Nadler, Herbert

Page 2 of 2

Withdrawals for water supply and operational changes to accommodate withdrawals from the river basin could dramatically affect power production at the projects and result in a loss of power benefits available and may result in an increase in federal power rates. A number of Southeastern's customers have already expressed concerns relating to the continuing increase in cost of federal power, as well as the reduction in benefits available as a result of competing operating purposes.

Southeastern would encourage the District, in its update of the water control manual, to explore options which minimize impacts to power production, or alternatively develop a methodology which equitably redistributes project costs to purposes benefiting from changes in operation and the utilization of project storage. It is unreasonable to expect an authorized purpose to be responsible for a level of costs which do not correspond to the degree of benefits received. Ultimately, if these issues are not addressed, it may jeopardize the continued marketability of federal hydropower, as current costs are already approaching market rates.

Southeastern understands the many challenges ahead and looks forward to working with the Mobile District in its development of a water control plan which both enables authorized purposes to meet obligations and satisfies the needs of the basin.

Sincerely,

Herbert Nadler

Herbert Nadler
Assistant Administrator for
Power Resources

cc: Tetra Tech, Inc.

Nash, Charlotte

Page 1 of 4

Board of Commissioners

75 Langley Drive • Lawrenceville, GA 30046-6935
770.822.7000 • www.gwinnettcounty.com

Charlotte J. **Nash**, Chairman
Jace W. **Brooks**, District 1
Lynette **Howard**, District 2
Tommy **Hunter**, District 3
John **Heard**, District 4

gwinnettcounty

January 9, 2013

Via Electronic and United States Mail

Colonel Steven J. Roemhildt
Commanding Officer
U.S. Corps of Engineers
Mobile District
C/O Tetra Tech, Inc.
61 St. Joseph Street
Suite 550
Mobile, AL 36602-3521

RE: Response of Gwinnett County, Georgia to 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

Dear Col. Roemhildt:

Gwinnett County, Georgia ("Gwinnett County") appreciates the opportunity to provide additional comments for consideration by the U.S. Army Corps of Engineers (the "Corps") in supplement to its prior submissions of October 20, 2008, and December 22, 2009, relative to accommodating municipal and industrial water supply from the Buford Dam/Lake Lanier Project. The Updated Scoping Report, Environmental Impact Statement, Update of the Water Control Manual for the Apalachicola-Chattahoochee-Flint (ACF) River Basin, in Alabama, Florida, and Georgia (March 2010)(the "2010 Scoping Report") reflects the County's prior comments. Given Gwinnett County's obligation to provide water supply and fire safety protection to more than 800,000 residents, as well as businesses, schools, and hospitals; the County's primary reliance upon the Buford Dam/Lake Lanier project for raw water; and the County's commitment of substantial public resources to supply the project with return flows that benefit lake and downstream users alike, the Corps' current effort to update the Water Control Manual is of significant importance to the County's citizens and the region.

Gwinnett County offers the following comments to be considered by the Corps in any revision to the 2010 Scoping Report based upon the decision of the Eleventh Circuit and the June 2012 Legal Opinion of its Chief Counsel:

- *Update Federal Authorities*: Per the Eleventh Circuit decision, Public Law No. 84-841 (July 30, 1956) ("1956 Act"), authorizes the Corps to contract with Gwinnett County for withdrawals at a rate of 11,200 acre-feet (10 mgd) annually from Lake Lanier, and is

Nash, Charlotte

Page 2 of 4

additional authority by which the Corps may authorize water storage for withdrawals by the County for a secure and regulated water supply. Consequently, the Corps should update the list of "Federal Authorizations" in Section 1.2 of the 2010 Scoping Report to include the 1956 Act and note that such withdrawals are within the baseline established by Congress.

- *Update Models with Representative Basin Conditions*: The Corps should update its modeling data to take into account recent shifts in rainfall and temperature patterns in the ACF Basin rather than relying on older, less representative data regarding basin conditions. It is widely recognized that drought conditions are becoming more frequent and widespread throughout the United States and the increased frequency and extent of drought need to be incorporated into the Corps' models. *See* Drought in the United States: Causes and Issues for Congress, Congressional Research Service, August 15, 2012 (http://www.fas.org/sgp/crs/misc/RL34580.pdf)(http://www.drought.gov/drought/ and http://www.gpo.gov/fdsys/pkg/PLAW-109publ430/pdf/PLAW-109publ430.pdf)

- *Alternatives Analysis*

    - Increase winter pool storage to 1,071 (msl): The Corps should evaluate an alternative that increases winter pool storage to 1,071 (msl) to be consistent with the summer storage amount; as discussed above, to the extent that recent shifts in rainfall and temperature patterns suggest that more water must be available for releases, a consistent full pool operational measure should be taken into account and incorporated as an alternative rather than curtailing storage and ignoring availability of Congressionally authorized flood control storage above 1071 (msl).

    - Remove 5,000 cfs operating policy as the floor for the ACF Basin: The 5,000 cfs floor is merely a parameter in the 2006 Interim Operation Plan and in any event is based on an incorrect analysis of the baseline conditions in the ACF Basin and should not be the driver for the Corps' operation of the reservoirs in the basin. Basin-wide performance measures should be considered instead.

    - Re-examine 750 cfs requirement at the Chattahoochee River below the Atlanta withdrawal point: the 750 cfs operational flow criteria utilized by the Corps should be re-examined in light of current permit requirements and assimilative capacity to determine whether alternatives to that flow may exist. In developing its alternatives, the Corps should de-emphasize use of any discretionary operational policy in favor of operating to maximize water supply, an authorized purpose of the project.

    - Maximize water supply at the Buford Dam/Lake Lanier project: The Corps should include in its alternatives analysis an alternative that maximizes the authorized purpose of water supply at Lake Lanier. Applying the Eleventh Circuit decision and the project purposes outlined in the 2010 Scoping Report, the Buford Dam/Lake Lanier project is the only reservoir within the ACF Basin that has water supply as an authorized project purpose and, as such, this purpose should be

Nash, Charlotte

Page 3 of 4

prioritized in Corps' operational policy. Supporting downstream project purposes at the expense of an authorized project purpose at the Buford Dam/Lake Lanier project would be inappropriate.

- *Facilitate return flows*: The 2012 Legal Opinion of the Corps' Chief Counsel projects availability of water supply from the Buford Dam/Lake Lanier project in reliance upon return flows to the project. Consistent with that forecast, and to maximize the potential for Lake Lanier to satisfy a range of authorized purposes, the Corps' operations should encourage and facilitate return flows to Lake Lanier, including providing direct 1:1 credit to entities providing return flows to the lake. Return flows mitigate the impact of withdrawals and releases made for all purposes on the lake levels, provide a level of assurance of water availability not provided by general basin inflow, and support principles of conservation and reuse. Moreover, to the extent any wastewater provider incurs additional treatment costs to satisfy wastewater permitting requirements for Lake Lanier, direct credit for return flows for each such provider will help offset such costs and thereby incentivize the provision of return flows. As such, directly credited return flows should be encouraged and facilitated.

- *Economic Impacts*: The Corps must incorporate into its analysis all of the potential economic impacts associated with the alternatives that it evaluates, including the host of detrimental economic impacts that would be associated with either not exercising its authority to allocate storage for water withdrawals or not maximizing the provision of water supply through making storage available for lake withdrawals and releases for downstream users. Further, economic impacts previously associated with the Magnuson decision (reversed by the Eleventh Circuit) nonetheless still could occur to some extent due to the unavailability of raw water for storage for water supply purposes due to operational management of the Buford Dam/Lake Lanier project. A number of analyses have been performed that demonstrate that the economic impacts to the Atlanta area of not being able to rely on the Buford Dam/Lake Lanier project for the provision of the region's water supply would be devastating and would have numerous adverse economic impacts on the region. Moreover, in light of the transportation and economic benefits that the metropolitan area affords other areas of the State as well as the Southeast region more broadly, the detrimental economic impacts of inadequate operational support for water supply at Lake Lanier extend far beyond the metropolitan area itself. The Corps must consider these economic impacts in structuring its operations to assure the availability of storage to support water supply consistent with the authority outlined in the 2012 Legal Opinion of its Chief Counsel in review of the Georgia Water Supply Request.

- *Environmental Impacts*:

    - Environmental impacts to the region: Although much attention has been focused by Florida upon the perceived environmental impacts of basin management below Woodruff Dam, the Corps must incorporate into its analysis all of the potential environmental impacts of the alternatives it considers, including environmental impacts that would occur absent the availability of storage in the Buford

Nash, Charlotte

Page 4 of 4

Dam/Lake Lanier project for water supply or in any operating scenario that does not maximize storage for water supply from Lake Lanier. Such impacts could include the environmental impacts associated with efforts to obtain alternative water supplies that the region would need to undertake absent reliance on Lake Lanier for storage (e.g. reservoir construction/interbasin transfers), and downstream effects in proximity to the project. Maximizing lake levels promotes availability of adequate storage and ameliorates impacts of alternative storage methodologies.

- The Corps should use an appropriate baseline: The Corps (and the Fish and Wildlife Service) should not inappropriately incorporate into the action being reviewed effects that would occur notwithstanding the action under review. The flow of a river depends upon the month, season, as well as multi-year precipitation patterns. A baseline flow regime should not include any of the discretionary federal actions such as rule curves, action zones, peaking hydropower releases, or other aspects of the Corps' water control plan and ongoing operations the effects of which are being studied . The Corps (and the Fish and Wildlife Service) should use the "run-of-river" flow regime, that is, one that assumes the dams are in place but that the reservoirs simply release the water as it comes in without storing any of it for release later.

- The Corps should incorporate the most recent information about the endangered species: Recent data provided to the Corps and FWS in 2012 by experts in the field demonstrate that the species promoted by Florida are in much better shape than previously assumed and this data must be incorporated into the EIS / ESA analysis for any revised operating plan for the ACF Basin.

Thank you for the opportunity to amplify the comments which Gwinnett County has provided to the Corps relative to the update of the Water Control Manual for the ACF Basin. Gwinnett County stands ready to assist the Corps in moving forward with this significant policy determination, hopes that expedited attention will be given to completing the manual, and is pleased to provide any additional feedback or respond to any question of the Corps arising out of the County's submission.

Sincerely,

GWINNETT COUNTY, GEORGIA

BY: Charlotte J. Nash

Charlotte J. Nash, Chairman
Gwinnett County Board of Commissioners

Active 20216169v4 003864.109976

Nash, Richard

Page 1 of 1

1/12/2013

COMMENTER: richard nash
107 Bedford street
Statesboro, GA 30458

ORGANIZATION: riverkeeper

COMMENTS: I wish to comment mainly about the mismanagement of the environments that affect the water systems throughout the S.E. You can't have a healthy eco system thats beneficial to mankind with the mindset the army Corps of Engineers has. Private property interests as well as timber companys and reckless development have depleted the forested areas to a point that unless there is a major conservation and replanting effort, there will continue to be major trouble ahead for all our river systems as well as the great network of fisheries and other industries and economies dependent on natural resources.

The Army Corps of Engineers backward in its initial approach and fundamental thinking as they are guided by the the lowest common denominator: making a fast dollar at the eternal detriment of the future of this country.

Richard Nash

Nelson, Alton

Page 1 of 1

10/29/2012

COMMENTER: Alton Nelson
203 Thomas Drive
LaGrange, GA 30240

ORGANIZATION:

COMMENTS: Sir,

As a home owner on West Point Lake I am dissatisfied with the lake management by the Corps of Engineers. I purchased my home specifically to be on the lake for direct access to the water for general recreation and enjoy boating on the lake. Because the Army Corps of Engineers method of controlling the lake is flawed, I am denied the utility of the lake after having made a substantial investment to gain access to it for recreational use. My dock is of a very limited use, and the operation of boats at any level below 632 ASL is impaired based on the Corps established recreational impact level. West Point Lake according to the Corps was authorized by our Congress for five purposes and is the first being a designated for a General Recreation purpose. The COE is mis-managing the lake for other un-authorized purposes at a much lower level, than the 632 ASL, as the minimum lake level for recreational use.

It appears to me, as well as my neighbors, West Point Lake could be held at a minimum of 632 ALS and still pass through water to the south.. I am oppose the C.O.E. plan to drop the level below 632 ALS and the subsequent loss of my entitlement to the use of the lake for recreational purposes.

Alton J. Nelson
203 Thomas Drive
LaGrange, GA 30240-9126

Nelson, Alton

Page 1 of 1

1/6/2013

COMMENTER: Alton N elson
203 Thomas Drive
Lagrange, GA 30240

ORGANIZATION: Retired

COMMENTS: I am hearing from local reputable sources West Point will only reach full pool 635' ASL during the months of June, July and August. As I understand WPL was created to be a recreational lake and the USACE original planned lake level would be controlled to 635' ASL in the summer months and lowered to 632' in the off season. Since moving here in 1990 I have made a considerable investment both in property and recreational facilities. Investments include a pontoon boat and a sail boat plus a dock which is now and has been for some time remains on dry land. When there was sufficient water I rented a dock for my sail boat. The marina does not have enough water most of the year to keep a boat there. My county taxes are higher because it is lakeside property. If the USACE continues to control lake levels my investment will be seriously eroded considering a planned three month lake level at 635' ABSL. I understand we have been in a severe drought the last three years. What I don't understand why a recreational lake level cannot be maintained by holding the lake at 635' by passing through the required flow down stream. It appears to myself and many residents on lakefront property on WPL was lowered first and has remained at a very low level, 621-625 this past year and continued into December 2012. Thank you for allowing my view in this manner.

AJ Nelson

Nelson, Elizabeth

Page 1 of 2

12/14/12

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.**

Nelson, Elizabeth

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. 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,

Elizabeth M. Nelson

Nelson, John

Page 1 of 2

12/9/2012

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

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Nelson, John

Page 2 of 2

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Nelson, John

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Nelson, Wanda

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Nelson, Wanda

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Sincerely,

Wanda A Nelson

Nelson, et al, Bill

Page 1 of 1

United States Senate
WASHINGTON, DC 20510-0905

October 12, 2012

The Honorable Jo Ellen Darcy
Assistant Secretary (Civil Works)
Department of the Army
108 Army Pentagon
Washington, DC 20310-0108

Lt. General Thomas P. Bostick
Chief of Engineers
U.S. Army Corps of Engineers
441 G Street NW
Washington, DC 20314-1000

Dear Secretary Darcy and Lt. General Bostick:

We are writing concerning the Corps announcement that it will restart the process of updating the water control manuals for the Apalachicola-Chattahoochee-Flint (ACF) River Basin.

First, we continue to expect the Corps to adhere to its pledge of neutrality during this process. We believe the responsibility for achieving a permanent resolution of the controversy rests with the three governors.

Second, we are concerned that the Corps is increasingly exceeding the limits of its discretion to reprioritize water project purposes without the involvement of Congress. In updating the manual, the Corps must not make material changes to the uses for specific purposes of water resources projects. That is the proper domain of the Congress, not the Corps.

Finally, the Corps noted in June that it is has not made a final decision on the operation of the ACF but will do so at the conclusion of this manual update process and after a National Environmental Policy Act (NEPA) analysis is complete. We would strongly encourage the Corps to hold a robust public notice and comment process and to give full and careful consideration to the comments and concerns of our respective States and other stakeholders who depend upon reliable downstream flows. Until the Corps completes this public process, we fully expect there will be no substantive changes to the operation of ACF system.

Please keep us apprised as the process of updating the water control manuals continues.

Sincerely,

Bill Nelson

Richard Shelby

Nepote, Mike

Page 1 of 1

1/15/2013

COMMENTER: mike nepote
602 NW AV. B
CARRABELLE, FL 32322

ORGANIZATION:

COMMENTS: It certainly seems that it would help considerably if 2 new reservoirs were built on te Fla. side of the line to beable to regulate much more. Also evryone needs to pray!

Newman, Charles

From: Newman, Charles <CNewman@georgiacrown.com>
Sent: Tuesday, December 11, 2012 10:28 AM
To: ACF-WCM
Subject: Scoping comments re: WPL

Gentlemen,
Thank you for the opportunity to share my concerns in regards to the current state of the ACF Basin and its future.

I am in a unique position. I currently reside in a home on West Point Lake, and my family has owned property on St. George Island for years. As a result, I have a huge interest in not only what is happening along the Chattahoochee, but what the effect of flows are to Appalachicola Bay and St. George Sound as well. As much as I love fishing the coves of West Point Lake and Lake Lanier, I also love roaming the grass flats and oyster bars of the Bay, looking for trout and redfish.

My concern in mandated water flow. In January of this year, West Point was nearly at full pool. We were fortunate to have a lot of rain over last winter. Unfortunately, the rain stopped. Now we are experiencing a severe drought, and yet the flow down the river continued at its mandated rate. The fishery, and ecological system of Appalachicola Bay survived for thousands of years prior to the damming of rivers along the Chattahoochee, surviving on nothing more than the "run of the river". Perhaps in drought conditions, the flows should be modified.

West Point Lake has FOUR authorizations. It is my understanding that none of them receive any priority over any others. In the state that the lake is currently in, it is meeting the requirements of only one, that being flood control. There's plenty of available capacity!

The citizens of LaGrange submitted that a West Point Lake with a constant pool of 633 feet, would meet ALL of the authorizations, and experience in the last 5 years has shown that the lake, even when full, can hold a 100 year flood event. A 633 foot pool is the best option for the public, and I hope that it is being seriously considered.
Maintain that pool, or higher, and use the runoff and the excess over 633, to provide the needs downstream.
I also feel that something similar would be the best option for ALL of the lakes in the Basin.

Thank you,
Charles T Newman
121 Riverbluff Dr.
LaGrange,GA. 30240

1

Nichols, Jr., Robert

11/15/12

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.**

Nichols, Jr., Robert

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,

Robert R. Nichols Jr.
P.O. Box 549
West Point GA 31833
Robbie@SouthernHarbor.com

Nix, Randy

Page 1 of 2

RANDY NIX
REPRESENTATIVE, DISTRICT69
291 EAST YORKTOWN DRIVE
LAGRANGE, GEORGIA 30240
(706) 845-9853 (H)

E-mail: randy.nix@house.ga.gov

HOUSE OF REPRESENTATIVES
COVERDELL LEGISLATIVE OFFICE BUILDING
ROOM 501
ATLANTA, GEORGIA 30334
(404) 656-0178 (office)
(404) 463-2796 (fax)

STANDING COMMITTEES

BANKS AND BANKING, SECRETARY
ECONOMIC DEVELOPMENT
AND TOURISM
EDUCATION
JUDICIARY
NATURAL RESOURCES. VICE-CHAIRMAN

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:

As the Georgia General Assembly member who represents most of West Point Lake, I would like to submit the following for consideration. The Corps' current management plan is destroying West Point Lake! We must stop being forced to drain West Point Lake to supply an unnecessary and arbitrarily high flow at the Florida line.

Please, please, reconsider and be fair to all-stakeholders, businesses, residents, and species (including humans) in the new plan.

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

Nix, Randy

Page 2 of 2

can be observed at Lake Martin, Alabama. The residents and potential visitors to West Point Lake demand similar treatment.

- 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.

Sincerely,

Randy Nix, Representative
District 69

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Overton, C.

Page 1 of 1

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

From: Lynn Overton [mailto:j-loverton@bellsouth.net]
Sent: Monday, January 14, 2013 1:07 PM
To: ACF-WCM
Cc: jcloud@lakelanier.org
Subject: Water Control Manual Revision Public Comments

Please review the Lake Lanier Association comments.
These are "FACTS" & common sense,not some bureaucratic manual.
We have wasted too much water & killed endangered species, with excessive releases and not compensating for downstream rains & storms.
The Corp also can save water & $50m dollars per year by discontinuing the locks downstream,that are not being used & are not needed.
Let's use common sense and do what's right.We're all in this together!

C.Lynn Overton

1

Parmenas, Gathana

Page 1 of 1

From: DIV.ACF.EIS
Subject: FW: WAter allocation from ACF river basin

From: Gathana Parmenas [mailto:gparmenas@yahoo.com]
Sent: Friday, December 07, 2012 2:44 PM
To: ACF-WCM
Subject: WAter allocation from ACF river basin

Re: Water allocation from ACF river basin

I have been a resident in Franklin County, Florida, near the mouth of the Apalachicola, since 1998. Prior to that I lived in the high desert of Santa Fe, New Mexico for 25 years. One thing which seems to be missing from all discussions of water allocation from the ACF river basin is conservation measures, especially for the residential users of the metro Atlanta area.

Humans have the ability to enormously decrease their daily use of water. Having lived with water use restrictions in desert areas has proven to me that it is not a huge hardship for most Americans to cut their water consumption in half by simple measures. These measures include limited or no watering of private lawns, low flow plumbing fixtures, and drought resistant native plants for landscaping.

Unlike humans, the oysters and other sea life dependent on the flow of the Apalachicola have no conservation measures available to them. While a human can decide not to flush a toilet needlessly, an oyster cannot make do with less water.

The utter failure of the entire metropolitan area of Atlanta to address water conservation in any serious way should be a signal that it's time to reduce the water allotment for residential use.

I urge the decision makers to include strict water conservation requirements in planning for allotments to the use of the ACF flow.

Sincerely,

Gathana Parmenas
PO Box 449
Carrabelle, FL 32322

850-697-3145

1

Payant, Mike and Rebecca

Page 1 of 2

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

12/1/12

Scoping Comments for ACF Water Control Manual

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! Increased Storage + Better Management = Reduced Risk of Flooding and Increased Economic Development and Economic Impacts!**

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.**

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2.

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Payant, Mike and Rebecca

Page 2 of 2

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We thank you for the opportunity to comment and ask that the above issues be submitted and studied during the EIS period. We look forward to a Revised WCM which will honor the WPL Congressional Authorizations and provide for the economic benefits envisioned by Congress and promised to the taxpayers!

Sincerely,

Mike & Rebecca Payant
912 S. Willowcrest Way
LaGrange, GA 30240

Pearce, K.

Page 1 of 1

10/29/2012

COMMENTER: K. Pearce
6240 Holland Cove Rd.
Cumming, GA 30041

ORGANIZATION:

COMMENTS: Permantely raising the full pool level of Lake Lanier would have the least amount (best) of impact on recreation, navigation, fish, and wildlife. Retaining a larger water supply would benefit all involved downstream also.

Perry, Val

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LAKE LANIER ASSOCIATION, INC.
a 501(c)3 nonprofit organization
615-F Oak Street • Suite 100 • Gainesville, GA 30501
(770) 503-7757 • lakeinfo@lakelanier.org • www.lakelanier.org

January 14, 2013

Tetra Tech
Attention: ACF-WCM
61 Saint Joseph Street
Ste 550
Mobile, AL 36602-3521

VIA EMAIL: acf-wcm@usace.army.mil

VIA WEBSITE: http://ww3.sam.usace.army.mil/pa/acf-wcm/form.htm#form

RE: Comments regarding update of ACF Water Control Manual

Dear Sir or Madam:

Thank you for the opportunity to submit comments regarding the Corps of Engineers' ("Corps") revision of the Water Control Manual ("WCM") for the Apalachicola-Chattahoochee-Flint River ("ACF") system. We understand that the scoping process has been re-opened due to the ruling by the U. S. Court of Appeals for the Eleventh Circuit in the *Tri-State Water Rights Litigation* that water supply storage is an authorized purpose of Lake Lanier.

The Lake Lanier Association ("Association") represents approximately 3,000 individuals and businesses whose lives, livelihoods, and profitability depend on Lake Lanier. Please accept this submission on behalf of all our constituents. We previously submitted scoping comments via letters of November 20, 2008, and January 2, 2010, and would appreciate your considering the contents of this letter in addition to our previous correspondence.

LAKE LANIER SHOULD BE MAINTAINED AT THE HIGHEST POSSIBLE WATER LEVEL TO SUPPORT THE RECREATION-BASED ECONOMY

The recreation-based economy of north Georgia relies heavily on a water level above 1060 MSL. Consistent with the Eleventh Circuit's reasoning, recreation is an authorized purpose of Lake Lanier, and the Corps has long recognized it as such. In the Corps' seminal Park Report submitted to Congress in 1939, the Corps listed recreational value as one of six direct benefits of constructing the ACF facilities and estimated the annual recreational benefit to be $50,000. Since the creation of Lake Lanier, the annual value of recreation has vastly outstripped that estimate. Based on a December, 2010, economic impact study by the *1071 Coalition* (a copy of which accompanies this letter), approximately $290

Perry, Val

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million in annual economic impact derives directly from the Lake. An estimated $87.6 million reduction in recreational spending was directly caused by low lake levels in 2008 alone. All of this underscores the importance of maintaining the highest levels possible on Lake Lanier.

Any water level below 1060 in Lake Lanier has a devastating impact on recreation and the regional economy that depends on it. We would urge the Corps to craft the WCM to maximize Lanier's levels to the greatest extent possible year-round, but especially in the critical Memorial Day-through-Labor Day time period.

THE 5,000 CFS OPERATING POLICY SHOULD BE ELIMINATED

The Corps currently mandates that a minimum flow of 5,000 cfs be maintained at the Chattahoochee Gage (by design, the lone exception for lowering the minimum to 4,500 cfs occurs only under conditions that are unlikely to occur). However, a 5,000 cfs minimum flow is not legally required and is unsustainable in the long run without substantial harm to recreation.

The Corps' ACF Pre-Lanier Flow Record Does Not Accurately Reflect the Lower Extent of the System's Historical Flows

The Corps bases the 5,000 cfs flow minimum on the premise that basin inflow less than 5,000 cfs did not occur in the pre-Lanier average daily flow record for the Chattahoochee gage (1929 through 1955). While flows may not have dropped below 5,000 cfs during that time, a 26-year base period is insufficient to serve as the baseline for minimum flows in the new WCM. Data over the last 20 years has shown substantially lower flows during the post-West Point period than during the so-called "pre-Lanier" period. This calls into question whether the pre-Lanier flow record accurately reflects the true lower extent of historical ACF flows. If not, then all planning based on that record is flawed and is likely unsustainable.

A study performed by Neil Pederson, et al., entitled *A Long-Term Perspective On A Modern Drought In The American Southeast,* published March 14, 2012, concludes that the baseline period used by the Corps in setting the minimum flow does not accurately reflect the lowest pre-Lanier flows in the ACF. Through their study of paleohydroclimate records, the authors uncovered evidence that the lowest flows in the ACF system likely dropped well below the level the Corps has assumed based on its 26-year pre-Lanier dataset. According to the authors,

> "…the recent droughts are not unprecedented over the last 346 years. Indeed, droughts of extended duration occurred more frequently between 1696 and 1820. Our results indicate that **the era in which local and state water supply decisions were developed and the period of instrumental data upon which it is based are amongst the wettest since at least 1665**." Environ. Res. Lett. 7 (2012) 014034), page 1, (emphasis added).

A copy of the study accompanies this letter with the permission of the authors. It can also be downloaded at http://academiccommons.columbia.edu/catalog/ac%3A145377 from Columbia University's Academic Commons program. The data is accessible at: ftp://ftp.ncdc.noaa.gov/pub/data/paleo/treering/reconstructions/northamerica/usa/seusa2012pdsi.txt

Perry, Val

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We would ask that the Corps re-evaluate the minimum flow requirement in light of this study and the corroborating evidence of the last dozen years.

A 5,000 cfs Minimum Flow is Unsustainable

When first implemented, the required minimum flow was based on the presumption that dams would be built on the Flint River in addition to those on the Chattahoochee. However, the Flint River dams were never built and have been de-authorized. The Corps' resulting inability to store and control the release of Flint River flows, exacerbated by Florida's elimination of dredging on the Apalachicola River, renders the original goal of ACF navigation unachievable. Nonetheless, because navigation continues to be a nominal authorized purpose, the WCM will presumably be designed to support navigation even though it is not sustainable on a consistent basis.

The WCM should reflect the reality that navigation as originally envisioned is no longer possible and provide for it only during very limited time windows so that it will not negatively affect recreation on Lake Lanier. The windows of navigation under the RIOP and Modified RIOP ("MRIOP") appear to be far too long, given recent precipitation trends.

As explained by the Georgia Environmental Protection Division in its May 2011 comments, long-term average precipitation in the Lanier portion of the ACF Basin has been substantially lower from January through April in the post-West Point period than in the pre-Lanier period. This decline is exerting a disproportionate impact on both Lanier's ability to refill and its capacity to support recreation during the critical Memorial Day through Labor Day time frame. More recently, precipitation has been below average during the fall as well, a period that has not historically seen rainfall in sufficient amounts to replenish Lanier and is even less likely to do so now.

The natural decline in winter and spring precipitation coincides with the increased demand for augmentation flows imposed by the Corps through the RIOP and MRIOP. Again, the presumption that the pre-Lanier record constitutes an accurate baseline for determining appropriate post-dam flows is an inadequately substantiated assumption. The hazard in making that assumption is exacerbated further by the noticeably drier climate that has predominated during the 21st century.

The result of this amalgamation of natural and government-induced effects has been seen in the failure of Lanier to reach full pool by June 1 in all but one year since 2000. Water levels in Lanier are once again mimicking those of 2007-2009, marking the third sustained period of time since 2000 that levels have been drawn down so low. Those levels are a direct result of the inadvisable and legally unrequired 5,000 cfs minimum flow mandated by the Corps.

Lake Lanier was not designed to provide the full volume of flows desired by all stakeholders downstream of Buford Dam, and the new WCM should recognize that operating Lanier to achieve that goal is not legally required or physically sustainable. Even if the Corps' pre-Lanier data were an accurate representation of the lowest ACF historical flows, basin hydrology, precipitation levels, and timing of precipitation have changed in recent years, exacerbating the effects of the insufficiency of the Corps' pre-Lanier data.

Perry, Val

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Augmentation Flows are Not Required by the Endangered Species Act

The Association is sensitive to the impacts of low water levels downstream of Lake Lanier, including in the Apalachicola River and Bay. We do not wish our comments to be misconstrued as being an attack on downstream stakeholders in any sense. But we believe the U. S. Fish and Wildlife Service ("Service") and the Corps misinterpret the Endangered Species Act ("ESA") to require that the ACF reservoirs – and in particular, Lake Lanier - must augment Apalachicola River flows above run-of-river levels. This is because nature herself - not discretionary Corps operations - is the predominant cause of low flows in the Apalachicola. Conversely, however, the Corps ***is*** obligated even during severe droughts to support the ACF facilities' legally authorized purposes, including recreation.

As addressed extensively in the Tri-State litigation, we believe the Service and the Corps used the wrong environmental baseline in determining what flow levels are required under the ESA. The correct baseline is run-of-river flows. Therefore, although we fully support the laudatory goal of the ESA, augmentation flows that raise Apalachicola River flows above run-of-river are not required by the ESA and should not be imposed by the new WCM.

YEAR-ROUND FULL POOL SHOULD BE RAISED TO 1071 MSL IMMEDIATELY, AND TO 1073 AFTER ALL NECESSARY PREPARATIONS HAVE BEEN COMPLETED

The Corps currently operates Lanier with a summer pool of 1071 and a winter pool of 1070. Ostensibly, this is to allow for greater flood control capacity during the wetter winter months. But the additional foot of flood control pool has not been needed in the entire history of the Buford Project and no projections of which we are aware substantiate the need for maintaining the additional foot of flood control storage.

Weather prediction and climate modeling have improved markedly since the full pool levels were set for Lanier, and the best science available for making those forecasts should be used in managing lake levels. The Corps already incorporates forecasting in its management activities, and should have little trouble in utilizing those capabilities to operate the flood control capability of Lake Lanier without dropping winter pool to 1070.

The Association has long championed raising full pool to 1073. The resulting additional 26 billion gallons of stored water at that level would be available for all authorized purposes and would increase the margin of safety in the event of severe drought.

In addition to providing a substantial additional volume of water for all ACF stakeholders, Lanier's nominal level would be two feet higher, allowing shoreline users to stay within approved, maintained recreation areas. A significant percentage of the drowning deaths in Lake Lanier have resulted from inexperienced swimmers venturing outside of the engineered swimming areas, where sudden drop-offs and deep siltation present unseen hazards. When the lake drops, the designated swimming areas are out of the water, leaving users no choice but to venture into these relatively more dangerous areas. The importance of this should be reflected in the WCM, and the most cost-effective solution for both safety and water storage needs is to raise Lanier's level.

Perry, Val

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Whatever studies and infrastructure adaptations are necessary to accomplish the goal of raising full pool year-round to 1073 should be incorporated in the new WCM and accomplished as soon as possible to benefit all ACF stakeholders.

EXISTING STORAGE AND RAMP RATE PROVISIONS SHOULD BE CHANGED

As mentioned above, we believe the RIOP is based on a fundamental misinterpretation of the ESA. Making matters worse, the Corps has incorporated provisions in the MRIOP that decrease the volume of basin inflow that can be stored in the reservoirs during the critical wet-weather months and increase Woodruff discharges to slow down-ramping. We believe the result of those changes will be to lower Lake Lanier levels even further under the MRIOP than they already are under the RIOP. The primary bases for the changes are the underlying propositions that the Fat Threeridge mussel ("FTR") is endangered and that some portion of its population needs assistance in moving down with the water after rainfall events.

Studies conducted by numerous scientists since the listing of the FTR have shown that it is vastly more populous than the Service believed when it was listed as endangered. It would appear that the population is sufficiently robust that the Service should move to de-list the FTR, and the WCM should be prepared in anticipation of the de-listing. But until the FTR is de-listed, we would challenge the Service's conclusion that it is necessary or even fundamentally beneficial to the species to artificially slow down-ramping.

The FTR thrived in the Apalachicola for millennia under conditions in which river levels varied widely and quickly. This causes us to question whether the Service's down-ramping requirements are based on sound science and whether they are ultimately efficacious in preserving the species. It stands to reason that they may inadvisedly be facilitating the preservation of the weakest members of the species for reproduction, which may ultimately be counterproductive. The down-ramping requirements deplete the resources available to preserve minimum flows in the Apalachicola during severe droughts, and absent an established need for artificially dampening ramp rates, we believe these provisions in the RIOP and MRIOP are unnecessary and should be eliminated.

GEORGIA "CONTEMPLATION"

We understand that recent studies commissioned by the Georgia Environmental Protection Division indicate that Lanier can be maintained at a level roughly four feet higher than is possible under the MRIOP. If an increase in Lanier's level is in fact obtainable under that methodology, especially during the warm-weather months when lake levels have their greatest affect on recreation, the Association would endorse its implementation - in addition to revising the environmental baseline and eliminating the 5,000 cfs minimum flow requirement and down-ramping restrictions.

CONCLUSION

During the 2006-2008 drought, Lake Lanier became the sole source of augmentation flows to maintain the 5,000 cfs minimum required flow at the Chattahoochee Gage. Augmentation releases from Lanier's

Perry, Val

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storage during late summer and fall of 2007 at times amounted to two to three times the basin inflow of the entire ACF. The same phenomenon occurred again in 2012, dropping Lake Lanier nearly six feet in six weeks between late October and mid-December. As explained above, Lake Lanier alone cannot provide enough water to be the sole source of augmentation flows to meet the 5,000 cfs minimum required flow under the changing climatic circumstances we are facing. We hope that the Corps will take this opportunity to re-examine its fundamental presumptions regarding that flow volume and draft the new WCM in a way that safeguards Lake Lanier's water levels for the future.

Yours truly,

Val Perry
Executive Vice-President

Attachments:

- Neil Pederson, et al. (2012), "A long-term perspective on a modern drought in the American Southeast"
- Bleakly Advisory Group, et al. (2010), "Executive Summary - Lake Lanier Economic Impact Analysis Final Report"

Perry, Val

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A long-term perspective on a modern drought in the American Southeast

2012 Environ. Res. Lett. 7 014034

(http://iopscience.iop.org/1748-9326/7/1/014034)

Perry, Val

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IOP Publishing Environmental Research Letters

Environ. Res. Lett. **7** (2012) 014034 (8pp) doi:10.1088/1748-9326/7/1/014034

A long-term perspective on a modern drought in the American Southeast

N Pederson[1,2,8], A R Bell[2], T A Knight[3], C Leland[1,4], N Malcomb[1,5], K J Anchukaitis[2], K Tackett[1], J Scheff[1], A Brice[1], B Catron[1], W Blozan[6] and J Riddle[7]

[1] Biological Sciences, Eastern Kentucky University, 521 Lancaster Avenue, Richmond, KY 40475, USA
[2] Tree Ring Laboratory, Lamont-Doherty Earth Observatory and Columbia University, POB 1000, Palisades, NY 10964, USA
[3] Environmental Studies, College of Saint Benedict and Saint John's University, POB 2000, Collegeville, MN 56321, USA
[4] Geology and Geography, West Virginia University, 98 Beechurst Avenue, 330 Brooks Hall Morgantown, WV 26506, USA
[5] Portland Forestry Sciences Laboratory, Pacific Northwest Research, USDA Forest Service, 620 SW Main Street, Suite 400, Portland, OR 97205, USA
[6] Appalachian Arborists, Incorporated, 2000 Riverside Drive, Suite 23, Asheville, NC 28804, USA
[7] Environmental and Forest Biology, SUNY-College of Environmental Science and Forestry, 1 Forestry Drive, Syracuse, NY 13210, USA

E-mail: adk@ldeo.columbia.edu

Received 1 December 2011
Accepted for publication 22 February 2012
Published 14 March 2012
Online at stacks.iop.org/ERL/7/014034

Abstract
The depth of the 2006–9 drought in the humid, southeastern US left several metropolitan areas with only a 60–120 day water supply. To put the region's recent drought variability in a long-term perspective, a dense and diverse tree-ring network—including the first records throughout the Apalachicola–Chattahoochee–Flint river basin—is used to reconstruct drought from 1665 to 2010 CE. The network accounts for up to 58.1% of the annual variance in warm-season drought during the 20th century and captures wet eras during the middle to late 20th century. The reconstruction shows that the recent droughts are not unprecedented over the last 346 years. Indeed, droughts of extended duration occurred more frequently between 1696 and 1820. Our results indicate that the era in which local and state water supply decisions were developed and the period of instrumental data upon which it is based are amongst the wettest since at least 1665. Given continued growth and subsequent industrial, agricultural and metropolitan demand throughout the southeast, insights from paleohydroclimate records suggest that the threat of water-related conflict in the region has potential to grow more intense in the decades to come.

Keywords: Southeastern US, water supply, water conflict, paleohydroclimate, tree-ring analysis
S Online supplementary data available from stacks.iop.org/ERL/7/014034/mmedia

1. Introduction

Drought is a pervasive phenomenon throughout much of North America with profound ecological and societal implications (Allen *et al* 2010, Breshears *et al* 2005, Hursh and Haasis 1931, Manuel 2008). Although much attention has been devoted to forecasting the frequency and magnitude of drought in semi-arid western North America, recent moisture deficits in the southeastern US have renewed water management challenges that underscore the need to better understand drought processes in humid, subtropical regions (Knight 2004, Seager *et al* 2009). Notably, the droughts of

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1986–8, 1998–2002 and 2006–9 caused severe crop damage, disruptions in electricity generation and water shortages, which prompted water restrictions and multi-state legal conflicts (Cook *et al* 1988, Manuel 2008). This is particularly evident in the state of Georgia, where droughts during the 1980s and 1990s occurred concomitant with a 50% increase in population and a 35% increase in groundwater withdrawal (Fanning 2003). During the 2006–9 drought, many municipal water supplies throughout the region, including Atlanta, were reduced to 60–120 day capacities (Goodman 2007, Campana *et al* 2011).

Given recent water shortages and emerging challenges, Georgia and adjacent states have revised water management plans to include greater focus on conservation and efficiency (MNGWPD 2009). Unfortunately, many water allocation plans are based on limited 20th century records and capture a narrow range of potential moisture variability (e.g., Stockton and Jacoby 1976). To plan for an expanded range of natural and anthropogenically forced variability, water managers have begun to incorporate tree-ring based hydroclimate reconstructions to place recent droughts in a long-term context (e.g., Cook and Jacoby 1983, Cook *et al* 2010, Gray *et al* 2004, Maxwell *et al* 2011, Stahle *et al* 1988, Stockton and Jacoby 1976, Woodhouse and Lukas 2006). Tree-ring based perspectives suggest that the 20th century has been relatively moist with respect to the last millennia in the eastern US and that although recent droughts have had significant societal implications, they are in most cases less severe relative to prior centuries (Cook *et al* 2010, Maxwell *et al* 2011, McEwan *et al* 2011, Seager *et al* 2009).

Here, we reconstruct drought, as expressed by the palmer drought severity index (PDSI), for the headwaters of the Apalachicola–Chattahoochee–Flint (ACF) river basin. PDSI is a good estimate of moisture availability because it estimates available soil moisture based upon rainfall, evapotranspiration, runoff and previous soil moisture estimates (Palmer 1965). Tree-ring work in the southeastern US includes the reconstruction of rainfall from bald cypress (Stahle and Cleaveland 1992, Stahle *et al* 1988) and a multi-species reconstruction of PDSI in the southern Appalachian Mountains (Cook *et al* 1988). We address the implications of drought history for water management for the ACF system by incorporating the first tree-ring records throughout the river basin (figure 1). Our multi-species network of tree-ring chronologies is denser and more diverse than previous studies, allowing us to better capture ACF drought variability, improve model calibration and validation statistics (Cook and Pederson *et al* 2010, Maxwell *et al* 2011), and provide an opportunity for placing the region's recent drought woes in the context of the last 350 years of climate variability.

2. Materials and methods

All series were processed using standard dendrochronological techniques (Fritts 1976, Holmes 1983, Stokes and Smiley 1968) and augmented with existing collections from the International Tree-Ring Databank (ITRDB) (NCDC 2011a)

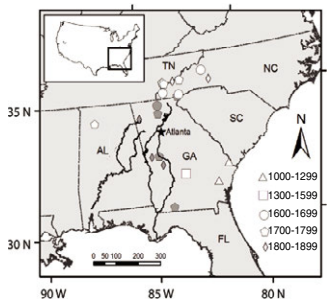

Figure 1. Map of tree-ring locations in the ACF river basin used for PDSI reconstruction. Different symbols represent the period for the beginning year of each chronology. Shaded symbols represent collections since 2008 or the first within ACF river basin. The Chattahoochee and Flint Rivers drain the climatic division in north-central Georgia that is reconstructed. The Apalachicola River begins at the confluence of the Chattahoochee and Flint Rivers at the Florida–Georgia state line.

(table S1 available at stacks.iop.org/ERL/7/014034/mmedia), including collections from D Stahle (no. = 7), E Cook (4), D Duvick (1) and J Young (1). Raw-ring widths from all collections were standardized using the same methodology via the program ARSTAN, which stands for autoregressive standardization (Cook 1985, Cook and Kairiukstis 1990, Cook and Krusic 2011). The purpose of standardization is to remove or reduce non-climatic influences in ring-width series, such as the allometric growth trend or growth patterns resulting from changes in local competition. First, all series were transformed using the adaptive power transformation, which stabilizes the variance of tree-ring series through time (Cook and Peters 1997). Because many series exhibited radial increment patterns typical of disturbance in closed-canopy forests (Lorimer 1985), individual series were standardized using a flexible curve (Pederson *et al* 2004). The 'Friedman Super Smoother' was the primary option used to reduce the influence of disturbance in each series (Buckley *et al* 2010, Friedman 1984). The Friedman Super Smoother sometimes caused distortion at either end of a series where ring-width measurements would trend up (down) while the standardization curve would trend down (up), resulting in an artificial upward (downward) trend in the resulting tree-ring index. In those cases, a cubic smoothing spline two-thirds the length of the series was used to reduce end-fitting issues (Cook and Peters 1981). The chronologies were stabilized in order to account for varying sample depth through time. The rbar (average correlation between raw ring-width series) weighted stabilization method was used to stabilize variance in series where three or more trees are present for nearly all of the chronology length. In chronologies with less than three trees at the beginning of the chronology, variance was

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stabilized using a combination of rbar weighted and one-third spline methodology (Cook and Krusic 2011, Osborn *et al* 1997). Finally, series ring-width index values were calculated using a robust biweight mean function (Cook 1985).

Chronology quality was interpreted using the expressed population signal (EPS) statistic, which indicates the extent of common variance in a chronology (the population signal) over time. Usable chronology length was determined according to the EPS threshold of 0.85 (Wigley *et al* 1984). Standard or ARSTAN chronologies were used as potential climate predictors. In tree-ring records with little evidence of stand dynamics, standard chronologies are used (table S1 available at stacks.iop.org/ERL/7/014034/mmedia). Conversely, ARSTAN chronologies were selected for records with evidence of radial increment patterns typical of disturbance. Through autoregressive modeling, ARSTAN chronologies are useful for examining long-term variability as they retain much of the common growth variability (assumed to be exogenous) and reduce much of the stochastic or endogenous disturbances experienced by surviving trees in closed-canopy forests, making them useful for the examination of long-term variability (Cook 1985).

Newly developed and existing ITRB chronologies within 400 km of Atlanta were selected for chronology length (figure 1). Chronologies north of Alabama and west of the Tennessee–North Carolina border were excluded as potential predictors as spatial analysis indicates diverging trends in moisture availability since 1958 (Kallis *et al* 2009). An examination of retained records was conducted through principal components regression (Cook and Kairiukstis 1990). We only included chronologies that improved the per cent variance of the north-central Georgia climate division PDSI (NCDC 2011b) explained by the model during the common period (1895–76) of the final reconstruction. The remaining set of tree-ring predictors ($n = 23$) was reduced to orthogonal principle components (PCs) using principle components analysis. Median segment length of all retained chronologies is 232 yr (table S1 available at stacks.iop.org/ERL/7/014034/mmedia).

Average April–August PDSI was reconstructed based upon the common response of the retained tree-ring network. Because prior year's climate and growth can influence current year ring formation (Kagawa *et al* 2006, Trumbore *et al* 2002), current year's ring index (t) and prior year's ring index (a lag of $t + 1$) was used for each chronology. This results in a pool of 46 candidate predictors. Model selection was based upon a two-tailed correlation at the 90% confidence level and for a maximum adjusted r-square. Following these criteria, 29 potential predictors were retained, seven of which were lagged. Only six of these predictors entered slightly below the 95% confidence level at $p = 0.055$–0.082.

A nesting procedure was used to extend the length of the reconstructions where shorter chronologies exit as potential predictors moving back in time (Cook *et al* 2004, Meko 1997). Nest length is determined by the usable length of the shortest tree-ring record within each nest. For example, while the Lynn Hollow *Quercus velutina* record extends to 1743, an EPS of 0.85 is not achieved until 1854 (table S1 available at stacks.iop.org/ERL/7/014034/mmedia). Thus, the common period nest for our tree-ring network is 1854–1977; 1977 is the last year of the Linville Gorge record. The final reconstruction is developed from the model calibrated on the full 1895–76 common period between our tree-ring network and the instrumental PDSI data. Split calibration–verification was used to test the stability of each nest over the 1895–76 common period with the instrumental data; one year of the common period is lost because of the lagged effect between climate and ring width. First, a tree-ring based estimate of PDSI was calibrated on the 1895–1922 period and then verified on the 1923–76 period. To complete verification to the stability of our reconstruction, we then performed a calibration on the 1923–1976 period and verified on the 1895–1922 period. All nest models were independently verified on a subset of the common period using the reduction of error (RE) and coefficient of efficiency (CE) statistics where positive values indicate predictive skill (Cook *et al* 1994, Fritts 1976, Wigley *et al* 1984). Nests that accounted for 30% or less of the instrumental record or had negative RE and CE statistics were considered insufficient for reconstruction and were omitted. All usable nests were first normalized and then stitched together to create a continuous, normalized time series. This series was then re-scaled according to the mean and standard deviation of the instrumental PDSI data from 1895 to 2009; the reconstruction was completed before the 2010 season of reconstruction was complete. The north-central region of Georgia is the focus of this reconstruction as it includes the headwaters and upper reaches of the ACF basin. The other climatic divisions of western Georgia were tested versus the full nest to investigate their representativeness of the ACF basin.

3. Results

Seventeen nests spanning 1634–2001 passed the verification criteria for the final reconstruction (table S2, figure S1 available at stacks.iop.org/ERL/7/014034/mmedia). Therefore, to place the most recent drought in context, instrumental data is added from 2002 to 2010. For the 1854–1976 common period nest, tree-ring records account for 58.1% annual variance of the 1895–1976 instrumental data (figure 2(a)). The weakest and earliest nest, 1634–64, accounted for only 35.3% of annual variance and only contains one record from north Georgia. Therefore, climatic variability analyses are only conducted on the 1665–2010 period save for the regime shift analysis, which was limited to the tree-ring based reconstruction (figures 2(b), 3, table 1). Violin plots, which combine box plots and density estimates in displaying data structure, indicate that these tree-ring records capture most of the variability in the instrumental PDSI values, with the expected over-representation of extreme wet years as moderately wet years (figure 3(a)). This source of error is typical for most tree-ring based reconstructions because additional moisture availability beyond a certain threshold does not always lead to increased radial growth (Fritts 1976). Overall, we do not observe significant bias in the reconstruction—the reconstruction captures as much variance

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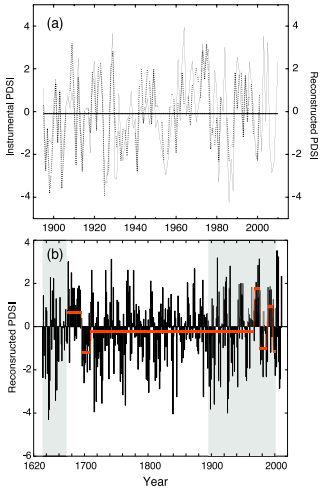

Figure 2. (a) Instrumental PDSI (solid line) versus reconstructed PDSI (dashed line) from 1895 to 2001. Instrumental from 2001 to 2010 is shown to reflect the 2006–9 drought. (b) Bar plot of ACF drought from 1634 to 2010. Shading in the 17th century highlights the era with only one ACF chronology. The shaded area on the right reflects the 1895–2001 calibration period. Bars in the white area after 2001 are instrumental data from 2002 to 2010. The orange line shows the regime shifts in ACF drought history between 1665 and 2001 as calculated by the methodology of Rodionov (2004). We limit the regime shift detection to this period so the analysis is performed only on replicated tree-ring records from within the ACF basin.

on average for dry events as for wet events (figure S2 available at stacks.iop.org/ERL/7/014034/mmedia). Finally, the reconstruction here represents much of the drought variation throughout the ACF basin, including seasonal transition from peak to low flow, or hydrological recession, in north Georgia basins (supplemental material, figure S3 available at stacks.iop.org/ERL/7/014034/mmedia). While it accounts for the lowest amount of annual, April–August drought variation in the lower reaches of the basin (r^2 for the southwest climatic division of GA = 46.1%), the full nest accounts for 53.2% and 62.2% of the annual variance for the northwest and west-central climatic divisions, respectively.

Analysis of dry and wet events from 1665 to 2010 shows a broad range of variability at annual to multi-decadal scales. The 20th century is among the wettest 100 yr periods observed in our reconstruction and had a higher ratio of wet to dry years than either the 18th or 19th centuries (figures 2(b), 3(a), (b); table 1). The 1968–1976 wet event is unmatched

Table 1. Ratio of 75th quantile wet years to 25th quantile dry years per century. Values greater than 1.0 represent a higher portion of wet years occurred in that century than dry years. Also listed is the number of moderate and extreme single-year events per century equal to or greater than ±1 and 2 standard deviations from the mean. This analysis is performed on the 1665–2010 portion of the reconstruction. Analyses for partial 17th and 21st centuries are shaded and based on 36 yr and 11 yr, respectively.

Century	17th	18th	19th	20th	21st
Quantile ratio	3.50	0.68	0.86	1.39	0.67
+2 Std dev	0	1	0	2	2
+1 Std dev	10	11	7	17	1
−1 Std dev	4	18	13	18	5
−2 Std dev	0	5	5	3	0

except for a brief wet event during the early 18th century and the longer event in the late-17th century. Regime shift detection (following Rodionov 2004 using a 10 yr cutoff with an $\alpha = 0.05$) indicates only three significant, positive regimes between 1665 and 2001 (the tree-ring only period with good replication in the ACF Basin): 1665–95, 1968–76 and 1989–97 (figure 2). Average reconstructed PDSI for 1968–76 is the highest of the positive regimes at 1.76 and is greater than 1 standard deviation from the long-term mean. In contrast, the benchmark 2006–8 drought, while severe, is surpassed at least once during each previous century and three times during the 1696–1760 and 1904–21 periods and does not appear to be remarkable in the broader context of 4 yr reconstructed PDSI averages in the record (figures 2 and 3(c)); in fact, it falls short of the previous 'benchmark' drought from 1986 to 1988.

Reconstructed annual values and violin plots indicate increased climatic variability during the 20th century, the entire 18th century, and between 1665 and 1714 (figures 2(b), 3(a)). Both plots also reveal relatively dry conditions with low variability during the latter half of the 19th century. Analysis of the climate distributions formed from moving 50 yr windows over the length of the chronologies demonstrates that these distinct differences in climate variability are not artifacts of the 50 yr periods chosen for the violin plots (figure S4 available at stacks.iop.org/ERL/7/014034/mmedia).

4. Discussion

4.1. Drought variability in the ACF river basin

Our reconstruction shows that the recent drought that threatened the ACF region water supply system was shorter in duration than droughts of the past. Most notably, the 1696–1820 era is punctuated by frequent, extended droughts. Our results confirm the findings of the first reconstruction of drought in the southern Appalachian Mountain region, which indicates that the mid-18th and early 20th centuries were the driest eras since 1700 CE (Cook *et al* 1988, Seager *et al* 2009, Stahle *et al* 1988). This result is also apparent in the reconstruction of spring rainfall in south-central and southeast Georgia (Stahle and Cleaveland 1992). Results here extend the

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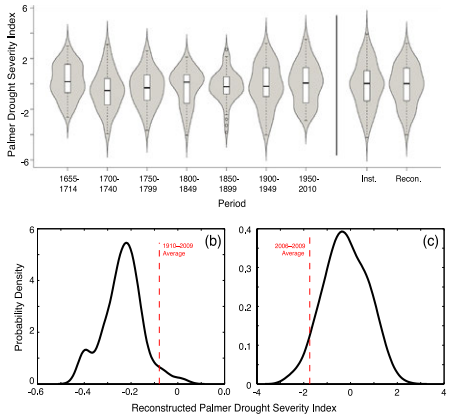

Figure 3. (a) Violin plots for 50-yr segments and for the 1895–2001 common period of the reconstructed and instrumental values, showing data quartiles and outliers (box-and-whisker plots) and probability densities (shaded gray areas). Because more reliable values during the 17th century begin in 1665, the 50-yr period from 1665–1714 is analyzed. (b) Probability density of 100-yr periods from 1665–2009 in black with 1910–2009 in red and (c) 4-yr periods from 1665–2009 in black with the 2006–2009 benchmark drought in red.

southern Appalachian Mountain reconstruction by revealing a substantial drought from 1696 to 1709 and an era of extended moisture variability in the 17th century. Like the Cook *et al* (1988) reconstruction, the instrumental PDSI value for the 1986 drought is unsurpassed in the new reconstruction.

Analyses of a range of instrumental atmospheric and oceanic parameters indicate that dry intervals are forced by local climate anomalies and to a lesser extent by synoptic-scale variability in the Pacific and Atlantic Oceans (Anchukaitis *et al* 2006, Kurtzman and Scanlon 2007, Seager *et al* 2009). Notably, Anchukaitis *et al* (2006) found that the influence of the Pacific Ocean was non-stationary in this region. While it is difficult to anticipate how anthropogenic warming will alter ocean–atmosphere climate dynamics, strengthening of ENSO or other climate dynamics could lead to extended drought or pluvial conditions.

4.2. Societal implications

Water shortages have recently returned as issues of prominence for Georgia, Florida, Alabama and rural and metropolitan communities in the tri-state ACF system. For example, Shepherd (1998) assessed drought planning in the Atlanta region in the 1990s and found weak plans with poorly defined goals and objectives, and a general lack of awareness or interest in drought. The 2006–9 drought brought the issue of water scarcity into sharp focus. The reality of water conflict emerged among Georgia, Alabama and Florida, with legal conflicts arising over water resources in US Army Corps of Engineers' Lake Lanier reservoir (Florida 2009). The battle over these resources continues at the time of writing; recently, a 2009 ruling which decided that supplying water to metropolitan Atlanta was not the priority for the Lake Lanier reservoir (and gave a 3 yr window to obtain congressional approval for water withdrawals to continue) was overturned to allow withdrawals to Atlanta on a demand-driven basis, forcing the Corps to develop a new water allocation plan within a year (US Court of Appeals 2011). For Georgia, the 2007 drought was particularly acute, and 'one of the driest recorded' (Georgia Water Council 2008); the drought and subsequent ruling have left the state struggling to find options, legal or otherwise, to meet water demand (Jackson 2011).

Our analysis demonstrates that the southeastern US can experience droughts equally or more severe than those over the instrumental record and has the potential to experience these kinds of water shortages in the future. Further, the frequency of extreme drought events in the first half of the 20th century (and relatively rare until the 1980s) was not anomalous, as similar droughts occurred in the first halves of the 18th and 19th centuries (figures 2(b), 3(b), (c), table 1). Perhaps more important is the notably high frequency of moderately dry years and low occurrence of moderately wet years during the 18th and 19th centuries. Beyond the immediate impacts of a rainfall deficit, the impacts of drought are diffuse and accumulate slowly (Kallis 2008), and are not necessarily felt within a climate year. Continued rainfall deficits that lead to agricultural droughts (only impacting crop

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production), can lead over time to pervasive hydrological drought, where surface and groundwater shortages manifest in a variety of socio-economic impacts (Wilhite and Glantz 1985). Though the recent drought in Georgia was not historically anomalous, these socio-economic impacts were intensified by high population numbers and significant water usage (Campana *et al* 2011). The Metropolitan North Georgia Water Planning District predicts nearly 60% growth in water demand in the region by 2035, even assuming an aggressive conservation gain of ca. 20% in per-capita water use (MNGWPD 2009). This growth will result in a demand of 3.8 million cubic meters per day, well above the current permitted supply of 3.3 million cubic meters per day and requiring the development of several new water sources (MNGWPD 2009). Increasing water use paired with extended periods of drought would make it difficult to reconcile societal needs with those of watershed ecosystems, and could lead to more persistent conflicts like those which arose in Florida between the US Army Corps of Engineers and the Endangered Species Act (Florida 2009). For example, Florida's Apalachicola Bay is a freshwater-driven estuary at the mouth of the Apalachicola River whose freshwater balance integrates the basin-wide effects of municipal and agricultural consumption. Saline intrusion brought by the disruption of the Apalachicola River flow has disastrous effects on the estuary's freshwater ecology, as well as on the important regional oyster fishery (Huang 2010, Monaco and Livingston 2003).

Drought is not the only signal our reconstruction provides insight into in the context of long-term dynamics of reconstructed PDSI. While tree-ring data is typically less reliable for reconstructing wet periods, our record decently captures the 1919–24, 1960–76 and 1989–92 wet events (figure 2(a)). The frequency of years with abundant moisture during the latter part of the 20th century is only matched in duration and intensity by a handful of events in the late-17th and early 18th centuries, and the 1768–71 event (figure 3; table 1). The difference in the frequency of wet events between the pre- and post-instrumental period is clear. Even acknowledging the representation of some strong wet anomalies as less severe (drier) in the reconstruction than in actuality, it is clear from the density of wet events that the recent instrumental history portrays the wettest period since the late-1600s, especially considering the wet regime shift from 1968 to 1976 (figures 2(b), 3(a), (b), table 1). This further demonstrates the insight into climate history afforded by tree-ring reconstructions, and the climate variability for which the Atlanta region may need to be prepared.

The latter 20th century instrumental data, upon which regional water supply management decisions are based, is characterized by frequent wet events that are not representative of much of the prior 300 yr. Investigations of long-term drought in other regions of the southeastern US have similar findings: the 20th century appears wetter in the context of the last 400–1000 years (Cook *et al* 2010, McEwan *et al* 2011, Seager *et al* 2009, Stahle *et al* 1988), although it should be noted that Cook *et al* (2010) and Seager *et al* (2009) are not independent from our reconstruction as they utilize some of the same proxy data. An analysis of two independent tree-ring records in our study area generally supports the indication that the 20th century was wetter in the context of the last 250 years (figure S5 available at stacks.iop.org/ERL/7/014034/mmedia). This is particularly true for the 1956–84 era (Stahle *et al* 1988), the era recently suggested to be the target for reservoir storage for the Atlanta watershed region (Florida 2009). A diverse body of literature suggests that better availability of water resources might perversely lead to greater vulnerability to drought, by not providing the impetus for developing efficient resource use or adaptation to severe or prolonged water shortage (Dahlin 2002, Hornbeck and Keskin 2011, Lucero 2002). Moreover, long-term evidence from paleoclimatology and archeology indicates that political, social and economic institutions dedicated in the management of complex water infrastructure may be vulnerable to droughts or flooding that exceed their social or technical capacity for resilience in the face of unexpected or extreme events (e.g. (Lucero 2002, Buckley *et al* 2010)). In sum, it may be prudent for water resources planning in the American Southeast to consider the drier centuries of climate variability that precede current experience and instrumental record.

The climatic patterns revealed here—the pervasively drier 18th century, the weak wet periods of the 19th century, and the high frequency of extreme drought in the early 18th and 19th centuries—provide valuable baseline scenarios for simulation of inter-annual climate variability and water resources planning that do not appear in the more recent, relatively wetter instrumental records. Although non-stationarity of the climate system could cause climate variability to differ from what has occurred historically Milly *et al* (2008), this reconstruction provides a broader representation of the potential range of climate variability than is available from the instrumental record alone, and thus is a valuable tool for understanding the context of extreme events to which our infrastructure must be able to adapt (Harou *et al* 2010). With these reconstructions as a resource, we are planning applied social research into the role that paleo-climate data can play in water resources planning, as has been done in other states (e.g., in Arizona—Block *et al* 2008).

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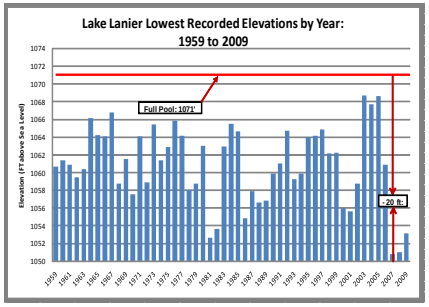
Executive Summary

In 2009, the 1071 Coalition funded a study to calculate the economic impacts arising from the U.S. Army Corps of Engineers' (USACE) management of water levels at Lake Sidney Lanier, located in Northwest Georgia. The goal of the study is to provide a quantitative measure of the economic impacts of low lake levels on the economies of the counties bordering the Lake, the Metro-Atlanta Region and the State of Georgia.

The scope of research included an extensive literature review, collection of background information and primary research in the form of web-based surveys. The Consultant team was able to assemble and analyze extensive historical data on lake levels, visitation, recreational spending, boat registrations, marina incomes, property values and related information. These findings are reported in Chapter II. That information was used to estimate the direct and indirect economic impacts associated with documented reductions in visitor spending during the period of historically low lake levels in 2008. Economic impacts are addressed in Chapters III and IV.

The final Chapter V of the report addresses economic impacts associated with broader water supply and regional equity issues. Management of downstream flows in the ACF Basin obviously involves complex legal and environmental issues which are well beyond the scope of this analysis. The limited purpose of Chapter V is to place observed economic impacts on Lake Lanier in the context of downstream economies. Findings regarding downstream economic impacts were assembled primarily from a review of prior research prepared by others. Sources relied upon to support the study findings are footnoted in the full report and listed in the report bibliography (Appendix A). The major report findings from this study are summarized below:

[Finding #1] Low water levels at Lake Lanier have been a recurring problem, which has periodically caused visitation to decline



Unusually low in-season water levels have reoccurred every few years and have tended to last for one to three seasons. Although the 2007-2009 drought just concluded was the longest and most severe over Lake Lanier's 50 year history, other less severe periods of low water occurred in 1981-1982, 2000-2001, 1987-1989, 1971 and 1979. While USACE is able to manage competing demands for the lake's water resource during periods of above average or normal rainfall, during recurring periods of

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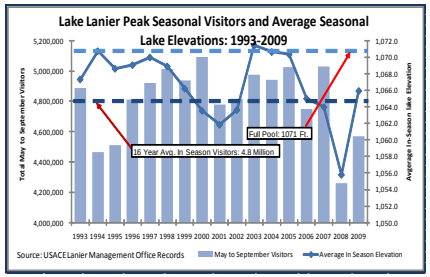
inadequate rain the lake has been drawn down by more than 10 feet in order to serve competing downstream demand. Changes to the Corps Interim Operation Plan (IOP) for the ACF Basin, implemented in March of 2006, may have also exacerbated the severity of the drawdown of reservoir storage during the most recent drought. Findings regarding the effects of the most recent change in lake levels on visitor patterns include the following:

- In the past, the number of annual visitors to Lake Lanier has occasionally dropped when water levels were not an issue. But visitation has almost always declined when water levels were unusually low. In 2008 lake elevations averaged 1,055.8 feet (15.2 feet below full pool) for the entire boating season and the number of visitors fell by 880,000 compared to the year earlier. In 2001, lake levels averaged 1,061.8 feet (9.2 feet below full pool) and the number of visitors fell by nearly 627,000 compared to the prior year.



- The effects of water levels on visitor patterns depend in part on when low elevations occur. Since 2000, 77% to 79% of total annual visits to Lake Lanier occurred during the (Apr-Oct) boating season and 29% to 34% of annual visits occurred during the months of June and July alone. The presence of low lake elevations in June and July has a much more negative impact on visitation than during other parts of the year.

- The nature of visits to Lake Lanier has changed since 2000. Overnight stays have declined as a percentage of total visitor days, from 62.5% in 2000 to 51.6% in 2008. The percentage of overnight stays to total visitors is largest in May and lowest in September.
- Because boaters (particularly marina slip renters), campers and lodging visitors spend significantly more per capita than day trippers, Lake Lanier's appeal as an overnight destination is very important to its overall economic impact on the region. According to USACE data, the number of boating, camping and other forms overnight visits fell more sharply in percentage terms than total visitors during 2008. This suggests that low water levels negatively impact the total dollar volume of recreational spending to a greater extent than is indicated by the percentage drop in visitors.

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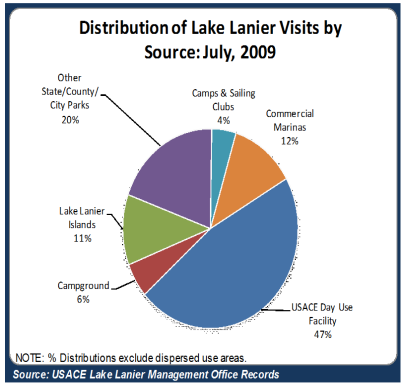
[FINDING #2] LAKE LANIER IS AN IMPORTANT CONTRIBUTOR TO THE METRO-ATLANTA AND GEORGIA ECONOMIES

Lake Lanier attracts 7.6 million annual visitors in normal years and is one of the most popular Corps facilities in the US. USACE's own economic modeling and the agency's prior studies of spending by marina slip renters and private dock owners confirm the economic importance of Lake Lanier's recreational use to Metro-Atlanta's economy (water supply value is addressed in Finding 10):

- USACE's own economic modeling estimates that recreational visitors to Lake Lanier spend more than $207 million annually including multiplier effects. Lake Lanier accounts for more than 5% of Metro-Atlanta's $3.5 billion tourism economy and 23% of the total economic impact of all Corps projects in the State of Georgia.



- The USACE estimates that annual recreational visitor spending at Lake Lanier supports nearly 2,300 jobs in the region. This estimate includes only trip spending by visitors and does not include capital spending on boats, docks, slip rentals, real estate and related items.
- In 2007, marina slip renters and owners of private lake residences with docks spent an estimated $135 million for recreational boating trips on the lake, plus an additional $91 million in capital costs for boat and docks repairs, new purchases, slip rentals, insurance and related fixed-cost items which are not reflected in USACE's annual recreational economic impact estimates. When these additional capital cost items are considered, the Consultants estimate that the Lake's local economic impact potentially reached $232.4 million in 2007 and supported nearly 5,200 jobs.
- The Corps' economic modeling also omits the Lake's value for water supply and power generation. As discussed in Finding 10, Lake Lanier's economic value as a regional water supply source is several orders of magnitude greater than its value as a recreational asset.

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[FINDING 3] LAKE LANIER IS AN IMPORTANT AMENITY FOR THE SURROUNDING LOCAL POPULATION

Lake Lanier has been a major contributing factor in supporting the growth and development of surrounding counties as well as the Metro-Atlanta region, as evidenced by the following findings:

- The five counties which surround Lake Lanier contain an estimated population of nearly 1.29 million. That population has grown by more than 40% since 2000, twice as fast as the combined downstream Georgia counties located below Buford Dam and more than 4 times the growth rate of the combined Alabama and Florida Counties in the Apalachicola-Chattahoochee-Flint (ACF) Rivers Basin.
- Lake Lanier serves a larger recreational market beyond the five counties, which extends to an approximate 30-mile radius and totals 2.1 million people, equivalent to roughly half of the Metro-Atlanta population.

- Water supplied from Lake Lanier for municipal and industrial consumption serves an even larger market of 4.0 million Metro-Atlanta residents and business which employ more than 2.0 million workers.
- The lake provides an amenity to 216,000 residents who live in the immediate vicinity of the lake shore, as well as companies that provide 133,000 local jobs located between I-985 and GA 400.
- The presence of Lake Lanier adds a "premium" of $5.3 to $6.4 billion in additional value to nearly 15,500 lakefront homes. This premium generates an additional $52.1 to $63.0 million in annual county and school district property tax revenues within the counties ($3,370 to $4,076 per unit), plus additional city taxes for lake properties located in incorporated areas.
- Residents of the five counties surrounding Lake Lanier owned more than 26,000 boats registered as personal property in 2007, contributing an estimated $4.4 million in personal property taxes to the respective counties and school districts.

[FINDING 4] EVIDENCE COLLECTED FROM MULTIPLE SOURCES SHOWS THAT THE SEVERE DRAW-DOWN IN LAKE LEVELS DURING 2008 HAD A NEGATIVE EFFECT ON VISITATION AND THE REGION'S ECONOMY

The study profiles historical trends in lake elevations, annual visitation, boating, real estate and related spending around Lake Lanier. Lake elevations fell to 50 year lows in 2008. Compared to 2007, Lake Lanier experienced:

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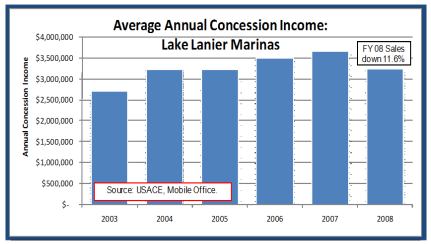
- A near 880,000 decline in total annual visits including 326,000 fewer boaters and 68,000 fewer campers;
- An estimated $4.7 million reduction in earnings among commercial marinas;

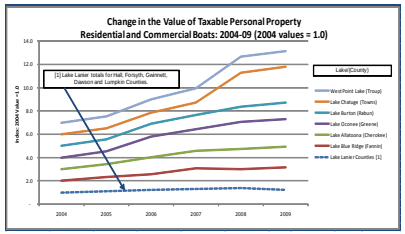


- A $50.2 million reduction in the personal property value of all boats located and taxed within the five counties which surround the lake;
- A $35 million reduction in purchases of new and used boats by local residents and registered within the five counties; and
- A 54% decrease in the number of arms-length sales of lakefront properties.
- A potential temporary loss of consumption value or amenity value of lakefront real estate of up to $133 million or 1.5% of the value of residential property value which surrounds the lake.

The Consultants estimate that total recreational spending at Lake Lanier fell by nearly $90.2 million in 2008 compared to the prior year. This estimate does not include other economic impacts or wealth effects that may have been associated with reduced home sales, losses in power generation, M&I water supply reductions or other effects of drought-related conditions on the regional economy. (The percentage of these direct spending reductions which can be linked to low lake levels versus other potential causes is addressed in the next finding.)

[FINDING 5] THE VAST MAJORITY OF NEGATIVE ECONOMIC AND VISITOR TRENDS OBSERVED IN 2008 CAN BE ATTRIBUTED TO LOW WATER LEVELS RATHER THAN ECONOMIC RECESSION

Even though 2008 was a period of regional and national economic recession, comparisons of these indicators at Lake Lanier versus conditions surrounding other Georgia lakes, as well as comparisons with statewide or national averages, clearly show that local impacts were far worse than might be expected based solely on economic conditions.



Surveys of area residents, visitors and businesses conducted for this report indicate that low water

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levels and not the downturn in regional and national economic conditions was the primary reason for changing recreational spending at Lake Lanier. Of the total reduction in Lake Lanier recreational spending from 2007 to 2008, the Consultants estimated that approximately $87.6 million was directly attributable to low lake elevations rather than other causes.

In addition to survey responses, the following evidence also supports this conclusion:

- Observed impacts on boat registrations and reductions in the taxable personal property value of boats based around Lake Lanier were far worse than the state average or impacts at other Georgia lakes.
- Recession did not fully impact the region until after the 2008 boating season.
- Lake Lanier spending began to recover in 2009 as water levels rose, while the region remained in recession.

[FINDING 6] OBSERVED RECREATIONAL SPENDING REDUCTIONS IN 2008 WOULD HAVE BEEN MORE SEVERE HAD LOW LAKE ELEVATIONS BEEN PERCEIVED AS A PERMANENT OR MORE FREQUENTLY RECURRING CONDITION

Although a very significant impact, the estimated $87.6 million reduction in recreational spending which is directly attributable to low lake elevations could have been greater had in not been for the fact that drought conditions were an anomaly in the context of the lake's 50-year history. Lakefront homeowners and marina slip renters are intensive recreational users and tend to have a long history of boating and/or property ownership on Lake Lanier. It is reasonable to assume that these users believed that low lake elevations in 2008 were temporary. Therefore, they avoided making painful economic decisions that they would have otherwise considered, had they believed that abnormally low water levels were going to become either a permanent or much more frequent occurrence. Homeowners and marina slip renters could decide to remain invested at Lake Lanier for one or two seasons to wait out low water levels. But over time, large numbers would eventually sell or relocate if convinced that elevations were not going to return to historical norms. IF 2008 lake elevations were to become a prevalent future condition rather than a temporary anomaly, it is very likely that percentage declines in marina occupancy, boat sales, overnight visitation and real estate values would have been much worse, perhaps orders of magnitude higher than were observed over a single season.

[FINDING 7] THE NEGATIVE ECONOMIC IMPACTS OF 2008 LAKE CONDITIONS WERE SUBSTANTIAL AND SIGNIFICANT TO THE REGION

It is important to understand that not all of the estimated reduction in recreational spending attributed to 2008 drought conditions represented a **net** loss of economic activity to the region. A portion of reduced lake spending was among the local population. Reductions in lake spending

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among local residents were certainly negative to some sectors of the economy, but could have been neutral to the region as a whole IF residents simply diverted their lake spending to other local businesses. Net negative economic impacts occur when the region loses visitor spending which originates from outside the region, and/or when area residents divert their own recreational spending at Lake Lanier to other states or regions. In addition, the economic impacts of changes in visitor spending, whether positive or negative are not entirely confined to the region where the spending change occurs. A portion of any change in economic activity tends to immediately "leak" from the local economy in the form of payments to non-local vendors, the manufacturer versus retailer share of retail purchases, or other profits accruing to non-local owners of enterprises operating in the region. Therefore, the economic impact analysis was very careful to focus on net impacts, as well as impacts to the local economy versus those of other states or regions.

The net negative regional economic impacts of low water levels at Lake Lanier included:

- The annual loss of local option sales tax revenues to surrounding counties ranging from $1.83 million to $1.94 million;
- The annual loss of hotel-motel tax revenues of approximately $34,000;
- The annual loss of property tax revenues (from lost personal property value of boats) of approximately $389,500;
- The annual loss of output (the value of all goods and services sold in the region) ranging from $43.81 million to $54.83 million;
- The reduction in output resulted in a corresponding reduction in labor income (salaries, wages and proprietors' income) ranging from $25.18 million to $31.51 million; and
- The reduction in economic activity and output also caused employment losses ranging from 987 to 1,224 jobs.

In the context of Lake Lanier's total economic impact on the region's recreational economy as measured by USACE, employment losses in the range of 978 to 1,224 jobs are very significant. The estimated impact of low water levels during 2008 represents an approximate 23% reduction in lake-supported employment in only one year.

It should be emphasized that these negative impacts focus on measurable short run spending effects in the counties bordering Lake Lanier. Although they are significant, these numbers understate the full incremental economic impact of low water levels for three major reasons:

1. Short-term changes in recreational spending always fail to capture total "consumption values," or the full economic value of benefits received by those who actually utilize Lake Lanier and its many related facilities. (Consumption values are explained in the introduction as well as in Chapter IV of the full report.)
2. The importance of Lake Lanier as a contributor to the size and growth rates of the five surrounding counties clouds the important distinction between out-of-region and local visitors to the lake. There is little doubt that the presence of the lake has contributed to population growth and has attracted upper-income households, seasonal residents and

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retirees who would not otherwise be living in the region. Persistently low water levels would impact that particular segment of the resident population and have long run adverse effects on the local economy, yet the effects of such "endogenous" population size factors are hard to fully capture in short run spending impact studies.

3. To the extent that the indirect multiplier analysis failed to fully capture the existence of a wider web of vendors and other suppliers to the lake-based economy located throughout the state of Georgia, the statewide economic impact of the decline in recreational activity at Lake Lanier would be larger than the estimated impacts on the local region only. Based on the naturally higher state-wide multipliers that would apply, relative to the localized multipliers that were used, such state-wide impacts could be as much as 20% higher than the local impacts estimated above.

[Finding 8] Downstream Economies and Populations in the Lower ACF Basin are substantially smaller than those immediately surrounding Lake Lanier

Based on Finding 7, it is clear that lake management policies which avoid severe draw-downs and maintain higher pool levels during longer periods of the year would certainly benefit the local lake recreation economy. However, an important focus of the study was to gather data to determine whether job and income losses suffered during 2008 as a result of low water levels at Lake Lanier, were equitable in comparison to economic impacts on downstream economies. Would management policies designed to reduce negative economic impacts on lake-dependent businesses simply cause more harmful economic impacts downstream? It was well beyond the scope of the study to address the complex legal and environmental issues that govern management of the ACF Basin's water resources, nor did the Consultants conduct an economic impact analysis of downstream economies. However, in order to provide a context for comparison, the report analyzed the relative population and employment levels of counties in the ACF Basin. The report also focused on power generation, tourism, fishing and agricultural industries which could be most directly impacted by changes to downstream flows. (Findings 8 through 10 focus on these issues.)

Analysis of population and employment data for the counties in the ACF Basin revealed the following:

- Alabama and Florida together contain 13% of the ACF River Basin's total population, 11% of its businesses and 9% of total private employment, while the Georgia portion of the ACF Basin contains 5.8 million people, representing 59% of Georgia's total population and an even larger share of the state's economy.
- The combined economies of Hall and Forsyth Counties alone are roughly comparable to the entire Florida portion of the ACF basin and only marginally smaller than the Alabama portion.

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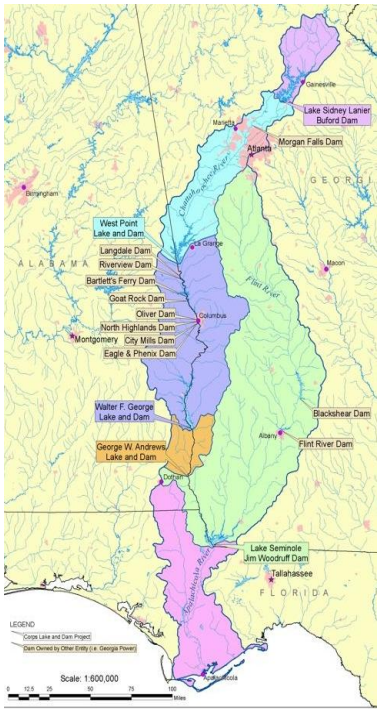
- The total private sector economies of the 17 Alabama and Florida counties in the ACF Basin, combined, represent less than half of Gwinnett County in terms of numbers of existing companies, private payrolls and employees.
- While the Florida portion of the ACF Basin is slightly more dependent on tourism as a percentage of its private employment, the total number of tourism-dependent jobs in that region appears to be smaller than the counties immediately surrounding Lake Lanier.

For nine months of the year and except during periods of exceptional drought, the Corps' IOP for the ACF Basin is designed to maintain minimum flows of 5,000 cubic feet per second (cfs) from Woodruff Dam into the Apalachicola River, with substantially higher flows in the Spring months, coinciding with the spawning season of the Gulf Sturgeon. These IOP objectives also tend to be the controlling factor for flows upstream of Woodruff Dam between Lake Lanier and Lake Seminole. Our review of available information found that minimum flows for municipal and industrial (M&I) water supply, power generation and agricultural demand in Alabama and Southern Georgia were lower than the minimum 5,000 cfs released from Woodruff Dam. Therefore, releases of reservoir storage needed to supply the Apalachicola River should also provide adequate flow rates to these other downstream users. Finding 9 focuses on downstream industries in Alabama and Georgia and Finding 10 addresses the Florida portion of the ACF Basin, including Apalachicola Bay.



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[Finding 9] The negative economic impacts on the Lake Lanier economy estimated in 2008 (see Finding #5) were substantially larger than those on downstream industries in Alabama and Georgia.

Except during those periods of most severe drought, Lake Lanier's influence on downstream Alabama and Georgia economies is very difficult to quantify and marginal at best. The analysis found that downstream industries that rely on Chattahoochee River flows (a) are comparatively small in size compared to the recreational economy of Lake Lanier; (b) have minimum flow requirements which are generally satisfied by the 5,000 cfs flow rates from Woodruff dam; (c) derive marginal or no economic benefits from higher river flows than the required minimums and (d) did not suffer the magnitude of negative economic impacts that were incurred by Lake Lanier dependent businesses during the 2007-09 drought. Therefore, there appear to be very limited or no positive downstream economic impacts to Alabama or Georgia that offset the negative effects of severe draw-downs of Lake Lanier or the other Corps' lakes in the ACF Basin. This finding is based on the following factors:

- The three lakes in the ACF Basin located south of Lake Lanier (West Point, Walter F. George and Seminole) combined, attract only 18% more visitors and support 423 more jobs than Lake Lanier alone. Reservoir storage was severely depleted at all of the Corp's ACF lakes during the 2007-09 drought. Economic losses at West Point and Walter George during this period were likely to be proportional to Lake Lanier.
- Releasing water and drawing down ACF reservoirs during droughts has had no discernable effect on downstream river recreation in the Chattahoochee National Recreation Area, while substantially reducing lake recreation. Prior studies have found no historical link between downstream river flows and visitation to the Chattahoochee NRA.
- The economic benefits of hydropower generation in the ACF Basin have been diminishing over time, while Lake Lanier's recreational value has increased. The marginal economic benefits of maintaining higher lake levels for recreation has been previously estimated to be 8 times the marginal cost of resulting reductions in hydropower production.

- The State of Alabama and Southern Nuclear Company have stated that the Farley Station nuclear plant near Dothan, Alabama requires a 2,000 cfs minimum flow rate on the lower Chattahoochee to maintain adequate cooling water for full operations, and can continue generating with one unit if flows should fall below 2,000 cfs. Farley Station underwent refueling during late 2007 and therefore was not impacted by drought conditions at that time. Although the State of Georgia and other parties have questioned the 2,000 cfs minimum flow assertion, there is

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generally little difficulty in supplying adequate flow during "normal" periods. Marginally adjusted operational priorities at Lake Lanier are unlikely to restrict downstream flows to a degree that would restrict power generation at Farley Station.

- Water releases from Lake Lanier have either a very minor influence or no influence at all on available supplies of irrigation and non-irrigation water for downstream agriculture and therefore have little or no economic impact on the ACF Basin's agricultural economy. Analysis of prior research on agricultural water demand found: (a) 70% of all agricultural water used in the ACF Basin is supplied from groundwater withdrawals; (b) of the remaining surface water withdrawals for agricultural use, about 60% of the water is taken from the Flint River Basin and not influenced at all by Lake Lanier; (c) a major percentage of surface water withdrawals for agricultural use in Alabama and Florida are from smaller tributaries to the Chattahoochee or Apalachicola Rivers and are also not dependent on Chattahoochee River flows; and (d) poultry production in the northern portion of the ACF Basin and surrounding Lake Lanier has been identified as the ACF Basin's economically dominant agricultural industry.

[Finding 10] Apalachicola Bay's freshwater fishing and oyster industries are small in comparison to the recreational economy supported by Lake Lanier. Lake Lanier's capacity to influence Apalachicola's larger saltwater fishing economy is also unclear.

Associations between freshwater inflows and oyster and crab harvesting productivity in Apalachicola Bay were first studied in the early 1990's using historical flow data for the prior decade. Statistical analyses in these studies found that oyster growth rates are significantly related to salinity. Although these studies found a statistical correlation between freshwater inflow and oyster and crab growth, the Consultants were unable to locate prior research which (a) determined what flow rates in the Apalachicola River supported optimal salinity for oyster growth; (b) measured the impacts of low flow periods on aggregate harvests in terms of actual percentage declines or dollar losses; or (c) determined the degree to which Lake Lanier directly influences Apalachicola Bay salinity. Absent of such data, it is difficult to estimate Lake Lanier's direct economic significance to the Apalachicola Bay fishing and oyster industries. However, prior research conducted within the State of Florida has estimated the economic impact of fishing in Apalachicola Bay to be no more important than the recreational economy of Lake Lanier, as highlighted by the following findings:

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- A March, 2003 study released by the University of Florida estimated that the total agricultural economy in the four county Apalachicola Bay Region supported fewer than 1,250 jobs in 1999. Commercial fishing represents only a component of the total agricultural sector.
- The same report estimated the **total** annual economic output of the region's seafood industry, consisting of both oysters and shrimp, at $22.7 million at that time. The industry supported 707 total jobs (including direct employment and multiplier effects), roughly 30% of the 2,300 jobs supported by Lake Lanier.
- According to more recent (2007) U.S. Department of commerce County Business Patterns reports, combined employment in the "forestry, fishing, hunting and agricultural support" industry supports only 111 direct payroll jobs in the entire region, with a substantial portion of those payroll jobs connected to the region's commercial forestry operations.
- The total economic value of all "wildlife related recreation" in the region, including hunting, freshwater and saltwater fishing and wildlife viewing attracted 156,000 visitors to the region in 2000, roughly 2.0% of annual visitation to Lake Lanier. These activities generated $235.5 million in total economic activity for the region and supported 3,360 total jobs. However, 86% of that total impact was associated with saltwater fishing, which has a less direct linkage to Apalachicola River flows. Saltwater fishing accounted for $201.7 million in total output and supported more than 2,500 of these jobs, numbers roughly comparable to Lake Lanier.
- Freshwater fishing (which is assumed to be more directly dependent on Apalachicola River flows), accounted for $17.7 million of total output and supported only 329 jobs, roughly equivalent to total employment supported by recreational hunting in the same region.
- Apalachicola Bay's oyster industry was studied more recently (in April, 2010) by the University of Florida in response to possible bed closures to protect consumers from "red tide" infections. Economic impacts of various closure scenarios were estimated for "harvesters, processors and the overall economies of Gulf and Franklin Counties." In comparing potential economic impacts from several proposed regulatory scenarios, the report confirmed that total annual oyster industry output in these two counties was roughly $13.6 million. The industry found a total of 496 harvesters in the region, including only 28 who earned more than $20,000 from oysters in 2004. Under a "worst case" scenario which modeled a total May through September closure of the half shell oyster market, the researchers estimated that the action would cause a 26% reduction to the industry's economic impact on the region, translating to a loss of about $3.4 million in total output. That sum represents about 6% to 8% of the estimated economic losses which resulted from Lake Lanier draw-downs in 2008.

Based on these findings, the total annual economic impact of Apalachicola's freshwater fishing and oyster industries appears to be in the range of $31 million per year, representing less than 20% of the total estimated local annual economic impact of Lake Lanier recreation estimated by USACE. The total economic output of these Florida industries is substantially less than the estimated $43.8 million to $54.8 million in economic losses suffered by Lake Lanier recreation during 2008. The

Perry, Val

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region's recreational saltwater fishing industry is larger and roughly comparable to Lake Lanier in terms of total economic impact, but the degree to which water releases from Lake Lanier directly impact the economic performance of these Florida industries either positively or negatively has never been quantified and appears to be marginal at best.

[Finding 11] Lake Lanier's value as a regional water supply dwarfs its significant value as a recreational resource

Even though maintaining higher pool levels might actually be made easier as a result of reducing lake withdrawals for water supply purposes, losing Lake Lanier as a source of regional water supply would have enormously negative regional economic consequences for Metro-Atlanta. The magnitude of negative economic impacts obviously depends upon the timing and degree of restricted withdrawals and the resulting supply shortfalls.

The economic impacts of resulting water shortages and the enormous public cost to acquire replacement supply would also have a substantial negative effect on recreational spending. Those negative impacts are likely to be permanent and worse to the lake-dependent economy than the effects of low water levels during 2008. The huge negative economic consequences of regional water supply shortages on Metro-Atlanta, a market of more than 4 million people and one of Florida's largest visitor markets, could also be more severe to Florida's tourism economy than the limited benefits associated with resulting marginally higher downstream flows in the lower ACF Basin. The annual economic benefits of continuing to use Lake Lanier for water supply dwarf any resulting negative effects on lake recreation or downstream economies. This conclusion is supported by the following findings:

- According to a 2004 study, which modeled a much less restrictive scenario than was recently imposed by court-mandated reductions to water supply withdrawals, the present value benefits to the national economy associated with Lake Lanier's use as a regional water supply was estimated at $19.1 billion.
- A more recent study also determined that the cost of replacing Lake Lanier as a source of regional water supply would have a multi-billion annual negative impact on the Metro-Atlanta economy. According to a preliminary analysis, court-mandated reductions in water supply withdrawals could:
  - Cause a 34% regional water shortfall by 2012;
  - Result in a 13% to 15% reduction in the region's total economic output and an annual "cost" of $35 to $39 billion; and
  - Lead to the possible loss of 250,000 jobs to the Georgia economy.

The to place this impact in context, potential job losses to the Atlanta Region, which could result from losing Lake Lanier water supply, exceed the estimated 223,000 total existing (2007) private sector jobs in all of the Florida and Alabama Counties in the ACF Basin, combined.

Perry, Val

Page 29 of 29

An ongoing study is being prepared by the Atlanta Regional Commission to refine the preliminary findings cited above. We understand that this study concludes that it will be even more difficult and expensive to replace Lake Lanier as a source of water supply than originally anticipated. Therefore, the resulting regional economic impact of losing/replacing Lake Lanier as a regional water supply source would also be greater than the $35 to $39 billion annual cost previously estimated, with resulting higher costs to the national economy as well.

The above findings are presented in more detail in the following report.

Pierce, Alan

Page 1 of 1

12/11/2012

COMMENTER: Alan Pierce
34 Forbes St.
Apalachicola, FL 32320

ORGANIZATION: Franklin County Board of County Commissioners

COMMENTS: The Apalachicola Bay in Florida is in desperate need of freshwater. The ACF water supply plan must take into account the needs of the Bay. The most productive oyster industry in the SE USA is being wiped out because of a lack of water.

Pine, Bill

Page 1 of 5

From: Pine, Bill <billpine@ufl.edu>
Sent: Friday, October 12, 2012 4:30 PM
To: Zettle, Brian A SAM; Karen_Herrington@fws.gov
Subject: RE: i'm confused (UNCLASSIFIED)

Thanks for the reply. I'll keep studying the documents then as I didn't realize that a new EIS was being drafted. That EIS will be based on the operations that are being "scoped" now correct? I'm pretty familiar with the process as it operates in the Colorado Basin as I've helped develop the basin states alternative to the BOR developed operations manual for the lower basin and have reviewed the BOR alternatives. Here it is a bit challenging because of the volume of material posted and it is confusing exactly what is being asked for review to be commented on. That is a question for your contractor I know who is running the process.

I will work through this over the next few weeks and give you a call if I can't figure out how to comment. Note we have two new flow-fish papers for the basin that you might not have seen. Links are below.

http://floridarivers.ifas.ufl.edu/Pine%20papers/Burgess%20-%20Apalachicola%20floodplain.pdf

http://floridarivers.ifas.ufl.edu/Pine%20papers/Dutterer%20et%20al%20-%20Fish%20recruitment%20related%20to%20river%20flows.pdf

I hope you guys have a good weekend.

bp

Dr. Bill Pine
Associate Professor
Department of Wildlife Ecology and Conservation and Fisheries and Aquatic Sciences Program University of Florida
http://floridarivers.ifas.ufl.edu

-----Original Message-----
From: Zettle, Brian A SAM [mailto:Brian.A.Zettle@usace.army.mil]
Sent: Friday, October 12, 2012 4:18 PM
To: Pine, Bill; Karen_Herrington@fws.gov
Subject: RE: i'm confused (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Bill,

I'm not sure you understand what this notification was referencing. This is not a FWS action. The USACE is re-opening the scoping for the ACF Master Water Control Manuals (WCM) Environmental Impact Statement (EIS). You will recall we originally held scoping for this in 2008, then again in 2009 due to the Magnuson ruling, and now once again due to the June 2011 Eleventh Circuit Court of Appeals ruling.

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Pine, Bill

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During the scoping process, the USACE encourages agencies, organizations, and the public to participate in the Master WCM update/EIS process and solicits input from those interests to ensure that relevant technical information, potential environmental effects, and public concerns are identified and fully considered in the EIS for the updated Master WCM. There will not be a Finding of No Significant Impact (FONSI) as an EIS is being prepared. The decision document for an EIS is called a Record of Decision (ROD). Scoping is the first step in development of the EIS. Additional notifications will occur when the draft EIS is available for review. Give me a call if you have questions about what this is all about.
Thanks.

Brian Zettle
Biologist
Chief, Inland Environment Team
U.S. Army Corps of Engineers, Mobile District
(251) 690-2115

-----Original Message-----
From: Pine, Bill [mailto:billpine@ufl.edu]
Sent: Friday, October 12, 2012 2:54 PM
To: Karen_Herrington@fws.gov; Zettle, Brian A SAM
Subject: i'm confused

Hi Brian and Karen,

I hope you guys are well. Boy this is exciting, but I find the ACOE and FWS documents super confusing as far as how to link the proposed operational scenarios with the USFWS assessed ecosystem impacts. Am I missing the document that says "flow volumes under scenario X will result in releases of Y at dams 1, 2, 3 and anticipated FONSI for species a, b, c based on the work by Smith 2010". Where is the Rosetta stone? Can you point me in a direction in which my review comments might be helpful?

Thanks,

Bill Pine

Dr. Bill Pine

Associate Professor

Department of Wildlife Ecology and Conservation and

Fisheries and Aquatic Sciences Program

University of Florida

http://floridarivers.ifas.ufl.edu

2

Pine, Bill

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From: acf.eis@tetratech.com [mailto:acf.eis@tetratech.com]
Sent: Friday, October 12, 2012 2:46 PM
To: Pine, Bill
Cc: acf.eis@tetratech.com
Subject: ACF River Basin Newsletter

<http://hudson.tetratech-ffx.com/riverbasin/acf_newsletter_Oct2012/images/acf_newsletter_banner.jpg>

October 2012

The U.S. Army Corps of Engineers (Corps) is resuming the process to update the Master Water Control Manual (WCM) for the Apalachicola-Chattahoochee-Flint River Basin and to prepare an environmental impact statement (EIS) addressing the effects of the proposed manual updates to account for significant new information resulting from a June 28, 2011, ruling of the U.S. Court of Appeals for the Eleventh Circuit. That ruling concluded that water supply is an authorized purpose for Buford Dam/Lake Sidney Lanier on the Chattahoochee River northeast of metropolitan Atlanta, Georgia.

Accordingly, on October 12, 2012, the Corps issued a Federal Register Notice of Intent (NOI) to reopen public scoping for 60 days. Interested parties can review a copy of the NOI online at www.sam.usace.army.mil/pa/acf-wcm/docs.htm <http://www.sam.usace.army.mil/pa/acf-wcm/docs.htm> and submit comments by email at ACF-WCM@usace.army.mil <mailto:ACF-WCM@usace.army.mil> , online, or by regular mail at the address indicated below.

The June 2011 Eleventh Circuit Court of Appeals ruling (1) reversed a July 2009 Federal District Court decision that the Corps had exceeded its authority under the 1946 Buford Dam/Lake Sidney Lanier project authorization and the Water Supply Act of 1958 by operating the project to accommodate present levels of withdrawals for water supply for metro Atlanta, and (2) directed that the case be remanded back to the Corps to reconsider and make a final determination as to its legal authority to operate Buford Dam/Lake Sidney Lanier to accommodate Georgia's water supply request made in 2000.

The Corps is updating the water control plans and manuals for the ACF Basin in order to improve operations for authorized purposes to reflect changed conditions since the manuals were last developed. The revised EIS will also consider, along with operations for all authorized purposes, an expanded range of water supply alternatives associated with the Buford Dam/Lake Lanier project, including current levels of water supply withdrawals and additional amounts that Georgia has requested from Lake Lanier and downstream at Atlanta.

In the scoping process, the Corps encourages agencies, organizations, and the public to participate in the Master WCM update/EIS process and solicits input from those interests to ensure that relevant technical information, potential environmental effects, and public concerns are identified and fully considered.

Throughout the scoping and subsequent WCM update and EIS development process, the public can obtain information on the progress of the project at the project website, www.sam.usace.army.mil/pa/acf-wcm/index.htm <http://www.sam.usace.army.mil/pa/acf-wcm/index.htm> . A general timeline of the process is presented below with point of contact information if you have additional questions.

_____

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Pine, Bill

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How to Get Involved

Agencies, organizations, and members of the public can submit scoping comments by email at ACF-WCM@usace.army.mil <mailto:ACF-WCM@usace.army.mil> , online at the project website, www.sam.usace.army.mil/pa/acf-wcm/form.htm <http://www.sam.usace.army.mil/pa/acf-wcm/form.htm> , or by regular mail to

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

Tetra Tech, a Corps contractor, will be collecting all information for the Corps, Mobile District. The deadline to submit scoping comments is December 11, 2012. When the comment period has ended, the scoping comments will be compiled, categorized, and summarized, and a scoping report will be prepared and posted on the project website. Other detailed information about the Apalachicola-Chattahoochee-Flint River Basin will also be available on the website.

_____

Corps Support

The information collected from agencies, organizations, and the public during the scoping process will be used to

* Identify significant issues and resource areas of concern
* Identify stakeholders to assist in the evaluation process
* Identify information sources and data gaps
* Identify and focus on the alternatives to be evaluated
* Identify the conditions for comparing the proposed action and alternatives
* Identify tools to help evaluate alternatives and analyze the impacts
* Identify areas of limited concern to ensure the evaluation focuses on major issues identified for analysis

Specific questions may be directed to
Mr. Brian Zettle
Environmental and Resources Branch
Planning and Environmental Division
U.S. Army Corps of Engineers, Mobile District P.O. Box 2288 Mobile, AL 36628-0001 Telephone (251) 690-2115 Fax (251) 694-3815 Email brian.a.zettle@usace.army.mil <mailto:brian.a.zettle@usace.army.mil>

<http://hudson.tetratech-ffx.com/riverbasin/acf_newsletter_Oct2012/images/Jim-Woodruff.jpg>

<http://hudson.tetratech-ffx.com/riverbasin/acf_newsletter_Oct2012/images/Chattahoochee-River.jpg>

<http://hudson.tetratech-ffx.com/riverbasin/acf_newsletter_Oct2012/images/DrinkingWater-050.jpg>

<http://hudson.tetratech-ffx.com/riverbasin/acf_newsletter_Oct2012/images/sailboats_compressed.jpg>

<http://hudson.tetratech-ffx.com/riverbasin/acf_newsletter_Oct2012/images/Apalachicola-estuary.jpg>

<http://hudson.tetratech-ffx.com/riverbasin/acf_newsletter_Oct2012/images/Bass.jpg>

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Pine, Bill

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<http://hudson.tetratech-ffx.com/riverbasin/acf_newsletter_Oct2012/images/acf_timeline.jpg>

Classification: UNCLASSIFIED
Caveats: NONE

5

Presnel, Cheryl

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1/11/13

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.**

Cheryl Presnel

Presnel, Cheryl

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. 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,

Cheryl Presnel 1-11-13

Price, Daniel

Page 1 of 1

11/8/2012

COMMENTER: Daniel Price
305 Cove Road
Lagrange, GA 30240

ORGANIZATION:

COMMENTS: West Point lake has not been maintained at the 628-635 Ft MSL since July. My dock has been dry since June and my quality of "lake living" is non-existant. Please consider a 630 minimal winter pool to conserve much needed water for the growing needs of this area both residential and industrial. The BASS MASTERS ELITE series will bring a lot of high profile attention to West Point Lake please retain and hold water longer every summer here on.

Rainio, Aku

Page 1 of 1

11/1/2012

COMMENTER: Aku Rainio
830 Cooper Farm Way
Johns Creek, GA 30097

ORGANIZATION:

COMMENTS: I see that the water release from lake Lanier has been greatly increased. Is there a chance that the water release could be concentrated to one continous period during weekends when there are plenty of fishermen on the river? If possible, the waetr release during weekdays could be more and during weekends less to support the people wanting to fish and bring money to local economy. Thank you for your consideration

Ramos, Sylvia

Page 1 of 1

From: Sylvia 1 <sylviasramos@comcast.net>
Sent: Saturday, December 08, 2012 3:58 PM
To: ACF-WCM
Subject: Apalachicola Basin management

These United States are governed by the principle of union and equality not first in line gets the most as Atlanta seems to believe.
Decreasing water flow to the coastal systems is damaging the ecology of the river and coastal areas of Florida downstream from Atlanta. The resulting loss of whole species of of sea life and way of life/jobs and income for residents is not only tragic in the present, but damage to the ecosystems may be irreparably harming or destroying our environment. It's time to look at the whole picture.

Thank you,
Sylvia Ramos
1738 Silverwood Drive
Tallahassee, Fl

1

Ray, John and Helga

From: ray144@bellsouth.net
Sent: Saturday, November 03, 2012 9:45 AM
To: ACF-WCM
Subject: West Point Lake

We are responding to an article in our local newspaper - LaGrange Daily News.
After attending meetings, completing surveys and writing letters in 2009, we realize this is most likely another wasted effort.
NOTHING has changed! The US Army CORP has managed to destroy our life-long dream of retirement on Lake West Point. Not to mention the damage to local businesses and dropping property values, all for the sake of sturgeons and mussels in Florida. It appears humans are secondary.
West Point Lake is the only congressionally authorized lake for recreation and sport in the system, but recreation, fishing etc. is almost non-existent due to the low water levels.
We realize we are in drought situation, but it seems storing water during rainy periods and keeping a 628' winter level and 635' level in the summer, would help during a crisis situation.

Please consider this in your research and for once listen to the human side of this problem.

Thank you!
John and Helga Ray
Property owners on a mud puddle!

Reed, Morton

January 14, 2013

Tetra Tech, Inc.
Attn: Colonel Steven J. Roemhildt
61 St. Joseph Street, Suite 550
Mobile, AL 36602-3521

ATN: ACF-WQM, Comments on Flood Control and Drought Management

The following comments are submitted for input in the scoping process. The current ResSim-based model illustrates the operating plan and shows two rules that are used in drought management and flood control. These are the Induced-Surcharge rule for flood control and the Maximum Head Limit rule for dam structural safety.

Flood Control
The ACF Operations Manual is based on the ACF ResSim model given out in May of 2011. It is the RIOP framework. It explains how each reservoir will be operated. Items related to flood control that impact Columbus are channel capacity, induced surcharge and head limits. There are only two channel capacity rules in place. Buford has a MaxCC of 10,000 cfs, West Point has 40,000 cfs. Columbus does not have a channel capacity set but in view of recent developments such as the Whitewater River Restoration Project and the placement of a new water intake for Fort Benning, a maximum channel capacity and revised flood stages need to be established. The channel capacity at West Point has been exceeded in the 2003 and 2009 flooding. This is due in part to the non-real-time responses to floods and the "induced surcharge" rule curves which are part of the operations manual. The calls for higher West Point Lake Levels for recreation need to be based on the ability to control flooding downstream.

The logic can be seen on page 23 in the ACF operations manual where only Buford and West Point are part of the flood storage plan. Only West Point and WF George have "induced surcharge" rules which are supposed to help control floods but could be more effective if real-time updating was switched to during flood surges. Buford does not have an induced surcharge rule since it is not supposed to store flood water like West Point. Induced surcharge is a set of rules that set how much water to store beyond the full pool based on what is coming to the dams. It is a good idea but it has a 1-day look-back and this is what causes the flooding to be worse than if real-time inflows, which are available from USGS gages upstream, were used during a flood. The Franklin gage now has real time flow that needs to be used instead of the computational 1-day delayed inflow used in Figure B.09.

Drought Operations
The ESA mandated 5000 cfs minimum release at Woodruff is hard to hit in a drought using daily flows that fluctuate from hydropower cycles. The Corps seems to over compensate by allowing Woodruff levels to rise while lowering WF George and causing head limits at Woodruff which then causes exceedance of the 5000 cfs to get the Woodruff tail water level to increase to counteract the head limit. WF George has a set head limit of 88 feet which is easy to control since there is no set release limit. Woodruff, on the other hand, has a variable rule curve that is followed based on the dam pool and the tail water elevation. Tail water is controlled by the release flows (Appendices E and G of the ACF manual). Surges in the dam pool have caused

Reed, Morton

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prolonged releases of over 6000 cfs in the 2012 drought season. This is significant in a drought given the 2030 Lanier net withdrawal of 294 cfs (190 mgd) and the Atlanta reach withdrawals of 631 cfs (408 mgd) which totals 925 cfs. This also assumes a minimum of 1381 cfs from Lanier and tributaries above the HWY 280 gage to meet the 750 cfs minimum flow after the 631cfs for withdrawal in the Atlanta reach. While the 1350 cfs daily minimum flow at Columbus is needed, exceeding the 5000 cfs minimum release at Woodruff takes away drought control upstream in West Point Lake and overcompensates for low flows in the Flint.

Water Quality

Water quality in the reach between West Point Dam and Walter F. George is fairly good. This is due to primarily to the minimum flows that are released during power generation at all dams along the reach. Good water quality is also attributed to the municipalities along this reach and their ongoing improvements to the wastewater treatment systems they operate. To continue this good water quality trend, a minimum flow of 1350 cfs is needed to assimilate wastewater treatment effluents from several municipal and industrial facilities along this reach. Another reason for the minimum flow is turnover in the reservoirs. It has been proven that during the growing seasons (April-October) higher water age in the reservoirs causes higher levels of Chlorophyll a, the indicator to algae growth. Control of algae growth is of paramount importance to the environment and human health.

I am at your disposal should you wish to discuss these comments.
I can be reached at 706-573-7451

Yours very truly,

Morton W. Reed, Ph.D., P.E.
49 Post Oak Drive
LaGrange, GA 30240

Reid, Carla

Page 1 of 1

1/12/2013

COMMENTER: Carla Reid
4180 Buttercup Way
Tallahassee, FL 32311

ORGANIZATION:

COMMENTS: I have lived in the North Florida region for the past 20 years, a transplant from Central Florida, and have had the opportunity to spend time in the Appalachicola Bay, one of the most beautiful and resource-rich areas around. To see this area starved for water is a travesty. We have an amazing natural resource here, as well as a community and oyster business that has a heritage. Please do what you can to protect these.

Reneau, Buddy

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efacec
Advanced Control Systems

November 10, 2012

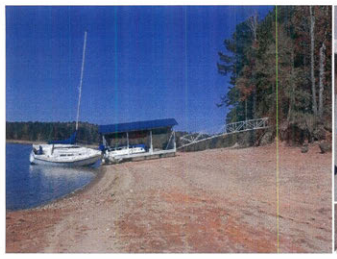
Tetra Tech
Attention: ACF-WCM
61 St. Joseph Street
Suite 550
Mobile, AL 36602-3521

Re: Scoping Comments for ACF Water Control Manual

My 15 years of public sector service gives me the experience and understanding of governing and the need for rules to govern by. However, anytime I directed my engineering staff to establish rules whether for land use, land development or water & stormwater management regulations I always told them to never make a rule without a reason and always make sure the supporting reason could stand the test of common sense and moral values. When people blindly enforce rules without applying common sense and/or moral values, history, in peacetime or wartime judges them very harshly.

One of my 5 life goals is to serve others and invest the resulting savings in a place of land and water that could be enjoyed by friends and family. Lagrange and West Point lake is that place. I invested carefully investigating the City, neighbors, water quality with DNR and water quantity with the Corp office. The Corp told me the rule: Water levels fluctuate 7 feet summer to winter with an occasional 10 foot drop for dam repair. Droughts occur but only twice had droughts taken the lake to the bottom level of 622' MSL since the lake's creation in 1970.

They say a picture is worth a thousand words. I hope these 4 pictures (taken today) are more effective in support of the comments I submit below than any additional words from me. These pictures represent my "winter lake level (read August through February)" for 3 of the past 5 years. I have not been able to share the lake with my friends and family for 3 of the last 5 "July 4th and Labor Day" holidays. **I am 59; I hope the Corp of Engineers solve this before I die.**



Reneau, Buddy

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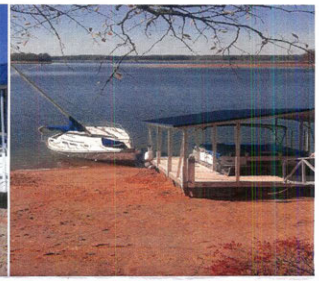
efacec
Advanced Control Systems



I do not understand how the application of the water management rules over the past 5 years has passed the test of common sense and/or moral values.

I submit the following comments to 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! Increased Storage + Better Management = Reduced Risk of Flooding and Increased Economic Development and Economic Impacts!

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.

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

Reneau, Buddy

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efacec
Advanced Control Systems

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!***

Thank you for the opportunity to comment and ask that the above issues be submitted and studied during the EIS period. ***I look forward to a Revised WCM which will honor the WPL Congressional Authorizations and provide for the economic benefits envisioned by Congress and promised to the taxpayers!***

Sincerely,

Buddy Reneau
Vice President of Contracting & Installation Services
efacec
Advanced Control Systems
Efacec ACS, Inc.
2755 Northwoods Parkway
Norcross, Georgia 30071
Direct 770-409-4221
Cell 404-314-7752

Rich, Lawrence

Page 1 of 1

From: Larry Rich <lrich346@yahoo.com>
Sent: Monday, November 26, 2012 4:55 PM
To: ACF-WCM
Subject: West Point Lake Control Maual

I would like to make three observations concerning the above topic:
1.) Unless there is reason to have a winter pool of 628 there are numerious common sense reasons to raise it to 632.5. These include longer use window, less bank errosion , Larger water reserves and most of all, safer boating
on a very shallow lake.

2.) I think it should be the state in which an indangered (?) species is located should be responsible for the protection of said species. Florida has ample land in westen panhandle to build a reservoir to provide water flow for their fish. I have not heard of any plans for this other than taking a disporportionant amount from West Point.

3.) The public info line for West Point Lake (706-645-2929) is the worst attempt of encouraging the public to use this asset. The tone of voice, the cript matter of fact message delivered in a monotone voice only amplifies the corps TAKE NO RESPONSIBITY for the operation of this lake.

Thank you in advance.

Lawrence C. Rich
Lake resident
205 Lakeshore Drive
LaGrange Ga. 30240

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Robinson, Kathy

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12/12/2012

COMMENTER: Kathy Robinson
44 Avenue E
Apalachicola, FL 32320

ORGANIZATION: Robinson Brothers Guide Service

COMMENTS: The Apalachicola end of the ACF river system is the red headed step child of the entire thing. Choosing to allow North GA and Atlanta one more drop of water than they are already getting is not only a crime against the entire Gulf of Mexico, it is a sin against nature. The effects of the WRONG decision on this topic will have lasting ruinous effects to the delicate balance of one of the last estuaries to act as a nursery to the Gulf of Mexico. Stop the madness and stop taking money from whomever is greasing palms, STOP issuing water taps to anyone in cities along the river system - say no to development and YES to responsible conservation. LET THE WATER FLOW!!!

Rogers, Charles

Page 1 of 3

From: Cheeks <cheeksf16@charter.net>
Sent: Wednesday, November 07, 2012 9:42 PM
To: ACF-WCM
Subject: Letter of Concern
Attachments: Letter to Corps of Engineers 10-31.docx

COL Steven Roemhildt,

Please find attached letter of concern. Request reply.

Very Respectfully,
Charles Rogers, Col, USAF Ret

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Rogers, Charles

Page 2 of 3

District Commander, CESAM-DE 31 Oct 2012

Department of the Army
Mobile District, Corps of Engineers
Attention: CESAM-DE
Post Office Box 2288
Mobile, Alabama 36628-0001

COL Steven Roemhildt
Commander
Phone: (251) 690-2512
CESAM-DE@usace.army.mil

I am writing in regard to the ongoing issue of inadequate water level in West Point Lake. This has become an annual problem, and I fear an acceptable annual status quo situation for the Army Corps of Engineers, charged with maintaining the lake. I have discussed the issue on the phone with employees in the Corps Mobile office on two occasions who are quick to point out that the low levels are out of the Corps' control, but rather are results of environmental regulation constraints and 'acts of God' (in the form of drought); and therefore the Corps does not acknowledge *any* responsibility for this recurring problem … all the blame goes to other factors. Although I have yet to find rainfall data that supports the magnitude of water loss we are now annually experiencing, I will concede that in combination with government regulations, lack of rainfall and resulting drought conditions are the major contributors to the low lake levels, and yes, out of the control of the Corps. My question then becomes, what is the Corps doing to mitigate this clear and recurring obstacle to meeting its responsibility to manage the level in a manner that allows the lake to exist as designed? In my opinion, responsibility for management of many of our rivers, lakes, other natural or manmade resources is entrusted to the Corps because the Corps possesses the knowledge and tools to manage, not just monitor those resources. To do nothing about external influences and allow the lake to seek its own level is not managing, and simply 'opening or closing the faucet' to comply with another environmental regulation can be done by most anyone with minimum training. It takes a special expertise to understand the mission (management of the lake to acceptable water levels), identify and analyze problems that interfere with accomplishing the mission, and develop courses of action to overcome the challenges that prevent mission success … rather than shirk responsibility because it's the easier course and there are no consequences for this mission's failure. I fear that the Corps has become like the hundreds of other agencies in our ever-growing expansive government bureaucracy, one that now exists for the purpose of sustaining itself, not for the purpose of serving the people.

As a retired military officer and defense contractor since retirement, when a job isn't getting done, I look to see if the person, team, unit, agency fully understand what the job is, and what their responsibility is for accomplishing it. In the military, units at each level develop a mission statement that describes what they realize their mission to be. Further, the US Army goes a step further to develop a vision statement that describes how they see themselves accomplishing the mission. Following are the Army Corps of

Rogers, Charles

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Engineers' mission and vision statements as found on their official website, http://www.usace.army.mil/About/MissionandVision.aspx:

> **U.S. Army Corps of Engineers Mission:**
> Provide vital public engineering services in peace and war to strengthen our Nation's security, energize the economy, and reduce risks from disasters.
>
> **U.S. Army Corps of Engineers Vision:**
> A GREAT engineering force of highly disciplined people working with our partners through disciplined thought and action to deliver innovative and sustainable solutions to the Nation's engineering challenges.

I respectfully ask that you provide us your vital public engineering services by delivering an innovative and sustainable solution to our recurring low lake level engineering challenge.

I believe it is time for a credible Corps spokesman to personally face the residents and other users of West Point Lake who pay taxes (some, extra taxes) to enjoy the pleasures of the lake, and tell us what efforts the Corps is expending to define, address, and find solutions to this ongoing problem. The explanation must address efforts specifically in terms of the operating budget of the Corps to manage this lake. I may be wrong, but my impression is that there is much wasted taxpayer money here funding a largely inefficient, ineffective operation that is not accountable to the people who pay for it.

"We [need] to put an end to the notion that the American taxpayer exists to fund the federal government. The federal government exists to serve the American people."
From Ronald Reagan's Acceptance speech at the Republican Convention, 17 July 1980

Very Respectfully,

Charles Rogers, Col, USAF Ret
LaGrange, GA

Rogers, Gilbert

Page 1 of 6

Southern Environmental Law Center

The Candler Building
127 Peachtree Street NE, Suite 605
Atlanta, GA 30303-1840
404-521-9900
Fax 404-521-9909
SouthernEnvironment.org

January 14, 2013

Via Electronic and First Class Mail

U.S. Army Corps of Engineers, Mobile District
Attn: ACF WCM Comments
P.O. Box 2288
Mobile, AL 36628-0001

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

Re: Comments in Response to Corps' Notice of Intent to Revise EIS Scoping - Apalachicola-Chattahoochee-Flint River Basin Master Water Control Manual Update

To Whom It May Concern:

The Southern Environmental Law Center ("SELC") submits the following scoping comments on behalf of the Tri-State Conservation Coalition ("TSCC" or "the Coalition"), including the Chattahoochee Riverkeeper, Flint Riverkeeper, Apalachicola Riverkeeper, American Rivers, Alabama Rivers Alliance, and the Georgia River Network, and on behalf of the Atlanta Rowing Club. The Coalition also adopts and incorporates by reference the comments submitted by the Chattahoochee Riverkeeper and the Apalachicola Riverkeeper.

SELC is a regional not-for-profit legal advocacy organization whose mission is to protect natural resources and special places throughout the Southeastern United States. The TSCC, a coalition of more than 50 organizations in Georgia, Alabama, and Florida, is committed to safeguarding the water quality, ecological, and recreational functions of the Apalachicola-Chattahoochee-Flint ("ACF") and the Alabama-Coosa-Tallapoosa ("ACT") River Basins. Five core principles guide the TSCC's work and inform its concerns regarding the ACF Water Control Manual Update: maintaining ecologically healthy instream flows in the ACF system; maximizing water and energy conservation and efficiency to meet current and future water demands; minimizing adverse impacts of interbasin transfers (IBTs); embracing adaptive management based on sound science and adequate monitoring and reporting; and ensuring transparent and accessible decision-making.

We submit these comments in response to the Army Corps of Engineers' ("the Corps") Oct. 12, 2012 Federal Register notice that it is reopening the scoping period for the ACF Master

Rogers, Gilbert

Page 2 of 6

Water Control Manual ("WCM") update.[1] The Corps is revising the scope of its Environmental Impact Statement ("EIS") to account for the June 2011 decision by the U.S. Court of Appeals for the Eleventh Circuit[2] and the Corps' June 2012 legal opinion,[3] both of which affirm that water supply is one of the authorized purposes of the Lake Lanier/Buford Dam project. The Corps' June 2012 legal opinion concludes that the Corps has the authority to consider Georgia's request for additional municipal and industrial water supply from Lake Lanier up to a net withdrawal of 190 million gallons per day ("mgd") and flow release of 1381 cubic feet per second ("cfs") from Buford Dam by the year 2030. This authorization alters the scope of the EIS by increasing the number of alternatives and impacts that must be considered by the Corps in its National Environmental Policy Act ("NEPA") analysis. We appreciate the opportunity to participate in this re-scoping process and offer the following comments concerning the proper scope of the EIS in light of this authorization.

Scoping and Compliance with NEPA

NEPA requires a federal agency to prepare an EIS for any major federal action significantly affecting the quality of the human environment. See NEPA § 102 (C), 42 U.S.C. § 4332 (C). By its very nature, NEPA is a forward-looking statute, requiring federal agencies to take a hard look at a particular project to assess its impacts and alternatives so that they will make an informed decision with full knowledge of a project's effects on the environment. As part of the NEPA process, the Corps must first determine the scope of the EIS, which "consists of the range of actions, alternatives, and impacts to be considered in an environmental impact statement." 40 C.F.R. § 1508.25. Actions include connected actions, cumulative actions, and similar actions. Alternatives include a no action alternative, other reasonable courses of action, and mitigation measures not included in the proposed action. Impacts refer to direct, indirect, and cumulative impacts. Id. Because of the length and complexity of the ACF system, from its headwaters in north Georgia to the Apalachicola Bay, the Corps must look comprehensively at the entire ACF system when determining the proper scope of the EIS and evaluating alternative management protocols for its reservoirs, and their associated impacts.

Alternatives Analysis

The alternatives analysis is "the heart of the environmental impact statement." 40 C.F.R. § 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, even

[1] Department of the Army, Corps of Engineers, 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, 77 Fed. Reg. 62,224 (Oct. 12, 2012).
[2] Florida v. U.S. Army Corps Eng'r (In re MDL-1824 Tri-State Water Rights Litig.), 644 F.3d 1160 (11th Cir. 2011).
[3] U.S. Army Corps of Engineers, Office of Chief Counsel, Memorandum for the Chief of Engineers: Authority to Provide for Municipal and Industrial Water Supply from the Buford Dam/Lake Lanier Project, Georgia (June 2012), *available at* http://www.sam.usace.army.mil/Portals/46/docs/planning_environmental/acf/docs/2012ACF_legalopinion.pdf

including "reasonable alternatives not within the jurisdiction of the lead agency." Id. One required alternative to consider is the alternative of taking no action. Id.

The Corps must look critically at every reasonable alternative for revisions to the WCM, including alternatives made available by the Eleventh Circuit's 2011 decision and the Corps' 2012 legal opinion authorizing greater water supply from the Lake Lanier/Buford Dam project. The Corps must consider all reasonable alternatives for operations during normal rainfall conditions and during times of drought. Management procedures considered for Lake Lanier/Buford Dam in times of drought should include analysis of each alternative's impacts on downstream users. Variations on the amount, timing, and quantity of water flows from Lake Lanier should be considered in light of potential impacts to downstream ecosystems and water users in Georgia, Alabama, and Florida. Emphasis should be placed on restoring natural flow volume and variation whenever possible.

Alternatives to providing water supply from Lake Lanier should specifically include aggressive water conservation and efficiency measures available to water users in the ACF system, particularly within the Metropolitan North Georgia Water Planning District ("Metro District") and the state of Georgia. The Corps must consider reasonable alternatives such as greater conservation and efficiency measures even if taking such measures are not within the Corps' jurisdiction. Alternatives which emphasize conservation and efficiency have impacts not only in the Lake Lanier/Buford Dam region, but also on flows within the entire ACF system and downstream users in Georgia, Alabama, and Florida. While north Georgia has made improvements in water conservation in response to the ongoing drought, Atlanta and the other members of the District could make more progress toward implementing aggressive water conservation measures, which could further reduce the need for much of the proposed future water allocations from Lake Lanier and other proposed water supply reservoirs in the Chattahoochee River Basin. The Corps must examine these other water supply alternatives and their effect on dam operations at Lake Lanier as part of the EIS process.

One specific alternative that the Corps should consider is requiring any municipal, industrial, or other entity in the ACF basin who holds a contract for water supply derived from federally financed (partially or in whole), authorized, and/or managed facilities to implement aggressive and accepted water conservation and efficiency methods and best management practices. Such a requirement would not be an anomaly. According to the Bureau of Reclamation's enabling legislation, the Secretary "shall…encourage the full consideration and incorporation of prudent and responsible water conservation measures in the operation of Non-federal recipients of irrigation water from Federal reclamation projects, where such measures are shown to be economically feasible for such non-Federal recipients."[4] Furthermore, "each district that has entered into a repayment contract or water service contract pursuant to Federal reclamation law or the Water Supply Act of 1958…shall develop a water conservation plan which shall contain definite goals, appropriate water conservation measures, and a time schedule for meeting the water conservation objectives."[5] This water conservation and efficiency requirement would foster environmental protection and natural systems' restoration, and it would

[4] See 43 U.S.C.S. § 390jj; U.S. Department of the Interior Bureau of Reclamation: Managing Water in the West, Section 210 (Jan. 2007), *available at* http://www.usbr.gov/rra/Law_Rules/public%20law%2097-293.pdf.
[5] Id.

benefit users and stakeholders throughout the ACF basin who are dependent on healthy river flows.

Additionally, the Corps must ensure that it is using reliable and up-to-date background data when evaluating alternatives. In particular, the Corps must review the adequacy of its unimpaired flow data set, as evaluated in the ACF Stakeholders' 2012 report by the Georgia Water Resources Institute and Georgia Tech: *Unimpaired Flow Assessment for the Apalachicola-Chattahoochee-Flint River Basin*. The Corps must also ensure that its current and future water demand data, particularly for the Metro District, is current and reliable. The Chattahoochee Riverkeeper's recent report, *Filling the Water Gap: Conservation Successes and Missed Opportunities in Metro Atlanta*, needs to be considered by the Corps as it analyzes flaws in current and future water demand data. Any flaws and gaps in this data increase the risk of negative consequences on water quality and flow for the entire ACF system and water users downstream of Lake Lanier.

Direct Impacts

Direct impacts are defined as those impacts which are caused by the action and occur at the same time and place. 40 C.F.R. § 1508.8(a). The Corps' regulation of its reservoirs can have immediate and pronounced effects throughout entire ACF system. For example, decisions made regarding flow into and out of Lake Lanier can affect communities and species that are located many miles downstream, as well as water quality in the lake itself. The Corps' engineers recognized these types of direct impacts more than a half-century ago. The U.S. Court of Appeals for the Eleventh Circuit Court's June 2011 determination that Buford Dam was authorized for water supply was based in large part upon a Corps' 1946 report designating that Buford Dam would provide regular flows to "ensure" a steady water supply for the City of Atlanta's drinking needs, "sanitation," "public health," and "to prevent damage to fish" downstream.[6]

Revision of the WCM will have obvious consequences for the ongoing uses of Lake Lanier and other reservoirs, for the amount of water that may be released downstream, and for the aquatic habitat in the lake and the rest of the Chattahoochee, Flint, and Apalachicola River basins. Because of these substantial direct impacts, the Corps must rely upon an objective and transparent body of scientific data to underpin its analysis of different water releases in the ACF system.

The EIS must evaluate all impacts to aquatic ecosystems and species throughout the ACF system, particularly threatened and endangered species in the river basins. In addition to threatened and endangered species, the Corps' analysis of effects on aquatic systems within the ACF must include all effects on fish populations. This includes both the fish populations present in the rivers and in the downstream impoundments. Both recreational and subsistence fishing

[6] See Florida v. U.S. Army Corps Eng'r (In re MDL-1824 Tri-State Water Rights Litig.), 644 F.3d 1160, 1186 (11th Cir. 2011); H.R. Doc 80-300 (June 6, 1947), Brigadier General James B. Newman, Report of the South Atlantic Division Engineer, March 20, 1946, see pp. VIII, IX, and 34; see also U.S. Army Corps of Engineers, Office of Chief Counsel, Memorandum for the Chief of Engineers 8–9 (June 2012), *available at* http://www.sam.usace.army.mil/Portals/46/docs/planning_environmental/acf/docs/2012ACF_legalopinion.pdf.

Rogers, Gilbert

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occur throughout the ACF system, so the Corps must be sensitive to any flow regime's effects on fish populations and habitat availability. Additionally, the Corps must address any impacts to water quality. Analysis of water quality and instream flow impacts should include an analysis of historic flow regimes that predate the construction of the dams and reservoirs within the ACF system. In analyzing historic ACF stream flows, the Corps should consult with the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the National Oceanic and Atmospheric Administration, the U.S. Geological Survey, and state resource agencies in Georgia, Alabama, and Florida.

Indirect Impacts

NEPA's implementing regulations define indirect impacts as those impacts 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 C.F.R. § 1508.8(b). Indirect impacts of the WCM revision are likely to be extremely significant in this case, particularly as they relate to growth made possible by any decision to increase water supply availability from Lake Lanier. Increased availability of water supply from Lake Lanier will fuel more growth, which will have impacts to water quality, the extent of impervious surfaces, and air quality, among other indirect impacts. The latter deserves particular note. With the Atlanta region continuing its struggle to attain national ambient air quality standards for both ozone and particulate matter, any federal action whose effect will be to increase growth – which will, in turn, increase the mobile sources of air pollutants via more vehicles on Georgia's roads – should be rigorously evaluated before, not after, the growth occurs.

Indirect effects may also encompass the effects of the WCM revision on threatened and endangered species in the ACF basin. Whether direct or indirect, these impacts are important for both the Corps and the public to evaluate in determining the best way to meet the water needs of communities in the Atlanta area and the rest of the ACF system. In addition, the Corps should examine the indirect effects of its management of the ACF system on water levels in the Oconee-Ocmulgee-Altamaha and Alabama-Coosa-Tallapoosa river systems, since there are a number of interbasin transfers taking place among these systems around metro Atlanta.

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. Cumulative impacts are particularly significant in a highly-regulated system such as the ACF Basin. We would like to see an evaluation of the cumulative impacts of maintaining or increasing water withdrawals and flows out of Lake Lanier for the rest of the ACF system. The EIS must examine cumulative impacts of all reservoir and dam operations throughout the ACF system and the cumulative, incremental impacts from reasonably foreseeable future actions such as the following proposed projects: Glades Farm

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Rogers, Gilbert

Page 6 of 6

Reservoir in Hall County, Georgia; Bear Creek Reservoir in South Fulton County, Georgia; Bartlett's Ferry hydroelectric (FERC) relicensing; and Georgia's regional water planning efforts. The Corps should coordinate with other agencies in determining the cumulative impacts of its WCM updates. In particular, the Corps should evaluate cumulative impacts after consulting with the Federal Energy Regulatory Commission, the Corps' Savannah District, Georgia Environmental Protection Division, and the Metro District.

Opportunity for Public Participation

Given the importance of the Corps' analysis of the impacts and alternatives in its ACF WCM EIS, we expect the NEPA process to generate broad public interest, from the upper Chattahoochee basin to downstream communities in southern Georgia, Alabama, and Florida. NEPA's purpose is to "ensure that environmental information is available to public officials and citizens *before* decisions are made and *before* actions are taken," 40 C.F.R. § 1500.1(b) (emphasis added). In keeping with this purpose, we look forward to a transparent process for drafting and revising the EIS associated with evaluating the impacts and alternatives to addressing the water needs of the entire ACF system while providing recreational opportunities and protecting aquatic habitats.

Conclusion

We look forward to participating in the NEPA process as it moves forward. Thank you for your consideration of these comments. Please contact us if you have any further questions.

Sincerely yours,

Gilbert Rogers

Gilbert Rogers
Senior Attorney
Southern Environmental Law Center

April R Ingle

April Ingle
Executive Director
Georgia River Network
Chair, TSCC

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Rosenbaum, Will

Page 1 of 1

1/12/2013

COMMENTER: Will Rosenbaum
65 5th ST
Apalachicola, FL 32320

ORGANIZATION: Veterinary Relief Services

COMMENTS: I have been catching sharks at the railroad bridge 5 miles up river this an example of how saline the river has become. We need more fresh water released up river.

Rush, Joyce

Page 1 of 1

1/11/2013

COMMENTER: Joyce Rush
709 Duparc Circle
Tallahassee, FL 32312

ORGANIZATION:

COMMENTS: Appalachee Bay is starving for water, please do not restrict flow. We need our seafood industry. Thanks for letting me comment. Joyce

Sak, Kim

Page 1 of 1

1/14/2013

COMMENTER: Kim Sak
270 East Smoketree Terrade
Johns Creek, GA 30005

ORGANIZATION:

COMMENTS: The drainage basin for Lake Lanier is grossly disproportionate to the demands of the ACF system. Lake Lanier is the water supply for Atlanta, the 9th largest Metro area in the US. This should come before all other demands. In addition, all reservoirs in the system should be utilized to their maximum ability. Please start by increasing the full pool level of Lake Lanier to 1073 as soon as possible.

Salo, John

Page 1 of 1

1/14/2013

COMMENTER: JOHN Salo
3760 T. W. Henderson Rd.
Cumming, AS 30041

ORGANIZATION:

COMMENTS: It would be nice to understand why raising the lake level to 1072 seems to be such an issue when from all I can understand that- that would double the volume in the lake and seemingly give plenty of water to support the down stream requirements.

Samet, Melissa

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NATIONAL WILDLIFE FEDERATION®
83 Valley Road
San Anslemo, CA 94960
415-762-8264
sametm@nwf.org

www.nwf.org

January 12, 2013

Submitted Via Email: acf.eis@tetratech.com and ACF-WCM@usace.army.mil

Colonel Steven Roemhildt
Commander, Mobile District
U.S. Army Corps of Engineers
P.O. Box 2288
Mobile, AL 36628-0001

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

Dear Colonel Roemhildt:

The National Wildlife Federation appreciates the opportunity to comment on the revised scope of the Environmental Impact Statement to be drafted by the U.S. Army Corps of Engineers (Corps) for the proposed updated of the Master Water Control Manual for the Apalachicola-Chattahoochee-Flint River Basin (ACF) in Alabama, Florida, and Georgia.

The National Wildlife Federation (NWF) is the nation's largest conservation education and advocacy organization. NWF has more than four million members and supporters and conservation affiliate organizations in forty-eight states and territories. NWF has a long history of working to protect the nation's coastal and inland waters and the fish and wildlife that depend on those vital resources, and of working to modernize water resources planning.

Introduction

On behalf our more than four million members and supporters, NWF urges the Corps to conduct a comprehensive and robust analysis of the environmental consequences of potential management regimes for the ACF System and to develop and recommend a water management regime that will protect and restore the ecological health of the Apalachicola River and Bay and the entire ACF system.

Law and policy require the Corps to manage the ACF system in a manner that protects and restores the health of fish and wildlife populations and the ecological health of the Apalachicola River and Bay. A management regime that restores and maintains ecological flows will meet these requirements, protect a national ecological treasure, and support a vibrant economy.

Ecological flows are the instream flows needed to: (a) support and reestablish the chemical, physical, biological, and overall ecological integrity of the ACF system; (b) support and reestablish a thriving and

Samet, Melissa

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resilient Apalachicola River, Apalachicola River floodplain, and Apalachicola Bay; and (c) restore and recover species that are endangered, threatened, or at risk. The Environmental Impact Statement (EIS) must evaluate the ecological flows and select an alternative that will ensure that those flows are established and protected.

The Corps' most recent scoping report will not lead to an EIS that achieves these objectives or complies with the requirements of the National Environmental Policy Act. The most recent scoping report improperly restricts the EIS to a review of a very limited set of alternatives, none of which seek to evaluate or meet the ecological flow needs of the Apalachicola River and Bay. The report also improperly restricts the analysis of impacts in the EIS by opting to compare the impacts of alternative management regimes only to the presumed health of the ACF Rivers as of 1989, despite the long-term and significant adverse impacts caused by the construction and operation of the ACF system prior to that date. To properly analyze the impacts of the proposed Water Control Manual alternatives, the Corps must define and utilize the historical flow conditions (pre-ACF and pre-non-Federal dams and reservoirs) of the Apalachicola, Chattahoochee, and Flint rivers, with particular attention to the historical flow regime of the Apalachicola River.[1]

The Corps also currently plans to rely on an inadequate and outdated "critical yield" methodology to establish the baseline for future water allocations rather than the ecological flows needed to maintain the health and integrity of the ACF system.[2] Water resources experts have long recognized that "critical yield" is *not appropriate* as a basis for making water management decisions as it looks only at the amount of water that may be physically available and does not assess the economic, environmental, social, and political constraints on the use of that water.[3] This analysis significantly overstates the

[1] If it is not currently available, the Corps must obtain or develop this historical flow information unless the costs of doing so would be "exorbitant." 40 C.F.R. § 1502.22.
[2] The Corps defines the ACF critical yield as "the maximum amount of water that can be consistently removed from a reservoir through releases from the dam and/or withdrawals from the reservoir during the most severe drought in the period of record (1939-2008), without depleting the reservoir conservation storage. Conservation storage is the amount of water available in a reservoir to meet project purposes other than flood control. Critical yield is the amount of water available from a reservoir at any time under any conditions described in the hydrologic period of record." The Corps' states that critical yield "is important because it is the basis from which water stored in a reservoir is allocated to various project purposes. The amount or volume of water stored in a reservoir can be allocated to a specific project purpose, such as hydropower or water supply, based on a percent of critical yield. A change in critical yield could result in modifications of the allocations for a project purpose." U.S.A.C.E., *Federal Storage Reservoir Critical Yield Analysis, Alabama-Coosa-Tallapoosa (ACT) and Apalachicola-Chattahoochee-Flint (ACF) River Basins*, February 2010 at 2-3.
[3] *The Regulated Riparian Model Water Code* (Dellapenna, 1997) (water management decisions should be based on an evaluation of safe-yield, which is defined as the "amount of water available for withdrawal without impairing the long-term social utility of the water source, including the maintenance of the protected biological, chemical, and physical integrity of the source"); *see* U.S.A.C.E. Institute For Water Resources, *Managing Water For Drought, National Study Of Water Management During Drought*, IWR Report 94-NDS-8 (September 1994) (recommending use of safe-yield). Indeed, we have been unable to locate any Corps guidance identifying "critical yield" as an appropriate or necessary methodology for developing water control manuals.

Samet, Melissa

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amount of water that is physically available in the ACF Basin, setting the stage for continued conflicts among the many competing users in the ACF Basin.[4]

An Ecological Treasure In Crisis

The Apalachicola River is a national treasure and one of the most productive river systems in North America. The River harbors the most diverse assemblage of freshwater fish in Florida and supports one of the most diverse floodplain forests in North America. The River basin is also home to some of the highest densities of reptile and amphibian species on the continent. The importance of the River has led to its designation by the State of Florida as an Outstanding Florida Water, by the United States as a National Estuarine Research Reserve, and by the United Nations as an International Man in the Biosphere Reserve.

The Apalachicola River and its floodplain also form the biological factory that fuels the Apalachicola Bay and the eastern Gulf of Mexico. The Apalachicola Bay is one of the most productive estuaries in the northern hemisphere, and its commercial fishing industry contributes $200 million annually to the regional economy and directly supports up to 85 percent of the local population. Recreational fishing in the Apalachicola River and Bay contributes an additional $191 million to the local economy each year. The ecosystem services provided by the River and Bay have been valued at $5 billion a year.

Despite its enormous ecological value, the Apalachicola River ecosystem has been severely degraded by, among other things, the construction and operation of the ACF System of federal dams and reservoirs. Operation of these upstream reservoirs, along with a long history of federal navigational dredging, have caused significant ecological harm to this vital ecosystem by starving the Apalachicola River of the flows needed to sustain a healthy system and by altering the River's hydrologic function and the shape of its channel. These activities have altered the river's flow regimes; reduced the river's hydraulic complexity and habitat diversity; smothered, displaced, and dried out habitat in the river's rich sloughs, floodplains, and channel margins; and destabilized and widened the river channel.

Drought has added to the significant problems facing the Apalachicola River and Bay. The ACF Basin has been experiencing Extreme (D3) and Exceptional (D4) drought conditions with significant adverse impacts to the Apalachicola River and Bay, and the fish and wildlife, commercial fishing, recreational fishing, and ecotourism that rely on these waters.

A new paradigm is needed for managing the ACF system. It is critical that the new Water Control Manuals protect and restore the ecological integrity of the Apalachicola River and Bay and the entire ACF system by ensuring the maintenance of ecological flows in the Apalachicola River.

[4] The Corps' critical yield analysis relies on an inaccurate unimpaired flow data set and is based on flawed assumptions regarding critical reservoir management practices, including that reservoir levels can be lowered far below the levels that have ever been reached, even during extreme drought years.

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Scoping Recommendations

I. The EIS Must Evaluate Alternatives That Will Protect Fish and Wildlife and Restore the Ecological Health of the Apalachicola River and Bay, and the Corps Must Select an Alternative that Will Achieve These Objectives

The Corps is required as a matter of law to operate the ACF system to protect and conserve fish and wildlife and the ecological health of the Apalachicola River and Bay. To do this, the EIS must assess and account for the ecological flows required to maintain a healthy and vibrant Apalachicola River and Bay. The updated water control manual must in turn ensure the reestablishment and protection of the flows needed to maintain a healthy and vibrant Apalachicola River and Bay.

As discussed above, ecological flows are the instream flows needed to: (a) support and reestablish the chemical, physical, biological, and overall ecological integrity of the ACF system; (b) support and reestablish a thriving and resilient Apalachicola River, Apalachicola River floodplain, and Apalachicola Bay; and (c) restore and recover species that are endangered, threatened, or at risk.

As clearly set forth in the June 2012 Legal Opinion of the Corps' Chief Counsel, fish and wildlife conservation is an authorized purpose of the ACF system of projects:

> "The systemwide plan of development for the ACF basin was intended to provide benefits for the purposes of hydropower, navigation, and flood control, estimated in annual average dollar values, and also to provide benefits for the purposes of municipal and industrial water supply, recreation, **and fish and wildlife conservation**, which were not quantified in the same manner."

Legal Opinion at 27 (emphasis added). Fish and wildlife protection and conservation are also general purposes for the ACF projects pursuant to the Fish and Wildlife Coordination Act.

The Legal Opinion goes on to state that "Congress expected that the Buford Project would be operated as an integral part of the ACF system, to achieve the purposes Congress authorized for that system when it approved the ACF plan of development in the 1946 RHA." Legal Opinion at 38-39. As a result, "the Buford Project cannot be understood in isolation, because the Buford Project was proposed and approved as one component in a system of projects, and Congress intended that storage in the Buford Project would be used to regulate flows throughout the system, in order to enable efficient operation of the downstream projects and to accomplish the authorized purposes of the ACF system." Legal Opinion at 39, note 167.

As a result, in assessing the impacts of water withdrawals, the Legal Opinion concludes that focusing on just the operations or impacts to Lake Lanier alone "would not comport with Congressional intent." Legal Opinion at 38-39. Instead, the Corps must assess the impacts on the ability to achieve the full suite of authorized purposes for the entire ACF system, including fish and wildlife conservation. *Id.*

The National Water Policy established by Congress in 2007 also requires the Corps to operate the ACF projects to protect the Apalachicola River and Bay. That policy states that "all water resources projects" shall "protect[] and restor[e] the functions of natural systems and mitigate[e] any unavoidable damage

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to natural systems." 33 U.S.C 1962-3 (established by § 2031(a) of the Water Resources Development Act of 2007, and immediately applicable to all water resources projects).

Moreover, enhancement of the environment has been an important federal objective for water resources programs for decades. Corps regulations in place since 1980 state that:

> "Laws, executive orders, and national policies promulgated in the past decade require that the quality of the environment be protected and, where possible, enhanced as the nation grows. . . . Enhancement of the environment is an objective of Federal water resource programs to be considered in the planning, design, construction, and **operation and maintenance of projects**. Opportunities for enhancement of the environment are sought through each of the above phases of project development. Specific considerations may include, but are not limited to, **actions to preserve or enhance critical habitat for fish and wildlife; maintain or enhance water quality; improve streamflow**; preservation and restoration of certain cultural resources, **and the preservation or creation of wetlands.**

33 C.F.R. § 236.4. (emphasis added).

Long-standing Corps guidance also requires the establishment of the minimum stream flow needed to address water quality, fish and wildlife, recreation, and aesthetic considerations when developing water control manuals, even where maintenance of minimum instream flows is not an authorized project purpose. EM 1110-2-3600, 30 Nov 87 (Management of Water Control Systems) at 2-3.

Critically, the alternative ultimately recommended by the EIS must also comply with the full suite of federal laws and policies designed to protect the environment. These include, the Endangered Species Act, the Clean Water Act, the Safe Drinking Water Act, the Magnuson-Stevens Fishery Conservation and Management Act, the Coastal Zone Management Act, and the mitigation requirements applicable to Corps civil works projects that were established by § 2036(a) of the Water Resources Development Act of 2007. These mitigation requirements must be satisfied, among other times, whenever the Corps will be recommending a project alternative in an EIS. 33 U.S.C. § 2283(d). The alternative ultimately recommend by the EIS must also comply with the Clean Water Act water quality certification requirements of Florida, Alabama, and Georgia. This includes compliance with Florida's strict instream flow protection requirements.

To achieve these objectives, the EIS must evaluate and select an alternative that will ensure the establishment and protection of the ecological flows required to reestablish and maintain a healthy and vibrant Apalachicola River and Bay. Ecological flows are the instream flows needed to: (a) support and reestablish the chemical, physical, biological, and overall ecological integrity of the ACF system; (b) support and reestablish a thriving and resilient Apalachicola River, Apalachicola River floodplain, and Apalachicola Bay; and (c) restore and recover species that are endangered, threatened, or at risk.

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II. The EIS Must Fully Analyze Direct, Indirect, and Cumulative Impacts

In comparing and analyzing potential alternatives, the EIS must examine, among other things, the direct, indirect, and cumulative environmental impacts of alternatives, the conservation potential of those alternatives, and the means to mitigate adverse environmental impacts. 40 C.F.R. § 1502.16. This assessment is essential for determining whether less environmentally damaging alternatives are available.

Direct impacts are caused by the action and occur at the same time and place as the action. Indirect impacts are also caused by the action, but are later in time or farther removed from the location of the action. 40 C.F.R. § 1508.8. Cumulative impacts are:

> "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

40 C.F.R. § 1508.7. A cumulative impact analysis ensures that the agency will not "treat the identified environmental concern in a vacuum." *Grand Canyon Trust v. FAA*, 290 F.3d 339, 346 (D.C. Cir. 2002).

Among many other things, the Corps must assess the magnifying and additive effects of global warming when evaluating the direct, indirect, and cumulative impacts of a particular flow regime for the ACF system:

> "Climate change can increase the vulnerability of a resource, ecosystem, or human community, causing a proposed action to result in consequences that are more damaging than prior experience with environmental impacts analysis might indicate . . . . [and] climate change can magnify the damaging strength of certain effects of a proposed action."
>
> * * *
>
> "Agencies should consider the specific effects of the proposed action (including the proposed action's effect on the vulnerability of affected ecosystems), the nexus of those effects with projected climate change effects on the same aspects of our environment, and the implications for the environment to adapt to the projected effects of climate change."

Council on Environmental Quality, *Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions* (February 18, 2010); s*ee Center for Biological Diversity v. Nat'l Hwy Traffic Safety Administration*, 538 F.3d 1172, 1217 (9th Cir. 2008) (holding that analyzing the impacts of climate change is "precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct"); *Center for Biological Diversity v. Kempthorne*, 588 F.3d 701, 711 (9th Cir. 2009) (NEPA analysis properly included analysis of the effects of climate change on polar bears, including

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"increased use of coastal environments, increased bear/human encounters, changes in polar bear body condition, decline in cub survival, and increased potential for stress and mortality, and energetic needs in hunting for seals, as well as traveling and swimming to denning sites and feeding areas."). The CEQ guidance makes it clear that analyzing the impacts of climate change is not restricted to evaluating whether a project could itself exacerbate global warming. The magnifying and additive effects of global warming also must be evaluated.

Where, as here, the project area encompasses entire river basins, the cumulative impacts analysis must analyze the cumulative effects of other projects in those river basins. *See, e.g.*, *LaFlamme v. F.E.R.C.*, 852 F.2d 389, 401-02 (9th Cir. 1988); *Natural Resources Defense Council v. Callaway*, 524 F.2d 79, 94 (2d Cir. 1975). This includes an analysis of the cumulative effects of federal, state, and private projects and actions. The requirement to assess non-Federal actions is not "impossible to implement, unreasonable or oppressive: one does not need control over private land to be able to assess the impact that activities on private land may have" on the project area. *Resources Ltd., Inc. v. Robertson*, 35 F.3d 1300, 1306 (9th Cir. 1993).

A meaningful assessment of cumulative impacts must identify:

> "(1) the area in which effects of the proposed project will be felt; (2) the impacts that are expected in that area from the proposed project; (3) other actions – past, present, and proposed, and reasonably foreseeable – that have had or are expected to have impacts in the same area; (4) the impacts or expected impacts from these other actions; and (5) the overall impact that can be expected if the individual impacts are allowed to accumulate."

TOMAC, Taxpayers Of Michigan Against Casinos v. Norton, 435 F.3d 852 (D.C. Cir. 2006) (quoting Grand Canyon Trust, 290 F.3d at 345); *Fritiofson v. Alexander*, 772 F.2d 1225, 1245 (5th Cir. 1985) (holding this level of detail necessary even at the less detailed review stage of an Environmental Assessment).

Importantly, as CEQ has made clear, in situations like those in the ACF where the environment has already been greatly modified by human activities, it is *not* sufficient to compare the impacts of the proposed alternative against the current conditions. Instead, the baseline must include a clear description of how the health of the resource has changed over time to determine whether additional stresses will push it over the edge. Council on Environmental Quality, *Considering Cumulative Effects Under the National Environmental Policy Act* at 41 (January 1997).

The EIS must provide "quantified or detailed information" on the impacts, including the cumulative impacts, so that the courts and the public can be assured that the Corps has taken the mandated hard look at the environmental consequences of the Project. *Neighbors of Cuddy Mountain v. U. S. Forest Service*, 137 F.3d 1372, 1379 (9th Cir. 1998); *Natural Resources Defense Council v. Callaway*, 524 F.2d 79, 87 (2d Cir. 1975). **If information that is essential for making a reasoned choice among alternatives is not available, the Corps must obtain that information unless the costs of doing so would be "exorbitant."** 40 C.F.R. § 1502.22 (emphasis added).

To conduct a meaningful assessment of the impacts of alternative water control manual management regimes on the ecological health of the Apalachicola River and Bay, the Corps should first determine the

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amount, timing, and variability of flows needed to maintain a healthy and vibrant river and bay. This information is essential to making a reasoned choice among alternatives and as a result must be obtain by the Corps unless the costs of doing so would be "exorbitant." 40 C.F.R. § 1502.22.

A. Types Of Impacts That Must Be Analyzed

It is critical that the EIS analyze the direct, indirect, and cumulative impacts of proposed alternative management regimes on the:

- Hydrology, channel morphology, stream flow (including deviations from the historical water levels, timing of freshwater flows, and natural flood pulse), and water quantity in the Apalachicola River and the ACF Basin;
- Water quality, salinity levels, and nutrient composition in the Apalachicola River and Bay, and the ACF Basin;
- Fish and wildlife in the Apalachicola River, Floodplain, and Bay, the ACF Basin, and the Gulf of Mexico including impacts to commercially and recreationally harvested species, and to affected migratory species throughout their ranges;
- Species listed as threatened or endangered under the federal Endangered Species Act (including both impacts within the Apalachicola River and ACF Basin and population-wide impacts), and to areas designated as critical habitat under the federal Endangered Species Act in the Apalachicola River and ACF Basin;
- Riverine and floodplain wetlands, including the Apalachicola River floodplain wetlands, and the Apalachicola River floodplain forests and sloughs;
- Marine fish and species and their habitat which require nutrients and fresh water from Apalachicola River and Bay to sustain their offshore Gulf ecosystem, otherwise known as the "Green River" effect;
- Quality, quantity, and value of ecosystem services provided by a healthy Apalachicola River, Floodplain, and Bay;
- Duration, frequency, and intensity of red tide in Apalachicola Bay and the near Gulf of Mexico waters; and
- Commercial fishing, recreational fishing, and ecotourism industries that rely on a healthy Apalachicola River, Floodplain, and Bay.

B. Actions that Must Be Evaluated In The Cumulative Impacts Analysis

To comply with the cumulative impact assessment requirements, the Corps must analyze whether and how the proposed alternative management regimes could supplement, aggravate, or intensify the impacts of the following types of past, present, and reasonably foreseeable future actions throughout the entire ACF Basin:

- Past, present, and reasonably foreseeable future water withdrawals from the Apalachicola, Chattahoochee, and Flint Rivers from Federal, non–Federal, and private projects and actions;
- Past, present, and reasonably foreseeable future reservoir and dam operations;

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- Past navigational dredging activities (with particular emphasis on changes in channel morphology, water levels, and floodplain forests and wetlands);
- Past, present, and reasonably foreseeable development, including commercial, residential, and road construction; and
- Reasonably foreseeable future changes in rainfall, water quantity, salinity, wetland losses, sea level rise, and storm events that will result from climate change.

C. The Proper Baseline for Analyzing Cumulative Impacts

In analyzing the cumulative effects of the activities discussed above, the Corps must define and utilize the historical flow conditions (pre-ACF Federal and pre-non-Federal dams and reservoirs) of the Apalachicola, Chattahoochee, and Flint rivers as the baseline, with particular attention to the historical flow regime of the Apalachicola River. Divergence from the historical flow conditions in the ACF have resulted in significant adverse impacts to Apalachicola River and Bay. As noted above, if this information is not currently available, the Corps must obtain this information unless the costs of doing so would be "exorbitant." 40 C.F.R. § 1502.22.

To establish the proper baseline, the Draft EIS should document and evaluate the historical changes in the ACF Basin with respect to the following indicators:

- Historical flows (*i.e.*, the pre-dam and reservoir flow regimes), including the amount, timing, and quality of flows in the ACF rivers;
- Acres of river and floodplain wetlands lost;
- Acres of native upland habitats lost;
- Miles of streambed lost or modified;
- Changes in stream flows;
- Changes in ground water elevations;
- Changes in the concentrations of indicator water quality constituents;
- Changes in the abundance, distribution, and diversity of indicator fish communities; and
- Changes in rainfall, and reasonably foreseeable future changes.

III. The Corps Should Adopt a New Approach to Developing Alternatives for the EIS, Selecting a Recommended Alternative in the EIS, and Updating the Water Control Manuals

NWF recommends that the Corps undertake the following approach to preparing the EIS and updating the Water Control Manuals.

(1) The Corps should first initiate an evaluation of the ecological flows needed to protect and restore the chemical, physical, and biological integrity of the Apalachicola River and its floodplain, the Chattahoochee River, the Flint River, and the Apalachicola Bay; and the species that rely on those waters. The Corps should undertake this evaluation jointly with the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the National Oceanic and Atmospheric Administration, and the U.S. Geological Survey. The ideal flow regime would mimic

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the quantity, timing, and quality of flows that existed prior to construction of the dams and reservoirs within the ACF system.

(2) The Corps should prioritize comprehensive review and implementation of a full range of alternatives that will ensure the maintenance of those ecological flows. The impacts of the proposed alternatives should be evaluated through a comparison to the environmental conditions present under historical flow conditions (pre-ACF and pre-non-Federal dams and reservoirs) in the Apalachicola, Chattahoochee, and Flint rivers.

(3) As part of its evaluation, the Corps should: (a) update and correct the unimpaired Flow Data Set and the water demand data currently be used by the Corps for its modeling and analysis; (b) establish the sustainable limits of water use in the basin; (c) re-evaluate evaporative losses, including particularly the evaporation that occurs during droughts; and (d) evaluate any ongoing or completed ecological flow evaluations being conducted for rivers within the ACF system.

(4) The Corps should ensure that the ecological flow evaluation, the EIS, and the Water Control Manuals are reviewed and assessed by the National Academy of Sciences pursuant to 33 U.S.C. § 2343(a)(3)(A)(iii).[5]

Conclusion

The National Wildlife Federation urges the Corps to develop a water management regime for the ACF system that will protect and restore the ecological health of the Apalachicola River and Bay and the entire ACF system. Fundamental to such a regime is the establishment and maintenance of the ecological instream flows needed to protect and restore the chemical, physical, biological, and overall ecological integrity of the Apalachicola River, Apalachicola River floodplain, and Apalachicola Bay and the health of the species that depend on these resources. We respectfully urge you to institute the planning process outlined above to ensure that this happens.

Sincerely,

Melissa Samet
Senior Water Resources Counsel

[5] The EIS, Water Control Manuals, and any ecological flow evaluation are clearly covered by the statutory independent review requirements which apply to, among other things, "any other study associated with a modification of a water resources project that includes an environmental impact statement" and that study's environmental impact statement. 33 U.S.C. § 2343(a).

Sandgren, Lyza

From: Lyza Sandgren <lyzasandgren@gmail.com>
Sent: Tuesday, October 23, 2012 12:04 AM
To: ACF-WCM
Subject: Low water levels at Lanier

Dear Sir and/or Madam Corp Person,

This is an election year and people are fed up with incompetence. I understand that you are not elected by the public but I would also think you would be tired of hearing all the scathing jokes about Army Corp of Engineers ineptitude. Other than lack of rain, the only other thing the Chattahooche and Lake Lanier suffer from are the gross negligence and stupid mistakes made by the Corp. Do you realize how silly your excuses of mis-communication sound?! Hello, no one owns a cell phone? Unless there is a rule for that, no one thinks to ask a question?

If you all were on my staff, you all would have been fired by now. Thank your stars that you are not employed by the private sector because expectations of a minimum job performance are higher than the performances, or lack thereof, that we have seen from the Corp.

Come on! Get your act together. Turning on and off valves is not rocket science.

Lyza L. Sandgren
President
CanopyLegal, LLC
Parent company of **CanopyParalegal**, an IP docketing and paralegal service
Suwanee, GA
770.573.7712 Office Direct
888.857.4777 Tollfree

Schmidt, Cathy

11/6/2012

COMMENTER: Cathy Schmidt
608 Waterview Dr.
LaGrange, GA 30240

ORGANIZATION:

COMMENTS: West Point Lake needs to be kept at a range of 630 - 635 ft.to sustain the mandates under which it was developed. LaGrange has lost millions of dollars of revenue because this lake is used, unfairly, as the workhorse for this entire region. There have also been fish kills, fish unable to spawn, and ersion of silt into the lake because of these unsound practices. The plan for this area needs to be revisited to make certain that this lake and community are treated according to the original mandates under which this project was undertaken.

Schurke, Robert

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1/14/2013

COMMENTER: Robert Schurke
1856 Blackthorn Way NE
Roswell, GA 30075

ORGANIZATION:

COMMENTS: - 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.

Searl, Kenneth

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1/14/2013

COMMENTER: Kenneth Searl
5840 Rock Springs Cir
Buford, GA 30518

ORGANIZATION: Lake Lanier Assoc.

COMMENTS: I have been boating on Lake Lanier since the '60s and my wish for many years was to live on the lake and I have been lucky to do that. Unfortually I can't enjoy the lake very much because of the water levels that are consistantly too low. My dock is sitting dry at least 6 months out fo a year.

- after reviewing many aspects of the basin I do believe that comments from the Lake Lanier Association are in order.

- 5,000 cfs min flow is not sustainable and is not representative of true lowest historical flows.

-I also agree that Lanier was not designed to support all downstream demands such as the Apalachicola River flows. Those muscles have been there forever and survived many different water flows.

-Navigation of the river bleow Columbus is not necessary or feasible and should not be supported by the Corps as this further places more demands on Lanier

- Also, the economy around the entire Lake Lanier basin is severly damaged with low water levels. Thousands of people rely on recreation to support their livelyhood and families.

Sexton, George

Page 1 of 1

1/14/2013

COMMENTER: George Sexton
9270 Bayhill Dr
Gainesville, GA 30506

ORGANIZATION:

COMMENTS: We purchased a house on Lake Lanier in 2006. Several years ago I attended a "seminar" put on by the ACE about the ACF basin. It was an excellent presentation. I was shocked to hear that the entire basin as planned was never completed. Specifically the reservoirs on the Flint River were never built. I understand this area has the largest water runoff but cannot be collected. You have the unenviable task of trying to run a "machine" with missing parts. I want to reiterate the Lake Lanier Association's second point " 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." I do not know what the solution is (other then to construct the missing reservoirs) but you should not penalize Lake Lanier and its residents for the US Government's failure to complete the entire ACT Basin project. Thank you

Shuler, Jay

Page 1 of 1

10/22/2012

COMMENTER: Jay Shuler
P.O. Box 850
Apalachicola, FL 32320

ORGANIZATION:

COMMENTS: Please stop Georgia from keeping the water in the Apalachicola River. The Apalachicola Bay, and our community, have been severely impacted by the lack of water flow in the river. Our oyster industry and our economy have been devastated. Please help us!

Shuler, Krystal

Page 1 of 1

1/12/2013

COMMENTER: Krystal Shuler
1561 Linden Road
Apalachicola, FL 32320

ORGANIZATION:

COMMENTS: Please help out the Apalachicola bay. The water levels are so low and our whole community is suffering due to it. For over a hundred years we have lived off the water and the lack of fresh water coming to our bay is killing it. We have thousands of families effected by this. Apalachicola bay is the second largest estuary in the USA. I beg and urge you to please release water from the Woodruff dam and asses the water needs of our bay. Our livelihood depends on it.

Simpson, Terrence

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1/14/2013

COMMENTER: Terrence Simpson
2665 Brook Valley Drive
Cumming, GA 30041

ORGANIZATION:

COMMENTS: I would like to add my support to calls for a complete reform of the the current policy of water release from Buford Dam and Lake Sidney Lanier. I completely agree with the following points:
- 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.

In addition I feel strongly that the current schedule of releases, their timing and flow rates, both short term and long term, seem to have a near random appearance. I have searched extensively through online resources for some understandable formula or target flow relationship for the daily releases, and have found very little that is understandable by ordinary folks. To that end may I suggest a simple web page describing the release shedule timing and flowrates measured in relation to the SPECIFIC DESIRED DOWNSTREAM EFFECT. I would like to suggest that in trying to satisfy ALL of the many stakeholders in the Lake and the ACF Basin, the Corps may be irrevocably degrading the resource itself.
Thank you.

Skrzypek, Robert

Page 1 of 1

1/14/2013

COMMENTER: Robert Skrzypek
4250 Creekwood Dr
Cumming, GA 30041

ORGANIZATION:

COMMENTS: Draw water from Lake Lanier only when & if mother nature provides it, allowing Lanier to be maintained at full pool.

Smallwood, Greg

Page 1 of 1

From: Greg Smallwood <gsmallwood@charter.net>
Sent: Tuesday, November 27, 2012 11:13 AM
To: brian.a.zettle@usace.army.mil
Subject: Lake Lanier

I am very concerned about the status level of Lake Lanier. I have been on the lake since 1963. We have never had the roller coaster ride we have experienced since 2008. We are on the way to 2 of the lowest levels since 2008 in the history of the lake. I know we are in drought conditions, but we cannot continue to send more water out than is coming in. I hope we are not going to let old manuals ruin the most beautiful fresh water lake in the U.S. There needs to be a new an updated manual to more accurately handle these conditions.

One way to protect Lake Lanier would be to put a minimum level on the lake. Where 1071 is full pool, we could put 1061 as the minimum. A 10 ft window could be achieved. When we are in drought conditions we should not let out anymore than what comes in. The endangered species only got what water flowed straight through the river before the lake backed up and they survived then. If we could raise the max level to 1073 would also give another 2 ft of water to play with.

As a home-property owner on Lake Lanier, what has happened since 2008 is very troublesome. We need to protect out Lake anyway we can.

Thank you,
Greg Smallwood

1

Smith, Lori

1/12/2013

COMMENTER: Lori Smith
2266 Howell Mill Road NW
Atlanta, GA 30318

ORGANIZATION:

COMMENTS: My family visits Apalachiacola Bay and St George Island every year. I know the oystermen there are STRUGGLING. Many have closed their business.

I am writing to request 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.

I appreciate consideration of my comments as you decide on the plan for the Apalachicola-Chattahoochee-Flint River (ACF) basin. This impacts the water release from Woodruff Dam into the Apalachicola River.

Sincerely,
Lori M. Smith

Snellings, J.

From: DIV.ACF.EIS
Subject: FW: Public Comments regarding the Water Control Manual for the ACF System. Lake Sydney Lanier

From: Clay Snellings [mailto:CSnellings@snellingswalters.com]
Sent: Monday, January 14, 2013 3:56 PM
To: ACF-WCM
Subject: Public Comments regarding the Water Control Manual for the ACF System. Lake Sydney Lanier

I am a homeowner at Property Address: 3770 TW Henderson Road, Cumming, Ga. 30041

I support the position of the Lake Lanier Association. Please review the specifics below.

- 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.

Sincerely Yours,
J Clayton Snellings

J Clayton Snellings, CPCU
Snellings Walters Insurance Agency
1117 Perimeter Center West, Suite W101
Atlanta, Ga. 30338
Direct: 770-508-3006
Cell: 770-617-0357
Fax: 770-399-9880
Main Office: 770-396-9600
http://www.snellingswalters.com

Spinks, Tracy

Page 1 of 2

November 13, 2011

Mrs. Tracy Y. Spinks
200 Victoria Drive
LaGrange, Georgia 30240

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, Troup County and the surrounding community, 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, City of West Point, 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.

Spinks, Tracy

Page 2 of 2

- As you are aware, West Point Lake was the first Corps 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 Corps.
- 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 Corps 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,

Signature

Spivey, Katie

Page 1 of 1

Jan. 14th, 2013

To Whom It May Concern,

When we moved to LaGrange 10 years ago, the Army Corps of Engineers showed up at my home to welcome us, give us information regarding rules and regulations of Westpoint Lake, and collect our dock fees. It was summer, the lake was full, and it was beautiful. Since that time, there have been a lot of problems with changes to Westpoint Lake.

My first personal negative encounter with the Corps was when they rapidly lowered the lake level to begin silt removal on one part of the lake. The only notice given was in the LaGrange Daily News, which I do not read every word of every article every day. There were no postcards , emails, or visits to the people living on the lake. When the lake was lowered so rapidly, my dock, which slid up and down on heavy poles, got hung up on the end closest to the shore. This caused about a 45 degree angle of the dock which caused my boat and it's engine to slide off the lift and remain submerged under water for as long as they worked on removing the silt. I think it was submerged for weeks. This caused us to have to replace our boat and file insurance on our dock, which cost around $6000+. The Army Corps claimed no responsibility, although we could have dry-docked our boat with some notification.

This year when we renewed our lake permits... we pay extra for having electricity to the dock; we pay extra for having our small bulkhead to prevent erosion, and we pay extra for the timber lined path down to the lake. This is all well worth the cost when there is water in the lake. Mostly, it is a red mudhole.

I find myself trying to hide what used to be a beautiful view from my house. I liked to watch the blue herons and occasionally an eagle fly over the lake. I don't see as many as I used to.

People of Troup County are good stewards of the lake. It is a unifying force in our community. Black and white, old and young, rich and poor all take pride in the lake and enjoy what it has to offer. The summers are filled with wake boarders, pontoon boats, and fishing boats.

My husband and I go to the July 4th fireworks by boat, and in the fall, we watch the leaves change on the lake. We sit on the dock until dark, and then watch the meteor showers.

It seems to me that it is unfair to manipulate the lake in this manner. It would be nice if the Army Corps of Engineers would focus on reducing pollution from Atlanta instead of giving them more water to pollute. They should be problem solvers instead of problem creators.

Thank you,

Katie Spivey
114 Quail Dr.
LaGrange, GA 30240

St. Amant, William

Page 1 of 1

11/5/2012

COMMENTER: WILLIAM ST. AMANT
9740 LEE CIRCLE
GAINESVILLE, GA 30506

ORGANIZATION:

COMMENTS: If the COE would loosen restrictions on dredging of coves at Lake Lanier and allow shallow coves to be dredged it would increase water storage, increase property values, improve navigation, and make the impact of lowered water levels less severe for recreational use of the lake. It would also increase economic activity in the lake area.

Stanford, Katherine

Page 1 of 1

10/31/2012

COMMENTER: Katherine Stanford
220 Westwood Drive
LaGrange, GA 30240

ORGANIZATION:

COMMENTS: Please restore our lake. You are depriving our area of a vital resource. Our lake has proven to be useless for most of this year due to the levels being so low. It's gotten so bad that it effected our drinking water this year. This is unacceptable.

Starr, Shane

Page 1 of 3

November 14, 2012

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

Comments for ACF Water Control Manual

To Whom It May Concern;

As an observer and participant in the ongoing dialogue between people with an interest in the way West Point Lake is managed, and the Army Corps of Engineers, the most positive thing I can say to date is that listening to the Corps makes me feel as close as I might ever come to the biblical phenomena of talking in tongues.

As such, I will divide my comments into two sections; those related to the way I wish the Corps would communicate to us, and those related to the way I wish the Corps would manage water.

Comments about the way the Corps communicates:

1) Please stop insisting that we do not understand "the big picture". We are not idiots; we are executives, military officers, professionals, and entrepreneurs, and we make our livelihoods from understanding the "big picture". The problem isn't that we don't understand the big picture, the problem is that the story about the "big picture" is so far from being compelling as to be insulting. If a field grade officer in the US Army cannot communicate a compelling, coherent reason for managing West Point Lake in a way that eliminates its use for recreation, then accept Occam's Razor, and consider that the simplest answer is the one most likely to be correct: there is no compelling, coherent reason.

2) If you make a mistake, admit it and learn from it. Don't hold up the Water Control Manual and hide behind it, as if it arrived with the two stone tablets on Mt. Sinai. Borrow from the Hippocratic Oath: do no harm. One bad thing about living on a lake with no water (is that an oxymoron?) is that you learn far more about water management than you ever wanted to know. At some point, isn't anyone held responsible for saying the West Point Lake Water Control Manual is fatally flawed, and needs fixed? Any rational person listening to the mantra that the lake is being managed strictly according to the manual would logically conclude the manual was wrong.

3) Stop contending that West Point Lake is suffering for the "greater good". The people in my community are like all Americans: we believe in doing what is right, and we are more than willing to sacrifice for the greater good. But if you invoke the greater good argument frivolously – such as for mussels that may or may not be endangered and may or may not be sensitive to the amount of flow rate, or for draught regions which don't really appear to be in distress on the draught maps – then people will eventually conclude that the Corps is

Starr, Shane

Page 2 of 3

throwing out red herrings in the hopes we'll be distracted by them, rather than providing important explanations that its constituents can believe in and support.

I think it is both unfortunate and disturbing that we citizens cannot get – and apparently are not entitled to - a rational answer as to why it has been deemed necessary to eliminate recreation from West Point Lake for a substantial portion of the past three years.

Comments about the way the Corps manages water resources:

4) 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! Increased Storage + Better Management = Reduced Risk of Flooding and Increased Economic Development and Economic Impacts!

5) 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.

6) 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.

7) 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.

8) 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.

Starr, Shane

Page 3 of 3

9) 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!

Since I moved here in 2003, I have watched West Point Lake slowly become a sad testament to an unfathomable management objective. I am sincerely hopeful that we can restore some amount of common sense into the management of West Point Lake.

Sincerely,

Shane Starr
4 River Mist Drive
LaGrange, GA 30240
(706)-882-0676

Steve Haubner, Douglas Hooker

Page 1 of 3

From: Steve Haubner <SHaubner@atlantaregional.com>
Sent: Wednesday, November 07, 2012 1:24 PM
To: 'brian.a.zettle@usace.army.mil'
Cc: Doug Hooker; Robin Rutherford
Subject: Request for Extension of ACF Scoping Period
Attachments: ARC_Extension_Request_11-7-2012.pdf

Mr. Zettle:

Please find attached a request from the Atlanta Regional Commission for an extension of the period for the submission of scoping comments concerning the update of the Water Control Manual update for the Apalachicola-Chattahoochee-Flint river basin.

Please contact me if you have any problems with the attachment. This request is also being sent via U.S. mail.

Regards,
Steve Haubner

Steve Haubner
Principal Engineer - Water Resources / Environmental Planning
Atlanta Regional Commission
regional impact + local relevance
phone: 404.463.3257
fax: 404.463.3254
email: shaubner@atlantaregional.com

1

Steve Haubner, Douglas Hooker

Page 2 of 3

ARC
ATLANTA REGIONAL COMMISSION

40 Courtland Street, NE
Atlanta, Georgia 30303
atlantaregional.com

November 7, 2012

Mr. Brian Zettle
Environment and Resources Branch
Planning and Environmental Division
U.S. Army Corps of Engineers, Mobile District
P.O. Box 2288
Mobile, AL 36628-0001

Dear Mr. Zettle:

The U.S. Army Corps of Engineers published a notice in the *Federal Register* on October 12, 2012, providing a 60-day period for the submission of scoping comments concerning the update of its Water Control Manual for the Apalachicola-Chattahoochee-Flint ("ACF") River Basin. The Atlanta Regional Commission ("ARC") requests that the public comment period be extended by 62 days, up to and including Monday, February 11, 2013.

This extension is necessary to allow ARC to complete and submit ongoing studies that will inform the Corps' National Environmental Policy Act ("NEPA") analysis. These include an economic analysis focused on water supply benefits, a review of potential environmental impacts of increased water supply, and proposed reservoir operations that would "expand the pie" for all users and reduce potential conflicts between uses. Although we understand that submissions of this type can be made after the scoping period closes, we believe these submissions will assist the Corps by providing concrete information and by suggesting specific areas to be studied further during the NEPA process.

Finally, we believe that any delay resulting from the requested extension is negligible in light of the history of the ACF dispute and is far outweighed by the benefits of a comprehensive, properly scoped NEPA analysis. Disputes have troubled the Corps' management of its ACF reservoirs—and prevented the Corps from taking action to update its water control manual and address metropolitan Atlanta's water needs—for more than three decades. At the same time, misinformation concerning the impacts resulting from the Corps' operations and various water uses has negatively impacted the debate over the Corps' operations for far too long. In these circumstances, it is critical that the Corps' updated water control manual, and its decision regarding Georgia's water supply request, be based on the very best information available. Only a comprehensive NEPA analysis and a decision based on facts and sound science will suffice. We know this to be the Corps' goal, and we believe this requested extension will support that end.

regional impact + local relevance

Steve Haubner, Douglas Hooker

Page 3 of 3

Mr. Brian Zettle
November 7, 2012
Page 2

As always, we appreciate the Corps' leadership and management of the ACF River Basin. If you have any questions about this request, please contact me at (404) 463-3110.

Sincerely yours,

Douglas R. Hooker, P.E.
Executive Director

Stradcutter, Charles

Page 1 of 2

12/4/12

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

Scoping Comments for ACF Water Control Manual

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! Increased Storage + Better Management = Reduced Risk of Flooding and Increased Economic Development and Economic Impacts!**

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.**

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**

Stradcutter, Charles

Page 2 of 2

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!

We thank you for the opportunity to comment and ask that the above issues be submitted and studied during the EIS period. We look forward to a Revised WCM which will honor the WPL Congressional Authorizations and provide for the economic benefits envisioned by Congress and promised to the taxpayers!

Sincerely,

Charles Stradcutter
914 S Willowcrest way
LaGrange GA 30240
706-882-7667
CStrad@BellSouth.Net

Swift, Jesse

Page 1 of 1

1/14/2013

COMMENTER: Jesse Swift
6295 McLeod Dr
Ste 1
Las Vegas, NV 89120

ORGANIZATION: SNEI

COMMENTS: I urge the Corps to include the following within the scope of its revised ACF Master Water Control Management Plan EIS:

1) A quantitative assessment of the downstream flows needed to sustain Apalachicola River and Bay ecosystems in an ecologically healthy condition;

2) Increased water releases from Woodruff Dam of appropriate timing and duration to sustain Apalachicola River and Bay ecosystems, in accordance with this assessment; and

3) Development of an ACF basin-wide sustainable water management plan which protects the ecological integrity of Apalachicola River and Bay, and equitably distributes ACF basin water resources.

The "Last Great Bay" is dying of thirst! This remarkably pristine and productive estuarine ecosystem displays signs of mounting ecological stress due to lack of sufficient freshwater input. Both scientists and lifelong oystermen/women have reported a noticeable increase in abundance of marine predators in the bay resulting from increased salinity, as well as increasing prevalence of a devastating oyster disease (Dermo).

It's quite clear that our previously thriving oyster populations have declined as a result, threatening to topple the entire bay ecosystem by reducing the number of filter-feeders. We've seen this happen in the Chesapeake Bay -- please don't let Apalachicola Bay go the same way!

Humans upstream can reduce their water use. Apalachicola River and Bay ecosystems can't. It's as simple as that.

Sincerely,
Jesse Swift

T. (illegible), Oliver

Page 1 of 2

12/9/12

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.

T. (illegible), Oliver

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.

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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,

Olivier D. Tart

Taber, Micheal

Page 1 of 1

10/23/2012

COMMENTER: Micheal Taber
1510 East Maxwell St
Pensacola, FL 32503

ORGANIZATION:

COMMENTS: I recently completed a complete 105-mile trip down the Apalachicola river and can speak first-hand to the problems I saw all along the river due to low water levels. Most concerning were the slews, swamps, and low lakes that have been separated from the main river preventing the ebb and flow of waters that replenish nutrients and life. Another shock was the significant growth of grasses and willows along sand bars where I had camped only a year ago where there was nothing but sand. Seasonal growth is one thing, but mature flora bears witness to a changing and troubled ecosystem. I encourage any action by the Corps that might return water flow to levels that might preserve this historic and important river to health.

Talley, Carol

Page 1 of 1

1/14/2013

COMMENTER: Carol Talley
972 E. Pine Avenue
St. George Island, FL 32328

ORGANIZATION: none

COMMENTS: We are continuing to see a significant decline in the productivity of the Apalachicola Bay. This decline is affecting both sport fishing and the commercial fishing industry. My concern is that the Apalachicola Bay ecosystem is being distroyed and that we are approaching a point of "no return." That is, once this ecosystem is distroyed, there is no getting it back.

It is horrifying that we have to fight our own government to save the environment. ~Ansel Adams

I do not belong to any environmental groups but I feel compelled to write to you to beg you not to distroy the beautiful Apalachicola Bay.

Regards,
Carol Talley

Teat, Wanda

Page 1 of 1

1/12/2013

COMMENTER: Wanda Teat
PO Box
Apalachicola, FL 32329

ORGANIZATION:

COMMENTS: Concern over any man made decisions to control water flow of the Apalachicola River.

Terrell, Ann

Page 1 of 2

11/24/12

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!**

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Terrell, Ann

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.

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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,

Terrell, O.

Page 1 of 2

11/21/12

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.

Terrell, O.

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. <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, Crystal Terrell

Thompson, Tommy

Page 1 of 1

1/10/2013

COMMENTER: Tommy Thompson
989 Parkview Dr.
Tallahassee, FL 32311

ORGANIZATION:

COMMENTS: The water flow into the Apalachicola must remain high enough to allow for the natural balance of the ecosystem to be maintained. The over-harvesting of water from the northern Georgia, Atlanta metro area is damaging to every community and ecosystem between Atlanta region and the Gulf of Mexico. Please honor the science.

Tilghman, Sidell

Page 1 of 1

1/14/2013

COMMENTER: Sidell Tilghman
2726 Water View Circle
Gainesville, GA 30504

ORGANIZATION:

COMMENTS: While I don't believe Lake Lanier was ever built with the actual or anticipated outflows it is now subject to, it seems to me that a priority should be put on building more reservoirs. And without all the usual red tape, EPA, EPD incumbrances that go along with oh, say the one in Hall County that has been in regulation limbo for over three years. With 159 counties in this state plus Alambamas and Floridas, why are we carrying the load for everyone else?

Timmerberg, Dick

Page 1 of 2

WEST POINT LAKE
COALITION
a non-profit organization

November 7, 2012

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

Scoping Comments for ACF Water Control Manual

On behalf of the West Point Lake Coalition, its 1,000+ members, and its Corporate Sponsors, 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! Increased Storage + Better Management = Reduced Risk of Flooding and Increased Economic Development and Economic Impacts!**

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.**

Timmerberg, Dick

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. 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!**

We thank you for the opportunity to comment and ask that the above issues be submitted and studied during the EIS period. We look forward to a Revised WCM which will honor the WPL Congressional Authorizations and provide for the economic benefits envisioned by Congress and promised to the taxpayers!

Sincerely,

Dick Timmerberg
Executive Director
West Point Lake Coalition
dtimmerberg@bellsouth.net

Tomlinson, Teresa

Page 1 of 5

COLUMBUS CONSOLIDATED GOVERNMENT

Georgia's First Consolidated Government

TERESA TOMLINSON
Mayor

Post Office Box 1340
Columbus, Georgia 31902-1340

Telephone (706) 653-4712
Cell (706) 905-9570
FAX (706) 653-4970
TDD (706) 653-4494

January 14, 2013

Colonel Steven Roemhildt
U.S. Army Corps of Engineers
c/o Tetra Tech, Inc.
61 St. Joseph Street, Suite 550
Mobile, AL 36602-3521

RE: ACF Scoping Comments

Dear Colonel Roemhildt:

Thank you for the opportunity for public comment with respect to the Environmental Impact Statement and the ACF Water Control Manual relative to water allocations from Lake Lanier. Please find attached my letter dated August 6, 2012 to you and Colonel Donald Jackson concerning the necessity of maintaining a minimum daily river flow rate of 1350 cubic feet per second (cfs), an instantaneous flow of 800 cfs and a weekly flow of 1850 cfs at Columbus and Ft. Benning, Georgia.

As noted in my previous letter, the flow rates are presently achieved 98 percent of the time and we feel that this is a reasonable and sound request. These rates are necessary for assimilating permitted wastewater discharges, to provide high quality drinking water and to ensure economic sustainability for the Columbus and Ft. Benning community, as well as Phenix City, Alabama, our partner in developing a new Chattahoochee RiverPark and other projects along the river. Ft. Benning has requested the same water flow rates as Columbus, as it considers these flow rates to be crucial to its mission and community.

If you are able to visit Columbus in the near future, Steve Davis and I would love to give you a short tour of the water treatment facilities and the Chattahoochee RiverPark project development which is nearing completion.

Tomlinson, Teresa

Page 2 of 5

January 14, 2013, page 2

Thank you again for this opportunity for public comment and we wish you and your team great success in striking the appropriate balance in the ACF water allocation process.

Very truly yours,

Teresa Pike Tomlinson
Mayor
Columbus, Georgia

cc: Steve Davis, Columbus Water Works
Clifton C. Fay, City Attorney

Tomlinson, Teresa

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COLUMBUS CONSOLIDATED GOVERNMENT

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August 6, 2012

VIA EMAIL AND U.S. MAIL
COL Steven Roemhildt
U.S. Army Corps of Engineer
Mobile District
P.O. Box 2288
Mobile, Alabama 36628

COL Donald Jackson
Commander South Atlantic Division
Room 10M15
60 Forsyth Street SW
Atlanta, Georgia 30303

RE: Required Minimum River Flow Rates for Columbus/Ft. Benning, Georgia

Dear Colonels Roemhildt and Jackson:

Let me first commend you on the difficult and complex work you do to balance the water needs and demands of communities throughout this region of the United States. Despite the complexity of the over-arching issues, Columbus area needs are quite straightforward and readily achievable.

To ensure the essential economic development interest of the region and preserve a vital National Security interest, Columbus and the immediately adjacent Ft. Benning, Georgia must maintain a minimum daily river flow rate of 1350 cubic feet per second (cfs), an instanteous flow of 800 cfs and a weekly flow of 1850 cfs. We know these flow rates are presently achieved 98 percent of the time, so this is a reasonable and sound request. These minimum flow rates are required to assimilate permitted wastewater discharges, provide high quality drinking water, and ensure economic sustainability for the entire Columbus and Ft. Benning community.

I am attaching correspondence from the Garrison Commander of Ft. Benning to the Army Corps of Engineers requesting the same water flow requirements as the City of

"An Equal Opportunity / Affirmative Action Organization"

Tomlinson, Teresa

Page 4 of 5

Columbus. Ft. Benning also considers these flow rates to be crucial to their mission and community.

As the Corps works to set appropriate flow rates in response to the 11th Circuit's remand orders in In re: Tri State Water Rights Litigation, we hope that you will thoughtfully consider the distinct yet intertwined needs of the Columbus/Ft. Benning community in requiring a 1350 cfs daily river flow rate.

Thank you for your consideration of this important matter.

Very truly yours,

Teresa Pike Tomlinson
Mayor
Columbus, Georgia

Enclosure

Tomlinson, Teresa

Page 5 of 5

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND
ATLANTIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON
1 KARKER STREET, BUILDING 4, SUITE 5900
FORT BENNING, GEORGIA 31905-4500

REPLY TO ATTENTION OF

IMBE-ZA

JUL 20 2012

MEMORANDUM FOR Commander, Mobile District, United States Army Corps of Engineers, 109 St. Joseph Street, Mobile, AL 36602

SUBJECT: Fort Benning Water Requirements

1. As you consider your decision concerning the allocation of water in the Chattahoochee River, I would like to provide you with Fort Benning's requirements regarding this matter. Our primary water flow and quality issue is the lack of minimum flow protection. A minimum flow in the Fort Benning and Columbus area is required to assimilate permitted wastewater discharges and provide high quality drinking water. The minimum flows measured at the United States Geological Service Columbus (US280) gauge as referenced in the Federal Energy Regulatory Commission license for the North Highlands project are 800 cubic feet per second (cfs) for instantaneous flow, 1350 cfs for daily flow and 1850 cfs for weekly flow. I request that these be established as minimum flows in the United States Army Corps of Engineers operating plan in order to avoid any water supply, wastewater assimilation or environmental degradation problems that could jeopardize the Army's mission at Fort Benning.

2. Maintaining the minimum flows referenced above will ensure no disruption of our training and deployment missions as well as supporting our commitment to environmental stewardship. I therefore request you give strong consideration to formalizing these flows in your operating plan.

JEFFREY FLETCHER
COLONEL, AG
Garrison Commander

Tonsmeire, Dan

Page 1 of 10

APALACHICOLA RIVERKEEPER®
SAVING AN AMERICAN TREASURE

January 14, 2013

Colonel Steven Roemhildt
US Army Corps of Engineers - Mobile District
PO Box 2288
Mobile AL 36628-0001

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

RE: Notice of Intent to Revise Scope of Draft Environmental Impact Statement for Updating the Water Control Manual for the Apalachicola-Chattahoochee-Flint River Basin

Dear Colonel Roemhildt:

On behalf of our Board of Directors and our 1,000+ members across the United States and our 400 members throughout the ACF Basin, Apalachicola Riverkeeper is pleased to submit the following comments on the referenced Water Control Manual (WCM) scoping document. Our mission is to advocate for the protection and preservation of the Apalachicola River and Bay. All of our members use and enjoy the water resources of this system. We believe the Corps has a ethical and legal responsibility to include our interest in the update of the ACF WCM, particularly since this is the first revision since 1958. We hope these comments will further your aim to manage this resource responsibly.

The Apalachicola River, Floodplain, and Bay System is a national treasure and one of the most productive river systems in the North America. Its significance can not be overstated. It has been designated as an *International Biosphere Reserve* by the United Nations, as a National Estuarine Research Reserve by the United States, and as an Outstanding Florida Water by the State of Florida. The river harbors the most diverse assemblage of freshwater fish in Florida, the largest number of species of freshwater snails and mussels, and the largest number of endemic species in western Florida. The river basin is home to some of the highest densities of reptile and amphibian species on the continent and the river's floodplain boasts one of the most diverse floodplain forests in North America.

The Apalachicola River's waters and floodplain are also the biological factory that fuels the Apalachicola Bay - one of the most productive estuaries in the Northern Hemisphere. The Apalachicola Bay is home to one of the largest and most productive oyster harvesting areas in the Gulf of Mexico, one of the principal nurseries for Gulf shrimp and blue crabs, and major commercial fishing operations. Apalachicola Bay provides nearly 90 percent of Florida's oyster harvest and over **10 percent of the nation's oyster harvest**. The river and bay provide thousands of commercial fishing, recreational fishing, and ecotourism jobs. These jobs form the cornerstone of the economy for the six Florida riparian counties along the Apalachicola River.

A NON-PROFIT ORGANIZATION DEDICATED TO THE PROTECTION AND STEWARDSHIP OF THE APALACHICOLA RIVER AND BAY
PO BOX 8 APALACHICOLA FL 32329 / 850.653.8936 RIVERKEEPER@APALACHICOLARIVERKEEPER.ORG / 232-B WATER STREET APALACHICOLA

Tonsmeire, Dan

Page 2 of 10

In a number of studies it has been shown that the freshwater flows and associated nutrients are also a driver of offshore fishing grounds up to 250 miles out into the Gulf of Mexico. The most recent report is entitled *Connectivity of Apalachicola River flow variability and the physical and bio-optical oceanicproperties of the northern West Florida Shelf by Morey et al (2009).* As this and other earlier studies show, these flows affect fish and habitat in the Eastern Gulf of Mexico, adding to their relative importance in broader ecological and economic system.

The combinations of this unique natural environmental, cultural and economically important area are of national, regional, and local significance. A thorough and comprehensive assessment of impacts to this area from the alternative proposed actions should be accomplished in order to assure these functions and natural services provided within the Apalachicola Basin are sustained.

Despite its enormous ecological value, the Apalachicola River ecosystem has been severely degraded as a result of the construction and operation of the ACF reservoirs, the impoundment of water by additional non-Federal upstream reservoirs, consumptive uses of water upstream, and a long history of navigational dredging. These activities have altered the river's flow regime; reduced the river's hydraulic complexity and habitat diversity; smothered, displaced, and dried out habitat in the river's rich sloughs, floodplains, and channel margins; and destabilized and widened the river channel. The cumulative degradation now threatens this resource's survival.

A new paradigm is needed for managing the ACF system. It is critical that the revised WCM prioritize the protection and restoration of the ecological integrity of the Apalachicola River, Floodplain, and Bay and the entire ACF system.

A Full Range of Alternatives Should Be Assessed to Satisfy NEPA

The U.S. District Appeals Court ruled that the Corps has the authority to utilize the Buford Dam/Lake Sidney Lanier project for water supply purposes. In response to this ruling, the Corps updated the scoping report for the environmental impact statement (EIS) that is supposed to inform the development of the new Water Control Manual. We urge that the scoping process evaluate the amount, timing, and quantity of flows needed to maintain the extraordinary richness and productivity of the Apalachicola River, Floodplain and Bay ecosystem as part of the update to the WCM. We also urged the Corps to evaluate a full range of alternatives that would ensure maintenance of those ecological in-stream flows for the ACF system.

First, the updated scoping report properly acknowledges the need to assess an alternative that will comply with the Appeals Court's ruling, the report improperly restricts the EIS to a review to a very limited set of alternatives, none of which seek to evaluate or meet the ecological flow needs of the Apalachicola River, Floodplain and Bay. NEPA requires a rigorous evaluation of all reasonable alternatives, and an "intense consideration of other more ecologically sound courses of action."[1] To satisfy these requirements, the EIS must evaluate alternatives that will

[1] *Environmental Defense Fund, Inc. v. Corps of Engineers of U.S. Army*, 492 F.2d 1123, 1135 (5th Cir. 1974); 40 C.F.R. § 1502.14(a). This includes an evaluation of "reasonable alternatives not within the jurisdiction of the lead agency."[1] 40 C.F.R. § 1502.14(c). Moreover, because the nature and scope of the revision to the Water Control Manuals will have significant, basin-wide impacts, the EIS must also examine a broad range of alternatives. *Alaska Wilderness Recreation and Tourism v. Morrison*, 67 F.3d 723, 729 (9th Cir. 1995).

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maintain the ecological in-stream flows for the ACF system. Long-standing Corps guidance also requires the establishment of the minimum stream flow needed to address water quality, fish and wildlife, recreation, and aesthetic considerations when developing water control manuals, even where maintenance of minimum in-stream flows is not an authorized project purpose.[2]

Second, the Corps is relying on an inadequate and outdated "critical yield" methodology to establish the baseline for future water allocations rather than the ecological in-stream flows needed to maintain the health and integrity of the ACF system.[3] Water resources experts have long recognized that "critical yield" is *not appropriate* as a basis for making water management decisions as it looks only at the amount of water that may be physically available and does not assess the economic, environmental, social, and political constraints on the use of that water.[4] The Corps' "critical yield" analysis also sets the stage for continued conflicts among the many competing users in the ACF Basin by significantly overstating even the amount of water that is physically available.[5]

The recent drought has brought to the forefront the importance for the Corps to recognize the impacts its actions have on the water resources of the Apalachicola River, Floodplain and Bay. The EIS will not evaluate the full scope of the environmental consequences of the proposed alternatives as the Corps has improperly restricted its impacts analysis. Despite the long-term and significant adverse impacts caused by the construction and operation of the ACF system on the historic flow regime and the health of the ACF ecosystem, the Corps has opted to compare the impacts of alternative management regimes only to the presumed health of the ACF Rivers as of 1989. To properly analyze the impacts of the proposed WCM alternatives, the Corps must define and utilize the historical flow conditions (pre-ACF and pre-non-Federal dams and reservoirs) of the Apalachicola, Chattahoochee, and Flint rivers, with particular attention to the historical flow regime of the Apalachicola River.[6]

[2] EM 1110-2-3600, 30 Nov 87 (Management of Water Control Systems) at 2-3.

[3] The Corps defines the ACF critical yield as "the maximum amount of water that can be consistently removed from a reservoir through releases from the dam and/or withdrawals from the reservoir during the most severe drought in the period of record (1939-2008), without depleting the reservoir conservation storage. Conservation storage is the amount of water available in a reservoir to meet project purposes other than flood control. Critical yield is the amount of water available from a reservoir at any time under any conditions described in the hydrologic period of record." The Corps' states that critical yield "is important because it is the basis from which water stored in a reservoir is allocated to various project purposes. The amount or volume of water stored in a reservoir can be allocated to a specific project purpose, such as hydropower or water supply, based on a percent of critical yield. A change in critical yield could result in modifications of the allocations for a project purpose." U.S.A.C.E., *Federal Storage Reservoir Critical Yield Analysis, Alabama-Coosa-Tallapoosa (ACT) and Apalachicola-Chattahoochee-Flint (ACF) River Basins*, February 2010 at 2-3.

[4] *The Regulated Riparian Model Water Code* (Dellapenna, 1997) (water management decisions should be based on an evaluation of safe-yield, which is defined as the "amount of water available for withdrawal without impairing the long-term social utility of the water source, including the maintenance of the protected biological, chemical, and physical integrity of the source"); *see* U.S.A.C.E. Institute For Water Resources, *Managing Water For Drought, National Study Of Water Management During Drought*, IWR Report 94-NDS-8 (September 1994) (recommending use of safe-yield). Indeed, we were unable to locate any Corps guidance identifying "critical yield" as an appropriate or necessary methodology for developing water control manuals.

[5] The Corps' critical yield analysis relies on an inaccurate unimpaired flow data set and is based on flawed assumptions regarding critical reservoir management practices, including that reservoir levels can be lowered far below the levels that have ever been reached, even during extreme drought years.

[6] If it is not currently available, the Corps must obtain or develop this historical flow information unless the costs of doing so would be "exorbitant." 40 C.F.R. § 1502.22.

To satisfy NEPA and provide the information needed to develop a complete WCM, the EIS must assess the ecological flows needed to maintain the health of the system and evaluate alternatives that would achieve those flows.

The ACF System Must Be Operated To Protect Fish and Wildlife And The Ecological Health of the Apalachicola River and Bay

The Corps is required as a matter of law to operate the ACF system to protect and conserve fish and wildlife and the ecological health of the Apalachicola River, Floodplain and Bay.

As clearly set forth in the June 2012 Legal Opinion of the Corps' Chief Counsel, fish and wildlife conservation is an authorized purpose of the ACF system of projects:

> "The system-wide plan of development for the ACF basin was intended to provide benefits for the purposes of hydropower, navigation, and flood control, estimated in annual average dollar values, and also to provide benefits for the purposes of municipal and industrial water supply, recreation, **and fish and wildlife conservation**, which were not quantified in the same manner."

Legal Opinion at 27 and 31 (emphasis added). "Thus, in enacting the 1946 RHA, Congress expressed its clear intent that the ACF system of projects should be constructed and operated for the general purposes set forth in the Corps reports adopted in that act, and that the Buford Project would serve as the primary storage reservoir to regulate flows throughout the ACF system necessary for integrated system operations for multiple purposes." Legal Opinion at 26-27.

"Congress expected that the Buford Project would be operated as an integral part of the ACF system, to achieve the purposes Congress authorized for that system when it approved the ACF plan of development in the 1946 RHA." Legal Opinion at 38-39. Indeed, "the Buford Project cannot be understood in isolation, because the Buford Project was proposed and approved as one component in a system of projects, and Congress intended that storage in the Buford Project would be used to regulate flows throughout the system, in order to enable efficient operation of the downstream projects and to accomplish the authorized purposes of the ACF system." Legal Opinion at 39, note 167.

As a result, in assessing the impacts of water withdrawals, the Legal Opinion concludes that focusing on just the operations or impacts to Lake Lanier alone "would not comport with Congressional intent." Legal Opinion at 38-39. Instead, the Corps must assess the impacts on the ability to achieve the full suite of authorized purposes for the entire ACF system, including fish and wildlife conservation. *Id.*

Fish and wildlife protection and conservation is also a general purpose for the ACF projects pursuant to the Fish and Wildlife Coordination Act. The Corps must also comply with the requirements of the Federal Endangered Species Act in operating the ACF projects.

Tonsmeire, Dan

Page 5 of 10

The National Water Policy established by Congress in 2007 also requires the Corps to operate the ACF projects to protect the Apalachicola River, Floodplain and Bay. That policy states that "all water resources projects" shall "protect[] and restor[e] the functions of natural systems and mitigate[e] any unavoidable damage to natural systems." 33 U.S.C 1962-3 (established by § 2031(a) of the Water Resources Development Act of 2007, and immediately applicable to all water resources projects).

Moreover, enhancement of the environment has been an important federal objective for water resources programs for decades. Corps regulations in place since 1980 state that:

> "Laws, executive orders, and national policies promulgated in the past decade require that the quality of the environment be protected and, where possible, enhanced as the nation grows. . . . Enhancement of the environment is an objective of Federal water resource programs to be considered in the planning, design, construction, and **operation and maintenance of projects**. Opportunities for enhancement of the environment are sought through each of the above phases of project development. Specific considerations may include, but are not limited to, **actions to preserve or enhance critical habitat for fish and wildlife; maintain or enhance water quality; improve streamflow**; preservation and restoration of certain cultural resources, **and the preservation or creation of wetlands.**

33 C.F.R. § 236.4. (emphasis added).

Long-standing Corps guidance also requires the establishment of the minimum stream flow needed to address water quality, fish and wildlife, recreation, and aesthetic considerations when developing water control manuals, even where maintenance of minimum in-stream flows is not an authorized project purpose. EM 1110-2-3600, 30 Nov 87 (Management of Water Control Systems) at 2-3.

A New Planning Approach Is Needed

To address these problems, we respectfully urge you to institute the following approach to planning the Water Control Manual updates:

(1) The Corps should immediately initiate an evaluation of the ecological in-stream flows needed to protect and restore the chemical, physical, and biological integrity of the Apalachicola River and its floodplain, the Chattahoochee River, the Flint River, and the Apalachicola Bay; and the species that rely on those waters. Our organization requests that the Corps do this jointly with the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the National Oceanic and Atmospheric Administration, and the U.S. Geological Survey. The ideal flow regime would mimic the quantity, timing, and quality of flows that existed prior to construction of the dams and reservoirs within the ACF system with consideration of changes in climate and rainfall.

(2) The Corps should prioritize comprehensive review and implementation of a full range of alternatives that will ensure the maintenance of those ecological in-stream flows. The impacts of the proposed alternatives should be evaluated through a comparison to the

Tonsmeire, Dan

Page 6 of 10

environmental conditions present under historical flow conditions (pre-ACF and pre-non-Federal dams and reservoirs) in the Apalachicola, Chattahoochee, and Flint rivers.

(3) The Corps should ensure that the ecological in-stream flow evaluation, the EIS, and the WCM are reviewed and assessed by the National Academy of Sciences pursuant to 33 U.S.C. § 2343(a)(3)(A)(iii).[7]

(4) The unimpaired Flow Data Set used by the Corps for its modeling analysis should be revised and updated. A recent document ("Unimpaired Flow Assessment for the Apalachicola-Chattahoochee-Flint River Basin – Draft Technical Report") sent to the Corps by the ACF Stakeholders outlines a number of inconsistencies and errors that should be addressed during the updating of the WCM.

(5) The water demands data used by the Corps for its determinations should be revised and updated. A recent document ("Unimpaired Flow Assessment for the Apalachicola-Chattahoochee-Flint River Basin – Draft Technical Report") sent to the Corps by the ACF Stakeholders outlines a number of inconsistencies and errors that should be addressed during the updating of the WCM.

(6) Evaporative losses used by the Corps should also be re-evaluated. The impact of the evaporation during droughts is enormous and is under-estimated.

(7) Comments and reports provided by the ACF Stakeholders should be considered as they are representative of a consensus by watershed based stakeholder organization of broad based interests. The reports anticipated include topics included UIF, Water Demands Report, Instream Flow Assessment, Bay Assessment, and Water Management Alternatives.

Define Sustainable Limits

Establishing water allocation (i.e., budgets) and compatible reservoir operations requires understanding the sustainable limits on the amount of water use within a basin. The first step is to determine the ecological flow needs to establish the sustainable limits of water available from a river system for current and future uses. Without such a determination of limits, increased water use will result in increased conflict for changes in water allocation and pit community against community and a final detriment to all users in the basin. When natural drought and low flows occur, compounded by unlimited water withdrawals and depletions, without consideration of alternatives, in particular, water conservation, the impact on this diverse, productive, world-class river and bay can be catastrophic. Such events may include:

[7] The Water Control Manuals, EIS, and any in-stream flow evaluation are clearly covered by the statutory independent review requirements which apply to, among other things, "any other study associated with a modification of a water resources project that includes an environmental impact statement" and that study's environmental impact statement. 33 U.S.C. § 2343(a).

Tonsmeire, Dan

Page 7 of 10

- Increased potential, duration, frequency, and intensity of red tide in Apalachicola Bay and the near Gulf of Mexico waters,
- Reduction and loss of wetlands, floodplain forest, fish and wildlife habitat and bio-diversity,
- Loss of traditional livelihoods resulting in impacts to the economic, social and cultural structure of the Apalachicola Basin.

Consideration of these and related impacts should be addressed through a comprehensive economic, environmental, social and cultural analysis.

Include All Socio-Economic Impacts to Ecosystem Services

The tremendous economic benefits to water uses on the Chattahoochee and Flint Rivers have been well documented by a number of economic reports. Much of that water use has resulted in negative economic impacts to users along the Apalachicola River, Floodplain and Bay, the region and the nation. Since the continued productivity and bio-diversity of the Apalachicola River, Floodplain and Bay are historically the economic and cultural backbone of the rural riparian counties and communities of the Apalachicola region, and has national significance, the EIS must include the socio-economic impacts to those specific users and to ecosystem services provided by a healthy functioning Apalachicola ecosystem to the nation.

Ecosystem services considered must include outdoor recreational activity such as fishing and swimming, water purification, flood mitigation, cycling and movement of nutrients, atmospheric carbon reduction, maintenance of biodiversity, protection of coastal shores, and more as identified in ATTACHMENT 1. The NRC has developed guidelines and recommendations for consideration of the economic value of ecosystem services. Using a methodology respected by the NRC will ensure the most objective scientific assessment.

Stakeholder Involvement and Process

Serious consideration of public comments and continued involvement of stakeholders throughout the process is critical for any accurate and meaningful analysis. To accomplish this a facilitated stakeholder process should be a necessary component of the EIS process.

Independent Peer Review by the National Academy of Sciences (NAS) is Warranted

Independent review by the NAS is both appropriate and necessary. It is appropriate because the WCM update is undeniably a controversial project study as defined by law since there clearly "is a significant public dispute as to the size, nature, or effects of the project" and "there is a significant public dispute as to the economic or environmental costs or benefits of the project."[8] As evidenced by the long history of litigation, the implications for the health of aquatic ecosystems in three states, and the strong opposition to the current planning approach, the WCM

[8] 33 U.S.C. § 2343(a)(4).

Tonsmeire, Dan

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update is likely one of the Nation's most controversial projects. Review by the NAS is necessary to ensure that the WCM is based on the best available science, on a full understanding of the ecological needs of the ACF system, and on a comprehensive analysis of a full range of environmentally beneficial water management regimes. A NAS review is also necessary to give the public the confidence it needs to support the Corps' recommended alternative.

Conclusion

Our organization has repeatedly urged the Corps to develop a water management regime for the ACF system that will protect and restore the ecological health of the Apalachicola River and Bay and the entire ACF system. Fundamental to such a regime is the establishment and maintenance of the ecological in-stream flows needed to protect and restore the chemical, physical, and biological integrity of the ACF Rivers and the species that depend on them. **We respectfully urge you to institute the planning process outlined above to ensure that this happens. Without the protection of these flows, the Florida citizens' livilihoods, cultural heritage and communities with economies that depend on the functioning of these natural systems will be lost forever.**

Thank you for the opportunity to provide comments. We look forward to working with the Corps to accomplish a WCM that we can all live with.

Sincerely,

Dan Tonsmeire
Riverkeeper and Executive Director

Cc:
The Honorable Jo-Ellen Darcy, Assistant Secretary of the Army (Civil Works)
Lieutenant General Thomas P. Bostick, USACE Commander General and Chief of Engineers
Major General Todd T. Semonite, USACE Deputy Commanding General and Deputy Chief of Engineers
Colonel Ed Jackson, USACE Commander, South Atlantic Division
Office of General Counsel, USACE
The Honorable Nancy Sutley, Chair, President's Council on Environmental Quality
The Honorable Lisa P. Jackson, Administrator, U.S. Environmental Protection Agency
The Honorable Dr. Jane Lubchenco, Secretary, U.S. National Oceanic and Atmospheric Adminitration (NOAA)
The Honorable U.S. Senator Bill Nelson - Florida
The Honorable U.S. Senator Marco Rubio – Florida
The Honorable U.S. Representative Steve Southerland – Florida District 2
The Honorable Governor Rick Scott - Florida

Tonsmeire, Dan

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The Honorable Marti Coley, Florida State Representative
The Honorable Jimmy Patronis, Florida State Representative
The Honorable Hershel Vineyard, Secretary, Florida Department of Environmental Protection
Nick Wiley, Director, Florida Fish and Wildlife Conservation Commission
Jon Steverson, Director, Northwest Florida Water Management District

A NON-PROFIT ORGANIZATION DEDICATED TO THE PROTECTION AND STEWARDSHIP OF THE APALACHICOLA RIVER AND BAY

PO BOX 8 APALACHICOLA FL 32329 / 850.653.8936 RIVERKEEPER@APALACHICOLARIVERKEEPER.ORG / 232-B WATER STREET APALACHICOLA

Tonsmeire, Dan

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ATTACHMENT 1

ECOSYSTEM SERVICES

Because ecosystem services are not generally traded in the marketplace, their full value is not captured in the conventional economic statistics. The market value of goods and services derived from ecosystems typically reflects only the human labor, technological and managerial inputs used for their extraction, processing, transportation and distribution. A consequence of this is that the underlying natural resources may be unsustainably exploited or improperly managed.

What are ecosystem services? The natural environment provides an array of ecosystem goods and services that are critical to the welfare of the human population and to the support of life generally. Following are some of the important ecosystem services that have been widely recognized (Daily, 1997) (see also, http://www.centurycommission.org/current_projects.asp):

- *Production of agricultural food and fiber products;*
- *Forestry and fisheries production;*
- *Setting for outdoor recreational activity;*
- *Purification of air and water;*
- *Mitigation of droughts and floods;*
- *Generation and preservation of soils and renewal of their fertility;*
- *Detoxification and decomposition of wastes;*
- *Pollination of crops and natural vegetation;*
- *Dispersal of seeds;*
- *Cycling and movement of nutrients;*
- *Control of potential agricultural pests;*
- *Maintenance of biodiversity;*
- *Protection of coastal shores from erosion by waves;*
- *Protection from the sun's harmful ultraviolet rays;*
- *Partial stabilization of climate;*
- *Moderation of weather extremes and their impacts.*

Nature furnishes these services to human society as an outcome of the normal functioning of healthy ecosystems. Flows of materials, energy and information arise from the natural capital stocks of plants, animals, minerals, and atmospheric gases, which may be periodically accumulated or depleted by both natural cycles and human activities. Ecosystems have evolved over billions of years to be highly efficient and robust. Some of these ecosystem services provided by nature are critical and irreplaceable. Others may be accomplished by engineered human systems only at great expense.

Reference

http://www.centurycommission.org/current_projects.asp and go to CC UF Applied Sustainability, "Review of Environmental, Social, and Economic Concepts for Sustainable Development in Florida" edited by Dr. Stephen S. Mulkey, Chair at UF of People and Land Use Strategies (PLUS) Workgroup", and to "Protecting Ecosystem Services in Florida" September 1, 2006 by Alan W. Hodges"

A NON-PROFIT ORGANIZATION DEDICATED TO THE PROTECTION AND STEWARDSHIP OF THE APALACHICOLA RIVER AND BAY

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Printed on 100% Recycled Paper. Join us in saving the environment one tree at a time.

Trotter, Billy

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11/7/2012

COMMENTER: Billy Trotter
2480 Cameron Mill Rd.
LaGrange, GA 30240

ORGANIZATION:

COMMENTS: Please up our winter pool. You are killing us during the droughts. Use some common sense and not subject our lake to Sturgeons and Mussels. Now that Lanier can hold back water, where will at leave us?

Tucker, Sandra

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United States Department of the Interior
Fish and Wildlife Service
105 West Park Drive, Suite D
Athens, Georgia 30606
Phone: (706) 613-9493
Fax: (706) 613-6059

West Georgia Sub Office
P.O. Box 52560
Ft. Benning, Georgia 31995-2560
Phone: (706) 544-6428
Fax: (706) 544-6419

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

January 11, 2013

Col. Steven J. Roemhildt, District Engineer
United States Army Corps of Engineers, Mobile
c/o Tetra Tech, Incorporated
61 St. Joseph Street, Suite 550
Mobile, Alabama 36602-3521

Dear Col. Roemhildt:

The U.S. Fish and Wildlife Service (Service) has reviewed the United States Army Corps of Engineers' (Corps) October 12, 2012, Notice of Intent (NOI). The NOI announces the Corps' plans to revise the scope of the Draft Environmental Impact Statement (DEIS) for updating the Water Control Manual (WCM) for the Apalachicola-Chattahoochee-Flint (ACF) River Basin. The new scoping is necessary to accommodate 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. Our comments at this time represent input from our Alabama, Florida, and Georgia Ecological Services Field Offices, as well as our Southeast Regional Office pursuant to the Service's authorities under the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*).

The recommendations we provided in our June 2011 Draft Fish and Wildlife Coordination Act Report are still relevant and should continue to inform the scope of the DEIS. In addition to our previous input to the process, we wish to submit a concept for an alternative, described in the paragraphs below, to receive full consideration in the DEIS. This alternative would support flows in the Apalachicola and Chattahoochee rivers for the fish and wildlife purpose of the ACF projects. Apalachicola River flows are supported at levels greater than 5,000 cubic feet per second (cfs) as an environmentally-preferable substitute for the loss of flow support via the navigation purpose that occurred prior to the year 2000. Limited use of the ACF reservoirs when storage is available to support flows greater than the current minimum release of 5,000 cfs could reduce the occurrence of short-term declines in flows that either directly harm fish and wildlife or otherwise limit their populations. In addition, flow support in the Chattahoochee River would restore some natural flow regime components resulting in improvements in ecosystem elements that were lost or reduced as a consequence of flow regulation.

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The focus of this alternative includes the regulated portion of the basin: Apalachicola River, Apalachicola Bay and the Chattahoochee River. The alternative we recommend supports monthly target and minimum releases from the system in a manner that is balanced with other project purposes and that avoids or minimizes some adverse effects of the current Revised Interim Operating Plan (RIOP), which uses system storage primarily to support the 5,000 cfs minimum release. We provide the following outline of such an alternative, but we believe that with more time and effort, this alternative can be improved upon to avoid or minimize adverse effects to fish and wildlife in the Apalachicola and Chattahoochee rivers. We fully expect the Corps to modify it as necessary to improve upon its potential to "avoid or minimize adverse effects" and to "restore and enhance the quality of the human environment," consistent with 40 CFR §1500.2(e) and §1500.2(f), respectively. We would like to work with you to further improve this alternative.

Reservoir Operations Alternative for Monthly Target and Minimum Flow Support

The governing features of the alternative we recommend are as follows:

1. Operate the system for target and minimum releases from Buford and Woodruff dams, consistent with current project-specific rules for flood-control, hydropower generation by storage zone, head limits, and maximum fall rates.
2. The targets and minimum releases are month- and zone-specific (Table 1 and 2).
3. Target releases are subject to zone-specific augmentation limits (Table 3).
4. Storage zones (1-4) are redefined for Lanier, West Point, and George, relative to the authorized top and bottom of the conservation pool.
5. Each storage zone contains a consistent year-round percentage of the total conservation storage at a project, but these percentages vary among the projects (Table 4).
6. Release decisions for Buford and Woodruff dams are based on the current composite storage zone (sum of storage in Lanier, West Point, and George), month, and the previous 7-day basin inflow.
7. If basin inflow exceeds the month/zone target, release the target flow from Buford and Woodruff dams. Basin inflow exceeding the target is available for storage.
8. If basin inflow does not exceed the month/zone target minus the zone augmentation limit, the release from Buford and Woodruff dams are the greater of: a) the month/zone minimum, or b) basin inflow plus the zone augmentation limit.
9. Each project makes daily releases to support its local operating requirements or to replenish storage in the project downstream, whichever is greater, so that all projects remain in the same operating zone.
10. Maximum fall rates and flow support for Woodruff Dam releases greater than 5,000 cfs are suspended when storage declines to Zone 4, and resumed when storage returns to a specified zone ("drought relief end zone").
11. When flows at Woodruff Dam have been less than 7,000 cfs for more than 30 days, maximum fall rates are suspended and resumed when flows have been greater than 10,000 cfs for 30 days.

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We have tested this alternative with a hydrologic model of the basin that is comparable to the Corps' ACF ResSim model (the daily time step ACF Stella model developed during the ACF Comprehensive Study) using the Corps' 1939-2008 unimpaired flows and existing consumptive water demands. We believe our preliminary results demonstrate for this type of alternative both: a) its feasibility, because simulated reservoir elevations are comparable to historic patterns; and b) its potential for reducing environmental impacts, because simulated flows represent modest to significant improvements relative to the RIOP for several biologically relevant, flow-based, performance measures in the Chattahoochee and Apalachicola rivers. Although we programmed the model to suspend support of Woodruff Dam releases greater than 5,000 cfs when storage enters Zone 4 and resume such support upon refill to a user-specified zone (feature 10 listed above), reservoir levels in simulations of the settings in Tables 1-4 resuming support in Zone 1 versus Zone 3 were not appreciably different. Therefore, it appears unnecessary under this alternative to delay the resumption of normal operations until a complete refill of reservoir storage, probably due to its zone-graduated flows and augmentation limits. However, we recommend testing the utility of this feature in any evaluation of alternative flows, augmentation limits, and zone definitions.

On November 29-30, 2012, the Service hosted a Technical Workshop for Alternatives to Reservoir Operations in the ACF. Over 50 people attended including stakeholders representing all three States, multiple interest groups, and two members of your staff. We presented an earlier version of this alternative and preliminary model results. We have since further refined our alternative by adding specific flow targets for Buford Dam to improve flows in the Chattahoochee River. We are willing and able to share the model with the Corps and others, and would welcome further discussions with your staff about modeling this concept in ResSim as an alternative for the DEIS. We view the values given in Tables 1-4 as flexible parameters, and we encourage the Corps to test different sets of values as necessary to achieve the best balance of results for project purposes that are dependent on river flows and reservoir levels. Our primary interest is in improving flows and levels for fish and wildlife resources, for which this alternative appears promising, but we acknowledge the need to examine significant effects on all environmental resources affected by the operations of the ACF reservoirs, including the National Park Service's Chattahoochee River National Recreation Area. We would like to work with you on potential improvements to this alternative, and we can quickly evaluate changes in model parameters in the ACF Stella model in conjunction with your work in ResSim. In addition, the States of Florida and Georgia also presented alternatives at the workshop in Eufaula, and some of their concepts could be incorporated to improve this alternative.

We have not yet examined how this alternative performs under scenarios of potential climate change, increasing consumptive demands, or its response to HEC-5Q water quality analyses, but we recognize the importance and necessity of doing so. Significant changes to the long-term patterns of basin inflow to the Corps' projects will affect flow regimes and reservoir levels. The minimum releases built into the alternative concept we propose, and to a lesser extent the targets and augmentation limits, would insulate to some degree flow-dependent resources from the adverse effects of continuing increases in consumptive demands and from some changes in precipitation/runoff patterns in the basin. However, this insulation is limited by the storage and

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Tucker, Sandra

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refill capacity of the reservoirs, and we recommend that the Corps evaluate how its proposed action and all reasonable alternatives would distribute the impacts of potential declines in basin inflow between reservoir- and river-dependent resources.

During our workshop, the alternative presented by State of Georgia and the Atlanta Regional Commission included flow targets for mussels that were based on bathymetric modeling in ArcGIS. Essentially, the Georgia Environmental Protection Division (GEPD) used the Corps' bathymetric data from 2009-2010 to delineate all the areas in the channel with a slope of 0.1 to 0.4, assuming that this is the preferred channel slope for the fat threeridge. They then linked the flow to stage and delineated the habitat that was less than 3-ft of inundation, assuming that fat threeridge prefer these shallow areas. These areas of slope and depth were then combined and modeled under various flow values to determine how much habitat (acres) was available at various flows from 10,000 cfs to 2,000 cfs. They concluded that more mussel habitat was available when flows were lower, so they recommended flows of 5,000 cfs with some pulses depending on basin inflows. There are several issues with this approach:

1) This method identifies a large amount of low slope-habitat in the actively migrating center of the channel. These habitats are comprised of coarse, shifting, sandy substrate. Mussel sampling last summer confirms that listed mussels do not occupy these habitats.
2) Our 2012 biological opinion on the RIOP discusses how the moderately depositional fat threeridge habitat is generally characterized by slopes of 10-40%, and that mussels in this habitat are generally found at a depth of about1-m regardless of flow. However, we also reported that fat threeridge are present in deeper, stable habitats in addition to the moderately depositional habitat. Additional sampling this summer indicates that fat threeridge can be abundant in these deep-water habitats associated with large woody material, along outside bends of the river, and in areas upstream of point bars. Slope may not play an important role in distribution, and it is likely that fat threeridge occur in areas with stable substrate that provide refuge from high flows, regardless of slope and depth.

We are currently undertaking a large-scale mussel distribution study using side-scan sonar and bathymetric data coupled with mussel sampling to determine mussel distribution in the river. We are willing to cooperate with GEPD to use our information to refine their approach in the future, but we do not support the performance measure for mussel habitat that GEPD described at the workshop.

We appreciate the opportunity to comment and look forward to continued participation as the WCM update moves forward. If you have any questions about these comments, please contact me at 706-613-9493 ext. 230, or Don Imm at 850-769-0552 ext. 247. I have assigned staff biologists Alice Lawrence (706-613-9493 ext. 222) and Will Duncan (ext. 227) to this project, and Dr. Imm has assigned staff biologist Karen Herrington (850-769-0552 ext. 250).

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Tucker, Sandra

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Sincerely,

Sandra S. Tucker
Field Supervisor

cc: Jerry Ziewitz, FWS, Tallahassee, FL
Don Imm, FWS, Panama City, FL
Karen Herrington, St. Charles, MO
Bill Pearson, FWS, Daphne, AL
Dan Everson, FWS, Daphne, AL
Jennifer Pritchett, FWS, Daphne, AL
Stephanie Nash, FWS, Washington, D.C.
Joyce Stanley, OEPC, Atlanta, GA
Loretta Sutton, OEPC, Washington, D.C.

Table 1. Target and minimum releases (cfs) from Woodruff Dam.

	Zone1		Zone2		Zone3		Zone4
Month	Target□	Minimum	Target□□	Minimum	Target□□□	Minimum	Minimum
JAN	21,000	10,000	15,000	10,000	10,000	5,000	5,000
FEB	28,000	10,000	20,000	10,000	10,000	5,000	5,000
MAR	33,000	16,000	22,000	16,000	16,000	5,000	5,000
APR	26,000	16,000	18,000	16,000	16,000	5,000	5,000
MAY	18,000	16,000	13,000	10,000	10,000	5,000	5,000
JUN	15,000	12,000	11,000	8,000	8,000	5,000	5,000
JUL	14,000	10,000	10,000	7,000	7,000	5,000	5,000
AUG	13,000	10,000	10,000	7,000	7,000	5,000	5,000
SEP	11,000	10,000	9,000	6,000	6,000	5,000	5,000
OCT	11,000	10,000	8,000	5,000	5,000	5,000	5,000
NOV	11,000	10,000	9,000	6,000	6,000	5,000	5,000
DEC	15,000	10,000	11,000	8,000	8,000	5,000	5,000

□Median observed flows, 1939-2008 (rounded to nearest 1,000).
□□Observed flows exceeded 75□ of the time, 1939-2008 (rounded to nearest 1,000).
□□□The minimum releases of Zone2 are the target releases of Zone3.

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Tucker, Sandra

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Table 2. Target flows (cfs) for the Chattahoochee River at Peachtree Creek

Month	Zone 1*	Zones 2 and 3*	Zone 4
JAN	1,908	1,561	750
FEB	2,267	1,611	750
MAR	2,466	2,020	750
APR	2,404	1,896	750
MAY	2,131	1,648	750
JUN	1,611	1,326	750
JUL	1,326	1,109	750
AUG	1,220	1,022	750
SEP	1,009	857	750
OCT	1,016	843	750
NOV	1,202	954	750
DEC	1,412	1,152	750

*Discharge values derived from the low flow guidelines estimated for median and dry hydrological conditions at the Peachtree Creek node.

Table 3. Target augmentation limits (cfs) by zone.

Zone1	3,000
Zone2	2,000
Zone3	1,000
Zone4	n/a

Table 4. Allocation (percent) of conservation storage by zone.

	Lanier	West Point	WF George	Composite
Zone1	10□	20□	25□	13□
Zone2	20□	20□	25□	21□
Zone3	20□	20□	25□	21□
Zone4	50□	40□	25□	46□

Turner, Billy

Page 1 of 221

December 14, 2012

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

ACF stakeholders
Working together to share a common resource.

To Whom It May Concern:

The ACF Stakeholders (ACFS) is a non-profit corporation created to provide a forum for diverse interests throughout the basin to work together to understand the water resources of the Apalachicola-Chattahoochee-Flint (ACF) River Basin and find collaborative solutions to their water management conflicts. The ACFS mission is to change the operation and management of the ACF Basin to achieve equitable and viable solutions among stakeholders that balance economic, ecological, and social values and ensure that the entire ACF Basin is a sustainable resource for current and future generations. Additional information about the ACFS's organizational history and operating procedures is attached.

ACFS formed after the previous scoping process in 2008-2009 and welcomes the opportunity to make comments now during this update to the original scoping document. These comments have been approved by consensus of the 56 member ACFS Governing Board.

The ACFS has appreciated hearing updates at its meetings from the U.S. Army Corps of Engineers (USACE), and looks forward to future similar opportunities to learn about progress on the Water Control Manual update and to serve as a truly basin-wide, multi-stakeholder sounding board. In addition, ACFS can serve as a source of in-depth and collaboratively developed information and analysis during the course of the Water Control Manual update. ACFS has already shared information with USACE on water demands and consumptive use and a report concerning the unimpaired flow data set, generated as part of the ACFS Sustainable Water Management Plan initiative. Over the next 12 to 18 months, ACFS, with assistance from its consultants (Black and Veatch, Georgia Tech, and Atkins) anticipates producing a series of additional documents including: performance criteria based on stakeholder interests and concerns, existing conditions model runs, an instream flow assessment, and a range of water management alternatives. The chair of the ACFS Technical Oversight and Coordination Work Group will share this information with USACE as it is developed. Further, ACFS would be pleased to designate a liaison with USACE to coordinate the exchange of information.

Specifically, ACFS urges that the scope of the Environmental Impact Statement for the update to the USACE Water Control Manual for the ACF Basin address the concerns of all stakeholders. The ACFS Charter and By-Laws identified 14 general areas of stakeholder interest to be considered in its mission to provide sustainable water resources management in the ACF Basin.

Turner, Billy

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These functional areas have been aggregated in ACFS planning documents into six major objectives as follows:

A. Ensure and/or maintain adequate water supplies for public supply/municipal uses including wastewater assimilation needs of current and projected future populations.

B. Maintain existing and promote future water availability and access for water dependent industries, power generation and recreational interests.

C. Promote the optimization of the use of water for agricultural irrigation including: types of irrigation technology, selection of crops, sustainable and resource-based permitting and water withdrawal monitoring.

D. Determine the nature and extent of commercial navigation that the ACF Basin can effectively support.

E. Protect the natural systems and ecology of the ACF Basin by defining and implementing desired flow regimes and lake levels, water quality enhancements, including wastewater and stormwater management and best management practices to maintain a healthy natural system and support a productive aquatic ecosystem in the Basin and estuary.

F. Create and support relationships with local governmental institutions and other public bodies within the ACF Basin to promote sustainability of the water resources and also to enhance the historical and cultural resources of the basin related to the management of its water resources.

ACFS will consider many available water management practices and technologies as we work toward completion of our Sustainable Water Management Plan which will accomplish the above objectives. We look forward to providing additional formal input to USACE at that time.

In addition, ACFS asks USACE to address the following questions:

1. How will both consumptive use (withdrawals less returns) and instream or non-consumptive uses be addressed and the system managed in both wet and dry periods?
2. How will USACE define how returns are calculated, noting that not all users have accurate information about returns?
3. Given the significance of drought to stakeholders in the basin, how can USACE make better use of drought predication information and tools, factoring those into its water control manual, rather than relying only on current lake levels as triggers?
4. What time step(s) does USACE plan to use in modeling the system, when the system must be operated on a daily and hourly basis? Would recommendations to USACE based on models using monthly or weekly time steps be considered compatible or reliable enough for consideration?

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5. Will USACE consider other operating rules besides the current RIOP based on:
   a. keeping more water in the reservoirs and still meeting the minimum required flow including changing the action zones and guide curves in all the reservoirs; and
   b. meeting all downstream flow needs?
6. Will USACE re-investigate the unimpaired flow data set (UIF) to resolve questions raised in the recent document provided by ACFS and update it? The referenced UIF report is also enclosed for your convenience.
7. What portions of the Water Control Manual can be changed without legislative action, and which committees have jurisdiction for portions that can't be changed without legislative action?
8. What are the current triggers and procedures used by USACE for operational decisions in drought conditions?

ACFS also requests that a meeting with USACE be scheduled in the near future so that we may follow-up on our Scoping comments as well as update USACE on our progress. Thank you very much for the opportunity to provide these questions and comments.

Sincerely,

Billy Turner
Chair, ACF Stakeholders

Turner, Billy

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Unimpaired Flow Assessment for the Apalachicola-Chattahoochee-Flint River Basin

Draft Technical Report

Developed by

The Georgia Water Resources Institute/Georgia Tech

Developed for

The ACF Stakeholders

October 2012

Turner, Billy

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Unimpaired Flow Assessment for the Apalachicola-Chattahoochee-Flint River Basin

Draft Technical Report

Developed by
The Georgia Water Resources Institute/Georgia Tech

Main Authors
A.P. Georgakakos and **M. Kistenmacher**

Contributing Authors
H. Yao, **C-J. Chen**, **R. Kim**, **Y. Dialynas**, and **C. Braneon**

Sponsored by
The ACF Stakeholders

October 2012

Acknowledgements

This study was funded in part by the ACF Stakeholders through a sub-contract with Black & Veatch Inc. Additional funds were provided by the Georgia Water Resources Institute and Georgia Tech.

We are grateful to the ACF Stakeholders for the opportunity to support their ground-breaking effort toward a shared vision water management plan. We also thank Black & Veatch Inc. for partnering and working with us on this critical regional project.

We wish to acknowledge the support of the U.S. Army Corps of Engineers and of the Georgia Environmental Protection Division in providing UIF related data and documents. The cooperation of Mr. James Hathorn and Dr. Wei Zeng is greatly appreciated.

Lastly, we wish to thank Brad Moore, Woody Hicks, Dan Tonsmeiere, Wilton Rooks, Steve Simpson, and Kristin Rowles for their thoughtful review comments and suggestions.

Disclaimer

The views expressed in this report are those of the authors and do not necessarily reflect the views of the ACF Stakeholders or any other organization.

Report Citation

This report should be cited as follows:

Georgakakos, A.P., and M. Kistenmacher, 2012: Unimpaired Flow Assessment for the Apalachicola-Chattahoochee-Flint River Basin. Technical Report, Georgia Water Resources Institute, Georgia Institute of Technology, Atlanta, Georgia, 211p.

Executive Summary

Unimpaired flows (UIFs) represent historical streamflows that have been processed to remove as many human influences as possible. UIFs are commonly used in water resources assessments to evaluate the effects of alternative development and management plans.

UIFs for the Apalachicola-Chattahoochee-Flint (ACF) river basin have been developed by the U.S. Army Corps of Engineers (USACE) Mobile District and by the Georgia Environmental Protection Division (Georgia EPD). These UIFs have been used in various past planning and management investigations. The purpose of this study is to assess the quality of the existing UIFs and determine their adequacy for the development of a sustainable water management plan (SWMP). This SWMP is currently undertaken by the ACF Stakeholders, a non-profit 501(c)3 organization with broad ACF membership.

The assessment included two main phases: (**a**) A detailed, reach-by-reach analysis of all local data used in the UIF derivation process and (**b**) a basin-wide evaluation of the cumulative UIF uncertainty impacts.

The assessment demonstrates that the existing UIF series include both random and systematic errors. *Random* errors are typically associated with (**i**) streamflow measurements and/or (**ii**) isolated erroneous data entries. Random measurement errors tend to average out over time and can be largely ignored, while erroneous data can be easily corrected. *Systematic* errors are much more critical than random errors, as they introduce biases that persist over long periods and impact the system response (and associated performance metrics) across a range of time scales (from daily to decadal). Systematic errors may affect the long term UIF levels as well as their daily variability, creating false assurances on the amount of water available during droughts, inaccurate estimates of reservoir drawdowns and releases, incorrect assessments of water supply reliability, and unrealistic representations of environmental flow regimes.

The ACF UIFs were shown to contain significant systematic errors at daily as well as monthly time resolutions. The underlying error sources and severities are assessed for each individual reach in Chapter 3, while their cumulative basin-wide implications are discussed in Chapter 4.

The overarching study finding is that while the existing UIFs contain valuable technical information, they need to be improved before they can support valid water management assessments. Such improvements are particularly critical at *daily* time scales, when river flow and reservoir release errors frequently exceed several thousand cfs at many ACF reaches. These errors undermine the results of ResSim and other river basin simulation models operating on daily time steps. As a consequence, model outputs are not representative of actual system conditions. Certain UIF errors and their basin-wide implications are mitigated at *monthly* time scales, but others remain significant enough to challenge the validity of water management assessment results and conclusions. Such errors should also be removed (or minimized) before water management plan assessments are carried out.

The recommended way forward is to follow a two-phased UIF improvement process focusing first on monthly UIF improvements and subsequently on daily UIF improvements. A summary discussion of the recommended UIF improvement areas is offered in Chapter 5.

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It is further recommended that a panel of experts be formed from USACE, USGS, USFWS, USEPA, USNPS, SERFC (NWS), the states, ACFS, and possibly other organizations to oversee, guide, support, and validate the proposed UIF improvement efforts.

A two-phased approach is also recommended for the water management assessments, with the first phase using the improved monthly UIFs to assess the system performance at a monthly temporal resolution. These assessments would use performance metrics aggregated to monthly resolution with the goal to identify areas of system stress, quantify important basin-wide water use tradeoffs, initiate stakeholder dialogue around critical issues, eliminate undesirable management alternatives, and formulate more relevant development and management options. The second management assessment phase would begin once improved daily UIFs are available. This phase would aim to expand the first phase deliberations by further developing the most attractive water management alternatives with respect to stakeholder performance metrics properly expressed in monthly *and* daily time scales.

The recommended UIF improvements and follow-up water management assessments are intended to create a comprehensive and credible knowledge base on which to build a sustainable water management plan as well as to assess its effectiveness once it is deployed.

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1. Introduction

Water resources planning and management studies commonly use observed streamflow data to evaluate the effects of alternative development and management plans. In many watersheds, however, observed streamflow records do not reflect natural conditions as they are affected by human water use activities such as withdrawals, returns, groundwater pumping, water transfers, reservoir operations, and land use change. These activities progressively alter the magnitude and timing of natural streamflows, making it difficult to establish a consistent hydrologic baseline to assess the true merits and impacts of alternative development and management strategies.

Unimpaired flows (UIF), sometimes also referred to as full natural flows (FNF), represent historical streamflows that have been processed to remove human influences as much as possible. While removing *all* human influences is practically impossible, the UIF generation process aims to approximate the natural watershed response better than direct gage measurements and create a more objective and temporally consistent basis for planning and management decisions.

However, the process of reconstructing UIFs from observed records may also introduce artificial uncertainties that can bias the assessment investigations. Thus, prior to their use in water resources planning and management studies, UIFs should be evaluated to ensure that they do not contain large, systematic errors that can potentially misinform the planning and management process.

The purpose of the study reported herein is to evaluate the quality of the unimpaired flow datasets that have been developed for the Apalachicola-Chattahoochee-Flint (ACF) river basin and to determine the reliability with which they can support water management and planning studies. This study is sponsored by the ACF Stakeholders, a non-profit 501(c)3 organization with broad ACF membership, as part of the development of a Sustainable Water Management Plan (SWMP).

UIFs for the ACF river basin were first developed in the 1990s by the U.S. Army Corps of Engineers, Mobile District, through a comprehensive data compilation and analysis effort. The original UIFs were used to support the tri-state (Alabama, Georgia, and Florida) negotiations for the development of an ACF Water Compact. In the years that followed, the Corps continued to work and extend the original UIFs. More recently, the Georgia Department of Natural Resources, Environmental Protection Division (EPD), in collaboration with the Corps, contributed new data and information toward improving the existing UIFs. EPD used these datasets in the development of the Georgia Water Resources Plan. The current UIF evaluation complements the previous efforts as part of the development-assessment-improvement cycle that underwrites good science, especially when it is used for policy making.

1.1 UIF Datasets

Several UIF datasets have been derived for the ACF river basin:

1. 1939-1993: U.S. Army Corps of Engineers
2. 1939-2001: U.S. Army Corps of Engineers
3. 1939-2008: U.S. Army Corps of Engineers
4. 1939-2007: Georgia Department of Natural Resources (ARCADIS US, Inc.)

Each of these datasets consists of *daily* unimpaired inflow sequences for several nodes along the ACF river basin network.

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The first dataset was developed by the U.S. Army Corps of Engineers (USACE) as part of the ACF/ACT Comprehensive Water Resources Study. Unimpaired flows were created by adjusting historically observed streamflow measurements from 1939 to 1993 to remove the effects of water use and infrastructure. The derivation process is described in USACE (1997) for the ACF reaches shown in **Figure 1.1**. Reaches are defined between two adjacent nodes, with the reach name corresponding to the name of the downstream node. The second and third datasets represent updated versions of this original dataset where the period of study was extended to 2001 and 2008, respectively. The same spatial configuration as the original unimpaired flow dataset was used. The derivation of the 1939-2001 dataset is described in USACE (2004), while official documentation pertaining to the 1939-2008 dataset has not yet been published.

The fourth unimpaired flow dataset was developed by the State of Georgia Department of Natural Resources (DNR), Environmental Protection Division (EPD), in conjunction with their contractor ARCADIS US, Inc.. EPD only derived unimpaired flows from 2001 through 2007, as described in DNR (2010). These unimpaired flows were then appended to the second USACE dataset to produce unimpaired flows from 1939 through 2007. The nodes and reaches modeled by EPD are shown in **Figure 1.2**. They generally coincide with those modeled by USACE, though there are a few differences.

All UIF datasets were evaluated as part of the present study. However, the most recent USACE UIF extension uses more reliable information and improved modeling methods and is meant to replace previous datasets. Thus, the 1939-2008 USACE dataset is considered to be the official USACE dataset and is the focus of this investigation. In addition, the EPD dataset, which makes use of the 1939-2001 USACE dataset prior to 2002, is also assessed.

1.2 Summary of Unimpaired Flow Derivation and Associated Issues

Unimpaired flows are estimated from water balance relationships across each river reach, as shown in **Figure 1.3**. This process first requires that all flows in and out of the reach be identified. Such flows may include upstream and downstream observed streamflows, temporary reservoir storage changes, net evaporation losses, groundwater-surface water interactions, and various water use withdrawals and associated returns. Then, the derivation process consists of (a) estimating all incoming and outgoing reach flows (other than the UIF), and (b) determining the UIF that completes the water balance. Daily UIFs are generated if the water balance relationships are considered over daily time intervals. Weekly or monthly UIFs can also be generated in a similar fashion.

While this is a straightforward derivation process, it also includes several ways through which errors and uncertainties may enter in the UIF computation. More specifically, all measured and estimated flow terms included in the water balance may contain errors and uncertainties that are cumulatively passed on to the derived UIF values. Furthermore, the derivation of daily UIFs requires that *all* water balance terms are expressed in daily resolution. However, as shown in **Table 1.1**, many of the available flow data have much coarser (i.e., weekly, monthly, and even decadal) resolutions. This mismatch in temporal resolution raises questions as to whether the UIFs thus derived are truly representative of daily unimpaired flow sequences.

1.3 Report Outline

This report identifies and assesses the impacts of uncertainties in the existing ACF unimpaired flow datasets. **Chapter 2** presents a qualitative overview of the procedures used to derive the unimpaired flow datasets. Major uncertainty sources are also discussed. Detailed assessments of

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the unimpaired flows for each ACF river basin reach are presented in **Chapter 3**. This includes an explanation of each dataset used, as well as the identification and quantification of major error and uncertainty sources. **Chapter 4** aims to assess the impact of the UIF uncertainties on water management performance statistics and metrics. These assessments make use of river basin simulation models driven by alternative UIF input sequences. Finally, **Chapter 5** summarizes the study findings and conclusions, and provides recommendations on ways to improve the existing UIF datasets. Additional technical material is included in two appendices.

Readers less interested in technical aspects may wish to proceed directly to Chapter 5.

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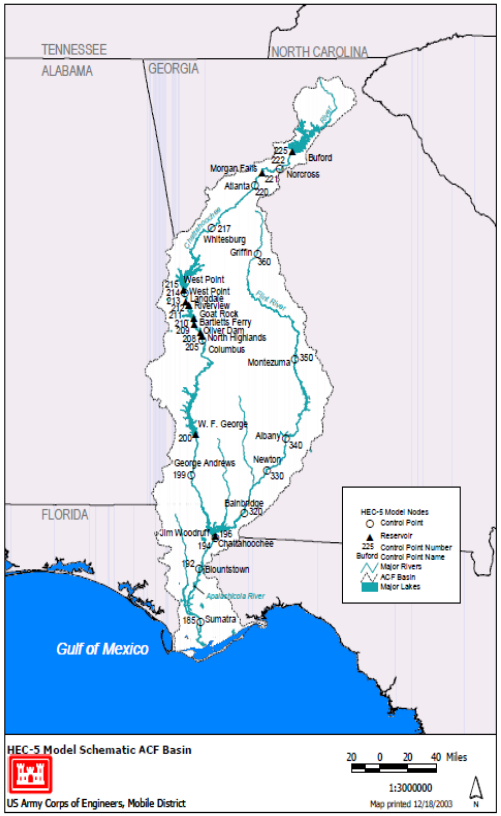

Figure 1.1: Nodes used in the USACE unimpaired flow derivation (image taken from USACE, 2004).

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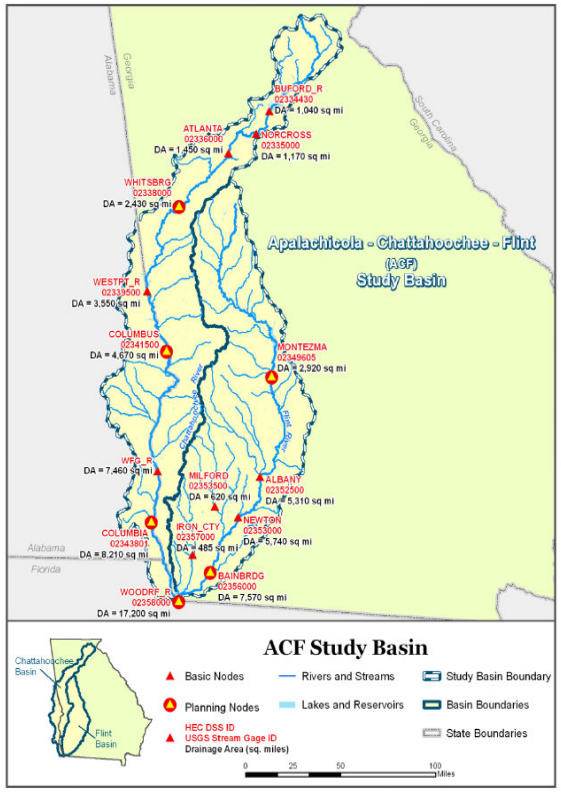

Figure 1.2: Nodes used in the EPD unimpaired flow derivation (image taken from DNR, 2010).

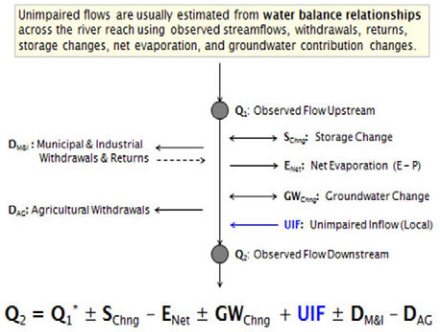

Figure 1.3: General UIF derivation process.

Dataset/Adjustment	Time Resolution
Observed Flow	Daily
Streamflow Routing	Can result in daily discrepancies
Municipal, Industrial, and Thermal Demands	Daily Monthly Decadal
Agricultural Demands	Monthly 3-5 Yearly
Net Evaporation	Monthly Multi-decadal
Adjustments	Potentially alters UIF patterns on daily, weekly, seasonal, annual, and even multi-decadal time scales.

Table 1.1: Temporal resolution of the individual flow datasets used in UIF derivation.

2. UIF Derivation Process

As described above (**Figure 1.3**), unimpaired flows are computed by specifying the quantities of each flow term in and out of a particular reach, and solving water balance equations for the unknown unimpaired flows. This section outlines the methodologies used to determine the data for each flow term and identifies the associated uncertainty and error sources. These discussions apply to both the USACE and EPD datasets unless otherwise stated. Additionally, uncertainties associated with other ancillary computational procedures, such as streamflow routing and flow adjustment, are also discussed. The aim of this chapter is to highlight the potential uncertainties introduced by the UIF derivation procedures. Detailed assessments of these uncertainties for each ACF river reach are the subject of the following chapter.

2.1 Observed Stream Flows

Observed streamflows at the downstream and upstream nodes of each reach are compiled to compute unimpaired flows[1]. The differences between the streamflows at the downstream and upstream nodes represent local *impaired* flows. The local *unimpaired* flows can then be derived from the impaired flows by accounting for any human-induced flow impacts in and out of the reach between the nodes.

2.1.1 Datasets and Procedures

Measurements for most nodes in the ACF basin were recorded by USGS gages, though data collected by the reservoir operators was sometimes used at nodes corresponding to reservoir outlets. While complete daily streamflow observations are available for the entire study periods at several nodes, observed data at other nodes either do not exist at all or are missing for certain data periods. Thus at several nodes, the streamflows that would have been observed had to be estimated.

Figure 2.1 depicts the typical estimation (or filling) process used to estimate missing streamflows at a particular node (Location 1). First, a nearby node (Location 2) that has observed streamflows during the time period of missing streamflows is identified. Then, another time period when observed streamflows for both of these two nodes are available is chosen. By analyzing the contemporaneous streamflow values at each of the nodes during this time period, a relationship that describes the streamflow at Location 1 as a function of the streamflow at Location 2 can be derived. This process is known as calibration. Finally, this relationship is used to estimate the missing streamflows at Location 1.

2.1.2 Uncertainty Sources

The relationships used to estimate the missing streamflows are not perfect. The magnitudes of the uncertainties and errors involved with this type of filling procedure can be explored by plotting the contemporaneous streamflows, as well as the derived relationship between the two nodes. The differences between the actual observed values of the streamflows at Location 1 and those predicted from the relationship to the Location 2 flows provide an estimate of the errors associated with the filling process. As will be seen in the next chapter, such errors can be as large as the UIFs themselves.

[1] For headwater reaches, only the observed streamflows at the downstream node are needed.

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Furthermore, streamflow observations also contain measurement errors. Such errors range from 5% to 10% of the actual flows, and are usually random. Namely, they become negligible when averaged over several time periods.

2.2 Streamflow Routing

Streamflow routing is used to translate the upstream streamflows to the downstream node if the travel time between the upstream and downstream nodes of a particular reach is comparable to or larger than the daily time step of the unimpaired flow dataset. Streamflow routing is necessary to ensure that the flows at the upstream and downstream nodes correspond to the same daily interval.

2.2.1 Datasets and Procedures

The USACE datasets are based on Muskingum-routing for most of the reaches, while the EPD datasets were derived using the Lag and K technique. Both routing methods perform hydrologic (as opposed to hydraulic) flow routing.

2.2.2 Uncertainty Sources

Hydrologic routing models are simplified representations of the true hydraulics that govern the flow of water from an upstream node to a downstream node. Before they are used, routing models need to be calibrated. Proper routing model calibration requires knowledge of the local reach inflows in addition to upstream and downstream streamflows. However, data on the local inflows is not available since they are part of the unimpaired flows which have yet to be estimated. Routed upstream streamflows therefore contain errors which manifest themselves as streamflow timing and magnitude discrepancies. While routed flows may be subject to significant errors on a daily basis, these errors tend to disappear when the flows are averaged over several days. Incorrectly calibrated routing models therefore might result in significant daily uncertainties but do not tend to cause systematic long term errors.

2.3 Municipal & Industrial Withdrawals and Returns

Municipal and industrial withdrawals are abstractions that are made from the river system to meet water demands. Returns are the portions of these withdrawals that return back to river.

2.3.1 Datasets and Procedures

Detailed measurements of municipal and industrial withdrawals and returns in the ACF basin only exist since 1980. Withdrawals and returns prior to that time are estimated by the steps depicted in **Figure 2.2**. The average net withdrawals (withdrawals minus returns) measured between 1980 and 1993 are calculated first. The net withdrawals are then hindcasted using factors computed from the ratios between the average reach population for each decade prior to 1980 and the population during the 1980-1993 period. The final net withdrawal estimates are therefore defined on a *decadal* basis from 1939 to 1980. After 1980, the net withdrawals correspond to the actual measurements, which were taken on a daily or monthly basis.

2.3.2 Uncertainty Sources

Some of the errors and uncertainties contained in the hindcasted net withdrawals can be quantified by examining the period after 1980 when actual measurements exist. The net withdrawal measurements show significant variation and differences from the average net withdrawals during

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this time period. These variations and differences are not considered in the hindcasted net withdrawals since the quantities are kept constant for each decade. Consequently, the errors on a daily, monthly, or even annual basis are as large as the daily, monthly, or annual variation of the actual net withdrawals from their corresponding average value. Systematic errors on decadal time scales may also exist if the fractions used during hindcasting over- or under-estimate past water usage. Additional systematic errors may occur if a certain reach does not include certain withdrawals/return sites or if the reach was incorrectly assigned sites that are located in other reaches. A few such discrepancies were also encountered in the existing UIFs.

2.4 Agricultural Withdrawals

Agricultural withdrawals represent abstractions from the river system made to supply irrigation water for the agricultural sector. It is assumed that none of the agricultural withdrawals return back to the river system.

2.4.1 Datasets and Procedures

While measurements for the municipal and industrial withdrawals are available for recent decades, comprehensive measurements of agricultural withdrawals remain scarce. The steps used to derive the agricultural demands for the USACE and EPD unimpaired flow datasets are described in detail in DNR (2009) and are summarized in **Figures 2.3** and **2.4**.

The first step consists of estimating the irrigated acreage for each reach. A distinction is made between fields that are irrigated by surface water and those irrigated by groundwater because the irrigation practices differ depending on the water source. Relatively detailed measurements of irrigated acreage within each reach are available from irrigation maps for 2004 and later years. Prior to that time, the irrigated acreage is estimated by hindcasting. The hindcasting is based on fractions computed from ratios of the statewide acreage in the year for which the acreage is to be hindcasted and the statewide acreage in 2004.

Monthly crop demands are estimated in the second step. These quantities specify how much water (in inches) is applied to fields in the reach for each month of the year. They were estimated from measurements taken at several irrigation sites in the late 1990s and early 2000s (Hook et al., 2005). Different crop demand values are estimated for irrigation water taken from groundwater and surface water sources. Furthermore, two separate monthly crop demand scenarios, dry and normal, were constructed for each water source. The values corresponding to the dry scenarios are used during years deemed as abnormally dry and the normal scenario crop demands are used during all other years.

Agricultural withdrawals taken directly from surface water sources are estimated by multiplying the surface water crop demands by the amount of acres irrigated with surface water. An additional step has to be performed for fields irrigated from groundwater sources. In certain areas of the ACF, water taken from groundwater aquifers does not influence surface water streamflows and the total agricultural irrigation withdrawals in those reaches is only equal to the withdrawals made directly from the surface water system. However, in other regions, especially the lower Flint, there is significant interaction between the surface and groundwater systems such that groundwater pumping can affect streamflows. This interaction is estimated from a groundwater model (Jones and Torak, 2006) and used to determine how much the groundwater withdrawals reduce nearby streamflows. These reductions are then added to the surface water agricultural withdrawals to represent the total agricultural withdrawals for a particular reach.

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2.4.2 Uncertainty Sources

There is a variety of uncertainties and potential error sources that arise during the estimation of the agricultural withdrawals. Detailed maps of irrigated acreage are available for recent years and can be used to relatively accurately estimate acreage for each reach. However, the acreage in earlier periods is estimated from statewide agricultural trends and therefore is subject to uncertainties. The distinction of irrigation water into surface water and groundwater attributed sources is also only based on estimates made using recent data and is only roughly approximate for previous years.

The monthly crop demands are also subject to several uncertainties. Only two different demand scenarios, dry and normal, were constructed and used during years of abnormally low and normal precipitation, respectively. In reality, crop demands are likely to exhibit more than just binary variation. **Figure 2.5** compares the crop demands used during the unimpaired flow derivation to those computed by a dynamic agricultural simulation model (DSSAT) that is driven by detailed meteorological data (precipitation, temperature, etc.) in the Newton reach. The results show that crop demands can vary significantly over time based on the specific meteorological conditions, and the associated error can be up to 70% of the actual crop water requirement.

Finally, uncertainties can also be introduced from the representation of the groundwater-surface water interactions. The groundwater model used to determine the streamflow reductions is subject to its own errors. Additionally, some of the input data required to run this model, for instance its initial conditions, were fixed to certain values corresponding to specific years.

Unfortunately, it is difficult to assess the exact magnitudes of the uncertainties and errors related to the estimation of agricultural withdrawals since comprehensive measurements of the exact withdrawals are not available. The estimates of agricultural withdrawals therefore may contain significant uncertainties. However, it should be pointed out that the process used to estimate agricultural withdrawals for the latest USACE dataset and the portion of the EPD dataset from 2002 to 2007 is an improvement over the processes used in earlier USACE datasets.

2.5 Reservoir Effects

Reservoir construction and operation can significantly alter natural streamflows. In order to develop unimpaired flows, the impacts of reservoirs on rivers flows have to be quantified and removed. Reservoir impacts include storage holdouts, net evaporation, and leakage.

Holdouts are defined as the changes in storage in a reservoir from one time period to another. If reservoir releases are smaller than inflows, then water is stored and the reservoir holdout is a positive quantity that needs to be added to the unimpaired flows. On the other hand, if the inflows are smaller than the reservoir releases, then the unimpaired flows need to be adjusted downward.

Net evaporation refers to the net loss or gain of water from a reservoir due to evaporation or precipitation. Net evaporation is computed by considering the following individual components:

Net evaporation = *Evaporation* from the reservoir surface area **-** *Precipitation* directly onto the reservoir surface area **+** *Runoff* that would have drained to the river from the inundated (by the reservoir) area.

2.5.1 Datasets and Procedures

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Storage holdouts are computed from measurements taken at the reservoir. The elevation of the water in the reservoir is typically measured and then used to determine reservoir storage via storage-elevation relationships. Holdouts can be computed by taking the difference of reservoir storages at consecutive days.

The evaporation component of the net evaporation computation refers to the amount of water lost from the reservoir surface to the atmosphere. A comprehensive set of measurements of evaporated water does not exist for the reservoirs in the ACF basin, and this quantity had to be estimated from meteorological data. USACE estimated reservoir evaporation by using evaporation rates that were developed by combining annual free water evaporation rates (NWS, 1982a) with monthly pan evaporation data (NWS, 1982b). The sample evaporation rates shown in **Figure 2.6** reveal that the same monthly evaporation rates are repeated for each year of the UIF study period. Evaporation rates at different locations within the ACF basin, i.e., at different reservoirs (for instance Lake Lanier and West Point Lake) are however considered to be different. The evaporation rates developed by EPD are based on the same annual free water evaporation rates and monthly pan evaporation data. However, additional daily and inter-annual variations were introduced by adjusting the data by factors computed from potential evapotranspiration estimates derived using the Hamon method (Lu et al., 2005). As a result, the EPD evaporation rates are not repeated year after year (**Figure 2.6**). The evaporation amounts for both the USACE and EPD datasets were obtained by multiplying the respective evaporation rates with historical measurements of reservoir surface area for each day of the study period.

The presence of a reservoir in a reach not only increases evaporation losses, but also affects the amount of precipitation entering the river system. Before the existence of a reservoir, precipitation used to fall directly onto the land surface and only a portion of it would enter the river system as runoff. After the construction and filling of the reservoir, all of the precipitation that falls directly onto the reservoir surface now enters the river system. Adjustments therefore have to be made to account for the increased amount of precipitation that enters the river system due to the presence of a reservoir.

Precipitation over the reservoir was estimated for the USACE dataset by first computing mean aerial precipitation over the reservoir. Mean aerial precipitation values were developed by averaging monthly rainfall observations (obtained from the National Climatic Data Center, NCDC) recorded at stations near each reservoir. The EPD dataset used daily rainfall observations obtained from NCDC to estimate mean aerial precipitation. Furthermore, the daily values were scaled by adjustment factors that consider ratios of the daily NCDC data aggregated to monthly values and another dataset (Parameter-Elevation Regressions on Independent Slopes Model, PRISM) of monthly precipitation data. The final volumes of precipitation entering the reservoirs for the USACE and EPD datasets were then computed by multiplying the mean aerial precipitation values by the historical measurements of reservoir surface area for each day of the study period.

The amount of runoff that would have entered the river system before the existence of the reservoir was estimated by multiplying the previously estimated precipitation volumes by runoff factors. Runoff factors represent the fraction of precipitation that becomes runoff and were estimated by comparing long term precipitation and streamflow trends within a particular reach. USACE and EPD used slightly different data sources to estimate the runoff factors, leading to slightly different values. Both USACE and EPD kept runoff factor values constant over the entire study period, though the values varied from reach to reach.

2.5.2 Uncertainty Sources

Several uncertainties in each of the individual datasets used to derive the net evaporation flows exist. The annually repeating evaporation rates used by USACE are likely to underestimate evaporation rates during hot periods. While the evaporation rates developed by EPD do incorporate variations with respect to temperature, several alternative methods could be used to estimate evaporation rates yielding different results. The precipitation data may also be subject to uncertainties, especially on a daily basis. Keeping runoff factors constant over the whole period of study is also a simplification of the true hydrologic processes. In reality, runoff factors can vary significantly over time depending on soil moisture conditions, temperature, and a host of other factors. Finally, neither the USACE nor the EPD datasets were developed by specifically considering reservoir leakage since this quantity is difficult to estimate. The unimpaired flows may therefore contain errors if there is significant leakage through the dam at the outlet of the reservoir or into surrounding groundwater aquifers.

The above-cited differences in the USACE and EPD estimation procedures can result in large (up to 100%) net evaporation discrepancies.

Furthermore, net evaporation from only the major federal reservoirs (i.e., Lake Lanier, West Point, W.F. George, and J. Woodruff) was considered in the computation of the existing UIFs by the USACE. Net evaporation losses from other existing reservoirs (i.e., several Georgia Power projects) and other impoundments within the ACF watersheds were included *indirectly* through their effect on observed streamflows. Finally, an added discrepancy arises from the treatment of net evaporation losses as part of the river basin simulations using ResSim and/or other models. In these model simulations, net evaporation losses for the Georgia Power projects are explicitly included even though they were also included *indirectly* in the computation of the unimpaired flows. As a result, net evaporation losses are actually subtracted for a second time during the river basin simulations. On the other hand, EPD does account for net evaporation losses at most Georgia Power reservoirs.

2.6 Unimpaired Flow Adjustments

After their computation, the unimpaired flows are analyzed to check their consistency and identify potential errors. In several reaches and for the reasons indicated earlier, the unimpaired flows exhibit patterns that do not resemble natural hydrographs, including very large and frequent magnitude fluctuations (roughness) and negative values. While this is not physically impossible, in most reaches of the ACF basin natural phenomena are unlikely to cause negative unimpaired flows. As a result, the initial unimpaired flows computed from the water balance relationships are adjusted to develop unimpaired flows that better conform to expected natural patterns.

2.6.1 Datasets and Procedures

The primary adjustment technique used by USACE aims to smooth the unimpaired flow timeseries using centered moving averages. As depicted in **Figure 2.7**, centered moving averages replace the original unimpaired flows at a particular day with averages of flows computed over a period of several days around that day. Depending on the particular reach, between zero to seven surrounding days are averaged. Comparisons between the pre- and post-adjusted unimpaired flows show that the adjusted unimpaired flows tend to be smoother and exhibit less abrupt fluctuations and roughness. The frequency and magnitude of negative unimpaired flows also decreases, though negative values still remain.

Flow adjustments were also made during the development of the EPD unimpaired flow dataset. All adjustments were made in a way that any negative unimpaired flows were completely removed. Central moving averages, as employed by USACE, were used for some reaches. However, several

additional adjustment procedures were explored at other reaches, and the least "intrusive" procedure that yielded acceptable results was selected to generate the final unimpaired flows.

The first such procedure makes no adjustments at all and was used in reaches where there were no negative unimpaired flows. A second procedure locally adjusts negative unimpaired flow values and was used at reaches for which unimpaired flows took on negative values infrequently and for short periods of time. This type of adjustment differs from the USACE central moving averaging approach since flows are only smoothed locally around periods of negative unimpaired flow values and flows at other times are left unadjusted. A third procedure is used for reaches that exhibited frequent or prolonged negative unimpaired flows. For each year, water was added to any negative unimpaired flow value to increase it to zero. The total quantity of water that had to be added to remove all negative flows during the span of the particular year was then subtracted from periods of that year when unimpaired flows were positive. This process was repeated for each year of the period of study. Finally, a fourth adjustment procedure was employed for reaches where negative flows were extremely frequent. This is similar to the third procedure, with the only difference being that the adjustments were not made separately for each year but were instead made once for the entire study period. **Figure 2.8** illustrates how the third and fourth adjustment procedures operate on the originally estimated unimpaired flows.

2.6.2 Uncertainty Sources

Adjustments to unimpaired flows are made to generate flow hydrographs that follow expected natural patterns. However, it is unclear if the adjustment techniques produce more accurate unimpaired flows. First, the choice of a particular adjustment technique is subjective, and the true unimpaired flows could lie within or even beyond the range of flow quantities defined by the pre- and post-adjusted flows. As a result, there are relatively large uncertainties about what the exact unimpaired flows are on a particular day. Fortunately, most of the flow adjustment procedures preserve the water balance over the span of multiple days and do not introduce systematic errors. The exceptions are the third and fourth flow adjustment procedures employed for the derivation of the EPD dataset. These procedures augment the flows during certain parts of the year (or study period) and correspondingly decrease the flows during other parts of the year (or study period). The integrity of the hydrographs and the total water balance over the span of several days, weeks, months, and even years (for the fourth adjustment technique) are therefore not preserved. As it will be seen in Chapter 4, this may lead to (a) over-estimation of low flows and under-estimation of high flows, and (b) substantial lake drawdown differences (between the USACE and the EPD data sets) during dry periods.

2.7 Summary

Several individual datasets and computational procedures were developed and used by the USACE and EPD during the unimpaired flow development. As a result, the final unimpaired flows are subject to various errors and uncertainties contained in these datasets and/or computational procedures. A general list of the potential error sources is shown in **Table 2.1.** These potential errors are categorized as (i) additive or systematic, and (ii) non-additive or random, depending on the ways they impact the accuracy of the UIFs.

Systematic errors occur when a specific quantity is being consistently under-or over-estimated. For instance, if withdrawals from a certain site within a particular reach were not recorded, then the overall reach withdrawals are always lower than they should be. Consequently, the unimpaired flows computed from these withdrawals will also be systematically different from their true values. If such errors persist over long time periods, they can impact the accuracy of the unimpaired flows

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over multiple time scales, from days to decades. Even small systematic errors have the potential to significantly affect the validity of water management metrics given long enough time to accumulate.

Other errors may not be additive over time and only affect smaller time scales. For instance, a typical error occurs when a routing model overestimates the amount of flow reaching a downstream node on a particular day. Usually, this error is counterbalanced on the following day if the routing model underestimates the actual flow. Although such daily discrepancies may be large, they are not additive over time and tend to disappear when averaged over weeks or months.

Systematic uncertainties and errors can be avoided by using good quality datasets, correct physical representations, and appropriate computational procedures. To this end, thorough data collection efforts are absolutely critical. Datasets generated by models of physical processes, such as lake evaporation, should accurately reflect the magnitude and variability of the underlying processes. Additionally, computational procedures that may introduce systematic errors, such as seasonal, annual, or period-of-record flow adjustments should be avoided.

Daily, non-additive errors can be reduced by using datasets with consistent temporal resolutions. Unfortunately, this is not always possible since, as shown in **Table 1.1**, many datasets are not available on daily time scales. As a result, the unimpaired flow datasets are subject to large uncertainties and errors though these errors do not accumulate over time. For instance, failure to incorporate the daily *variation* of water balance terms results in *artificially* exaggerated UIF variation and roughness. This can clearly be seen by inspecting the UIFs of early versus more recent periods, as shown in **Figure 2.9**. During the early time periods, many of the human flow alterations are minor, and the UIFs are primarily estimated from streamflow records commonly available on a daily basis. During more recent time periods, human water use has intensified, and has caused daily flow alterations that are not well documented. As a result, early UIFs tend to be much smoother than recent UIFs and more characteristic of actual watershed runoff processes. However, these differences are mitigated when UIFs are compared at weekly or monthly resolutions.

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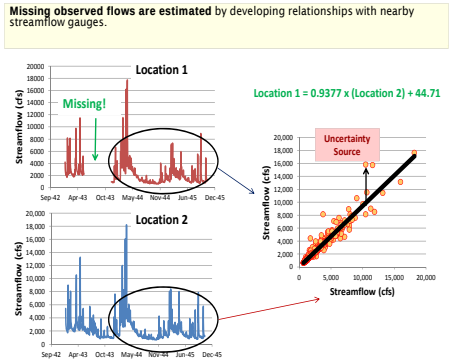

Figure 2.1: Procedure used to estimate missing streamflows

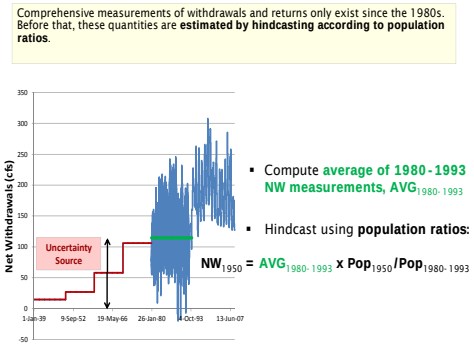

Figure 2.2: Hindcasting procedure used to estimate municipal & industrial withdrawals.

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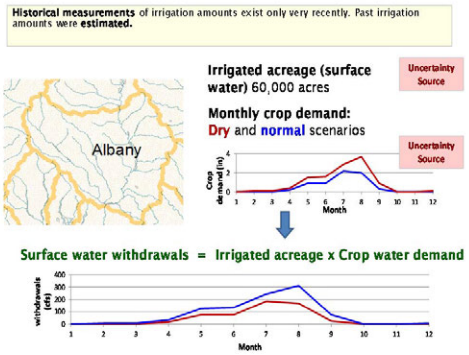

Figure 2.3: Estimation of crop water demands and monthly agricultural withdrawals.

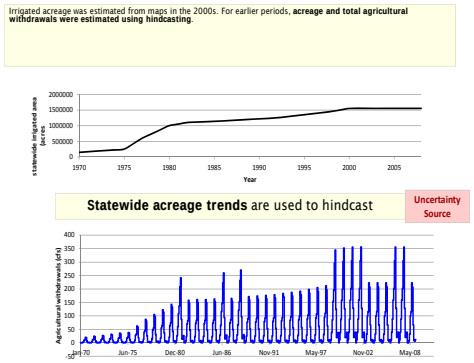

Figure 2.4: Hindcasting of agricultural withdrawals using statewide acreage trends.

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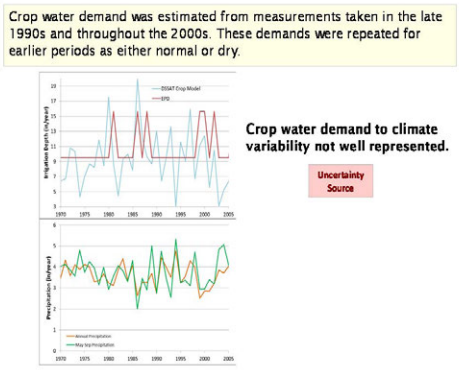

Figure 2.5: Comparison of crop water demands used to estimate USACE and EDP agricultural demands with crop water demands computed by a crop simulation model (DSSAT) in the Newton reach.

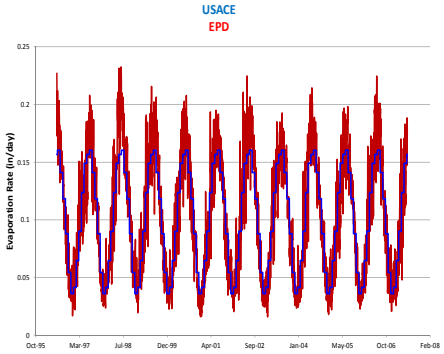

Figure 2.6: Sample USACE and EPD evaporation rates.

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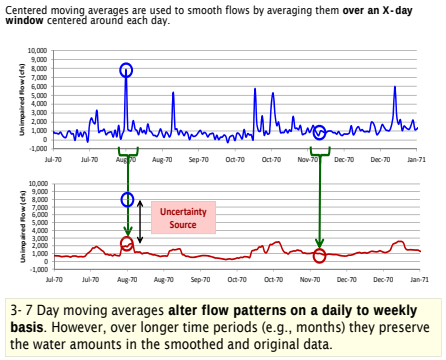

Figure 2.7: Unimpaired flow adjustment using centered moving averages.

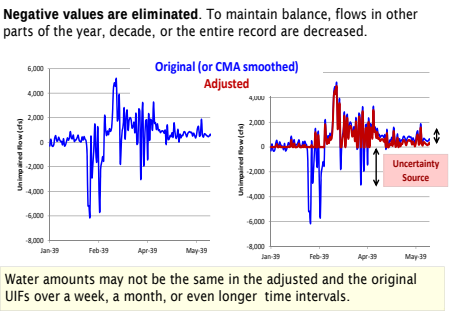

Figure 2.8: Unimpaired flow adjustment using annual or period of study adjustments.

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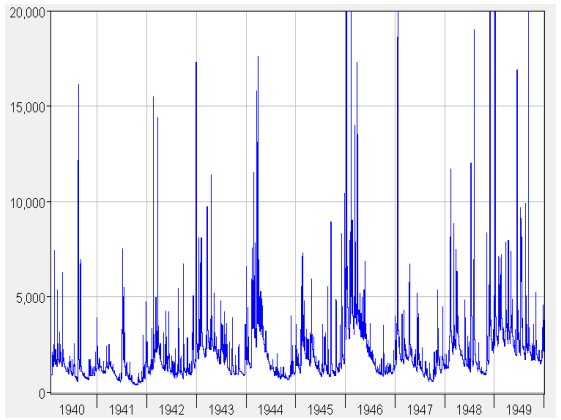
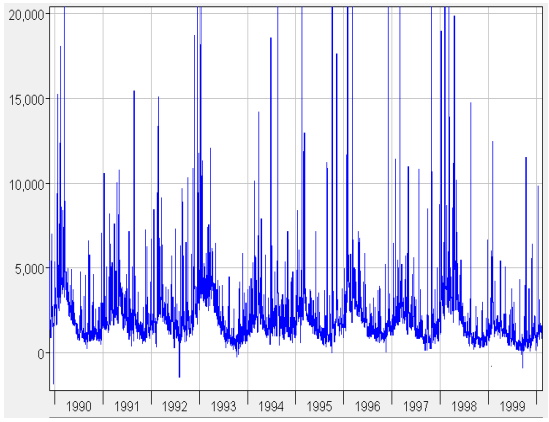


1940-1950



1990-2000

Figure 2.9: Unadjusted unimpaired flows in the Buford reach.

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Dataset/Adjustment	Additive (Systematic) Uncertainties/Errors	Non-additive Uncertainties/Errors
Observed Flow	Biased streamflow measurements or estimation procedures	Random measurement and estimation errors
Streamflow Routing	Models with biases at high or low flows	Random routing model errors
Municipal, Industrial, and Thermal Demands	Persistent under- or over-estimation	Use of average monthly, annual, or interannual data
Agricultural Demands	Persistent under-or over-estimation	Use of average monthly, annual, or interannual data
Net Evaporation	Persistent under- or over-estimation	Use of average monthly, annual, or interannual data
Adjustments	Seasonal, annual, or period-of-record removal of negative values	Smoothing over neighboring days

Table 2.1: Potential UIF error and uncertainty sources and types.

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3. Individual Reach Assessments

This section presents detailed assessments of the unimpaired flows contained in the USACE and EPD datasets. Individual assessments are carried out for every reach within the ACF river network and include analyses of the final unimpaired flows as well as the individual flow type datasets used in their derivation.

The assessments begin with general information about the particular reach under consideration. This includes the percent of the ACF basin drainage area covered by the reach as well as the average flow contribution of the reach to the basin-wide unimpaired flows. The contribution of each flow type to the reach water budget is also shown via pie charts for both the whole period of record and specifically for the dry months (May-October) of the major drought years since 1980. These charts give an indication of the importance of each flow type and the impacts that uncertainties or errors in their estimated values can have on the unimpaired flows.

The assessments proceed with a presentation of the unimpaired flows. Both the daily timeseries of unimpaired flows as well as two-year moving averages of the same data are provided. The two-year moving averages are presented alongside two-year moving averages of mean aerial precipitation over the watershed drained by the reach being considered. While there are additional hydrologic and meteorological variables that affect unimpaired flows, a comparison of the moving averages can be used to ascertain if the unimpaired flows are generally consistent with precipitation. The individual flow type datasets used in the development of the unimpaired flows are also presented. Finally, any large inconsistencies or major issues associated with the unimpaired flows and their development are discussed. If possible, the datasets used by USACE and EPD for each reach are shown together to allow for easy comparison. The exceptions are for reaches where one of the datasets does not contain unimpaired flows or reaches that are not directly comparable since the spatial resolutions differ.

In addition to presenting the USACE and EPD data, additional information may be provided for certain reaches. Additional datasets developed by GWRI are presented for the net evaporation flows and the datasets used in their derivation. These datasets are provided for informational purposes to identify the range of uncertainties that may exist when net evaporation is estimated. The procedure used to derive the GWRI evaporation rates is summarized in **Appendix A.** Hydrologic models were also calibrated for some reaches and used to investigate the root causes of unimpaired flow inconsistencies.

A summary of the basin-wide water use is provided at the last subsection of this chapter.

3.1 Buford

Summary information for the Buford reach is shown in **Figure 3.1.1**. On average, this reach contributes about 7.8% of the basinwide UIF volume (up to the most downstream Sumatra node). The water budget is primarily dominated by the unimpaired flows (88%), with net evaporation flows accounting for the second largest term (5%). During dry periods, however, the evaporation and municipal & industrial withdrawals can account for sizeable portions of the water budget (up to 27%).

3.1.1 Final Unimpaired Flows

The daily unimpaired flows shown in **Figure 3.1.2** reveal that the USACE and EPD datasets differ significantly on a daily basis, with the differences reaching up to 45,000 cfs. The differences arise

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due to the fact that the USACE flows were adjusted with 7-day centered moving averages while the EPD flows were left unsmoothed. However, local adjustments were made to the EPD flows to remove negative values.

The two-year moving averages shown in **Figure 3.1.3** reveal that the unimpaired flows are quite similar between the two datasets. A general comparison with the precipitation moving averages reveals that the trends are similar and there is good correspondence between the unimpaired flows and precipitation in the Lake Lanier watershed.

3.1.2 Observed Streamflow Filling

Only streamflows at the downstream node, Buford, were required since the Buford reach is a headwater sub-basin. The Buford streamflow records were not complete over the entire study period, and the flows at several time periods were filled in using relationships developed with streamflows at the Norcross node, as shown in **Figure 3.1.4**. A period from early 1942 to the middle of 1946 was used to calibrate the relationship, which was then used to estimate the streamflows from 1939 to early 1942. The errors between the predicted and observed streamflows during the calibration period reveal that there can be large errors on a daily basis of up to 13,000 cfs. However, the errors decrease down to a maximum of 250 cfs when considering a monthly time resolution (bottom left graph in **Figure 3.1.4)**. The top graph of **Figure 3.1.4** also shows the degree to which the construction of the Buford Dam in the mid to late 1950's altered the observed streamflows.

3.1.3 Streamflow Routing

No streamflow routing from the upstream node was performed since the reach is a headwater sub-basin.

3.1.4 Municipal & Industrial Withdrawals

The net municipal & industrial withdrawals are shown in **Figure 3.1.5** and reach up to 250 cfs in recent years. The data used by the USACE and EPD datasets are similar except for a period in early 2002. Analysis of the differences between measured and averaged flows from 1980 to 1993 reveal that sizable uncertainties (of up to 90 cfs) are introduced by hindcasts that keep withdrawals constant on a decadal basis. These uncertainties are larger than the mean M&I net withdrawal (estimated at 72 cfs during the same time period). Some isolated M&I values are clearly erroneous in the EPD data set (**Figure 3.1.5**).

3.1.5 Agricultural Withdrawals

Agricultural withdrawals are shown in **Figure 3.1.6**. Though the magnitudes are quite small (less than 25 cfs), a comparison of the agricultural withdrawals reveals that there are *relative* discrepancies between the USACE and EPD datasets of up to 15 cfs.

3.1.6 Net Evaporation

The different datasets used to compute the net evaporation losses from Lake Lanier are shown in **Figures 3.1.7** to **3.1.10**. It should be noted that prior to 2001 the EPD dataset is based on the same net evaporation rates as the USACE dataset. However, in order to facilitate comparison between the USACE and EPD net evaporation estimation procedures, the EPD results depict the quantities that would have been computed if the EPD approach had also been used prior to 2001.

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The USACE, EPD, and GWRI evaporation rates are shown in **Figure 3.1.7** and are of the same order of magnitude when averaged over a year. However, the EPD rates tend to be higher than the USACE rates during the months with high evaporation rates. The GWRI rates are even higher than the EPD rates during the high evaporation months but also lower during the low evaporation months. The precipitation data used by USACE, EPD, and GWRI are shown in **Figure 3.1.8** and are generally similar in magnitude. The constant runoff coefficients used by USACE and EPD are depicted in **Figure 3.1.9**, with the USACE coefficient being larger than the EPD coefficient (0.5 versus 0.4). The GWRI coefficients are time varying and are based on a physically based hydrologic model (Georgakakos and Zhang, 2011) calibrated for the Buford watershed. The GWRI runoff coefficients exhibit significant variation, as is appropriate for the response of a natural watershed. The final net evaporation timeseries computed by combining the evaporation, precipitation, and runoff datasets are shown in **Figure 3.1.10**. The EPD net evaporation losses are consistently higher than those computed by USACE, on average by a factor of 2 (or approximately 40 cfs). The GWRI net evaporation losses tend to be lower than the USACE rates.

The USACE dataset also contains an erroneous abrupt spike on September 30, 2000. The net evaporation losses on that day are about 30 times larger in magnitude than the net losses during the preceding days.

3.1.7 Discussion

The daily USACE and EPD flows can be significantly different (up to 45,000 cfs). The filled in observed streamflow values in this reach also add significant uncertainties on a daily basis. Alternative estimation procedures of missing values could mitigate these errors. As a result, there are large uncertainties about the unimpaired flows when considering them on a daily time step.

There are differences between the net evaporation losses computed by USACE and EPD of about 40 cfs. On average, the EPD flows are twice as high as the USACE flows. These differences are unexpected since the individual USACE and EPD datasets (evaporation rate, precipitation, runoff coefficients) used to calculate the net evaporation flows are relatively similar. Additionally, the USACE and EPD documentation mention similar derivation procedures. Closer analysis of the EPD computer programs and results indicates that the EPD derivation deviates from the procedure and values discussed in the EPD documentation. The net evaporation difference is primarily due to using half of the actual precipitation (through multiplication of the precipitation data by 0.5) in the EPD derivation procedures. While these adjustments may have been motivated by the need to improve on the USACE net evaporation rates, they do not follow a consistent climatological approach. The alternative net evaporation losses computed by GWRI for informational purposes show closer correspondence to the USACE values, but exhibit larger fluctuations intra-annually. Further investigation into developing the best estimates of net evaporation from the reservoir surface is recommended.

There are also some discrepancies between the EPD and USACE agricultural withdrawals (of about 15 cfs). However, the agricultural withdrawals only account for a negligible portion of the water budget in the Buford reach.

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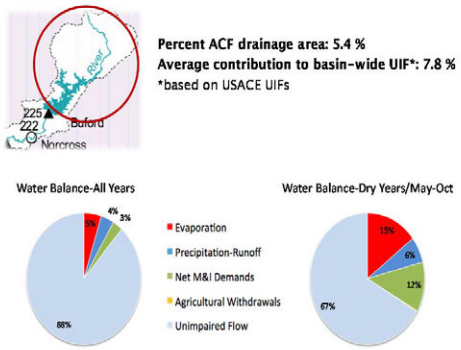

Figure 3.1.1: Buford reach overview.

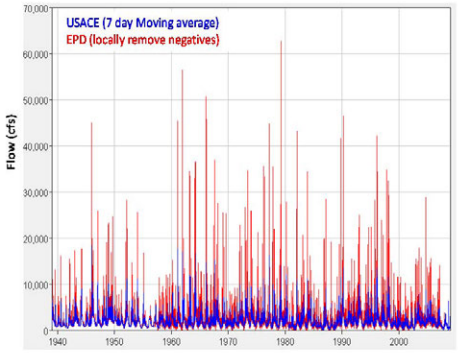

Figure 3.1.2: Buford reach daily unimpaired flows.

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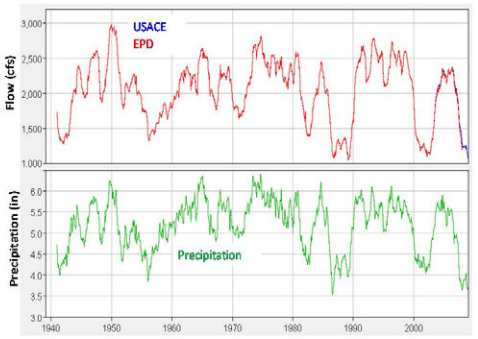

Figure 3.1.3: Two year moving averages of unimpaired flows and precipitation in the Buford reach.

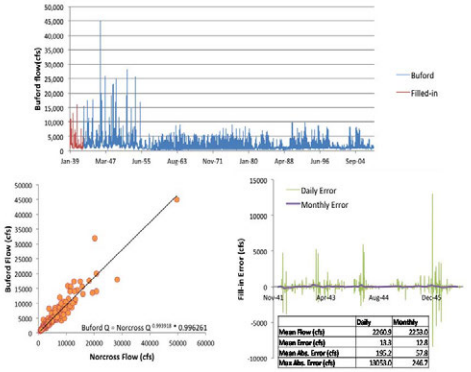

Figure 3.1.4: Estimation of Buford node streamflows.

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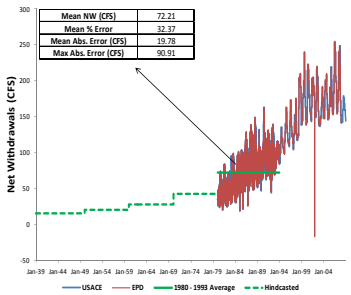

Figure 3.1.5: Buford reach net municipal & industrial withdrawals.

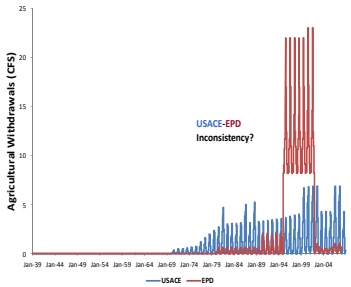

Figure 3.1.6: Buford reach agricultural withdrawals.

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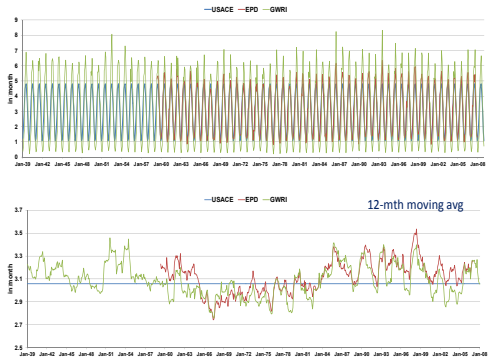

Figure 3.1.7: Lake Lanier evaporation rates.

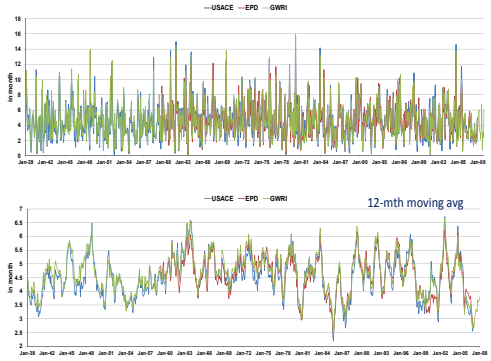

Figure 3.1.8: Mean aerial precipitation over Lake Lanier.

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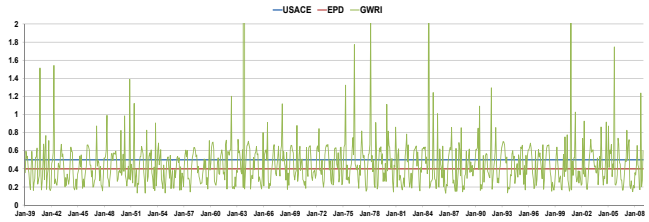

Figure 3.1.9: Runoff coefficients in the vicinity of Lake Lanier.

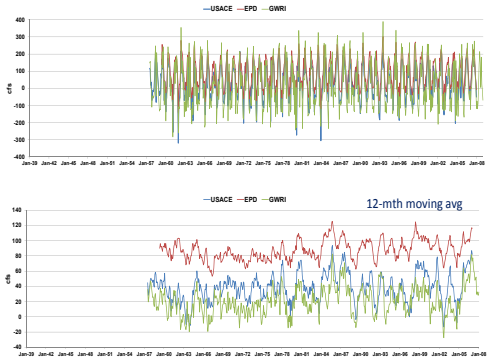

Figure 3.1.10: Net evaporation flows out of Lake Lanier.

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3.2 Norcross

The Norcross reach is located between the Buford and Norcross nodes. Summary information for the Buford reach is shown in **Figure 3.2.1**. The reach is very small and only makes a minor contribution (less than 1%) to the basin-wide flows. The water budget is heavily dominated by the unimpaired flows, even during dry periods.

3.2.1 Final Unimpaired Flows

The daily unimpaired flows are shown in **Figure 3.2.2**. Both USACE and EPD used 7 day centered moving averages to smooth the unimpaired flows. The USACE dataset contains negative values frequently reaching -500 cfs and occasionally exceeding -1000 cfs. EPD made additional annual adjustments to remove any negative unimpaired flows. The figure clearly shows that the UIF patterns during the early, middle, and recent periods are dissimilar.

Since the EPD adjustments are made annually, the overall water balance over each individual year is maintained and the two year moving averages shown in **Figure 3.2.3** are similar for most of the study period. However, there are some systematic differences between the unimpaired flows starting in 2002 because USACE and EPD used different streamflow gages at the upstream node of the reach (Buford) to obtain observed streamflow data. In this time period, the EPD UIFs are higher than those of USACE by up to 120 cfs.

The two year moving averages of unimpaired flows do not correspond well with moving averages of precipitation. There is a sudden large increase of the average unimpaired flows in the mid to late 1950s even though the precipitation patterns do not change significantly. The unimpaired flows also exhibit a declining trend after 1980. Such a trend is not present in the precipitation data.

The previous comparisons provide evidence that significant random and systematic errors and biases exist in the Buford UIFs across a wide range of temporal scales, from daily to decadal.

3.2.2 Observed Streamflow Filling

Computation of the unimpaired flows required streamflow observations at the upstream Buford and downstream Norcross nodes. The data and filling process at the Buford node are discussed in the section for the Buford reach. The Norcross streamflow records were also not available over the entire study period, and the flows at several time periods were filled in using relationships developed with streamflows at the Buford node, as shown in **Figure 3.2.4**. A period from early 1942 to the middle of 1946 was used to calibrate the relationship, which was then used to estimate the streamflows from 1946 to 1956. The errors between the predicted and observed streamflows during the calibration period reveal that there can be large errors on a daily basis (up to ±10,000 cfs). However, the errors decrease when considering a monthly time resolution.

3.2.3 Streamflow Routing

A simplified Muskingum model with only two parameters was used to route observed streamflows from Buford to Norcross. As shown in **Figure 3.2.5**, the unimpaired flows exhibit negative values whenever the hydrograph is rising (often exceeding -5,000 cfs). Closer inspection of the data reveals also that these negatives are usually preceded by large positive values of roughly equal (but opposite) magnitude. These peaks and valleys were found to be the result of an approximate routing model that does not properly route flows during flood events. As a result, the unimpaired flows can have large, unnatural fluctuations on a daily basis, some of which remain even when the flows are smoothed.