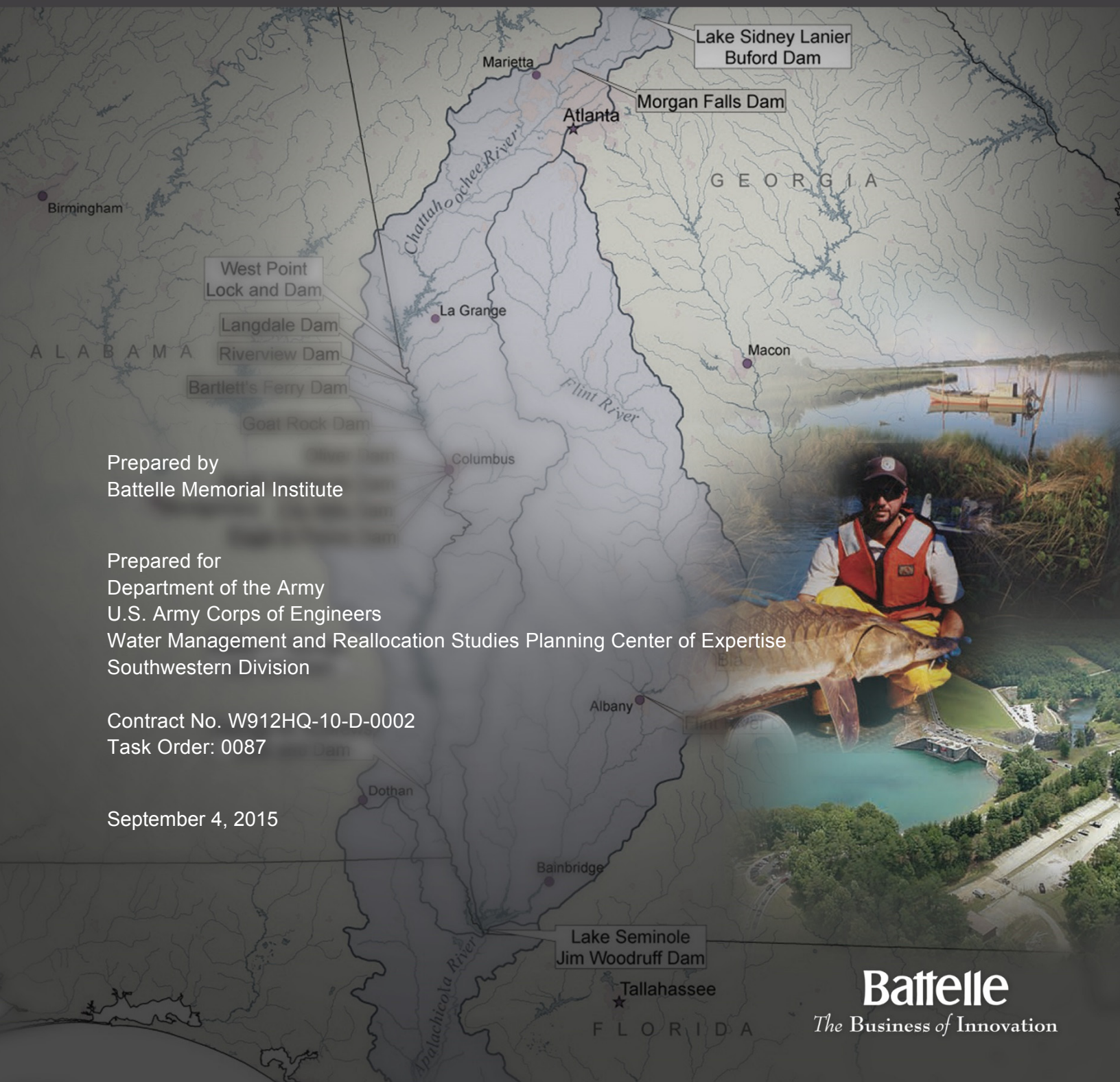
Final Independent External Peer Review Report Apalachicola-Chattahoochee-Flint River Water Control Manual, Environmental Impact Statement, and Water Supply Storage Assessment Report



Prepared by
Battelle Memorial Institute

Prepared for
Department of the Army
U.S. Army Corps of Engineers
Water Management and Reallocation Studies Planning Center of Expertise
Southwestern Division

Contract No. W912HQ-10-D-0002
Task Order: 0087

September 4, 2015

Battelle
The Business of Innovation

This page is intentionally left blank.

CONTRACT NO. W912HQ-10-D-0002
Task Order: 0087

Final Independent External Peer Review Report Apalachicola-Chattahoochee-Flint River Water Control Manual, Environmental Impact Statement, and Water Supply Storage Assessment Report

Prepared by

Battelle
505 King Avenue
Columbus, Ohio 43201

for

Department of the Army
U.S. Army Corps of Engineers
Water Management and Reallocation Studies
Planning Center of Expertise
Southwestern Division

September 4, 2015

This page is intentionally left blank.

Final Independent External Peer Review Report Apalachicola-Chattahoochee-Flint River Water Control Manual, Environmental Impact Statement, and Water Supply Storage Assessment Report

Executive Summary

PROJECT BACKGROUND AND PURPOSE

The Apalachicola-Chattahoochee-Flint (ACF) River Basin originates in northeast Georgia, crosses the Georgia-Alabama state line into central Alabama, and follows the state line south until it terminates in Apalachicola Bay, Florida. Extending a distance of approximately 385 miles, the basin drains 19,600 square miles.

There are five Federal reservoirs and eight non-Federal reservoirs in the ACF system. At the headwaters of the system north of Atlanta are Buford Dam and Lake Sidney Lanier (hereinafter: Lake Lanier). Other Federal reservoirs in the ACF River system are West Point Dam and West Point Lake; Walter F. George Lock and Dam and W.F. George Lake; George A. Andrews Lock and Dam and George A. Andrews Lake; and Jim Woodruff Lock and Dam and Lake Seminole.

Federal interest in the ACF Basin dates back to the 1800s. Navigation improvements were authorized under the River and Harbor Act of 1874. Later, flood control and hydropower interests were addressed. The River and Harbor Acts of 1945 and 1946 provided for the construction of a series of locks, dams, and reservoirs within the ACF Basin as part of a general plan to provide system-wide benefits for navigation, flood control (flood risk management), hydropower generation, water supply, water quality, recreation, and fish and wildlife conservation. Modifications of those plans and subsequent legislation have resulted in the completion of five Federal dams, four on the Chattahoochee and one at the confluence of the Chattahoochee and Flint Rivers. Operations of the ACF system and of the individual projects within it are governed by the original authorizing legislation, as amended, and by other general authorities and applicable law.

Project operations at each reservoir are described in water control plans and/or manuals. These manuals typically outline the regulation schedules for each project, including operating criteria, guidelines and rule curves, and specifications for storage and releases from the reservoirs. The water control manuals also outline the coordination protocol and data collection, management, and dissemination associated with routine and specific water management activities (such as flood control operations or drought contingency operations). As a major Federal action, updates and revisions to the water control plans must undergo the National Environmental Policy Act (NEPA) public involvement and documentation process.

In order to balance the water management needs for the numerous and often competing authorized project purposes at each individual project with the basin-wide water resource needs for areas throughout the ACF basins, the water control plans must include a certain level of operation flexibility and discretion.

Project operations must also be able to adapt to seasonal and inter-annual variations in flow and climatic conditions.

ACF management faces two immediate challenges. First, there are no current, approved water control manuals outlining how the system and individual projects will be operated in current basin circumstances. Second, physical and hydrologic conditions in the ACF Basin have changed since the project(s) were authorized and constructed. Manuals that guide water management under today's conditions are needed.

Several entities are making municipal and industrial (M&I) withdrawals from Lake Lanier that are not in compliance with the 1958 Water Supply Act and U.S. Army Corps of Engineers (USACE) policy requiring water supply agreements. This is an artifact from the 'live and let live' policy for water use that was put in place to allow M&I withdrawals to continue while the states of Alabama, Florida, and Georgia resolved their concerns about water use in the ACF Basin. Disagreement over water use in the ACF system and USACE authorities and operations has been a source of controversy since the 1980s and the subject of ongoing litigation since 1990. Efforts to study and resolve these disagreements include Memoranda of Agreement, a Comprehensive Study, an ACF Compact, court-ordered mediation, and governor-initiated and administration-led negotiations. Litigation includes cases heard by the District Court for Middle District of Florida and the District Court, 11th Circuit Court of Appeals. Subsequent to the decision by the 11th Circuit Court of Appeals, the U.S. Supreme Court declined to accept the case. The State of Florida initiated litigation against the State of Georgia in 2013.

Secretary of the Army Pete Geren concluded that USACE should prepare water control manuals that were in accordance with applicable policy and regulation, and directed in January 2008 that work should begin on a water control manual update.

The planning objectives of the ACF Water Control Manual Update are to:

1. Develop manuals that enable Mobile District to operate the Federal projects in a balanced manner to achieve all authorized purposes while not attempting to resolve the longstanding controversies associated with the ACF Basin.
2. Develop a water supply storage assessment that accurately assesses current and future water demands in the upper ACF Basin, and define management actions and conditions under which level of water supply storage could be made available for reallocation, if it is determined that it is appropriate to do so.

Independent External Peer Review Process

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. USACE is conducting an Independent External Peer Review (IEPR) of the Apalachicola-Chattahoochee-Flint River Water Control Manual, Preliminary Draft Environmental Impact Statement (PDEIS), and Water Supply Storage Assessment Report (hereinafter: ACF River IEPR). As a 501(c)(3) non-profit science and technology organization, Battelle is independent, free from conflicts of interest (COIs), and meets the requirements for an Outside Eligible Organization (OEO) per guidance described in USACE (2012). Battelle has experience in establishing and administering peer review panels for USACE and was engaged to coordinate the IEPR of the ACF River project. The IEPR was external to the agency and conducted following USACE and Office of Management and Budget (OMB) guidance described in USACE (2012) and OMB (2004). This final report presents the Final Panel Comments of the IEPR Panel (the Panel). Details regarding the IEPR (including the process for selecting panel members,

the panel members' biographical information and expertise, and the charge submitted to the Panel to guide its review) are presented in appendices.

Based on the technical content of the ACF River review documents and the overall scope of the project, Battelle identified potential candidates for the Panel in the following key technical areas: water supply planning, water resources engineering/hydrology, economics, and environmental and NEPA. Battelle screened the candidates to identify those most closely meeting the selection criteria and evaluated them for COIs and availability. USACE was given the list of final candidates to confirm that they had no COIs, but Battelle made the final selection of the four-person Panel.

The Panel received an electronic version of the 4,574-page ACF River review documents, along with a charge that solicited comments on specific sections of the documents to be reviewed. Following guidance provided in USACE (2012) and OMB (2014), USACE prepared the charge questions, which were included in the draft and final Work Plans.

The USACE Project Delivery Team briefed the Panel and Battelle during a kick-off meeting held in person and via teleconference/webinar prior to the start of the review to provide the Panel an opportunity to ask questions of USACE and clarify uncertainties. The kickoff meeting was held at the USACE Mobile District Annex Office in Mobile, Alabama on July 7, 2015. Two panel members attended this meeting in person along with two Battelle staff, the remaining two panel members participated via teleconference and webinar. Other than this meeting and Battelle-facilitated teleconferences, there was no direct communication between the Panel and USACE during the peer review process. The Panel produced individual comments in response to the charge questions.

IEPR panel members reviewed the ACF River documents individually. The panel members then met via teleconference with Battelle to review key technical comments and reach agreement on the Final Panel Comments to be provided to USACE. Each Final Panel Comment was documented using a four-part format consisting of: (1) a comment statement; (2) the basis for the comment; (3) the significance of the comment (high, medium/high, medium, medium/low, or low); and (4) recommendations on how to resolve the comment. Overall, 15 Final Panel Comments were identified and documented. Of these, three were identified as having medium/high significance, six had a medium significance, four had medium/low significance, and two had low significance.

Results of the Independent External Peer Review

The panel members agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2012; p. D-4) in the ACF River review documents. Table ES-1 lists the Final Panel Comment statements by level of significance. The full text of the Final Panel Comments is presented in Section 4.2 of this report. The following summarizes the Panel's findings.

Based on the Panel's review, the report is well-written and organized, and provides an excellent presentation of information using graphics that enable the reader to better understand the proposed action. The Panel found this to be an extremely complicated project, but USACE has successfully balanced several competing reservoir purposes that complicate the decision-making process. The Panel did, however, identify elements of the project that require further evaluation and verification and sections of the ACF River documents that should be clarified or discussed in greater detail.

Plan Formulation: The Panel found the documents to be very thorough in the presentation of information; however, in some instances this amount of information also led to confusion. By the time the actual plan formulation process was discussed, the overall process became difficult to follow. One of the Panels' most significant findings was that the alternatives analysis equally weighted the authorized project purposes, which is not consistent with the disproportionate importance of some project purposes. The Panel suggests that USACE develop a strategy for weighting the relative importance of project purposes based on factors such as Federal and state legal requirements, project authorizations, monetary and non-monetary benefits/impacts. The Panel noted that the Future Without-Project (FWOP) conditions are not consistent across all alternatives. USACE can address this by including all water supply measures assumed to be in the FWOP conditions, including the Glades Reservoir, as available, to meet Georgia's future water demand requirements for all alternatives. Finally, the Panel noted that the reason for using the two-phased approach to screen alternatives is not fully explained, and the use of different terms for alternatives is confusing. Adding a detailed description of the two-phased approach to alternative screening and providing a rationale for using the two-phased screening would help clarify this issue.

Economics: The Panel appreciated the updated information describing socioeconomic conditions within the study area provided after the mid-review teleconference facilitated by Battelle. They also found the graphics illustrating the elevations of reservoir storage pools, the action zones within the conservation pool throughout the year, and the activities supported/suspended in the various action zones to be valuable. However, the Panel determined that there was a lack of information on the future water demand requirements, which are the basis for assessing the impacts of the alternatives on M&I water supply. Additional information on the impacts of water conservation measures enacted within the basin to the water demand analysis would help confirm the need for future water supply requests. The Panel noted that an accurate assessment of the impacts on navigation is needed to validate the selection of the proposed action alternative (PAA) or recommended plan. Providing an analysis to support the assertion that shippers would divert commodity movements to the waterway under navigation conditions expected to occur under the PAA could help address this issue. Similarly, the Panel noted that an accurate assessment of the impacts on M&I water supply is needed to validate the selection of the PAA or recommended plan as well. The maximum reasonable net withdrawal from Lake Lanier is not provided and as a result, the PDEIS did not address the ability of Lake Lanier to support gross water supply withdrawals between 225 million gallons a day (mgd; provided by the PAA) and 297 mgd (requested by the state of Georgia). USACE can address this issue by revising the assessment of the M&I water supply impact of the PAA on Lake Lanier to be consistent with criteria cited in the PDEIS.

Environmental: The Panel noted that there is no evidence to support equal weighting for each water availability and water quality parameter/indicator used to evaluate effects on fish and wildlife resources. This issue can be addressed by evaluating the relative significance of each parameter/indicator, and giving more weight to those parameters/indicators that are more important to fish and wildlife resources. The Panel also noted that the conclusion that specific compensatory mitigation measures would not be required for the PAA in resource areas where substantial adverse effects and slightly adverse effects were identified is not supported by the documentation provided. Discussion of the need for mitigation specifically for each resource area where adverse effects were determined would strengthen the documents.

Engineering: The Panel noted that, during the formulation of alternatives, opportunities were not considered where structural measures could increase the performance of the Federal reservoirs/dams with minimal changes to their overall physical features. The Panel suggests the Project Delivery Team

analyze potential structural changes to ACF dam features that would enhance downstream flows during peak and low-flow periods and provide benefits that would be sufficient to offset the costs of such changes.

Table ES-1. Overview of 15 Final Panel Comments Identified by the ACF River IEPR Panel

No.	Final Panel Comment
Significance – Medium/High	
1	The authorized project purposes are equally weighted for the alternative analysis, which is not consistent with the disproportionate importance of some project purposes.
2	The future water demand requirements, which are the basis for assessing the impacts of the alternatives on M&I water supply, could not be confirmed.
3	The maximum reasonable withdrawal from Lake Lanier is not identified and as a result, the PDEIS did not evaluate the ability of Lake Lanier to support gross water supply withdrawals between 225 and 297 mgd.
Significance – Medium	
4	The finding that the PAA would have a substantially beneficial effect on navigation is not supported by data or analysis.
5	There is no evidence to support the use of equal weighting for each water availability and water quality parameter/indicator used to evaluate effects on fish and wildlife resources.
6	The finding that the PAA would have a “substantially beneficial” effect on the M&I water supply is not supported by the data or analysis.
7	Future Without-Project (FWOP) conditions are not consistent across all alternatives.
8	The conclusion that specific compensatory mitigation measures would not be required for the PAA in resource areas where substantial adverse effects and slightly adverse effects were identified is not supported.
9	Structural measures that could increase the performance of the Federal reservoirs/dams with minimal changes to their overall physical features are not considered in the formulation of alternatives.
Significance – Medium/Low	
10	For four resource categories, the rationale for measuring some parameters and/or determining the resulting conclusions or environmental condition changes is not described.
11	All alternatives are considered to perform equally well in flood control; however, changes in storage capacity during storm events due to differences in lake stages are not considered.

Table ES-1. Overview of 15 Final Panel Comments Identified by the ACF River IEPR Panel (continued)

No.	Final Panel Comment
12	The return rate, an important parameter for estimating the availability of water supply, is not applied in a consistent manner across all water management and water supply alternatives.
13	The two-phased approach to the screening of alternatives is not explained, and the use of different terms for alternatives is confusing.
Significance – Low	
14	Certain socioeconomic data provided in the PDEIS documents are inconsistent or inaccurate, which could lead to misinterpretation of study area conditions.
15	The PDEIS does not acknowledge that variations in the amount of hydroelectric power generated under the alternatives would be offset by increases or decreases in power generation from another source, which could change greenhouse gas emissions.

Table of Contents

List of Tables

LIST OF ACRONYMS

ACF	Apalachicola-Chattahoochee and Flint
ATR	Agency Technical Review
COI	Conflict of Interest
DrChecks	Design Review and Checking System
EC	Engineer Circular
EIS	Environmental Impact Statement
ER	Engineer Regulation
ERDC	Engineer Research and Development Center
ESA	Endangered Species Act
FWOP	Future Without-Project
IEPR	Independent External Peer Review
IWR	Institute of Water Resources
M&I	municipal and industrial
NAA	No Action Alternative
NAICS	North American Industry Classification System
NEPA	National Environmental Policy Act
O&M	Operation and Maintenance
OEO	Outside Eligible Organization
OMB	Office of Management and Budget
PAA	Proposed Action Alternative
PCX	Planning Center of Expertise
PDEIS	Preliminary Draft Environmental Impact Statement
PDT	Project Delivery Team
PIR	Project Implementation Report
SLM	Senior Leader Meeting
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Services
WCM	Water Control Manual
WRDA	Water Resources Development Act
WSSA	Water Supply Storage Assessment

1. INTRODUCTION

The Apalachicola-Chattahoochee-Flint (ACF) River Basin originates in northeast Georgia, crosses the Georgia-Alabama state line into central Alabama, and follows the state line south until it terminates in Apalachicola Bay, Florida. Extending a distance of approximately 385 miles, the basin drains 19,600 square miles.

There are five Federal reservoirs and eight non-Federal reservoirs in the ACF system. At the headwaters of the system north of Atlanta are Buford Dam and Lake Sidney Lanier (hereinafter: Lake Lanier). Other Federal reservoirs in the ACF River system are West Point Dam and West Point Lake; Walter F. George Lock and Dam and W.F. George Lake; George A. Andrews Lock and Dam and George A. Andrews Lake; and Jim Woodruff Lock and Dam and Lake Seminole.

Federal interest in the ACF Basin dates back to the 1800s. Navigation improvements were authorized under the River and Harbor Act of 1874. Later, flood control and hydropower interests were addressed. The River and Harbor Acts of 1945 and 1946 provided for the construction of a series of locks, dams, and reservoirs within the ACF Basin as part of a general plan to provide system-wide benefits for navigation, flood control (flood risk management), hydropower generation, water supply, water quality, recreation, and fish and wildlife conservation. Modifications of those plans and subsequent legislation have resulted in the completion of five Federal dams, four on the Chattahoochee and one at the confluence of the Chattahoochee and Flint Rivers. Operations of the ACF system and of the individual projects within it are governed by the original authorizing legislation, as amended, and by other general authorities and applicable law.

Project operations at each reservoir are described in water control plans and/or manuals. These manuals typically outline the regulation schedules for each project, including operating criteria, guidelines and rule curves, and specifications for storage and releases from the reservoirs. The water control manuals also outline the coordination protocol and data collection, management, and dissemination associated with routine and specific water management activities (such as flood control operations or drought contingency operations). As a major Federal action, updates and revisions to the water control plans must undergo the National Environmental Policy Act (NEPA) public involvement and documentation process.

In order to balance the water management needs for the numerous and often competing authorized project purposes at each individual project with the basin-wide water resource needs for areas throughout the ACF basins, the water control plans must include a certain level of operation flexibility and discretion. Project operations must also be able to adapt to seasonal and inter-annual variations in flow and climatic conditions.

ACF management faces two immediate challenges. First, there are no current, approved water control manuals outlining how the system and individual projects will be operated in current basin circumstances. Second, physical and hydrologic conditions in the ACF Basin have changed since the project(s) were authorized and constructed. Manuals that guide water management under today's conditions are needed.

Several entities are making municipal and industrial (M&I) withdrawals from Lake Lanier that are not in compliance with the 1958 Water Supply Act and U.S. Army Corps of Engineers (USACE) policy requiring water supply agreements. This is an artifact from the 'live and let live' policy for water use that was put in place to allow M&I withdrawals to continue while the states of Alabama, Florida, and Georgia resolved

their concerns about water use in the ACF Basin. Disagreement over water use in the ACF system and USACE authorities and operations has been a source of controversy since the 1980s and the subject of ongoing litigation since 1990. Efforts to study and resolve these disagreements include Memoranda of Agreement, a Comprehensive Study, an ACF Compact, court-ordered mediation, and governor-initiated and administration-led negotiations. Litigation includes cases heard by the District Court for Middle District of Florida and the District Court, 11th Circuit Court of Appeals. Subsequent to the decision by the 11th Circuit Court of Appeals, the U.S. Supreme Court declined to accept the case. The State of Florida initiated litigation against the State of Georgia in 2013.

Secretary of the Army Pete Geren concluded that USACE should prepare water control manuals that were in accordance with applicable policy and regulation, and directed in January 2008 that work should begin on a water control manual update.

The planning objectives of the ACF Water Control Manual Update are to:

1. Develop manuals that enable Mobile District to operate the Federal projects in a balanced manner to achieve all authorized purposes while not attempting to resolve the longstanding controversies associated with the ACF Basin.
2. Develop a water supply storage assessment that accurately assesses current and future water demands in the upper ACF Basin, and define management actions and conditions under which level of water supply storage could be made available for reallocation, if it is determined that it is appropriate to do so.

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. The objective of the work described here was to conduct an Independent External Peer Review (IEPR) of the Apalachicola-Chattahoochee-Flint River Water Control Manual, Preliminary Draft Environmental Impact Statement (PDEIS), and Water Supply Storage Assessment Report (hereinafter: ACF River IEPR) in accordance with procedures described in the Department of the Army, USACE, Engineer Circular (EC) *Civil Works Review* (EC 1165-2-214) (USACE, 2012) and the Office of Management and Budget (OMB), *Final Information Quality Bulletin for Peer Review* (OMB, 2004). Supplemental guidance on evaluation for conflicts of interest (COIs) was obtained from the *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports* (The National Academies, 2003).

This final report presents the Final Panel Comments of the IEPR Panel (the Panel) on the existing engineering, economic, environmental, and plan formulation analyses contained in the ACF River IEPR documents (Section 4). Appendix A describes in detail how the IEPR was planned and conducted. Appendix B provides biographical information on the IEPR panel members and describes the method Battelle followed to select them. Appendix C presents the final charge to the IEPR panel members for their use during the review; the final charge was submitted to USACE on June 16, 2015. Appendix D presents the organizational conflict of interest form that Battelle completed and submitted to the Institute for Water Resources (IWR) prior to the award of the ACF River IEPR.

2. PURPOSE OF THE IEPR

To ensure that USACE documents are supported by the best scientific and technical information, USACE has implemented a peer review process that uses IEPR to complement the Agency Technical Review (ATR), as described in USACE (2012).

In general, the purpose of peer review is to strengthen the quality and credibility of the USACE decision documents in support of its Civil Works program. IEPR provides an independent assessment of the engineering, economic, environmental, and plan formulation analyses of the project study. In particular, the IEPR addresses the technical soundness of the project study's assumptions, methods, analyses, and calculations and identifies the need for additional data or analyses to make a good decision regarding implementation of alternatives and recommendations.

In this case, the IEPR of the ACF River was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO) (as defined by EC 1165-2-214). Battelle, a 501(c)(3) organization under the U.S. Internal Revenue Code, has experience conducting IEPRs for USACE.

3. METHODS FOR CONDUCTING THE IEPR

The methods used to conduct the IEPR are briefly described in this section; a detailed description can be found in Appendix A. Table 1 presents the major milestones and deliverables of the ACF River IEPR in chronological order. Due dates for milestones and deliverables are based on the award/effective date of April 24, 2015. Note that the work items listed under Tasks 5 and 7 occur after the submission of this report. Battelle anticipates submitting the pdf printout of the USACE's Design Review and Checking System (DrChecks) project file (the final deliverable) on December 18, 2015. The actual date for contract end will depend on the date that all activities for this IEPR are conducted.

Table 1. Major Milestones and Deliverables of the ACF River IEPR

Task	Action	Due Date
1	Award/Effective Date	4/24//2015
	Review documents available	5/7/2015
2	Battelle submits revised list of selected panel members	6/9/2015
	USACE confirms the panel members have no COI	6/11/2015
3	Battelle convenes kick-off meeting with USACE	5/7/2015
	Battelle convenes kick-off meeting with USACE and panel members	7/7/2015
4	Panel members complete their individual reviews	8/3/2015
	Panel members provide draft Final Panel Comments to Battelle	8/18/2015
6	Battelle submits Final IEPR Report to USACE	9/4/2015
7[a]	Battelle convenes Comment-Response Teleconference with panel members and USACE	9/16/2015
	Battelle submits pdf printout of DrChecks project file to USACE	12/18/2015
5[a]	Public comments provided to Battelle by USACE	11/9/2015
	Battelle compiles and summarizes public comments	11/17/2015
	If applicable, Battelle sends USACE addendum to Final Report	12/7/2015
	Contract End/Delivery Date	4/23/2016

[a] *Tasks 5 and 7 occur after the submission of this report.*

Battelle identified, screened, and selected four panel members to participate in the IEPR based on their expertise in the following disciplines: water supply planning, water resources engineering/hydrology, economics, and environmental and NEPA. The Panel reviewed the ACF River document and produced 15 Final Panel Comments in response to 17 charge questions provided by USACE for the review. This charge included two overview questions and a public comment question added by Battelle. Battelle instructed the Panel to develop the Final Panel Comments using a standardized four-part structure:

1. Comment Statement (succinct summary statement of concern)
2. Basis for Comment (details regarding the concern)
3. Significance (high, medium/high, medium, medium/low, or low; in accordance with specific criteria for determining level of significance)
4. Recommendation(s) for Resolution (at least one implementable action that could be taken to address the Final Panel Comment).

Battelle reviewed all Final Panel Comments for accuracy, adherence to USACE guidance (EC 1165-2-214, Appendix D), and completeness prior to determining that they were final and suitable for inclusion in the Final IEPR Report. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comments. The Panel's findings are summarized in Section 4.1; the Final Panel Comments are presented in full in Section 4.2.

4. RESULTS OF THE IEPR

This section presents the results of the IEPR. A summary of the Panel's findings and the full text of the Final Panel Comments are provided.

4.1 Summary of Final Panel Comments

The panel members agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2012; p. D-4) in the ACF River IEPR review document. The following summarizes the Panel's findings.

Based on the Panel's review, the report is well-written and organized, and provides an excellent presentation of information using graphics that enable the reader to better understand the proposed action. The Panel found this to be an extremely complicated project, but USACE has successfully balanced several competing reservoir purposes that complicate the decision-making process. The Panel did, however, identify elements of the project that require further evaluation and verification and sections of the ACF River documents that should be clarified or discussed in greater detail.

Plan Formulation: The Panel found the documents to be very thorough in the presentation of information; however, in some instances this amount of information also led to confusion. By the time the actual plan formulation process was discussed, the overall process became difficult to follow. One of the Panels' most significant findings was that the alternatives analysis equally weighted the authorized project purposes, which is not consistent with the disproportionate importance of some project purposes. The Panel suggests that USACE develop a strategy for weighting the relative importance of project purposes based on factors such as Federal and state legal requirements, project authorizations, monetary and non-monetary benefits/impacts. The Panel noted that the Future Without Project (FWOP) conditions are not consistent across all alternatives. USACE can address this by including all water supply measures assumed to be in the FWOP conditions, including the Glades Reservoir, as available, to meet Georgia's

future water demand requirements for all alternatives. Finally, the Panel noted that the reason for using the two-phased approach to the screening of alternatives is not fully explained, and the use of different terms for alternatives is confusing. Adding a detailed description of the two-phased approach to alternative screening, and providing a rationale for the two-phased screening would help clarify this issue.

Economics: The Panel appreciated the updated information describing socioeconomic conditions within the study area provided after the mid-review teleconference facilitated by Battelle. They also found the graphics illustrating the elevations of reservoir storage pools, the action zones within the conservation pool throughout the year, and the activities supported/suspended in the various action zones to be valuable. However, the Panel determined that there was a lack of information on the future water demand requirements, which are the basis for assessing the impacts of the alternatives on M&I water supply. Additional information on the impacts of water conservation measures enacted within the basin to the water demand analysis would help confirm the need for future water supply requests. The Panel noted that an accurate assessment of the impacts on navigation is needed to validate the selection of the proposed action alternative (PAA) or recommended plan. Providing an analysis to support the assertion that shippers would divert commodity movements to the waterway under navigation conditions expected to occur under the PAA could help address this issue. Similarly, the Panel noted that an accurate assessment of the impacts on M&I water supply is needed to validate the selection of the PAA or recommended plan as well. The maximum reasonable net withdrawal from Lake Lanier is not provided and as a result, the PDEIS did not address the ability of Lake Lanier to support gross water supply withdrawals between 225 million gallons a day (mgd; provided by the PAA) and 297 mgd (requested by the state of Georgia). USACE can address this issue by revising the assessment of the M&I water supply impact of the PAA on Lake Lanier to be consistent with criteria cited in the PDEIS.

Environmental: The Panel noted that there is no evidence to support the use of equal weighting for each water availability and water quality parameter/indicator used to evaluate effects on fish and wildlife resources. This issue can be addressed by evaluating the relative significance of each parameter/indicator, and giving more weight to those parameters/indicators that are more important to fish and wildlife resources. The Panel also noted that the conclusion that specific compensatory mitigation measures would not be required for the PAA in resource areas where substantial adverse effects and slightly adverse effects were identified is not supported by the documentation provided. Discussion of the need for mitigation specifically for each resource area where adverse effects were determined would strengthen the documents.

Engineering: The Panel noted that, during the formulation of alternatives, opportunities were not considered where structural measures could increase the performance of the Federal reservoirs/dams with minimal changes to their overall physical features. The Panel suggests the PDT analyze potential structural changes to ACF dam features that would enhance downstream flows during peak and low-flow periods and provide benefits that would be sufficient to offset the costs of such changes.

4.2 Final Panel Comments

This section presents the full text of the Final Panel Comments prepared by the IEPR panel members.

Final Panel Comment 1

The authorized project purposes are equally weighted for the alternative analysis, which is not consistent with the disproportionate importance of some project purposes.

Basis for Comment

Selection of the recommended water management and water supply alternatives required a two-step process: (1) evaluation of how the alternatives impacted each of the authorized project purposes individually, and (2) comparison of the impacts to all the project purposes collectively. By not assigning weights to each of the project purposes, all project purposes are weighted equally. The PDEIS presents ample evidence indicating that not all project purposes are equal, as summarized below:

- Flood Risk Management: The PDEIS states, "USACE does not prioritize project purposes with the exception of flood risk management during a flood event as explained in Section 2.1.1.2." (Section 4.1.1, page 4-6). Flood risk management was considered so important that a screening criterion was applied to eliminate measures that could impact flood risk from consideration. The screening criterion required that a measure (or alternative) maintain at least the current level of flood risk management (PDEIS, Section 1.4.4, page 1-15). In fact, none of the water management alternatives included changes to the project guide curves for Lake Lanier or West Point in order to maintain the current level of flood risk.
- Recreation: The PDEIS states, "… although recreation is an authorized project purpose, it is secondary (relative to storage operation) to project functions for which the reservoir storage was formulated (EM 1110-2-3600, p. 2-29)." (Section 2.1.1.2.1, page 2-60).
- Navigation: Navigation was given a relatively low priority in the planning process because only one of the seven water management alternatives evaluated included attempting to provide year-round navigability, and it was not selected. The following evidence supports navigation's low priority.
  - No maintenance dredging has been performed since 2001 (PDEIS, page 2-67).
  - The Apalachicola River was designated a low-use navigation project in fiscal year 2005 (PDEIS, Appendix A, Section 7-11, page 7-20).
  - Since 2001, there has been virtually no commercial navigational use of the Federal channel (PDEIS, Table 2.6-3, page 2-224).
  - The Rivers and Harbors Act authorizes the project for navigation (and hydropower) in accordance with HD 342, Seventy-Sixth Congress, which specifies that authorization is "...subject to the provisions that local interest furnish assurances satisfactory to the Secretary of War that they will provide free of cost to the United States, when and as required, ….. spoil-disposal areas…." Disposal areas have not been provided by local interests (PDEIS, Section 2.6.2, page 2-221).
- Fish and Wildlife Conservation: Protection of endangered species is a critical objective that is addressed by Section 7 of the Endangered Species Act. Compliance with the 2012 Revised Interim Operating Plan to protect endangered species and critical habitat downstream of the Jim Woodruff Lock and Dam requires that USACE take actions to avoid adverse impacts to federally listed species or habitat.
- Hydroelectric Power Generation: There is no storage allocated specifically to hydroelectric power generation. The amount of generation per day is governed by a preset guide curve and action zones for each reservoir, with diminishing energy generation with declining storage. Minimum generation

Final Panel Comment 1

provides the release that would normally meet downstream water supply and water quality demands (PDEIS, Section 2.1.1.2.4.2, page 2-65).

Because the project purposes are not equally important in the evaluation of alternative plans as described above, weighting them equally does not support the goal of identifying the alternative that optimizes overall benefits. Appropriate weights could be developed for the project purposes by evaluating factors such as Federal and state legal requirements, project authorizations, monetary and non-monetary benefits/impacts, etc. To provide transparency, a sensitivity analysis could be performed to clearly demonstrate the impacts of the weights on the decision making process.

Significance – Medium/High

Comparison of alternatives and identification of the preferred water management and water supply plans may be based on an analysis that gives disproportionate importance to certain project purposes.

Recommendations for Resolution

1. Develop a strategy for weighting the relative importance of project purposes based on factors such as Federal and state legal requirements, project authorizations, monetary and non-monetary benefits/impacts, etc.

2. Apply weights to the evaluation and comparison of the overall performance of water management and water supply alternatives in supporting the authorized project purposes.

Final Panel Comment 2

The future water demand requirements, which are the basis for assessing the impacts of the alternatives on M&I water supply, could not be confirmed.

Basis for Comment

The water demand analysis, developed by USACE in order to confirm the need for the water supply requested by the state, could not be validated because certain assumptions used in the analysis are not supported by the review documents, and sufficient information on parameters such as population and employment served by the public water supply systems, residential per-capita water use, and water use rates per employee is not provided.

The assessment of impacts of each alternative on M&I water supply is based on the ability of the alternative to meet Georgia's future water demand requirements of 705 million gallons per day (mgd) (297 mgd from Lake Lanier and 408 mgd from the Chattahoochee River) by 2040. The methods and assumptions used by the State of Georgia to develop its water demand requirements are not provided. The population for which the State of Georgia developed its future water demand requirements, which is the basis for its requested water withdrawals, could not be determined.

The Water Supply Storage Assessment (WSSA) report included a water demand analysis for Lake Lanier that was conducted by USACE in order to confirm and validate the need for future water supply requested by the state. Sufficient data to validate all assumptions and methods used by USACE to develop the water demand forecast are not provided.

The water demand analysis developed by USACE to confirm and validate the state's future water demand request was based on several assumptions, including:

1) Rates of water use per unit for each sector would not account for future improvements in water use efficiency (i.e., water conservation).

2) Residential water use in each county would maintain the current average rate of water use per capita.

3) Water use per employee into the future would maintain the current average rate of use per employee per North American Industry Classification System (NAICS) group.

Data presented in the documents do not support the assumption that water use rates per unit for each sector should not account for water conservation measures. As stated in the WSSA report, water providers within the basin have been implementing multiple water conservation measures in order to reduce demand. These conservation measures should result in reduced per-capita rates due to ultra-low flow water use fixtures being installed in new structures during construction and in existing structures as old water use fixtures are replaced. In addition, the State of Georgia indicated that per-capita use rates are projected to continue to fall over the period of analysis. For these reasons, the assumption that the analysis would not account for the impact of water conservation measures is not valid. Not incorporating the impact of water conservation programs within the basin into the water demand analysis could lead to an overestimation of water demand. If water conservation measures had been incorporated into the water demand analysis as they should have been, the next two assumptions (that residential water use in each county would maintain the current average rate of water use per capita and that water use per employee

Final Panel Comment 2

into the future would maintain the current average rate of use per employee) would not be valid.

Furthermore, the review documents do not clearly quantify the population utilized in the water demand analysis. Future water use should be based on the population served by the public supply systems that currently withdraw, or are projected to withdraw, water from Lake Lanier. However, it appears that the water demand analysis was developed for the entire population within each county that has a portion of its land area within the ACF basin, regardless of how much of the county's land area lies within the basin. This approach would overestimate water demand.

Finally, the values for parameters used to forecast residential and non-residential water use (population served, employment, residential per-capita water use, and water use per employee) are not provided.

Significance – Medium/High

Verifiable water demand projections are needed to accurately assess the impact of each alternative on M&I water supply.

Recommendations for Resolution

1. Incorporate the impact of water conservation measures enacted within the basin into the water demand analysis.
2. Verify that the water demand analysis was developed only for the population served by the public supply systems that currently withdraw, or are projected to withdraw, water from Lake Lanier.
3. Provide the values for parameters used to forecast residential and non-residential water use (population served, employment, residential per-capita water use, and water use per employee).

Final Panel Comment 3

The maximum reasonable withdrawal from Lake Lanier is not identified and as a result, the PDEIS did not evaluate the ability of Lake Lanier to support gross water supply withdrawals between 225 and 297 mgd.

Basis for Comment

The 225 mgd water supply allocation in the PAA was calculated based on the gross allocation requested by the state of Georgia and what was considered to be a reasonable return rate. However, the PAA's water supply allocation does not fully meet Metro Atlanta's 2040 water supply needs.

In Section 5.1.4.1.1, page 5-5 and 5-6 of the PDEIS, an analysis of the net withdrawals and returns to Lake Lanier indicates that 225 mgd in gross withdrawal can be supported by some combination of Lake Lanier and Glades Reservoir, including a return of 91 mgd of treated wastewater and a net withdrawal of 134 mgd, which was stated as a reasonable net withdrawal. The rationale for assuming that 134 mgd is a reasonable net withdrawal from Lake Lanier is not sufficiently explained. The maximum reasonable withdrawal from Lake Lanier is not identified and as a result, the PDEIS did not address the ability of Lake Lanier to support gross water supply withdrawals between 225 and 297 mgd. Therefore, PDEIS does not demonstrate that a water supply allocation greater than 225 mgd could not be provided without unreasonable adverse impacts.

Significance – Medium/High

It may be possible to provide a water supply allocation from Lake Lanier greater than 225 mgd without unreasonably adverse impacts.

Recommendations for Resolution

1. Provide the rationale for assuming 134 mgd is a reasonable net withdrawal rate from Lake Lanier.
2. Provide an estimate of the maximum withdrawal rate from Lake Lanier that can be made without unreasonable adverse impacts to other project purposes.

Final Panel Comment 4

The finding that the PAA would have a substantially beneficial effect on navigation is not supported by data or analysis.

Basis for Comment

The Panel did not find any analysis to support the assessment that the PAA would provide a significantly beneficial impact to navigation.

Based on modeling the system over the 73-year period of record (1939-2011), under the No Action Alternative (NAA), flows sufficient to support a minimum 7-foot-deep navigation channel in January through May (the navigation season) would be expected to be available during 15 of the 73 years included in the period of record (20.5 percent of the navigation seasons). The PDEIS states that an important benchmark for the navigation industry to judge channel reliability is the extent to which a 7-foot navigable depth would be available using a 90-percent reliability standard (i.e., 7-foot channel depth available 90 percent of the time during the navigation season). Under the NAA, this benchmark would be met in 36 of the 73 years included in the period of record (approximately 50 percent of the navigation seasons). Under the NAA, which reflects USACE's current water management operations, no commercial navigation occurs on the waterway.

Under the PAA, a 7-foot-deep navigation channel would be available during 31 of the 73 years included in the period of record (42 percent of the navigation seasons), compared to 21 percent under the NAA. Under the PAA, the benchmark of having a 7-foot channel depth available 90 percent of the time during the navigation season would be met during 54 of the 73 years included in the period of record (approximately 74 percent of the navigation seasons), compared to 50 percent under the NAA.

Due to the unreliability of the existing navigation channel under current water management operations, there is currently no navigation on the waterway. In order for any alternative to have an impact that would result in a highly noticeable effect (significantly beneficial), shippers would have to divert commodity movements away from existing established modes of transportation (truck and rail), to the waterway under the restricted navigation conditions (limited depth, availability, and reliability) that are expected to occur under the PAA. No data are provided to support this assertion, nor are any data provided to quantify the potential amount of cargo that could be diverted to the waterway under the action alternatives. Moreover, no evidence is presented to show that the economic benefits of maintaining the navigability provided by the PAA would justify the economic cost of the water supply that would be sacrificed.

Significance – Medium

An accurate assessment of the impacts on navigation is needed in order to validate the selection of the PAA or recommended plan.

Recommendations for Resolution

1. Provide analysis to support the assertion that shippers would divert commodity movements to the

Final Panel Comment 4

waterway under navigation conditions expected to occur under the PAA.

2. Provide data quantifying the potential amount of cargo that could be diverted to the waterway under the action alternatives.

Final Panel Comment 5

There is no evidence to support the use of equal weighting for each water availability and water quality parameter/indicator used to evaluate effects on fish and wildlife resources.

Basis for Comment

The basis for equal weighting of parameters/indicators that were measured in order to evaluate effects to fish and wildlife resources is not explained in the PDEIS.

In Section 4.10.4 of the PDEIS, six indicators of water availability were used to measure the degree to which a water management alternative satisfied the fish and wildlife project purpose. These indicators are:

- Percent of years with days greater than flow
- Median number of days/year greater than flow
- Median number of consecutive days/year greater than flow
- Annual maximum 30-day growing season floodplain connectivity (acres)
- Median fall rates
- Maximum fall rates

These indicators are weighted equally in the analysis, yet their importance to fish and wildlife resources is only loosely discussed in previous sections.

In Section 6.1.2 of the PDEIS, Water Quality, all indicators were treated equally. These indicators are:

- Temperature
- Dissolved oxygen
- Phosphorus
- Nitrogen
- Chlorophyll a

However, the presence/absence of sufficient dissolved oxygen could arguably be considered to outweigh other parameters because the lack of sufficient dissolved oxygen can result in ‘dead zones’. In Table 6.4-2, the outcomes for the effect of water quality on fish and wildlife resources in rivers were based upon the most extreme effect of all criteria (refer to last paragraph on page 6-171).

Significance – Medium

Weighting the most critical parameters/indicators (for example, dissolved oxygen in the case of water quality) could produce different results in the analysis of effects on fish and wildlife resources.

Recommendations for Resolution

1. Evaluate the relative significance of each parameter/indicator, giving more weight to those parameters/indicators that are more important to fish and wildlife resources.

Final Panel Comment 5

2. Assign a specific numeric value to each parameter/indicator based on the evaluation.
3. Reanalyze the impacts to fish and wildlife resources based on the newly assigned weights.
4. Provide the rationale for equal weighting of parameters when a ranking system employs equal weighting.

Final Panel Comment 6

The finding that the PAA would have a "substantially beneficial" effect on the M&I water supply is not supported by the data or analysis.

Basis for Comment

The stated impact of the PAA on the M&I water supply is inconsistent with the criteria for assessing the impacts as stated in the review documents.

Section 6.5.1, page 6-189, of the PDEIS states: "Alternatives that fail to meet Metro Atlanta's 2040 water supply needs are substantially adverse and those that meet the requested amount for 2040 are substantially beneficial." (The rationale for limiting the impact on the M&I water supply to either being substantially adverse or substantially beneficial is not provided in the review documents.) Section 2.6.1.3, page 2-219, of the PDEIS states that the future water use withdrawals from Lake Lanier by 2040 are forecasted at 297 mgd (277 mgd for Metro Atlanta and 20 mgd for existing relocation contracts). Alternative 7H (the PAA) provides for withdrawal of 225 mgd from Lake Lanier and the proposed Glades Reservoir, 72 mgd less than the projected need of 297 mgd. Section 6.5.1.1.9 states that this alternative "would satisfy a major portion of Georgia's stated 2040 water supply need," but not meet the requested amount. Table 6.5-1, page 6-190, indicates that the impacts of the PAA on M&I water supply withdrawals from Lake Lanier are "substantially beneficial." Based on the definition cited on page 6-189, since the alternative would fail to meet Metro Atlanta's 2040 water supply needs, the water supply impact of the PAA should be characterized as "substantially adverse," not substantially beneficial.

In addition, in the Environmental Consequences section of the PDEIS (Section 6.5.1.1, page 6-190), the future water demand to be withdrawn from Lake Lanier is incorrectly stated as 277 mgd, instead of the 297 mgd (277 mgd for Metro Atlanta and 20 mgd for existing relocation contracts) as stated in the Purpose and Need section of the PDEIS. As a result, the unmet demand for certain alternatives, as stated in the Environmental Consequences section, appear to be understated by 20 mgd.

Significance – Medium

An accurate assessment of the impacts on M&I water supply is needed in order to validate the selection of the PAA or recommended plan.

Recommendations for Resolution

1. Revise the assessment of the M&I water supply impact of the PAA on Lake Lanier to be consistent with criteria cited on page 6-189 of the PDEIS.

2. Provide the rationale for characterizing the impact on the M&I water supply as being only "substantially adverse" or "substantially beneficial."

3. Revise Section 6.5.1.1, page 6-190, in the Environmental Consequences section of the PDEIS to reflect future water demand withdrawals, as requested by the State of Georgia, from Lake Lanier of 297 mgd.

Final Panel Comment 7

Future Without-Project (FWOP) conditions are not consistent across all alternatives.

Basis for Comment

The proposed Glades Reservoir, to be constructed by non-Federal interests and having a safe yield of 40 mgd, is stated as being included in the FWOP conditions. In accordance with the Planning Guidance Notebook, the FWOP conditions reflect the most likely conditions expected during the period of analysis and provide the basis from which all alternative plans are formulated and impacts are assessed. Forecasts of the FWOP shall consider all other actions, plans, and programs that would be implemented in the future to address the problems and opportunities in the study area in the absence of a USACE project.

Because the Glades Reservoir was included in the FWOP, the 40 mgd of water supply that could be provided by the reservoir should be included in all alternatives. However, only Alternatives 1C, 7C, 7E, and 7H (the PAA) include the 40 mgd as a means of meeting Georgia's future water demand requirements. Excluding the proposed reservoir from Alternatives 1A (the NAA), 1B, 7A, 7D, and 7F) requires these alternatives to identify additional water sources in order to be assessed as being significantly beneficial to the M&I water supply.

By being included in only some of the alternatives, the Glades Reservoir appears to have been treated as another water supply measure, and not part of the FWOP. If the reservoir is treated as another water supply measure, the cost of implementing the measure should be considered for those alternatives that include the reservoir as a means of meeting Georgia's future water demand.

Significance – Medium

Excluding the proposed Glades Reservoir from certain alternatives results in an inconsistent definition of the FWOP conditions that are intended to constitute the benchmark against which all the plans are evaluated.

Recommendation for Resolution

1. Include all water supply measures assumed to be in the FWOP conditions, including the Glades Reservoir, as available to meet Georgia's future water demand requirements for all alternatives.

Literature Cited:

USACE (2000). Planning – Planning Guidance Notebook. Engineer Regulation (ER) 1105-2-100. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. April 22.

Final Panel Comment 8

The conclusion that specific compensatory mitigation measures would not be required for the PAA in resource areas where substantial adverse effects and slightly adverse effects were identified is not supported.

Basis for Comment

Section 6.10, Mitigation Considerations, paragraph 3, recognizes that substantial adverse effects could result from total phosphorus and total nitrogen loads; however, the PDEIS concludes, “Based on the analysis of the PAA and other alternatives, specific compensatory mitigation measures would not be required.” It is unclear how this conclusion was arrived at. There are significant effects to several resource areas. Adverse effects were documented for mussels, total nitrogen (in one water segment), and drought operations. Substantially adverse effects were documented for riverine fish and wildlife resources from Atlanta to West Point. Additionally, slightly adverse effects were documented for five resources areas (Executive Summary, Table ES-5).

Significance – Medium

The conclusion that no mitigation would be required for the PAA is contrary to the results of the effects analysis.

Recommendation for Resolution

1. Discuss the need for mitigation specifically for each resource area where adverse effects were determined.

Final Panel Comment 9

Structural measures that could increase the performance of the Federal reservoirs/dams with minimal changes to their overall physical features are not considered in the formulation of alternatives.

Basis for Comment

The PDEIS states, "... this EIS does not address any structural changes to federal ACF Basin improvements or proposed changes to water management practices that are expected to **exceed** existing authority." (PDEIS, page 1-4) (emphasis added). However, it is unclear why even minor structural measures were not evaluated for each of the ACF flood management dams/reservoirs in order to **meet** existing authorities and enhance benefits.

One example of a problem that might be solved with relatively minor structural modifications is the gates at the Jim Woodruff Lock and Dam, where modifications that would allow fall rates to be managed to environmentally acceptable levels might substantially improve operations and enhance benefits. However, no structural modifications were considered. There may be other structural management measures that warrant such consideration in formulating the alternatives.

Significance – Medium

Consideration of potential changes to the physical characteristics and flow conditions at each of the ACF flood management dams/reservoirs could have a material impact on the selection of the PAA or recommended plan.

Recommendations for Resolution

1. Analyze potential structural changes to ACF dam features that would enhance downstream flows during peak and low-flow periods and provide benefits that would be sufficient to offset the costs of such changes.
2. Add the results of the analyses to the evaluation criteria when selecting the PAA or recommended plan.

Final Panel Comment 10

For four resource categories, the rationale for measuring some parameters and/or determining the resulting conclusions or environmental condition changes is not described.

Basis for Comment

In the following specific instances, discussions of impacts to four resource categories (water quality, vegetative communities and wildlife, fish and aquatic resources, and Gulf sturgeon) require further information in order to clarify and scientifically support the effects analysis.

- **Water Quality** (PDEIS, Section 6.1.2). It is unclear how the delta ranges for temperature, dissolved oxygen, phosphorus, nitrogen, and chlorophyll *a* were determined to relate to the qualitative summary statements (substantial beneficial impact, slightly beneficial, slightly beneficial impact, no impact, slightly no effect, slightly adverse impact, adverse impact, substantial adverse impact) developed for each parameter. For example, page 6-92, line 3, states "A slightly adverse impact if the water temperature increased by 0.5 to 1.0 °C" (when compared to the NAA). The method or reference used to determine that this range of temperature increase would result in a slightly adverse impact is not presented. With regard to the results of the effects analysis, it is unclear how the management of the project lakes could affect total phosphorus concentrations and loads.
- **Vegetative Communities and Wildlife** (PDEIS, Section 6.4.1.2). The rationale for each of the Alternative 1B's effects statements is not provided. Beginning with Alt B1, this section states that the effects will be similar to those of the NAA. A description of those effects is not provided, nor is the rationale for the conclusion that the effects would be similar. The related table simply says 'No Change' (page 6-167). The same section (page 6-166) states that flood conditions can result in beneficial or adverse effects to terrestrial vegetation and wildlife, but these potential effects are not further described or detailed.
- **Fish and Aquatic Resources** (PDEIS, Section 6.4.2). The spatial extent of floodplain connectivity to the main channel during the April to October growing season is used to compare impacts on fish and wildlife conservation. However, the section does not explain why this connectivity is of value to fish and wildlife resources, nor does it explain how important the fish and wildlife resources that benefit from this connectivity are. Similarly, there is no explanation for why the median fall rate or flow rates from Jim Woodruff Dam are important to fish and wildlife resources or for the importance of the affected fish and wildlife resources. As a result, it is not possible to evaluate the significance of impacts to these resources.
- **Gulf sturgeon** (PDEIS, Section 6.4.3.3.1). This section discusses impacts to spawning areas in the Apalachicola River. Because the juveniles can stay in the river for a couple of years, and preferred foraging habitat for juveniles is different than preferred spawning habitat of adults that migrate to the river for this purpose, a complete picture of the potential for impacts to Gulf sturgeon is not presented.

Significance – Medium/Low

Gaps in supporting information limit the reader's understanding of the rationale used to determine the effects of the proposed alternatives on these resources.

Recommendations for Resolution

Final Panel Comment 10

1. In Section 6.1.2, provide credible water quality information related to the establishment of the deltas, such as references to the literature or personal communication with scientific experts, to substantiate the validity of the effects analysis.
2. For vegetative communities and wildlife, provide the rationale for each effects statement for each alternative, or provide the rationale once, and refer to it for the subsequent alternatives.
3. Discuss the importance of connectivity to the main channel for fish and wildlife resources to support use of this metric to analyze impacts to these resources.
4. Discuss effects to foraging habitat for Gulf sturgeon juveniles.

Final Panel Comment 11

All alternatives are considered to perform equally well in flood control; however, changes in storage capacity during storm events due to differences in lake stages are not considered.

Basis for Comment

The conservation storage capacity relative to the top of each of the five federal reservoirs' full summer and winter pool is discussed in Section 2 of the PDEIS. In that discussion, Storage Level 3 in the related reservoirs is identified as the top of the flood risk management pool. This level manages the flooding risk downstream (limiting discharges to safe channel capacity) at two of the three ACF lakes with storage capacity: Lake Lanier (598K acre-feet [ac-ft]) and West Point Lake (170K ac-ft).

The PDEIS states that by not altering the existing guide curves, the existing extent of flood risk is not degraded. However, the water management and water supply alternatives that were evaluated modified the lake stages. The PDEIS does not acknowledge the fact that at the beginning of a storm event, each lake is assumed to have available its full conservation pool storage capacity, which will be used for flood storage. There is no discussion in the PDEIS regarding the water levels at the start of a storm event and the resultant effect on the actual capacity available for flood storage. It is possible that the water management and water supply alternatives could change flood risk levels as a result of different lake stages that exist prior to storm events.

The HEC-ResSim simulations performed over the 73-year period of record provide results that could be evaluated to assess potential impacts on flood risk related to the water management and water supply alternatives. This would provide a more robust assessment of critical evaluation criteria used to differentiate between alternatives.

Significance – Medium/Low

Differentiating potential changes in flood risk associated with water management and water supply alternatives would provide a more complete disclosure of impacts and strengthen decision-making.

Recommendation for Resolution

1. Assess the HEC-ResSim simulation results for the 73-year period of record to identify differences in stages at Lake Lanier and West Point Lake that occur prior to storm events, and include that information in the evaluation and comparison of water management and water supply alternatives.

Final Panel Comment 12

The return rate, an important parameter for estimating the availability of water supply, is not applied in a consistent manner across all water management and water supply alternatives.

Basis for Comment

The return rate directly affects the availability of water in Lake Lanier and the Chattahoochee River to meet water supply demands. It is primarily affected by the total volume of water supply withdrawals in relation to the wastewater treatment capacity of the local utilities. Historical return rates have been measured and future return rates can be predicted based on projected water supply withdrawals and planned infrastructure improvements, in combination with knowledge of historical return rates.

The return rate is a physical process that varies based on physical conditions, yet it is treated in the PDEIS as a management measure in the development of water supply options. It is unclear why water supply options include multiple return rates for Lake Lanier, Glades Reservoir, and the Chattahoochee River (PDEIS, Table 5.1-1). Additionally, return rate was used to evaluate water supply alternatives. For example:

- Water supply option G was dropped from consideration because the 43% return rate was considered too high. It resulted in a return of 128 mgd. However, options D and E were retained even though they had return rates of 55% with 163 mgd and 141 mgd return flows, respectively.
- Water supply alternatives 7D and 7E were not selected as the recommended plan because the return rate was considered overly optimistic.

Significance – Medium/Low

The inconsistent application of return rates among alternatives resulted in evaluation of unrealistic alternatives.

Recommendations for Resolution

1. Estimate return rates to be applied to the water management and water supply alternatives based on historical data, projected water supply deliveries, and planned infrastructure improvements.
2. Apply the estimates of existing and future return rates in a uniform manner for all water management and water supply alternatives.
3. To address uncertainties in the estimate of future return rates, perform a sensitivity analysis to identify the potential impacts on the performance of alternative plans.

Final Panel Comment 13

The two-phased approach to the screening of alternatives is not explained, and the use of different terms for alternatives is confusing.

Basis for Comment

Two-Phased Approach

In the PDEIS (Section 4, first page, last paragraph), the plans considered were formulated in two phases: water management and water supply. The reason(s) for using a two-phased approach to screen alternatives are not clearly explained. Without the explanation, the reader wonders if there may be a superior alternative in one of the other combinations that was not analyzed. For example, in Table 4.10-14 of the PDEIS, the NAA (Alternative 1) has a summary ranking of 16, the PAA (Alternative 7) has a summary ranking of 9, and these two alternatives were carried forward. However, Alternative 2 has a summary ranking of 14, but it was not carried forward even though it ranked better than the PAA.

Inconsistent Terms for Alternatives

The PDEIS uses different terms for the same alternative, which can be confusing. Naming of, and reference to, the alternatives and the PAA can be complicated by the two-phased approach to screening of alternatives.

In the PDEIS, page ES-17: Water management Alternative 1 is called the NAA and water management Alternative 7 is called the PAA. Then, when combined with water supply options A-H, Alternative 1A becomes the NAA. After the alternatives analysis, Alternative 7H becomes the PAA.

After the water management PAA is defined in Section 4 of the PDEIS, the term PAA is redefined on page 5-1 of the PDEIS, in the second bullet.

Table 5.2-1 could represent the alternatives more clearly if Alternative 1 were also labeled ‘No Action’, similar to Alternative A.

In the WSSA report, Section 4.2 uses the term “Future Without-Project Condition” instead of “No Action Alternative.”

Significance – Medium/Low

Without additional discussion and a clear rationale for using a two-phased approach to screen alternatives, there is not sufficient information to understand why other alternative combinations were considered not viable, and confusion resulting from using inconsistent terms can affect the understanding of the project.

Recommendations for Resolution

1. Include a detailed description of the two-phased approach to alternative screening, and the rationale as to why this two-phased screening was used.
2. Use consistent terminology to refer to the water management and water supply alternatives.

Final Panel Comment 14

Certain socioeconomic data provided in the PDEIS documents are inconsistent or inaccurate, which could lead to misinterpretation of study area conditions.

Basis for Comment

Consistent and accurate socioeconomic data are needed in order to develop a comprehensive understanding of the socioeconomic resources within the study area. The Panel identified the following issues pertaining to inconsistent or inaccurate socioeconomic data in the PDEIS documents. Without accurate data, the Panel could not determine whether the socioeconomic resources are accurately portrayed and whether they reflect current study area conditions:

- The reported percent of government employment (PDEIS, Table 2-6.27, page 2-240) requires verification.
- The employment data presented (PDEIS, Table 2-6.27, page 2-240) is inconsistent with employment data presented in the Combined Water Control Manual (Table 4-4, page 4-10).
- The data on all families and families with female householder living in poverty in the basin (PDEIS, Table 2-6.29, page 2-241) requires verification.
- The data presented in Table 2-6.29 (PDEIS, page 2-241) concerning the percent of families living in poverty is not consistent with the description in the narrative (PDEIS, page 2-241).
- The socioeconomic data presented in the documents appear to include all resources (population, employment, housing units) within each county that has a portion of its land area within the ACF basin, regardless of how much of the county land area lies within the basin. As a result, all resources within a county are included in the basin, when only a portion of its land area (and resources) is actually encompassed within the basin, resulting in an overstatement of socioeconomic resources within the basin.

Significance – Low

Consistent and accurate socioeconomic data are needed to improve the overall understanding of the study area and the understanding of the significance of the impacts resulting from implementation of the PAA.

Recommendations for Resolution

1. Verify government employment for the study area.
2. Eliminate inconsistencies/conflicts between employment data presented in the review documents.
3. Verify data concerning all families and families with female householder living in poverty within the basin.
4. Eliminate inconsistencies/conflicts between data presented in the tables and in text concerning families and persons living in poverty.

Final Panel Comment 14

5. Revise socioeconomic data to reflect resources physically within the ACF basin, or indicate throughout the review documents that the socioeconomic data presented accounts for resources that are in portions of counties that extend beyond the ACF basin.

Final Panel Comment 15

The PDEIS does not acknowledge that variations in the amount of hydroelectric power generated under the alternatives would be offset by increases or decreases in power generation from another source, which could change greenhouse gas emissions.

Basis for Comment

The amount of hydroelectric power generated under the various water supply alternatives varies significantly. The alternative that produces the lowest annual average hydroelectric power generation is Alternative 7A, with 1,024,311 megawatt per hour (MWh). The highest hydroelectric power generation is produced under the PAA, with 1,309,555 MWh. This is a 28% variation in average annual hydroelectric power generated among the alternatives. Any increase or decrease in hydroelectric power generation will be offset by a corresponding increase or decrease in power generated by another source. It is likely that the offsetting power will be generated either partially or wholly by a source that utilizes a fossil fuel. Therefore, greenhouse gas emissions could be impacted by the alternative plans, but these impacts are not addressed in the PDEIS.

Significance – Low

Because impacts from greenhouse gas emissions are not evaluated, the analysis of water management and water supply alternatives in the PDEIS is incomplete.

Recommendations for Resolution

1. Under the various alternatives, based on their average annual hydroelectric power generation data, identify increases or decreases in power generation that would be required from other power sources.

2. Analyze the impacts of greenhouse gas emissions from sources using fossil fuels under the water management and water supply alternatives.

5. REFERENCES

OMB (2004). Final Information Quality Bulletin for Peer Review. Executive Office of the President, Office of Management and Budget, Washington, D.C. Memorandum M-05-03. December 16.

The National Academies (2003). Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports. The National Academies (National Academy of Science, National Academy of Engineering, Institute of Medicine, National Research Council). May 12.

USACE (2012). Water Resources Policies and Authorities: Civil Works Review. Engineer Circular (EC) 1165-2-214. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. December 15.

USACE (2000). Planning – Planning Guidance Notebook. Engineer Regulation (ER) 1105-2-100. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. April 22.

This page is intentionally left blank.

APPENDIX A

IEPR Process for the ACF River Project

This page is intentionally left blank.

A.1 Planning and Conduct of the Independent External Peer Review (IEPR)

Table A-1 presents the schedule, in chronological order, followed in executing the Apalachicola-Chattahoochee-Flint River Water Control Manual, Environmental Impact Statement, and Water Supply Storage Assessment Report Independent External Peer Review (hereinafter: ACF River IEPR). Due dates for milestones and deliverables are based on the award/effective date of April 24, 2015. The review documents were provided by U.S. Army Corps of Engineers (USACE) on May 7, 2015. Note that the work items listed under Task 6 occur after the submission of this report.

Battelle will enter the 15 Final Panel Comments developed by the Panel into USACE's Design Review and Checking System (DrChecks), a Web-based software system for documenting and sharing comments on reports and design documents, so that USACE can review and respond to them. USACE will provide responses (Evaluator Responses) to the Final Panel Comments, and the Panel will respond (BackCheck Responses) to the Evaluator Responses. All USACE and Panel responses will be documented by Battelle. Battelle will provide USACE and the Panel a pdf printout of all DrChecks entries, through comment closeout, as a final deliverable and record of the IEPR results.

Table A-1. ACF River Complete IEPR Schedule

Task	Action	Due Date
1	Award/Effective Date	4/24/2015
	Review documents available	5/7/2015
	Battelle submits draft Work Plan[a]	5/8/2015
	USACE provides comments on draft Work Plan	5/14/2015
	Battelle submits final Work Plan[a]	6/16/2015
2	Battelle requests input from USACE on the conflict of interest (COI) questionnaire	5/4/2015
	USACE provides comments on COI questionnaire	5/11/2015
	Battelle submits list of selected panel members[a]	5/15/2015
	Battelle submits revised list of selected panel members	6/9/2015
	USACE confirms the panel members have no COI	6/11/2015
	Battelle completes subcontracts for panel members	6/26/2015
3	Battelle convenes kick-off meeting with USACE	5/7/2015
	Battelle sends review documents to panel members	6/29/2015
	Battelle convenes kick-off meeting with panel members	6/30/2015
	Battelle convenes kick-off meeting with USACE and panel members	7/7/2015
	Battelle convenes Mid-Review Teleconference for panel members to ask clarifying questions of USACE	7/20/2015
4	Panel members complete their individual reviews	8/3/2015

Table A-1. ACF River Complete IEPR Schedule (continued)

Task	Action	Due Date
4	Battelle provides panel members with talking points for Panel Review Teleconference	8/7/2015
	Battelle convenes Panel Review Teleconference	8/10/2015
	Battelle provides Final Panel Comment templates and instructions to panel members	8/10/2015
	Panel members provide draft Final Panel Comments to Battelle	8/18/2015
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	8/19-26/2015
	Panel finalizes Final Panel Comments	8/27/2015
6	Battelle provides Final IEPR Report to panel members for review	8/31/2015
	Panel members provide comments on Final IEPR Report	9/2/2015
	Battelle submits Final IEPR Report to USACE[a]	9/4/2015
	USACE PCX provides decision on Final IEPR Report acceptance	9/14/2015
7[b]	Battelle inputs Final Panel Comments to DrChecks and provides Final Panel Comment response template to USACE	9/16/2015
	Battelle convenes teleconference with USACE to review the Post-Final Panel Comment Response Process	9/16/2015
	Battelle convenes teleconference with Panel to review the Post-Final Panel Comment Response Process	9/16/2015
	USACE Project Delivery Team (PDT) provides draft Evaluator Responses to USACE Planning Center of Expertise (PCX) for review	9/30/2015
	USACE PCX reviews draft Evaluator Responses and works with USACE PDT regarding clarifications to responses, if needed	10/6/2015
	USACE PCX provides draft PDT Evaluator Responses to Battelle	10/7/2015
	Battelle provides the panel members the draft PDT Evaluator Responses	10/9/2015
	Panel members provide Battelle with draft BackCheck Responses	10/15/2015
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	10/16/2015
	Battelle convenes Comment-Response Teleconference with panel members and USACE	10/19/2015
	USACE inputs final PDT Evaluator Responses to DrChecks	10/26/2015

Table A-1. ACF River Complete IEPR Schedule (continued)

Task	Action	Due Date
7[b]	Battelle provides final PDT Evaluator Responses to panel members	10/28/2015
	Panel members provide Battelle with final BackCheck Responses	11/2/2015
	Battelle inputs the Panel's final BackCheck Responses in DrChecks	11/9/2015
	Battelle submits pdf printout of DrChecks project file[a]	12/18/2015^
5[b]	Public comments provided to Battelle by USACE	11/9/2015
	Battelle compiles and summarizes public comments	11/17/2015
	Battelle sends public comments to Panel	11/18/2015
	Panel completes their review of the public comments	11/25/2015
	Battelle and Panel review Panel's responses to public comments	11/30/2015
	Panel drafts Final Panel Comment, if necessary	12/1/2015
	Panel finalizes Final Panel Comment regarding public comments	12/3/2015
	If applicable, Battelle sends USACE addendum to Final Report [a]	12/7/2015
SLM	Senior Leader Meeting (If Optional Task 2 is awarded)	TBD
	Contract End/Delivery Date	4/23/2016

a Deliverable.

b Task 7 occurs after the submission of this report

At the beginning of the Period of Performance for the ACF River IEPR, Battelle held a kick-off meeting with USACE to review the preliminary/suggested schedule, discuss the IEPR process, and address any questions regarding the scope (e.g., clarify expertise areas needed for panel members). Any revisions to the schedule were submitted as part of the final Work Plan. The final charge consisted of 17 charge questions provided by USACE, two overview questions added by Battelle (all questions were included in the draft and final Work Plans), one public comment question added by Battelle, and general guidance for the Panel on the conduct of the peer review (provided in Appendix C of this final report).

Prior to beginning their review and within five days of their subcontracts being finalized, all the members of the Panel attended a kick-off meeting via teleconference planned and facilitated by Battelle in order to review the IEPR process, the schedule, communication procedures, and other pertinent information for the Panel. Battelle planned and facilitated a second kick-off meeting, which was held in person in Mobile, Alabama at the USACE Mobile District Annex Office and was broadcast via webinar. During the second kick-off meeting, USACE presented project details to the Panel. Before the meetings, the IEPR Panel received an electronic version of the final charge, as well as the ACF River review documents and reference materials listed below. The documents and files in bold font were provided for review; the other documents were offered for reference or supplemental information only.

- **Draft ACF Master Water Control Manual (WCM) and Individual Project Water Control Manuals (1063 pages)**
- **ACF WCM Environmental Impact Statement (760 pages)**
- **ACF Water Supply Storage Assessment (180 pages)**
- Scoping Report for the ACF River Basin, March 2014 (Volume 3, Appendix D)
- HEC ResSim Modeling Report (Volume 3, Appendix E)
- ACF Basin Critical Yield Report (Volume 3, Appendix F)
- HEC-5Q Water Quality Modeling Report (Volume 3, Appendix K)
- USACE Institute for Water Resources ACF Climate Change Support Analysis (Volume 3, Appendix N)
- Draft Fish and Wildlife Coordination Report (if available)
- USACE guidance, *Civil Works Review* (EC 1165-2-214), December 15, 2012
- Office of Management and Budget, *Final Information Quality Bulletin for Peer Review,* December 16, 2004.

About halfway through the review of the ACF River IEPR documents, a teleconference was held with USACE, the Panel, and Battelle so that USACE could answer any questions the Panel had concerning either the review documents or the project. Prior to this teleconference, Battelle submitted 30 panel member questions to USACE. USACE was able to provide verbal responses to all but one of the questions during the teleconference, and provided written responses to all questions on July 30, 3015.

In addition, during the review period, USACE provided a copy of the Rivers and Harbors Act, House Document No. 342, 76th Congress at the request of panel members. This document was provided to Battelle and then sent to the Panel as additional information only and was not part of the official review.

A.2 Review of Individual Comments

The Panel was instructed to address the charge questions/discussion points within a charge question response table provided by Battelle. At the end of the review period, the Panel produced individual comments in response to the charge questions/discussion points. Battelle reviewed the comments to identify overall recurring themes, areas of potential conflict, and other overall impressions. At the end of the review, Battelle summarized the individual comments in a preliminary list of 14 overall comments and discussion points. Each panel member's individual comments were shared with the full Panel in a merged individual comments table.

A.3 IEPR Panel Teleconference

Battelle facilitated a 3.75-hour teleconference with the Panel so that the panel members could exchange technical information. The main goal of the teleconference was to identify which issues should be carried forward as Final Panel Comments in the Final IEPR Report and decide which panel member should serve as the lead author for the development of each Final Panel Comment. This information exchange ensured that the Final IEPR Report would accurately represent the Panel's assessment of the project, including any conflicting opinions. The Panel engaged in a thorough discussion of the overall positive and negative comments, added any missing issues of significant importance to the findings, and merged any related individual comments. At the conclusion of the teleconference, Battelle reviewed each Final Panel

Comment with the Panel, including the associated level of significance, and confirmed the lead author for each comment.

At the end of these discussions, the Panel identified 15 comments and discussion points that should be brought forward as Final Panel Comments.

A.4 Preparation of Final Panel Comments

Following the teleconference, Battelle prepared a summary memorandum for the Panel documenting each Final Panel Comment (organized by level of significance). The memorandum provided the following detailed guidance on the approach and format to be used to develop the Final Panel Comments for the ACF River IEPR:

- Lead Responsibility: For each Final Panel Comment, one Panel member was identified as the lead author responsible for coordinating the development of the Final Panel Comment and submitting it to Battelle. Battelle modified lead assignments at the direction of the Panel. To assist each lead in the development of the Final Panel Comments, Battelle distributed the merged individual comments table, a summary detailing each draft final comment statement, an example Final Panel Comment following the four-part structure described below, and templates for the preparation of each Final Panel Comment.

- Directive to the Lead: Each lead was encouraged to communicate directly with the other panel member as needed and to contribute to a particular Final Panel Comment. If a significant comment was identified that was not covered by one of the original Final Panel Comments, the appropriate lead was instructed to draft a new Final Panel Comment.

- Format for Final Panel Comments: Each Final Panel Comment was presented as part of a four-part structure:

    1. Comment Statement (succinct summary statement of concern)
    2. Basis for Comment (details regarding the concern)
    3. Significance (high, medium/high, medium, medium/low, and low; see description below)
    4. Recommendation(s) for Resolution (see description below).

- Criteria for Significance: The following were used as criteria for assigning a significance level to each Final Panel Comment:

    1. **High:** Describes a fundamental issue with the project that affects the current recommendation or justification of the project, and which will affect its future success, if the project moves forward without the issue being addressed. Comments rated as high indicate that the Panel determined that the current methods, models, and/or analyses contain a “showstopper” issue.

    2. **Medium/High:** Describes a potential fundamental issue with the project, which has not been evaluated at a level appropriate to this stage in the planning process. Comments rated as medium/high indicate that the Panel analyzed or assessed the methods, models, and/or

analyses available at this stage in the planning process and has determined that if the issue is not addressed, it could lead to a "showstopper" issue.

3. **Medium:** Describes an issue with the project, which does not align with the currently assessed level of risk assigned at this stage in the planning process. Comments rated as medium indicate that, based on the information provided, the Panel identified an issue that would raise the risk level if the issue is not appropriately addressed.

4. **Medium/Low:** Affects the completeness of the report at this time in describing the project, but will not affect the recommendation or justification of the project. Comments rated as medium/low indicate that the Panel does not currently have sufficient information to analyze or assess the methods, models, or analyses.

5. **Low:** Affects the understanding or accuracy of the project as described in the report, but will not affect the recommendation or justification of the project. Comments rated as low indicate that the Panel identified information that was mislabeled or incorrect or that certain data or report section(s) were not clearly described or presented.

- Guidelines for Developing Recommendations: The recommendation section was to include specific actions that USACE should consider to resolve the Final Panel Comment (e.g., suggestions on how and where to incorporate data into the analysis, how and where to address insufficiencies, areas where additional documentation is needed).

Battelle reviewed and edited the Final Panel Comments for clarity, consistency with the comment statement, and adherence to guidance on the Panel's overall charge, which included ensuring that there were no comments regarding either the appropriateness of the selected alternative or USACE policy. During the Final Panel Comment development process, the Panel determined that one of the Final Panel Comments could be either dropped or merged into another Final Panel Comment and identified one new comment; therefore, the total Final Panel Comment count remained 15. At the end of this process, 15 Final Panel Comments were prepared and assembled. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comments. The Final Panel Comments are presented in the main report.

APPENDIX B

Identification and Selection of IEPR Panel Members for the ACF River Project

This page is intentionally left blank.

B.1 Panel Identification

The candidates for the Apalachicola-Chattahoochee-Flint River Water Control Manual, Environmental Impact Statement, and Water Supply Storage Assessment Report (hereinafter: ACF River IEPR) Panel were evaluated based on their technical expertise in the following key areas: water supply planning, water resources engineering/hydrology, economics, and environmental and National Environmental Policy Act (NEPA). These areas correspond to the technical content of the ACF River IEPR review documents and overall scope of the ACF River project.

To identify candidate panel members, Battelle reviewed the credentials of the experts in Battelle's Peer Reviewer Database, sought recommendations from colleagues, contacted former panel members, and conducted targeted Internet searches. Battelle evaluated these candidate panel members in terms of their technical expertise and potential conflicts of interest (COIs). Of these candidates, Battelle chose the most qualified individuals, confirmed their interest and availability, and ultimately selected four experts for the final Panel. The remaining candidates were not proposed for a variety of reasons, including lack of availability, disclosed COIs, or lack of the precise technical expertise required.

The candidates were screened for the following potential exclusion criteria or COIs.[1] These COI questions serve as a means of disclosure and to better characterize a candidate's employment history and background. Providing a positive response to a COI screening question did not automatically preclude a candidate from serving on the Panel. For example, participation in previous USACE technical peer review committees and other technical review panel experience was included as a COI screening question. A positive response to this question could be considered a benefit.

- Previous and/or current involvement by you or your firm in the Apalachicola-Chattahoochee-Flint River (ACF) Water Control Manual (WCM), Environmental Impact Statement (EIS) and Water Supply Storage Assessment (WSSA) Report
- Previous and/or current involvement by you or your firm[2] in water supply/water rights-related studies in the Apalachicola-Chattahoochee-Flint River Basin (originating in northeast Georgia, crossing the Georgia-Alabama border into central Alabama, and following the state-line south until it terminates in Apalachicola Bay, Florida) consisting of the following four sub-basins: Upper Chattahoochee, Lower/Middle Chattahoochee, Apalachicola, and the Flint Basins.
- Previous and/or current involvement by you or your firm[2] in the Apalachicola-Chattahoochee-Flint River (ACF) Water Control Manual (WCM), Environmental Impact Statement (EIS) and Water Supply Storage Assessment (WSSA) Report-related projects.

---

[1] Battelle evaluated whether scientists in universities and consulting firms that are receiving USACE-funding have sufficient independence from USACE to be appropriate peer reviewers. See OMB (2004, p. 18), "….when a scientist is awarded a government research grant through an investigator-initiated, peer-reviewed competition, there generally should be no question as to that scientist's ability to offer independent scientific advice to the agency on other projects. This contrasts, for example, to a situation in which a scientist has a consulting or contractual arrangement with the agency or office sponsoring a peer review. Likewise, when the agency and a researcher work together (e.g., through a cooperative agreement) to design or implement a study, there is less independence from the agency. Furthermore, if a scientist has repeatedly served as a reviewer for the same agency, some may question whether that scientist is sufficiently independent from the agency to be employed as a peer reviewer on agency-sponsored projects."

[2] Includes any joint ventures in which a panel member's firm is involved and if the firm serves as a prime or as a subcontractor to a prime.

- Previous and/or current involvement by you or your firm[2] in the conceptual or actual design, construction, or operation and maintenance (O&M) of any projects in the Apalachicola-Chattahoochee-Flint River (ACF) Water Control Manual (WCM), Environmental Impact Statement (EIS) and Water Supply Storage Assessment (WSSA) Report -related projects.
- Current employment by the U.S. Army Corps of Engineers (USACE).
- Previous and/or current involvement with paid or unpaid expert testimony related to Apalachicola-Chattahoochee-Flint River (ACF) Water Control Manual (WCM), Environmental Impact Statement (EIS) and Water Supply Storage Assessment (WSSA) Report.
- Previous and/or current employment or affiliation with members of the cooperating agencies, local sponsors, stakeholders or any of the following cooperating Federal, state, county, local, and regional agencies, environmental organizations, and interested groups (for pay or pro bono) including:
    - The States of Florida, Georgia and Alabama
    - ACF Stakeholders including:
    - Alabama Municipal Electric Authority
    - Alabama Rivers Alliance
    - Apalachicola Riverkeeper
    - Arcadis-US
    - Atlanta Fulton County Water Resource Commission
    - Atlanta Regional Commission
    - Black and Vetch
    - Calhoun County Board of Water Commissioners
    - Camilla Chamber of Commerce
    - CCT & Associates, Inc.
    - Chattahoochee Riverkeeper
    - City of Atlanta
    - City of Camilla
    - City of Cumming
    - City of Dothan
    - City of Gainesville
    - City of Griffin
    - City of LaGrange
    - City of Montezuma
    - City of Sandy Springs
    - Clayton County Water Authority
    - Cobb County Water System
    - Cobb County-Marietta Water Authority
    - Columbus Water Works
    - Conservation/Recreation Lands, LLC
    - Council for Quality Growth
    - D J Plastics
    - Dougherty County Farm Bureau

- Emory University
- Flint Riverkeeper, Inc.
- Florida Riparian Stakeholders
- Forsyth County Water & Sewer
- Franklin County
- Franklin County Seafood Workers Association
- Friends of Lake Eufaula
- Gasden County
- Georgetown – Quitman County Commissioners
- Georgia Conservancy
- Georgia Green Industry Association
- Georgia Institute of Technology
- Georgia Municipal Association
- Georgia Poultry Federation
- Georgia Power Company
- Golder Associates, Inc.
- Gulf County Board of Commissioners
- Gulf Power Company
- Gwinnett County
- Gwinnett Environmental and Heritage Center Historic Chattahoochee Commission
- Jim Woodruff Preference Customers
- Jones Ecological Research Center
- LaGrange-Troup County CoC
- Lake Lanier Association
- Lake Seminole Association
- Liberty County Board of Commissioners
- Liberty County Riparian Stakeholders
- MeadWestvaco
- Metro Atlanta Chamber of Commerce
- Metro North GA Water Planning District
- Middle Chattahoochee Water Coalition
- MillerCoors LLC
- Mitchell County Board of Commissioners
- Mitchell County Development Authority
- Mitchell County Farm Bureau
- National Peanut Buying Point Association
- Nature Conservancy of Georgia
- Neal Land & Timber Co.
- Oglethorpe Power Corporation
- Pelham Chamber of Commerce
- Procter and Gamble

  - Riparian County Stakeholders Coalition
  - Riverway South
  - Robert B. Ragland Foundation, Inc.
  - Southeastern Federal Power Customers, Inc.
  - Southern Aluminum Finishing Co.
  - Stansbury Resolutions by Design, Inc.
  - Southern Nuclear Operating Co.
  - Stripling, Inc.
  - SunTrust Bank
  - Tetra Tech
  - Thoms Trees and Plants, Inc
  - TOTO USA
  - Tri Rivers Development Association
  - Troy University
  - Troup County Board of Commissioners
  - Utilities Board Tuskegee
  - West Point Lake Coalition
- Past, current, or future interests or involvements (financial or otherwise) by you, your spouse, your children, or relations associated with the Apalachicola-Chattahoochee-Flint River Basin.
- Current personal involvement with other USACE projects, including whether involvement was to author any manuals or guidance documents for USACE. If yes, provide titles of documents or description of project, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please highlight and discuss in greater detail any projects that are specifically with the Mobile District.
- Previous or current involvement with the development or testing of models that will be used for, or in support of the Apalachicola-Chattahoochee-Flint River (ACF) Water Control Manual (WCM), Environmental Impact Statement (EIS) and Water Supply Storage Assessment (WSSA) Report project.
- Current firm[2] involvement with other USACE projects, specifically those projects/contracts that are with the Mobile District. If yes, provide title/description, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please also clearly delineate the percentage of work you personally are currently conducting for the Mobile District. Please explain.
- Any previous employment by USACE as a direct employee, notably if employment was with the Mobile District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
- Any previous employment by USACE as a contractor (either as an individual or through your firm[2]) within the last 10 years, notably if those projects/contracts were with the Mobile District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
- Previous experience conducting technical peer reviews. If yes, please highlight and discuss any technical reviews concerning water supply/water rights-related studies and include the client/agency and duration of review (approximate dates).

- Pending, current, or future financial interests in Apalachicola-Chattahoochee-Flint River (ACF) Water Control Manual (WCM), Environmental Impact Statement (EIS) and Water Supply Storage Assessment (WSSA) Report-related contracts/awards from USACE.
- A significant portion (i.e., greater than 50%) of personal or firm[2] revenues within the last 3 years from USACE contracts.
- A significant portion (i.e., greater than 50%) of personal or firm[2] revenues within the last 3 years from contracts with any non-Federal sponsors or members of the Apalachicola-Chattahoochee-Flint River Stakeholders.
- Any publicly documented statement (including, for example, advocating for or discouraging against) related to Apalachicola-Chattahoochee-Flint River (ACF) Water Control Manual (WCM), Environmental Impact Statement (EIS) and Water Supply Storage Assessment (WSSA) Report. This includes any documented statements on what the press has deemed “water wars.”
- Participation in relevant prior and/or current Federal studies relevant to this project and/or Apalachicola-Chattahoochee-Flint River (ACF) Water Control Manual (WCM), Environmental Impact Statement (EIS) and Water Supply Storage Assessment (WSSA) Report.
- Previous and/or current participation in prior non-Federal studies relevant to this project, this area of the country, and/or Apalachicola-Chattahoochee-Flint River (ACF) Water Control Manual (WCM), Environmental Impact Statement (EIS) and Water Supply Storage Assessment (WSSA) Report.
- Is there any past, present, or future activity, relationship, or interest (financial or otherwise) that could make it appear that you would be unable to provide unbiased services on this project? If so, please describe.

Other considerations:

- Participation in previous USACE technical review panels
- Other technical review panel experience.

B.2 Panel Selection

In selecting the final members of the Panel, Battelle chose experts who best fit the expertise areas and had no COIs. Three of the four final reviewers are affiliated with consulting companies; the other is an independent consultant. Battelle established subcontracts with the panel members when they indicated their willingness to participate and confirmed the absence of COIs through a signed COI form. USACE was given the list of candidate panel members, but Battelle selected the final Panel.

Table B-1 presents an overview of the credentials of the final four members of the Panel and their qualifications in relation to the technical evaluation criteria. More detailed biographical information regarding each panel member and his or her area of technical expertise is given in Section B.3.

Table B-1. ACF River IEPR Panel: Technical Criteria and Areas of Expertise

Technical Criterion	Hornung	Fowler	Scheda	Maher
Water Supply Planning				
Minimum 10 years of experience in water supply planning.	X			
Familiarity with large, complex water resources projects with high public and interagency interests.	X			
Experience in the USACE water supply storage reallocation process for Federal water projects.	X			
Familiarity with the development and evaluation of alternative plans for water supply for municipal and industrial uses, including both surface and groundwater sources.	X			
Demonstrated experience working in states under both Eastern and Western systems of water rights.	X			
Experience in water storage reallocation studies at federal multipurpose reservoir projects as defined in USACE Engineer Regulation (ER) 1105-2-100.	X			
Degree in physical sciences, engineering, or a related field.	X			
Water Resources Engineering/Hydrology				
Minimum 10 years of experience in water resources engineering.		X		
Familiarity with large, complex water resources projects with high public and interagency interests.		X		
Experience in the USACE water supply storage reallocation process for Federal water projects.		X		
Experience building and using rules-based water reservoir simulation models such as HEC-ResSim or RiverWare to analyze alternatives for operation of multi-project and multipurpose river systems.		X		
Thorough knowledge of applied statistical methods in analyzing streamflow records.		X		
Experience working on studies of river systems with multiple reservoirs operated for multiple purposes, such as flood control, navigation, water supply, fish and wildlife and recreation.		X		
Demonstrable understanding or experience with studies involving hydropower operations.		X		
Licensed or registered Professional Engineer or Professional Geologist.		X		
Minimum M.S. degree in engineering and/or geology.		X		
Environmental and NEPA				
Minimum 10 years of experience with environmental studies and National Environmental Policy Act (NEPA).			X	
Familiarity with large, complex water resources projects with high public and interagency interests.			X	
Experience in the USACE water supply storage reallocation process for Federal water projects.			X	

Table B-1. ACF River IEPR Panel: Technical Criteria and Areas of Expertise (continued)

Technical Criterion	Hornung	Fowler	Scheda	Maher
Experience preparing an EIS in accordance with NEPA.			X	
Experience preparing an EIS in accordance with Endangered Species Act (ESA) requirements.			X	
Experience in studies related to operational changes in multipurpose reservoir systems.			X	
Experience related to the ecosystems of rivers and lakes in the southeastern United States.			X	
Minimum M.S. degree in ecology, biology, or a related field.			X	
Economics				
Minimum 10 years of experience in economics.				X
Familiarity with large, complex water resources projects with high public and interagency interests.				X
Experience in evaluating costs, benefits, and impacts related to municipal and industrial water supply.				X
Experience forecasting future water use in both urban and rural areas.				X
Experience evaluating the impacts of operational changes in reservoir systems to hydropower, inland navigation, and lake recreation.				X
Experience in applying the methods for determining costs and benefits associated with these project purposes in accordance with the procedures in ER 1105-2-100 and the Water Supply Handbook, Revised IWR Report 96-PS-4, dated December 1998.				X
Minimum M.S. degree in economics or a related field.				X

Lewis Hornung

Role: Water supply planning expert.
Affiliation: DR Reed & Associates, Inc.

Mr. Hornung is a planning expert with DR Reed & Associates in Jupiter, Florida, specializing in the planning, design, and operation of water resources and public works projects. He earned his B.S. in civil engineering from the University of Houston in 1977. He has 37 years of experience in USACE water resources planning for water supply, ecosystem restoration, flood damage reduction, and navigation. His career includes 19 years with USACE, seven years with the South Florida Water Management District, and 11 years with architectural/engineering consulting firms.

Mr. Hornung has played lead roles in many major water resource planning projects. He served as lead planner for the Central and Southern Florida (C&SF) Water Supply Study for the Jacksonville District, a multi-purpose project for flood risk management, municipal/industrial and agricultural water supply, water deliveries to Everglades National Park, and ecosystem preservation for a 16,000-square-mile area with 5 million residents. The C&SF Water Supply Study established the risks of water shortages and evaluated alternative operational and structural modifications to reduce shortages. He also served as project

manager and lead planner for the Lake Okeechobee Watershed Study, which evaluated structural and operational modifications for reducing nutrient loading to Lake Okeechobee and improving the ability to control the lake's water levels. Currently, he is lead planner and project manager for a proposed public-private partnership to construct and operate a water supply reservoir to reduce harmful discharges to the Indian River Lagoon and to supplement water supply to an area that undergoes chronic water shortages.

During his last nine years with USACE, Mr. Hornung served as Program Manager for the C&SF Project, supervising a group of project managers who led more than 20 projects with a total annual budget of up to $50 million. This effort required working closely with public and private stakeholders (Federal and state resource agencies, environmental and agricultural organizations, utilities, and the public) who held strong interests in the region's large, complex water resources projects. He also served as program manager and project manager for preparation of a reconnaissance study and feasibility study for the Comprehensive Everglades Restoration Plan (CERP). For that project, an interagency team was established early in the process to address potentially competing agency concerns. He also led the coordination of an interagency task force that provided guidance for the C&SF study.

Mr. Hornung's experience in water allocation includes his work on the Lake Okeechobee Watershed Study, which involved identifying approaches to maintaining existing levels of service for both municipal/industrial and agricultural water supplies. He also led two major revisions to the Lake Okeechobee Water Control Plan to develop operational strategies for enhancing municipal/industrial and agricultural water supplies, reducing environmentally harmful discharges to coastal estuaries, and reducing flood risk. In addition, as part of the CERP planning process, increased water supplies resulting from implementation of restoration projects was quantified and legally reserved (allocated) for the natural environment.

During his career, Mr. Hornung has gained knowledge of the critical nature of South Florida's hydrologic system, particularly its direct interaction between surface water and groundwater. An example is the Biscayne Aquifer, a surficial aquifer that provides the municipal/industrial water supply for all of Broward and Dade Counties. A 930-square-mile component of the C&SF Project acts as a primary recharge of the Biscayne Aquifer. For that project, Mr. Hornung led a reallocation study to identify operational strategies to maintain and enhance the area's ability to recharge the Biscayne Aquifer while controlling water levels for suitable fish and wildlife habitat.

Mr. Hornung has a knowledge of and experience with water law, particularly in the Eastern United States where water is considered a public resource and must be managed in the public interest. His experience includes familiarity with Federal and state laws and regulations such as NEPA, the Clean Water Act, the ESA, the Everglades Forever Act, the Lake Okeechobee Protection Act, and the Northern Everglades and Estuaries Protection Program Act. He is also familiar with Western water law.

Mr. Hornung's planning experience for the Lake Okeechobee Watershed Study and Water Control Plan, the CS&F Water Supply Study, and other planning efforts demonstrates his knowledge of water supply reallocation consistent with ER 1105-2-100. He also served as Executive Director of the Southern Everglades Restoration Alliance, an interagency organization that implemented an adaptive management program to identify an operating strategy that provided water supply to Everglades National Park in a manner that did not increase flood risks to nearby agricultural areas. This project involved a reallocation of groundwater supply by revising operating rules for the canal system that recharged the aquifer. It also included a tradeoff analysis of impacts on flood risk management vs. water supply.

Chester Deane Fowler, P.E., CDT, CCM, PgMP

Role: Water resources engineering/hydrology expert.
Affiliation: Independent Consultant

Mr. Fowler is an independent consultant with more than 30 years of experience in working on complex, phased multi-year Civil Works construction projects. He earned his M.S. in civil engineering/construction management in 1986 from the University of Florida, is a registered professional engineer in Florida and Virginia, and is a Construction Documents Technologist, Certified Construction Manager, and Program Management Professional. He has program, project, facilities, and construction contract management experience and has held positions in every facet of engineering, including daily and long-term budgeting, planning, scheduling, operations, and executive level management.

Mr. Fowler has experience with large, complex water resource projects with high public and interagency interests through his position as Deputy District Engineer, USACE-Jacksonville (1995-1998). Relevant experience include his oversight of the operation, maintenance and monitoring for the Cerrillos Dam, USACE-Jacksonville (1995-1998) and his project oversight for the Rio Puerto Nuevo Flood Control Project and nearly 40 other major Civil Works projects in Puerto Rico totaling over $1B in various stages of planning, design, and construction. He also provided final review of the cost-sharing agreement and sign-over for the Cerrillos Dam from USACE-Jacksonville to the Commonwealth of Puerto Rico and oversaw the economic analysis (included construction cost estimating) with benefit/cost ratio computations during the design phase for the Portugués Dam Flood Control Project for USACE-Jacksonville.

Mr. Fowler is familiar with, and has experience in, the USACE water supply storage reallocation process for Federal water projects. He assisted in the preliminary risk analysis for the Portugués Dam, USACE-Jacksonville. This included flood risk management and analysis of the main structure, overflow, support elements, construction risks, water storage and reallocation, and public outreach for the downstream communities. In addition, he has led five levee inspection teams performing risk management, design criteria, flood proofing, stability analysis, early warning system analysis, local training, and flood fight capabilities for the Portland District in 2009/2010. He has conducted design review of stability analysis and seepage control on Reaches J, H, F, and G on Morganza to the Gulf Hurricane Protection Project (72-mile earthen levee project) for New Orleans District. He was also involved in the planning for seven flood control projects with New Orleans District in Southeastern Louisiana (2006-2009) while supporting the Project and Program Management Division as a project manager under contract with USACE-MVN. Support included risk management review and the planning/coordination of all project delivery team functional areas while developing project execution planning.

Mr. Fowler is experienced with building and using rules-based water reservoir simulation models such as HEC-ResSim or RiverWare to analyze alternatives for operation of multi-project and multipurpose river systems. His more than 35 years of experience in civil engineering projects is demonstrated in such studies as the Periodic Levee Inspection for Clatsop 1 & 7, Svensen Levee Systems, Warrenton Diking District, and Clatsop 14 Diking District for Portland District (2010). Inspection included construction cost estimating for repair/replacement, validation of design with cost projections, stability analysis, overtopping potential, control structure (floodgates and culverts) review, and benefit/cost evaluation. He was the project manager (under contract with USACE-MVN) for the Morganza to the Gulf of Mexico Hurricane Protection Project, East Baton Rouge Parish Flood Control Project, St. Charles Parish Flood Risk Reduction Project, and St. John the Baptist Flood Risk Reduction Project (2006-2009). Effort involved

cost analysis of multiple alternatives (Mii and cost estimating by AE) in support of the Post Authorization Change Report, developing a Letter Report to document 902 limits, design review of levee and navigation lock, hydraulic and wave modeling analysis oversight (ST Wave, ADICPR, STORM, etc.), review of economic storm damage analysis and projections, coordination between in-house and outside design organizations including Federal, state, and private engineering, USACE District Staff, local resource agencies, and the sponsor.

Mr. Fowler has a thorough knowledge of applied statistical methods in analyzing streamflow records and was trained in statistical analysis of streamflows while assigned/supporting the Jacksonville, Mobile and Seattle Districts (1996-2011). He also has direct experience working on studies of river systems with multiple reservoirs operated for multiple purposes, such as flood control, navigation, water supply, fish and wildlife, and recreation in the states of Nevada, California, Ohio, Oregon, and Missouri as well as internationally. Studies include the Rio Puerto Nuevo and Tributaries Flood Protection System, San Juan, Puerto Rico and the Western Tributaries of the Columbia River Flood Control System, Portland, Oregon. He has also served as an engineering expert on several USCACE IEPR panels including the Skagit River Basin Flood Risk Management General Investigation, the General Reevaluation Report for the Truckee Meadows Flood Control Project, and the Manhattan, Kansas, Local Protection Flood Risk Management Feasibility Study.

Mr. Fowler has a demonstrable understanding or experience with studies involving hydropower operations, and has supported planning, review, conceptual design, detailed design, maintenance for numerous dams, flood control structures, and water control systems involving hydropower in Puerto Rico, Washington, California, Louisiana, and Oregon.

Sandra Scheda

Role: Environmental and NEPA expert.
Affiliation: Scheda Ecological Associates, Inc.

Ms. Scheda is president and principal scientist at Scheda Ecological Associates, Inc. She earned her M.S. in zoology from University of South Florida in 1984 and has more than 28 years of experience conducting environmental planning efforts, biological assessments, and related studies throughout the southeast United States including Florida, Georgia, and South Carolina. These efforts have included surface and groundwater quality studies, planning/NEPA, the construction oversight of environmental elements, and design/permitting. She has also authored journal articles, conducted peer reviews for technical documents, presented at conferences, and taught at the University of South Florida.

Ms. Scheda is familiar with large, complex water resources projects with high public and interagency interest. She has worked on several large water resources projects with multi-agency funding and project development teams. Some examples include the Tamiami Trail Culverts/Hydrologic Restoration Feasibility Study, the Water Preserve Areas Feasibility Study Project Implementation Report/ Environmental Impact Statement (PIR/EIS), the C-43 West Basin Reservoir PIR/EIS, and the Site 1 Impoundment PIR/EIS and Strazzullla Wetlands PIR/EIS as a technical reviewer.

Ms. Scheda is experienced in the USACE water supply storage reallocation process for Federal water projects with studies that have involved water storage for reallocation based upon modeling. One such project was the C-43 West Basin Reservoir. This reservoir was designed to intercept above normal flows upstream and redeliver water downstream to match at least the required CFS rate in the Caloosahatchee

River over the Franklin Lock. She is also familiar with, and experienced in, studies related to operational changes in multipurpose reservoir systems. Her work on the Water Preserve Areas Feasibility Study for the South Florida Water Management District included both operational changes as well as new project components, which were prepared in conformance with the NEPA process, CERP regulations, and USACE/District requirements.

Ms. Scheda is experienced in the preparation of EISs in accordance with NEPA. She is thoroughly knowledgeable about the Project Development and Environment (PD&E) guidelines used for development of transportation projects by the Florida Department of Transportation and the NEPA process and related requirements. In addition, she has completed NEPA studies in her areas of expertise for port/marine, water resources, and habitat restoration/CERP projects. She has compiled the required NEPA documents in her areas of expertise under the direction of different lead Federal agencies including Federal Highway Administration, Federal Transit Authority, Federal Railroad Administration; Maritime Administration, U.S. Army Corps of Engineers, and U.S. Coast Guard. Examples of studies include the Kissimmee River Pools D and E Hydrologic Restoration Feasibility Studies, the MacDill AFB Wave Barriers EA/FONSI, and the SR 7 Extension PD&E Study (Wetland Evaluation Report, Endangered Species Biological Assessment/Biological Opinion, and Mitigation/Habitat Restoration Plan [for over 300 acres]).

She also has extensive experience preparing EISs in accordance with ESA requirements and has prepared numerous NEPA documents and related Biological Assessments in accordance with ESA requirements. She has worked on various levels of NEPA documentation for a wide variety of project types and species. Relevant studies include C-43 West Basin Reservoir Design and Permitting, Hendry County, Florida and numerous construction/design build projects in the Southeast U.S.

Daniel Maher, PMP

Role: Economics expert.
Affiliation: DSM Contracting, LLC

Mr. Maher is an independent consultant and senior economist at DSM Contracting, LLC and has more than 25 years of experience managing numerous ecosystem restoration, incremental analyses, navigation, economic impact, water supply, flood control, and recreation studies for clients throughout the United States. He earned his M.S. in agricultural economics from Louisiana State University in 1988, and is a certified Project Management Professional. He has served as an economist and project manager on over 50 USACE planning studies and has been responsible for assisting in alternative development and screening, and conducting economic analysis in accordance with USACE principles and guidelines.

Mr. Maher is familiar with large, complex water resources planning efforts with high public and interagency interest. These efforts have frequently required his expertise in both evaluating costs, benefits, and impacts related to municipal and industrial (M&I) water supply, as well as forecasting future water use in both urban and rural areas. These aspects of water use are often intertwined in complex planning efforts, as demonstrated in the following examples of Mr. Maher's work: Water Supply Demand Analysis, Pine Mountain Study Area, Arkansas, which developed an M&I water use forecast as part of the estimation and analysis of water supply benefits; East Baton Rouge Parish Alternative Industrial Water Supply Study Market Demand Analysis, which not only prepared a market forecast, but also examined cost, availability, and quality in assessing the ability of industrial users to convert to other water sources; M&I Water Use Forecast, Southwest Florida Feasibility Study, which estimated existing water use and

developing water demand projections; and M&I Water Use Forecast, CERP Forecast Update. During the M&I Water Use Forecast, Lake Okeechobee Regulation Schedule Study for USACE, Mr. Maher was involved in the development of water supply forecasts for use in estimating the allocation (release) of water from Lake Okeechobee.

Mr. Maher has also served as senior economist on several navigation and lake recreation studies for USACE. For the Calcasieu River and Pass, Louisiana, Dredge Material Management Plan Phase II, he updated and finalized the deep draft navigation incremental benefits associated with maintaining navigation on the various reaches of the Calcasieu River and estimating benefit-cost ratios for various operational scenarios. For San Diego Harbor in California, he evaluated the economic feasibility of increasing the current authorized depth of the Federal central harbor and navigation channels to the Tenth Avenue Marine Terminal. As economist, he was responsible for evaluating the economic feasibility and assessing the operational and environmental impacts resulting from the removal of several underwater natural obstructions (pinnacles) in San Francisco Bay. Removing the pinnacles reduced bay transit distances for deep-draft oil tankers and container vessels that frequent the ports on the bay. He has played similar roles on such projects as Montgomery Point Lock and Dam, McClellan-Kerr Arkansas River Navigation System, Limited Reevaluation Report, Economic Analysis Update; and the Regional Economic Development, Southwest Arkansas Navigation Study.

Mr. Maher has worked with USACE and with architect/engineering project teams on various Civil Works projects to identify and evaluate costs and benefits in accordance with USACE's Planning Guidance Notebook (ER 1105-2-100). He has also applied his extensive computer skills to these project purposes, specifically, IMPLAN Economic Impact Software, USACE IWR-Planning Suite (and its predecessor IWR-Plan), and IWR-MAIN Water Use Forecast System. He has also served as an economics expert on several USACE IEPR panels including the Berryessa Creek, Santa Clara County, California, General Reevaluation Study Draft General Reevaluation Report and Environmental Impact Statement/ Environmental Impact Report; and the General Reevaluation Report for the Truckee Meadows Flood Control Project, Nevada.

APPENDIX C

Final Charge to the IEPR Submitted to USACE on June 16, 2015 for the ACF River Project

This page is intentionally left blank.

CHARGE QUESTIONS AND GUIDANCE TO THE PANEL MEMBERS FOR THE IEPR OF THE APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER WATER CONTROL MANUAL, ENVIRONMENTAL IMPACT STATEMENT, AND WATER SUPPLY STORAGE ASSESSMENT REPORT

BACKGROUND

The Apalachicola-Chattahoochee-Flint (ACF) River basin originates in northeast Georgia, crosses the Georgia-Alabama border into central Alabama, and follows the state-line south until it terminates in Apalachicola Bay, Florida. The basin covers 50 counties in Georgia, 10 counties in Alabama, and eight counties in Florida. Extending a distance of approximately 385 miles, the basin drains 19,600 square miles.

There are five Federal reservoirs and eight non-Federal reservoirs in the ACF system. At the headwaters of the system north of Atlanta are Buford Dam and Lake Sidney Lanier. Lake Lanier is a multi-purpose reservoir project, which holds 64% of the basin storage, but represents only 6% of the total ACF drainage basin. Other Federal reservoirs in the ACF system are West Point Dam and West Point Lake; W.F. George Lock and Dam and W.F. George Lake; George A. Andrews Lock and Dam and George A. Andrews Lake; and Jim Woodruff Lock and Dam and Lake Seminole.

Federal interest in the ACF River Basin dates back to the 1800s. Navigation improvements were authorized under the River and Harbor Act of 1874. Later, flood control and hydropower interests were addressed. The River and Harbor Acts of 1945 and 1946 provided for the construction of a series of locks, dams, and reservoirs within the ACF Basin as part of a general plan to provide system-wide benefits for multiple purposes including navigation, flood control (flood risk management), hydropower generation, water supply, water quality, recreation, and fish and wildlife conservation. Modifications of those plans and subsequent legislation have resulted in the completion of five Federal dams, four on the Chattahoochee and one at the confluence of the Chattahoochee and Flint Rivers. Operations of the ACF system and of the individual projects within it are governed by the original authorizing legislation, as amended, and by other general authorities and applicable law.

Buford Dam is a multiple-purpose project, originally authorized by the Rivers and Harbors Act of 24 July 1946, to be operated in conjunction with the other Federal works of improvement in the ACF Basin for the authorized system purposes. Buford Dam is operated to provide benefits for authorized purposes including hydropower, flood risk management, navigation, water supply, water quality, fish and wildlife conservation, and recreation.

West Point Dam and Lake is a multiple-purpose project, originally authorized by the Flood Control Act of 23 October 1962 to be operated in conjunction with the other Federal works of improvement in the ACF basin for the authorized system purposes. West Point Dam is operated to provide benefits for authorized purposes including hydropower, flood risk management, navigation, recreation, fish and wildlife conservation, and water quality. In addition, water supply withdrawals are made from West Point Lake pursuant to relocation agreements entered into at the time of construction.

Walter F. George Lock and Dam and Lake is a multiple-purpose project, originally authorized by the River and Harbors Act of 1945 (under the original name of Fort Gaines) to be operated in conjunction with the other Federal works of improvement in the ACF basin for the authorized system purposes. Walter F. George Lock and Dam is operated to provide benefits for authorized purposes including navigation, hydropower water quality, recreation, fish and wildlife conservation, and water supply.

The George W. Andrews Lock and Dam was originally authorized under the River and Harbors Acts of 1945 and 1946 (under the original name of Columbia Dam) to be operated in conjunction with the other Federal works of improvement in the ACF basin for the authorized system purposes. George W. Andrews Lock and Dam is operated to provide benefits for authorized purposes including navigation, water quality, recreation, and fish and wildlife conservation.

Jim Woodruff Lock and Dam is a multipurpose project originally authorized originally authorized under the River and Harbors Acts of 1945 and 1946 to be operated in conjunction with the other Federal works of improvement in the ACF basin for the authorized system purposes. George W. Andrews Lock and Dam is operated to provide benefits for authorized purposes including hydropower, navigation, recreation, water quality, fish and wildlife conservation, and water supply.

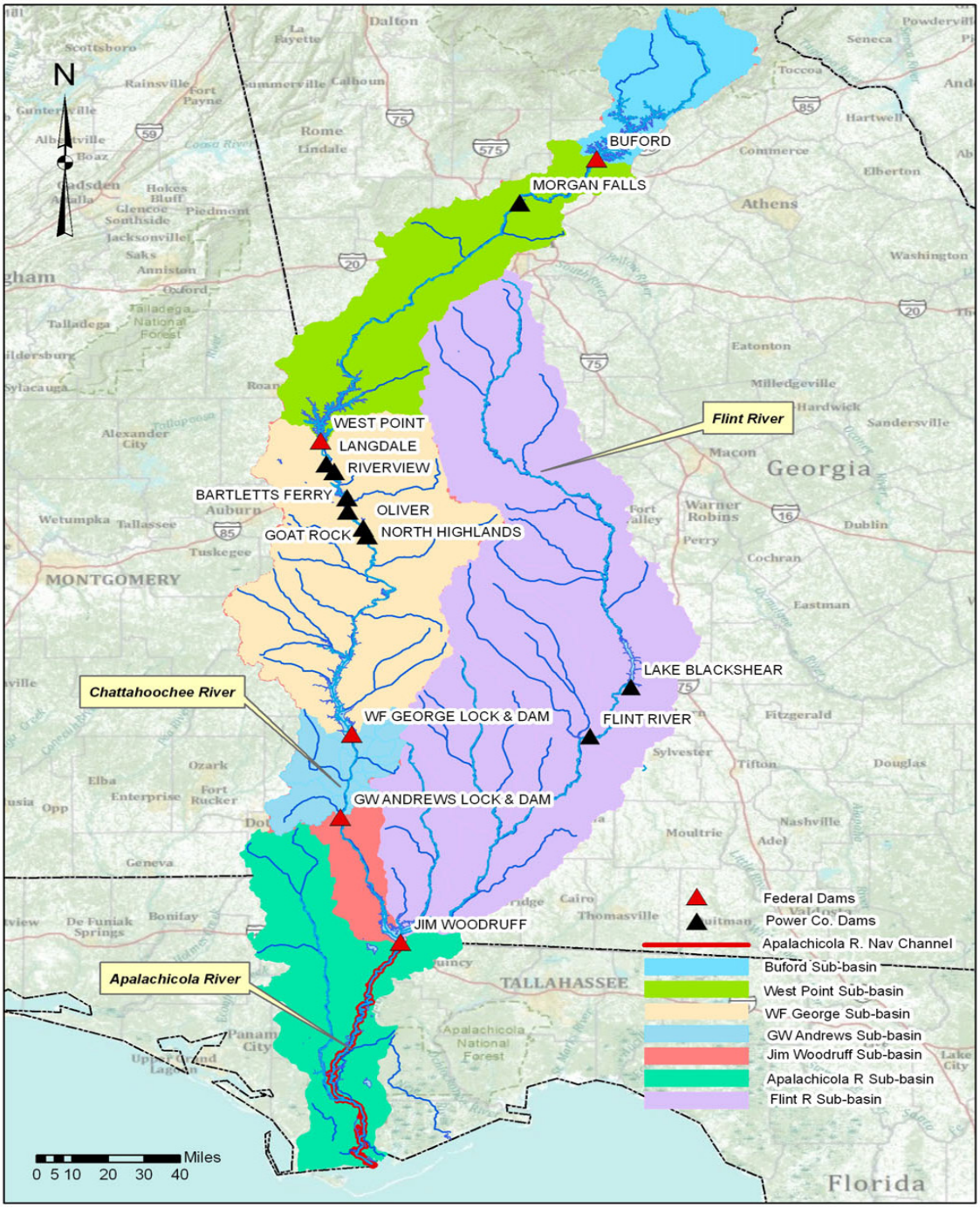
Project operations at each reservoir are described in water control plans and/or manuals. These manuals typically outline the regulation schedules for each project, including operating criteria, guidelines and rule curves, and specifications for storage and releases from the reservoirs. The water control manuals also outline the coordination protocol and data collection, management, and dissemination associated with routine and specific water management activities (such as flood control operations or drought contingency operations). As a major Federal action, updates and revisions to the water control plans must undergo the National Environmental Policy Act (NEPA) public involvement and documentation process.

In order to balance the water management needs for the numerous and often competing authorized project purposes at each individual project, plus the need to balance basin-wide water resource needs for areas throughout the ACF basins, the water control plans must include a certain level of operation flexibility and discretion. Project operations must also be able to adapt to seasonal and inter-annual variations in flow and climatic conditions.

There are two immediate challenges to ACF management. There are no current, approved water control manuals outlining how the system and individual projects will be operated in present basin circumstances. Physical and hydrologic conditions in the ACF basin have changed since the project(s) were authorized and constructed. Manuals that guide water management under today’s conditions are needed.

Several entities are making municipal and industrial (M&I) withdrawals from Lake Lanier that are not in compliance with the 1958 Water Supply Act and Corps policy requiring water supply agreements. This is an artifact from the ‘live and let live’ policy for water use that was put in place to allow M&I withdrawals to continue while the states of Alabama, Florida, and Georgia resolved their concerns about water use in the ACF basin. Disagreement over water use in the ACF system and USACE authorities and operations has been the source of controversy since the 1980s and the subject of ongoing litigation since 1990. Efforts to study and resolve these disagreements include Memorandum of Agreement, Comprehensive Study, an ACF Compact, court-ordered mediation, and governor-initiated and administration-led negotiations. Litigation includes cases heard by the District Court for Middle District of Florida and the District Court, 11th Circuit Court of Appeals. Subsequent to the decision by the 11th Circuit Court of Appeals, the U.S. Supreme Court declined to accept the case. The State of Florida initiated litigation against the State of Georgia in 2013.

Figure 1. Study Area.



The position of Secretary of Army Pete Geren was that USACE should prepare water control manuals that were in accordance with applicable policy and regulation, and directed in January 2008 that work should begin on a water control manual update.

The planning objectives of the ACF Water Control Manual Update are to:

1. Develop manuals that enable Mobile District to operate the Federal projects in a balanced manner to achieve all authorized purposes while not attempting to resolve the longstanding controversies associated with the ACF.
2. Develop a water supply storage assessment that accurately assesses current and future water demands in the upper ACF basin, and define management actions and conditions under which level of water supply storage could be made available for reallocation, if it is determined that it is appropriate to do so.

OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the Apalachicola-Chattahoochee-Flint River Water Control Manual, Environmental Impact Statement, and Water Supply Storage (hereinafter: ACF River IEPR) in accordance with the Department of the Army, U.S. Army Corps of Engineers (USACE), Water Resources Policies and Authorities' *Civil Works Review* (Engineer Circular [EC] 1165-2-214, December 15, 2012), and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (December 16, 2004).

Peer review is one of the important procedures used to ensure that the quality of published information meets the standards of the scientific and technical community. Peer review typically evaluates the clarity of hypotheses, validity of the research design, quality of data collection procedures, robustness of the methods employed, appropriateness of the methods for the hypotheses being tested, extent to which the conclusions follow from the analysis, and strengths and limitations of the overall product.

The purpose of the IEPR is to assess the "adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (EC 1165-2-214; p. D-4) for the ACF River documents. The IEPR will be limited to technical review and will not involve policy review. The IEPR will be conducted by subject matter experts (i.e., IEPR panel members) with extensive experience in water supply planning, water resources engineering or hydrology, environment and NEPA and economic issues relevant to the project. They will also have experience applying their subject matter expertise to water management and relocation.

The Panel will be "charged" with responding to specific technical questions as well as providing a broad technical evaluation of the overall project. Per EC 1165-2-214, Appendix D, review panels should identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods. Review panels should be able to evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable. Reviews should focus on assumptions, data, methods, and models. The panel members may offer their opinions as to whether there are sufficient analyses upon which to base a recommendation.

DOCUMENTS PROVIDED

The following is a list of documents, supporting information, and reference materials that will be provided for the review.

Documents for Review

The following documents are to be reviewed:

Title	Actual. No. of Pages
Review Documents	
Draft ACF Master Water Control Manual and Individual Project Water Control Manuals (Volume 2)	1063
ACF WCM Environmental Impact Statement (Volume 1)	760
ACF Water Supply Storage Assessment (Volume 3, Appendix B)	180
Public Review Comments	1500
Total Number of Review Pages	**3503**

Supporting Information

- Scoping Report for the ACF River Basin, March 2014 (Volume 3, Appendix D)
- HEC ResSim Modeling Report (Volume 3, Appendix E)
- ACF Basin Critical Yield Report (Volume 3, Appendix F)
- HEC-5Q Water Quality Modeling Report (Volume 3, Appendix K)
- USACE Institute for Water Resources ACF Climate Change Support Analysis (Volume 3, Appendix N)
- Draft Fish and Wildlife Coordination Report (if available)

Documents for Reference

- USACE guidance *Civil Works Review,* (EC 1165-2-214, December 15, 2012)
- Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (December 16, 2004)

SCHEDULE

This schedule is based on the May 7, 2015, receipt of the final review documents. Note that dates presented in the schedule below could change due to panel member and USACE availability.

Task	Action	Due Date
Conduct Peer Review	Battelle sends review documents to panel members	6/29/2015
	Battelle convenes kick-off meeting with panel members	6/30/2015
	Battelle convenes Study Overview Meeting (in person, Mobile, AL)	7/7/2015
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE	7/20/2015
	Panel members complete their individual reviews	8/3/2015
Prepare Final Panel Comments and Final IEPR Report	Battelle provides panel members with talking points for Panel Review Teleconference	8/7/2015
	Battelle convenes Panel Review Teleconference	8/10/2015
	Battelle provides Final Panel Comment templates and instructions to panel members	8/11/2015
	Panel members provide draft Final Panel Comments to Battelle	8/18/2015
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	8/19/2015 - 8/26/2015
	Battelle finalizes Final Panel Comments	8/27/2015
	Battelle provides Final IEPR Report to panel members for review	8/31/2015
	Panel members provide comments on Final IEPR Report	9/2/2015
	*Battelle submits Final IEPR Report to USACE	9/4/2015
Comment/ Response Process	Battelle inputs Final Panel Comments to DrChecks and provides Final Panel Comment response template to USACE	9/16/2015
	Battelle convenes teleconference with Panel to review the Post-Final Panel Comment Response Process	9/16/2015
	USACE provides draft Project Delivery Team (PDT) Evaluator Responses to Battelle	9/30/2015
	Battelle provides the panel members the draft PDT Evaluator Responses	10/9/2015
	Panel members provide Battelle with draft BackCheck Responses	10/15/2015
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	10/16/2015
	Battelle convenes Comment-Response Teleconference with panel members and USACE	10/19/2015
	USACE inputs final PDT Evaluator Responses to DrChecks	10/26/2015
	Battelle provides final PDT Evaluator Responses to panel members	10/28/2015

Task	Action	Due Date
	Panel members provide Battelle with final BackCheck Responses	11/2/2015
	Battelle inputs the panel members' final BackCheck Responses to DrChecks	11/9/2015
Public Comment Review	Public comments provided to Battelle by USACE	11/9/2015
	Battelle compiles and summarizes public comments	11/17/2015
	Battelle sends public comments to Panel	11/18/2015
	Panel completes their review of the public comments	11/25/2015
	Battelle and Panel review Panel's responses to public comments	11/30/2015
	Panel drafts Final Panel Comment, if necessary	12/1/2015
	Panel finalizes Final Panel Comment regarding public comments	12/3/2015
	Addendum to Final Report Provided to USACE, if applicable	12/7/2015
	*Battelle submits pdf printout of DrChecks project file	12/18/2015
Senior Leader Meeting	Panel prepares and/or reviews slides for SLM	TBD (If Optional Task 2 is awarded)
	SLM	

* *Deliverables*

CHARGE FOR PEER REVIEW

Members of this IEPR Panel are asked to determine whether the technical approach and scientific rationale presented in the ACF River documents are credible and whether the conclusions are valid. The Panel is asked to determine whether the technical work is adequate, competently performed, and properly documented; satisfies established quality requirements; and yields scientifically credible conclusions. The Panel is being asked to provide feedback on the economic, engineering, environmental resources, and plan formulation. The panel members are not being asked whether they would have conducted the work in a similar manner.

Specific questions for the Panel (by report section or appendix) are included in the general charge guidance, which is provided below.

General Charge Guidance

Please answer the scientific and technical questions listed below and conduct a broad overview of the ACF River documents. Please focus your review on the review materials assigned to your discipline/area of expertise and technical knowledge. Even though there are some sections with no questions associated with them, that does not mean that you cannot comment on them. Please feel free to make any relevant and appropriate comment on any of the sections and appendices you were asked to review. In addition, please note the following guidance. Note that the Panel will be asked to provide an overall statement related to 2 and 3 below per USACE guidance (EC 1165-2-214; Appendix D).

1. Your response to the charge questions should not be limited to a “yes” or “no.” Please provide complete answers to fully explain your response.

2. Assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, and any biological opinions of the project study.

3. Assess the adequacy and acceptability of the economic analyses, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, and models used in evaluating economic or environmental impacts of the proposed project.

4. If appropriate, offer opinions as to whether there are sufficient analyses upon which to base a recommendation.

5. Identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods.

6. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable.

7. Please focus the review on assumptions, data, methods, and models.

Please **do not** make recommendations on whether a particular alternative should be implemented, or whether you would have conducted the work in a similar manner. Also, please **do not** comment on or make recommendations on policy issues and decision making. Comments should be provided based on your professional judgment, **not** the legality of the document.

1. If desired, panel members can contact one another. However, panel members **should not** contact anyone who is or was involved in the project, prepared the subject documents, or was part of the USACE Agency Technical Review (ATR).

2. Please contact the Battelle Project Manager (Lynn McLeod, mcleod@battelle.org) or Program Manager (Karen Johnson-Young (johnson-youngk@battelle.org) for requests or additional information.

3. In case of media contact, notify the Battelle Program Manager, Karen Johnson-Young (johnson-youngk@battelle.org) immediately.

4. Your name will appear as one of the panel members in the peer review. Your comments will be included in the Final IEPR Report, but will remain anonymous.

Please submit your comments in electronic form to Lynn McLeod, **mcleod@battelle.org**, no later than August 3, 2015, 10 pm ET.

Independent External Peer Review

of the

Apalachicola-Chattahoochee-Flint River Water Control Manual, Environmental Impact Statement, and Water Supply Storage Assessment Report

Charge Questions and Relevant Sections as Supplied by USACE

The following Charge to Reviewers outlines the objectives of the Independent External Peer Review (IEPR) for the subject study and the specific advice sought from the IEPR Panel.

The objective of the IEPR is to obtain an independent evaluation of whether the interpretations of analysis and conclusions based on analysis are reasonable for the subject study. The IEPR Panel is requested to offer a broad evaluation of the overall study decision document in addition to addressing the specific technical and scientific questions included in the charge. The Panel has the flexibility to bring important issues to the attention of decision makers, including positive feedback or issues outside those specific areas outlined in the charge. The Panel can use all available information to determine what scientific and technical issues related to the decision document may be important to raise to decision makers. This includes comments received from agencies and the public as part of the public review process.

The Panel review is to focus on scientific and technical matters, leaving policy determinations for USACE and the Army. The Panel should not make recommendations on whether a particular alternative should be implemented or present findings that become “directives” in that they call for modifications or additional studies or suggest new conclusions and recommendations. In such circumstances, the Panel may have assumed the role of advisors as well as reviewers, thus introducing bias and potential conflict in their ability to provide objective review.

Panel review comments are to be structured to fully communicate the Panel’s intent by including the comment, why it is important, any potential consequences of failure to address, and suggestions on how to address the comment.

Broad Evaluation Charge Questions

1. Is the need for and intent of the decision document clear?
2. Does the decision document adequately address the stated need and intent relative to scientific and technical issues?
3. Given the need for and intent of the decision document, assess the adequacy and acceptability of the project evaluation data used in the study analyses.
4. Given the need for and intent of the decision document, assess the adequacy and acceptability of the economic, environmental, and engineering assumptions that underlie the study analyses.
5. Given the need for and intent of the decision document, assess the adequacy and acceptability of the economic, environmental, and engineering methodologies, analyses, and projections.

6. Given the need for and intent of the decision document, assess the adequacy and acceptability of the models used in the evaluation of existing and future without-project conditions and of economic or environmental impacts of alternatives.
7. Given the need for and intent of the decision document, assess the adequacy and acceptability of the methods for integrating risk and uncertainty.
8. Given the need for and intent of the decision document, assess the adequacy and acceptability of the formulation of alternative plans and the range of alternative plans considered.
9. Given the need for and intent of the decision document, assess the adequacy and acceptability of the overall assessment of significant environmental impacts and any biological analyses.
10. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable.
11. Assess the considered and tentatively selected alternatives from the perspective of systems, including systemic aspects being considered from a temporal perspective, including the potential effects of climate change.

Specific Technical and Scientific Charge Questions

12. Have existing water uses in the basin been adequately evaluated and considered in the formulation and evaluation of alternative plans?
13. Are the assumptions and methods used to forecast future water needs in the basin adequate to support alternative formulation and evaluation of alternative plans?
14. Is the underlying technical analysis adequate to provide the basis for identifying the most likely and least costly no action alternative?
15. Is the cost information provided in the Water Supply Storage Assessment Report adequate to compare alternatives and select a recommended plan?
16. Have the hydrologic assessments of the mainstem reservoirs been adequately considered to support the assignment of storage to individual users in the basin to meet their needs with reasonable reliability?
17. Has the hydrologic uncertainty related to the yield of conservation storage from the Corps reservoirs in the mainstem system been adequately considered to support the evaluation of alternative plans?

Summary Questions

18. Please identify the most critical concerns (up to five) you have with the project and/or review documents. These concerns can be (but do not need to be) new ideas or issues that have not been raised previously.
19. Please provide positive feedback on the project and/or review documents.

Public Comment Questions

20. Does information or do concerns raised by the public raise any additional discipline-specific technical concerns with regard to the overall report?

APPENDIX D

Conflict of Interest Form

This page is intentionally left blank.

Conflicts of Interest Questionnaire

[Independent External Peer Review]

[ACT Water Control Manual]

The purpose of this document is to help the U.S. Army Corps of Engineers identify potential organizational conflicts of interest on a task order basis as early in the acquisition process as possible. Complete the questionnaire with background information and fully disclose relevant potential conflicts of interest. Substantial details are not necessary; USACE will examine additional information if appropriate. Affirmative answers will not disqualify your firm from this or future procurements.

NAME OF FIRM: **Battelle Memorial Institute**
REPRESENTATIVE'S NAME: **Gina M. Crabtree**
TELEPHONE: **614-424-5097**
ADDRESS: **505 King Avenue, Columbus, OH 43201**
EMAIL ADDRESS: **crabtreeg@battelle.org**

I. INDEPENDENCE FROM WORK PRODUCT. Has your firm been involved in any aspect of the preparation of the subject study report and associated analyses (field studies, report writing, supporting research etc.) No **X** Yes (if yes, briefly describe):

II. INTEREST IN STUDY AREA OR OUTCOME. Does your firm have any interests or holdings in the study area, or any stake in the outcome or recommendations of the study, or any affiliation with the local sponsor? No **X** Yes (if yes, briefly describe):

III. REVIEWERS. Do you anticipate that all expert reviewers on this task order will be selected from outside your firm? No Yes **X** (if no, briefly describe the difficulty in identifying outside reviewers):

IV. AFFILIATION WITH PARTIES THAT MAY BE INVOLVED WITH PROJECT IMPLEMENTATION. Do you anticipate that your firm will have any association with parties that may be involved with or benefit from future activities associated with this study, such as project construction? No **X** Yes (if yes, briefly describe):

V. ADDITIONAL INFORMATION. Report relevant aspects of your firm's background or present circumstances not addressed above that might reasonably be construed by others as affecting your firm's judgment. Please include any information that may reasonably: impair your firm's objectivity; skew the competition in favor of your firm; or allow your firm unequal access to nonpublic information. **No additional information to report.**

LaDonna James

Digitally signed by LaDonna James
DN: cn=LaDonna James, o=Battelle Memorial Institute, ou=Contracts, email=jamesl@battelle.org, c=US
Date: 2015.04.01 11:17:35 -04'00'

FOR: Gina Crabtree, Battelle — April 1, 2015 DATE

Battelle
The Business *of* Innovation