

Summary of a Workshop on Water Issues in the Apalachicola-
Chattahoochee-Flint and Alabama-Coosa-Tallapoosa
(ACF-ACT) River Basins

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Water Science and Technology Board

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**STEERING COMMITTEE FOR A WORKSHOP ON WATER ISSUES IN THE
APALACHICOLA-CHATTahoochee-FLINT AND ALABAMA-COOSA-
TALLAPOOSA (ACF-ACT) RIVER BASINS**

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Foreword

The southern states of Alabama, Florida, and Georgia share two large river systems—the Apalachicola, Chattahoochee, and Flint (ACF) rivers, and the Alabama, Coosa, and Tallapoosa (ACT) rivers. Much of the water in these river systems is stored and allocated for various uses in 10 reservoirs operated by the U.S. Army Corps of Engineers and in 21 non-federal reservoirs. The shared waters of these interstate river systems have been the subjects of extensive negotiations and litigation since the 1980s.

The water-related disputes and differences of opinion among the federal government, the states, and other entities in the basin may seem unusual to the uninitiated observer, as the western U.S. traditionally has been the site of disputes over shared water resources. Friction regarding shared water resources, however, is increasingly common across the nation. Examples from the eastern U.S. include New York City—which has had disputes with some Delaware River Basin communities—and the Savannah River and the Tennessee River, both of which are subject to disputes over shared inter-state waters. The ACF-ACT river systems are an example of where extended drought and population growth, even in a humid region, have led to reduced water deliveries to some users and to tensions and litigation.

There are differences of opinion over water resources decisions in this region, on many different topics and at a variety of levels and spatial scales. There also is limited or incomplete scientific information related to several key water management concerns. Questions such as “How much water does the Atlanta metropolitan area use?” or “How much water is required by endangered and other important species in Apalachicola Bay?” do not have clear answers. Lack of clarity on these and other hydrologic and scientific issues may obstruct agreement and inhibit more flexible water management regimes and decisions.

In response to a request from the U.S. Army Corps of Engineers, staff members from the National Academies’ Water Science and Technology Board (WSTB), along with a five-person WSTB steering committee,¹ organized a one-day workshop to discuss a range of water science and planning issues. The workshop was held on April 3, 2009 in Washington, D.C., and engaged a group of nearly 50 water resources experts, stakeholders, and political officials. The objective of the event was to identify the key management issues in the ACF-ACT basins, and to identify

¹ Steering committee members are listed in this report’s frontmatter.

study topics and questions that might be pursued as a means to support better water management decisions (see the Statement of Task for this event in Appendix A). The workshop generated a great deal of enthusiasm and featured vigorous exchanges of ideas and perspectives among meeting participants.

Following this event, a list of the topics discussed at the workshop and a list of possible topics and questions that might be usefully pursued in a future study(ies) was compiled by the WSTB staff and summarized in this workshop summary. Although the workshop was not designed to produce specific findings or recommendations, many workshop participants expressed the view that a forward-looking, comprehensive water resources assessment would be of great value in helping the Corps of Engineers and Alabama, Florida, Georgia in their water resources planning for the next 20-30 years. Topics that could be usefully pursued within such a study include future water supply scenarios and management options; changes in water demands and demand patterns across the region; connections between river flows and impacts on downstream ecology and species of concern; and the effects of climate change on water availability.

This summary was reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise in accordance with the procedures approved by the NRC's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the NRC in making its published report as sound as possible, and to ensure that the report meets NRC institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. We thank the following for their review of this report: Aris Georgakakos, Georgia Institute of Technology; William L. Graf, University of South Carolina; G. Tracy Mehan, The Cadmus Group, Inc., and; A. Dan Tarlock, Chicago Kent College of Law. Although these reviewers provided many constructive comments and suggestions, they did not see the final draft of the summary before its release. The review of this report was overseen by the NRC Division on Earth and Life Studies, which was responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the author and the institution.

I wish to thank the participants from the ACF-ACT region and other parts of the nation who attended and participated in the workshop. It was a pleasure to host them and to learn of the many different perspectives and opinions regarding water management in the ACF-ACT rivers. The discussions at the meeting were professional and informative and the cooperative spirit of the invitees contributed greatly to the success of the event.

Jeffrey Jacobs, National Research Council
Rapporteur

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Introduction

WATER DEMANDS AND SUPPLIES IN THE ACF-ACT RIVER BASINS

Large areas of Alabama, the Florida panhandle region, and western Georgia lie in the watershed of the Apalachicola-Chattahoochee-Flint (ACF) and Alabama-Coosa-Tallapoosa (ACT) river systems. These river systems provide an array of water-related benefits and services to the region's residents, municipalities, farms, other economic sectors and ecosystems. Each of these river basins has experienced extensive water resource development in the form of multiple purpose reservoirs constructed by the Corps of Engineers and by non-federal entities. There literally are hundreds of dams across these river systems. The largest of these are 10 Corps of Engineers dams and 21 non-federal dams (Figure 1).

These river basins drain the southern end of the Appalachian Mountains then flow through a piedmont region of low hills and across a coastal plain of low relief. The significance of this physical context is that the upper reaches of the basins, where private hydropower dams are common, are very different from the lower reaches, where species of concern are largely located. These river systems became the sites of heightened disputes over shared water resources during the 1980s. At that time, the region was experiencing drought conditions and steady population growth with increasing water demands. The population of Metro Atlanta, for instance, grew from roughly less than one-half million in 1950 to over five million in 2007. The city of Atlanta and significant portions of the surrounding metropolitan area derive much of their drinking water supply from direct withdrawals and releases from Lake Lanier, which is impounded by Buford Dam on the Chattahoochee River in north-central Georgia. Tensions among increasing urban water demands and other water use sectors have continued. Those tensions tend to be magnified during conditions of drought and water shortages, such as during 2006-08, and reduced during periods of greater rainfall, such as during the spring of 2009.

Driven by increasing demands and erratic or decreased water supplies, the basin states of Alabama, Florida, and Georgia, and the Corps of Engineers have been involved in considerable litigation since the 1980s. A prominent example of an effort to find reconciliation among these parties began with a series of negotiations that led the three states to enter a congressionally authorized compact in 1997, in which they agreed to work toward a water allocation agreement



FIGURE 1. Apalachicola-Chattahoochee-Flint (ACF) and Alabama-Coosa-Tallapoosa (ACT) river systems.
SOURCE: USGS (2004). ga.water.usgs.gov/publications/abstracts/acfactlist.html.

for the ACF river systems. In 2003 these negotiations ended without the states agreeing to an allocation scheme. The three states and the Corps continue to be involved in litigation over sharing the waters within the ACF basin, with some focus on the Corps' operation of its four Chattahoochee River dams.

CORPS OF ENGINEERS WATER CONTROL MANUALS

Water management operations for the federal dams and reservoirs in these river systems are described in Corps of Engineers water control manuals specific to each reservoir and included within master water control manuals for the ACF and ACT river basins. These manuals outline the regulation schedules for each project and specifications for storage and releases from each reservoir. They also outline policies and data protocols for flood control operations and drought contingency operations. In writing these manuals, the Corps of Engineers considers

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authorized project purposes, power contract commitments, hydrologic and climatic factors, downstream lake and basin-wide conditions, potential threats of flood and drought, and lake levels. In addition to balancing these many, sometimes competing, variables, the Corps of Engineers also must consider changes in water demand patterns, economic factors, and social preferences.

Drought conditions in 2006 resulted in the Corps initiating formal consultation with the U.S. Fish and Wildlife Service in order to determine flow regimes that are beneficial to federally endangered species in the lower reaches of the Apalachicola River. As part of the consultation, the Corps proposed and implemented a set of operation rules—the Interim Operation Plan (IOP)—for the federal reservoirs in the ACF basin. A drawdown of Lake Lanier was required to support these flows, and many Georgia water users and officials questioned the justification for the minimum flow requirements. The year 2007 saw drought conditions across the basin continue, the IOP was modified to include Emergency Drought Operations (EDO) as the Apalachicola River experienced record low flows and further threats to endangered aquatic species. Systems operations are complicated further by minimum flow requirements in other areas, such as reaches downstream from Buford Dam and similar constraints downstream from Morgan Falls Dam in Atlanta.

In 2007, the Secretary of the Army directed an update of the ACT master water control manual, and in 2008 the Secretary directed an update of the ACF master water control manual.² The existing ACT and ACF water control manuals were completed in 1951 and 1958, respectively. These basins have seen numerous physical changes since then, not the least of which is the addition of several dams and reservoirs. The legal context for national water resources decisions has also changed greatly with passage of the National Environmental Policy Act, the Clean Water Act, the Endangered Species Act, and the Safe Drinking Water Act. The scientific setting of water resources decisions also has changed. For instance, there is a better understanding and wider appreciation of the impacts of dam and reservoir operations on downstream ecology, and water managers today may try to implement concepts such as the natural flood pulse to help restore ecosystems or protect species of special concern. The social setting, too, has changed; the role of stakeholders, for instance, is today far more prominent in decision making than in the 1950s when the current manuals were written.

NATIONAL ACADEMIES WORKSHOP

In 2008, the Corps of Engineers South Atlantic Division contacted the National Academies' Water Science and Technology Board (WSTB) to discuss the possible involvement of the Academies' in providing independent, expert advice to the Corps and others regarding river system operations, aquatic ecology, and related issues. Brigadier General Joseph Schroedel, then-Corps Division Commander, spoke with WSTB members and staff at their October 2008

² A draft updated ACF Master Water Control Manual that incorporated the overall system management was proposed in 1989 as part of the Lake Lanier post-authorization change report. This master manual described current system operations at that time but was not finalized due to litigation filed by the State of Alabama objecting to current and proposed changes to operations in the basin. The Corps has been operating the ACF projects under the draft 1989 Master Water Control Manual on an interim basis pending update of the Master Manual and individual project Water Control Manuals.

board meeting. It was agreed that the Corps would sponsor a one-day workshop in which key ACF-ACT water management issues were discussed, and in which a handful of topics that might serve as the basis for future studies would be identified (the statement of task for this activity is included as Appendix A).

The workshop was convened at the National Academy of Sciences in Washington, D.C. on April 3, 2009. The workshop included presentations from National Research Council (NRC)³ staff; the Corps of Engineers; the U.S. Fish and Wildlife Service; the states of Alabama, Florida, and Georgia; and several invited experts. An open comment session and open discussion session also were held. The event was moderated and overseen by a small steering committee of Water Science and Technology Board members that worked with WSTB staff (a meeting agenda is included as Appendix B; workshop participants are listed in Appendix C).

Meeting participants represented many different organizations, sectors, and perspectives, and the sessions held through the day featured many lively exchanges and an abundance of thoughtful questions and comments. Historical and ongoing conflicts and lawsuits over ACF-ACT system operations are undeniable and a prominent part of any discussions of these issues. The workshop invitees, however, participated in the meeting with positive spirits, candor, and enthusiasm. The discussions were conducted at a professional level and the invitees identified and explained numerous important issues regarding scientific concepts and data, legal and institutional issues, and modes of decision making, all of which affect ACF-ACT water management.

The following sections summarize the main topics discussed by participants at the workshop, and possible topics for future studies that were raised at the meeting by members of the steering committee and other participants. This report does not identify any possible findings or recommendations that may have emerged during the workshop nor does it offer its own findings and recommendations.

At this time, the National Academies has not been requested to conduct any further studies in the ACF-ACT region, although some pending federal legislation calls for the National Academies to carry out a study to provide advice on water management in the basin (see Appendix D).

³ The National Research Council (NRC) is the working arm of the National Academies. The National Academy of Sciences (NAS) is an honorific body and is part of the National Academies. The National Academy of Engineering (NAE) and Institute of Medicine (IOM) also are honorific bodies within the National Academies complex. For more information see www.nationalacademies.org/

Topics Discussed at the Workshop

The workshop covered a rich array of issues that coalesced around the following major topics:

1) Stakeholder involvement

The value of stakeholder participation and input into ACF-ACT operations decisions was mentioned by several meeting participants. Some participants stated that past input from a broad range of stakeholders into ACF-ACT decisions had been inadequate. Discussion on the topic included means and processes by which stakeholder perspectives—and their different water use and management objectives—might be more explicitly incorporated into future ACF-ACT systems management.

2) Rapid population growth and the adequacy of ACF-ACT water supplies to support new users

Meeting participants expressed diverse views on this topic. Some participants asserted that water supplies in the river systems were “adequate” for all users, while other participants stated that there is not enough water to supply all users and sectors. Attendees generally acknowledged that additional population growth would add further stresses to the water supply system.

Related to these discussions was the topic of water use data. Many participants said that more precise information on water withdrawals, use rates by sector, demand change forecasts and consequences, and return flows—or some type of a basin-wide “water balance” evaluation—would be helpful to the Corps of Engineers, the states, and other decision makers. The presentations and discussions highlighted some differences of opinion about the nature, adequacy, and interpretation of data addressing both population growth and the amount of water available to supply all needs.

3) The flow regime of the lower Apalachicola River and Apalachicola Bay, and implications for navigation, aquatic ecology, and species of concern

A topic of central importance in ACF-ACT water management decisions is water flow into Apalachicola Bay. Providing flows that are adequate to protect endangered species is a water management challenge for the Corps of Engineers and the U.S. Fish and Wildlife Service, particularly during periods of low flow or drought. Upstream users—mainly in Georgia—would like to maintain or increase water withdrawals there, while downstream users and environmental groups—many of them in Florida—are concerned that if flows go too low, that ecosystems and species will be harmed and commercial navigation might be impaired. The Corps and the FWS find themselves in the middle of these debates and differences of opinion and it may not be possible to find flow regimes that consistently satisfy all interests—especially as population and demand grow.

The implications of various flow regimes on Apalachicola aquatic species—and the topic of “minimum flows” required for endangered species—was identified by many participants as an important topic for future study. Some participants also identified the importance and challenges associated with providing flows for navigation.

4) Water conservation design and policy

The roles of water conservation practices and environmental design for water conservation were identified by some participants as approaches that could help extend existing water supplies and help address larger, basin-wide water supply concerns.

5) Climate change and drought

Climate variability, drought, and climate change were discussed in opening presentations by invited speakers. For example, moderator Dave Moreau pointed out the several, recent dry years in the region and noted that these dry years mark a clear departure from historical climate and hydrologic statistics and variability. Aris Georgakakos, invited speaker from the Georgia Institute of Technology, presented findings from a recent NOAA-funded study indicating that in the southeastern U.S. most climate change scenarios portend reduced water supplies and more severe droughts. Throughout the day, other participants noted the importance of possible climate change and how it may be affecting, and possibly reducing, long-term surface water and groundwater supplies.

6) Ambiguity of Corps of Engineers authorities

Many meeting participants stated that there is a lack of clarity regarding the authorities that govern Corps of Engineers’ operations of Buford Dam and other projects through these river basins. Although storage allocations in these projects are governed by language in congressional authorizations, ambiguities arise because of discretionary authorities and emergency powers delegated to the Corps of Engineers.

7) Federal-state decision making processes

Some participants asserted that some aspects of the current decision making regime among the federal government and the three basin states inhibit the creation of more workable, timely, and less contentious agreements among the parties.

8) Balancing human water uses and withdrawals with needs of aquatic systems and species

Invited speaker Brian Richter of the Nature Conservancy focused his presentation on ways in which ecosystem needs and the needs of a growing population might be simultaneously accommodated. The need to recognize the economic and other values of ecosystem services was also discussed (e.g., by Sam Hamilton of the U.S. Fish and Wildlife Service). This is related to point #1 above.

9) The Master Water Control Manual revision process and the timing of any possible NRC study

Several cases of litigation currently are being heard in a U.S. district court by Judge Paul Magnuson that may have important implications for Lake Lanier operations and downstream flows into Apalachicola Bay. Some meeting participants urged that the NRC not conduct any study before a decision on these cases is reached; others, however, asserted that an NRC study that could provide advice for better management of shared water resources would be timely (note: Judge Magnuson held a live hearing on these cases in Jacksonville, Florida on May 11, 2009; any NRC study likely would not likely begin before early 2010).

Possible Topics and Questions for Future Study

Of the topics discussed by the meeting participants, the following may constitute topics for fruitful future studies and contributions to the next stage of ACF-ACT water resources planning:

1) Drought, climate change/variability, and impacts and responses

Potential studies under these topics could take several different forms: assessments of past climate changes and streamflow impacts; studies of how future precipitation shortfalls and higher summer temperatures might affect water supplies, allocations, and withdrawals; and evaluations of past climate impacts and societal responses.

2) Water supply availability under different population growth scenarios

These studies could consider how different patterns and different magnitudes of future population growth may stress existing supplies and allocation schemes and agreements.

3) Prospects for operational adjustments and adaptive management in the ACF-ACT systems

Given this region's steady increases in population, the possibility of a shift to a drier climate regime, and large uncertainties in ecosystem responses to human actions, it may be a good candidate for implementation of some principles of adaptive management. In addition, many water managers and users in the region are interested in the capacity of the ACF-ACT system to provide reliable supplies to water users under different water availability and storage scenarios.

4) Ecosystem responses to different flow scenarios

Many users and water managers are interested in further details of how different flows into Apalachicola Bay will affect ecology and species of concern. The Corps of Engineers, Fish and Wildlife Service, and the states all could benefit by better understanding these phenomena, as it could provide a better footing for ACF-ACT operations decisions, such as setting water release schedules from Buford Dam. Given the importance of this topic to so many stakeholders, it would seem valuable to strengthen the scientific connection between flow levels and ecosystem responses in the lower rivers.

5) Prospects for using more social sciences-demographics-economics studies

Reservoir releases and other water management decisions are based partly on economic and social preferences and values. As this region continues to grow, and as the uses of and preferences for water change, more information on the values of water, prices paid by different users, population growth patterns, and so on could be useful to users and decision makers. These analyses could explicitly incorporate consideration of economic and social values of ecosystem services.

6) Clarification of values regarding amounts of water withdrawal rates and uses

There continue to be some uncertainties regarding the “water balance” for the ACF-ACT region. Meeting participants, for instance, offered different values in describing the City of Atlanta’s water use as a percentage of water in the ACF basin. Better information on topics such as water uses and demands; water availability; water withdrawals; water table levels, and so on, could aid water management decisions and long-term planning.

7) Demand side management and design studies

This could include prospects for broader and more aggressive demand side management of water resources, from the aggregation of site-scale specific water-conserving design to collaborative transboundary watershed conservation. In each case, estimating region-wide benefits of demand management measures and technologies is a key scientific issue. Such studies also could go beyond the ACF-ACT region and learn from demand management approaches and techniques employed in other parts of the nation or in arid areas around the world.

8) Water reuse

Some meeting participants discussed the prospects for water reuse in a variety of applications. This certainly is a prominent topic in water conservation discussions and has been a viable option in several areas and applications mainly in the arid western and southwestern U.S. for many years. As drought and water shortages are relatively new issues in the southeastern U.S., there may be great opportunities for water reuse in the region, which could be identified and assessed in a study(ies).

9) Transboundary water management issues and institutional arrangements

The extensive body of litigation among the states and the federal government over ACF-ACT water issues suggests that an assessment of federal-state, and interstate, agreements and institutions may be of value. For instance, there is a large and growing literature on transboundary water cooperation and conflict, and future basinwide management in the ACF-ACT region could benefit by evaluations of transboundary agreements that have proven useful in other parts of the U.S. and other parts of the world. Water managers in the ACF-ACT region also could consult with experts who have helped mediate disputes over shared water resources.

10) Ecosystem services

A challenge in allocating limited water supplies to benefit aquatic ecosystems and species is that the economic values of ecosystem “goods and services” are difficult to quantify and in most cases have not been monetized. It is difficult to make accurate comparisons between the value of ecosystems and sectors in which dollar values of economic activity (e.g., hydropower sales; commercial navigation; agricultural products) are more readily available. Some experts assert that the limited information on the market value of ecosystem goods and services puts them in an inferior position compared to other water use sectors. In any case, more explicit quantitative information about the values of ecosystem services, in Apalachicola Bay and elsewhere, could improve the knowledge base of ACF-ACT water management decisions.

11) Alternative processes for gathering stakeholder input

Although the Corps of Engineers used a “Shared Vision Model” as a collaborative approach in a comprehensive study conducted in the 1990s, several meeting participants stated that it was important to encourage broader participation for future ACF-ACT decisions. There are different ways by which stakeholder input might be solicited and weighted in making ACF-ACT allocation and operations decisions. These could include informal meetings among stakeholders and decision makers, the use of computer-based decision support systems, and other approaches employed by the Corps of Engineers in other river and water systems. The Corps has accumulated considerable experience with the Shared Vision Model in many regions, and the Corps’ ongoing study of Louisiana Coastal Protection and Restoration has employed multi-criteria and risk-informed decision making processes as means of soliciting stakeholder input. An evaluation of these and other techniques for encouraging stakeholder input and advice, and how they might be employed in the ACF-ACT region, could be of value.

Summary and Future Directions

An overarching theme from the workshop is that across the region, water demands for multiple uses are beginning to exceed available supplies. Several workshop participants asserted that a comprehensive, proactive, and forward-looking—two to three decades hence—assessment of the ACF-ACT river systems could be of considerable value in planning for future water management in the face of growing and competing demands.

A systems-level evaluation of the region's water supplies and demands; broad water management options; and environmental, ecological, and socio-economic impacts of alternative regulation strategies and could encompass several of the topics and issues raised by workshop participants. For example, a basinwide assessment could consider:

- hydrologic and storage characteristics, including groundwater aquifer storage and groundwater-surface water interactions;
- implications of drought and climate variability for storage and demand;
- changes in population and water demand patterns;
- better information on water requirements and withdrawals of all users—municipal and industrial, ecosystem goods and services, irrigation, hydropower generation, commercial navigation, and recreation being the primary ones;
- environmental implications to Apalachicola Bay of different flow regimes;
- alternative approaches to augmenting water supply (e.g., water reuse);
- demand management prospects; and,
- system operation alternatives and their implications.

Several meeting participants noted the importance of broad stakeholder input as part of such a study.

Advocates of a forward-looking assessment assert that such studies could support a more positive and collaborative strategic vision and direction for planning the region's water resources and provide an alternative to continued, expensive litigation over narrower, current issues.

The Congress also seems to recognize the value of such an approach, as pending federal legislation would “provide for a comprehensive study by the National Research Council of the National Academy of Sciences to assess the water management, needs, and conservation of the Apalachicola-Chattahoochee-Flint River System” (see the full text of H.R. 1901 in Appendix D).

Appendix A

Statement of Task

Assessment of Water Issues in the Apalachicola-Chattahoochee-Flint River and Alabama-Coosa-Tallapoosa (ACF-ACT) River Basins

A planning conference will be convened by an ad hoc committee under the auspices of the Water Science and Technology Board (WSTB). The conference will feature invited presentations of discussions that will explore and identify priority water resources issues regarding future water management plans and operations in the ACF-ACT system of the southeastern U.S.

An individually-authored summary of the conference will be prepared by a designated rapporteur. The summary will cover what transpired at the event, including priority water resources issues as identified by conference participants, and a description of detailed studies that could help promote resolution of water management challenges in these river systems.

Appendix B

AGENDA

WORKSHOP ON WATER ISSUES IN THE APALACHICOLA-CHATTAHOOCHEE- FLINT RIVER AND ALABAMA-COOSA-TALLAPOOSA (ACF-ACT) RIVER BASINS

Friday, April 3

Members' Room

8:00 a.m.	Working breakfast (continental breakfast available in Members' Room)	
8:30 a.m.	<i>Welcome and Overview of Friday Workshop Schedule</i>	S. Parker
	<i>Workshop Goals</i>	J. Jacobs
	<i>WSTB Studies of U.S. River Systems and Changing Water Demands</i>	J. Jacobs
9:00 a.m.	<i>Overview of the ACF-ACT River Systems</i>	D. Moreau
	<ul style="list-style-type: none">• U.S. Army Corps of Engineers• U.S. Fish and Wildlife Service	J. Schroedel S. Hamilton
9:45 a.m.	<i>State Perspectives and Statements</i>	G. Galloway
	<ul style="list-style-type: none">• Trey Glenn, Alabama Department of Environmental Management• Mike Sole, Florida Department of Environmental Protection• Carol Couch, Georgia Department of Natural Resources	
10:45 a.m.	Break	

- 11:00 a.m. ***Expert Panel Presentations and Discussion*** J. Ehrenfeld
- Aris Georgakakos, Georgia Institute of Technology, Atlanta
 - Brian Richter, The Nature Conservancy, Charlottesville, VA
 - Dan Sheer, HydroLogics, Columbia, MD
 - James Wescoat, Jr., Massachusetts Institute of Technology, Cambridge
 - Discussion
- 12:15 p.m. Working Lunch
 NAS Refectory (basement)
- 1:15 p.m. ***Stakeholder Statements*** (4 minutes/speaker) D. Moreau
- Susie PerezQuinn, Office of FL Senator Bill Nelson
 - Billy Houston, Tri-Rivers Waterway Development Assn., Eufaula, AL
 - Robert Hunter, City of Atlanta
 - Joe Maltese, LaGrange, GA
 - David McLain, Apalachicola Riverkeepers, Apalachicola, FL
 - Kim Tanzer, University of Florida
 - Robert Morrison, Lake Allatoona Preservation Authority, Acworth, GA
 - Edmund Mullinax, City of Cartersville (GA) Water Department
 - Glenn Page, Cobb County-Marietta Water Authority (GA)
 - Jim Phillips, Middle Chattahoochee Water Coalition
 - Kelly Randall, City of Gainesville, GA
 - Wilton Rooks, Lake Lanier Association, Gainesville, GA
 - Frank Stephens, Gwinnett County (GA)
 - George Taylor, Southeastern Federal Power Customers, Inc.
 - Brian Manwaring, U.S. Institute for Env. Conflict Resolution, Tucson
- 2:30 p.m. Break
- 2:45 p.m. ***Open Discussion Facilitated by Steering Committee on
 Key Water Resources Issues and Possible Study Topics*** D. Moreau
- 3:30 p.m. **Workshop Ends and Break**
- 3:45 p.m. Closed session for WSTB Steering Committee—work with J. Jacobs to discuss
 report and determine follow up
- 5:00 p.m. Adjourn

Appendix C

April 3 Workshop Participants

U.S. Army Corps of Engineers

Jerry Barnes (retired consultant)
James Hathorn, Mobile District
Cheryl Hrabovsky, Mobile District
General Joseph Schroedel, South Atlantic Division, Atlanta
Steve Stockton, Corps of Engineers Headquarters, Washington, D.C.
Pete Taylor, Mobile District
Beverley Stout, Mobile District

Alabama state officials

Brian Atkins, Alabama Department of Environmental Management, Montgomery
Trey Glenn, Alabama Department of Environmental Management, Montgomery
Larkin Radney, Alabama Department of Environmental Management, Montgomery

Florida state officials

Michael Sole, Florida Department of Environmental Protection, Tallahassee

Georgia state officials

Carol Couch, Georgia Department of Natural Resources, Atlanta

Invited experts

Aris Georgakakos, Georgia Institute of Technology, Atlanta
Brian Richter, The Nature Conservancy, Charlottesville, V A
Daniel Sheer, Hydrologics, Columbia, MD
James Wescoat, Jr. Massachusetts Institute of Technology, Cambridge

Other attendees

Sally Bethea, Upper Chattahoochee Riverkeeper, Atlanta
Willard Bowers, Alabama Power Company, Birmingham

Wendy Graham, University of Florida, Gainesville
 Billy Houston, Tri-Rivers Waterway Development Association, Eufaula, FL
 Robert Hunter, City of Atlanta
 Mark Limbaugh, The Ferguson Group, Washington, D.C.
 Joe Maltese, City of LaGrange, GA
 David McLain, Apalachicola Riverkeeper, Eastpoint, FL
 Buddy Morgan, Montgomery Water Works and Sanitary Sewer Board, Montgomery, AL
 Robert Morrison, Lake Allatoona Preservation Authority, Acworth, GA
 Ed Mullinax, City of Cartersville Water Department, Cartersville, GA
 Glenn Page, Cobb County-Marietta Water Authority, Marietta, GA
 Jim Phillips, Middle Chattahoochee Water Coalition
 Kelly Randall, City of Gainesville, GA
 Malcolm Steeves, Mobile Area Water and Sewer System, Mobile
 Frank Stephens, Gwinnet County Department of Public Utilities, Lawrenceville, GA
 Pat Stevens, Atlanta Regional Commission
 Kim Tanzer, University of Florida, Gainesville
 George Taylor, Southeastern Federal Power Customers

Federal staff (non-Corps)

Gail Carmody, U.S. Fish and Wildlife Service, Panama City, FL
 Sam Hamilton, U.S. Fish and Wildlife Service, Atlanta
 Brian Manwaring, U.S. Institute for Environmental Conflict Resolution, Tucson
 Susie PerezQuinn, professional staff of FL Senator Bill Nelson

WSTB steering committee and members

Joan Ehrenfeld, Rutgers University (steering committee)
 Gerry Galloway, University of Maryland (steering committee)
 Kenneth Herd, South Florida Water Management District, Brooksville
 Theodore Hullar, Hullar Group, Tucson (steering committee)
 G. Tracy Mehan, III, The Cadmus Group, Arlington, V A
 David Moreau, University of North Carolina (steering committee)
 Soroosh Sorooshian, University of California, Irvine
 James Wescoat, Jr., Massachusetts Institute of Technology, Cambridge (steering committee).

NRC staff

Jeanne Aquilino
 Jeffrey Jacobs
 Stephen D. Parker
 Stephen Russell

Appendix D

H.R. 1901

111TH CONGRESS
1ST SESSION H. R. 1901

To provide for a comprehensive study by the National Research Council of the National Academy of Sciences to assess the water management, needs, and conservation of the Apalachicola-Chattahoochee-Flint River System.

IN THE HOUSE OF REPRESENTATIVES
APRIL 2, 2009

Mr. BOYD (for himself, Mr. KLEIN of Florida, Mr. CRENSHAW, Mr. LINCOLN DIAZ-BALART of Florida, Ms. GINNY BROWN-WAITE of Florida, Mr. MILLER of Florida, Ms. CASTOR of Florida, Ms. WASSERMAN SCHULTZ, and Mr. MARIO DIAZ-BALART of Florida) introduced the following bill; which was referred to the Committee on Transportation and Infrastructure

A BILL

To provide for a comprehensive study by the National Research Council of the National Academy of Sciences to assess the water management, needs, and conservation of the Apalachicola-Chattahoochee-Flint River System.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. STUDY ON THE APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER SYSTEM.

(a) DEFINITIONS.—In this section:

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1 (1) ACF RIVER SYSTEM.—The term ‘‘ACF River System’’ means the Apalachicola-Chattahoochee-Flint River System.

(2) **COUNCIL.**—The term ‘‘Council’’ means the National Research Council of the National Academy of Sciences.

(3) **SECRETARY.**—The term ‘‘Secretary’’ means the Secretary of the Army.

(b) **NATIONAL RESEARCH COUNCIL STUDY.**—Not later than 60 days after the date of enactment of this Act, the Secretary shall offer to enter into an agreement with the Council under which the Council shall conduct a comprehensive study of the water management, needs, and conservation of the ACF River System.

(c) **MATTERS TO BE ADDRESSED.**—The study under subsection (b) shall include the following:

(1) A summary of the existing body of scientific knowledge on—

(A) the ecology, hydrology, geomorphology, and biogeochemistry of the Apalachicola River and the greater ACF River System;

(B) the ecosystem services provided by the Apalachicola River;

(C) the impact of variation in freshwater flow on the ecology of the river and downstream

• **HR 1901 IH**

coastal ecosystems, including the Apalachicola Bay ecosystem; and

(D) how to restore the natural hydraulic function of the ACF River System, including restoration of floodplains and wetlands.

(2) An assessment of models that serve as the basis for the master manuals of the ACF River System.

(3) An assessment of water availability, supply options, demand-management alternatives, and socioeconomic factors that influence uses in the ACF River System, including water quality, navigation, hydropower, recreation, in-stream ecology, and flood control.

(4) An assessment of policies, regulations, and other factors that affect Federal water project operations.

(5) Recommendations for an approach to determine water limits that recognize the needs of all water users along the ACF River System, including adequate in-stream flow requirements.

(6) Recommendations for any additional measures to address the long-term watershed management needs of the ACF River System as the Council considers to be appropriate.

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(d) **REPORT.**—Not later than 2 years after entering into an agreement under subsection (b), the Council shall submit to the Secretary and Congress a report containing the findings of the study under subsection (b), including such recommendations as the Council considers to be appropriate.

(e) **AUTHORIZATION OF APPROPRIATIONS.**—There is authorized to be appropriated to carry out this section \$1,200,000.