incorporation of the guidelines in the Corps' operations. Therefore, the Service is providing revised low and high flow guidelines (Figures 1-4 and Tables 1-4).

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We had two reasons for revising the flow guidelines. First, the default IHA parameters used for the PAL initially separated the flow data into high and low flows using a percentile of the pre-Buford period of record. This method resulted in representation of low-flow discharges in summer-fall months by many values, and representation of low flows in winter-spring months by fewer values. This means that some months in some years were not represented in subsequent analyses. For example, historic low flows in the Apalachicola River remained above the 75th percentile or above flood stage for prolonged time periods, meaning that those periods were not represented in the low flow analysis. Thus, if the historic flow regime is to be used to help guide low flow alternative development, evaluation, and implementation, the low flow analysis should examine the entire range of low flows that occurred in every month of every year before construction of Buford Dam.

Second, the low and high flow analyses in IHA calculate summary statistics using median values (for non-parametric analyses) to represent each year (TNC 2007). For example, IHA calculates the annual median high pulse magnitude, and uses the median values from every year to calculate summary statistics. While this is a statistically valid approach to summarizing large datasets, summarizing multiple intra-annual pulses by a single value results in a narrower range of magnitude, duration, timing, and rate of change values. Because the intent of the analysis is to quantify a range of discharge values that are likely to be beneficial to riverine habitat and fauna and to facilitate planning for high flows in the Corps' operations, we calculated the following high-flow guidelines by including each high flow event in summary statistic calculation (e.g., percentiles representing upper and lower limits, and dry, average, and wet years). With the exception of not using annual medians to calculate percentiles, the revised method for high flow guideline development is analogous to the "non-advanced" method for high flow analysis in IHA.

Low flow analysis methodology

1. In Microsoft Excel, the seven smallest values from each month in every year were extracted for analysis. We chose multiple values to represent each month so that the overall results are less likely to be influenced by an aberrant value (i.e., less likely to be skewed by one value), especially in future analyses that may examine and compare Corps' modeled flow alternatives which are likely to occasionally contain negative discharge values. A comparison of the effects of one, seven, and ten minimum flow values to represent low flows in each month showed little difference in overall low flow hydrograph shape, similar flow magnitudes throughout the year, and minor differences in winter 90th percentile flow magnitudes. These results also generally correspond to the Web-based Hydrograph Analysis Tool (WHAT Local Minimum Method; Lim et al. 2005) output for baseflow generation. Collectively, these results lend greater support for the decision to use the seven lowest values to characterize low flows.

2. The 10th, 25th, 50th, 75th, and 90th percentiles for each month were calculated on the extracted data to define the lower limit, dry year, average year, wet year, and upper limit, respectively.

3. The Walter F. George low flow guidelines were calculated slightly differently. A long-term period of pre-Buford Dam discharge data was not available below Walter F. George. As a proxy

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for actual data, the Corps' unimpaired flows dataset was used. As referenced in the PAL, the unimpaired flows datasets do not accurately represent the magnitude, duration, timing, and rate of change of flow extremes (p. 14 in April 2, 2010 PAL). Thus, these low flow guidelines should be treated as estimates.

4. Note that in this low flow analysis, in cases where an entire month is above flood stage, the lowest values are flood-related values. A strength of the low flow analysis is that the user can characterize the entire range of the lower flows that occur in every month of the user's flow dataset.

High flow analysis methodology

1. In Microsoft Excel, the 75th percentile of all flows in the time series was used as the flow threshold to separate high flows from the remainder of the flow dataset. Because this is consistent with our understanding of the meteorological conditions that should cause pulses to occur, the 75th percentile is a valid threshold to separate low and high flows.

2. The following parameters were then calculated: The duration of each high flow event, the maximum discharge in each sequence of high flows, the date of the initial high flow value, the rise rate (calculated as the difference between the preceding low flow value to the maximum flow divided by the number of time steps (n-1)), and the fall rate (calculated as the difference between the maximum flow and the following low flow value, divided by the number of time steps (n-1)).

3. The 2-year and 10-year recurrence interval discharges were calculated using the following methodology: Maximum discharge was calculated for every year, and the 50th and 90th percentiles in Excel were used to calculate approximations of the 2- and 10-year recurrence intervals, respectively. This is a close approximation to the IHA method, but not as sophisticated as the USGS PeakFQ calculation (Flynn et al. 2006). Nevertheless, these percentiles provide close approximations of these recurrence interval discharges. Although bankfull discharge in the Coastal Plain physiographic province tends to occur more frequently than every two years, we used an approximate 2-year recurrence interval basinwide as a consistent guide.

4. The 2-year and 10-year recurrence interval discharges were used to further separate high flows into small pulses, high pulses, and floods (note: these are the default values used in IHA to separate high flow data). Maximum high flow values between the 75th percentile and the 2-year recurrence interval were classified as small pulses (analogous to High Pulses in IHA). Values between the 2- and 10-year recurrence interval were classified as high pulses (analogous to small floods in IHA), and values greater than the 10-year recurrence interval were classified as floods. With the exception of the Apalachicola River analysis, floods greater than the 10-year recurrence interval were excluded from this letter because they exceed the discharge stages that are predicted to cause damage according to the National Weather Service Advanced Hydrologic Prediction Service (Table 1 in April 2, 2010 PAL).

5. The range of discharge values that were used to define small and high pulses are presented in the tables. Similar to the PAL, we also provide the 25th and 75th percentiles of the magnitudes, frequencies, durations, rise rates, and fall rates which were calculated separately for small pulses,

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high pulses, and floods. These values correspond to the high flow guidelines presented in Tables 1-4. Timing values were visually estimated from histograms of pulse or flood occurrence by month.

6. The Walter F. George high flow guidelines were calculated slightly differently. As referenced in the PAL, the unimpaired flows datasets do not accurately represent the magnitude, duration, timing, and rate of change of flow extremes (p. 14 in April 2, 2010 PAL). Consequently, using the Corps-modeled data to make high pulse recommendations cannot be justified. Thus, high pulse frequency, duration, timing, and rate of change calculations were used from the West Point analysis. To calculate magnitudes, however, the West Point analysis indicated that pulses should peak 1.6-3.5 times higher than the low flow river discharge in March [7,720-16,500 cubic feet per second (cfs)]. Assuming that pulses at Walter F. George should also peak 1.6-3.5 times higher than March low flow (derived from the Corps' unimpaired flows model output), small pulses below Walter F. George should peak between 14,161-30,978 cfs.

Figure 1. Low flow guidelines for the Chattahoochee River near Norcross, GA (USGS 02335000).

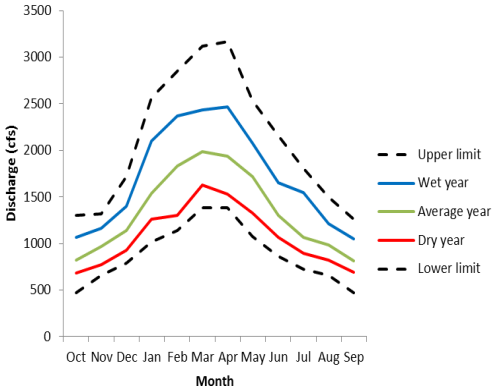

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Figure 2. Low flow guidelines for the Chattahoochee River at West Point, GA (USGS 02339500).

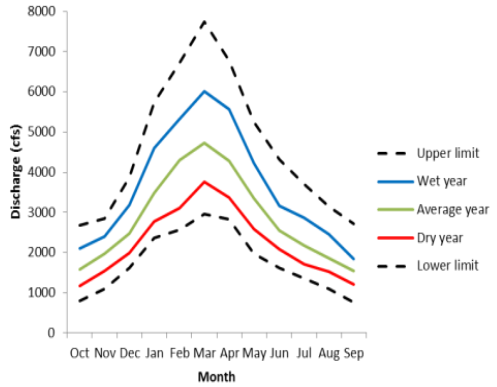

Figure 3. Low flow guidelines for the Chattahoochee River at Walter F. George using the Corps' unimpaired flows dataset.

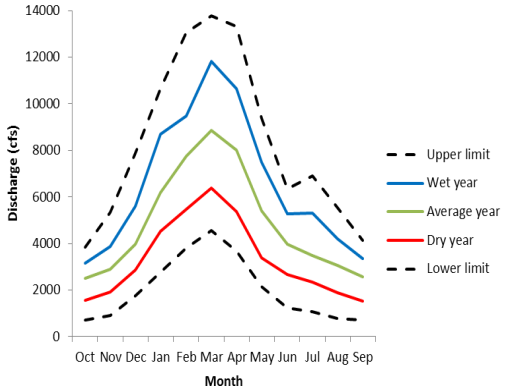

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Figure 4. Low flow guidelines for the Apalachicola River at Chattahoochee, FL (USGS 02358000).

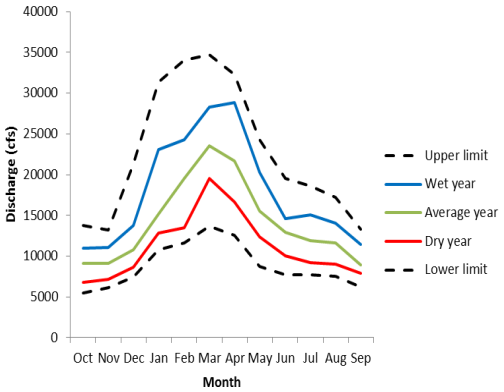

Table 1. High flow guidelines for the Chattahoochee River near Norcross, GA developed from USGS gage 02335000 for the pre-Buford Dam period from January 1, 1903 to September 30, 1946.

	Small pulse	High Pulse
Range used (cfs)	2550-17249	17250-33549
Magnitude (cfs)	3105-6787.5	19000-28900
Frequency (# events/year)	9-18	0-1
Duration (days)	1-5	11-72
Rise Rate (cfs/day)	770-2775	927-7830
Fall Rate (cfs/day)	507-1452	459-2193
Timing	Oct-Sep	Dec- Mar

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Table 2. High flow guidelines for the Chattahoochee River near West Point Dam developed from USGS gage 02339500 for the pre-Buford Dam period from August 1, 1896 to December 31, 1955.

	Small pulse	High Pulse
Range used (cfs)	6250-45649	45650-71079
Magnitude (cfs)	7720-16500	51150-60825
Frequency (# events/year)	10-15	0-1
Duration (days)	2-6	17-39
Rise Rate (cfs/day)	1605-5118	5336-12509
Fall Rate (cfs/day)	1092-2850	1622-4472
Timing	Oct-Sep	Dec- Mar

Table 3. High flow guidelines for the Chattahoochee River at Walter F. George Dam developed from low flow analysis on the Corps' unimpaired flow dataset, and inferences from Chattahoochee River at West Point Dam high flow analysis. See text for additional details.

	Small pulse	High Pulse
Range used (cfs)	N/A	N/A
Magnitude (cfs)	14,161-30,978	95598-114187
Frequency (# events/year)	10-15	0-1
Duration (days)	2-6	17-39
Rise Rate (cfs/day)	1605-5118	5336-12509
Fall Rate (cfs/day)	1092-2850	1622-4472
Timing	Oct-Sep	Dec- Mar

*Upper range of high pulse values may need to be reevaluated to ensure that damage to structures is avoided. The stage discharge relationship (used to ensure that guidelines do not cause damage) was calculated using available data between 79 ft (6,510 cfs) and 110 ft (90,200 cfs; USGS gage 02343805), meaning that discharge calculations above this range of values are extrapolations and should be used cautiously.

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Table 4. High flow guidelines for the Apalachicola River near Chattahoochee, FL developed from USGS gage 02358000 for the pre-Buford Dam period from July 1, 1922 to December 31, 1955.

	Small pulse	High Pulse	Flood
Range used (cfs)	25800-73799	73800-150499	≥ 150500
Magnitude (cfs)	28600-43475	85650-116500	201500-268500
Frequency (# events/year)	3-6	0-1	≥ 10 year RI
Duration (days)	3-15	32.5-68.5	49.5-89.5
Rise Rate (cfs/day)	2166-5606	2763-8056	7650-8761
Fall Rate (cfs/day)	1250-2615	1916-3811	4527-5795
Timing	Dec-Sep	Jan-Mar	Jan-Apr

Thank you for your January 18, 2011, response to the Service's PAL-requested analyses. We are currently reviewing the information that you provided, but recommend using ecosystem flow guidelines as calculated in the manner outlined above. As we continue to review the information you have produced, additional addendums or information requests may be supplied by the Service. We appreciate the opportunity to participate in the planning stages of your project and look forward to exploring opportunities to restore and improve habitat. If you have any questions, please contact Georgia Ecological Services staff biologists Will Duncan or Alice Lawrence at (706) 613-9493, or Panama City Ecological Services staff biologist Karen Herrington at (850) 769-0552 ext. 250.

Sincerely,

Sandra S. Tucker
Field Supervisor

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cc: J. Ziewitz, USFWS, Tallahassee, FL
D. Everson, USFWS, Daphne, AL
S. Abbott, USFWS, Ft. Benning, GA
M. Hubbard, USFWS, Eufaula, AL
B. Zettle, Corps, Mobile, AL
Pete Taylor, Corps, Mobile, AL
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D. Bernhart, NOAA, St. Petersburg, FL

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Filling the Water GAP

Conservation Successes and Missed Opportunities in Metro Atlanta

2012 UPDATE

CHATTAHOOCHEE RIVERKEEPER®

Keeping Watch Over Our Waters

Chattahoochee Riverkeeper

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ABOUT CHATTAHOOCHEE RIVERKEEPER

Chattahoochee Riverkeeper (formerly Upper Chattahoochee Riverkeeper) is committed to the protection and stewardship of the Chattahoochee River basin and the restoration and preservation of its ecological health for the people and wildlife that depend upon it. Established in 1994, Chattahoochee Riverkeeper (CRK) is an environmental advocacy organization with more than 6,000 members and was the 11th licensed program in the international Waterkeeper Alliance, now close to 200 organizations. Visit www.chattahoochee.org.

ACKNOWLEDGEMENTS

We thank the local water utility leaders who not only gave us valuable information and insights but also are working to provide clean drinking water to metro Atlanta residents everyday: Corlette Banks (Fulton County Department of Public Works), Joe Basista (DeKalb County Department of Watershed Management), Yolanda Boazman (Atlanta Department of Watershed Management), Jennifer Carlile (Atlanta Department of Watershed Management), Alice Champagne (city of Roswell), Vicki Culbreth (city of Roswell), Jennifer Flowers (city of Gainesville), Pete Frost (Douglasville-Douglas County Water & Sewer Authority), Charles Lambert (DeKalb County Department of Watershed Management), Melinda Langston (Atlanta Department of Watershed Management), Michelle Lawrence (Fulton County Department of Public Works), Joey Leverette (city of Gainesville), Janet Liberman (city of Roswell), Jennifer McLaurin (Fulton County Department of Public Works), Heather Moody (Gwinnett County Department of Water Resources), Kathy Nguyen (Cobb County Water System), Mike Patton (Douglasville-Douglas County Water & Sewer Authority), Alicia Pennie (DeKalb County Department of Watershed Management), Tim Perkins (Forsyth County Water & Sewer), Kelly Randall (city of Gainesville), Jim Scarbrough (Gwinnett County Department of Water Resources), Kevin Smith (Forsyth County Water & Sewer), Brian Sterner (Gwinnett County Department of Water Resources), and Barbara Williams (Douglasville-Douglas County Water & Sewer Authority).

We also thank Tanya Blalock (Georgia Power), Gail Cowie (Georgia Environmental Protection Division), Steve Haubner (Metro North Georgia Water Planning District), Alice Miller Keyes (Georgia Environmental Protection Division), Lebone Moeti (Georgia Environmental Protection Division), Pat Stevens (Metro North Georgia Water Planning District), Bryan Wagoner (Georgia Association of Water Professionals), and Wei Zeng (Georgia Environmental Protection Division) for providing much of the data compiled in this report.

Thanks also to members of metro Atlanta's private sector who provided information on several innovative water conservation initiatives, including Michael Cheyne (Hartsfield-Jackson Atlanta International Airport), Mary Ann Dickerson (Alliance for Water Efficiency), Sharon Douglas (Hartsfield-Jackson Atlanta International Airport), Bob Drew (Southeast Rainwater Harvesting Systems Association), Joy Hinkle (Southface Energy Institute), Larry Kowal (Ciba Vision/Novartis), Barb Shadomy (Stonehurst Place), William Strang (TOTO USA), and Clark Wisenbaker (Davis, Pickren, Seydel & Sneed, LLP).

We thank the C.S. Mott Foundation, JST Foundation and Turner Foundation for their ongoing support of our work.

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FILLING THE WATER GAP

Conservation Successes and Missed Opportunities in Metro Atlanta

2012 UPDATE

We dedicate our report to James H. "Jim" Scarbrough.
We miss his kindness, humor, dedication and
water management expertise greatly.

CHATTAHOOCHEE RIVERKEEPER®

Keeping Watch Over Our Waters

A Publication of Chattahoochee Riverkeeper
By Laura Hartt, *CRK Water Policy Director*
lhartt@ucriverkeeper.org
September 2012

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EXECUTIVE SUMMARY

In 2011, Chattahoochee Riverkeeper concluded that metro Atlanta could save as much as 160 million gallons of water per day (MGD) by investing in just three conservation measures: fixing system leaks, replacing outdated plumbing fixtures, and pricing water right. Since then, as our 2012 report reveals, the region has made some incremental progress in reducing water use. However, we can and should do more. Resolving the ongoing conflict with Alabama and Florida over allocation of Lake Lanier for water supply depends on our ability to show our downstream neighbors that we are doing all we can to conserve. Moreover, these measures are cheaper and more sustainable than the costly and destructive options proposed by state leaders for meeting our future water supply needs.

For our 2012 update we took another look at our three conservation measures as well as some new ones. We conclude that there is still at least 134 to 147 MGD of water supply available to metro Atlanta in the near term, based on the following:

- 8-16 MGD from loss reduction targeting *just four utilities*: city of Atlanta Watershed Department, DeKalb County Department of Watershed Management, Douglasville-Douglas County Water & Sewer Authority, and city of Gainesville;
- 29-34 MGD from retrofitting old homes with new plumbing fixtures through direct installation;
- 24 MGD from limiting the sale of clothes washers and dishwashers to Energy Star models;
- 27 MGD from more effective multi-tiered conservation pricing for residential customers;
- 19 MGD from multi-tiered conservation pricing for commercial customers; and
- 27 MGD from large-scale rainwater harvesting at homes and businesses.

A serious commitment to water reuse over the next decade could add another 100 to 252 MGD, bringing the **total potential water savings up to 234-399 MGD, enough water to serve 1.5 to 2.6 million people in the metro Atlanta region**.[1]

Implementation of these measures will require financial, institutional, and political support at both the regional and state level. In particular,

- The state should provide more **grants and zero-interest loans** to support local government efforts to repair leaks, retrofit old buildings with new plumbing fixtures, explore rainwater harvesting and reuse as options for reducing outdoor water demand, encourage more use of green infrastructure, and support other innovative water conservation projects.
- The state should adopt legislation to **expedite inventory replacement** of low-efficiency appliances (clothes washers, dishwashers) with efficient models and fund rebates for the purchase of water- and energy-efficient appliances.
- The state should require and set minimum standards for **landscaping and irrigation certification** to reduce outdoor water waste.

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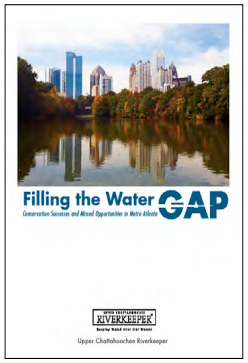
- During the mandated 2014 update of the region's water plan, the Metro North Georgia Water Planning District should require all local governments within its jurisdiction to adopt those conservation programs implemented successfully at the local level including **retrofit on reconnect** requirements, **low income assistance** for leak repairs and retrofits, **multi-family toilet rebates**, and **conservation pricing** for the commercial sector.
- Importantly, the Metro District must commit to **reassessing future water demands** based on the latest U.S. Census data, drought information, water conservation efforts, and employment outlook.

INTRODUCTION

Last year, Chattahoochee Riverkeeper (CRK) released "Filling the Water Gap: Conservation Successes and Missed Opportunities in Metro Atlanta."[2] In that report, we outlined local water conservation efforts within the 15-county metro Atlanta region. During our review, we discovered many success stories, singling four out for special recognition as "Best in Class":

1) City of Atlanta Department of Watershed Management: "Care and Conserve" Program
2) Cobb County Water System: Green Industry Partnership
3) DeKalb County Department of Watershed Management: Retrofitting Old Homes with Efficient Fixtures
4) Douglasville-Douglas County Water & Sewer Authority: Protecting its Primary Source of Water



In the past year, the legal landscape changed dramatically. In June 2011, the 11th Circuit for the U.S. Court of Appeals reversed a lower court decision, restoring metro Atlanta's access to Lake Lanier as a major source of water supply. [3] Relief was short-lived however, because also in June 2011, the region entered yet another drought which for some portions of Georgia may prove to be almost as severe as the one from 2006 to 2009.[4]

Other things have not changed. Local governments and some businesses continue to lead in efforts to conserve water in metro Atlanta while state conservation efforts remain minimal. For this 2012 update, we revisit the 2011 success stories and recommendations for areas of improvement and outline new successes and recommendations.

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BEST IN CLASS (2012)

In 2011, after evaluating conservation programs across ten select utilities, we honored four local governments with "Best in Class" awards for their efforts. For CRK's 2012 "Best in Class" award, we chose to focus primarily on the private sector, honoring efforts to significantly reduce water use within the business community.

One initiative in particular may prove to yield significant water savings is the Better Buildings Challenge. In 2011, the Obama Administration chose Atlanta (along with Seattle and Los Angeles) as one of three pilot cities to participate in the Better Buildings Challenge (BBC). The BBC was launched to support private efforts to improve energy efficiency in commercial buildings. Nationally, the initiative could save $40 billion dollars annually in energy costs, while helping businesses grow and creating more jobs. To meet the challenge, the Mayor's Office of Sustainability has partnered with the U.S. Department of Energy, local businesses, and non-profits to upgrade Atlanta's 400-block downtown area, roughly 33 million square feet.[5]

Atlanta has targeted government (e.g., City Hall, Civic Center, Hartsfield-Jackson Atlanta International Airport), commercial (e.g., Georgia Dome, Georgia World Congress Center), hospital, and university buildings for improvement. In addition to improved energy efficiency in commercial buildings, by 2020 Atlanta has committed to

- reduce greenhouse gas emissions 25%;
- reduce, reuse, and recycle 90% of the city's residential waste;
- provide at least ten acres of green space per 1,000 residents and protection and restoration of tree canopy to 40% coverage; and
- provide local food within ten minutes of 75% of all residents.

Perhaps most impressive is Atlanta's further commitment to work with partners to reduce water use in government and non-government buildings 20% by 2020.

For our 2012 Best in Business Class Award we honor not only the city of Atlanta for its efforts as a BBC pilot city, but also two other businesses for a unique partnership that is achieving real water savings: Hartsfield-Jackson Atlanta International Airport and TOTO USA.

Beginning in 2008, the Airport partnered with TOTO to retrofit toilets and urinals throughout the airport. To date, they have retrofitted 630 toilets and 1,200 urinals with efficient flush valves, resulting in an annual savings of over 56 million gallons which already represents a 19% reduction in water use. The Airport has immediate plans to retrofit over 1,000 faucets with efficient models as well.

The Hartsfield-Jackson Atlanta International Airport is also committed to reduce energy consumption by 20% by 2020. A solar facility generates power for the rental car facility as well as airport shuttle buses. Composting on site generates methane gas that helps power other airport vehicles.[6]

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As we reported in 2011, TOTO's water savings efforts extend well beyond their work with the Hartsfield-Jackson Atlanta International Airport. TOTO is one of the world's largest manufacturers of plumbing fixtures and a leader in developing popular and affordable efficiency toilets, urinals, faucets, and showerheads. In addition to the Airport, TOTO has partnered with the United Parcel Service (UPS) to purchase carbon offsets to mitigate for green house gases generated during transport of products and partnered with the Grand Hyatt in Buckhead to retrofit guest rooms with low flow toilets, saving over three million gallons of water each year.

Replacing old urinals with WaterSense or other high efficiency models (i.e., 0.5 gallons per flush) can save between 1.0 and 4.5 gallons per flush. The Hartsfield-Jackson Atlanta International Airport was able to reduce urinal water use by half, or more than 650,000 gallons each month, by switching to WaterSense models as depicted here. Photo courtesy of William L. Strang.

TOTO engages in a wide range of other best management practices including reusing grey water during plant operations in order to reduce reliance on treated drinking water, recycling imperfect china for use as the raw material to produce floor tile at Crossville tile, and purchasing green electricity from Georgia Power.[7]

For outstanding efforts to reduce water use within the business sector, we honor the city of Atlanta, Hartsfield-Jackson Atlanta International Airport, and TOTO USA as "Best in Class" for 2012.

2012 BEST IN BUSINESS CLASS AWARD WINNERS

For significant efforts and firm commitments to reduce water use within the commercial sector, CRK recognizes the

City of Atlanta
Hartsfield-Jackson Atlanta International Airport
TOTO USA

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CASE STUDIES

For this 2012 update of water conservation practices in metro Atlanta, we evaluated nine local water utilities and select commercial customers within their service areas. These select utilities all depend upon the Chattahoochee River and Lake Lanier for water supply:

- City of Atlanta Department of Watershed Management
- Cobb County Water System
- DeKalb County Department of Watershed Management
- Douglasville-Douglas County Water & Sewer Authority
- Forsyth County Water & Sewer
- Fulton County Department of Public Works
- City of Roswell
- City of Gainesville
- Gwinnett County Department of Water Resources

DATA & METHODS

For each of the nine utilities, we constructed a "Performance Dashboard" featuring the following information:

- Population Served as of 2011
- Population Change from 2000 to 2010
- Water Use in 2010
- Water Loss
- Conservation Pricing
- Toilet Rebates
- Reuse
- Rainwater Harvesting

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Population Served as of 2011

These figures were taken from the Georgia rate survey and rate structure survey produced annually by the Georgia Environmental Finance Authority (GEFA).[8] Figures are irrespective of water supply source.

Population Change from 2000 to 2010

These figures are provided by the U.S. Census Bureau and with the exception of the Atlanta-Sandy Springs-Marietta metropolitan area are available only on a county-wide basis.[9]

Water Use in 2010

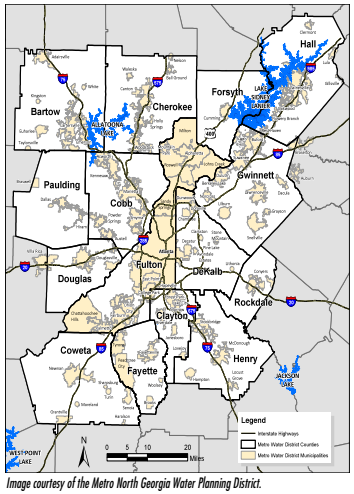

Image courtesy of the Metro North Georgia Water Planning District.

In our analysis, we identify the primary water supply source as well as three indicators of water use: average annual withdrawals (million gallons per day (MGD)), summer peak withdrawals (MGD), and single-family household use (gallons per household per day). Georgia's Environmental Protection Division provided us with 2010 water withdrawal data—data for 2011 and the beginning of 2012 remain unavailable as of September 2012. Single-family household use was reported by each water utility in the *2011 Metro Water District Plan Implementation*.[10]

Although average annual withdrawals may be a good indicator of general water use trends, summer peak withdrawals are much more useful for both water planning and environmental protection purposes because they reflect the maximum water withdrawn during summer months when rivers experience low flow conditions. Most irrigation occurs during the dry summer months, so high summer peak withdrawals suggest high outdoor water use.

Single-family household use is a metric that provides information about residential use. However, within the Metropolitan North Georgia Water Planning District (Metro District, above right), not all utilities distinguish between single-family and multi-family accounts or even between residential and commercial accounts.

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FUTURE METRO ATLANTA WATER DEMAND

In 2009, the Metropolitan North Georgia Water Planning District (Metro District) projected future water demand out to 2035, relying on outdated data and invalid assumptions. As a result, those projections overstate the region's future water need.

Economic Forecasts

In 2009, the Metro District used a model to project 2035 water demand, assuming high population and employment growth.[11] Those projections ignored the last severe economic recession (December 2007-June 2009), from which the nation is still recovering.[12] In fact, between 2006 and 2010, the 15-county Metro District area *lost* more than 148,000 jobs.[13]

To reach the number of jobs forecasted in the Metro District's 2009 plan, the 15-county region would have to *add* more than 650,000 jobs by 2015, 1,270,000 jobs by 2025, and 1,918,000 jobs by 2035. That amounts to 32%, 62%, and 93% job growth, respectively!

Population Forecasts

The Metro District's water demand projections also are overly optimistic with respect to population growth. The latest U.S. Census data reveals a population of roughly 4.8 million in 2010 for the 15-county Metro District area. This estimate is approximately 200,000 (or 4%) *less* than the 2009 forecasts generated by the state based on the 2000 U.S. Census.[14]

To reach the population sizes forecasted in the Metro District's 2009 plan, the 15-county region would have to add more than 460,000 people by 2015, 1.45 million people by 2025, 2.66 million people by 2035, and 4.17 million people by 2050. That amounts to 10%, 30%, 55%, and 86% population growth, respectively.

Water Use

The Metro District's 2035 projections also used 2006 as the baseline year for estimating future water demand. Water use in 2006 then was "adjusted" upward on the presumption that use in 2006 was "unnaturally depressed" due to the drought.[15] In fact, the 2006 data preceded the drought and proved to be the second highest year of water use over a 17-year period.[16]

2010 data from Georgia's Environmental Protection Division (EPD)[17] shows that the total annual Chattahoochee water withdrawals for the nine utilities featured in our report have dropped to pre-drought levels. See Figure 1. Whether reduced water use is sustained in spite of our current drought remains an open question.

Conservation Savings Potential

Finally, the Metro District's 2035 water demand projections also underestimated the region's ability and commitment to reduce water use. The 2009 plan estimates that by 2035 the region will reduce water use 8% through water conservation efforts and an additional 5% simply due

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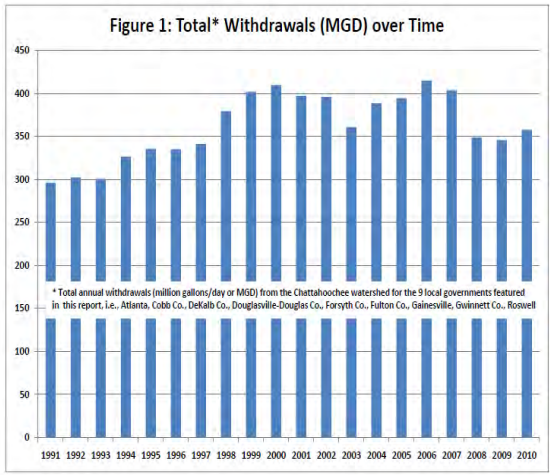
to natural retrofitting in compliance with the latest plumbing code.[18] The Metro District estimates that the approved 2010 amendments to the plan will save an additional 23 million gallons of water day (MGD),[19] amounting to just slightly more than 2% of the region's projected 2035 water demand.[20] In other words, the Metro District estimates the region can reduce water use by only 15% by 2035.

For the nine utilities featured in this report, we see that water use already has declined by more than 14% since 2006. If this reduced water use is sustainable following our current drought, then greater water savings through conservation must be feasible.

Before the U.S. Army Corps of Engineers determines a future water allocation for metro Atlanta or the region contemplates any more expensive, unsustainable water supply projects, the Metro District must update its water demand projections using the most current and accurate data available.



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Water Loss

In June 2010, Georgia enacted the Water Stewardship Act. This legislation imposes additional, albeit modest, water conservation requirements on local governments throughout the state. Perhaps the most noteworthy is the requirement that all water utilities adopt a uniform, standardized method for assessing water loss. By March 2012, all water utilities serving more than 10,000 customers were required to complete and submit to the state an American Water Works Association (AWWA) water loss audit report. Smaller utilities (those serving more than 3,300 to 10,000 customers) have until March 2013 to complete their AWWA water loss audits.[21]

Figure 2: IWA/AWWA Apparent vs. Real Water Losses

Water Losses	Apparent Losses	Unauthorized Consumption
		Meter & Data Inaccuracies
	Real Losses	Leaks Along Mains
		Leaks Along Service Lines (before the meter)
		Leaks & Overflow at Storage

According to the International Water Association (IWA) and the AWWA, "water loss" consists of both "apparent losses" and "real losses." Apparent losses are perceived losses due to illegal water use, billing errors, and metering errors. Real losses are actual losses stemming from leaks in the distribution system. See Figure 2. Real water losses are typically reported as CARL or "current annual real water loss." Another metric is UARL or "unavoidable annual real loss." UARL estimates the theoretical lowest water loss possible assuming optimal pressure, main lengths, and service connections.[22]

The Infrastructure Leakage Index (ILI) takes the ratio of CARL to UARL as an indicator of how well real water losses are being managed with the current technology in place relative to what would be possible with an optimized system. Generally, the lower the ILI value, the more efficient the system is. For those utilities reporting low ILI values, water loss may be attributed to billing errors, metering errors, and illegal use rather than to actual leaks. As ILI increases, leaks tend to contribute relatively more to overall water loss.[23]

City of Atlanta repair crew out fixing leaky pipes. Photo courtesy of City of Atlanta's Department of Watershed Management.

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In the dashboards *(pages 25-33),* we report real and apparent water losses each as a percentage of water supplied. We also include the ILIs.

In December 2010 the Metro District Governing Board approved a "real water loss" goal for utilities lying within the six counties (Cobb, DeKalb, Forsyth, Fulton, Gwinnett, Hall) directly impacted by the federal judicial ruling invalidating use of Lake Lanier for water supply. Under this requirement, those affected utilities must cut in half any "real water loss" exceeding 10% by 2025. Other utilities in the District have until 2035 to achieve the same water loss reduction.[24] Therefore, in our analysis all utilities except Douglasville-Douglas County Water and Sewer Authority (DDCWSA) must meet the 2025 deadline. DDCWSA has until 2035. We have included these water loss reduction goals in the dashboards as well.

Conservation Pricing

The goal of conservation pricing is to encourage customers to reduce water use; therefore, in order for conservation pricing to be effective, charges must be based primarily on the quantity of water consumed. Because water utilities rely on ratepayers for funding, a poorly-constructed rate structure may reduce the revenue available for infrastructure and leak repairs, staffing, and other conservation programs. However, a well-designed rate structure can encourage homes and businesses to conserve.

An inclining tiered-structure, consisting of three or four tiers, is optimal for encouraging reduced use. During peak periods when demand is highest, an optimal rate design will result in at least half the residential customers exceeding the first tier, 30% exceeding the third tier, and 10% exceeding the fourth tier when first implemented.[25]

In the dashboards (*pages 25-33*), we have included information regarding pricing structure for residential accounts, noting the number of blocks and how pricing changes when moving from one block to the next. We also include information on customer costs, both in terms of average billing and peak summer billing. These figures were taken from the Georgia Environmental Finance Authority (GEFA) 2011 rate survey. We used the default values of 5,000 gallons/month for winter use and 12,000 gallons/month for peak summer months. Cost estimates combine both sewer and water costs. We further note whether local governments have established conservation pricing for either commercial customers or irrigation. Ideally, irrigation rates should be at least double those for the first residential pricing block, and for each utility we have noted whether that is in fact the case.[26]

Toilet Rebates

Unless otherwise noted, we used data from the *2011 Metro Water District Plan Implementation Review*, which reflects rebate totals through June 2011. The Atlanta Department of Watershed Management, Forsyth County Department of Water and Sewer, Gwinnett County Department of Water Resources, and city of Roswell all participate in the toilet rebate program administered by the Metro District. This program provides a $100 rebate for the purchase and installation of a WaterSense toilet (1.28 gallons per flush or 1.28 gpf).[27]

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Other utilities have chosen to implement their own rebate programs, albeit limited to single-family residential customers. The city of Gainesville offers $75 rebates while both Cobb County Water System and DeKalb County Department of Watershed Management offer $100 rebates for WaterSense toilets.[28]

The 2010 amendments to the Metro District's 2009 *Water Supply and Water Conservation Management Plan* extend the rebate program to multi-family, residential (apartments, townhomes, condominiums) customers.[29] Currently, the city of Atlanta offers a multi-family toilet rebate of $100 for WaterSense toilets to multi-family residential owners and managers on a first come, first served basis. Similar programs are pending later this year for Gainesville, Gwinnett County, and Cobb County.

Logo courtesy of U.S. Environmental Protection Agency.

Water Reuse

Reuse information was obtained from Metro District's 2009 *Water Supply and Water Conservation Management Plan* and supplemented with information provided by each utility.[30] We define reuse as the collection, treatment, and use of wastewater for either potable (i.e., drinkable) or non-potable purposes.


Purple pipes indicate treated wastewater transported for reuse purposes. Photo courtesy of Brown and Caldwell.

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Rainwater Harvesting

We obtained information concerning rain barrel workshops and other rainwater harvesting outreach directly from each utility. All utilities participate in rain barrel workshops at some level.

Also, in 2011, the city of Atlanta enacted an ordinance to authorize single-family homeowners to harvest rainwater for indoor potable use. Although this ordinance has set a national precedent for rainwater harvesting on a larger scale, homeowners have yet to take advantage of it.

RESULTS & RECOMMENDATIONS

Our 2011 survey of local governments and businesses revealed some areas in need of improvement and led to three primary recommendations:

1) Fix System Leaks
2) Replace Outdated Plumbing Fixtures
3) Price Water Right

Our 2011 survey also led to several additional recommendations:

4) Reduce Outdoor Water Demand
5) Increase Reliance on Reuse
6) Promote Pervious Paving and Other Green Infrastructure
7) Invest in Energy Efficiency

For each of these seven measures, we provide updates and additional recommendations below.

1) Fix System Leaks

Under Georgia's Water Stewardship Act of 2010, large water utilities (i.e., those serving more than 10,000 customers) were required to submit their water loss audit reports to Georgia's Environmental Protection Division (EPD) by March 1, 2012. Many utilities across the state did not meet that deadline. EPD extended the deadline to March 31, then May 1, and finally May 31. The state now is in the process of securing a consultant to validate, compile, and analyze the results. Pending the state's release of its analysis of the audit results (date yet to be determined), we have conducted our own analysis of preliminary audit results provided to us directly by each water utility. **We emphasize that these results are preliminary and subject to change, pending the outcome of the state's analysis.**

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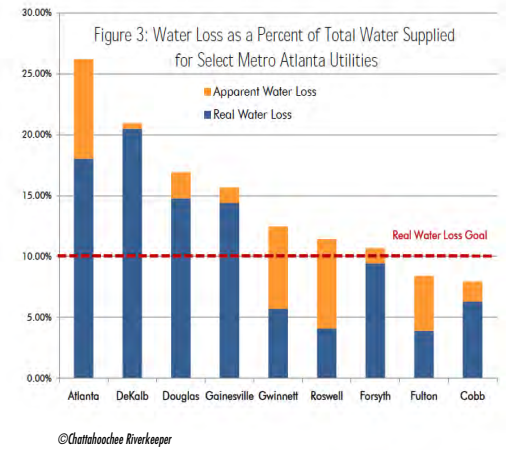
Figure 3 shows apparent and real water loss as a percentage of total water supplied for each utility. Of the nine utilities we surveyed, only two reported *combined* water losses (real and apparent) below 10%: Fulton County Department of Public Works and Cobb County Water System. Five utilities had *real* water losses below 10%: Cobb County Water System (6.3%), Fulton County Department of Public Works (3.9%), Forsyth County Water & Sewer (9.4%), city of Roswell (4.1%), and Gwinnett County Department of Water Resources (5.7%).



The remaining utilities had real water losses in excess of 10%: city of Gainesville (14.4%), DDCWSA (14.8%), DeKalb County Department of Watershed Management (20.5%), and city of Atlanta Department of Watershed Management (18%). Both DeKalb County and city of Atlanta had combined water losses in excess of 20%, or 20.9% and 26.2%, respectively.

Figure 4 displays the ILI for all nine utilities surveyed. Four utilities (Gwinnett County Department of Water Resources, Forsyth County Water & Sewer, city of Roswell, and Fulton County Department of Public Works) reported ILIs below 1.0. Three other utilities had ILIs falling between 1.0 and 3.0 (Cobb County Water System, DDCWSA, and city of Gainesville). Finally, two utilities had ILIs exceeding 3.0 (DeKalb County Department of Watershed Management and city of Atlanta Department of Watershed Management).

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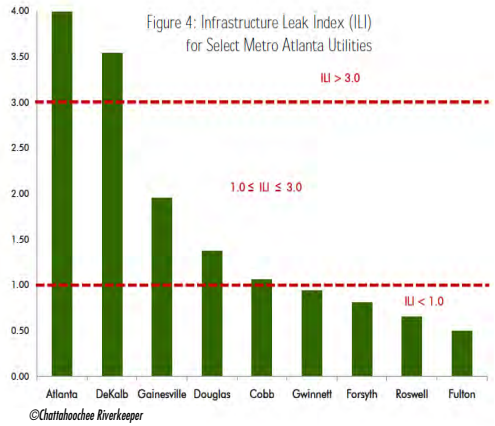

According to the AWWA, ILI values less than 1.0 indicate either a top performing system (i.e., few leaks) or flaws in the data. Data validity scores were fairly high for these particular utilities (ranging from 72 to 81 on a 100-point scale) suggesting that invalid data alone is probably not driving the low ILI values. Notably, Gwinnett County Department of Water Resources, Forsyth County Water & Sewer, city of Roswell, and Fulton County Department of Public Works are all relatively new systems, so low leakage rates seem likely.

ILI values ranging from 1.0 to 3.0 are more typical. Three utilities fell within this range (city of Gainesville, DDCWSA, and Cobb County Water System). Cobb County's ILI just barely exceeded 1.0, suggesting their system is close to peak performance. The ILIs for Gainesville and DDCWSA were below 2.0, suggesting both utilities have some work to do to reduce real water loss.

Both the city of Atlanta Department of Watershed Management and DeKalb County Department of Watershed Management had ILIs in excess of 3.0, which suggest high leakage relative to apparent losses. Both these systems are among the oldest of the ones we surveyed, and declining infrastructure is an ongoing and expensive concern. Both utilities will have to overcome financial and institutional challenges in order to reduce their real water losses appreciably.

Based on our calculations and focusing on just the nine utilities we surveyed, cutting in half any real water loss exceeding 10% could save more than 8 MGD, while achieving 10% or less water loss could save more than 16 MGD.[31]

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2012 RECOMMENDATIONS

- During the 2014 plan update, the Metro District should require all utilities to set more rigorous water loss reduction goals and timelines for achieving these goals, e.g., 10% or less real water loss by 2025.
- During these tough economic times during which local governments are loath to incur more debt, Georgia Environmental Finance Authority (GEFA) should provide more grants and zero-interest loans to help local governments repair their leaky infrastructure.

2) Replace Outdated Plumbing Fixtures

Retrofitting old-fashioned plumbing fixtures with new efficient ones can secure significant water savings. For example, WaterSense fixtures can yield the following reductions in water use:

- toilets (1.28 gallons/flush): 6,900 gallons per person per toilet per year
- faucets : 200 gallons per person per fixture each year
- showerheads: 900 gallons per person per fixture per year

Retrofitting is also an effective means of detecting and repairing leaks, where each leaky toilet can waste up to 73,000 gallons of water in a year and each leaky faucet can waste up to 3,000 gallons annually.[32]

In 2011, we honored two local governments for innovative programs that focused on retrofitting outdated plumbing in older homes and businesses: the city of Atlanta's "Care and Conserve" program and DeKalb County's ordinance requiring retrofitting on water service reconnection. We are pleased to report that both programs remain active.

In the case of "Care and Conserve," a low-income assistance program to help customers offset the cost of retrofitting outdated plumbing and fixing household leaks, Atlanta plans to spend $1.6 million next year on this program, a substantial increase from the $300,000 million budgeted last year. The Care and Conserve program receives funding from multiple sources, including Community Development Block Grants from Housing and Urban Development (HUD) and revenue generated from cell tower leases on Department of Watershed Management properties. In 2011, Atlanta partnered with Utility Service Partners, who offer water and sewer line warranty plans to Atlanta water customers at a discount. Ten percent of each warranty purchased is donated to the Care and Conserve program. Future plans include developing a mechanism to allow customers the option of donating to the program when they pay their water bills. [33]

With respect to DeKalb County's retrofit ordinance, the recent economic downturn has slowed the rate at which residential and commercial properties are turning over. Nonetheless, the county remains committed to enforcing the ordinance, which requires new water account holders to certify that they have replaced inefficient plumbing fixtures with

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efficient ones if their property predates 1993. Since 2008, the county has inspected over 7,400 homes, with 275 more inspections pending.[34]

At least twice the Metro District Governing Board considered, but then rejected, a proposal requiring local governments to implement a retrofit on reconnect ordinance or policy as an additional condition for receiving state water withdrawal and wastewater discharge permits. In 2010, Atlanta considered a similar ordinance which never made it out of committee because of opposition from the real estate sector, which viewed the ordinance as a point of sale mandate alleging it would slow already sluggish home sales. The lack of political will to implement this measure on a regional scale is disappointing, given there are still well over half a million homes across the Metro District predating 1993 in need of plumbing upgrades.[35]

Beginning this year, some of the local governments directly impacted by the 2009 court decision invalidating access to Lake Lanier for drinking water are implementing a new Metro District requirement: toilet rebates for multi-family, residential customers.[36] Three local governments have begun developing their rebate program already: city of Atlanta, city of Gainesville, and Cobb County.[37] Although the city of Gainesville and Cobb County programs are only just underway, Atlanta's program has been in place since October 2010 and has already yielded some significant water savings. Since its inception in October 2010, Atlanta has provided $253,600 in rebates for 2,536 toilets, saving 26.5 million gallons of water annually while preventing 63.4 tons of porcelain from reaching landfills due to mandatory recycling requirements.[38]

Atlanta works with two end-use recyclers, Patterson Services and Stephens MDS, that crush toilet porcelain for reuse in road paving, landscaping, and countertops. Photo ©iStockphoto.com/J. Montgomery Brown.

All of these measures rely on mandates or incentives to induce retrofitting. Another option that has not been given serious consideration by the Metro District is direct installation of efficient plumbing fixtures. In 2011, the Metro District estimated there were 615,000 homes in metro Atlanta predating 1993 still in need of retrofits. If we assume a 2% rate of retrofit, over 600,000 homes in metro Atlanta remain in need of retrofits. A direct installation of just one toilet in each of these homes could yield as much as 29.5 MGD in water savings. Installing a single faucet and showerhead along with the single toilet could yield an additional 4.7 MGD.[39]

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In order to maximize potential water savings by replacing outdated plumbing fixtures, we make the following recommendations:

2012 RECOMMENDATIONS

- All Metro local governments should adopt low income assistance programs similar to Atlanta's "Care and Conserve" program.
- During the 2014 plan update, the Metro District should require all local governments to enact a retrofit on reconnect ordinance applicable to new residential and commercial customers.
- During the 2014 update, the Metro District should examine the costs and benefits of a district-wide direct installation program that would expedite retrofitting for current customers.
- During the 2014 update, the Metro District should make the multi-family toilet rebate program a district-wide requirement and provide all local governments with institutional support to administer the program.
- During these tough economic times during which local governments are loath to incur more debt, GEFA should provide more grants and zero-interest loans to help local governments retrofit pre-1993 buildings with efficient plumbing fixtures.

3) Price Water Right

Because each utility's pricing structure is unique, and because data are lacking with respect to how water use has changed in response to changes made to the pricing structure, this metric is difficult to evaluate. What we can say is that although monthly bills may vary somewhat across the Metro District, the city of Atlanta's rates remain high, virtually double any other utility's rates (Figure 5).

As we noted in our 2011 report, high water rates coupled with a tiered pricing structure means Atlanta's businesses continue to lead the way in saving money by saving water. Unfortunately, most other jurisdictions not only fail to price water effectively, but also do not impose a tiered pricing structure on commercial customers to help incentivize reduced use. As the water loss audits reveal, the need to "price water right" in order to finance repairs for leaky infrastructure is greater than ever, and commercial customers should help shoulder the cost of infrastructure repair.

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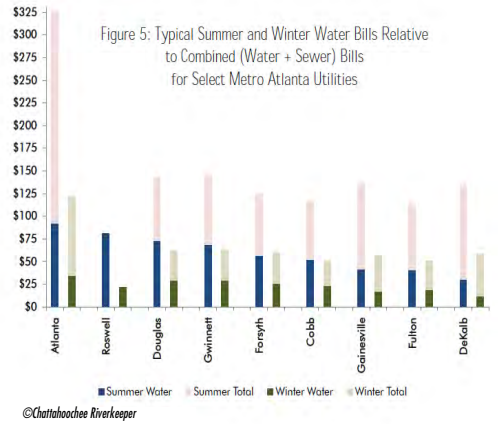

2012 RECOMMENDATIONS

- During the 2014 plan update, the Metro District should require all local utilities to impose a multi-tiered, conservation pricing structure on commercial customers.
- During the 2014 plan update, the Metro District should require all utilities to evaluate the efficacy of their current conservation pricing structure for residential customers and adjust the pricing structure as needed to secure additional water savings.

4) Reduce Outdoor Water Use

Georgia's 2010 Water Stewardship Act imposed a partial ban on daytime watering. Unfortunately, the Act contains so many exceptions they appear to virtually undo any benefits.[40] Nonetheless, local governments have found other ways to encourage customers to reduce reliance on treated drinking water while still meeting outdoor watering needs.

Take for example rainwater harvesting. Virtually all local governments we surveyed offered workshops to demonstrate how to assemble rain barrels and explain their water savings benefits. A rain barrel can save the average household 1,300 gallons of water during the summer, amounting to 40% of total household water use.[41] In our 2011 report, we noted several innovative rainwater harvesting projects which are helping to reduce outdoor water demand (e.g., Atlanta Golf Club, Enota Multiple Intelligences Academy, Sweetwater Creek State Park, Weatherford Place).

Some local governments and businesses also are exploring rainwater harvesting as a way to reduce indoor water demand. For example, in September of 2011, Atlanta's City Council

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passed an ordinance that permits rainwater harvesting for indoor potable uses (e.g. showering, dishwashing). This ordinance was among the first in the nation and is serving as a model for other local governments across the country. Stonehurst Place, a local bed and breakfast inn, was the inspiration for this ordinance and is proposing to take rainwater harvesting to the next level. Upon completion, Stonehurst will collect rainwater from its rooftop and store it underground for irrigation as well as reuse indoors. Some of that rainwater will pass through a six-step purification process before getting piped indoors for use during clotheswashing, dishwashing, and bathing. Once that indoor water is used, the resulting grey water is collected, filtered, treated, and then used once again to flush toilets. Finally, energy needs are fulfilled using solar power.[42]

Chattahoochee Riverkeeper partners with local governments, schools, churches, and clubs to offer rain barrel workshops to show people how to use recycled 60-gallon syrup drums donated by the Coca-Cola Company to harvest rainwater. Photo courtesy of Bonny Putney.

According to the Southeast Rainwater Harvesting Systems Association (SERHSA), rainwater harvesting on a large scale has the potential to provide 27 MGD of water for both indoor and outdoor uses by 2016.[43] Whether on a large or a small scale, reducing reliance on our drinking water system not only saves water but also saves energy that is no longer needed to treat and transport water from treatment plants to homes and businesses. Moreover, rainwater harvesting helps reduce the stress we put on our stormwater systems, alleviating runoff and keeping our streets safer and streams cleaner.

In 2011, we honored Cobb County Water System for its simple, yet effective campaign targeting outdoor water use. Cobb County's "Give 'em an inch…Grow a yard!" campaign continues to deliver a basic message to water customers: plants and lawns only need one-inch of water per week. During the 2007 drought, this campaign helped reduce Cobb County's per capita water use by 7%. In response to our current drought, Cobb County has now partnered with the Georgia Green Industry Association and the Georgia Urban Agriculture Council in order to broaden the campaign by reaching out to landscapers, nurseries, and irrigators.

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In our 2011 report, we also noted the voluntary commitment of Georgia's golf course superintendents to reduce water use substantially through a wide array of best management practices. These partnerships remain strong and since 2003, water withdrawals by Chattahoochee golf courses averages well under 1.0 MGD annually for all courses combined.[44]

Cobb County continues to promote other best management practices by offering training and licensing workshops for professional landscapers and irrigators.[45]

2012 RECOMMENDATIONS

- State and local governments should provide financial and regulatory incentives (e.g., stormwater fee waivers) for increasing rainwater harvesting for outdoor use.
- State and local governments should evaluate the potential of rainwater harvesting for non-potable indoor use (e.g., institutional toilets).
- GEFA should provide grants and interest-free loans to support innovative rainwater harvesting projects.
- The state should require and set minimum standards for landscaping and irrigation certification.

5) Increase Reliance on Reuse

Water reuse involves the collection and treatment of wastewater, which is then available to help offset demands on our drinking water systems. Reuse water should be distinguished from gray water, the latter of which may include wastewater from baths, showers, sinks, and clothes washers. Gray water may be used for non-potable purposes such as irrigation and flushing toilets with little or no treatment.

Reuse water consists of treated wastewater that can be used for potable (i.e., drinkable) and non-potable purposes, depending on the level of treatment. In 2011, we showcased several local governments and businesses that rely on reuse to help reduce their water demand, including Fulton County's Johns Creek Environmental Campus and Gwinnett County's F. Wayne Hill Water Resources Center. Forsyth County also has an active reuse program. With a capacity of 2.5 MGD, the Fowler Water Reclamation Facility currently serves nineteen facilities in south Forsyth County, including schools, golf clubs, and parks.[46] Potential reuse for Fulton County, Gwinnett County, and Forsyth County is 87.5 MGD, but only 20.6 MGD of treated wastewater are used currently for potable and non-potable purposes, including irrigation, drinking water, and lake level augmentation.[47]

At least two other local governments have begun to explore reuse as an option for meeting their water supply needs. DeKalb County has initiated a feasibility study to evaluate the extent to which reuse may help limit interbasin transfers of water out of the Chattahoochee to the Ocmulgee, while the city of Atlanta is considering an ambitious reuse project that would use treated wastewater for outdoor irrigation of parks, golf courses, and schools lying along the Beltline.

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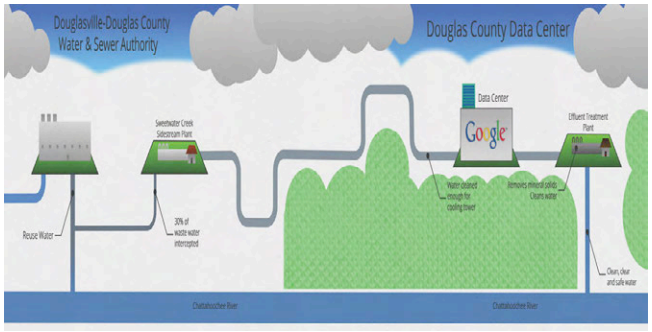
Some local businesses also look to reuse as a means of saving water and money. In our 2011 report we highlighted water recycling by Manheim, which has reduced water consumption at its auto reconditioning center by 60%. Similarly, we reported that the Cartersville Anheuser-Busch has reduced water use at its beer brewery by 15% through water reclamation and reuse within its facility.

Consider also Alcon in Johns Creek, an eye product manufacturing facility built in 1996. This facility was expected to reach full capacity by 2002 and require Chattahoochee withdrawals of nearly two million gallons of water a day to operate. However, the state would only permit half that amount. Alcon invested $2.2 million to construct an onsite conservation and recycling system which has reduced consumption of treated drinking water by nearly 80% while saving half a million dollars *annually*.

Another example is the Google Data Center in Douglas County. Rather than use treated drinking water to help cool its facility, Google invested $17 million in a wastewater treatment plant to intercept and treat wastewater collected by Douglasville-Douglas County Water and Sewer Authority. Every day the Google-funded Sweetwater Creek Sidestream Plant diverts approximately 1.0 MGD of treated wastewater to the data center. Any water that is not evaporated during cooling is treated and returned to the Chattahoochee.



Google uses treated wastewater provided by Douglasville-Douglas County Water and Sewer Authority to cool its data center. The remaining cooling effluent is treated again and then discharged back into the Chattahoochee River. Diagram courtesy of Google.

In spite of these success stories, enthusiasm for reuse as a means of meeting future water supply needs remains lacking. Georgia EPD gave the Metro District a 2035 goal to reuse 10% of water withdrawn, which equates to about 100 MGD. According to the Metro District, they have met this goal: currently District utilities are reusing 16% of their treated wastewater, or over 100 MGD. By 2035, the District estimates that percentage will increase to 26% or approximately 263 MGD.[48] The Governor's Contingency Task Force estimated that as much as 252 MGD is possible through indirect potable reuse in six metro Atlanta counties alone.[49] Clearly, reuse is a water supply option that merits further exploration.

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2012 RECOMMENDATIONS

- All Metro local governments should conduct a feasibility study to explore the potential benefits and detriments of relying on reuse to reduce outdoor water demand.
- During the 2014 update, the Metro District should assess the degree to which reuse projects may help meet future water demand.

6) Promote Pervious Paving and Other Green Infrastructure

Hard surfaces including parking lots, roads, sidewalks, and buildings pose an ongoing threat to water quality and availability. Hard surfaces increase stormwater runoff, polluting our rivers by sending sediment-laden water rapidly downstream. Hard surfaces also impede our ability to store water locally underground as baseflow; baseflow is needed especially during the dry summer months to help augment our rivers and lakes. One cost-effective way to enhance groundwater infiltration and protect water quality is to forego traditional paving in favor of pervious or porous paving.

In our 2011 report, we highlighted several local businesses (Stone Mountain Park, Weatherford Place, Gwinnett Environmental & Heritage Center, Sweetwater Creek State Park) that employ pervious or porous paving at their facilities. In Appendix B we provide more information on the costs of installation and maintenance as well as provide some resources for those who are interested in this best management practice.

As we did in 2011, we again emphasize the benefits of using natural features to help augment our water supply by reducing rapid stormwater runoff and enhancing groundwater infiltration. These features include riparian buffers, wetlands, and even green spaces. They are relatively inexpensive, sustainable, and provide a myriad of additional benefits including water filtration, wastewater assimilation, flood control, recreation, and habitat for fish and wildlife. Water management does not typically focus on these measures as a means of augmenting water supply; nonetheless, investing in "green infrastructure" can help us meet our future water supply needs.

Local governments such as Roswell, Gwinnett County, DeKalb County, and Douglasville-Douglas County have formed utilities to manage stormwater more effectively. We strongly recommend that other local governments follow suit and either form their utilities and impose fees on customers based on impervious surface coverage in order to manage stormwater better or offer credits or waivers for reducing impervious surfaces.

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2012 RECOMMENDATIONS

- State and local governments should provide financial and regulatory incentives (e.g., stormwater fee waivers, expedited permit review) for increasing use of pervious paving and other green infrastructure.
- During the 2014 plan update, the Metro District should add pervious paving to its list of options for compliance with the green infrastructure requirement within the District's Watershed Management Plan.

7) Invest in Energy Efficiency

Nearly half of all surface water withdrawn in Georgia—2.7 billion gallons a day—is used to cool thermoelectric power plants.[50] A significant portion of the water withdrawn is evaporated while keeping these plants cool; in fact, 35-40% of the water withdrawn to cool the two coal-fired plants along the Chattahoochee River between Atlanta and West Point Lake is lost to evaporation.[51] Therefore, reducing energy demand and increasing energy efficiency has the additional benefit of reducing water use.

Last May, Better Buildings Challenge partners including the city of Atlanta, Atlanta Gas Light, and Central Atlanta Progress marked completion of energy upgrades at the Civic Center. Photo courtesy of Central Atlanta Progress.

In spite of the obvious water savings benefits associated with improved energy efficiency, Georgia's Water Stewardship Act of 2010 included only one measure: after July 1, 2012, all new commercial and industrial construction must install high-efficiency cooling systems if applicable. This measure should generate at least 5.4 MGD in water savings for metro Atlanta.[52]

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Last year we also reported that the state had suspended the fall tax holiday, which would have exempted energy and water efficient appliances and fixtures from sales tax. Fortunately, the state legislature has reinstated the holiday for 2012 and 2013.[53] This October holiday exempts Energy Star and Water Sense certified products, including dishwashers, clothes washers, refrigerators, air conditioners, ceiling fans, fluorescent light bulbs, programmable thermostats, toilets, urinals, showerheads, and faucets from sales tax.

In our 2011 report, we recognized energy efficient innovations for several metro Atlanta businesses, including Manheim, Philips Arena, TOTO, and Weatherford Place. A relatively new initiative, the Better Buildings Challenge (BBC), has begun to yield additional energy savings within Atlanta's business sector. As noted earlier, in order to participate in the BBC, Atlanta businesses must commit to reducing energy and water use 20% by 2020. In just three years, the BBC pilot facility, Atlanta Civic Center, has reduced energy use 25%. Through major improvements to its heating, cooling, and lighting systems, the Center has saved $93,000 in utility costs over the past six months with an annual savings of $200,000 anticipated.[54]

2012 RECOMMENDATIONS

- The state should provide rebates for the purchase of Energy Star and WaterSense appliances.
- The state should adopt legislation phasing in the replacement of low-efficiency appliance inventory (i.e., clothes washers and dishwashers) with Energy Star models.
- The state should set minimum water and energy efficiency requirements for power plants.

CONCLUSION

The Chattahoochee River is the most heavily-used water resource in Georgia. The ability of the river system to satisfy growing and competing demands simply depends on our ability to share. In the absence of good stewardship, our downstream neighbors have little incentive to work with us to finalize an equitable water sharing agreement for the entire Apalachicola-Chattahoochee-Flint river basin, placing our future water security at risk. Many local governments in metro Atlanta have taken the lead by implementing effective conservation measures such as those outlined in this report. It is up to our state leaders to take further action by supporting and building upon these local successes.

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Atlanta Department of Watershed Management

PERFORMANCE DASHBOARD

POPULATION	
Population Served (2011)[55]	650,000
City Population Change (2000 to 2010)[56]	0.8%
WATER USE	
Primary Source	Chattahoochee River
Annual average withdrawal (MGD)[57]	84.1 (2010) 2.2% increase from 2009
Monthly peak withdrawal (MGD)[58]	98.7 (2010) 4.2% increase from 2009
Single-family household winter use (gallons/month)[59]	5,173 (2011) 34.6% increase from 2010
WATER LOSS (2012)[60]	
AWWA audit data validity score	58
Apparent water loss	8.1%
Real water loss	18.0%
ILI	3.99
Real water loss goal (2025)[61]	14.0%
CONSERVATION PRICING[62]	
Residential	3 increasing blocks
Winter monthly water bill/combined water & sewer bill (assuming 5,000 gallons/month)	$34.54/$121.98
Summer monthly water bill/combined water & sewer bill (assuming 12,000 gallons/month)	$92.18/$326.45
Commercial	3 increasing blocks
OTHER	
Single-family toilet rebates (Sept. 2011)[63]	5,197 (1.28 gpf)/ 5,597 (1.6 gpf)
Multi-family toilet rebates (May 2012)[63]	2,536 (1.28 gpf)
Reuse[64]	No current reuse program; however, the city is exploring the feasibility of a reuse loop along the Beltline to provide irrigation water for several golf courses and 30 city parks as well as water to flush toilets in new homes and businesses constructed along the Beltline.
Rainwater harvesting[65]	Since 2009, Atlanta has hosted 12 rain barrel workshops, with 130 participants and 159 (55-gallon) rain barrels distributed. In 2011, the city led the nation by enacting an ordinance authorizing single-family homeowners to harvest rainwater for indoor potable use.

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Cobb County Water System

PERFORMANCE DASHBOARD

POPULATION	
Population Served (2011)[55]	533,000
Total County Population Change (2000 to 2010)[56]	13%
WATER USE	
Primary Source	Chattahoochee River
Annual average withdrawal (MGD)[57]	43.3 (2010) 0.7% decrease from 2009
Monthly peak withdrawal (MGD)[58]	49.4 (2010) 3.9% decrease from 2009
Single-family household winter use (gallons/month)[59]	5,040 (2011) 4.9% decrease from 2010
WATER LOSS (2011)[60]	
AWWA audit data validity score	74
Apparent water loss	1.7%
Real water loss	6.3%
ILI	1.06
Real water loss goal (2025)[61]	<10%
CONSERVATION PRICING[62]	
Residential	5 increasing blocks
Winter monthly water bill/combined water & sewer bill (assuming 5,000 gallons/month)	$23.71/$50.21
Summer monthly water bill/combined water & sewer bill (assuming 12,000 gallons/month)	$52.48/$116.08
Commercial	uniform block
OTHER	
Single-family toilet rebates (Sept. 2011)[63]	7,237 (1.28 gpf)/ 9,896 (1.6 gpf)
Reuse[64]	No current reuse program in the Chattahoochee basin; however, the Northwest Water Reclamation Facility (Coosa River Basin) provides 2 MGD of treated wastewater for irrigation of the Cobblestone Golf Course and the Acworth Sports complex.
Rainwater harvesting[65]	Cobb County hosts an annual rain barrel decorating contest: "Rain Barrel of Fun." Each year, 15 public elementary schools decorate 15 barrels. To date, more than 50 schools and hundreds of students have participated. Cobb County also offers its customers an online video and do-it-yourself rain barrel guide.[66]

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DeKalb County Department of Watershed Management

PERFORMANCE DASHBOARD

POPULATION	
Population Served (2011)[55]	670,000
Total County Population Change (2000 to 2010)[56]	3.9%
WATER USE	
Primary Source	Chattahoochee River
Annual average withdrawal (MGD)[57]	74.9 (2010) 1.4% increase from 2009
Monthly peak withdrawal (MGD)[58]	87.6 (2010) 2.1% increase from 2009
Single-family household winter use[59]	Not Available
WATER LOSS (2011)[60]	
AWWA audit data validity score	72
Apparent water loss	0.5%
Real water loss	20.5%
ILI	3.54
Real water loss goal (2025)[61]	15.2%
CONSERVATION PRICING[62]	
Residential	4 increasing blocks
Winter monthly water bill/combined water & sewer bill (assuming 5,000 gallons/month)	$12.00/$58.49
Summer monthly water bill/combined water & sewer bill (assuming 12,000 gallons/month)	$30.03/$134.55
Commercial	4 increasing block
OTHER	
Single-family toilet rebates (Sept. 2011)[63]	10,419 (1.28 gpf)/ 5,457 (1.6 gpf)
Reuse[64]	No current reuse program; however, DeKalb County is exploring the feasibility of reuse as a means of capping future interbasin transfers of water out of the Chattahoochee basin into the Ocmulgee basin.
Rainwater harvesting[65]	Over the past 18 months, DeKalb County has hosted three rain barrel workshops, with 38 participants and 46 (55-gallon) rain barrels distributed.

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Douglasville-Douglas County Water & Sewer Authority

PERFORMANCE DASHBOARD

POPULATION	
Population Served (2010)[55]	108,027
Total County Population Change (2000 to 2010)[56]	43.6%
WATER USE	
Primary Source	Dog River & Bear Creek (Chattahoochee tributaries)
Annual average withdrawal (MGD)[57]	11.9 (2010) 13.3% increase from 2009
Monthly peak withdrawal (MGD)[58]	12.6 (2010) 3.3% increase from 2009
Single-family household winter use (gallons/month)[59]	4,449 (2011) 0.3% increase from 2010
WATER LOSS (2011)[60]	
AWWA audit data validity score	71
Apparent water loss	2.1%
Real water loss	14.8%
ILI	1.37
Real water loss goal (2035)[61]	12.4%
CONSERVATION PRICING[62]	
Residential	3 increasing blocks
Winter monthly water bill/combined water & sewer bill (assuming 5,000 gallons/month)	$29.70/$61.55
Summer monthly water bill/combined water & sewer bill (assuming 12,000 gallons/month)	$72.99/$142.25
Commercial	3 increasing blocks
OTHER	
Single-family toilet rebates (Sept. 2011)[63]	2,275 (1.28 gpf)/ 228 (1.6 gpf); Note: DDCWSA has suspended its rebate program
Reuse[64]	Douglasville-Douglas County diverts 6 MGD of treated wastewater to the base of Dog River Reservoir in order to augment stream flow below the dam.
Rainwater harvesting[65]	Douglasville-Douglas County has held two workshops, attended by 121 participants. Workshop participants learned how to construct rain barrels and landscape with drought tolerant plants.

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Forsyth County Water & Sewer

PERFORMANCE DASHBOARD

POPULATION	
Population Served (2011)[55]	114,499
Total County Population Change (2000 to 2010)[56]	78.4%
WATER USE	
Primary Source	Lake Lanier (Chattahoochee River)
Annual average withdrawal (MGD)[57]	7.8 (2010) 25.8% increase from 2009
Monthly peak withdrawal (MGD)[58]	10.4 (2010) 3.7% decrease from 2009
Single-family household winter use (gallons/month)[59]	4,800 (2011) 4.3% increase from 2010
WATER LOSS (2011)[60]	
AWWA audit data validity score	81
Apparent water loss	1.3%
Real water loss	9.4%
ILI	0.81
Real water loss goal (2025)[61]	Eliminate all unaccounted for water loss
CONSERVATION PRICING[62]	
Residential	5 increasing blocks
Winter monthly water bill/combined water & sewer bill (assuming 5,000 gallons/month)	$25.60/$59.80
Summer monthly water bill/combined water & sewer bill (assuming 12,000 gallons/month)	$56.18/$124.26
Commercial	uniform block
Other	
Single-family toilet rebates (Sept. 2011)[63]	131 (1.28 gpf)/ 80 (1.6 gpf)
Reuse[64]	The Fowler Water Reclamation Facility provides treated wastewater for irrigation of a high school, two public parks, and a golf course.
Rainwater harvesting[65]	Since 2008, Forsyth County has hosted 22 rain barrel workshops, with 324 participants and 280 (55-gallon) rain barrels distributed.

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Fulton County Department of Public Works

PERFORMANCE DASHBOARD

POPULATION	
Population Served (2011)[55]	172,533
Total County Population Change (2000 to 2010)[56]	12.8%
WATER USE	
Primary Source	Chattahoochee River
Annual average withdrawal (MGD)[57]	40.1 (2010) 8.1% increase from 2009
Monthly peak withdrawal (MGD)[58]	52.8 (2010) 1.1% decrease from 2009
Single-family household winter use (gallons/month)[59]	11,127 (2011) 13.3% increase from 2010
WATER LOSS (2011)[60]	
AWWA audit data validity score	81
Apparent water loss	4.5%
Real water loss	3.9%
ILI	0.5
Real water loss goal (2025)[61]	Achieve minimum losses possible
CONSERVATION PRICING[62]	
Residential	3 increasing blocks (seasonal)
Winter monthly water bill/combined water & sewer bill (assuming 5,000 gallons/month)	$18.55/$50.70
Summer monthly water bill/combined water & sewer bill (assuming 12,000 gallons/month)	$40.81/$113.14
Commercial	uniform block
OTHER	
Single-family toilet rebates (Sept. 2011)[63]	1,342 (1.28 gpf)/ 1,154 (1.6 gpf)
Reuse[64]	Cauley Creek Plant provides 5 MGD of treated wastewater for golf course irrigation; Johns Creek Environmental Campus has an additional 17 MGD of treated wastewater available for reuse, but no customers yet.
Rainwater harvesting[65]	Since 2007, Fulton County has hosted 21 rain barrel workshops, with 950 (55-gallon) rain barrels distributed.

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City of Gainesville

PERFORMANCE DASHBOARD

POPULATION	
Population Served (2011)[55]	126,620
City Population Change (2000 to 2010)[56]	32.2%
WATER USE	
Primary Source	Lake Lanier (Chattahoochee River)
Annual average withdrawal (MGD)[57]	17.5 (2010) 5.4% increase from 2009
Monthly peak withdrawal (MGD)[58]	19.9 (2010) No change from 2009
Single-family household winter use (gallons/month)[59]	4,361 (2011) 0.2% increase from 2010
WATER LOSS (2011)[60]	
AWWA audit data validity score	77
Apparent water loss	1.3%
Real water loss	14.3%
ILI	1.95
Real water loss goal (2025)[61]	12.2%
CONSERVATION PRICING[62]	
Residential	3 increasing blocks
Winter monthly water bill/combined water & sewer bill (assuming 5,000 gallons/month)	$17.16/$57.32
Summer monthly water bill/combined water & sewer bill (assuming 12,000 gallons/month)	$41.94/$135.62
Commercial	3 increasing blocks
OTHER	
Single-family toilet rebates (Sept. 2011)[63]	226 (1.28 gpf)/ 924 (1.6 gpf)
Reuse[64]	No current reuse program
Rainwater harvesting[65]	Over three years, Gainesville has hosted more than 25 rain barrel workshops and distributed more than 350 rain barrels (55 gallon).

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Gwinnett County Department of Water Resources

PERFORMANCE DASHBOARD

POPULATION	
Population Served (2011)[55]	749,722
Total County Population Change (2000 to 2010)[56]	36.9%
WATER USE	
Primary Source	Lake Lanier (Chattahoochee River)
Annual average withdrawal (MGD)[57]	75.5 (2010) 3.8% increase from 2009
Monthly peak withdrawal (MGD)[58]	86.7 (2010) 0.7% decrease from 2009
Single-family household winter use (gallons/month)[59]	5,330 (2011) 0.6% increase from 2010
WATER LOSS (2011)[60]	
AWWA audit data validity score	72
Apparent water loss	6.8%
Real water loss	5.7%
ILI	0.94
Real water loss goal (2025)[61]	<10%
CONSERVATION PRICING[62]	
Residential	3 increasing blocks
Winter monthly water bill/combined water & sewer bill (assuming 5,000 gallons/month)	$29.40/$63.85
Summer monthly water bill/combined water & sewer bill (assuming 12,000 gallons/month)	$68.82/$144.50
Commercial	uniform block
OTHER	
Single-family toilet rebates (Sept. 2011)[63]	5,993 (1.28 gpf)/ 2,935 (1.6 gpf)
Reuse[64]	Gwinnett F. Wayne Hill Water Resources Center returns 20 MGD of treated wastewater to the Chattahoochee; en route, 180 million gallons reused to irrigate golf courses, public parks, sports fields, and commercial landscaping.
Rainwater harvesting[65]	Since 2006, the Gwinnett Environmental & Heritage Center has hosted 17 rain barrel workshops, with 160 participants and 160 rain barrels distributed.

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City of Roswell

PERFORMANCE DASHBOARD

POPULATION	
Population Served (2011)[55]	14,300
City Population Change (2000 to 2010)[56]	11.4%
WATER USE	
Primary Source	Big Creek (Chattahoochee tributary)
Annual average withdrawal (MGD)[57]	1.1 (2010) No change from 2009
Monthly peak withdrawal (MGD)[58]	1.2 (2010) No change from 2009
Single-family household winter use (gallons/month)[59]	8,597 (2011) no change from 2010
WATER LOSS (2011)[60]	
AWWA audit data validity score	74
Apparent water loss	7.3%
Real water loss	4.1%
ILI	0.65
Real water loss goal (2025)[61]	<10%
CONSERVATION PRICING[62]	
Residential	3 increasing block
Winter monthly water bill/combined water & sewer bill (assuming 5,000 gallons/month)	$22.00/not applicable
Summer monthly water bill/combined water & sewer bill (assuming 12,000 gallons/month)	$81.20/not applicable
Commercial	3 increasing block
OTHER	
Single-family toilet rebates (Sept. 2011)[63]	171 (1.28 gpf)/ 185 (1.6 gpf)
Reuse[64]	No current reuse program.
Rainwater harvesting[65]	Over the past four years, Roswell has hosted four workshops and distributed 750 rain barrels.

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APPENDIX A

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APPENDIX B

UPPER CHATTAHOOCHEE RIVERKEEPER®

Keeping Watch Over Our Waters

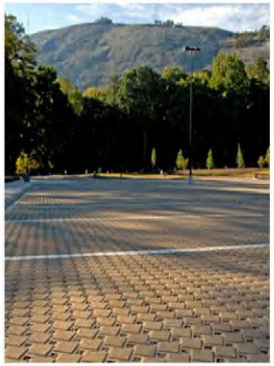
Pervious Pavement

Solutions for Sustainable Development

Porous Alternatives to Conventional Paving

- **Pervious Concrete** is similar to conventional concrete, but with 15-20% open space to allow water to filter through the surface. Installation cost: 15-20% more than conventional concrete.
- **Porous Asphalt** relies on the same mixing and application process as conventional asphalt. No waterproofing sealants are needed. Installation cost: 10-15% more than conventional asphalt.
- **Permeable Interlocking Concrete Pavement (PICP)** funnels water between blocks of concrete into a basement layer of gravel and sand to drain away water. Installation cost: 3-4 times more than conventional concrete.
- **Grid Pavers** consist of recycled plastic or concrete with space between the pavers to collect water. Grass often grows between grid pavers. Installation cost: 4 times more than conventional concrete.

Overall Savings: Although installation is typically more expensive for pervious pavements, these surfaces lower management costs by increasing infiltration and eliminating the need for expensive ponds and drainage infrastructure to capture runoff, often making pervious pavements cheaper than conventional counterparts. Typical maintenance includes routine pressure washing or vacuuming.



Photos courtesy of Gwinnett County Stormwater Authority

Pervious materials have applications ranging from highway paving to patios and parking lots, such as this parking lot located in Stone Mountain Park. When installed properly, these materials are a durable and cost-effective system for effectively controlling stormwater runoff.

Porous asphalt used at a metro Atlanta area parking lot

Pervious Paving for Water Quality and Supply

Hard, impervious surfaces prevent water from seeping into the ground and rapidly transport pollutants to water resources. From 2001 to 2005, an average of 55 acres of land in metro Atlanta were converted to impervious surfaces each day (NRSAL, University of Georgia, http://narsal.uga.edu/projects/glut/data-stats/statewide-impervious-trends). Pervious paving solutions slow stormwater down and act as a natural filter for pollutants. Porous surfaces also increase the "baseflow," the water naturally stored in the ground that recharges lakes and streams during droughts.

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EAST ATLANTA LIBRARY: HIGH PERFORMANCE & COST-EFFECTIVENESS

Above: EAL Pervious Concrete Lot
Below: Artist's Rendering

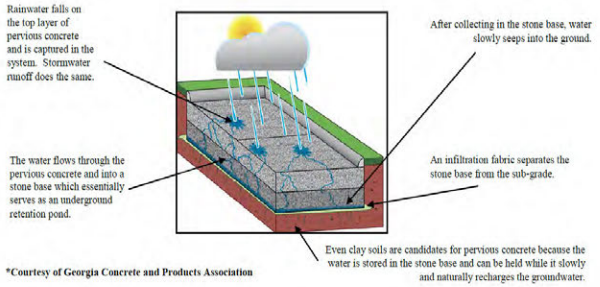
Located at 400 Flat Shoals Ave. in Atlanta, the pervious concrete parking lot at the East Atlanta Library (EAL) is a model of sustainability that demonstrates the highest performance standards. Constructed by Fulton County in 2004, the pervious concrete pavement continues to benefit the environment and contributes to the library's L.E.E.D. (Leadership in Energy and Environmental Design) certification.

The EAL parking lot consists of 10,000 square feet of 6" pervious concrete pavement designed to capture and infiltrate 5.2" of rain over a 24-hour period. The stormwater that falls on the pavement and roof is stored under the pervious concrete pavement in a ¾" (#57) stone base. A non-woven infiltration fabric was placed on the natural clay soil prior to the aggregate base.

The pervious concrete pavement at the EAL eliminated the need for traditional storm water piping, inlets, and detention ponds, providing first initial savings of $30,000 over a traditional asphalt parking lot. The long life span of concrete has provided the EAL years of maintenance free performance and has generated long-term savings. Infiltrating the stormwater on site decreases the load on Atlanta's overloaded infrastructure and will continue to save public funds for decades.

By keeping stormwater on-site, pervious concrete is particularly effective in capturing first flush pollutants. Pervious concrete eliminates heated runoff into sensitive waterways and mitigates the urban heat island effect.

A PERVIOUS CONCRETE PAVING SYSTEM COMMONLY FOUND IN GEORGIA



*Courtesy of Georgia Concrete and Products Association

For more information, please visit **www.chattahoochee.org/no-time-to-waste-sustainability.php**

Upper Chattahoochee Riverkeeper (UCR) is a non-profit, 501(c)(3) environmental advocacy organization with the mission of protecting and preserving the Chattahoochee River system for the people and wildlife that depend upon it.
916 Joseph Lowery Blvd., Suite 3, Atlanta, GA 30318 — (404) 352-9828 — www.chattahoochee.org

September 2011

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ENDNOTES

[1]Figure assumes an average of 151 gallons per person per day. Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009).

[2]CRK, *Filling the Water Gap: Conservation Successes and Missed Opportunities in Metro Atlanta*, (March 2011), available at http://www.ucriverkeeper.org/filling-the-water-gap-report.php.

[3]In Re: MDL – 1824 Tri-State Water Rights Litigation, 644 F.3d 1160 (11th Cir. 2011).

[4]http://www.cpc.ncep.noaa.gov/products/expert_assessment/seasonal_drought.html.

[5]http://www4.eere.energy.gov/challenge/.

[6]M. Cheyne, Director of Asset Management and Sustainability, City of Atlanta Department of Aviation, *pers. comm.*

[7]W. Strang, Senior Vice President of Operations, TOTO USA, *pers. comm.*

[8]Georgia Environmental Financing Authority and the University of North Carolina Environmental Finance Center, 2011, available at http://www.efc.unc.edu/RatesDashboards/.

[9]U.S. Census Bureau, 2010, State and County Quick Facts, available at http://quickfacts.census.gov/qfd/index.html.

[10]Metro North Georgia Water Planning District, *2011 Metro Water District Plan Implementation Review* (Dec. 2011).

[11]Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009).

[12]Data from National Bureau of Economic Research, http://www.nber.org/.

[13]Data from U.S. Department of Labor, Bureau of Labor Statistics, http://www.bls.gov/data/.

[14]Data from the U.S. Census Bureau, http://2010.census.gov/2010census/.

[15]Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009).

[16]http://water.sam.usace.army.mil/Buford_Dam_Water_Supply_Analysis_23_Nov_08.pdf.

[17]Data provided by W. Zeng, Hydrological Unit, Georgia Environmental Protection Division (EPD) (May 2012). Note, according to EPD, 2011 and 2012 water use data is not yet available.

[18]Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009).

[19]K. Shorter (AECOM) Memorandum to P. Stevens (Metro North Georgia Water Planning District), *Additional Conservation Measure Analysis* (Aug. 2, 2010).

[20]Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009).

[21]Georgia Water Stewardship Act of 2010 (SB 370/ HB 1094). O.C.G.A. §12-5-4.

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[22]American Water Works Association, W*ater Audits and Loss Control Programs* (M36) (3rd edition, 2009).

[23]American Water Works Association, W*ater Audits and Loss Control Programs* (M36) (3rd edition, 2009); Georgia Association of Water Professionals, *Georgia Water System Audits and Water Loss Control Manual* (Sept. 2011).

[24]Metro North Georgia Water Planning District, *Amendments to the Water Supply and Water Conservation Management Plan* (Dec. 2, 2010).

[25]For more information on conservation pricing, see http://www.allianceforwaterefficiency.org/.

[26]http://www.efc.unc.edu/RatesDashboards/.

[27]Metro North Georgia Water Planning District, *2011 Metro Water District Plan Implementation Review* (Dec. 2011). Limit is two toilet rebates per household.

[28]DeKalb County and Cobb County limit rebates to three per household. Gainesville has a limit of four rebates per household.

[29]Metro North Georgia Water Planning District, *Amendments to the Water Supply and Water Conservation Management Plan* (Dec. 2, 2010). Note the rebate is available to the building owner, not necessarily the building tenant.

[30]Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009).

[31]We assume that utilities currently with real water loss of < 10% (i.e., Cobb County Water System, Gwinnett County Department of Water Resources, Forsyth County Water & Sewer, City of Roswell, and Fulton County Department of Public Works) do not reduce water loss any further. Also assumes that the volume of water supplied remains constant; annual savings could increase if more water is provided.

[32]EPA WaterSense figures were generated by assuming the national average of 2.6 people/ household. EPA's water calculator is available here: http://www.epa.gov/watersense/our_water/be_the_change.html.

[33]M. Langston, Director of Water Conservation, City of Atlanta's Department of Watershed Management, *pers. comm*.

[34]C. Lambert, Deputy Director of Construction and Maintenance, DeKalb County's Department of Watershed Management, *pers. comm*.

[35]Last year, the Metro District estimated 615,000 homes in the region still contained old-fashioned plumbing. PolitiFact, *Water advocate says toilets could save nearly 50 million gallons daily*, Atlanta Journal Constitution (April 9, 2011).

[36]Although the 2009 court decision was reversed in June of 2011, the District has remained committed to this requirement which currently applies to most of the local governments in Cobb, DeKalb, Forsyth, Fulton, Gwinnett, and Hall counties. Exempt are Fulton County's Palmetto, College Park, and East Point because they do not withdraw from the Chattahoochee River.

[37]Note that in 2011, Douglasville-Douglas County Water and Sewer Authority (DDCWSA) received federal funding to offer single and multi-family toilet rebates. However, due to the lack of applications and apparent interest, DDCWSA has since suspended its toilet rebate program.

[38]J. Carlile, Environmental Program Manager, City of Atlanta's Department of Watershed Management, *pers. comm*.

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[39]Calculations based on EPA WaterSense figures generated by assuming a national average of 2.6 people/ household. Maximum water savings for single toilet retrofit is 6,900 gallons per person per toilet per year; maximum savings for single showerhead and single faucet retrofit is 1,100 gallons per person per fixture per year. EPA's water calculator is available here: http://www.epa.gov/watersense/our_water/be_the_change.html.

[40]See "Outdoor Water Use Guidelines" in Appendix A.

[41]U.S. Environmental Protection Agency, http://www.epa.gov/greenhomes/ConserveWater.htm.

[42]http://www.stonehurstplace.com.

[43]See SERHSA's submission to the Georgia Water Supply Task Force (2012), available at http://www.serhsa.com/.

[44]Data provided by W. Zeng, Hydrological Unit, Georgia Environmental Protection Division (EPD) (May 2012). Note, according to EPD, 2011 and 2012 water use data is not yet available.

[45]K. Nguyen, Senior Project Manager, Cobb County Water System, *pers. comm*.

[46]T. Perkins, Director, Forsyth County Water & Sewer Department, *pers. comm*. Note, Cobb County also has a reuse program in the Etowah River basin, but because our report focuses on the Chattahoochee River basin we do not include their program in our calculations.

[47]Fulton County potential reuse is 15 MGD (John's Creek) and 5 MGD (Cauley Creek); currently none is reused. Gwinnett County potential reuse is 60 MGD; currently 20 MGD is reused. Metro North Georgia Water Planning District, 2011 Metro Water District Plan Implementation Review (Dec. 2011). Forsyth County potential reuse is 2.5 MGD; currently, slightly more than 600,000 gallons per day are used (T. Perkins,Director, Forsyth County Water & Sewer Department, *pers. comm.*). This adds up to 20.6 MGD of 87.5 total MGD possible for these three utilities alone. Note treated wastewater also may be used to augment river flows to help mitigate for impoundments upstream. For example, Douglasville-Douglas County Water and Sewer Authority diverts 6 MGD of treated wastewater from the South Central Wastewater Treatment Plant to the base of Dog River Reservoir in order to replenish river flows in Dog River.

[48]Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009).

[49]Water Contingency Planning Task Force, *Findings and Recommendations* (Dec. 2009), available at http://gov.georgia.gov/00/channel_modifieddate/0,2096,78006749_154453222,00.html.

[50]U.S. Geological Survey, *Water Use in Georgia by County for 2005; and Water-Use Trends, 1980-2005*, available at http://pubs.usgs.gov/fs/2009/3034/pdf/fs2009-3034.pdf.

[51]Georgia Power, *Consumption Reports* (2003-2011) (on file with UCR).Note these estimates do not include water loss due to evaporation from hydropower reservoirs, which may be substantial. See River Network's *Burning our Rivers: the Water Footprint of Electricity* (2012), available at http://www.rivernetwork.org/news/burning-our-rivers-water-footprint-electricity.

[52]Water Contingency Planning Task Force, *Findings and Recommendations* (Dec. 2009), available at http://gov.georgia.gov/00/channel_modifieddate/0,2096,78006749_154453222,00.html. Task Force figures represent savings from commercial buildings only.

[53]https://etax.dor.ga.gov/salestax/bulletins/5-1-12_Sales_Tax_Holiday_IB_05_02_2012.pdf.

[54]http://www.atlantabbc.com/projects.

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[55]Georgia Environmental Financing Authority and the University of North Carolina Environmental Finance Center, 2011, available at http://www.efc.unc.edu/RatesDashboards/.

[56]U.S. Census Bureau, 2010, State and County Quick Facts, available at http://quickfacts.census.gov/qfd/index.html.

[57]Data for 2009 and 2010 average annual daily surface water withdrawals provided by Georgia Environmental Protection Division. Withdrawals are for the Chattahoochee River basin only.

[58]Data for 2009 and 2010 peak summer monthly surface water withdrawals provided by Georgia Environmental Protection Division. Withdrawals are for the Chattahoochee River basin only.

[59]The figure represents average gallons used per single-family household monthly or daily (as indicated) in the winter. Metro North Georgia Water Planning District, *2011 Metro Water District Plan Implementation Review* (Dec. 2011). Data do not distinguish between indoor and outdoor use. Also, not all utilities distinguish between residential and commercial accounts or between single-family and multi-family accounts. Average household sizes differed for each county, as reported in the 2010 Metrics Report.

[60]Each utility provided their American Water Works Association (AWWA) Water Audit Software Report to CRK. The AWWA software computes "data validity score," "apparent water loss," and the infrastructure leak index, or "ILI." CRK computed "real water loss" as the percentage of total water supplied that consisted of "current annual real loss" (CARL). The AWWA software computes CARL by taking total water loss and subtracting out apparent water loss. Data validity scores theoretically range from 0 to 100, where 100 is optimally reliable. Over time, these scores should increase in response to accumulation of more accurate information.

[61]The 2010 Metro District plan requires each local utility to assess "real water loss" and set a goal for reduction. Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009). For select utilities impacted by the federal judicial ruling, utilities must cut in half any "real water loss" exceeding 10% by 2025. For remaining utilities, the timeline for reducing excessive water loss is 2035.

[62]The table characterizes the pricing structure for both commercial and residential customers. The table also notes the average monthly winter (5,000 gallons/month) and summer (12,000 gallons/month) water bills. Finally, the table notes average monthly winter and summer total bills for water and sewer combined. Rate structure and water bill data are available at http://www.efc.unc.edu/RatesDashboards/.

[63]Data is current as of September 2011. Metro North Georgia Water Planning District, *2011 Metro Water District Plan Implementation Review* (Dec. 2011).

[64]Metro North Georgia Water Planning District, *2011 Metro Water District Plan Implementation Review* (Dec. 2011). Additional information provided by each individual utility.

[65]Rain barrel workshop information provided by each individual utility.

[66]http://watershed.cobbcountyga.gov/files/rainbarrels.htm.

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