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COMPREHENSIVE WATERSHED MANAGEMENT AND PLANNING: DROUGHT-RELATED ISSUES IN THE SOUTHEASTERN UNITED STATES

(110–106)

HEARING

BEFORE THE

SUBCOMMITTEE ON
WATER RESOURCES AND ENVIRONMENT

OF THE

COMMITTEE ON
TRANSPORTATION AND
INFRASTRUCTURE
HOUSE OF REPRESENTATIVES

ONE HUNDRED TENTH CONGRESS

SECOND SESSION

MARCH 11, 2008

Printed for the use of the
Committee on Transportation and Infrastructure

U.S. GOVERNMENT PRINTING OFFICE

41–492 PDF WASHINGTON : 2008

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March 10, 2008

SUMMARY OF SUBJECT MATTER

TO: Members of the Subcommittee on Water Resources and Environment

FROM: Subcommittee on Water Resources and Environment Staff

SUBJECT: Hearing on Comprehensive Watershed Management and Planning: Drought-related Issues in the Southeastern United States

PURPOSE OF THE HEARING

The Subcommittee on Water Resources and Environment will hold a hearing on "Comprehensive Watershed Management and Planning: Drought-related Issues in the Southeastern United States" on Tuesday, March 11, at 10:00 a.m., in 2167 Rayburn House Office Building. Testimony will be received from the City of Atlanta, Georgia, the U.S. Geological Survey, the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, the National Oceanic and Atmospheric Administration, and stakeholders on drought issues and planning in the southeastern United States.

BACKGROUND

This memorandum introduces comprehensive watershed management and planning issues – especially as they pertain to drought in the southeastern United States. It provides an overview of drought-stressed river basins across the southeastern United States. It then highlights the roles that federal agencies do or can play in working with states to respond to drought conditions. Finally, it summarizes both the ongoing drought in the Apalachicola-Chattahoochee-Flint (ACF) basin, its impacts in the states of Alabama, Georgia and Florida, and state and federal actions to respond to both the short-term and long-term water resource needs of the region. *(See Appendix for map of the ACF system)*

Drought in the Southeastern United States

Drought Overview: Drought is a protracted period of deficient precipitation. It is, however, a normal and recurrent element of the climate cycle. It occurs in nearly all regions and climate zones, but its characteristics will vary significantly from one area to another.

Various scientific disciplines operationally define drought differently. Meteorological drought is usually defined on the basis of the degree and duration of dryness, as opposed to the average precipitation amount for that period. Hydrological conceptions of drought differ, however. Hydrological drought centers on the effects of periods of precipitation shortfalls on surface or subsurface water supplies. As a result, hydrological drought is often conceived on the watershed or river basin scale.

Importantly, hydrological droughts often lag meteorological droughts. Entering into a drought phase, it takes longer for evidence of hydrological drought to show up in areas of the hydrological system, such as soil moisture, stream flow, groundwater, and reservoir levels. Similarly, hydrological drought conditions may extend beyond meteorological drought conditions because elements of the hydrological system may take a longer period of time to return to non-drought conditions.

Drought should not be viewed solely as a natural hazard or event. Instead, drought impacts on society are a function of the interplay between the natural event (less precipitation than under average climate conditions) and the demand that users place on water supplies. Viewed through this lens, water users can exacerbate drought conditions and impacts.

Drought-stressed River Basins in the Southeast: River basins across the country, including the southeastern United States, are subject to droughts and drought impacts. This is especially the case in basins where stakeholders compete for water resources. Increasing populations and drinking water demands, industry use, environmental regulations, in-stream species and ecosystem needs and requirements, water source contamination, agricultural water demand, and climate variability are amongst the factors that combine to place pressure on finite (and in drought phases, decreasing) water resources.

A number of river basins in the southeastern United States, in addition to the ACF basin, are currently experiencing drought conditions. It is important to note, however, that drought conditions can vary significantly from basin to basin depending on hydrological conditions, water use, and sub-region- or basin-variability.

In its February 21, 2008-May 2008 U.S. Seasonal Drought Outlook, the National Oceanic and Atmospheric Administration (NOAA) predicts that large areas of the southeastern United States will remain under drought conditions. However, they predict improvement in northern Alabama, eastern Tennessee, far northern Georgia, western South Carolina, and western Virginia. They predict ongoing drought conditions with some improvement for South Carolina, central Alabama and Georgia, eastern North Carolina, and eastern Virginia. NOAA predicts that drought conditions will either persist or develop in much of Florida. They predict average precipitation conditions for this time period in Mississippi, western Tennessee, the Florida panhandle, and very southern Alabama and Georgia.

Drought in the southeastern United States is exacerbated by the La Niña phase of the El Niño-Southern Oscillation (ENSO) event. ENSO is the aperiodic oscillation of the ocean-atmosphere system in the tropical Pacific Ocean. The warm phase of the oscillation is called El Niño. The cold phase is referred to as La Niña. ENSO impacts are experienced around the globe, and differ by region depending on whether the Pacific Ocean is in an El Niño or La Niña phase. La Niña impacts in the southeastern United States often include decreased hurricane activity in the Gulf of Mexico, as well as drought conditions in the region. El Niño events can result in increased hurricane activity in the Gulf of Mexico. While ENSO events (the El Niño and La Niña phases) do not occur on regular cycles, climatologists are becoming increasingly skilled at predicting when events will occur. As a result, incorporation of La Niña forecasts by federal and state policymakers in the southeast can be of great utility in proactively planning for drought conditions and impacts.

Amongst the river basins in the southeastern United States that are currently experiencing ongoing drought conditions are:

- Apalachicola-Chattahoochee-Flint (ACF) Basin: This system consists of the Apalachicola, Chattahoochee, and Flint Rivers, and covers portions of Alabama, Florida, and Georgia. Lake Lanier sits at the top of the ACF system. It is the significant water supply source for Atlanta, Georgia, and is currently at historically low levels. The U.S. Army Corps of Engineers considers drought conditions in the ACF Basin to be an area of concern. (*More detail on the ACF drought, and federal and state responses to it will be summarized later in this memorandum.*)

- Alabama-Coosa-Tallapoosa (ACT) Basin: This system consists of the Alabama, Coosa, and Tallapoosa Rivers, and covers portions of Tennessee, Georgia, and Alabama. Lake Allatoona is a significant source of water for Atlanta, Georgia. Water levels in Lake Allatoona are nearly sixteen feet below average Conservation Storage levels (as of 29 January, 2008.) The U.S. Army Corps of Engineers considers drought conditions in the ACT Basin to be an area of concern.

- Neuse River Basin: This river basin is located within North Carolina. Falls Lake is one of the primary drinking water reservoirs along the Neuse River. It is a primary source of drinking water for Raleigh, North Carolina. Water levels in the Falls Lake Dam are below the halfway point of its Conservation Storage levels (as of 29 January, 2008.) The U.S. Army Corps of Engineers considers drought conditions in the Neuse River Basin to be an area of concern.

- South Florida and Lake Okeechobee: Lake Okeechobee and south Florida Water Conservation Areas provide auxiliary water supplies for south Florida. As of late January 2008, water levels in Lake Okeechobee were above historic lows, but because drought conditions are expected to either persist or develop in south Florida in the coming months, the U.S. Army Corps of Engineers considers this an area of concern.

- Catawba and Broad River Basin: The Catawba and Broad Rivers begin in North Carolina and flow into South Carolina. Amongst the uses of basin waters are flood control, hydro-power, and drinking water. Ongoing controversies include whether water transfers should

be allowed to take place to municipalities that lie outside of the basin. Drought conditions have resulted in water use restrictions being established across the system.

- Tennessee Valley Authority (TVA) River Basins: The TVA includes the Tennessee, Cumberland, and lower Ohio River basins. TVA has operated in conservation mode since February 2007. The TVA includes territory in Tennessee, Kentucky, North Carolina, Mississippi, Alabama, and Georgia. As a result of drought conditions, TVA hydropower generation was down 58% from January through September 2007. This resulted in TVA's having to purchase more expensive power from other sources.

Federal Agencies and Drought: Roles and Resources

Traditionally, the federal government has an active role in the management and oversight of the nation's water resources. However, this authority is typically carried out in conjunction with states, which do have authority to allocate and use water within their respective jurisdictions. For example, the U.S. Army Corps of Engineers (the Corps) may own and operate a dam, but the state in which the dam resides has authority to use the water that resides in that dam.

However, while states do have broad authority over waters within their boundaries, the interests of other states over waters that are part of the same system must also be considered. The potential for competing interests amongst states and stakeholders over water use at different points along a river basin system – especially under drought conditions – can be a source of conflict between states.

Federal government agencies have various management responsibilities over water resources, such as managing facilities like Corps' dams. Federal agencies can also provide resources and services to states to help them manage and adapt to drought conditions, as well as settle water disputes between states. Services or resources provided by federal agencies can include facilitating dialogues between states and stakeholders, and providing technical expertise, support and services.

The following federal agencies have various roles in water resources management within the southeastern United States. Other agencies, such as the Bureau of Reclamation, play a larger role in other regions of the country.

U.S. Army Corps of Engineers: The Corps operates and maintains numerous dams and reservoirs throughout the southeastern United States. For example, the ACF system involves 5 Corps of Engineers projects – Lake Lanier; West Point Lake; Walter F. George Lake, Lock, and Dam; George W. Andrews Lock and Dam; and Jim Woodruff Lock and Dam, and 11 Georgia Power Projects. The ACT system involves five Corps of Engineers projects – the Carters and Allatoona projects; R.F. Henry Lock and Dam; Millers Ferry Lock and Dam; and Claiborne Lock and Dam, and 11 Alabama power projects.

In all cases, the Corps of Engineers must operate its projects for the purposes for which they have been expressly authorized by Congress, for example flood control, navigation, or hydropower, and in a manner that complies with all applicable laws. The Corps also operates these projects on a cooperative basis with States and local governments by making water supply storage space in reservoirs available to governmental entities for municipal and industrial use, under the authority of

the 1958 Water Supply Act, where that is possible and appropriate, and by taking the needs of other stakeholders and users along the system into account. It accomplishes this latter objective by monitoring water flows at various points along the systems so that sufficient supplies of good quality water are available for various uses, such as non-Federal hydropower generation and drinking water.

The Corps of Engineers divides its reservoirs into different zones in order to determine what storage is available for various purposes. These "action zones" are based on water levels in the reservoir, and as the water levels decrease, lower "action zones" are associated with more stringent conservation measures. In other words, as water levels in a Corps facility drop, Corps management activities, including its decision to release water from reservoirs, will change depending on what zone the water level currently resides.

In the basins across the southeast, the Corps coordinates with state and non-governmental stakeholders through meetings and teleconferences to discuss ongoing water management issues.

U.S. Fish and Wildlife Service: Pursuant to the Endangered Species Act (ESA) and the National Environmental Policy Act (NEPA), the U.S. Fish and Wildlife Service (FWS) consults with federal agencies to help inform them about the potential consequences of their actions on ESA listed species and on the environment.

With regards to Corps facility operation during drought periods, the FWS has produced Biological Assessments to determine the ESA impacts of reduced flow from dams.

U.S. Geological Survey: The United States Geological Survey (USGS) provides scientific and technical information to describe and assess the nation's land and water resources. In addition to providing geographic information on river basin systems, USGS can provide technical information on flow requirements for various users, as well as current flow conditions. This information can be used to help state and federal policymakers and water resource managers best allocate surface water resources.

USGS uses a comprehensive monitoring network in a number of areas across the country to assess water flow. This information can be used to assist water management decisionmaking under low-water flow drought conditions. In the joint ACF-ACT basin, USGS uses a series of 137 surface-water, 77 groundwater, and 25 continuous water quality monitoring stations. In the ACF-ACT basin, USGS shares information from these monitoring stations with a large network of federal, state, and local organizations.

USGS also periodically releases a Drought Watch monitor. This provides streamflow data on the state level to provide information on whether hydrologic drought conditions are present.

National Oceanic and Atmospheric Administration: NOAA provides a number of climate and drought services for federal and state agencies. Amongst these are the NOAA U.S. Drought Monitor, the NOAA U.S. Seasonal Drought Outlook, and the National Integrated Drought Information System (NIDIS.)

NOAA's Drought Monitor is a real-time assessment of drought conditions across the country. This information is updated on a weekly basis, and can be broken out to the state level. *(See Appendix for March 4 2008 NOAA Drought Monitor)*

NOAA's Seasonal Drought Outlook provides forecasts of drought conditions across the United States. This information is released every three months. *(See Appendix for March 6-May 2008 NOAA Seasonal Drought Outlook)*

NIDIS is an information system, or tool, intended to provide users with predictive and real-time information that can be used to help mitigate drought impacts. Users of NIDIS are intended to be wide-ranging: federal, state, and local policymakers and water managers, tribes, farmer and ranchers, utilities, etc. NIDIS establishes a system whereby observations, analyses, and forecasts are coordinated and integrated to support decision-making at all levels of policymaking and water resources management – including at the local and individual user level.

NIDIS is organized on a regional scale across a select number of basins and systems throughout the country. A NIDIS framework has been established for the southeastern United States through both the Southeast Climate Consortium and the Carolinas Integrated Sciences and Assessments. While NIDIS may be established in a particular region, involvement by states and other participants is voluntary.

Congress and Other Federal Agencies and Departments: Congress has a number of potential powers with regards to water allocation. Under the Water Supply Act, Congressional approval is required for modifications of federal reservoir projects that are intended to provide storage where the modification "would seriously affect the purposes for which the project was authorized, surveyed, planned, or constructed, or which would involve major structural or operational changes."[1] If states do develop a compact by which they would allocate water amongst themselves, it must be approved by Congress to go into effect.[2] Finally, in the absence of an interstate compact, Congress has the power to directly allocate water rights among the states under the interstate commerce clause of the Constitution.[3]

Numerous other federal agencies can be, and are, involved in providing drought services to states and localities. With regards to the ACF water disputes, Secretary of the Interior Dirk Kempthorne committed the resources of his department in 2007 to facilitate negotiations between Alabama, Florida, and Georgia about arriving at a water allocation resolution for the ACF basin. While these negotiations concluded without success on March 1, 2008, that they took place highlights the important role that the federal government can play in resolving conflict between the states over equitable water use determinations.

ACF Drought

Drought conditions from 2006-present in the ACF basin have resulted in competition for water in federal reservoirs run by the Corps. Water in the system emanates in Georgia, and empties into the Gulf of Mexico after passing through Alabama and Florida. Disputes have arisen over what

[1] 43 U.S.C. § 390(b)(d)
[2] U.S. CONST. Art. I, §10
[3] U.S. CONST. Art. I, §8

the equitable allocation of water should be for upstream and downstream users. The current dispute over equitable allocation of water in the ACF system is one that has been ongoing since the late 1980s.

Drought Impacts on Stakeholders in the ACF Basin: A variety of stakeholder groups and entities rely heavily on the availability of water in the ACF system. These include water for municipal and industrial purposes in the Atlanta metropolitan region, irrigated agriculture in Georgia, hydropower dams, cooling of coal-fired and nuclear power plants throughout the basin, the Apalachicola Bay (Florida) oyster and seafood industry, as well as ESA listed species on the Apalachicola River. Concern over upstream consumption of ACF water has resulted in downstream users protesting current allocation methods.

In addition to upstream and downstream users, use of ACF waters can be divided into two categories of use type: stakeholders with consumptive demands; and stakeholders with in-stream, non-consumptive flow requirements. The first category includes stakeholders who withdraw the water. These include municipal and industrial uses in metropolitan Atlanta, as well as irrigated agriculture users. The second category includes those stakeholders who require a particular minimum flow for their operations to take place at a given level. These include power plant and hydropower operators, the Florida seafood and oyster industry, and endangered species.

The following highlights some of these stakeholder and use needs in more detail:

- Municipal and Industrial Water Use in Metropolitan Atlanta: Metropolitan Atlanta has a population of more than 5 million people. This figure is projected to increase to 8 million by 2030. The metro Atlanta area receives 99% of its water supplies from surface water. 72% of its drinking water needs come from Lake Lanier and the Chattahoochee River, at the 'top' of the ACF system. Georgia's municipal and industrial use annually averages 290 million gallons per day (mgd.)

- Georgia Irrigated Agriculture: Irrigated agriculture in Georgia includes peanuts, cotton, corn, and vegetables. Irrigating these crops greatly increases crop yields, quality, and diversity. Most irrigated agriculture in Georgia impacts water levels in the Flint River. On average, annual daily use is 170 mgd. However, during dry summers daily use can exceed 650 mgd.

- Power Facilities: Many of the hydropower and coal and nuclear power plants are located on the Chattahoochee River between Alabama and Georgia. A number of these facilities are operated by Alabama Power. Some hydropower facilities on the system require low flow rates. For example, Buford Dam on Lake Lanier requires only 750 cubic feet per second (cfs.) Downstream, however, some power facilities require higher flow rates. The Joseph M. Farley Nuclear Plant requires a minimum flow rate of 2000 cfs for temperature regulation purposes, and the Herbert Scholz Generating Plant, a coal-fired power plant, requires a minimum flow rate of 5000 cfs.

- Apalachicola Bay Oyster and Seafood Fisheries: The oyster fishery centered around the mouth of the Apalachicola River is an integral part of the northwestern Florida economy. $10 million in oysters are harvested each year. This represents 90% of Florida's oyster

harvest, and 10% of the nation's oyster supply. Oyster production is controlled, amongst other factors, by salinity. Salinity increases as a function of decreasing water flows in the ACF system, due to upstream consumption. The Florida Department of Environmental Protection has raised concerns that sustained low freshwater flow could result in a permanent collapse of the oyster industry in the Apalachicola Bay. Short-term reductions in freshwater flow have been found to be associated with both a decline in some coastal fisheries, and harm to the fishery food chain.[4]

- Endangered Species Concerns: The Apalachicola River is home to four species that are listed under the federal ESA: a fish, the Gulf sturgeon, and three species of mussels. Critical habitat for these four species was designated on November 15, 2007, and took effect on December 17, 2007. On November 15, 2007, FWS signed a Biological Opinion on the Corps' Exception Drought Operations (EDO) plan. The proposed EDO envisions reducing flows to 4,150 cfs at the Chattahoochee gauge in lieu of the 5,000 cfs flows that are required at this gage in the existing IOP.

- FWS' Biological Opinion indicated that reducing flow rates to a minimum of 4,500 cfs would "have a measurable – but not appreciable – impact on [mussel] survival and recovery."[5] This assessment was conducted in order to avoid unacceptable impacts to listed species in the Apalachicola River while making allowances for increased storage opportunities and/or reductions in the demand of storage in order to provide continued support to project purposes and minimize impacts to all water users, including those most downstream, during a severe multi-year drought. For these levels, and for a further reduction to 4,150 cfs, the Corps is required to monitor impacts. In this Biological Opinion, FWS noted that a lack of long-term data would mean that the Opinion was limited to June 1, 2008. Based on the Corps' existing Water Control Plan, the minimum flow requirement for the Scholz Generating Plant requires 5000 cfs. This flow rate pre-dates the flow-rate outlined in FWS's Biological Opinion.

Federal and State Responses to the ACF Drought: Arriving at an equitable water allocation method in the ACF basin is difficult due to the reliance on riparian water rights doctrine in this region. This doctrine permits those whose lands border waters to use them in a way that is reasonable relative to other users. When water quantities are insufficient to meet all reasonable needs, equitably speaking, all water users should reduce their usage proportionally. However, resolving the method and amounts by which to proportionally reduce usage has few precedents – resulting in historical difficulties among Alabama, Florida, and Georgia being able to arrive at a successfully negotiated water allocation compact.

The following is a timeline of major actions in the ACF water system:

1970s-1980s Georgia officials become concerned with meeting water supply needs for metro Atlanta

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[4] Drinkwater, K.F., and K.T. Frank. 1994. "Effects of River Regulation and Diversion on Marine Fish and Invertebrates." *Aquatic Conservation: Marine and Freshwater Ecosystems*. 4: 135-151.
[5] CRS Report for Congress. 2008. "Apalachicola-Chattahoochee-Flint (ACF) Drought: Federal Water Management Issues." (February 8, 2008). 19

1989	Corps agrees to double storage space in Lake Lanier for metro Atlanta municipal and industrial water needs.
1989	Corps releases *Draft Apalachicola-Chattahoochee-Flint Basin Water Control Plan.* This has not been finalized due to ongoing litigation and expectations in 2003 for a tri-state compact.
1990	Alabama and Florida file suit against Corps to stop increased withdrawals from Lake Lanier. Suit ongoing.
1998-2002	ACF Drought
2000	Georgia passes Flint River Drought Protection Act. Act creates a program to preserve in-stream flows in the Flint River by paying irrigators who voluntarily agree to cease irrigating during declared severe droughts.
2003	Alabama, Florida and Georgia are unable to negotiate a water allocation compact.
2003	Georgia adopts *Georgia Drought Management Plan*
2006-present	ACF Drought
June 21, 2006	Georgia: Level 1 drought declared for all of Georgia. Hourly restrictions on residential outdoor watering.
2006	Corps adopts Interim Operating Plan (IOP) for Woodruff Dam. This amends the 1989 draft plan. IOP adds new in-stream flow requirements for protection of threatened and endangered species along the Apalachicola River. Minimum flows are determined based on different inflow rates into ACF reservoirs. Operational zones from the 1989 draft plan were left in place, but the IOP requires the Corps to meet minimum flow requirements in normal and dry conditions (thereby lowering reservoir levels when necessary.)
April 18, 2007	Georgia: Level 2 drought declared for all of Georgia. Residential outdoor watering limited to mornings.
Sept. 28, 2007	Georgia: Level 4 drought declared for northern and western counties. Prohibition on most outdoor residential water use.
Oct. 23, 2007	Georgia: Governor Perdue calls for 10% cut in withdrawals by groundwater and surface water permit holders in northern and western counties.
Nov. 1, 2007	Corps proposes Exceptional Drought Operations (EDO), and requests expedited FWS ESA consultation and Biological Opinion.
Nov. 15, 2007	FWS provides Biological Opinion allowing EDO to go into effect. The Biological Opinion stipulates that FWS and the Corps must agree on triggers for how the

Corps would reduce flows from previous lows of 5000 cfs, to 4,750 cfs, to 4,500 cfs. Triggers for reductions to 4,150 cfs will be considered in late spring 2008 when more data is available.

Corps begins operations under EDO. This is a modification to the IOP. EDO reduces minimum flow requirements – resulting in decreased drawdown and increased storage in ACF reservoirs.

Jan. 9, 2008 U.S. Department of Interior, led by Secretary Kempthorne, initiates Tri-State Drought Agreement taskforce negotiations to arrive at agreement on water allocations between Alabama, Florida, and Georgia. As part of the agreement to enter into the negotiations, the parties agreed to put ongoing litigation on hold.

Mar. 1, 2008 Georgia declines to trigger Flint River Drought Protection Act to preserve in-stream flow on the Flint River.

Mar. 1, 2008 Tri-State Drought Agreement negotiations called off by Secretary of the Interior Dirk Kempthorne. No resolution to ACF water conflict. Litigation between states as well as with the federal government expected to continue.

June 1, 2008 Corps and FWS will issue new Interim Operating Plan (IOP) and Exceptional Drought Operations (EDO) plans for ACF system. FWS will have issued Biological Opinion by this date.

WITNESSES

PANEL I

The Honorable John Lewis
5th District of Georgia

The Honorable Allen Boyd
2nd District of Florida

The Honorable Henry C. "Hank" Johnson, Jr.
4th District of Georgia

PANEL II

Mr. Robert Hunter
Commissioner of the Department of Watershed Management
City of Atlanta
Atlanta, Georgia

Mr. Kevin Begos
Franklin County Oyster & Seafood Industry Taskforce
Executive Director
Apalachciola, Florida

Also testifying on behalf of:
Riparian County Stakeholder Coalition

Mr. Tim Burch
Georgia Peanut Commission
Board Member
Newton, Georgia

PANEL III

Mr. Jess D. Weaver
Regional Executive, Southeast Area
United States Geological Survey
Department of the Interior

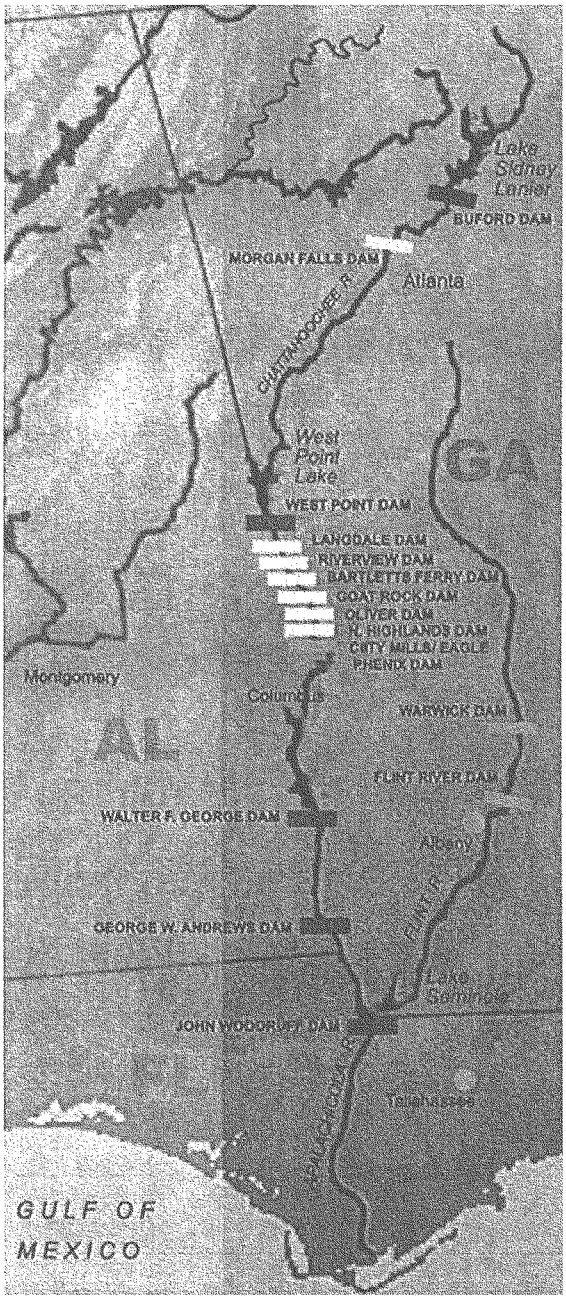
Brigadier General Joseph Schroedel
US Army Engineer Division, South Atlantic
United States Army Corps of Engineers
Atlanta, Georgia

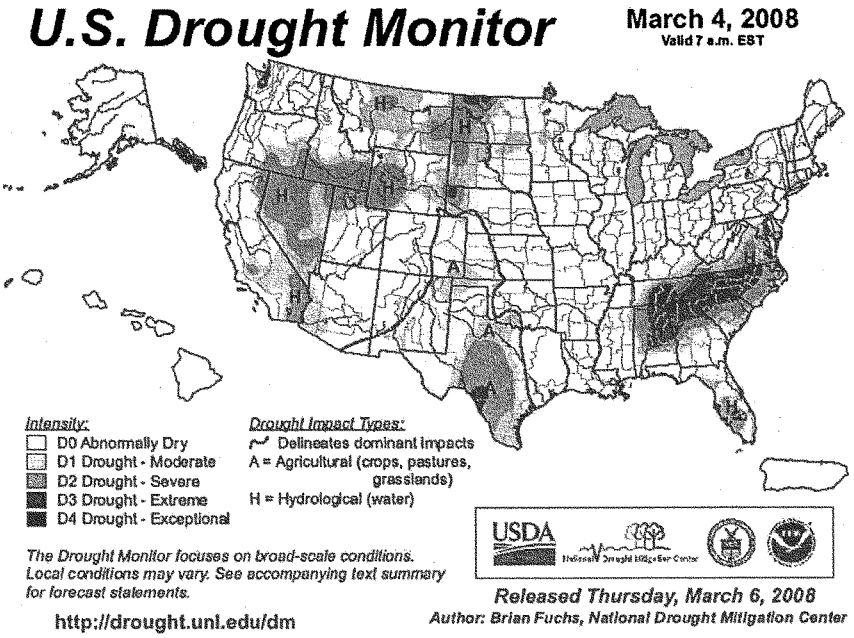
Mr. Sam D. Hamilton
Regional Director, Southeast Region
U.S. Fish and Wildlife Service
Department of the Interior

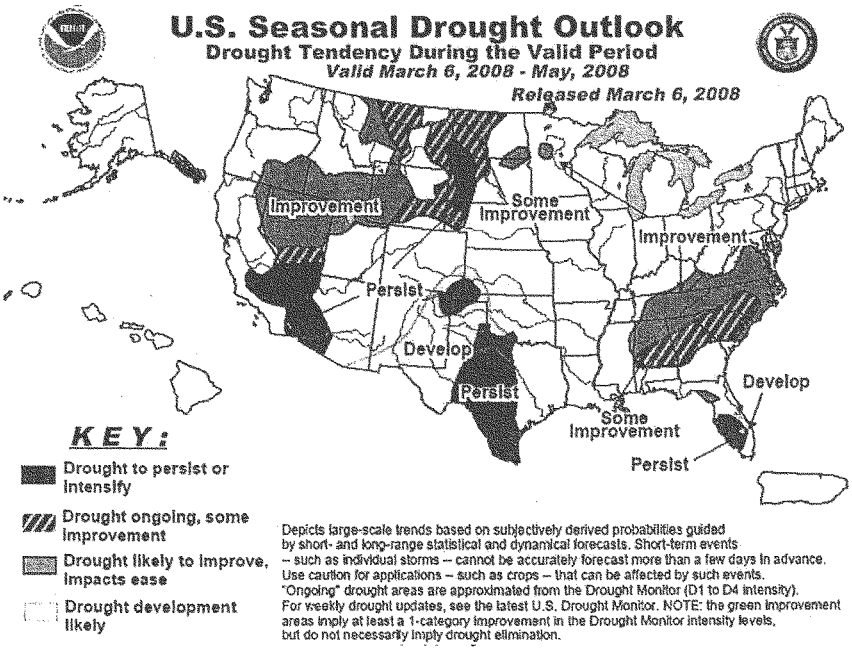
Mr. J. John Feldt
Hydrologist-In-Charge
National Oceanic and Atmospheric Administration
National Weather Service Southeast River Forecast Center
Peachtree City, Georgia

APPENDIX

Apalachicola-Chattahoochee-Flint (ACF) River Basin




U.S. Drought Monitor
March 4, 2008
Valid 7 a.m. EST
Intensity:
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptional
Drought Impact Types:
Delineates dominant impacts
A = Agricultural (crops, pastures, grasslands)
H = Hydrological (water)
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.
http://drought.unl.edu/dm
USDA
Released Thursday, March 6, 2008
Author: Brian Fuchs, National Drought Mitigation Center


U.S. Seasonal Drought Outlook
Drought Tendency During the Valid Period
Valid March 6, 2008 - May, 2008
Released March 6, 2008
Improvement
Some Improvement
Improvement
Persist
Develop
Persist
Develop
Some Improvement
Persist
KEY:
Drought to persist or intensify
Drought ongoing, some improvement
Drought likely to improve, impacts ease
Drought development likely
Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Short-term events -- such as individual storms -- cannot be accurately forecast more than a few days in advance. Use caution for applications -- such as crops -- that can be affected by such events.
"Ongoing" drought areas are approximated from the Drought Monitor (D1 to D4 intensity).
For weekly drought updates, see the latest U.S. Drought Monitor. NOTE: the green improvement areas imply at least a 1-category improvement in the Drought Monitor intensity levels, but do not necessarily imply drought elimination.

HEARING ON COMPREHENSIVE WATERSHED MANAGEMENT AND PLANNING: DROUGHT-RELATED ISSUES IN THE SOUTHEASTERN UNITED STATES

Tuesday, March 11, 2008

HOUSE OF REPRESENTATIVES,
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE,
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT,
Washington, DC.

The Subcommittee met, pursuant to call, at 10:00 a.m., in Room 2167, Rayburn House Office Building, the Honorable Eddie Bernice Johnson [Chairwoman of the Subcommittee] presiding.

Ms. JOHNSON. I would like to call the Subcommittee to order and immediately apologize for being late.

Today, we will be holding a hearing on Comprehensive Watershed Management and Planning and the Drought-Related Issues in the Southeastern United States.

As many of you know, the Chairman is unable to attend this morning's hearing because he is undergoing a medical procedure. I would like to ask, therefore, for unanimous consent that his statement along with that of any other Members of the Committee be entered into the record.

Ms. JOHNSON. It is a Committee practice not to ask questions to the Members, and I request unanimous consent that Congressman Westmoreland can sit in the Committee.

I, first, want to also welcome Mr. Boozman who is the new Ranking Member. I am delighted to have him; he is from Arkansas. I have worked with Mr. Boozman on numerous occasions, and I look forward to a productive relationship on this Committee.

I would like to also acknowledge Congressmen John Lewis and Hank Johnson as well as other Members of the Georgia Congressional delegation for requesting the Subcommittee to hold this hearing on the southeastern drought. This group is all too aware of the scarcity of water that grips that region and, ultimately, the country and of the need to resuscitate a dialogue to resolve the ongoing disputes over water resources between Georgia, Florida and Alabama.

Congressman Allen Boyd of Florida will also provide testimony today on the impacts of the ongoing water dispute in his district.

So, thank you all for being here and holding this hearing on drought issues in the southeast and the need for proactive water resources management.

I want to emphasize that the road to an equitable solution lies not in the courts but at the negotiating table. I would encourage the governors of Georgia, Florida and Alabama to return to their talks and, once and for all, resolve the water disputes that are impacting the region so dearly.

I was planning to have said this to the governors myself but, to our surprise, they did not come. I think all three of them declined the invitation to testify at this hearing. Given that the Tristate Drought Agreement negotiations recently collapsed, I am very disappointed that the governors would neither appear themselves or send any member of their staff to testify today.

Alabama, Florida and Georgia have been fighting each other and the Federal Government in the courts since 1990 with the collapse of talks that had been facilitated by the U.S. Department of Interior. It, unfortunately, seems that the rivers will run even drier as this drought continues, and unending litigation will flow on and on.

While they did not show up today, an ACF compact can be reached if the governors of these three states demonstrate the commitment to arrive at an equitable arrangement—but first they must show up. Effective water resources management in the southeast requires an effective partnership between the Federal and State governments. In periods of drought, this is even more the case.

The Federal Government can provide a host of services to the States. These range from management of facilities to drought forecast and technical assistance to facilitating negotiations as Interior Secretary Kempthorne did earlier this year.

However, for this partnership to be effective and for these services to be utilized, the States must embrace them. Similarly, for Federal services and expertise to be useful for the States, the Federal Government must encourage negotiations and offer services before a drought takes place. Otherwise, we will just end up behind the curve, setting ourselves up for more fights in the courts.

This point is underscored by the fact that river basins across the southeast are under stress as a result of ongoing drought. The Catawba and Broad River Basins in North and South Carolina, the Neuse River Basin in North Carolina, and basins throughout the Tennessee Valley are experiencing drought conditions. All of these require steadfast and determined work by the States and Federal agencies working in concert with one another.

Along these lines, this Subcommittee looks forward to the future when it will explore new watershed approaches and strategies to water quality protection and water resource management.

I welcome our witnesses here today, and I now yield to Mr. Boozman for his opening statement.

Mr. BOOZMAN. Thank you very much, Madam Chair, and I certainly look forward to working with you and your staff and appreciate your leadership.

While I appreciate the Subcommittee holding a hearing on this very important issue, I hope that today the Committee will focus on solutions to the problem rather than just describing the ongoing controversy in one watershed.

Congress begins the hard work of tackling one of the most important and difficult environmental and economic issues facing our

Nation, ensuring we have an adequate supply of clean water. We need water for our homes, farms and factories. Water also supports navigation, generates power and sustains our environment. Communities cannot grow or even exist without adequate water.

As we enter the 21st Century, demands for water are growing and are outstripping supplies in many areas, both in the west and east, leading to disputes over water supply and allocation. The drought of 2007 in the east has made it clear that while water may be abundant in many areas, it is not limitless and even our Nation's most water-rich regions can run dry.

Between 1990 and 2000, water use in Georgia increased 30 percent, and officials are still grappling with how to provide for a projected doubling of demand over the next 30 years.

The drought has had real-life consequences as well. According the Metro Atlanta Landscape and Turf Association, almost 14,000 in landscaping-related industries have lost their jobs in Georgia alone.

Policy makers can no longer ignore this issue. We need to start planning for the future and help start that planning process by looking at our Nation's available water supply and the projected demand for water in the future.

One way to begin is for this Committee to favorably report H.R. 135, the 21st Century Water Commission Act as written by our colleague from Georgia, Mr. Linder. We have passed this legislation in overwhelming fashion in each of the last two Congresses, and we should do it again in the 110th Congress.

Another thing we can do is have a hearing to look for ways we might be able to expand or adapt existing Federal services in a way that would encourage States and regions to engage in long-term water management planning. The State of Texas is widely recognized as having one of the best water planning approaches in the Nation, yet we are not hearing from them today. Let's hear from their experience and see what we can learn.

In addition, the Tennessee Valley Authority recently updated their reservoir operations manual and has proven to be very effective in addressing drought in the Tennessee Valley. Let's hear from them and other Federal agencies to see what we can learn.

Ultimately, States have the primary role in addressing water supply issues, but Congress needs to begin laying the groundwork to ensure we are fulfilling our obligations by requiring the Federal Government to operate in a coordinated and efficient manner to guarantee an adequate and safe water supply for the 21st Century.

While I wish we were discussing solutions and I hope we will discuss solutions today, I really look forward to hearing from our witnesses.

Thank you, Madam Chair.

Ms. JOHNSON. Thank you.

Are there any opening statements?

Okay, we will go right to our witnesses.

We are pleased to have a very distinguished panel of witnesses on our first panel this morning. First, we have Congressman John Lewis of the 5th District of Georgia. Next, we have Congressman Allen Boyd, the 2nd District of Florida. Our final witness on the

first panel is Congressman Hank Johnson from Georgia's 4th District.

Your full statements will be placed in the record. We ask that the witnesses try to limit their testimony to five minutes oral summary of their written statements as a courtesy to other witnesses.

We will continue to proceed in the order in which the witnesses are listed on the call.

Congressman Lewis.

TESTIMONY OF THE HONORABLE JOHN LEWIS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF GEORGIA

Mr. LEWIS. Thank you very much.

I would first like to take this opportunity to thank my good friends and colleagues, Chairwoman Johnson and Ranking Member Boozman, for agreeing to hold this important hearing.

Georgia is in crisis, Madam Chairwoman, and I want to tell you how much I appreciate your Subcommittee's attention to this important matter. Georgia is going through a harsh drought. The lack of water has hurt the environment, hurt the local economy and disrupted the lives of Georgia citizens.

I will continue to work with leaders in Atlanta, across Georgia, throughout the southeast and in Washington to protect our vital water supply. Water is the most essential resource that we have. Water is necessary to survive. If you don't have water, you don't have much of anything.

What we have with today's hearing is an opportunity, an opportunity to share on record and in the public's eye how our water is actually being distributed, why reserves in Lake Lanier continue to be depleted and where negotiations between Alabama, Florida and Georgia went wrong.

I am very disappointed that the governors from these three States declined your invitation to appear here today and explain and discuss how, after 5 months of negotiations, discussions were allowed to collapse. The States play such a key role in these issue, and the fact they would choose not to come here today and take part in this dialogue is upsetting.

Today, we lay out for the public to see what is really going on and how our most precious resource is being allocated. We have called the Federal agencies who manage our water here today to testify, to explain to us how water reserves have fallen to such a dangerous level.

Yet, we also have invited them here to ask the questions: Are the resources of your agencies being utilized by the States? Are State, local and Federal agencies and officials working together to the fullest extent possible? And, finally to ask them, what needs to change?

One area where change is long overdue concerns the outdated water control manuals that govern water released from Georgia's key reservoirs. These manuals are not meeting the needs of Georgia's citizens. It is unacceptable that such important plans are over 40 years old. Finally, after all of these years, the Army Corps has begun the process of updating these important manuals for both the ACF and the ACT river basins.

Unfortunately, this process will take at least three years to complete, allowing for another three years of mismanagement. This three years timetable does not even take into account the politically motivated, obstructionist language in the Energy and Water Appropriations Bill which prohibits the updated manuals from being implemented.

The time is now. We cannot afford to wait any longer. We need these changes.

It is clear that our water policy is flawed. Our water policy is reactive. Water is too precious a resource not to have a long-term plan. Water management issues must be agreed upon before we face the type of crisis we are in today.

The implementation of the new manuals by the Army Corps is a key component, but not enough. This will only change how the Army Corps manages their own projects.

Madam Chairwoman and Members of the Committee, we need to take a step back. We need to see our water issues in the larger picture. We need a comprehensive watershed management study of the entire southeastern United States.

I plan to introduce legislation that would do just that. The current piece-meal approach to watershed management does not work. Later today, I will introduce legislation that will direct the Army Corps of Engineers to study and develop recommendations to address current and future water needs in the southeastern United States.

It is important to look at the water demands of Georgia, of Florida, of Alabama as individual States from the perspectives of the individual stakeholders, but this narrow-minded perspective is not enough. Water transcends State borders and political boundaries.

We need to stop trying to find winners and losers and do what is right, what is necessary to work together. I hope this hearing serves as a new beginning in open and productive negotiations that bring everyone together to meet the long-term needs of the entire southeastern United States.

Madam Chairwoman and Members of the Subcommittee, I want to thank you for bringing us here together and holding this hearing.

Ms. JOHNSON. Thank you very much.

I now welcome Congressman Allen Boyd from Florida's 2nd District and thank you for testifying today.

TESTIMONY OF THE HONORABLE ALLEN BOYD, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF FLORIDA

Mr. BOYD. Chairwoman Johnson, Ranking Member Boozman and Members of the Subcommittee, thank you very much for convening this hearing on this most important topic.

I apologize for my voice, but that can't be helped. Maybe some good water will help fix it.

I listened very carefully to both of your opening comments, and I want to say that both of you are right on. Long-term planning is the only solution to this very severe problem that we have. We don't necessarily have to plan for stormy times, but we do have to plan for droughts, and your comments in your opening statements were right on.

For almost 20 years, the Apalachicola-Chattahoochee-Flint water sharing disagreements have presented numerous challenges to the local, State and Federal officials. In order for us to responsibly address this issue, we must look at the bigger picture and tackle both short-term and, as you described, long-term problems.

My testimony before the Subcommittee today will focus on the need for the States to plan for their own water needs which Georgia has just only now begun.

I have been involved in the Apalachicola River Basin issues along the Florida coast for all of my 19 years in public life. I have worked closely with the water management districts of Florida, especially as they began to focus on regional water supply needs in the late 1970s when water supply issues in the western panhandle were very severe as a result of the 1977 drought.

When Florida chose to focus on these water issues over 30 years ago, the Florida legislature created five water management districts by a State constitutional amendment. Actually, they were created in the constitution, and they were given broad statutory authority by the State legislature.

We chose to do five regional districts rather than having one State czar, if you will. That way, we thought we could maintain better working relations and more local control.

These water management districts were given ad valorem taxing authority in the constitution as well as their statutory authority which includes programs such as land acquisition, regulation, construction, land management and water resource preservation. Again, these water management districts have been constitutionally authorized for over 30 years.

I commend the Florida model, Madam Chair, to my friends from Georgia, from the north, as many other States have looked at our model as a very good workable model.

In 1982, we completed the first regional water supply development plan.

In the late 1990s, the Florida legislature amended the Florida Water Resources Act, directing the State's five water management districts to comprehensively assess the adequacy of water supplies over a 20-year planning period.

Let me say that again. In the 1990s, the Florida legislature directed the State's five water management districts to comprehensively assess adequacy of water supplies over a 20-year planning period and to develop regional water supply plans for these areas, identified as either having or being likely to develop future water supply problems.

In response, the Florida water management districts established seven water supply planning regions and completed the first district-wide water supply assessments in 1998.

In 2003, the demand projections from the assessments were updated through 2025. So, again, even after the turn of this century, we have updated those assessments through 2025.

Based on the results of the assessments, the Water District Governing Board determined that water supply demands were not sustainable in three west Florida counties—Santa Rosa, Okaloosa and Walton—because of high concentrations of development taking place in those areas.

The Board directed staff to develop a regional water supply plan to include water resource development and water supply development components. This plan was first developed in 2001 and updated in 2006.

Thus, Madam Chair and Ranking Member Boozman, for the past 35 years, Florida has followed a long-term Statewide management strategy, while some of our friends to the north have allowed for unbridled development with little to no thought of its increased water needs. This second plan works well until you have a drought, but when you have a drought, all that goes out the window.

On the ACF water sharing issue, I have been an advocate for Florida to receive our fair share of water. By the same token, I believe the solution to the water problems in the ACF Basin should be solved by the three States.

I agree with John Lewis. Alabama, Florida and Georgia have to get together and solve this problem. They need appropriate oversight by the Federal Government.

I believe that the three States should use a transparent process to include the following points: Number one, use independent and local experts to determine the water flows, at the river and the Apalachicola Bay, needed to maintain their productivity.

Number two, set limits on water use within the tristate basin. For example, cap the water use to ensure that the river flow requirements can be met.

Three, assess the water conservation potential among all users in the basin—agricultural, municipal and industrial—and determine the most cost-effective investments and who will pay for them.

And, fourthly, embody these agreements in a durable, tristate compact with strong enforcement mechanisms.

Madam Chair, fundamental inequities that currently exist between the States also need to be corrected. Let me give you an example.

In Florida, if you go to apply for a building permit, you have to demonstrate that sustainable fresh water already exists to support that new usage for that building permit. Georgia does not require this as part of its new development process. This is the long-term planning part that I am talking about.

The recent ruling in the D.C. Court of Appeals that overturned an award of 750 million gallons per day for Atlanta needs to find immediate implementation in actions by the Corps of Engineers to modify the current Exceptional Drought Operations Plan and release the increased amount of water downstream.

If Georgia seeks to get municipal and industrial water supply added as a Congressionally authorized use for the waters in Lake Lanier, then there should be another Congressionally authorized use added for the protection and preservation of the health, ecology and productivity of the Apalachicola River, flood plain and estuary.

I also believe that Congress should have close oversight over the Corps of Engineers' development of an updated water control plan for the ACF system, including a comprehensive scope for the environmental impact assessment.

Madam Chair, I am very excited to have members of the Apalachicola River Riparian County Stakeholders Coalition in Washington, D.C. for your important hearing.

Kevin Begos, who is the Executive Director of the Franklin County Oyster and Seafood Taskforce and a member of the Stakeholders Coalition, will testify before your Committee. Kevin is on the front lines of the water sharing issue, and I am confident that he will be a strong voice to speak for our interests before the Subcommittee.

Kevin will be joined by other members of the Coalition including Dave McLain of the Apalachicola Riverkeepers, Commissioner Smokey Parrish with the Franklin County Commission and Chad Taylor representing Jackson County on the Riparian Coalition. Their combined expertise and insight on this issue will be invaluable.

Madam Chair, thank you again for holding this hearing, and I look forward to working productively with you and my friends from Alabama and Georgia to find long-term good solutions. Thank you much.

Ms. JOHNSON. Thank you very much.

Now we will hear from Congressman Johnson.

TESTIMONY OF THE HONORABLE HENRY C. JOHNSON, JR., A REPRESENTATIVE IN CONGRESS FROM THE STATE OF GEORGIA

Mr. JOHNSON. Madam Chair Johnson, Ranking Member Boozman, thank you for holding this hearing on Comprehensive Watershed Management and Planning: Drought-Related Issues in the Southeastern United States. I look forward to the testimony of the distinguished panel of witnesses, and I thank you for your efforts.

Thank you also for the opportunity to address the Subcommittee on Water Resources and the Environment on such an important issue for my State and my district.

As you know, Georgia and much of the southeast is in the third year of what many are calling the worst drought in recorded history. The drought has arrived at a particularly poor time as the manuals directing how the water in the ACT and ACF river basins is managed have not been updated in decades.

The U.S. Army Corps of Engineers, charged with the difficult task of managing these two systems in normal years, was initially forced to manage this extraordinary drought without a plan and is now operating under an Exceptional Drought Operations Plan which will expire in the coming months. Meanwhile, the governors of Georgia, Alabama and Florida, failing to reach an agreement on long-term water use allocation, the people of Georgia and the entire region are becoming increasingly frustrated.

It is clear, Madam Chair, that the complete failure to properly manage these river basins over the years has led directly to the situation we are currently in. It is deplorable that Federal agencies and elected leaders have been unable to work together to ensure that millions of people across the southeast have adequate access to water for drinking, power generation, fishing and recreation.

Unfortunately, these are the facts and there was no plan in place to deal with this drought when it arrived, further exacerbating the situation.

Georgians now face very strict restrictions on water use, and municipal water systems across the State are required to reduce their consumption by 10 percent or face steep fines which will then be passed on to already strapped ratepayers.

Like my colleagues from the region, I am concerned about the impact that failure to reach a long-term agreement will have on the economy of the southeast. Many small businesses, already squeezed by high gas prices, are now further squeezed by the water restrictions. Many larger businesses may decide not to locate in Georgia, and the millions of people who are expected to move to the region may choose instead to relocate elsewhere.

Faced with dramatic increases in their water bills and increasingly strict restrictions on how they can use their water, the people back home want a plan for managing this crisis and a plan for preventing another similar crisis.

Federal agencies and elected officials must continue to work toward both a long-term allocation of water as well as a short-term plan for managing this drought. It is unacceptable that negotiations have broken down while the people of this region grow increasingly worried.

I, however, am very proud of the citizens of Georgia as they have shown a remarkable ability to come together and adapt. Georgians have met and, in many cases, exceeded the governor's mandated 10 percent reduction in water use. This is a remarkable achievement for a State and a metropolitan area that is rapidly growing, and it shows the commitment to conservation that Georgians are making.

This drought has awakened many people to the fact that Atlanta has a very tenuous supply of water. Conservation must be an integral part of an agreement on water allocation, yet the region must also consider options for increasing the amount of storage capacity in order to accommodate the projected growth.

I am hopeful that as a result of this hearing and others, the continued involvement of the Secretary of the Interior as well as the Congressional delegations from Georgia, Alabama and Florida, that a workable solution will soon be reached.

Once again, I applaud the efforts of the Chairwoman and the Members of this Subcommittee, and I thank you for the opportunity to be present here today.

Ms. JOHNSON. Thank you very much, Congressman Johnson, and I thank all of the members of this first panel. You may now be excused, and we will go with the second panel.

Thank you very much for your valuable participation this morning.

Our second panel of witnesses consists of Mr. Robert Hunter, Commissioner for the City of Atlanta's Department of Watershed Management, Mr. Kevin Begos testifying on behalf of both the Franklin County Oyster and Seafood Taskforce as well as the Riparian County Stakeholder Coalition, and our final witness is Mr. Tim Burch, a board member from the Georgia Peanut Commission.

Your statements will be placed in the record, and we ask that you try to limit your testimony to about five minutes as a courtesy to other witnesses. Again, we will proceed in the order in which the witnesses are listed on the call.

So, Mr. Hunter, you may proceed.

TESTIMONY OF ROBERT J. HUNTER, COMMISSIONER OF THE DEPARTMENT OF WATERSHED MANAGEMENT, CITY OF ATLANTA; KEVIN BEGOS, EXECUTIVE DIRECTOR, FRANKLIN COUNTY OYSTER AND SEAFOOD INDUSTRY TASKFORCE AND RIPARIAN COUNTY STAKEHOLDER COALITION; TIM BURCH, BOARD MEMBER, GEORGIA PEANUT COMMISSION

Mr. HUNTER. Thank you, Madam Chair and distinguished Members of the Subcommittee, for holding this hearing and allowing me to testify.

I am here in my capacity as the Commissioner of the Department of Watershed Management for the City of Atlanta with responsibilities for the drinking water, wastewater and stormwater systems in serving over 1.2 million people daily. I also represent the water supply providers for Metro Atlanta's five million people.

The southeastern United States is currently experiencing a drought of record proportions. Unfortunately, the effects of these drought conditions on the Federal reservoirs and those who depend upon them have been exacerbated by management decisions driven by litigation rather than sound science or effective resource management.

What is needed is cooperative, responsible stewardship of the region's water resources for all users. The implementation of science-based sustainable operating plans for the southeast region's reservoirs is the essential first step in moving to a future of sound regional water resource management.

We know that such a plan is possible because the water supply providers of the Metro Atlanta area have done the research and developed an alternative plan that is better for all users including protected species and recreation. That is what I would like to discuss today.

We have all seen the media coverage of last year's exceptional drought and water crisis and, while we are now in the last month of our rainy season, it is important to note that we are already two and a half inches short of rainfall this year. The drought continues.

Knowing that we set records for low water levels last year, it is sobering to note that Lake Lanier water levels are currently almost 13 feet lower than this time last year. If drought conditions persist this summer as predicted, the result could be devastating for the entire ACF Basin. The need for action is immediate.

What are the causes of these dangerous water levels? First of all, we are in a record drought. All users should expect significant impacts and all users should be taking appropriate conservation measures.

More importantly, it is the management plan implemented by the Corps that has turned a natural disaster into a crisis. The operating plan that caused this crisis is the interim operating plan for the Jim Woodruff Lock and Dam, the IOP adopted in March, 2006. This operating plan is not sustainable because it requires

large releases from reservoir storage to meet artificially high minimum flows at the Florida line without ever allowing the reservoirs to refill, in particular Lake Lanier.

This unsustainable plan nearly emptied the Federal reservoirs and throughout the system in a crisis in 2007. From May to November, 2007, the water delivered from the Federal reservoirs in the Chattahoochee River to the Apalachicola River amounted to 220 percent of the river's natural unimpaired flow.

What is not the problem is that there isn't enough water. The problem is how we manage the water and especially the reservoir system.

Some basic facts on water use in the ACF:

Metro Atlanta, annual net consumptive use is only 1 percent of the total volume at the Georgia-Florida State line in normal years and less 2 percent during drought years; 4.5 million people; 72 percent of the basin population use less than 2 percent of the water.

Comparison to other users: Flint River irrigation, the annual average is 165 percent of the Metro Atlanta use. Peak use is 313 percent for irrigation. The evaporation from reservoirs is 83 percent, and the Port St. Joe diversion from the Apalachicola Basin is 50 percent of the Metro Atlanta use.

Protected species requirements for discharge are 20 times that of Metro Atlanta's consumption and the spring sturgeon release is 72 times the volume.

All these uses are significant and important, but all users need to be part of the solution and take appropriate conservation measures.

A few quick notes on conservation in the Metro area: The North Metro Atlanta Water District has strict conservation in the plan for the Metropolitan North Georgia area. We have a virtual ban on outdoor water use.

An example from the City of Atlanta, in 2004, we committed almost $1 billion towards water system improvements. We had tiered conservation pricing.

Since that time, we have replaced 55 miles of old pipes with new main. We are moving from design to construction of almost $325 million in new water mains. We are repairing more than 800 leaks per month to our water distribution system which saved 55 million gallons of water in 2005.

And, you can grow and conserve water. Between the years 2000 and 2006, the City of Atlanta added 9 percent more water customers but was able to reduce total water consumption by 5.2 percent through water conservation and tightening up our system.

What is the solution? First of all, the Corps must also conserve. The amount of water that can be saved through conservation pales in comparison to the amount that is continuing to be wasted through improper reservoir operation. It is literally a drop in the bucket.

From the standpoint of Corps operations, the Corps needs to conserve storage to the maximum extent possible. First of all, the Corps needs to stop over-releases. The Corps, in recent weeks, has been making excess releases from Lake Lanier on the order of 400 to 500 cubic feet per second per day for no purpose. The amount of water that is being wasted each day is roughly twice the total

amount of water the entire Metropolitan Atlanta area consumes in a day.

The Corps also needs to grant Georgia's request to reduce the flow target at Peachtree Creek by 200 cfs. That is a water quality issue during the winter, not a water quantity issue. Not reducing this flow simply wastes water in Lake Lanier that we are very likely to need by late summer for all the users in the system.

Finally, the Corps reservoir operations must change. We recommend that the Corps adopt a three-step recovery plan for Lake Lanier. The first step is to adopt an emergency recovery plan. To weather the current prices, the Exceptional Drought Operations Plan must be extended and modified to allow all reservoirs to refill.

The second step is to replace the IOP with a better, more sensible plan to ensure we do not repeat the mistakes of 2006 and 2007.

And, a third step for the longer term is to adopt a comprehensive water control plan for the ACF Basin that is based on facts and sound science.

The City of Atlanta and the other metro area water supply providers strongly support the Corps' current initiative to update water control plans for the ACF Basin. We know this can be done because we have already found a way to do it. On January 10th, 2007, the water supply providers submitted a proposal to the Corps which we call the Maximum Sustainable Release Rule.

Our proposal is attached as Exhibit C, and a summary explanation is attached as Exhibit D to my testimony.

Our analysis shows that the alternative we propose could be better for all parties including the endangered species that inhabit the Apalachicola River.

Ms. JOHNSON. Mr. Hunter, if you could just wrap up.

Mr. HUNTER. Madam Chair, thank you for allowing me to provide testimony on this important issue.

Ms. JOHNSON. Thank you very much.

I want the record to show that Congressman Bishop from Georgia is entering his testimony into the record. He is scheduled for two other places at the same time, which is not unusual around here.

I would like to welcome now, Mr. Kevin Begos, testifying on behalf of the Franklin County Oyster and Seafood Taskforce as well as the Riparian County Stakeholder Coalition.

You may proceed.

Mr. BEGOS. Madam Chair and Committee Members, we would like to thank you all for this opportunity to testify on this issue of great importance to the people, economy and environment of north Florida, and we also thank Congressman Boyd for his support.

I am speaking on behalf of nearly 2,000 people who work in the Franklin County seafood industry and for the people who live and work in the six-county region bordering the Apalachicola River.

Last May, a period of extremely low flows on the Apalachicola River began and stayed that way for nearly six months, the longest recorded period of low flows since recordkeeping began in the early 1920s. As the river vanished, people and businesses began to suffer.

The electric turbines that help supply the cities of Chattahoochee and Quincy fell silent, and electric bills began to spike. In the swamps, the Tupelo honey trees that help make the world's sweetest honey delivered just half their normal bounty to beekeepers.

Then the lush aquatic grasses that normally cover the upper parts of Apalachicola Bay bean to die off, leaving nothing but barren sand and mud bottoms. The blue crabs disappeared, and fishermen pulled up pots mostly in vain.

The summer progressed and soon the effects of the low flows could be seen everywhere. The white shrimp catches crashed to historic lows, and entire oyster bars died off from the combined stress of lack of fresh water and a huge wave of predators that came in from the Gulf. Even the color of the water in the bay changed.

The entire ecosystem was impacted, and at this time we still don't know the full extent of the damage because the drought is not over.

Madam Chair, this is not a case of people versus mussels. It is about finding a way for all the vital needs along the river to be fairly balanced, from cities to farms to seafood producers to the environment.

The seafood industry drives our economy in Franklin County, and many of our neighbors upstream rely on the Apalachicola River. The bay is one of the most productive estuaries in the northern hemisphere, a nursery for species from all over the Gulf of Mexico. Recreational fishermen, commercial fishermen, beekeepers, the timber industry and the tourism industry all benefit from and depend on this natural chain.

The National Oceanic and Atmospheric Administration has designated 246,000 acres of the lower river and bay as a National Estuarine Research Reserve, and the United Nations has also designated it as an International Biosphere Reserve which draws visitors from all over the world.

Here are some details of what a lack of fresh water can do to the system:

For generations, shrimp fishing has been a cornerstone of our economy. Yet, in 2007, the white shrimp harvest crashed by about 90 percent, and the brown shrimp harvest declined by 65 percent according to preliminary figures. Boats fell into disrepair and even sank at the dock, and shrimp houses fell silent too, depriving workers of paychecks.

The blue crab catch from the bay in 2007 declined by about 70 percent from the previous year, and the flounder catch declined by about 30 percent. Even with different life cycles and feeding habits, all suffered.

Our oyster fishery was hit when entire oyster bars died off during late summer and others failed to produce as they had in the past. So, virtually, our whole fleet of oystermen focused on one area of the bay, threatening to wipe it out.

Though ample rainfall over the last three months has eased the pressure, any tristate agreement that fails to take the needs of the entire ecosystem into account could doom our river, bay and way of life by locking in low flows every year.

Oysters play a key role in maintaining our water quality since they are filter feeders. If our oyster beds die off, we will head to-

ward the same situation as Chesapeake Bay, where State and Federal authorities have spent vast sums trying to repair the damage done to nature.

We say it makes moral and economic sense to protect what we have rather than to destroy and rebuild. Since the late 1960s, hundreds of millions of dollars have been spent, mostly by the State of Florida to put approximately 261,000 acres in Apalachicola River and Bay drainage basin into public ownership.

Madam Chair, two closing points, much has been written and said about the disputes between these three States, but in fact the people of north Florida have much in common with our neighbors in Georgia and Alabama. There are deep family, cultural, economic and environmental ties. These river systems belong to us all, not to one.

So we say, let's try to work together in a fair and open way to find a balanced solution based on science that meets your needs as well as ours. But to do that, the Federal Government and the States need to move away from closed door negotiations and start a transparent process with all interested parties including Congress.

One final point, Madam Chair, some have suggested that these water disputes are simply a matter of big versus small, hinting that those areas with fewer people and less power must lose out. That would set a disastrous precedent not only for our region but for the entire Country.

If some say that big must always win, that sets the stage for every minority to lose. That is not the American way.

I will close with a nod to the sentiment about small places that Daniel Webster first expressed to the U.S. Supreme Court in 1818, which is still true today. The cities of Apalachicola, Wewahitchka, Blountstown and Chattahoochee are small, yet there are those that love them.

The people and environment of north Florida deserve to be treated as equals, and we thank you and this Committee for giving us that opportunity.

And, finally, Madam Chair, I would like to say that we had some updated statistics since I submitted written testimony, and we would like your consent to include those in the written record.

Ms. JOHNSON. With no objection.

Thank you very much.

The Committee now will hear testimony from Mr. Burch.

Mr. BURCH. Good morning, Madam Chair and Members of the Subcommittee.

My name is Tim Burch. I am a native of Baker County, Georgia, which is located in the southwest part of the State. We are part of the Flint River Basin.

I have farmed with my brother and father all of my life and live on my grandparents' farm. I grow peanuts, cotton and raise beef cattle.

I have served on the Georgia Farm Bureau advisory committees and have been a delegate to the National Cotton Council. I currently serve as Executive Board Member of the Georgia Peanut Commission, and I am also an elected Baker County Commissioner, serving since 1993.

The extended drought in the southeast has dramatically impacted agriculture. Irrigation systems, which have become a necessity to produce crops, continue to expand at great expense to the operating costs of our businesses.

Increases in energy costs have made our drought problem worse. There is no indication that energy costs will diminish in the 2008 crop year.

Drought loses in Georgia during 2007 were approximately $800 million according to the Center for Agribusiness and Economic Development at the University of Georgia. Those losses came primarily from hay, pasture, cotton, peanuts and corn. The greatest losses were in pasture, approximately $265 million.

The Center estimates that the 2007 drought had a total economic output impact of 1.3 billion in losses. Output losses are the total sales that are lost to the Georgia economy due to these direct losses reported for each commodity.

My home county of Baker was one of the more severe drought counties in the State. Total peanut losses were four to eight million dollars. Cotton losses were six to eleven million dollars. Total losses in Baker County were estimated by the Center to be between 10 and 20 million dollars.

This is a lot of money to take out of the economy of a small, sparsely populated rural county. Please note that Baker County has no manufacturing and only a few retailers and agriculture.

The water issues in Georgia have been much debated for many years. There are clear concerns for both urban and rural areas.

There are two key areas I would like to emphasize this morning for agriculture. First, individual producers recognize the importance water as a shared natural resource. Second, collectively, Georgia producers have participated in planning initiatives for water resources in our State and will continue to do so.

With regard to production agriculture, farmers are applying new water conservation methods such as conservation tillage and technologies for irrigation, such as the precision application of water. This latter method is so critical to improving water use efficiency.

The Flint River Soil and Water Conservation District recently testified before the House Agricultural Appropriations Subcommittee. The hearing focused on rural broadband issues.

This may not appear on its face to be a concern that impacts water conservation, but new technologies advanced by the University of Georgia allow for more irrigation efficiency using internet technologies. Without broadband, this new water conservation efficiency technology is of little value to Georgia producers.

In addition to helping our rural kids compete with urban school systems, broadband technology will assist farmers in water conservation. Whether you produce cotton, corn or peanuts in the southeast, irrigation will continue to expand or farmers will not be in business.

We have to utilize the most efficient water conservation technologies possible to assure that we are not wasting this precious resource. Expanding rural broadband is a critical piece to this process.

The Senate version of the 2007 Farm Bill contains a new conservation rotation program. If this program survives the Farm Bill

conference, we believe it will add to water stewardship. The program provides incentives to farmers to practice better crop rotation.

Flint River Soil and Water Conservation District estimates that since 2001 agricultural producers have saved over 13 billion gallons of water due to groundwater conservation practices. These savings were due to irrigation water management, conservation tillage, irrigation reservoirs, moisture monitoring and variable rate irrigation.

With reference to our collective efforts in Georgia to resolve the water management issue, Georgia Farm Bureau Federation has taken the lead representing Georgia farmers in the State water plan development. Georgia farmers have supported augmenting our water supplies through all reasonable means including more reservoirs of various types, aquifer storage and recovery and desalination.

The water plan has now passed the State legislature and become law. It establishes a framework for moving forward on Georgia's water issues. Georgia producers will continue to participate as the plan evolves.

I appreciate the opportunity to testify today. We have very serious water issues in our State and the southeast.

As one segment of Georgia's economy, we are striving to use the best technologies and conservation practices available to protect our water resources. We are actively involved in the State water management planning.

We encourage the Congress to provide as many tools as possible to help southeastern producers use the best available process for conserving water.

Thank you.

Ms. JOHNSON. Thank you very much, Mr. Burch, and we will now hear questions from the Subcommittee for the second panel.

I will begin by asking Mr. Hunter. Mr. Begos observed in his testimony that Florida links growth to water usage by requiring building permit applicants to demonstrate that there are sufficient water resources to support the proposed construction. What steps has the City of Atlanta taken to similarly ensure that the city's growth does not outstrip the water supplies?

Mr. HUNTER. I would answer with both a City of Atlanta and Atlanta Metro response to that question, Madam Chair.

The Metropolitan North Georgia Water Planning District has been very active for the past several years in terms of our water supply plan and our water conservation plan in conjunction with the Georgia Environmental Protection Division.

Only water withdrawal permits for the water utilities that are part of that plan—that includes not only the supply side but the water conservation requirements—are allowed. So, from a macro standpoint for the entire 5 million population region, we have an established control procedure in a plan tied into permitting.

On the local level for the City of Atlanta, as I indicated, we have not only increased our population by 9 percent but decreased our consumption by over 5 percent through a very active program of capital investment, replacing 55 miles of water main, repairing over 800 leaks a month, of how we manage our water and how we conserve that water.

We also have a million dollar program set up for retrofit rebates on plumbing fixture changes. We have a very aggressive water conservation plan and long-term planning so that we stay within the confines of our permitted capacity.

Ms. JOHNSON. Thank you very much.

Mr. Begos, what role do you think that Congress should play in ensuring that the economy and way of life of the north Florida oyster industry is maintained while ensuring that there is sufficient water for upstream users in Alabama and Georgia?

Mr. BEGOS. Madam Chairwoman, we think it is partially just to give us opportunities to speak like this. As you noted, the governors of the three States did not appear here. We felt a little bit shut out from the process recently too.

We think a more open process and also what Mr. Boozman referred to of providing some technical information and assistance to the States, and also to the Corps of Engineers and the States so that they can have economic impact studies of Apalachicola Bay. We believe there needs to be a new look at the whole economic impact of the Apalachicola Bay ecosystem and that should be integrated into water control manuals.

Ms. JOHNSON. Thank you very much.

Now let me ask this to Mr. Burch. Do you think that the new Georgia water management plan, recently enacted by the Georgia legislature, is an effective system to reduce water consumption and fairly distribute the cost of drought throughout the State and region?

Mr. BURCH. Madam Chair, I certainly hope that it is a good starting point.

Ms. JOHNSON. Thank you.

Mr. Boozman.

Mr. BOOZMAN. Thank you, Madam Chair.

To the whole panel, we have been hearing a lot about comprehensive watershed planning, and my understanding is perhaps that we will go into that further this year. What role should the Corps of Engineers play in that as far as comprehensive watershed planning?

Mr. Hunter, where do you see their role?

Mr. HUNTER. Mr. Boozman, I believe the Corps of Engineers has a central role to the comprehensive planning. This is not only a Federal and State but a local issue, and I would share my colleague's sentiments, his statements that local water providers and local users must have a seat at the table.

The Corps, though, manages the projects along with the power companies in both the ACF and ACT. They control the water plans, the control plans for the projects.

It is essential that they take that role. It is essential that it be a thorough, comprehensive evaluation and look at how to maximize the benefits to all the users, and the work that we have done on our modeling indicates that that is not only possible but readily implementable.

Mr. BOOZMAN. Very good.

Mr. BEGOS. We believe the Corps does have a central role, but I would say there is also room for other agencies such as NOAA to provide technical support, perhaps National Marine Fisheries

Service from our perspective and, most importantly, not just independent experts but even local experts in our case who have knowledge of our specific issues.

Of course, I would say the same for my colleagues here, that they should have the right to bring in their independent experts and their local experts for their needs, so we can really have a comprehensive body of data, looking at the whole basin from Lake Lanier all the way down to Apalachicola Bay.

Mr. BURCH. I certainly feel that the Corps has the lead role.

It is terribly important that they take into account all of the water supply issues in the State. Different basins have annual water recharge. We have been under a water restriction in the past in my area on irrigation, a moratorium on well-drilling, and it has been determined that our aquifer recharges on an annual basis.

So it does need to be looked at independently. We have got to have representation when negotiations take place.

Mr. BOOZMAN. Some suggest that the Federal agencies can play a key role in helping municipalities switch to desalinization, other technologies. Other than funding, what role can the Federal Government play in that respect?

Mr. HUNTER. Desalinization, internationally, is a viable technology. We have some countries that are completely reversing the flow of their water from east to west, going to west to east, looking at desalinization as the source and water reuse.

In the United States, desalinization is primarily a coastal technology. It is growing in popularity.

Applications in the ACF Basin don't necessarily involve what is often discussed, which is the big pipeline to Lake Lanier. Atlanta is 250 miles to Savannah and over 300 miles to the Gulf of Mexico. It is a viable technology in terms of providing water closer to the source, whether that is Apalachicola Bay, whether that is the Apalachicola River or whether that is south Georgia in terms of agriculture.

Certainly, something that could be a Federal role on a regional basis like that is a support of infrastructure funding.

Mr. BOOZMAN. As Atlanta grows, again in looking at alternatives to the lake, what are the impediments as far as building another reservoir or whatever? I am sure that you all have explored that.

Mr. HUNTER. Well, the metro area has explored a number of reservoirs and, of course, there are several hurdles to overcome there, one of which would be the permitting. Another one would be the substantial cost. Land prices and population have changed a bit in the north Georgia mountain areas since the early fifties.

Another aspect, though, that is going on is smaller reservoirs. For example, the City of Atlanta recently purchased a granite quarry which will provide us almost 2 billion gallons of offline storage and will help us extend our water use by managing it, being able to take in flows during high flow periods and save those for summer months. That will extend our water use, our water permit viability by over 15 years.

Mr. BOOZMAN. Thank you, Madam Chair.

Ms. JOHNSON. Thank you very much.

Mr. McNerney.

Mr. MCNERNEY. Thank you, Madam Chair, and I want to thank the panel for coming here this morning.

You know this is a wakeup call or more than a wakeup call to the eastern part of the Country.

We have seen a lot of these things you are talking about in California for many decades now. For example, the San Joaquin River runs through my district. It used to be a navigable river.

Now it is a dry riverbed, and that degraded ecosystem has basically shut down livelihood. People that made a living on the river are now long gone.

There are also conflicts between the populated areas that want the water and the rural areas that have the water. I don't want to point fingers, but certain parts of the State have been known to take water from other regions of the Country, and we have to make sure that when we go down that path that we do it carefully and in a way that takes care of both needs.

We can't take water for granted, and we need a rationale and flexible—flexible—approach. We need to capture more fresh water when there is a large flow without adversely impacting natural systems.

What sort of alternatives are there to reservoirs in the Georgia area that would be useful? I mean, in California, we can recharge groundwater in ways, but I don't if that is viable in Georgia.

Mr. HUNTER. No, sir. There are a few distinct differences between the situation in north Georgia and most of the California major water projects.

For one, only 5 percent of the drainage basin is above Lake Lanier or a little bit more than 1,000 square miles to recharge that lake. That is why even if we get a normal rainfall pattern now, it will probably take three to four years to fill Lake Lanier under current operating plans.

The other issue is that we essentially have a thin layer of red Georgia clay over solid granite. I am constructing some very large eight mile long tunnels in Atlanta as part of our Corps project now, and we are boring through solid granite.

There are very minor groundwater resources, none sufficient to use to run a large municipal water system.

So what we have as a water resource is a small drainage basin, 100 percent surface water that is controlled by the Corps projects.

Mr. MCNERNEY. That is what bothers me.

We want to look for the way the Fed can help, but the needs are so different depending on what region of the Country you are in, I am, therefore, afraid that mandates would be counterproductive. Do you have any suggestions on how we could build a Federal involvement that would be beneficial across the Nation?

Mr. HUNTER. Well, certainly, Representative Linder's plan, in terms of the studying and active involvement of multiple groups at all levels in formulating the plan, will be a large help.

In the case of Georgia, we certainly are using the experiences and using the knowledge of the western United States as they have gone through that process and the negotiations of the Colorado River and other areas of the west. Perhaps the greatest immediate resource is the sharing of that knowledge as we try to solve this problem that is growing throughout the eastern United States.

Mr. MCNERNEY. Well, it is clear that the problem is not going to get better by itself. So I look forward to working with the panel and Members of the Committee to finding rational solutions to this and a flexible way to move forward.

I yield back.

Ms. JOHNSON. Thank you very much, Congressman.

Congressman Duncan.

Mr. DUNCAN. Well, thank you, Madam Chairwoman, and thank you for calling this very important hearing.

I am sorry that a very large school group ran late, and I didn't get to hear the testimony.

This problem of the drought in our region has become so serious that there has even been talk in the Georgia legislature about movement of the Georgia-Tennessee border, and there have been a lot of jokes about this proposal, but this is a pretty serious problem.

The Knoxville News Sentinel published an editorial just a couple of days ago, and they wrote this. They said: "The effects of drought are well documented. The Tennessee Valley Authority reported a loss of $17 million in the first quarter of the 2008 year, and the drought is one of the main reasons. In November, reports revealed the reservoirs in Atlanta were close enough to the bottom that dirtier water that contained more bacteria was going to need more expensive purification."

The Sentinel said now is the time to take a serious look at our water resources and how they are managed, and I think this hearing is an important part of that.

On the other hand, over the years, we have had many studies that are on the shelves, and I think people would prefer that we have less studying and more action on some of these problems. We have heard testimony about duplication or various agencies—local, State and Federal—going sometimes in different directions.

But about four years ago, we had T. Boone Pickens, the great entrepreneur, in here, who made just an unbelievable fortune off of oil, and he is out buying up water rights in Texas because as one article said in the New York Times. It said water is going to be the oil of the 21st Century, and there are even predictions that there will be wars fought over water in some parts of the world. So this is something that we can't overemphasize the seriousness of what we are dealing with.

The problem, it seems to me, I read in the National Journal about three weeks ago that two-thirds of the counties in this Nation are losing population, and that surprises many people, but all over the Country the small towns and rural areas are losing population or barely holding on.

People say they want land around them, but they really do not. They still want to be near the malls and the restaurants and the movie theaters.

I represent Knoxville and the surrounding area and the tremendous growth in Tennessee is in a circle around Nashville and in a circle around Knoxville, and I am very familiar with the growth that has occurred in and around the Atlanta area.

I don't know what the answers are, what all the answers are, but I will tell you that in most of the rapidly developing countries

around the world, they do these infrastructure projects in about a third of the time that we do them in.

We take 10 years to study a problem before we really act on it. In fact, this is not water, but the newest runway at the Atlanta Airport took 14 years from conception to completion mainly because all the environmental rules and regulations and red tape. It took only 99 days of actual construction.

What we are going to have to do, we are going to have to put more emphasis on water projects, in my opinion, where this rapid development is going on, and we are going to have to do a lot fewer studies and a lot more actually taking action or doing some projects where the need is the greatest.

Thank you, Madam Chairwoman.

Ms. JOHNSON. Thank you very much.

Any other questions?

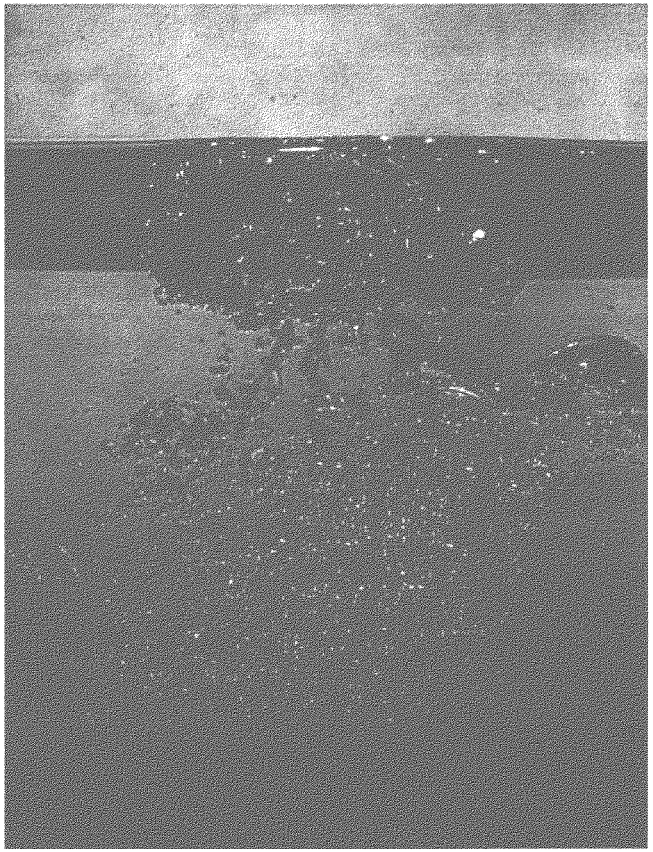
Mr. Westmoreland.

Mr. WESTMORELAND. Thank you, Madam Chair, and I want to thank you and the Committee for allowing me to be here.

Mr. Hunter, I want you to go back and congratulate Mayor Franklin on the job that she has done in trying to get Atlanta's water and sewer systems on the right track. I served in the Georgia legislature for 12 years. It was always easy to kick Atlanta and try to fine them and other things for their water situation, but Mayor Franklin has stepped up to the plate in spending money.

Madam Chair, I would like to ask unanimous consent to submit this pamphlet to the Committee and put it in the record that gives testimony and some facts and statistics to back up what Atlanta has done to help solve some of these water problems that they have had in the past.

[Information follows:]



Submitted by Representative Lynn A. Westmoreland

City of Atlanta

Department of Watershed Management

2008 ATLANTA WATERSHED BRIEFING

Presentation to:

GEORGIA DELEGATION
Washington, DC

March 4, 2007

Submitted by Representative Lynn A. Westmoreland

January 30, 2008 (revised)

1) Metro Atlanta's water use is not the problem in the ACF.

- Downstream water users cite metro Atlanta's water use as the cause of the ACF tri-state water crisis. Farmers believe there would be more water in the basin for their crops were it not for metro Atlanta; fishermen in Florida believe their livelihood is threatened because of metro Atlanta's demands for water. These claims are not supported by the facts.

- The culprit is not metro Atlanta. The cause is two-fold:

  - First, we are in the midst of one of the worst droughts in this region's history.

  - Second, and more importantly, the reservoirs that we rely on are being managed by the Corps using an unsustainable operating plan that drained Lake Lanier.

- Metro Atlanta uses 1 percent of the annual water volume in the ACF basin during normal years and just 2 percent even during extreme drought. In other words, if metro Atlanta's 5 million residents vacated the region, flows at the Georgia-Florida border would improve, at best, by a mere 2 percent. This is a function of geography:

  - Because Lake Lanier is situated in the headwaters of the Chattahoochee River, it controls runoff from just 5.3% of the land area of the ACF Basin, controlling only about 9% of the total flow of the basin above the Florida line.

  - In other words, 91% of the flow of the ACF Basin above the Florida line is geographically inaccessible to the metro area. Of the 9% of the flow that is geographically accessible to the metro area, we use only a small fraction, and the majority of the water that is used is returned to the river.

- Metro Atlanta is not the biggest user in the basin. Consider the following:

  - Metro Atlanta's net water withdrawal is 162 million gallons per day (MGD) or 250 cubic feet per second (cfs).

  - Depletions to the Flint River due to agricultural irrigation in South Georgia average approximately 268 MGD (415 cfs), which is about 66 percent more than metro Atlanta's net water consumption. Although most agricultural withdrawals are from groundwater, these withdrawals reduce base flow into the tributaries of the Flint River and thus result in this impact on surface water flows.

  - Evaporation from the mainstem reservoirs alone causes depletions of approximately 135 MGD (209 cfs).

- The minimum required release under the IOP varies based on inflow conditions, but under conditions like those experienced in the last severe drought year for which complete data are available (2001), the minimum release required by the IOP at the Florida line would be 7371 mgd (11426 cfs) on average. This is over 45 times as much as metro Atlanta's average net use. Further, actual flow at the Florida line would be significantly higher than the minimum flow required by the IOP.

2) The Interim Operations Plan (IOP) adopted by the Corps in 2006 caused the water crisis in 2007 and needs to be revised this spring to avoid a repeat in 2008.

- The Interim Operations Plan adopted by the U.S. Army Corps of Engineers in March 2006 is not sustainable because it requires large releases from reservoir storage to meet artificially high minimum flows at the Florida line *without ever allowing the reservoirs to refill.*

  - In budgetary terms, the IOP draws heavily on savings (water stored in reservoirs) during the summer and fall, when river flows are naturally low, without allowing savings to be replenished in the spring, when river flows are naturally high.

- What are "artificially high" water flows? Between May and November 2007, IOP flows in the lower Chattahoochee River amounted to 220 percent of the natural unimpaired flow of the river. This is more than twice the flow that would have occurred naturally, with no development upstream and no reservoir storage.

- As we predicted when the IOP was adopted in 2006, this unsustainable plan nearly emptied the federal reservoirs and threw the system into crisis in 2007.

- The Corps has suspended the Interim Operations Plan and put in place the Exceptional Drought Operations (EDO) Plan. This plan allows the Corps to begin refilling the reservoirs by holding water this winter and spring; it also slightly reduces the required minimum flows downstream. Although this is a good emergency plan, it is necessary only because the IOP drained the system. If the reservoirs had been properly managed in the first place the EDO would have been unnecessary.

- The EDO is scheduled to expire on June 1. But the EDO must remain in place until Lake Lanier has recovered.

3) New water control plans based on facts and sound science must be adopted by the Corps for the ACF reservoirs.

- The ACF basin has sufficient water to meet the reasonable demands of all users and to protect endangered species — *if* the reservoirs are managed properly.

- Proper management means that Lake Lanier must be utilized, in part, to store water for the metro area.
- Water supply for metro Atlanta was one of the primary and principal purposes for which Lake Lanier was authorized and constructed. The reservoir was strategically located specifically to provide a secure water supply for the metro area.
- Although the Corps does manage Lake Lanier for water supply, the IOP is poorly designed and has an adverse impact on Lake Lanier. A proper management plan would solve this problem.

- In the short term, the IOP must be revised immediately to avoid a repeat of 2007. New water control plans will take at least 3 years to develop. We cannot wait that long.
- If the reservoirs are operated properly and if all users adopt sound conservation practices, there will be sufficient water for all users within the basin, including towns and cities, power generation, farmers and fishermen and endangered species.
  - The metro area water supply providers have proposed one alternative to the current operating plan that would perform much better for Lake Lanier and for the endangered species downstream. This plan is called the "Maximum Sustainable Release Rule." The Corps should study this and other alternatives as it develops the new water control plans for the ACF Reservoirs.

4) Water conservation by all users in the ACF Basin is crucial to protect our precious water resources.

- Water conservation is an essential component to protecting and respecting our precious water resources. Improved conservation by all users — combined with sound water management by the Corps -- can ensure that adequate water supplies are available to meet the reasonable needs of all users in the basin.
- 53 counties in Georgia, Alabama and Florida are wholly or partially within the ACF Basin (Only 10 of the counties are in the Metro North Georgia Water Planning District).
- Metro Atlanta is doing its part and making significant progress in water conservation efforts. Sixteen counties, 98 cities and 61 water systems are working within the Metropolitan North Georgia Water Planning District (MNGWPD) to develop and implement a water conservation program that is projected to help conserve 138 million gallons a day by 2030. This plan, developed in 2003 through the district, has been approved by the Georgia Environmental Projection Division and adopted by local governments.
- All jurisdictions are committed to implementing the top 10 water conservation measures that have been identified for water savings and cost effectiveness:

- Conservation pricing (the more you use, the more you pay). Ninety-eight percent of the water district's population is subject to increasing or tiered rates.
- Replacement of old toilets.
- Reduction of water system leaks.
- Rain sensor shut-offs for irrigation systems.
- Pre-rinse spray valves for commercial restaurants and food service operations.
- Sub-unit meters in new multi-family buildings.
- Residential water audits.
- Low-flow retrofit kits.
- Commercial water audits.
- Education and outreach.

- For more than two years, metro Atlanta has had mandatory conservation measures that have been developed on the local, state, water district and federal level. Federal and district requirements alone are projected to reduce water withdrawals by 20 percent when fully implemented.
- The state of Georgia has implemented statewide restrictions on outdoor water use. The state's outdoor water use regulations were enacted as part of the 2004 drought management plan.
    - Outdoor water use is restricted to three days per week during non-drought periods.
    - During times of severe drought, the state bans all outdoor water use.
- We cannot, however, "conserve" our way out of a crisis such as we experienced in 2007.
    - Because we use just 1 to 2% of the water in the basin above the Florida line, no amount of conservation in the metro area will produce an appreciable increase in the flow of the Apalachicola River.
    - Although conservation is important to preserving storage in Lake Lanier, no amount of conservation can overcome problems created when the reservoir is mismanaged.

- Even if North Georgia's consumptive use doubles over the next 30-40 years, as projected by the MNGWPD, this is still a small fraction of the flow in the ACF basin.

- We want to be good partners with the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service. We believe that with sound water management — based on science, not politics — and improved conservation throughout the basin, that there will be sufficient water in the basin for towns and cities, for power generation, farmers and fishermen and endangered species.

Mr. WESTMORELAND. Mr. Begos, I used to go visit Bay City Lodge and Mr. Jimmy Muscala quite a bit down there, and I have fished in Apalachicola Bay on many occasions and have eaten some of those great oysters down there.

Is it true too that a lot of times there is more fresh water in the bay than there needs to be?

Mr. BEGOS. Congressman, that is sometimes true. We are sometimes frustrated by having too much water coming down the system that would shut down oyster harvest for a period of days or weeks. There is a potential solution, long-term, of looking at the whole thing at certain times when you could hold more water upstream.

Mr. WESTMORELAND. I was just talking to a friend that was down there fishing, and he said they were catching a shellcracker almost out to the cut. So that is an indication that there is probably more fresh water down there during these times of heavy rains than have been.

You also mentioned about Blountstown. I have been down the river before also, stopped at Blountstown, and I know they get a lot of economic development from that river traffic.

Do you know anything about that silting up in that area where it is harder to get boat traffic down and what is stopping the dredging of that area, if anything, and does it need to be dredged?

Mr. BEGOS. Congressman, that is not really my area of expertise. I am more of the Apalachicola Bay area. So I would defer on that.

Mr. WESTMORELAND. I will ask Mr. Burch this same question. Do you think it would help if there was some type of controls put on the Flint River?

Right now, the Flint River is basically unbridled and, if they get a large amount of rain and they are still releasing the 5,000 cfs on Lanier, it causes too much fresh water to get into that bay. Have you thought about any type of flood control or any kind of mechanism on the Flint that would help that situation?

Mr. BEGOS. On that too I would defer to the final panel and to the experts, the hydrologists and marinologists for that. My area of expertise is not the Flint or its basin.

Mr. WESTMORELAND. But you have had problems with too much as well as not enough?

Mr. BEGOS. Sure. Droughts and floods are a natural part of the cycle. We are just looking for a fair long-term agreement that doesn't peg us at a such a low level that we are stuck just there.

Mr. WESTMORELAND. I am with you, but if we could keep that flow constant, using both the management of the Flint and the Chattahoochee, I think that would be a better solution.

Mr. BEGOS. Congressman, we are not asking for a constant flow. We are asking for more something that approximates the natural variations.

Mr. WESTMORELAND. Do you know what the natural flow of the Flint or the Chattahoochee were, the natural flow before anything was ever on it? Do you have any idea what that natural flow was?

Mr. BEGOS. I would defer to biologists and hydrologists on that.

Mr. WESTMORELAND. Well, you might want to look at that because it is pretty interesting, what those natural flows are.

Mr. Burch, just real quickly, I know that you live in Newton, Georgia. Was it in 1994 that your town was under water?

Mr. BURCH. Nineteen ninety-four and then again in 1998, the historic downtown was flooded, yes, sir.

Mr. WESTMORELAND. I am going to have some questions for the other panel too about the impoundments on the Flint, but do you think any impoundments on the Flint other than the two small that are on there now would help maybe with your city not being put under water in some of these flood situations and also help the ability for agriculture?

Let me make one other point quickly, Madam Chair. As far as agriculture and use of water in Georgia, I think this water plan has done a real good job of working with agriculture and making sure that they don't deplete the water resources.

Mr. BURCH. A dam certainly would have been a great benefit in 1994 and 1998. I am no expert, but I do know that our aquifer is limestone, and we don't know how much water is flowing underneath into Florida. So I don't know how much water we could hold back due to our substructure.

Mr. WESTMORELAND. Yes, ma'am. Thank you, Madam Chair.

Ms. JOHNSON. Let me thank the witnesses. There are no further questions.

Before we proceed, I will ask unanimous consent to submit the report that Mr. Westmoreland offered to go into the record. Any objections?

Hearing none, so ordered.

Ms. JOHNSON. I want to thank the witnesses for being here, and I appreciate their valuable participation.

The third panel of witnesses consist of representatives from a number of key Federal agencies. Testifying first is Mr. Jess Weaver. Mr. Weaver is a Regional Executive for the Southeast Area of the United States Geological Survey.

Next, we will hear the important testimony of Brigadier General Joseph Schroedel from the U.S. Army Corps of Engineers' South Atlantic Division, and his testimony will be followed by that of Mr. Sam Hamilton from the U.S. Fish and Wildlife Service. Mr. Hamilton is a Regional Director of the Southeast Region.

The final witness on our third panel is Mr. John Feldt. Mr. Feldt is the Hydrologist-in-Charge for the National Oceanic and Atmospheric Administration's National Weather Service, Southeast River Forecast Center.

I thank you for being here, and you may proceed in the order that you are listed.

TESTIMONY OF JESS D. WEAVER, REGIONAL EXECUTIVE, SOUTHEAST AREA, U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR; BRIGADIER GENERAL JOSEPH SCHROEDEL, COMMANDER, SOUTH ATLANTIC DIVISION, U.S. ARMY CORPS OF ENGINEERS; SAM D. HAMILTON, REGIONAL DIRECTOR, SOUTHEAST REGION, U.S. FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR; J. JOHN FELDT, HYDROLOGIST-IN-CHARGE, NATIONAL WEATHER SERVICE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, U.S. DEPARTMENT OF COMMERCE

Mr. WEAVER. Madam Chairwoman and Members of the Subcommittee, thank you for the opportunity to testify on behalf of the Department of the Interior regarding the current drought in the southeast.

I am Jess Weaver, Regional Executive for the Southeast Area of the U.S. Geological Survey. The mission of the U.S. Geological Survey is to assess the quantity and quality of the Earth's resources and to provide information to assist resource managers and policy makers at the Federal, State and local levels in making sound decisions.

As part of that mission, in the ACF and ACT Basins, the USGS monitors continuous stream flow at 158 stations, providing the data in real time. In addition, the USGS measures continuous groundwater levels at 77 well sites, collects water quality samples at more than 80 sites and prepares water use data reports.

The USGS works in partnership with 12 Federal, 10 State and 60 local government agencies in the ACF and ACT Basins, and part of the 12 Federal include the agencies of the members of the panel sitting to my left.

The ACF Basin covers 19,600 square miles extending from the Blue Ridge Mountains with free-flowing trout streams to the ecologically-rich Apalachicola Bay and the Gulf of Mexico. The basin includes parts of Georgia, Alabama and Florida and includes the Chattahoochee, Flint and Apalachicola Rivers.

Located at the headwaters of the ACF system, Lake Lanier comprises 62.5 percent of the storage in the system but only 6 percent of the drainage area. Because of its huge storage capacity and relatively small drainage area, it takes longer to refill Lake Lanier than it does other lakes in the system.

There are numerous competing demands for the waters of the ACF Basin which provide water supply for about 60 percent of the population of Georgia and about 8 percent of the population of Alabama and about 1 percent of the population of Florida.

The groundwaters of the ACF irrigate more than 780,000 acres of farmland. The lower ACF rivers are home to one threatened fish species and two threatened and four endangered mussels.

The rivers of the ACF are the source for about 59 public water suppliers, about 41 industrial plants including about 7 thermal electric plants that each withdraw more than 100,000 gallons per day. Additionally, there are more than 80 groundwater withdrawal permits in the ACF Basin for public supply and industrial use.

The system also provides flood control, navigation and recreation benefits. At the mouth of the ACF Basin, Apalachicola Bay represents a significant oyster and shrimp fishery.

The greatest changes in basin hydrology in the past decades have been driven by increased public supply demands associated with the Atlanta region and increased agricultural withdrawals in the southern portion of the basin. During droughts, Lake Lanier is the storage of last resort to meet minimum flow requirements throughout the system. Another complicating factor is the effect on stream flow from groundwater withdrawals used for irrigation in the lower ACF Basin.

The cumulative influence of these withdrawals can change the direction of groundwater flow. Streams that would normally gain water from surrounding aquifers during low flow begin to lose water to these aquifers. These dynamics have been simulated as part of a recently completed study conducted by the USGS.

In the ACT Basin, the Alabama, Coosa and Tallapoosa Rivers flow southwestward from northwest Georgia to southwest Alabama, draining approximately 22,800 square miles into Mobile Bay.

There are five Federal projects within the basin and eleven non-Federal Alabama power projects. Federal projects compose 22 percent of the total water storage in the basin. The waters of the ACT are used to irrigate about 28,000 acres of farmland.

The rivers of the ACT are the source for about 218 industrial and public permitted water suppliers, 155 in Alabama, 63 in Georgia. These permits are required for users to withdraw more than 100,000 gallons per day. Additionally, there are numerous groundwater withdrawal permits in the ACT Basin for public supply and industrial use.

The flood control, navigation and recreation benefits of the rivers and reservoirs in this basin provide enormous intrinsic and economic values.

Thank you for the opportunity to present this statement, Madam Chairwoman, and I will be happy to answer any questions that the Members of the Subcommittee may have.

Ms. JOHNSON. Thank you very much, Mr. Weaver.

Brigadier General Joseph Schroedel.

General SCHROEDEL. Thank you, Madam Chair, first for the opportunity to testify here today, but I would also like to take this opportunity to thank all the Members of Congress for your support of our great Army which is engaged in a real war in far off lands to include 800 or so civilian volunteers from the United States Army Corps of Engineers and my own son with the Third Special Forces in Afghanistan on his third combat tour. Thank you very much for your support.

Now the Corps generally constructs and operates multipurpose water resource projects and manages those projects as a system within a watershed irrespective of political boundaries. Project purposes can include flood damage reduction, production of hydropower, recreation, navigation, water supply, water quality, irrigation, and fish and wildlife conservation.

Our day to day operation of our multipurpose projects seeks to balance these competing purposes. During a drought, that competition for limited water resources is magnified. To better manage these systems during this drought, we have focused on adapting to the uncertainties of the drought and managing the risks associated with those uncertainties.

My division area encompasses operations on 13 of the 18 major watersheds from Virginia to Mississippi. We have four districts involved in managing those watersheds, and there are two important things that we have done to help manage the drought in a flexible and adaptive manner.

First, our district water managers have been diligent in adjusting operating and drought plans to manage the limited water resources during this drought.

When conditions became so severe that our approved plans no longer support the system in accordance with our Corps regulations, the district water managers sought approval for temporary deviations from me, and I can tell you we have approved many deviations throughout the region. We can talk more about that later.

The second critical thing we have done, which I would like to emphasize today, is that our district water managers routinely engage Federal, State and local agencies, industry and other concerned stakeholders, striving for both continual communication and complete transparency.

Intensive communication is absolutely key during a drought for two reasons: one, to ensure that we, the Corps, understand the concerns of all of those involved in using our water resources and, second, to ensure that we notify the public in advance of management decisions which we intend to make. Our management of the ACT and ACF Basins, I believe, is very instructive in this sense.

The ACT and ACF River Basins include Federal multipurpose projects. Under normal rainfall conditions, the Corps manages these systems to meet all authorized project purposes in accordance with draft water control manuals and plans that were developed in the late 1980s.

When drought conditions develop, however, and water supplies dwindle, the Corps begins to lose its ability to meet all of the authorized project purposes all of the time. So we are faced with tough choices.

On the ACT and ACF, we have faced considerable challenges in balancing project needs. Again, the key is communication. Last year, the Mobile District and the South Atlantic Division and my staff initiated, for the first time ever, weekly drought calls, conference calls on the ACT and biweekly drought calls on the ACF.

These conference calls included all interested parties including environmental groups, industry, State and local agencies, Congressional staff and the media, complete transparency.

These calls, which are very well attended—we are talking 60 or better people every week—provide an update on basin conditions and describe the Corps management actions, both current and anticipated. They have been valuable venues for promoting two-way information sharing and, because they are direct linked through agencies, Congressional staff and stakeholders provide information to the Corps.

I would add that we leverage every means available, TV, newspapers and others, to ensure that we sustain a healthy dialogue with and our responsiveness to the public we serve.

We also believe that it is vitally important that Federal agencies act as a cohesive and integrated Federal team, given the complexity of the issues that span multiple State and local govern-

ments. I am pleased to report to you today that we are a very cohesive team. These members sitting in this panel and many others talk to each other all the time.

Our coordination with the Fish and Wildlife Service, for example, has been extremely successfully. Our team approach to the ESA consultation has allowed both the Corps and the Fish and Wildlife Service to reduce review times to a duration no one would ever have imagined.

We personally rely on the NOAA for not only near-term weather forecasts but also long-term forecasts to help manage the risks I mentioned earlier.

We rely on the USGS and their gauges to get accurate and timely data on stream flow, and we use their gauges and their information on our lakes. That is something that we have worked hard to do.

We are also working hard with the Department of Homeland Security and the Department of Energy in anticipation of possibly having to exercise our authorities under Public Law 8499, should the crisis call for those actions. These are just a few examples.

Water resources challenges are here to stay, and I would like to address, for just a second, Mr. Boozman's point earlier about solutions and not problems.

Two actions which we are taking today to help shape the future are, first, as most of you know, we have begun our efforts to update our water control manuals and, second, I would like to give a few seconds on another initiative which we began about a year ago, which we believe may help.

Our current water control plans are the most important management tool that water managers have. We have now begun the process on both the ACT and ACF. Notice of intent has been filed in the Federal Register, and the process will be about a two to three-year, very open, public process and in complete compliance with NEPA.

The second action which we have taken, almost a year ago, I introduced a concept which we call the Southeast Regional Water Resource Council. It is somewhat mirrored after the Western States Water Council, which would be a State-led forum to develop a regional vision for integrated solutions to water resource challenges in the southeast.

My intent was to establish a process whereby the Corps and other Federal partners could ensure our programs and priorities are in concert with States' needs and priorities across the region and to foster a more collaborative and consistent effort for development and use of water resources in the region. This would also help us define Federal and State responsibilities.

We are now in the process of sharing this concept with the States, the Southern Governors Association, other Federal partners and stakeholders. Working regionally with the States on water issues in the southeast represents a new way of doing business, but we have found that States and stakeholders are receptive to exploring the regional water council concept further.

Madam Chair and Committee Members, the south is a national resource. We need to turn the challenges of this drought into an

opportunity to shape the future for all of the citizens of this great section of our Country.

Madam Chair and Members of the Subcommittee, I appreciate again the opportunity to testify, and I thank you again for your support for our magnificent Army. Thank you.

Ms. JOHNSON. We will now hear testimony from Mr. Sam Hamilton of the U.S. Fish and Wildlife Service.

Mr. HAMILTON. Madam Chair, Members of the Subcommittee, thank you for giving us the opportunity to testify today on behalf of the Department of the Interior.

I am Sam Hamilton, Regional Director of the U.S. Fish and Wildlife Service's Southeast Region, a ten-State region that includes the Caribbean. The Fish and Wildlife Service is the principal Federal agency responsible for conserving, protecting and enhancing fish, wildlife and plants and habitats for the American people.

As you have heard already, we are in a record drought, entering the third year. This had a profound effect not only on the economies of the southeast but also the environment.

I want to briefly focus on some key basins, but before I do that I want to mention a few items related to the Fish and Wildlife values in this part of the world. Rivers and streams are really the circulatory system of our Nation. They provide a variety of services: clean drinking water, recreational opportunities, transportation, hydropower and food.

The southeast is blessed with the highest biodiversity, aquatic biodiversity, in North America. But, again, it represents the most imperiled group of species in the United States. Two-thirds of the Nation's freshwater mussels are at risk of extinction. One in ten may have already vanished forever. Forty percent of the fish in these river systems are at risk.

So rivers and streams are not only valuable for the economy to the southeast, but overall they are an indicator of the health of the environment, and it really became magnified in the drought that we are facing today.

The ACF, as you have heard a lot about, drew a lot of public attention, an unfortunate mischaracterization of mussels versus people.

This is really a classic example of people versus people, upstream and downstream, States versus States, a 20-year discussion, that has been underway. Some view it as a water war.

We work very closely with the Army Corps of Engineers. In my 30 years of working for the United States Fish and Wildlife Service, we have never worked more closely with the Corps on an issue like this.

The Department's role is to ensure that there is a balanced approach so that threatened and endangered species, in particular, are not jeopardized as we are charged by Congress.

We work very closely with Federal agencies and States, the EPA, USGS, NOAA, and we began consulting on the ACF in the 1990s as some of these species were listed. We worked very closely even dating back to the 1980s with the Corps on the ACF system.

We have done a few items to be proactive when it comes to conservation and other planning in the ACF Basin. We provided funding for some agricultural retrofitting to conserve water, stream-

lined protocols for reservoir reviews, assisted in the development of water supply protocols, and we have passed to the State of Georgia $130,000 for habitat conservation planning for endangered species.

The need for this became all too apparent as we entered the drought of 2007.

Working with the Army Corps of Engineers and other agencies, we evaluated the interim operating plan of 2006 and wrote a non-jeopardy biological opinion for endangered mussels and the Gulf sturgeon.

In 2007, the drought worsened and working very closely in a team approach with the Army Corps and others, an emergency drought plan was developed, and we consulted in record time on that. Typically, we have 135-day consultations under the Endangered Species Act. We did this one in 15 days, recognizing the emergency situation that we were facing.

As you well know and as you have mentioned, Secretary Kempthorne has led an ongoing discussion with the governors in the three States in an attempt to work through these issues, and we spent a considerable amount of time working in that arena.

On June 1, we expect to update our biological opinion, working with the Army Corps as they revise the plans that they have in place to deal with the current hydrology that is out there.

The drought not only affects the ACF, it affects the ACT system which starts in Georgia and flows to Mobile Bay. We work with the Federal Energy Regulatory Commission, Alabama Power, the Corps and the State of Alabama and on the Duck River we are working very closely with TVA in Tennessee.

The drought is very pronounced in south Florida, we are working with the Army Corps and the State of Florida on Lake Okeechobee and Loxahatchee National Wildlife Refuge.

The final area is South Carolina and North Carolina which are facing devastating droughts in that part of the world as the City of Raleigh struggles with its water supplies, and we are working very closely with them.

The Department of the Interior has been very active on water issues since the eighties with expertise and resources. There has been unprecedented collaboration between the Federal agencies to try and deal with these issues.

These record droughts are occurring, it appears, more frequently, and the increasing demands on the water that are there are pretty well documented. How we choose to deal with these finite resources in the future is going to be critical to the future not only of the economies of this part of the world but certainly the environment, and they go hand in hand.

Madam Chairwoman, thank you for the opportunity to speak today, and I will answer questions at the appropriate time.

Ms. JOHNSON. Thank you very much, Mr. Hamilton. We appreciate it.

Finally, now we will hear testimony from Mr. John Feldt, the Hydrologist from NOAA, National Weather Service Southeast River Forecast Center.

Mr. FELDT. Well, good morning, Madam Chairwoman and Members of the Committee. Thank you for inviting me to present

NOAA's role in coordinating and providing climate and drought information to Federal agencies and States.

I am the Hydrologist-in-Charge of NOAA's National Weather Service Southeast River Forecast Center. I have been directly involved in forecasting either weather or water for the National Weather Service for over 30 years now.

Today, I will discuss the recent and ongoing severe drought in the southeast. I will then focus briefly on the new National Integrated Drought Information System or NIDIS.

In the most general sense, drought refers to a period of time when precipitation levels are abnormally low, affecting human activity and the environment. Primary effects of drought may include water shortages and crop, livestock and wildlife losses. Droughts may also cause secondary effects on areas such as tourism, commodity markets, transportation, wildfires, insect epidemics, soil erosion and hydropower.

Drought is normal. It is a recurrent feature of climate and occurs almost everywhere, although its features vary from region to region.

As you know, the southeast region of the United States has been in the midst of an exceptional drought for a little over two years now. Just about every day, people ask me, when is this drought going to end?

While we do not know how much longer this particular drought in the southeast will last, there are two things that I personally look at quite closely. Number one is the average length of exceptional drought, and the second factor is the prevailing climate signal.

In the past, exceptional droughts have typically lasted between two and three years. However, it is important to know that a few droughts have lasted nearly four years.

In addition, over the past year, NOAA has been monitoring a La Niña episode which is an unusual cooling of ocean temperatures in the equatorial Pacific. A La Niña episode typically results in dry weather across the southeast U.S., especially from the central part of Georgia and Alabama on further south into Florida.

Climate models now show a trend out of this La Niña event into neutral conditions either late this spring or this summer. The recent U.S. seasonal drought outlook for February through May predicts some improvement in the southeast drought condition.

NOAA's National Weather Service has been providing information to key decision-makers in support of drought management activities since the onset of the drought. The National Weather Service weather forecast offices have been attending local and State drought management meetings and providing hydrometeorological support and forecast information.

My office, the Southeast River Forecast Center, has been front and center in providing ongoing hydrometeorological support to the U.S. Army Corps of Engineers, the USGS and numerous other Federal, State and local decision-makers.

My office has also developed several new tools that provide critical information and direct support of drought operations for State, Federal Government agencies, the media and the private sector.

These include a product called the Critical Water Watch and the Southeast RFC Journal which are issued on a weekly to biweekly basis to convey technical information relating to critical water supply users. We also issue a weekly Water Resources Outlook which is a 15-minute multimedia presentation where NOAA meteorologists and hydrologists provide expertise and forecast information directly to key decision-makers.

These are just a few of the many examples of the work that NOAA does both locally and regionally to provide climate and drought information.

I would now like to very briefly focus on a new tool that is in development and helping the Nation better prepare for and respond to the effects of drought, the National Integrated Drought Information System or NIDIS.

NIDIS is envisioned to be a dynamic and accessible drought risk information system. The explicit goal of NIDIS is to enable society to respond to periods of short-term and sustained drought through improved monitoring, prediction, risk assessment and communication.

Over the next five years, NIDIS will build on the successes of the tools and products provided by NOAA to close the gap between what is currently available and what is needed for proactive drought risk reduction. Just one example would be that municipalities and State agencies will have improved drought information and forecasts when allocating both domestic and industrial water usage.

Water resource managers will have access to more information when balancing irrigation water rights with the needs of wildlife, and farmers will be better positioned to make decisions on what crops to plant and when to plant them.

While NOAA is the lead agency for NIDIS, NOAA works with numerous Federal agencies, emergency managers and planners, State climatologists and State and local governments to obtain and use drought information.

Several efforts are underway to improve drought early warning systems. These include coordinating interagency drought monitoring and forecasting. NIDIS also provides a framework for coordinating the research agenda among participating agencies.

Thank you for the opportunity to discuss drought conditions in the southeast and NOAA's role in coordinating and providing climate and drought information to Federal agencies and States. I would be happy to answer any questions you or other Members of the Committee may have.

Ms. JOHNSON. Thank you very much for your testimony.

We will proceed now with questions.

General Schroedel, you said in your testimony that the Corps' near-term strategy for addressing the drought is updating water control plans. What specific changes to the plans are needed and what will be the biggest difference between the updated plans and the current plans?

General SCHROEDEL. Yes, ma'am. The biggest need, after several decades of not being updated, is the first step, which is a basin-wide EIS. The hydrology has changed, the ecosystems have

changed, and the demands on the water have changed. The entire situation has changed.

So it is important that we start with a basin-wide EIS, gather all the facts in a very open and public process. That will enable us then as a part of that process to generate suitable alternative operations approaches to then balance those competing needs, as I mentioned.

So I would say that the basin-wide EIS is the critical first step just to get a good handle on what is really going on.

Ms. JOHNSON. Thank you very much.

This question is for Mr. Hamilton. You mentioned that there are many competing uses for water in the ACF Basin, including irrigation, public water supplies, industrial uses and for endangered species. How much water is currently available for endangered species and how much is needed to be sufficiently protective?

Mr. HAMILTON. The endangered species in the Apalachicola system are three listed mussels and the Gulf sturgeon.

We have consulted with the Army Corps in the last year and looked at the required flows for those species. What we found was that the historic numbers that we had looked at, 5,000 cfs, had only been reached one or two times in the history of recorded time in the Apalachicola.

Recognizing that we were in an exceptional drought and using the full flexibility that we had in the Endangered Species Act, we consulted and wrote an opinion that enabled the Corps to drop those flows to 4,500 cfs, which is a 10 percent reduction at unprecedented levels.

What we don't know right now is, if you continue to do that over an extended period of time, will that jeopardize the future existence of that species?

We also wrote an opinion looking at the Gulf sturgeon, using the higher spring flows like today, when you have flows exceeding forty and fifty thousand cfs hitting the Apalachicola Bay. I believe our numbers that we were identifying range between 11,000 and 16,000 cfs for spawning flows for the Gulf sturgeon.

Ms. JOHNSON. Thank you very much.

Let me just ask each of you to comment. There is a water shortage around the world, not just in the southeast U.S. Do you know whether or not this has been an understood and accepted thing in the planning of these three States together?

Mr. WEAVER. Personally, I do not know if they have accepted that fact in their planning.

General SCHROEDEL. Ma'am, I would just offer that given how rapidly Georgia, for example, just passed their water plan and the same actions are being taken by all three governors and other governors around the south, I frankly think everyone has recognized that this is a huge problem we have to deal with now.

My personal opinion is that there is probably a lot of water out there we are not capturing. Maybe that is what we need to take a look at.

So I think they all recognize that.

Mr. HAMILTON. I would have to agree. I think you see it in the discussions we have had. You have seen it in the plans that all three States have enacted, very much recognizing that these

droughts are occurring frequently and with increased demand. So you are seeing more and more discussion on conservation measures and actually implementing some.

Mr. FELDT. Madam Chair, I think that is out of my area of expertise, so I would like to defer on that question.

But I would like to point out that it is interesting just recently, just last week in our office, we were actually looking at some flooding over parts of the southeast at the same time as we are working drought. So water can be very complicated. Sometimes you can have very close to one area in extreme drought, other areas could have floods.

Ms. JOHNSON. Thank you very much.

I am going to now recognize Mr. Boozman.

Mr. BOOZMAN. Thank you, Madam Chair.

I am curious as to what we have really learned from this. You can't really plan. I guess you can, but it is very difficult for an entity like this that just hasn't happened in a long, long time as far as the severity of the drought.

Mr. Feldt, they try and forecast the weather and things. An example of that would be did you feel like your forecasts were good and then did you all use them? Did you change anything and, really, do we have the ability to do that with the current structure?

You mentioned, General Schroedel, that you are implementing a rewrite of the plans and all that stuff, but the reality is that is probably going to take years. Do we have the ability? Even though we are in a crisis situation, are we still using old plans based on the knowledge, hopefully, that we have learned for the last year or two?

General SCHROEDEL. Yes, sir. I would tell you that the process of managing the systems is a very dynamic process. It is a day to day, hour by hour process of our experts, many of whom have been doing this for three or four decades, processing and assimilating all the information they can to make timely decisions, and we are very flexible in how we do that. This isn't a cookbook solution to managing these reservoirs, not even in the least.

A good example would be we were prepared in the October time frame to reduce the flows out of Lake Allatoona, just as an example, the right thing to do based on how we normally manage and what our manuals say. We were about to go below zone one into zone two, which normally our operations guys would direct. Cut the flow from two hours of power to one hour of power.

Then, as a result of realizing that there are other needs downstream and the forecast that we got from NOAA that said, wait a minute, the 100 degree temperatures in September are going to sustain themselves into October, which was rare.

We said, wait a minute, for cooling purposes and water quality purposes, we cannot reduce the flow out of Allatoona at that point because we have another concern, which we got the heads-up again from NOAA that tipped us off, and then we adjusted. So we actually made that decision about two weeks later than we normally would based on that information.

Mr. BOOZMAN. So that is something you have learned. A couple years ago, you wouldn't have done that, perhaps.

General SCHROEDEL. I am not sure I would say that.

Mr. BOOZMAN. Hopefully, you are a little bit, and I don't mean this bad, but a little more conservative in the water use.

General SCHROEDEL. Perhaps.

Mr. BOOZMAN. Mr. Hunter mentioned the discharges. He was concerned about the discharges now that are going on. Can you tell us why you are doing that or if that is under the old manual?

General SCHROEDEL. No, sir. Again, that is a part of the dynamic balancing process. We treat the entire system as a system.

A very important point with respect to the water supply needs, if you will, of Atlanta and water quality needs of Atlanta is that water is not drawn out of Lake Lanier. It is drawn out of the rivers south of Buford Dam, which means it is necessary to release water from Lake Lanier through the dam to satisfy both the water supply needs of Atlanta and the water quality needs as measured at Peachtree Creek.

We are about to exercise our authority in line with Congressionally authorized legislation for Buford that says we can reduce the water quality flow requirement from 750 cfs at Peachtree Creek to 650 cfs. So we are about to reduce the flow for water quality by about 100 cfs. Then that is the limit, based on the legislation, that we could go to.

The remainder of the flow, you combine intervening flow, the rain that hits and flows into the river south of Buford and between Peachtree Creek, and then we figure out on a day to day basis—actually it is on a weekly basis—how much water needs to be released out of Lanier to make up the difference to supply those needs south of Lanier.

Some of the concerns that we are well aware of, Georgia Trout Hatchery which requires 538 cfs, which is south of Buford again and then the water quality piece in Atlanta. Those are the only reasons right now water is being released from Lanier, to satisfy those needs.

Mr. BOOZMAN. Is that transparent where people can actually know what is going on?

General SCHROEDEL. Yes, sir, absolutely. That is something that we have celebrated quite a bit.

With these drought calls that we conduct every week on the ACT and biweekly on the ACF, we inform all of those people who call in on those calls, what decisions we are about to make, what flows, what adjustments we are making to the system, and then we explain to them why. Then everyone who is on the call has a chance to chime in with their concerns.

Then, of course, we make sure that we do not violate the FACA laws in terms of participation in Federal decision-making. So we are very deliberate in how we run that process, but we have learned more.

Also, we have a web site. I am just reminded. We have a very detailed web site that we maintain every day. So, absolutely transparent, yes, sir.

Mr. BOOZMAN. Let me just ask one other thing, and then we have some questions we would like to submit for you that you can fiddle with at your leisure for all of you.

General SCHROEDEL. Sure. Okay.

Mr. BOOZMAN. Does the Corps need any Congressional guidance or authority to better manage the reservoir system with the contemporary needs?

The contemporary needs being that we have a situation now with Atlanta being on board. Certainly, I don't think anybody could envision an area of that large a population 20 years ago or 30 years ago, whenever all these things came about, longer than that.

If so, do you need Congressional guidance or do you need more authority?

General SCHROEDEL. Sir, at this point, I think our general opinion is that we do not need any additional guidance or authority. It is pretty well laid out.

Mr. BOOZMAN. Is there anything we need to be doing?

General SCHROEDEL. Sir, at this point, I do not believe so.

Mr. BOOZMAN. Okay.

Thank you, Madam Chair.

Ms. JOHNSON. Thank you.

General, let me ask, how could more water be captured for the ACF system?

General SCHROEDEL. Madam Chair, one option might be additional storage. Of course, when I say storage, there are options above ground, below ground, and you have already heard a little bit about the geology that underlies the region, which makes it very difficult for an aquifer recharge, for example.

I am reminded that the 1945 Rivers and Harbors Act authorized three flood control projects on the Flint River. Today, there are, I believe, three dams on the Flint River or two that I know of, Crisp County Dam and Albany Dam which are very small and do not provide any flood protection.

But then again, I am reminded that WRDA 1986 de-authorized those projects. Those would be the only way that I could think of that you could actually flexibility in the management of the ACF as a system. Today, we have no control over the Flint system.

We talked about 5,000 cfs at the Chattahoochee gauge. Today, we are releasing 30,000 cfs, and it may not be the right amount at the right time, but that is basically all that I can see that we could do.

Ms. JOHNSON. You mentioned lowering the flow rate at Peachtree Creek. Does that mean that the water quality downstream would be affected?

General SCHROEDEL. No, ma'am. We would not be able to do that. We went through the proper NEPA work to do that, so the FONSI will be signed and then completing the NEPA work.

So, no, ma'am, not at all. We would not do that.

Ms. JOHNSON. Thank you very much, General.

Mr. Westmoreland. Thank you, ma'am.

General Schroedel, you made the comment about the Flint impoundments. So that is something that Congress could do is to look at why, in 1986, the WRDA Bill cut those two impoundments out because I think you agree with me from just what you have said, that we need to do some type of study on that again, a feasibility study to see where we are at.

General SCHROEDEL. Yes, sir. I would say if the States saw that as something that would be essential, then that would be a good action to take.

Mr. WESTMORELAND. Yes, sir.

Mr. Hamilton, do you know what the natural flows of the Chattahoochee and the Flint were?

Mr. HAMILTON. I don't have those figures offhand. When you say natural, I am assuming that is pre-dam.

Mr. WESTMORELAND. Yes.

Mr. HAMILTON. The figures that I am aware of are post-dam that range from 178,000 cfs in the springtime to lows of about 5,000 on the most part, so a wide-ranging amount of water.

But maybe USGS might have some information on the historic flows.

Mr. WESTMORELAND. Mr. Weaver, do you have any information on what the normal pre-dam flow was?

Mr. WEAVER. We actually published a report in about 1995 which listed the pre and post-dam flows, which I could provide to the Committee. We looked at the period from 1929 to 1957 and from about 1957 to 1970 and 1970 to 1993.

Mr. WESTMORELAND. I think that would be interesting to get those.

Mr. Hamilton, let me ask you a question. Do you think the sturgeon and the mussel would do better in a natural environment that they had than this man-made environment that we are creating today with the flows?

Mr. HAMILTON. That is a complex question. Obviously, they did well before all the pressures on the water systems that we have out there, and it is not just water supply. It is water quality, habitat throughout their range.

Those species require high flows and low flows, and have all been affected in various ways, so populations have dramatically declined over time. There are those that are endangered and on the verge of extinction and those that are threatened and on the verge of becoming endangered.

So I would say obviously they would do better.

Mr. WESTMORELAND. But, normally, species do better in their normal environment than a created environment.

Mr. HAMILTON. Correct.

Mr. WESTMORELAND. I have so many questions.

General Schroedel, the Corps, how does it related to the FERC agreements because of the power plants up and down the Chattahoochee?

How does the Corps and the FERC line up as far as FERC guaranteeing a certain amount of flow through an area and the Corps actually managing the river? How does that work?

General SCHROEDEL. Sir, it works in a couple of different ways.

If I could use the Alabama Power reservoirs on the ATC as an example, they are currently up for relicensing. In the process of that relicensing, as the Alabama Power projects go through the NEPA process and go through that whole licensing process, they will consult with the Corps to determine what sort of flows are required in the aggregate from those projects to meet a navigation requirement, south of Montgomery in this case of 4,640 cfs. Then FERC, in this case, will generally memorialize those flows into their licensing process.

Mr. WESTMORELAND. I guess what my question is who has the authority to regulate the flows, the FERC or the Corps?

General SCHROEDEL. It is the FERC.

Mr. WESTMORELAND. FERC?

General SCHROEDEL. Yes, sir.

Mr. WESTMORELAND. Okay.

General SCHROEDEL. They lay that out as part of the licensing process.

Mr. WESTMORELAND. Okay. So they can require the Corps to up their flow?

General SCHROEDEL. They require the Alabama Power.

Mr. WESTMORELAND. That is what I wanted to hear, okay.

General SCHROEDEL. Then also through the Fish and Wildlife Service for endangered species, for example, at Jordan Dam, that would be done.

Mr. WESTMORELAND. So if the flow is not meeting what FERC promised or what was in their permit, then they need to increase the flow out of their lakes to make up for that?

General SCHROEDEL. There is a way to enforce that, yes, sir.

Mr. WESTMORELAND. Okay. Now the last thing is Chairwoman Johnson asked about the updating of the manuals, and you mentioned two decades. If I remember correctly, the last manual that was approved and went through the full process of being approved was in 1957.

General SCHROEDEL. Yes, sir. We have been operating with a 1989 draft.

Mr. WESTMORELAND. Fifty years.

General SCHROEDEL. Yes, sir.

Mr. WESTMORELAND. So, Madam Chairwoman, I am going to say that there is something that Congress can do.

When you have had the growth up-river and in that basin and let me also point out that the Chattahoochee and the Flint, for some people who don't understand, originate in Georgia. The Chattahoochee originates above Helen. The Flint originates just a little bit south of Atlanta.

These manuals have not been updated in 50 years and, Madam Chair, let me say this too, that there are Senators over in the other body that are trying to prevent them from being updated today. That is a disgrace. That is something we need to stop, and that is something we need to work towards to make sure that the Corps has everything, every tool in their arsenal to come up with an updated water plan.

Madam Chair, I yield back the balance of my time.

Ms. JOHNSON. Thank you very much.

We have no further questioners, and so I declare that the hearing has concluded.

Thank you so very much for being here.

I look forward to the governors and all getting together and coming up with a good plan and solving the problem.

[Whereupon, at 12:05 p.m., the Subcommittee was adjourned.]

Written Statement of the Honorable Allen Boyd
Before the
House Transportation Subcommittee on Water Resources and the Environment

March 11, 2008

Chairwoman Johnson, Ranking Member Boozman, and members of the subcommittee.

Thank you for convening this hearing on this most important topic, and I appreciate the opportunity to testify today.

For almost 20 years, the Apalachicola-Chattahoochee-Flint water sharing disagreements have presented numerous challenges on the local, state, and federal levels. In order for us to successfully and responsibly address this issue, we must look at the big picture and tackle both our short-term and long-term problems.

My testimony before the subcommittee will focus on the need for the states to plan for their own water needs, which Georgia has not done.

I have been fighting for the Apalachicola River Basin along the Florida coast for all of my 19 years in public service.

I have worked closely with the Water Management Districts in Florida, especially as they began to focus on regional water supply needs in the late 1970s, when water supply constraints in the western Panhandle became quite evident.

Because Florida chose to focus on water issues three decades ago, Water Management Districts in Florida were created by a state constitutional amendment and then were given broad statutory authority by the state legislature.

Water Management Districts were given ad valorem taxing authority as well as their statutory authority, which include programs such as:

- Land acquisition
- Regulation
- Construction
- Land management
- and Water resources preservation

These efforts continued through the 1980s.

The first Regional Water Supply Development Plan was completed in 1982.

In the late 1990s, the Florida legislature amended the Florida Water Resources Act, directing the state's five water management districts to comprehensively assess the sufficiency of water supplies over a twenty-year planning period and to develop regional water supply plans for those areas identified as either having, or being likely to develop, future water supply problems.

In response, the Florida Water Management Districts established seven water supply planning regions and completed the first District-wide Water Supply Assessments in 1998.

In 2003, the demand projections from the assessment were updated through 2025.

Based on the results of the assessment, the Water District Governing Board determined that water supply demands were not sustainable in Santa Rosa, Okaloosa, and Walton counties – where high concentrations of development began to predominate in those counties.

The Board directed staff to develop a regional water supply plan to include water resource development and water supply development components. This plan was first developed in 2001 and updated in 2006.

Thus, for the past 35 years, Florida has followed a long-term, statewide water management strategy, while Georgia has allowed for unbridled development with little to no thought of its increased water needs.

On the ACF water sharing issue, I have been an active advocate for Florida to receive our fair share of water.

By the same token, I believe the solution to the water problems in the ACF Basin should be solved by the three states, Alabama, Florida, and Georgia with appropriate oversight by the federal government.

I am very interested in the Congressional role to solve the water problems in the ACF basin.

In that regard, I believe that all parties involved use a transparent process to:

Use independent experts and knowledgeable local experts to determine the water flows that the river and the Apalachicola Bay need to maintain their vital productivity;

Set legal limits on water use within the tri-state basin (for example, cap the water use to ensure that the river flow requirements can be met);

Assess the water conservation potential among all users in the basin – agricultural, municipal, and industrial – and determine the most cost-effective investments and who will pay for them;

And embody these agreements in a durable, tri-state compact with strong enforcement mechanisms.

Also, fundamental inequities that currently exist between the states need to be corrected. For example, growth management in Florida requires those seeking building permits be able to demonstrate that sustainable fresh water already exists to support that new usage. Georgia does not require this as part of the new development process.

The recent ruling in the D.C. Court of Appeals that overturned an award of 750 million gallons per day for Atlanta needs to find immediate implementation in actions by the Corp of Engineers to modify the current Exceptional Drought Operations plan and release the increased amount of water downstream.

If Georgia seeks to get Municipal and Industrial Water Supply added as a Congressionally Authorized Use for the waters in Lake Lanier, then there should be another Congressionally Authorized Use added for the protection and preservation of the health, ecology, and productivity of the Apalachicola River, Flood Plain, and Estuary.

I also believe firmly that Congress should have close oversight over the Corps of Engineers' development of an updated Water Control Plan for the ACF system, including a comprehensive scope for the Environmental Impact Assessment.

The current Exceptional Drought Operation plan should be expanded to include consideration of alternative water supply sources for the Greater Atlanta Area other than the Chattahoochee.

Madam Chairwoman, I am very excited to have members of the Apalachicola River Riparian County Stakeholders Coalition in Washington, D.C., for this important hearing.

Kevin Begos, the Executive Director of the Franklin County Oyster and Seafood Task Force, and a member of the Apalachicola River Riparian County Stakeholders Coalition, will testify before the subcommittee.

Kevin is on the front lines of the water sharing issue, and I am confident that he will be a strong voice to speak for our interests before the subcommittee.

Kevin will be joined at the hearing by other members of the Riparian Coalition: Dave McLain of the Apalachicola Riverkeepers; Smokey Parrish with the Franklin County Commission; and Chad Taylor representing Jackson County on the Riparian Coalition.

Their combined expertise and insight on this issue will be invaluable.

Thank you again for holding this hearing and for inviting me to testify.

I stand ready to help you and the subcommittee in any way I can.

OPENING STATEMENT FOR THE HONORABLE RUSS CARNAHAN (MO-3)
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT

Hearing On:
Comprehensive Watershed Management and Planning: Drought-related Issues in the Southeastern United State
March 11, 2008

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Chairwoman Johnson and Ranking Member Boozman, thank you for holding this hearing on drought-related issues in the Southeastern United States. Additionally, I would like to thank our colleagues Congressman John Lewis, Congressman Allen Boyd, and Congressman Hank Johnson for joining us today to share their personal perspective.

We have long known about the importance of having a reliable water source for both industrial use and drinking supply. The drought in the Apalachicola-Chattahoochee-Flint basin, which has had a severe affect on the water supply of Alabama, Georgia, and Florida, has exemplified the need to update our water policy for the future. As we look at reforming our water policy we must look at all the factors that will increase the incidence of drought from growing metropolitan areas to global climate change. Global climate change places new pressure on our critical water resources, because as temperature increases so will the rate of evaporation of our lakes, rivers and reservoirs, which are all key water sources nationwide. Therefore global warming should be among the considerations as we look at long term concerns and solutions to preventing future droughts.

Again, I want to thank our Chairwoman and Ranking Member for holding this hearing and I look forward to hearing from our witnesses.

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STATEMENT OF
THE HONORABLE JERRY F. COSTELLO
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT
HEARING ON COMPREHENSIVE WATERSHED MANAGEMENT AND PLANNING: DROUGHT-RELATED ISSUES IN THE SOUTHEASTERN US
TUESDAY, MARCH 11, 2008 AT 10:00AM

Thank you, Madame Chairwoman, for holding this hearing on drought issues and planning in the southeastern United States.

When droughts occur, they have an enormous effect because of how vital water is to our lives. They produce economical, environmental, and social impacts – both positive and negative. Because a drought can occur anywhere at anytime, droughts often produce economic impacts exceeding $1 billion, with the costliest occurring in the Corn Belt, with crop losses exceeding $15 billion in 1988.

My understanding is there is nothing we can do to prevent a drought from occurring since it is linked to unpredictable weather conditions. However, federal agencies can play an important role in working with affected stakeholders to respond to drought

conditions and I am interested in hearing more from our witnesses on this point.

Again, I am pleased that this Subcommittee is exploring these issues. I welcome the witnesses here today, and look forward to their testimony.

CONGRESSMAN TERRY EVERETT (AL-02) TESTIMONY
SOUTHEASTERN U.S. WATER MANAGEMENT HEARING
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT OF THE HOUSE
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
MARCH 10, 2008

I would like to thank Chairwoman Johnson, Ranking Member Boozman, and the members of the Committee for allowing me the opportunity to address the Subcommittee on Water Resources and Environment today regarding the impact of droughts on our water systems and specifically the Apalachicola-Chattahoochee-Flint waterway otherwise known as the "ACF".

As my colleagues know, the Southeast has been experiencing extreme drought conditions. These conditions have resulted in significant losses in agriculture production, reduction of the availability of water for human consumption, the threatening of wildlife, reduction of electricity generation from hydropower and nuclear generators, and hindering navigation. Today, the Committee will be hearing from the Georgia Peanut Commission, which is a member of the Southern Peanut Farmers Federation, and a group that I have worked closely with on a variety of agriculture issues as a member of the House Committee on Agriculture. The Georgia Peanut Commission will talk about the impact of the drought on agriculture production and the need for irrigational farming.

The need for on-the-farm drought management has become increasingly evident as farmers and the government struggle to keep ahead of the effects of Mother Nature. A few years ago, I began to work on the concept of a cost-sharing program to assist farmers to build off-stream on-farm reservoirs. The current approach of providing ad hoc disaster assistance is inadequate and does not give farmers the certainty they need. Last year, I introduced H.R. 2088, the Farm Reservoir Act to create this cost-sharing program. Additionally, the Farm Reservoir Act is included as part of the Regional Water Enhancement Program in the House and Senate passed versions of the 2007 Farm Bill.

The Farm Reservoir Act would provide cost-share assistance to agricultural producers for the construction of small reservoirs on their farms. By combining sound planning with the right resources, agricultural producers can reduce the impact of droughts on their operations. Small on-farm storage reservoirs are an economical way to save water for summer use. The collection and storage of surface water during the off-season, when rainfall and stream levels are typically high, can make irrigation possible in areas where direct pumping from streams, lakes, or wells

during the growing season is not feasible. Especially in the Southeast, we receive large amounts of rain (even in years of severe drought), but it falls during non-planting winter seasons. A major portion of that rainfall is not captured and flows directly into the Gulf of Mexico. Therefore, the building of off-stream reservoirs would be able to capture this water to be used during the growing season. Because these reservoirs are small, the engineering and construction costs per acre-foot are less than big on-stream reservoirs. Additionally, they are more acceptable from an environmental perspective because they are off-stream and do not block streams or disturb riverine habitats. Without this program, farmers are becoming more attracted to irrigating their farmland from rivers and streams, which would place more stress on an already burdened water system. Therefore, my legislation would be environmentally friendly to systems such as the ACF.

The building of these reservoirs would not only assist farmers in mitigating their losses, but would reduce the need for financial assistance through crop insurance and disaster payments, and keep the cost of food low since more products would be able to be available to consumers. In addition to protecting our nation's farmers from the costly effects of drought, enhancing their irrigation capacity will allow our farmers to expand production to more acres and increase the productivity of existing acres. Cost-share assistance to construct small, environmentally-friendly reservoirs located on the farm will provide us with the tools necessary to grow additional bio-fuel crops and enable us to wean ourselves from foreign oil. This will reduce harmful greenhouse gas emissions by increasing the availability of the cleaner burning fuels these crops produce.

As I mentioned, the recent droughts have placed a significant burden on water systems like the ACF. The ACF flows through a portion of my district and provides many of the municipalities in Alabama their water supply, generation of electricity through hydropower and nuclear power, and navigation. As this Committee is aware, there is an ongoing difference of opinion among Alabama, Florida, and Georgia over the management of the ACF River Basin. This debate has been tied up in legal proceedings for over two decades and the recent droughts have only escalated the debate and legal actions. The disagreements have focused on various aspects of how the Corps is managing the system: allowing the City of Atlanta to take more water than allowed from Lake Lanier; the level of flow in the system and its impact on the three species that are protected by the Endangered Species Act that live in the system; and the lack of maintaining navigation in the Alabama portion of the system. I will not go into the details of all

of these arguments or the current status of these legal discussions. However, it is important to note that navigation, energy production, water use for human consumption, and recreational use of the system has significant economic importance of billions of dollars annually for the State of Alabama. The unvetted taking of water by the State of Georgia has been detrimental to the industries, businesses and communities down river that rely on this system.

Another impact stems from Florida's efforts in attempting to prevent the Corps from fulfilling the navigational priority of the system. Congress authorized and has repeatedly provided appropriations for the Corps of Engineers to operate and maintain the Apalachicola-Chattahoochee-Flint (ACF) River System for navigation. In recent years, the Corps has all but abandoned that mission. The Corps has disregarded explicit Congressional direction, but just as important, the Corps has failed the communities and businesses on the ACF in Alabama and Georgia by cutting off interstate commerce to those two states. As a result, on March 2, 2006, the Tri Rivers Waterway Development Association (Tri Rivers) filed a petition urging the Corps to exercise its federal authority to maintain the ACF Project pursuant to Sections 404(t) and 511(a) of the Clean Water Act. Tri Rivers urged the Corps to resume necessary dredging and snagging activities to keep the ACF navigable, notwithstanding the State of Florida's refusal to provide a state permit.

The Corps has yet to provide an adequate explanation for its repeated failure to maintain the ACF Project. For that reason, Tri Rivers recently again asked the Corps to respond to its 404(t) petition and renew its navigational maintenance responsibilities. In the meantime, the Corps has allowed a single downstream state to choke off commerce and economic development to the two upstream states. This is a serious hardship to communities such as Eufaula and Phenix City, Alabama, and Columbus and Bainbridge, Georgia. Additionally, it sets a troubling national precedent, which could be replicated wherever the Corps operates a multi-state navigation project. The Corps must explain its position of allowing Florida to impede its ability to maintain the Nation's waterways for navigation and provide for interstate commerce. Meanwhile, the Corps must get back to work on its operation and maintenance activities on the ACF Project.

Once again, I would like to thank the Committee for providing me this opportunity to share the impact of the ACF on my district and the need to reduce stress on water systems like the ACF. I believe the Farm Reservoir Act is a positive step in this direction. I hope that this hearing will enable Alabama, Georgia, Florida, the Corps of Engineers, and Department of

Interior to establish a workable agreement that addresses everyone's concerns. In addition to my testimony, I have included the September 22, 2007 New York Times Op-Ed piece that was written by Dr. Richard McNider and Dr. John F. Christy. Both professors are from the University of Alabama at Huntsville and have been looking at the idea of off-stream reservoirs to elevate the effects of droughts on agriculture production. Thank you.

TERRY EVERETT
MEMBER OF CONGRESS (AL-2)

OP-ED ARTICLE

September 22, 2007
OP-ED CONTRIBUTOR
Let the East Bloom Again
By RICHARD T. McNIDER and JOHN R. CHRISTY

Huntsville, Ala.

THE United States faces two major security challenges this century. Both involve water.

The increasing demand for water in the Western United States in an era of diminishing supply has put America's highly efficient agricultural system in jeopardy. At the same time, our nation's energy demands have led President Bush and Congressional leaders from both parties to call for more domestic production of biofuels like corn ethanol. Some agricultural experts fear that the country does not have enough water and land to both replace the declining agricultural production in the arid West and expand the production of biofuels.

There is, however, a sustainable solution: a return to using the land and water of the East, which dominated agriculture in the United States into the 20th century.

Until the middle of the 1900s, much of our country's food and fiber was produced east of the Mississippi River. Maine led the nation in potato production in 1940, and New York wasn't far behind. The South, including

Alabama, Georgia and Mississippi, dominated cotton. Large amounts of corn were grown in almost every state for consumption by the local livestock and poultry. Regional vegetable markets, especially in the mid-Atlantic states, served the population centers of the East.

By 1980, Western irrigation and improvements in transportation had largely destroyed this Eastern system of agriculture. Irrigated cotton in Arizona, California and Texas displaced the cotton economy of the Deep South. Idaho and Washington became the nation's major potato producers. Corn production became more concentrated in the Midwest.

Through irrigation, Western farmers were spared the occasional droughts that had plagued Eastern farmers, but the specialized Western system came with a price. Water projects dried up the area's rivers. Salmon runs disappeared. Soils were poisoned from the salt in irrigated water that is left behind after evaporation.

Returning agricultural production to the Eastern United States under irrigation would be efficient and environmentally sound. In the West, at least three to four feet of water per acre is needed every year to produce a good crop. In the East, only a few inches of irrigated water per acre are needed, because of the region's heavier rainfall. Even in a dry year for the East, about a foot of water per acre will suffice.

Because of the huge size of the rivers in the East and the small amount of water required for Eastern irrigation, only a tiny fraction of the water in Eastern rivers would be needed for farming. Right now, the Tennessee River, with twice the natural flow of the Colorado River, has less than 1 percent of its water consumed for all uses, while the Colorado is just a memory when it reaches Mexico.

Even if irrigation in the East were significantly expanded, the region's rivers would not be as depleted as the West's. Three percent of the Alabama River would support one million irrigated acres, compared with the nearly 30 percent of the Colorado River that is needed to irrigate a similar area.

In most years, the amount of water withdrawn and stored in the East would be imperceptible. Unlike the West, which requires gigantic reservoirs that take billions of dollars to build and years to fill, in the East water can be stored in inexpensive, off-stream storage ponds that do not require the damming of rivers.

Because of the wetter climate, irrigation in the East will not produce the water quantity or salt poisoning problems found in the West. But there are obstacles peculiar to the East that will need to be addressed. Heavy rains can erode tilled soils. The use of no-till farming in an irrigated setting, however, can preserve soil moisture and prevent erosion.

Runoff of fertilizer and chemicals can also be a problem. But with irrigation, fertilizer can be watered into the roots of crops before a big rain, which will reduce runoff.

And although the annual average stream flows in the East are large, they fall to critically low levels during the summer. Water for irrigation needs to be withdrawn during the winter, when billions of gallons run to the sea.

The East can help answer the challenge of increasing bioenergy and replacing food production in the face of declining agriculture in the West. But to realize the region's potential, the federal government will need to provide money to help farmers build storage ponds to catch winter water. Without a government role, Eastern farmers may decide instead to forgo storage ponds and irrigate on-demand from low-flow summer streams or from ground water. Neither strategy is sustainable or good for the environment.

The East cannot and should not simply replace Western agriculture, but the East should be prepared to pick up the slack as Western farmers lose water to urban pressures and environmental concerns. To remain profitable in the face of reduced water, farmers in the West will most likely gravitate from rice and cotton to high-value crops, like winter lettuce, almonds and avocados, that fill seasonal niches.

Based on an analysis of tree rings, the 20th century was the wettest century on record in parts of the West. Eastern vegetables may not be as perfect as those

grown under irrigation in a desert, but if the West returns to a drier climate, imperfect vegetables will look good indeed.

If the United States does not expand agriculture in the East, the nation's food production will move offshore, to developing countries that may not manage herbicides, pesticides and health safety as well as our country does.

By moving more of its agriculture into the East, the United States can show the world that irrigation can be done sustainably, by irrigating where water is plentiful.

Richard T. McNider and John R. Christy are professors of atmospheric science at the University of Alabama in Huntsville.

5 minute remarks
Transportation and Infrastructure Subcommittee on Water Resources & Environment

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- Mr. Chairman, thank you for holding this hearing on "Comprehensive Watershed Management and Planning: Drought-related Issues in the Southeastern United States". I look forward to hearing the testimony of the distinguished panel of witnesses and I thank you for your efforts.

- Thank you also for the opportunity to address the Subcommittee on Water Resources and the Environment on such an important issue for my state and my district.

- As you know, Georgia and much of the southeast is in the third year of what many are calling the worst drought in recorded history.

- The drought has arrived at a particularly poor time as the manuals directing how the water in the Alabama, Coosa, Tallapoosa and Apalachicola, Chattahoochee, Flint river basins is managed have not been updated in decades.

- The U.S. Army Corps of Engineers, charged with the difficult task of managing these two systems in normal years, was initially forced to manage this extraordinary drought without a plan and is now operating under an Interim Operating Plan which will expire in the coming months.

  Meanwhile, with the Governors of Alabama, Florida, and Georgia failing to reach an agreement on long term water use allocation, the people of Georgia and the entire region are becoming increasingly frustrated.

- It is clear, Mr. Chairman, that the complete failure to properly manage these river basins over the years has led directly to the situation we are currently in.

- It is deplorable that federal agencies and elected leaders have been unable to work together to ensure that millions of people across the southeast have adequate access to water for drinking, power generation, fishing, and recreation.

- Unfortunately, these are the facts, and there was no plan in place to deal with this drought when it arrived, further exacerbating the situation.

- Georgians now face very strict restrictions on water use and municipal water systems across the state are required to reduce their consumption by 10% or face steep fines which will then be passed on to already strapped ratepayers.

- Like my colleagues from the region, I am concerned about the impact that failure to reach a long term agreement will have on the economy of the southeast.

- Many small businesses, already squeezed by high gas prices, are now further squeezed by the water restrictions. Many larger businesses may decide not to locate in Georgia and the millions of people who are expected to move to the region may choose instead to relocate elsewhere.

- Faced with dramatic increases in their water bills and increasingly strict restrictions on how they can use their water, the people back home want a plan for managing this crisis, and a plan for preventing another similar crisis.

- Federal agencies and elected officials must continue to work towards both a long-term allocation of water as well as a short-term plan for managing this drought. It is unacceptable that negotiations have broken down while the people of this region grow increasingly worried.

- I, however, am very proud of the citizens of Georgia as they have shown a remarkable ability to come together and adapt.

- Georgians have met, and in many cases exceeded the Governors mandated 10% reduction in water use. This is a remarkable achievement for a State and a metropolitan area that is rapidly growing and shows the commitment to conservation that Georgians are making.

- This drought has woken many people up to the fact that Atlanta has a very tenuous supply of water. Conservation must be an integral part of any agreement on water allocation yet the region must also consider options for increasing the amount of storage capacity in order to accommodate the projected growth.

- I am hopeful that as a result of this hearing and others and the continued involvement of the Secretary of the Interior as well as the Congressional Delegations from Georgia, Alabama, and Florida, that a workable solution will soon be reached.

- Once again, I applaud the efforts of the Chairman and the members of this subcommittee and I thank you for the opportunity to be present here today.

Testimony before the Subcommittee on Water Resources and Environment

**"Comprehensive Watershed Management and Planning –
Drought Related Issues in the Southeastern US"**

**Tuesday, March 11, 2008
10:00 a.m.
Room 2167
Rayburn House Office Building
Washington, DC**

**Written Testimony of:
Congressman John Lewis**

I would first like to take this opportunity to thank my good friends and colleagues, Chairwoman Johnson and Ranking Member Boozman for agreeing to hold this important hearing.

Georgia is in crisis Madam Chairwoman and I want to tell you how much I appreciate your subcommittee's attention to this important matter. Georgia is going through a harsh drought. The lack of water has hurt the environment, hurt the local economy, and disrupted the lives of Georgia's citizens. I will continue to work with leaders in Atlanta, across Georgia, throughout the southeast and in Washington DC to protect our vital water supply. Water is the most essential resource that we have. Water is necessary to survive. If you don't have water you don't have much of anything.

What we have with today's hearing is an opportunity. An opportunity to share, on record and in the public eye, how our water is actually being distributed, why reserves in Lake Lanier continue to be depleted, and where negotiations between Alabama, Florida and Georgia went wrong. I am very disappointed that the Governors from these three states declined your invitation to appear here today and explain and discuss how after 5 months of negotiations, facilitated by the Secretary of Interior, discussions were allowed to collapse. The states play such a key role in these issues and the fact they would choose not to come here today and not to take this opportunity for dialogue is upsetting.

Today we lay out, for the public to see what is really going on, and how our most precious resource is being allocated. We have called the federal agencies who manage our water here today to testify. To explain to us how our water reserves have fallen to such a dangerous level. Yet we also have invited them here to ask the questions; are the resources of your agencies being utilized by the states? Are state, local, and federal agencies and officials working together to the fullest extent possible?" And finally to ask them, "what needs to change?"

One area - where change is long overdue – concerns the outdated water control manuals which govern the water released from Georgia's key reservoirs. These manuals are not meeting the needs of Georgia's citizens. It is unacceptable that such important plans are over 40 years old. Finally, after all these years, the Army Corps has begun the process of updating these important manuals for both the ACF and ACT river basins.

However, this process will take at least three years to complete. Unfortunately, allowing for another three years of mismanagement. This three year timetable does not take into account the politically motivated, obstructionist language, in the Energy and Water appropriations bill, that prohibits the updated manuals from being implemented. The time is now. We cannot afford to wait any longer. We need these changes.

It is clear that our water policy is fundamentally flawed. Our water policy is reactive. Water is too precious a resource not to have a long-term plan. Water management issues must be agreed upon before we face the type of crisis we are in today. The implementation of the new manuals by the Army Corps is a key component, but not enough. This will only change how Army Corps manages their own projects.

Madame Chairwoman, we need to take a step back. We need to see our water issues in the larger picture. We need a comprehensive watershed management study of the entire southeastern United States. The current piecemeal approach to watershed management does not work. I plan to introduce legislation today that would direct the Army Corps of Engineers to develop recommendations to address current and future water needs in the southeastern United States.

It is important to look at the water demands of Georgia, of Florida, of Alabama, as individual states and from the perspectives of the individual stakeholders. But this narrow-minded perspective it is not enough. Water transcends state borders and political boundaries.

We need to stop trying to find winners and losers and do what is right and what is necessary to work together. I hope this hearing serves as a new beginning in open and productive negotiations that bring everyone together to meet the long-term water needs of the entire southeastern United States.

I would like to close by saying: we all need to drink clean water, breathe fresh air, and eat safe food. These things are all necessary for us to live, and I believe that access to these vital components of human life is a sacred right that should not be violated.

Thank you.

1

Statement of Rep. Harry Mitchell
House Transportation and Infrastructure Committee
Subcommittee on Water Resources and Environment
3/11/08

--Thank you Madame Chairwoman.

--Arizona is no stranger to the pressures of rising population and prolonged drought.

--We are the fastest growing state in the union, and despite some helpful precipitation this winter, many portions of our state our still well into a second decade of drought.

2

--I look forward to today's hearing.

--I yield back.

Written Statement to the
House Subcommittee on Water Resources and the Environment

by Kevin Begos
Executive Director, Franklin County Oyster & Seafood Industry Task Force
and member of the Riparian County Stakeholder Coalition
P.O. Box 404, Apalachciola, FL 32329
(850) 653 3351

March 11, 2008

Madam Chair and Committee members, we'd like to thank you all for the opportunity to testify on this issue of great importance to the people, economy, and environment of North Florida. I'm speaking on behalf of the nearly 2,000 people who work in the Franklin County seafood industry and for the people who live and work in the six county region bordering the Apalachicola River.

Last May the amount of water coming from Georgia into the Apalachicola River faded to a trickle and stayed that way for nearly six months — the longest recorded period of low flows since record-keeping began in the early 1920s.

As the river water vanished, people and businesses began to suffer. The electric turbines that help supply the cities of Chattahoochee and Quincy fell silent and the electric bills of young and old began to spike. River and swamp levels in the upper Apalachicola ecosystem fell, so the water table did too, and the pumps used to irrigate crops were more costly to operate. The Tupelo trees that help make the world's sweetest honey delivered just half their normal bounty to beekeepers, and people started to catch saltwater fish five, 10, and then 30 miles upriver from Gulf of Mexico.

Then the lush aquatic grasses that normally cover the upper parts of Apalachicola Bay began to die off, leaving only barren sand and mud bottoms. The blue crabs disappeared, and fishermen pulled up pots mostly in vain.

The summer progressed and soon the effects of the low flows could be seen everywhere. The flounder and white shrimp catches crashed to historic lows, and entire oyster bars died off from the combined stress of lack of freshwater and a huge wave of predators that came in from the Gulf of Mexico due to the excessive salinity in the Bay.

Even the color of the water in the Bay changed. The entire ecosystem was impacted and at this time we still don't know the full extent of the damage because the drought isn't over.

Madam Chair, this is not a case of people vs. mussels. It is about finding a way for all the vital needs along the river to be fairly balanced — from cities to farms to seafood producers to the environment.

That principle of fairness in dealing with this nation's great rivers goes back to our first president and to the very foundations of our Constitution. In March of 1785 George Washington invited delegates from Maryland and Virginia to his home at Mount Vernon to resolve disputes over the Potomac River. The country was young and fragile, still without even a Constitution or president. Yet under Washington's guidance the Maryland/Virginia Compact became law and that success helped lay the groundwork for the Constitutional Convention of 1787, and for Congressional oversight of the system of fair and balanced interstate commerce that is the foundation of our economy even today. Congress has a role to play in this issue, and we appreciate that role. The U.S. Department of the Interior and other federal agencies do not have the only authority over water issues.

Madam Chair, the economy of Franklin County's seafood industry and many of our neighbors upstream rely on the Apalachicola River.

The river and its flood plain provide a myriad of recreational hunting and fishing opportunities used by generations of local residents. The river provides nutrients for one of the most productive estuaries in the northern hemisphere, and the Bay is a nursery for species from all over the Gulf of Mexico. Recreational fishermen, commercial fishermen, beekeepers, the timber industry, and the tourism industry all benefit from and depend on this natural chain.

The National Oceanic and Atmospheric Administration has designated 246,000 acres of the lower river and Bay as a National Estuarine Research Reserve, and the United Nations has also designated it as an International Biosphere Reserve, which draws visitors from all over the world.

Here are some details of what can happen when the system is disrupted. For generations shrimp fishing has been a cornerstone of our economy. Yet in 2007 the white shrimp harvest crashed by almost 90 percent compared to the 2000 to 2004 period, and the brown shrimp harvest declined by 65 percent, according to preliminary figures.

The proud owners of the small shrimp boats who have worked inshore waters for generations suffered mostly in silence, embarrassed that they could no longer provide for their families. Boats fell into disrepair and even sank at the dock, and shrimp houses fell silent, too, depriving many workers of paychecks.

The blue crab catch from the Bay in 2007 declined by about 70 percent from the previous year, and the flounder catch declined by about 30 percent.

I list these different species because these declines suggest how severe the impact of the drought was on the entire ecosystem. Even with different life cycles and feeding habits, all suffered.

Our oyster fishery was hit in two ways. When entire oyster bars died off during late summer and others failed to produce as they had in the past, virtually our whole fleet of oystermen focused on one area of the bay, threatening to wipe it out. And while the total harvest looked good, in fact the catch per boat declined as the drought progressed.

Though ample rainfall over the last three months has eased the pressure, any tri-state settlement that fails to take the needs of the entire system into account could doom our river, Bay and way of life by locking in low flows every year.

Oysters play a key role in maintaining our water quality since they are filter feeders. If our oyster beds die off, we'll head towards the same situation as Chesapeake Bay, where state and federal authorities have spent vast sums trying to repair the damage done to nature. The roughly 6,000 acres of oyster reef in Apalachicola Bay have an economic and habitat value of just over $21,000 per acre, or $130,680,000 in total. We say it makes moral and economic sense to protect what we have rather than to destroy and rebuild.

Since the late 1960s state, federal, and private groups have been purchasing uplands and wetlands in the Apalachicola River and Bay drainage basin to protect this unique and productive system. During this period approximately 261,928 acres have been purchased and put into public ownership and hundreds of millions of dollars have been spent, mostly by the state of Florida. The St. Vincent National Wildlife Refuge, a 12,358 acre barrier island, is located on the southwestern side of Apalachicola Bay and surrounded by some of the most productive oyster bars in the nation.

Madam Chair, here are two closing points. Much has been written and said about the disputes between these three states, but I would like to say that I'm honored to sit here with representatives from Georgia and Alabama.

My mother graduated from the University of Georgia. My uncle has spent his entire adult life in Huntsville, Ala., working for NASA. In fact, the people of North Florida have much in common with our neighbors in Georgia and Alabama. There are deep family, economic, cultural, and environmental ties. These river systems belong to us all, not to one.

In fact, many people from Georgia and Alabama visit our river and bay and even buy property in the area. So we say to the farmers and people of Atlanta: let's try to work together in a fair and open way to find a balanced solution based on science that meets your needs as well as ours.

Here are some specific recommendations we have to reach that goal:

That the federal government and states move away from closed door negotiations and start a transparent process with all interested parties to:

- Use independent experts and knowledgeable local experts to determine the water flows that the river and the Apalachicola Bay need to maintain their vital productivity;
- Set legal limits on water use within the tri-state basin (i.e. "cap" the water use to ensure that river flow requirements can be met);
- Assess the water conservation potential among all users in the basin — agricultural, municipal, and industrial — and determine the most cost-effective investments and who will pay for them; and
- Embody these agreements in a durable tri-state compact with strong enforcement mechanisms.
- Fundamental inequities that currently exist between the states need to be corrected. For example, growth management in Florida requires those seeking building permits be able to demonstrate that sustainable freshwater already exists to support that new usage. Georgia does not require this as part of the new development process.
- The recent ruling in the D.C. Court of Appeals that overturned an award of 750 mgd for Atlanta needs to find immediate implementation in actions by the Corps of Engineers to modify the current Exceptional Drought Operations plan and release the increased amount of water downstream.
- If the State of Georgia seeks to get Municipal and Industrial Water Supply added as a "Congressionally Authorized Use" for the waters in Lake Lanier, then there should be another "Congressionally Authorized Use" added for the "Protection and preservation of the health, ecology, and productivity of the Apalachicola River, Flood plain and Estuary."
- There needs to be close Congressional oversight of the Corps of Engineers development of an updated Water Control Plan (WCP) for the ACF system, including a comprehensive scope for the Environmental Impact Assessment. The number of water contracts between the Corps and M&I water users in the Greater Atlanta area approved since the last approved WCP must be individually justified and shown not to over-allocate the Chattahoochee.
- The current Exceptional Drought Operation plan should be expanded to include consideration of alternative water supply sources for the Greater Atlanta Area other than the Chattahoochee.
- The EPA requirements to handle Atlanta's inadequate and malfunctioning waste treatment systems by fine only must be corrected. EPA should not approve reducing the current flow requirement at the Peachtree Creek.

One final point, Madam Chair. Some have suggested that these water disputes are simply a matter of big vs. small, hinting that those areas with fewer people and less power must lose out.

That would set a disastrous precedent not only for our region, but the entire country. If some say that big must always win, that sets the stage for every minority to lose. That is not the American way. I mentioned our first president before, and I'll close with a nod to the sentiment about small places that Daniel Webster first expressed to the U.S. Supreme Court in 1818, which is still true today.

The cities of Apalachicola, Wewahitchka, Blountstown, and Chattahoochee are small places, yet there are those that love them.

The people and the environment of North Florida deserve to be treated as equals, and we thank you and this Committee for giving us that opportunity.

STATEMENT

OF

MR. TIM BURCH
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BEFORE THE
U.S. HOUSE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT

MARCH 11, 2008

Good Morning Mr. Chairman, members of the Subcommittee. My name is Tim Burch. I am a native of Baker County, Georgia which is located in the Southwest part of the State. We are part of the Flint River Basin. I have been a farmer for 33 years and live on the farms of grandparents'. I grow peanuts, cotton and raise beef cattle. I have served on the Georgia Farm Bureau advisory committees and have been a delegate to the National Cotton Council. I currently serve on the Executive Board of the Georgia Peanut Commission. I am also an elected Baker County Commissioner serving since 1993.

The extended drought in the Southeast has dramatically impacted agriculture. Irrigation systems which have become a necessity to produce crops continue to expand at a great expense to the operating costs of our businesses. Increases in energy costs have only made our drought problem worse. There is no indication that energy costs will diminish for the 2008 crop year.

Drought conditions in Georgia during 2007 were approximately $800 million according to the Center for Agribusiness and Economic Development at the University of Georgia. These losses came primarily from hay and pasture, cotton, peanuts and corn. The greatest losses were in pasture, approximately $265 million.

The Center estimates that the 2007 drought had a total economic output impact of $1.3 billion in losses. Output losses are the total sales that are lost to the Georgia economy due to these direct losses reported for each commodity.

My home county of Baker was one of the more severe drought counties in the State. Total peanut losses were $4,000,000 to S8,000,000. Cotton losses were $6,000,0000 to $11,000,000 . Total losses in Baker County were estimated by the Center to be between $10,000,000 and $20,000,000. This is a lot of money to take out of the economy of a small, sparsely populated rural county. Please note that Baker County has no manufacturing; only a few retailers and agriculture.

The water issues in Georgia have been much debated for many years. There are clear concerns for both urban and rural areas. There are two key areas I would like to emphasize this morning for agriculture. First, individual producers recognize the importance of water as a shared natural resource. Second, collectively, Georgia producers have participated in planning initiatives for water resources in our state and will continue to do so.

With regard to production agriculture, farmers are applying new water conservation methods such as conservation tillage and technologies for irrigation, such as the precision application of water. This latter method is so critical to

improving water use efficiency. The Flint River Soil and Water Conservation District recently testified before the House Agricultural Appropriations Subcommittee. The hearing focused on rural broadband issues. This may not appear on its face to be a concern that impacts water conservation but new technologies advanced by the University of Georgia allow for more irrigation efficiency using internet technologies. Without broadband, this new water conservation efficiency technology is of little value to Georgia producers. In addition to helping our rural kids compete with urban school systems, broadband technology will assist farmers in water conservation. Whether you produce cotton, corn or peanuts in the Southeast, irrigation will continue to expand or farmers will not be in business. We have to utilize the most efficient water conservation technologies possible to assure that we are not wasting this precious resource. Expanding rural broadband is a critical piece to this process.

The Senate version of the 2007 Farm Bill contains a new conservation rotation program. If this program survives the Farm Bill conference, we believe it will add to water stewardship. The program provides incentives to farmers to practice better crop rotations.

Flint River Soil and Water Conservation District estimates that since 2001, agricultural producers have saved over 13 billion gallons of water due to

groundwater conservation practices. This equates to the annual water use of 367,217 Georgia citizens. These savings were due to Irrigation Water Management (46%), Conservation Tillage (30%), Irrigation Reservoirs (14%), Soil Moisture Monitoring (6%) and Variable Rate Irrigation (4%).

With reference to our collective efforts in Georgia to resolve the water management issue, Georgia Farm Bureau Federation has taken the lead representing Georgia farmers in the State Water Plan development. Georgia farmers have supported augmenting our water supplies "through all reasonable means, including more reservoirs of various types, aquifer storage and recovery and desalination". The Water Plan has now passed the state legislature and become law. It establishes a framework for moving forward on Georgia's water issues. Georgia producers will continue to participate as the Plan evolves.

I appreciate the opportunity to testify today. We have very serious water issues in our state and the Southeast. As one segment of Georgia's economy, we are striving to use the best technologies and conservation practices available to protect our water resources. We are actively involved in the state water management planning. We encourage the Congress to provide as many tools as possible to help Southeastern producers use the best available processes for conserving water.

WRITTEN TESTIMONY OF
JOHN FELDT
NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

FOR AN OVERSIGHT HEARING ON "COMPREHENSIVE WATERSHED MANAGEMENT AND PLANNING: DROUGHT-RELATED ISSUES IN THE SOUTHEASTERN UNITED STATES"

BEFORE THE
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT
U.S. HOUSE OF REPRESENTATIVES

March 11, 2008

Good morning, Madam Chairwoman and members of the Committee, I am J. John Feldt of the National Oceanic and Atmospheric Administration's (NOAA's) National Weather Service. I am the Hydrologist-In-Charge of the Southeast River Forecast Center, located in Peachtree City, Georgia. Thank you for inviting me to discuss drought conditions in the southeastern United States and NOAA's role in coordinating and providing climate and drought information to federal agencies and states.

NOAA's vision is an informed society that uses a comprehensive understanding of the role of the oceans, coasts, and atmosphere in the global ecosystem to make the best social and economic decisions. NOAA pursues this vision through its mission to monitor, understand and predict changes in Earth's environment and conserve and manage coastal and marine resources to meet our nation's economic, social, and environmental needs. NOAA's weather and climate programs provide the nation with services and information to protect lives and property, and improve management of weather and climate sensitive sectors, such as energy, agriculture, water, and living resources through environmental observations, analyses and predictions, forecasts, and sustained user interaction. No region of the United States is immune to the impacts of drought. NOAA's weather and climate programs work to monitor conditions and provide forecasts to meet the nation's need for reliable and accurate drought information.

In my testimony today, I will first discuss the ongoing severe drought in the southeast. I will then focus on the new National Integrated Drought Information System (NIDIS), and the role NIDIS will play in coordinating and providing climate and drought information to help the Nation better prepare for, and respond to, the effects of drought. However, before I do so, I would like to define drought and touch on its impacts.

Defining Drought

In the most general sense, drought refers to a period of time when precipitation levels are abnormally low, impacting human activities and the environment. While there is no single definition of drought that meets all local needs, drought refers to a deficiency in long term average precipitation over a period of time resulting in a water shortage that has an adverse impact on the environment, agriculture, industry, recreation or domestic consumption. Scientists evaluate precipitation, temperature, soil moisture, ground water, and surface water data for the present and recent past to determine if water shortages exist. Drought is not a purely physical phenomenon, but is an interplay between water availability and the needs of humans and the environment. Drought is a normal, recurrent feature of climate. It can occur almost anywhere, although its features vary from region to region. Because droughts can have profound societal and environmental impacts, there are several definitions of drought, each correct in its use. These include meteorological drought, which is defined by the magnitude of precipitation departures below long-term average values for a season or longer; agricultural drought, which is defined as the soil moisture deficit that impacts crops, pastures, and rangelands; and hydrological drought, which is defined by significant impacts on water supplies. NOAA provides information on all three types of droughts in its U.S. drought information products.

Drought is a unique natural hazard. It is slow in onset, does not typically impact infrastructure directly, and its secondary effects, such as impacts on tourism, commodity markets, transportation, wildfires, insect epidemics, soil erosion, and hydropower, are frequently larger and longer lasting than the primary effects. Primary effects include water shortages and crop, livestock, and wildlife losses. Drought is estimated to result in average annual losses to all sectors of the economy of between $6 to 8 billion (in 2002 dollars; *Economic Statistics for NOAA*, April 2006, 5th edition). The costliest U.S. drought of the past forty years occurred in 1988 and caused more than $62 billion (in 2002 dollars) of economic losses (*Economic Statistics for NOAA*, April 2006, 5th edition). Although drought has not threatened the overall viability of U.S. agriculture, it does impose costs on regional and local agricultural economies. Severe wild fires and prolonged fire seasons are brought on by drought and strong winds. These raging fires, similar to the ones in California this past year, can cause billions of dollars in additional damages and fire suppression costs.

Drought in the Southeast

The southeast United States, including parts of Virginia, North and South Carolina, Tennessee, Georgia, Alabama, Mississippi and Florida, has been in the midst of a historic drought for the past two years. After receiving significant rainfall from an active hurricane season in 2005, drought conditions took hold across the southeast. Typically, there are two periods of the year that bring significant rainfall to the southeast. These include winter into early spring and then the tropical season. These time periods present the greatest chance for flooding, but also for recharging groundwater and reservoirs.

Below normal rainfall during the spring of 2006 was followed by a lack of land-falling hurricane/tropical storms for the area. The following spring (2007) also recorded well below average precipitation, followed by another inactive hurricane season across the southeast states.

As destructive as hurricanes and tropical storms can be, they are part of the climatology of the southeast that can bring beneficial rains to many areas. In addition to an inactive tropical season, excessive heat during the late summer months increased evaporation rates from the soils and from the ground.

Currently, some areas along the Gulf Coast of Alabama, Florida, and areas of south Georgia have received enough rainfall to result in some improvement of conditions. However, areas near the mountains of the Carolinas, Georgia, eastern Tennessee, and Alabama have not received enough rainfall to fill some of the major reservoirs. This month will be critical to "recharge" the water supplies in those areas.

The historic southeast U.S drought is nearing two years in duration. During any prolonged drought, the question on everyone's mind is "When will it end?" While the state of the science is never certain, there are two factors to consider: the typical length of a major drought and the prevailing climate signal.

A major southeast U.S. drought typically lasts from two to three years. If this drought lasts three years, we would not expect much improvement until at least this summer. From a climate signal standpoint, we have been in the midst of a moderate or strong La Niña episode since last fall. This type of climate signal typically produces dry weather over the southeastern United States. Climate models show a trend out of a La Niña and into neutral conditions late this spring or this summer. The recent U.S. Seasonal Drought Outlook (Feb-May 2008) predicts some improvement in southeast drought conditions.

NOAA's National Weather Service (NWS) has been providing information to key decision makers in support of drought management activities since the onset of the southeast drought. Throughout the duration of the drought, informed decisions had to be made with regard to the operation of local water facilities, management of federal and private reservoirs, and the determination of mandatory water conservation measures.

A number of new and innovative services have been developed to help meet the critical needs of drought management officials. NWS Weather Forecast Offices have been attending local and state drought management meetings and providing hydrometeorological support and forecast information.

My office, the Southeast River Forecast Center (SERFC), has been front and center in providing drought support services. Since the start of the drought, the SERFC has worked alongside the U.S. Army Corps of Engineers (USACE) and the U.S. Geological Survey in providing hydrometeorological analysis and support for reservoir operations. SERFC staff have provided briefings to USACE officials several times a month and have attended constituent on-site workshops and meetings.

The SERFC has also developed several new services, which provide critical information in direct support of drought operations for individual states, federal government agencies, the media, and the private sector. "Critical Water Watch" and "SERFC Journal" products are issued on a weekly to bi-weekly basis to convey technical information relating to critical water supply users.

The SERFC also issues a weekly "Water Resources Outlook," which is a 15-minute multi-media presentation where NOAA meteorologists and hydrologists provide expertise and forecast information to support decision makers in their efforts to manage the drought conditions. Hundreds of users view the Water Resources Outlook, including state and federal water managers, private reservoir operators, emergency managers, and a multitude of others involved in responding to this historic drought.

National Integrated Drought Information System (NIDIS)

I would now like to focus on a new effort NOAA is leading the development of to help the nation better prepare for and respond to the effects of drought: NIDIS. NIDIS will be a valuable resource to water users and decision makers in the southeast and elsewhere in the United States.

The *National Integrated Drought Information System Act of 2006* (Public Law 109-430) prescribes an approach for drought monitoring, forecasting, and early warning. Led by NOAA, this approach is being developed through the consolidation of physical/hydrological and socio-economic impacts data, engaging those affected by drought, integration of observing networks, development of a suite of drought decision support and simulation tools, and interactive delivery of standardized products through an internet portal. NIDIS is envisioned to be a dynamic and accessible drought risk information system that provides users with the capacity to determine the potential impacts of drought, and the decision support tools needed to better prepare for and mitigate the effects of drought.

In its 2000 report, National Drought Policy Commission (Commission) observed that the United States would benefit from the development of a national drought policy with preparedness as its core. The Commission laid out the characteristics of such a coordination and preparedness system that would increase the resilience of the nation and of local communities to drought. As requested in the 2004 Western Governors' Association Report, *Creating a Drought Early Warning System for the 21st Century: The National Integrated Drought Information System*, NIDIS is being designed to serve as an early warning system for drought and drought-related risks in the 21st century. With these guidelines in mind, the explicit goal of NIDIS is to enable society to respond to periods of short-term and sustained drought through improved monitoring, prediction, risk assessment, and communication.

Over the next five years, NIDIS will build on the successes of the U.S. Drought Monitor, Seasonal Outlooks, and other tools and products provided by NOAA to effect fuller coordination of relevant monitoring, forecasting, and impact assessment efforts at national, watershed, state, and local levels. NIDIS will provide a better understanding of how and why droughts affect society, the economy, and the environment, and will improve accessibility, dissemination, and use of early warning information for drought risk management. The goal is to close the gap between the information that is available and the information that is needed for proactive drought risk reduction. Federal monitoring and prediction programs are also working with universities, private institutions, and other non-federal entities to provide information needed for effective drought preparedness and mitigation.

NIDIS will provide more comprehensive and timely drought information and forecasts for many users to help mitigate drought-related impacts. For example, hydropower authorities will benefit from enhanced water supply forecasts that aim to incorporate improvements in monitoring soil moisture, precipitation, and temperature for snowpack conditions into forecasting efforts and drought information for water management decisions. Municipalities and state agencies will have improved drought information and forecasts when allocating both domestic and industrial water usage. Water resource managers will have access to more information when balancing irrigation water rights with the needs of wildlife. Purchasing decisions by ranchers for hay and other feed supplies will be enhanced through the use of drought information to identify areas of greatest demand and the potential for shortages. Farmers will be better positioned to make decisions on which crops to plant and when to plant them. Since drought information is used in allocating federal emergency drought relief, improvements in monitoring networks will also lead to more accurate assessments of drought and, as a result, emergency declaration decisions that better reach out to those communities in need of assistance. An example of a specific improvement in monitoring networks is the addition of soil moisture sensors to the climate reference network by NOAA/NIDIS. Also, in partnership with Department of Agriculture (USDA), priorities for snow cover/snow telemetry sites will be updated as need arises. The identification of monitoring gaps, primarily snow cover, soil moisture, stream gauge (U.S. Geological Survey), which are needed to improve the early warning systems, are to be identified in each NIDIS pilot program (i.e., test program for the design and implementation of early warning systems in selected locations). Cross-agencies partnerships to fill monitoring gaps will be developed.

A hallmark of NIDIS will be the provision of decision support tools coupled with the ability for users to report localized conditions. To this end, NIDIS will link multi-disciplinary observations from a number of sources to 'on-the-ground' conditions that will yield value-added information for agricultural, recreational, water management, commercial, and other sectors. Multi-disciplinary observations include land surface conditions (e.g. for fire/fuel risk and soil moisture), streamflow and precipitation observations, climate models, and sectoral and environmental impacts information (to identify potential high impact areas or sectors for different types of drought events). Also, impacts information (i.e, how drought is affecting a location, how similar/past droughts have affected the location) must be provided by NIDIS, as required in the NIDIS Act, the Western Governors Report, and decades of study on what information leads to effective early warning triggers for response.

The first step towards accomplishing these goals was to produce an implementation plan. With the results of deliberate and broad-based input from workshops held with federal, state, and local agencies, academic researchers, and other stakeholders, the NIDIS implementation plan was produced and published in June 2007. The NIDIS implementation plan outlines the governance structure, priorities, and operational requirements needed to meet the objectives of the program. To provide guidance on system implementation, technical working groups were formed to focus on five key components of NIDIS. These components are public awareness and education, engaging preparedness communities, integrated monitoring and forecasting, interdisciplinary research and applications, and the U.S. Drought Portal.

A lot of progress has been made since the NIDIS program was established. The NIDIS Drought Portal (www.drought.gov), launched in November 2007, is now online and operational, providing comprehensive information on emerging and ongoing droughts, and enhancing the nation's drought preparedness. Other current NIDIS activities include conducting the first national workshop to assess the status of drought early warning systems across the United States. A NIDIS southeast drought workshop will be held in Peachtree City, Georgia, in April 2008 to discuss drought early warning information systems for the southeast region.

While NOAA is the lead agency for NIDIS, NOAA works with numerous federal agencies, emergency managers and planners, state climatologists, and state and local governments, to obtain and use drought information. NOAA routinely disseminates drought forecast information via its NWS drought statements, and collaborates with state drought committees and the media to assure NOAA information is correctly understood and used. NOAA strives to provide an end-to-end seamless suite of drought forecasts, regional and local information, and interpretation via its Climate Prediction Center, six Regional Climate Centers, Regional Integrated Sciences and Assessments (RISA) including the Southeastern Climate Consortium, local NWS field offices and state climatologists. Efforts are underway to improve drought early warning systems including coordinating interagency drought monitoring, forecasting, and developing indicators and management triggers for societal benefit. The other major federal agencies involved in NIDIS are the Department of Interior, USDA, the National Aeronautic and Space Administration, the Department of Energy, the Department of Homeland Security, the Department of Transportation, the Army Corps of Engineers, the Environmental Protection Agency, and the National Science Foundation. There is significant leveraging of existing observing system infrastructure, data, and products produced by operating agencies, for example, stations of the NOAA National Weather Service Cooperative Observer Program, USDA Natural Resources Conservation Service SNOTEL (SNOpack TELemetry) network, Soil Climate Analysis Network, National Climate Data Center Climate Reference Network, and the United States Geological Survey streamflow and ground-water networks, as well as the USDA-Joint Agricultural Weather Facility and the USDA-Natural Resources Conservation Service/Water and Climate Center Weekly Report - Snowpack/Drought Monitor Update. NIDIS also provides a framework for coordinating the research agenda among these agencies.

The FY 2009 President's Budget requests $10.4 million within NOAA's budget request to support NIDIS and NOAA's efforts to monitor and forecast drought including an increase of $2.0 million to develop improved climate forecast products. This increase will support the development of new drought monitoring and prediction products and accelerate future improvements of NOAA's operational climate forecast and application products through the use of competitive grants.

Concluding Remarks

Madam Chairwoman, this concludes my testimony. I thank you for the opportunity to discuss drought conditions in the southeastern United States and NOAA's role in coordinating and providing climate and drought information to federal agencies and states. The topic of drought is critical given its economic and environmental impacts in the United States and the increasing

demand for drought information to help manage the demand for water. I would be happy to answer any questions you or other Members of the Committee may have.

TESTIMONY OF SAM D. HAMILTON, REGIONAL DIRECTOR, SOUTHEAST REGION, U.S. FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR, BEFORE THE HOUSE TRANSPORTATION AND INFRASTRUCTURE COMMITTEE, SUBCOMMITTEE ON WATER RESOURCES AND THE ENVIRONMENT REGARDING DROUGHT ISSUES IN THE SOUTHEAST
March 11, 2008

Madame Chairwoman, and Members of the Subcommittee, thank you for the opportunity to testify on behalf of the Department of the Interior regarding the impacts of the current drought in the Southeast. I am Sam Hamilton, Regional Director for the Southeast Region of the U.S. Fish and Wildlife Service, headquartered in Atlanta, Georgia. I am accompanied today by Jess Weaver, Regional Executive for the Southeast Region of the U.S. Geological Survey.

As you are aware, the Southeast is in the midst of an historic drought. Many reservoirs are at their lowest recorded elevations and several cities and towns support significantly higher populations and demand more water than they did during previous droughts. In 2007, parts of Georgia, Alabama, North Carolina, South Carolina and Tennessee had their lowest annual rainfall on record and stream flows in many areas have been at all time lows. While some forecasts for 2008 suggest that conditions may improve later this year, the situation today remains very serious.

Using information provided by the USGS, this statement provides a brief overview of the relevant hydrology in the region. It includes a discussion of the principal regional reservoirs and the various water uses and competing demands for water in the relevant river basins. The testimony concludes with a discussion of the Department's ongoing role in the region.

Overview of Apalachicola-Chattahoochee-Flint (ACF) River Basin

The ACF Basin covers 19,600 square miles extending from the Blue Ridge Mountains with free-flowing trout streams to the ecologically rich Apalachicola Bay in the Gulf of Mexico. The ACF Basin covers parts of the Blue Ridge, Piedmont, and Coastal Plain

with 74 percent of the basin lying within Georgia, 15 percent in Alabama, and 11 percent in Florida. The Apalachicola River is formed by the confluence of the Chattahoochee River (8,770 square miles, of which 70 percent is within Georgia) and the Flint River (8,460 square miles, which lies entirely within Georgia) at the border between Florida and the southwestern corner of Georgia. From its confluence, the Apalachicola River flows about 107 miles to the Gulf of Mexico. The ACF Basin receives an average annual precipitation of 55 inches and the average annual streamflow near the mouth of the river is 25,100 cubic feet per second (1978-2006 at Sumatra, Florida).

There are five Federal reservoirs in the ACF Basin: Lake Lanier, West Point Lake, Walter F. George Lake, George W. Andrews Lock and Dam, and Lake Seminole at Jim Woodruff Lock and Dam. In addition, 11 non-Federal Georgia Power projects are present within the ACF Basin.

In the context of severe droughts, which occurred in the early and late 1980s and from 1999-2002, conflicts have arisen between increased water demands for Atlanta in the upper part of the Basins and increased demands for irrigation in the lower portion of the ACF. Lake Lanier is the uppermost and largest reservoir in the ACF Basin.

Principal Reservoirs of the ACF Basin

Much of the recent attention regarding the ACF Basin has focused on storage water that remains in Lake Lanier. Lake Lanier is the principal source of water supply for the population of metropolitan Atlanta, which doubled in size between 1980 and 2000, and grew to more than 4.9 million people in 2005. Despite abundant average rainfall, no large rivers flow through metropolitan Atlanta because of its location in the headwaters of five major river basins. Additionally, ground-water sources supply less than 1.5 percent of metropolitan Atlanta's water needs because the region is underlain by crystalline rock aquifers that typically do not support high-yield wells.

Lake Lanier was formed by Buford Dam in 1956 as a Federal reservoir. Located at the headwaters of the ACF system, Lake Lanier comprises 62.5 percent of the storage in the system, but only 6 percent of the drainage basin. This means that because of its huge

storage capacity and relatively small drainage area, it takes longer to refill Lake Lanier than it does other lakes in the system. Operation of the network of reservoirs to provide downstream water is complicated by having the majority of storage located in the upper end of the basin. Lake Lanier must release adequate water to meet water quality and water supply requirements at Peachtree Creek. During extreme drought conditions when storage in the downstream reservoirs is depleted, operations must meet other flow requirements downstream.

West Point Lake was created by West Point Dam in 1974 and represents 17 percent of the ACF Basin storage. Lake Walter F. George was formed by Walter F. George Dam in 1963 and represents 14 percent of the ACF Basin storage. Releases from West Point Lake are critical to meet minimum flow requirements for Columbus, Georgia and for temperature reduction at the Plant Farley thermoelectric generating plant. Plant Farley, completed in 1970 (phase one) and 1977 (phase 2), has a capacity of 1,776 megawatts. This plant supplies more than 20 percent of the electric power used in the State of Alabama. Releases are also required at times to provide adequate depth for navigation.

Lake Seminole was completed in 1957 with the construction of Jim Woodruff Lock and Dam and represents 6 percent of the ACF Basin storage. Releases from Lake Seminole are required to maintain minimum flows established at the time of dam construction to support the Herbert Scholz thermoelectric generating plant, which was completed in 1953 and has a 92 megawatt generating capacity. Recently, additional minimum flow requirements were set to support threatened and endangered species of the Apalachicola River.

Competing Demands for Water in the ACF Basin

There are numerous competing demands for the waters of the ACF Basin, which provide water supply for several million people representing about 60 percent of the population of Georgia, about 8 percent of the population of Alabama, and about 1 percent of the population of Florida. The waters of the ACF irrigate more than 780,000 acres of farmland. The lower ACF Rivers are home to one threatened fish species, and two threatened and four endangered mussels. The rivers of the ACF are the source for about

59 public water suppliers and about 41 industrial plants, including about 7 thermoelectric power plants that collectively withdraw more than 100,000 gallons per day. Additionally, there are more than 80 ground-water withdrawal permits in the ACF Basin for public supply and industrial use. The flood control, navigation, and recreation benefits of the rivers and reservoirs of this system provide both intrinsic and economic values. At the mouth of the ACF Basin, Apalachicola Bay represents a significant oyster and shrimp fishery.

How Much Water is in the ACF Basin, and How Much Water is Used?

There are no simple answers to the questions of how much water is in the ACF Basin and how much water is used. Instead, the answers depend on the location in the river basin and on the year and season. Location is important because as one moves from upstream to downstream in a typical river setting, additions to streamflow from tributaries including ground-water contributions and subtractions of streamflow for consumptive use are cumulative, with increasing total amounts in the downstream direction. Time is important because streamflow and consumptive use can vary by hundreds of percent from year to year and from season to season at any given location; consumptive use typically is highest during drought periods and summer months when streamflow typically is low.

Surface-water use may be classified as consumptive when water is removed from a source and is not returned to the source for reuse immediately downstream. These consumptive amounts depend on several factors, particularly the type of water use, which varies from region to region. Streamflow during low-flow periods comes primarily from ground water and can be affected by ground-water pumping.

On an average annual basis, consumptive use from the metropolitan Atlanta area represents about 1 percent of average annual streamflow of Apalachicola at Woodruff Dam, which is less than the measurement errors for these data. However, water-supply planning must focus on the amount of streamflow in the upper Basin and not on flows in the Apalachicola River. For instance, in the extreme drought of 1999-2001, average monthly streamflow into Lake Lanier during the summer was not sufficient to meet all

downstream needs without significant reservoir level declines during those drought conditions. A USGS Fact Sheet (FS 2007-3034) indicates that cumulative consumptive use in the ACF Basin down to Lake Seminole represented about one-fourth of the streamflow leaving Lake Seminole in July 2000. This was the lowest documented July streamflow in the Apalachicola River leaving Lake Seminole since recordkeeping began there in 1929, although other months have had even lower streamflow. Extreme droughts are rare but recurring and are the focus of water management and planning.

Complicating Factors

The greatest changes in Basin hydrology in the past three decades have been driven by increased public supply demands associated with the Atlanta region and increased agricultural withdrawals in the southern portion of the Basin. During extreme, protracted droughts, Lake Lanier is the storage of last resort to meet minimum flow requirements throughout the system. Another complicating factor is the effect on streamflow from intensive ground-water withdrawals used for irrigation in the lower ACF Basin. The vast majority of the 780,000 irrigated acres in the ACF are supplied by center-pivot wells. The cumulative influence of these wells can change the direction of ground-water flow. Streams that would normally gain water from surrounding aquifers during low flow begin to lose water to these aquifers. These dynamics have been simulated as part of a recently completed study conducted by the USGS. Interbasin transfers represent another important complicating factor, particularly in the upper AFC Basin. Because the Atlanta region is spread across the headwaters of 5 major river basins, water withdrawn from one basin may supply users in other basins; similarly, wastewater supplied from one basin may be discharged across a major basin boundary into another basin.

Overview of Alabama-Coosa-Tallapoosa (ACT) River Basin

The Alabama, Coosa, and Tallapoosa Rivers flow southwestward from northwest Georgia to southwest Alabama, draining 22,800 square miles into Mobile Bay. Twenty-three percent of the drainage area is within Georgia and 77 percent is within Alabama. There are five Federal projects within the Basin – Carters Lake, Lake Allatoona, Robert F. Henry Lock and Dam, Millers Ferry Lock and Dam, and Claiborne Lock and Dam,

and 11 non-Federal Alabama Power projects. Federal projects compose 22 percent of the total water storage in the Basin. The five Federal reservoirs are operated and managed to serve multiple purposes. Average precipitation across the Basin is about 55 inches per year. There are 29 threatened and endangered aquatic species in the ACT Basin. The waters of the ACT are used to irrigate about 28,000 acres of farmland. The rivers of the ACT are the source for about 218 industrial and public permitted water suppliers; 155 in Alabama and 63 in Georgia (2001 data). These permits are required for users to withdraw more than 100,000 gallons per day. Additionally, there are numerous ground-water withdrawal permits in the ACT Basin for public supply and industrial use. The flood control, navigation, and recreation benefits of the rivers and reservoirs in this Basin provide enormous intrinsic and economic values.

The upper reservoirs in the ACT Basin have been discussed extensively with respect to interbasin transfers for supply to the Atlanta region. The two upper reservoirs in this Basin are Carters Lake and Lake Allatoona. Carters Lake was formed in 1974 by construction of Carters Dam and represents 5.7 percent of the Basin reservoir storage and 2.3 percent of the Basin drainage area. Lake Allatoona, impounded in 1950 by Allatoona Dam, represents 11.4 percent of the overall Basin storage and 4.9 percent of the Basin area.

Federal Role in the Apalachicola-Chattahoochee-Flint (ACF) River Basin

Water is a public resource governed by state governments, not Federal agencies. However, Federal agencies play an important cooperating role, and the Federal government has made significant investments in the construction and maintenance of reservoirs to meet multiple public use purposes. As noted above, in the ACF basin there are four large Federal reservoirs. One of the Department's roles, through the Service, is to advise Federal agencies with regard to their obligations under the Endangered Species Act.

In the ACF River basin, this means working closely with the U.S. Army Corps of Engineers, the states of Alabama, Florida and Georgia, and other partners to ensure the

threatened Gulf sturgeon and three species of endangered mussels – the Purple bankclimber, Fat threeridge and Chipola slabshell - are not jeopardized by any agency action. Collectively, we are working towards the recovery of these species, which require flowing water to survive.

Balancing the water needs of millions of people across three States is not easy, particularly during this extreme drought. The river system supplies water for many municipal and industrial purposes, including power generation, flood control, navigation, drinking water, agriculture, pollution dilution, fish and wildlife habitat, and recreation. It is important to understand that the Service is not putting the needs of fish and mussels ahead of the needs of people. Conserving aquatic species is a means to ensure the health of our rivers and streams, and mussels are the canary in the coal mine for our rivers - declines in native mussel populations indicate an emerging problem with the health of the river that could affect people.

The Service has been working with the Corps since the 1980s when drafting of revisions to the ACF Water Control Plan began. Shortly thereafter the "ACF Water Wars" ensued in several Federal courts. Throughout the era of the tri-state water compact in the 1990s, the Service provided assistance as additional data was collected and as the States negotiated water allocations. With the listing of the Gulf sturgeon as threatened in 1991 and the mussels as endangered in 1998 under the Endangered Species Act, the Service consulted with the Corps as it managed flows within the system.

In addition to our participation in these overarching negotiations, the Service is working proactively on the ground in the ACF basin to help communities meet their growing water demands. For example:

- In 2001, we provided $200,000 to agricultural producers in the Flint River basin to retrofit irrigation systems in order to conserve water;
- In 2004, we helped develop guidance for streamlining the review process for water supply reservoirs throughout Georgia;

- In 2005-2006, we helped develop a water supply plan protocol to assist municipalities with securing water supply while minimizing impacts to federally listed species north of Atlanta; and
- In 2006, we provided $130,000 to the State of Georgia to begin the planning process for the development of a habitat conservation plan for the lower Flint River basin which would help engage basin stakeholders, primarily agricultural users, in water conservation and mussel protection.
- For many years, we have been working in high priority areas throughout the basin on mussel surveys and monitoring. By entering into partnerships with communities, landowners, and local, State and Federal agencies, we continue to explore opportunities to restore and protect aquatic habitat.

Regardless of these and other proactive efforts to conserve species, in 2006, the basin experienced diminishing precipitation levels and the situation worsened in 2007. Without rainfall, the Corps had to adjust its operations to meet the multiple purposes of the reservoirs, the needs of fish and wildlife, and the needs of basin stakeholders.

To address potential effects of reservoir operations, the Corps developed the Interim Operating Plan (IOP) in 2006, and the Service formally consulted on this plan. While some mussels could be affected by the IOP, we concluded that the 2006 IOP was not enough to avoid jeopardy to the species' continued existence. Measures to avoid and minimize harm to the species were recommended and accepted by the Corps.

As the drought worsened, the Corps and the Service agreed to several adjustments to the IOP in October 2007, to help maintain water in reservoir storage. The Corps then formally amended the IOP on November 1, 2007, producing the Exceptional Drought Operations (EDO) plan to increase opportunities to store water during rain events. Knowing that extreme drought was continuing, and given our close working relationship with the Corps, the Service marshaled a large team to collect additional data, complete the needed analyses, and complete formal consultation on the EDO in only 15 days, a process that typically takes up to 135 days.

Today we continue to work closely with the Corps, the States, and other Federal agencies to enhance flexibility in water management on the ACF, while considering the needs of fish and wildlife resources. Most recently, we have been supporting Secretary Kempthorne and his staff as they assist the States in negotiating a water sharing agreement for the ACF.

Drought Throughout the Southeast

Of course, the ACF basin is just one of the stressed river systems throughout the Southeast. In addition to working with Alabama, Florida, and Georgia, we are working with partners in North Carolina, South Carolina, and Tennessee as they wrestle with assessing and understanding the ongoing and future impacts of drought. For example:

- We are actively working with the Corps, the Federal Energy Regulatory Commission, and Alabama Power Company in the Alabama-Coosa-Tallapoosa (ACT) River Basin to address the impact of operational changes on listed species.
- We are working with six States most deeply affected by the current drought (AL, FL, GA, NC, SC and TN) to develop a drought contingency plan for freshwater mussels. The plan will guide decision-making with regard to appropriate actions that should be carried out in the event of extreme drought conditions. Contingency planning will identify a monitoring network of specific actions to be taken, expected consequences of these actions, and triggers for initiating actions and expectations regarding evaluation of any actions that are implemented.
- In Tennessee, we worked with the Tennessee Valley Authority (TVA) when they reduced flows at Normandy Dam on the Duck River in October 2007. The Duck River supports significant populations of three federally listed mussel species. In February 2008, we developed a plan with TVA and the state of Tennessee to further reduce flows from Normandy Reservoir in order to conserve water for future needs of humans and mussels if the drought continues.
- In South Carolina and North Carolina, we are working with key partners on strategies to save a number of mussel species. We have also initiated emergency rescue operations for one species, the federally endangered Carolina heelsplitter, of which only 10 small populations remain.

- In North Carolina, we are working with the Corps and other partners to manage reservoir levels and river flows in the Raleigh area.
- In Florida's Everglades, we are working with many partners including the South Florida Water Management District, local governments, and the Corps to manage the significant drought challenges currently found throughout the entire ecosystem. Lake Okeechobee, known as the liquid heart of the Everglades, is facing record low water levels that are expected to drop even further as the dry season continues. We are working together to strike a balance that meets south Florida's water needs, protects important habitat such as the Arthur R. Marshall Loxahatchee National Wildlife Refuge, and conserves species including the snail kite, a highly endangered bird.

Information Needs

The Department is seriously committed to working with states affected by drought now and in the future. The drought has highlighted data gaps and information needs that, if filled, would facilitate future decision-making for the Service and our State and Federal partners. For example, for the ACF we have created a list of projects that would increase our understanding of river hydrology and the habitat needs of sturgeon and mussels; implement key habitat restoration efforts; and provide incentives to private landowners to conserve water. We are developing similar lists of information needs for the ACT and other basins.

The drought has also highlighted existing areas of work that are crucial for understanding water shortages. For example, USGS stream gauges throughout these river systems have been important monitoring tools over the course of the drought. Data resulting from this program is basic to our ability to understand changing hydrology and manage these river systems.

While we need information to make decisions, partnerships with key water users and education efforts that encourage the public to conserve water are also needed. Water may soon become a limiting factor for growth and development in many areas of the

southeast. While we cannot produce more rain, we can all do more to maximize the use of the precipitation that the Southeast receives to best meet the needs of all water users.

Conclusion

The Department and its State and Federal partners have been working proactively for many years to implement solutions that balance the many uses of these systems, including meeting the water needs of people, while at the same time conserving species. Maintaining healthy river systems is critically important to the economy and natural environment of the Southeastern United States. The drought has taught us that more needs to be done to keep these systems healthy for generations to come. These lessons are particularly important in light of climate change predictions, which suggest more intense droughts, sea level rise and increased temperatures in the Southeast. The Department is committed to help states find practicable and balanced solutions, based on the realities of Mother Nature, to manage their water supplies.

Madame Chairwoman, thank you for the opportunity to testify today. This concludes my prepared remarks, and I would be happy to respond to any questions that Members may have.

Selected References

U.S. Army Corps of Engineers, 2004, Extended unimpaired flow report, January 1994–December 2001, for the ACT/ACF River Basins, 34 p.

Fanning, J.L., 2003, Water use in Georgia by county for 2000 and water-use trends for 1980 – 2000: Georgia Department of Natural Resources Information Circular 106, 176 p., also online at *http://ga.water.usgs.gov/pubs/other/ggs-ic106/.*

Jones, L.E., and Torak, L.J., 2006, Simulated effects of seasonal ground-water pumpage for irrigation on hydrologic conditions in the Lower Apalachicola– Chattahoochee–Flint River Basin, southwestern Georgia and parts of Alabama and Florida, 1999 –2002: U.S. Geological Survey Scientific Investigations Report 2006-5234, 83 p., Web-only publication available at *http://pubs.usgs.gov/sir/2006/5234/.*

Landers, M.N. and Painter, J.A., 2007, How Much Water Is in the Apalachicola, Chattahoochee, and Flint Rivers, and How Much Is Used?, USGS Fact Sheet 2007-3034, 4 P.

Torak, L.J., and McDowell, R.J., 1996, Ground-Water Resources of the Lower Apalachicola-Chattahoochee-Flint River Basin in parts of Alabama, Florida, and Georgia—Subarea 4 of the Apalachicola-Chattahoochee-Flint and Alabama-Coosa-Tallapoosa River Basins, USGS Open-File Report 95-321, 145 p., available online at http://pubs.usgs.gov/of/1995/ofr95321/

EIS LINK: http://www.sam.usace.army.mil/pd/actacfeis/

Testimony before the Subcommittee on Water Resources and Environment

"Comprehensive Watershed Management and Planning –
Drought Related Issues in the Southeastern US"

Tuesday, March 11, 2008
10:00 a.m.
Room 2167
Rayburn House Office Building
Washington, DC

Written Testimony of:
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Complete Statement
of
Robert J. Hunter
Commissioner of the Department of Watershed Management
City of Atlanta

before

The Subcommittee on Water Resources and Environment
Committee on Transportation and Infrastructure
United States House of Representatives

on

Comprehensive Watershed Management and Planning –
Drought Related Issues in the Southeastern US

March 11, 2008

I. Opening

Madam Chair and Distinguished Members of the Subcommittee:

Thank you for the opportunity to testify before you on the issue of Comprehensive Watershed Management and Planning – Drought Related Issues in the Southeastern US. I am testifying today in my capacity as Commissioner of the Department of Watershed Management for the City of Atlanta, Georgia (the "Department"). The Department was formed in 2002 to administer all water-related services and functions within the City of Atlanta and certain surrounding areas, including the operation of water treatment and distribution systems, wastewater collection and treatment services, and stormwater management. In my capacity as Commissioner of the Department, I am responsible for ensuring that the City of Atlanta complies with all federal and state regulations regarding water resource management; identifying potential environmental issues and developing strategies to effectively respond; ensuring the city officials are aware of proposed environmental standards, trends and technologies; and providing engineering reviews and design and construction management services on capital improvement projects.

The Southeastern United States is currently experiencing a drought of record proportions. Unfortunately, the effects of these drought conditions on the Federal reservoirs and those who depend upon them have been exacerbated by management decisions driven by litigation rather than sound science or resource management.

II. Geography

Before proceeding, I will provide a brief overview of the geography of the Apalachicola-Chattahoochee-Flint (ACF) River Basin, which is essential to understanding the controversy.

The entire metropolitan area, including the City of Atlanta, depends on two federal reservoirs for water supply. The City of Atlanta and most other localities depend on Lake Lanier, which is located on the Chattahoochee River approximately 50 miles north of the city. The Chattahoochee River rises in the Blue Ridge Mountains in northeastern Georgia and flows through Atlanta to the southwest until it turns south and forms, at its western bank, the border between Georgia and Alabama.[1] The river joins the Flint River at Lake Seminole at the Florida border. Upon crossing into Florida, the river becomes the Apalachicola River and empties into the Apalachicola Bay in the Gulf of Mexico (see Figure 1).

Figure 1.

[1] Although the Chattahoochee River forms the eastern border between Alabama and Georgia for part of its length (from West Point south to Florida), the bed and both banks of the river lie entirely within the State of Georgia under the terms of the articles of agreement and cession between the United States and Georgia, dated April 24, 1802 (the "1802 Cession"). Ga. Laws 1802, p. 48 (Appendix A). The 1802 Cession is the document by which Georgia ceded its unsettled lands west of the Chattahoochee River, including what is now the State of Alabama, to the United States. The United States Supreme Court has held that this negotiated agreement was worded specifically to ensure that Georgia would retain control over the Chattahoochee. *See Howard v. Ingersoll*, 54 U.S. 381, 418 (1851) (explaining that reference to the "western bank" of the Chattahoochee, as opposed to the river itself, showed that "Georgia meant to retain the river to the Western bank, and the United States conceded it."); *see also Alabama v. Georgia,* 64 U.S. 505 (1859).

The United States Army Corps of Engineers operates five reservoirs on the Chattahoochee River, of which Lake Lanier, with 1,087,600 acre-feet of storage, is the largest by far. Notwithstanding its size, Lake Lanier is a headwaters reservoir that controls just 9% of the total flow of the basin above the Florida line.[2] The small ratio of drainage area to storage volume in Lake Lanier means that, once depleted, it takes a very long time for this reservoir to refill.

Lake Lanier is the primary source of drinking water for the metropolitan Atlanta area, as it was intended to be. Indeed, the Corps stated on numerous occasions—including in its testimony before Congress seeking authorization for the project—that the need to ensure an adequate water supply for metro Atlanta was one of the "principal" and "primary" purposes of Lake Lanier. Other authorized purposes, in addition to water supply, include flood control, hydroelectric power generation, navigation and recreation.[3]

Some systems (Gwinnett County and the City of Gainesville) withdraw water directly from the reservoir, while others (the City of Atlanta, Atlanta-Fulton County Water Resources Commission, DeKalb County and Cobb County-Marietta Water Authority) withdraw water from the Chattahoochee River below the dam. Although these systems do not take water directly out Lake Lanier, we do rely on the reservoir to maintain sufficient flows in the Chattahoochee River to cover our intakes.

Water systems in the metropolitan area depend almost exclusively surface water from the federal reservoirs, as opposed to groundwater, due to the unavailability of sufficiently high-yielding wells. Given the geology of the area, we do not have access to any large aquifer such as the Floridan Aquifer that is available to users in the lower part of the basin.

III. Current Drought Conditions and Projections

The ACF Basin is currently in the grips of one of the most severe droughts on record. The drought has caused record low flows throughout the ACF River Basin, but it is the management plan implemented by the Corps that has been the real disaster.

The operating plan that caused this crisis is the "Interim Operations Plan for Jim Woodruff Lock and Dam," (the "IOP"). The IOP was hurriedly adopted in March 2006, without proper analysis and without following procedures required by law, in response to litigation threatened by the State of Florida.

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[2]The percentage stated above is for the portion of the ACF Basin *above* the Florida line. Florida receives substantial additional inflow from tributaries to the Apalachicola River that come in *below* the state line. Florida receives 100% of the waters of these tributaries (an additional 4,500 cfs on average) in addition to the vast majority of the flow of the Chattahoochee and Flint Rivers.

[3] *See* 33 C.F.R. § 222.5 (listing the authorized purposes of Lake Lanier and other reservoirs); *see also* "Q&A," Exhibit A.

As many parties protested when the IOP was first adopted, this operating plan is not sustainable because it requires large releases from reservoir storage to meet artificially high minimum flows at the Florida line *without ever allowing the reservoirs to refill.* In budgetary terms, the IOP draws heavily on savings (water stored in reservoirs) during the summer and fall, when river flows are naturally low, without allowing savings to be replenished in the spring, when river flows are naturally high. This is like running a deficit year after year without ever allowing a surplus. This unsustainable plan nearly emptied the federal reservoirs and threw the system into crisis in 2007.

Although the nominal purpose of the IOP is to protect threatened and endangered species that inhabit the Apalachicola River (the threatened Gulf sturgeon, three species of threatened and endangered mussels—the threatened purple bankclimber and Chipola slabshell and the endangered fat threeridge), the plan was developed and implemented before the Corps or the United States Fish and Wildlife Service (USFWS) had collected sufficient information to understand the needs of these species. Moreover, because the plan was adopted and implemented without sufficient analysis to determine whether operations under the IOP could be sustained through a record drought such as we are currently experiencing, the plan has proved to be disastrous for all users, including the federally-protected species.

As a result of the IOP, conservation storage in Lake Lanier was very nearly exhausted in the Fall of 2007. Although conditions in the basin have improved over the past couple of months, such that lower reservoirs have completely filled, it will take a much longer time to refill Lake Lanier because its drainage area is so small. Lanier is currently eighteen feet below full pool, which is a record low for this time of the year. This eighteen-foot deficit represents over 600,000 acre-feet of water—an amount well in excess of the volume of water consumed by the entire metropolitan Atlanta area over a 3-year period.[4]

So what emptied Lake Lanier? The IOP. From May to November 2007, the water delivered from the federal reservoirs on the Chattahoochee River to the Apalachicola River amounted to 220% of the river's natural, "unimpaired flow"—i.e., the flow that would have been experienced if there were no reservoirs and no depletions anywhere in the ACF River Basin—during that same time period.

The situation is critical. Empty reservoirs are dangerous, especially given the prospect of a multi-year drought. The low level of storage places the security of the water supply for 4.5 million people at great risk. It also places the environment downstream at great risk. We have all seen the media coverage of last year's water crisis. The fact is that Lake Lanier water levels are currently 13 feet lower than they were this time last year. If drought conditions persist this summer and if Lanier has not refilled by June 1, the result could be devastating to the entire ACF Basin.

[4] Average annual consumptive use for the entire metropolitan area is approximately 250 cfs.

IV. Metro Atlanta's water use is not the problem in the ACF.

Downstream water users cite metro Atlanta's water use as the cause of the ACF tri-state water crisis. Farmers believe there would be more water in the basin for their crops were it not for metro Atlanta; fishermen in Florida believe their livelihood is threatened because of metro Atlanta's demands for water. But these claims are not supported by the facts.

The fact is that metro Atlanta uses 1% of the annual water volume in the ACF basin during normal years and just 2% even during extreme drought. In other words, if metro Atlanta did not withdraw a single drop of water, flows at the Georgia-Florida border would improve, at best, by a mere 2%.

This is a function of the geography detailed above. Because Lake Lanier controls only 9% of the total flow of the basin above the Florida line, 91% is geographically inaccessible to the metro area. Therefore our *maximum* impact on the system—the impact that would result if the area consumed 100% of the water that passes through Lake Lanier without returning anything to the system—would be to reduce the flow of the Apalachicola River by just 9%. In reality, of course, we use only a fraction of the flow that is actually accessible to us, and we return the majority of the water withdrawn. That is why our total impact is on the order of just 1 to 2%.

Furthermore, Metro Atlanta is not even biggest user in the ACF Basin. Consider the following:

- Depletions to the Flint River due to agricultural irrigation in South Georgia average approximately 268 mgd (415 cfs), which is about 66% more than metro Atlanta's net water consumption. Total agricultural withdrawals for irrigation are even higher. The number cited above is the total depletion of surface waters in the Flint River due to the combination of surface and groundwater withdrawals.

- Metro Atlanta's net water withdrawal is 162 million gallons per day (mgd) or 250 cubic feet per second (cfs).

- Evaporation from the mainstem reservoirs alone causes depletions of approximately 135 mgd (209 cfs).

- The State of Florida has authorized a large interbasin transfer from the lower Chipola River, a tributary to the Apalachicola River, to the town of Port St. Joe. The Florida Department of Environmental Protection has stated that the withdrawal varies monthly but can reach a monthly high of 126 cfs. Therefore, it appears the very small town of Port St. Joe is diverting about half as much water from the ACF River Basin (and from the Apalachicola Bay) as is used by the entire Atlanta metropolitan area combined, representing 72% of the total population of the basin. *See* Florida DEP, *See* 2005 *Water Quality Assessment Report for the Apalachicola-Chipola* at 31 & 94. Florida DEP has acknowledged that the water diverted to Port St. Joe "is transferred out of the basin and could affect salinity levels in the Apalachicola Bay." *Id.*

V. Water conservation by all users in the ACF Basin is crucial to protect our precious water resources.

In order to protect our precious water resources, all users in the ACF Basin must practice conservation--that includes municipal, industrial and agricultural users.

That said, conservation has different effects and is important for different reasons for different users within the basin. For example, water conservation within the metropolitan Atlanta area has a negligible impact on river flows at the Florida line. As has already been explained above, if the entire metropolitan area ceased to use water altogether, flows at the Florida line would increase by only 1 to 2%. Nonetheless, conservation in the metropolitan area is vitally important to protecting the water supply of the metropolitan area. As has been stated above, Lake Lanier controls only 9% of the flow of the ACF Basin above the Florida line while providing water supply for 72% of the population of the entire basin. We cannot expect to meet existing and future demands without practicing best-in-class conservation. Therefore the metropolitan Area is strongly motivated and fully committed to conservation even though we understand that our efforts will have no perceptible benefit to the Apalachicola River.

A. Metro Atlanta Recognizes the Need to Adopt Aggressive Conservation Measures

Metro Atlanta is doing its part and making significant progress in water conservation efforts. Sixteen counties, 98 cities and 61 water systems are working within the Metropolitan North Georgia Water Planning District to develop and implement a water conservation program that is projected to help conserve 138 million gallons a day by 2030. This plan, developed in 2003 through the District, has been approved by the Georgia Environmental Projection Division and adopted by local governments.

All jurisdictions in the District are committed to implementing the top ten water conservation measures that have been identified for water savings and cost effectiveness:

- Conservation pricing (the more you use, the more you pay). Ninety-eight percent of the water district's population is subject to increasing or tiered rates.
- Replacement of old toilets.
- Reduction of water system leaks.
- Rain sensor shut-offs for irrigation systems.
- Pre-rinse spray valves for commercial restaurants and food service operations.
- Sub-unit meters in new multi-family buildings.
- Residential water audits.
- Low-flow retrofit kits.
- Commercial water audits.

- Education and outreach.

Metro Atlanta has had mandatory conservation measures for more than two years on the local, state, water district and federal level. Federal and district requirements alone are projected to reduce water withdrawals by 20% when fully implemented.

The State of Georgia displayed foresight and leadership by enacting in 2004 a drought management plan that authorized the state to impose restrictions on outdoor water use during times of drought. Under this plan outdoor water use is restricted to three days per week during non-drought periods. In drought, the State has the authority to further reduce outdoor water use. In October 2007, during the severe drought, the State imposed an ban on virtually all outdoor water use in the northern third of Georgia. In addition, the Governor mandated a 10% reduction in withdrawals for all water utilities and other permit holders in North Georgia. Those measures have recently been revised to authorize local governments to allow some limited outdoor water use.

With regard to the City of Atlanta specifically, Mayor Shirley Franklin and the City Council have been very aggressive in promoting conservation and protection of our water resources. For example, the City of Atlanta has opted to maintain in force the ban on virtually all outdoor water use, because of the imperative that Lake Lanier be allowed to refill. In addition:

- In 2004, Atlanta committed $1 billion toward water system improvements, an unmandated expenditure. With that $1 billion, the city is replacing water mains and meters, and identifying and repairing leaks in the system.

- In 2004, Atlanta began using conservation pricing for its water/sewer bills, rewarding those who use less water.

- Atlanta is in the first year of a three-year, $35 million project to replace its 148,000 water meters with Automated Meter Reading technology, which will reduce leaks, allow meters to be read remotely, and ensure accurate billing.

- In November 2006, Atlanta was billing 158,960 accounts for a total of 662 gallons per day per account. In October 2007, those numbers were 183,405 accounts using 537 gallons per day per account, a reduction of 129 gallons per account, or 19.4%.

- The projected result of the district's conservation plan is to reduce daily average per capita use by 15.6%, from 180 gallons per day to 162 gallons per day.

- Between 2000 and 2006 the City of Atlanta added 9% more water customers but was nevertheless able to reduce water consumption by 5.2% over that same period.

- The City of Atlanta has replaced 55 miles of old pipes with new water mains. We are moving from design to construction of several additional water main projects with an estimated construction cost in excess of $325 million. The City is repairing more than 800 leaks per month to our water distribution system, which saved over 55 million gallons of water in 2007. We have also purchased and are converting a quarry to a

new drinking water reservoir that will provide 1.8 billion gallons of storage and increase our ability to effectively manage our water resources.

Individual business within the metropolitan area are doing their part as well. For example:

- The Georgia Aquarium has increased water efficiency and will reduce its water demands by more than 20% in 2008. For example, through the installation of waterless urinals and a system to recapture condensation from cooling units, the Georgia Aquarium will in excess of 2.5 million gallons of water in this year alone. In addition, Georgia Aquarium staff have extensively refined the aquatic animal Life Support Systems and processes, saving millions of gallons of water per year without compromising the effectiveness of the systems to support aquatic life.

- Hotels in the Metropolitan Atlanta area have reduced water consumption per occupied room by 50%. This has been achieved, at significant expense, through actions such as the installation of laundry water recycling systems and low-flow fixtures in rooms and public facilities, the replacement of water-cooled equipment with air-cooled equipment, closing water-dependent amenities, and actively encouraging water conservation by hotel guests and employees.

- Delta Airlines has invested millions of dollars in its water conservation effort and is committed to being a leader in water conservation and water quality issues. As a direct result of this commitment, the company has implemented a water saving and recycling program at its Technical Operations Center that resulted in a savings of more than 150 million gallons per year (gpy), cut its water use in its plating shop by more than 55% at a savings of approximately 14 million gpy, and installed automatic metering devices on aircraft water tanks, resulting in a savings of nearly 3 million gpy.

While metro Atlanta has made progress in water conservation and will continue to make progress, it is incumbent that ALL users in the basin adopt conservation measures aimed at reducing water usage over time. Metro Atlanta is doing its part, but we must all play a role.

B. Agricultural Users Must Adopt Reasonable Conservation Measures As Well

No discussion of water management in the ACF would be complete would be complete without a discussion of agricultural withdrawals and their effects on the flow of the Flint River. Although most agricultural withdrawals in the ACF are from groundwater, these withdrawals reduce baseflow into the tributaries of the Flint River and thus have a major impact on surface water levels. Agricultural withdrawals in Southwest Georgia, Southeast Alabama and Northwest Florida are largely unregulated. These withdrawals have a major impact on the operation of the system.

According to the 2006 Flint River Basin Regional Water Development and Conservation Plan ("FRP Plan") adopted by Georgia Environmental Protection Division ("EPD"), as much as 250 mgd (357 cfs) may be withdrawn for irrigation from surface waters during peak irrigation months. FRB Plan at 15. Groundwater withdrawals also have a major impact on stream flows,

reducing stream levels by as much as 257 mgd (398 cfs) at peak season. Therefore, according to the data in this plan, the total impact on stream flows during the peak irrigation months is in the range of 507 mgd (786 cfs). The average annual impact therefore appears to be in the range of 268 mgd (415 cfs).[5] In contrast, the average annual consumptive use for the entire metropolitan Atlanta area is just 161 mgd (250 cfs).

The situation with agriculture raises an important question about the authorized purposes of Lake Lanier and the other federal reservoirs. Although the federal reservoirs on the Chattahoochee are not authorized to support irrigation, they are in fact being used to support irrigation in the Flint River Basin to a large degree. This is a direct result of the Corps' decision to operate the Chattahoochee reservoirs to meet a single minimum flow target at the Chattahoochee gage in the Apalachicola River. Because the flow at this point is made up of the combined flow of the Flint River and the Chattahoochee River, for any depletion of the Flint River an equivalent amount must be supplied from the Chattahoochee River to meet the minimum flow requirement. Thus, by agreeing to meet a single minimum flow regardless of the flow of the Flint River, the Corps has, in effect, agreed to use reservoir storage to supplement any reduction in flows caused by agricultural withdrawals in the Flint River Basin. This unauthorized use of the federal reservoirs is having a significant impact on other authorized purposes and on the system as a whole.

C. The Corps Must Also Adopt Reasonable Conservation Measures

Although we recognize that water conservation is essential, the fact is that we cannot conserve our way out of the current crisis. The amount of water that can be saved through conservation pales in comparison to the amount that is continuing to be wasted through improper reservoir operations. It is literally a drop in the bucket.

From the standpoint of Corps operations, the Corps needs to conserve storage to the maximum extent possible. The Corps also needs to draw on its expertise to manage the system wisely. This is especially critical now, given the extreme drought conditions, but it is not happening.

1. Over-releases

For example, the highest priority at this time should be to refill Lake Lanier by minimizing reservoir releases to the maximum extent possible. No water should be released from the reservoir unless it is being released to meet a specific need, such as a specific instream flow requirement. Water can be retained in the reservoir at this point in time without any impact to downstream interests because basin inflows below Lake Lanier are high enough to meet instream flow requirements, the downstream reservoirs are currently full, and the flow of the Apalachicola River has been well above 20,000 cfs for months. Notwithstanding this relative abundance in the lower part of the basin, the Corps is currently making excess releases from Lake Lanier on the order of 400-500 cfs per day for no purpose. The average daily consumptive use for the entire metro area is just 250 cfs, so the amount of water that is being wasted each day is roughly *twice* the total amount of water the entire metropolitan Atlanta area consumes in a day.

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[5] See *Streamflow Depletions in the Flint River Basin Caused by Irrigation Pumping from the Floridan Aquifer in Drought Years*, Exhibit B.

In the last three months alone, over-releases from Lake Lanier have wasted approximately 17,000 acre-feet, which equates to 0.56 feet of elevation at current elevations. The water that has been wasted could have been used to sustain the needs of the metro area for an additional 34 days if extreme drought conditions persist. Alternatively, the water could have been used to increase the flow of the Apalachicola River by 250 cfs for the same period of time during the summer or fall, when the river flows are much lower and the additional water would actually do some good. Neither option is available now, however, because the water has already been released at a time when there is more than enough water downstream.

Stated differently, the amount of water wasted through over-releases from Lake Lanier over a two-week period (approximately 13,000 acre-feet) can erase the gains in storage achieved at great hardship and economic cost by having the entire metro area reduce its water demand by 10% for 100 days.[6]

2. The Corps Needs To Grant the State of Georgia's Request to Reduce the Flow Target Below Lake Lanier From 750 cfs to 550 cfs.

On a related point, the State of Georgia recently petitioned the Corps to reduce releases from Lake Lanier to the extent such releases are intended to meet the existing 750 cfs flow target below Atlanta. Although the State's petition indicates that it might be appropriate to continue the reduced release through the rest of the calendar year, the immediate request is to reduce the release from now until April 30. This should have been granted immediately.

First, the Corps has granted similar requests during prior droughts.

Second, given the specific circumstances that justify this request, each day that passes constitutes a missed opportunity to conserve a significant amount of water. By our estimates, reducing the 750 cfs target will conserve approximately 20,000 acre-feet of storage between now and April 30. These savings can likely be achieved without any significant impact to the downstream reservoirs, which are currently full, but they can only be achieved if the target is reduced immediately.

Third, the 750 cfs target was originally established by Georgia EPD to protect water quality in the Chattahoochee River and because Georgia EPD has determined that 550 cfs will suffice through April 30. The 750 cfs minimum flow requirement was set by Georgia EPD (with oversight from US EPA) to meet the water quality standard for dissolved oxygen, which is not an

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[6] This calculation assumes an over-release of approximately 500 cfs, which is the actual amount of the over-release for the past ten days. It also assumes an average annual gross withdrawal for the metropolitan area in the amount of 420 mgd (~650 cfs), which is the actual amount for 2006. Note that net withdrawals are much lower (~250 cfs) because most of the water that is withdrawn from storage used is returned to the system. The amount of storage in Lake Lanier could be saved by reducing gross withdrawals across the board by 10% would therefore be approximately 65 cfs per day, but the impact on stream flows in the lower Chattahoochee would be closer to 25 cfs (10% of the net consumptive use) than to 65 cfs (10% of the gross withdrawal).

issue at cooler temperatures. Instead of second-guessing agencies responsible for the water quality standards, the Corps should defer to them by immediately granting the request.

VI. Recommendations for Reservoir Operations

We recommend that the Corps adopt a three-step recovery plan for Lake Lanier and for the entire ACF reservoir system. The first step is to adopt an emergency recovery plan to weather the current crisis. The second step is to replace the IOP with a better, more sensible plan to ensure we do not repeat the mistakes of 2006-2007. The third step, for the longer term, is to adopt a comprehensive water control plan for the ACF Basin that is based on facts and sound science.

A. Continue the Emergency Operations Plan Until All of the Reservoirs Refill

The Corps took the first step on November 15, 2007 by adopting a recovery plan known as the Exceptional Drought Operations Plan (EDO). The EDO suspends restrictions in the IOP that prevent the reservoirs from refilling. The EDO also reduces the minimum flow requirement for the Apalachicola River to more reasonable levels.

As proposed by the Corps, the EDO would be a permanent feature of the IOP that would be triggered whenever reservoir storage is depleted to certain levels and would remain in effect until the reservoirs have recovered. The United States Fish and Wildlife Service (USFWS) has only approved the EDO through June 1, 2008. Therefore, if the EDO is not extended, there is a good chance that operations will revert back to the unsustainable IOP on June 1 *even if Lake Lanier has not yet recovered.* This would be disastrous indeed. Therefore it is essential to continue the EDO beyond June 1.

In addition, the "trigger" for determining when normal operations should resume (i.e., when operations under the EDO should cease) needs to be changed. Currently the IOP is triggered when the "composite storage" reaches "composite zone 2." Composite storage is a measure of the total amount of water in storage in all of the reservoirs. This measure is flawed because it is possible for composite storage to be relatively high even when storage in Lake Lanier is relatively low. In February 2008, for example, the lower reservoirs were full—and "composite storage" was approaching composite Zone 2—while Lake Lanier was still in its lowest zone. The EDO should be continued at least until *each reservoir* is in zone 2.

B. The Corps Should Adopt a New Interim Plan to Replace the IOP After the Reservoirs Have Recovered

The IOP should be replaced with a new *sustainable* operating plan. This cannot wait for the development of a long-term plan. Under no circumstances should operations revert to the IOP.

The combined effect of the IOP and the EDO is to keep the reservoirs in the lower zones for an extended period of time. The reservoirs might not empty, thanks to the emergency relief provided to the EDO, but the IOP will take effect to prevent them from refilling before they are ever allowed to completely refill. This type of plan will not benefit anybody.

C. New water control plans based on facts and sound science must be adopted by the Corps for the ACF reservoirs.

In the longer term, we need a comprehensive new water control plan based on facts and sound science. One major cause of the interstate controversy is the fact that the Corps has failed to follow its own rules that require the preparation of water control plans and manual for each of its projects. 33 C.F.R. § 222.5(f)(1). Currently no plan is in place for any of the reservoirs in the Chattahoochee River.

The Corps has been operating from a "draft" water control plan since 1989, but the "draft" was officially withdrawn in 1992 as a result of legal challenges. The Corps has now been operating from the "draft" plan for so long that the draft itself is woefully out of date.

To be fair, the Corps has been trying to update the water control plans for many years but has been prevented from doing so by our downstream neighbors. Notwithstanding the fact that Alabama and Florida have both filed lawsuits purporting to compel the initiation of this process, they have worked behind the scenes to prevent this from happening. This is one reason the Corps was not prepared to deal with the present crisis when it hit.

The City of Atlanta and the other metro-area Water Supply Providers strongly support the Corps' current initiative to update water control plans for the ACF Basin. We support this effort because we know the facts will show that our use of the resource is *not* the cause of the present crisis. To the contrary, ACF basin has sufficient water to meet the reasonable demands of all users—including towns and cities, power generation, farmers and fishermen and endangered species—if the reservoirs are managed properly.

We know this can be done because we have already found a way to do it. On January 10, 2007, the water supply providers submitted a proposal to the Corps which we call the "Maximum Sustainable Release Rule." Our proposal is attached as Exhibit C and a summary explanation is attached as Exhibit D. Our analysis shows that the alternative we propose would be better for *all parties*, including the endangered species that inhabit the Apalachicola River.

Although many parties have expressed an interest in this plan, the Corps has yet to give it any serious consideration. The Corps should be encouraged to study this and other alternatives as it develops the new water control plans for the ACF Reservoirs. The Corps should also be encouraged to collaborate with its stakeholders, including the City of Atlanta, instead of excluding them from the discussion. We and the other metro-area water providers stand ready to cooperate with the Corps and with the other stakeholders to find creative, constructive solutions to this long-standing controversy.

VII. Thank you and Closing

Madam Chair, thank you for allowing me to provide testimony on this important issue. Much has been said about the tri-state water wars in the Southeast. Yet we all know that 20 years of litigation have not produced a workable solution. We don't need wars, what we need is cooperative, responsible stewardship of the regions water resources for all users. The implementation of sound, science-based, sustainable operating plans is the essential first step in moving to a future of sound, regional water resource management. I look forward to working

with you in the future as you continue to discuss ways to address our local, regional and water resource management, supply and infrastructure needs.

EXHIBIT A

Q&A re Authorized Purposes of Buford Dam
Lewis B. Jones, King & Spalding LLP
March 11, 2008

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ANSWERS

1. Questions about the authorized purposes for Buford Dam

1.1. What are the authorized purposes of Buford Dam and Lake Lanier?

The authorized project purposes for the reservoir are: flood control; hydroelectric power generation, navigation, recreation, water quality, water supply, and, fish and wildlife conservation.

1.2. Does any official document specifically enumerate the "authorized purpose" of Buford Dam? If so, what does it say?

Short Answer: The Corps' official position regarding the authorized and operating purposes of its projects is set forth in the Code of Federal Regulations at 33 C.F.R. § 222.5. This regulation identifies "municipal and industrial water supply" as one of the "authorized" and "operating" purposes of Lake Lanier.

Long Answer:

Neither the authorizing legislation nor the documents referenced by the authorizing legislation enumerate specific "authorized purposes." In fact, this terminology was not even used by the Corps in 1946 when Buford Dam was authorized by Congress.

However, the Corps' official regulations enumerate the "authorized" and "operating" purposes for each and every one of its reservoirs. **This regulation identifies "Municipal and/or Industrial Water Supply" as a "Project Purpose" of Buford Dam and Lake Lanier.** *See* 33 C.F.R. § 222.5.

The Corps promulgated these regulations response to a congressional mandate. Section 311 of the Water Resources Development Act of 1990, Pub. L. No. 101-640 ("WRDA 1990"), directed the Secretary of the Army to "conduct a study of the operations of reservoir projects which are under the jurisdiction of the Secretary (1) to identify the purposes for which each such project is authorized; and (2) to identify the purposes for which each such project is being operated." The report—*Authorized and Operating Purposes of Corps of Engineers Reservoirs* (First Printing July 1992, *Second Printing* (with revisions not related to Buford Dam) November 1994)—was issued in 1992. The 1992/1994 Report specifically distinguishes "authorized purposes" from "incidental purposes." The report identifies "water supply" as an "authorized purpose" of Buford Dam based on the original authorizing legislation. See id. at E-74. The report is the basis of the information published in the Code of Federal Regulations.

1.3. What does the authorizing legislation say about the purposes of the project?

Short Answer: Nothing.

Long Answer:

Buford Dam and Lake Lanier. Buford Dam and Lake Lanier were authorized by the Rivers and Harbors Act of 1945 (PL 79-14,) as amended by Section 1 of the Rivers and Harbors Act of 1946 (P.L. 79-525). This legislation does not, however, provide any details about the project or its authorized purposes.

Both bills were omnibus bills in which Congress "adopted" and "authorized" certain water projects "to be prosecuted under the direction of the Secretary of War and supervision of the Chief of Engineers, in accordance with the plans and subject to the conditions recommended by the Chief of Engineers in the respective reports herein designated." 60 Stat. 634. The list of authorized projects included certain works within the Apalachicola Chattahoochee Flint ("ACF") River Basin, including the Buford Project, which were to be prosecuted in accordance with "the report of the Chief of Engineers, dated May 13, 1946." (JA0834).

1.4. What do the "project documents" referenced in the authorizing legislation say about the authorized purposes of Buford Dam?

Short Answer: The say that water supply for the Atlanta area was one of the purposes of the project.

Long Answer:

The Rivers and Harbors Act of 1946 authorized Lake Lanier/Buford Dam to be constructed in accordance with "the report of the Chief of Engineers, dated May 13, 1946." The report of the Chief of Engineers, which Congress approved, is a 7-page report generally recommending approval of a study prepared by the Division Engineer. *See* H.R. Doc. No. 80-300 (1947). With respect to Buford Dam, the Chief of Engineers noted that "**[t]he city of Atlanta and local interests in that area urge that a reservoir be constructed above Atlanta to meet a threatened shortage of water for municipal and industrial purposes.**" *See* Chief of Engineers' Report ¶ 9. The Chief of Engineers further explained that the Division Engineer had proposed construction of just such a dam: specifically, that he had proposed construction of the Buford Reservoir on the Chattahoochee River that would, among other things, "**assure an adequate supply of water for municipal and industrial purposes in the Atlanta metropolitan area**." *See* Chief of Engineers' Report ¶ 11(d). Finally, the Chief of Engineers generally recommended that the previously-authorized plan for the development of the ACF basin "be modified to provide for construction of Buford multiple-purpose reservoir . . . in accordance with the plans of the Division Engineer." Chief of Engineer's Report ¶ 16.

The Chief of Engineers, in turn, recommended approval of a "Survey Report" prepared by the Division Engineer. The Survey Report explains the recommended plan of development together with its expected benefits.

1.5. What did the "survey report" approved by the Chief of Engineers say about the authorized purposes of Buford Dam?

Short Answer: that the proposed project would provide "assured water supply for the city of Atlanta."

Long Answer:

The 1946 "Survey Report" by the Division Engineer is an extensive document that explored all aspects of the planned developments for the Chattahoochee River. Despite the breadth of its focus, the Survey Report discussed the water supply needs of metropolitan Atlanta in some detail. *See* Division Engineer's Survey ¶¶ 79-80, *reprinted in* H.R. Doc. No. 80-300 (1947) at 34.[1]

Paragraph 79 of the Survey Report provided estimates of the region's present and projected future water supply demands. Paragraph 80 described how Buford Dam might operate to meet these demands. To meet the area's then "present needs," the Division Engineer recommended that the dam release up to 600 cfs for withdrawal near Atlanta. *See id.* ¶ 80. The Survey Report had already explained, however, that the area's projected future demands for municipal and industrial water supply would reach 800 cfs by the year 1965. *See id.* ¶ 79. Thus, the Division Engineer suggested that adjustments to the 600 cfs maximum release would probably have to be made in the future to accommodate increasing demand as the area developed. *See id.*

The Division Engineer also considered the trade-off between the need to make such adjustments and the impact on hydropower. He first noted that a small off-peak generator could be installed to capture the energy that would otherwise be lost by virtue of water supply releases. *See id.* He also noted, however, that increases in water supply releases in the future would impinge somewhat on power returns from the dam. *See id.* He did not view this as a problem. Instead, he noted that such adjustments would not materially affect returns from the dam and would not affect downstream power benefits at all. *See id.* In any event, the Division Engineer concluded that **"the benefits to the Atlanta area from an assured water supply for the city and the Georgia Power Company's steam plant downstream would outweigh any slight decrease in system power value."** *See id.*

1.6. What did the Army Corps of Engineers tell Congress about the purposes of the project when it requested authorization for it?

Short Answer: That "water for the City of Atlanta" was one purpose of the project.

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[1] The Division Engineer's Survey was reprinted, along with the recommendation of the Chief of Engineers, in H.R. Doc. No. 80-300 (1947). Note, however, that House Document 80-300 was complied in 1947, after the vote on authorization. For this reason, it includes documents from both before and after the vote on authorization.

Long Answer:

When asked about the authorized purposes of the Buford Project, the Corps specifically stated that it was a multiple-purpose project that would provide "water for the city of Atlanta":

> Q: Is this a power project mainly?
>
> A: Colonel Feringa: This is basically a multiple-purpose project. **** [T]here is proposed a multiple purpose dam at the Buford site which would provide power; **also water for the city of Atlanta....**"

Hearings on Rivers and Harbors Bill (May 3, 1946). This exchange is the only instance during the pre-authorization hearing that the authorized purposes of Buford Dam were discussed.

1.7. What did the Army Corps of Engineers tell the State of Georgia about the purposes of the project when it requested the State's support for the project?

Short Answer: The Corps of Engineers told Governor Arnall that the project for which it sought authorization would "ensure adequate municipal and industrial water supply for the Atlanta metropolitan area."

Long Answer: In its consultation with the Governor of the State of Georgia prior to submitting its recommendation to Congress, the Corps stated the Buford Project would "ensure adequate municipal and industrial water supply for the Atlanta metropolitan area." Specifically, the Corps told Governor Arnall that it was recommending ...

> [T]hat a multi-purpose reservoir be provided on the Chattahoochee River at the Buford site, about 45 miles above Atlanta, to regulate the stream flow for navigation below Columbus and for the economical operation of the existing and proposed power plants downstream, **to ensure adequate municipal and industrial water supply for the Atlanta metropolitan area**, and to reduce flood stages and damages in the valley below.

See Letter of Ellis Arnall, Governor of the State of Georgia to Chief of Corps Engineers (April 29, 1946).[2]

---

[2] Governor Arnall's letter pre-dates the report of the Chief of Engineers, which was issued on May 13, 1946. The State's comments were based on the survey prepared by the Division Engineer.

Note that Congress specifically directed the Corps to consult with the State before submitting any plans, proposals or reports to Congress. *See* Pub. L. No. 79-14 (1945) § (a). Congress directed the Corps to consult with the State because it recognized the "interests and rights of the states in the development of the watersheds within their boundaries." *See id.* For this reason, the Corps "traditionally defers to the adverse view of a Governor on a proposed project located in his or her state." *See* EP 1165-2-1 ¶ 3-3 ("Opposition by a State") (July 30, 1999). *See also* Pub. L. No. 79-14 (1945) § (a). If the Corps were to recommend a project over a Governor's objection, the Governor's opposition would have to be fully documented and submitted to Congress. *See id. See also* Pub. L. No. 79-14 (1945) § 2. Therefore it is highly significant that the Corps described the project as a water supply project in its communications with Governor Arnall.

1.8. What did the Army Corps of Engineers tell the public when it requested support for this project prior to its authorization?

Short Answer: That the proposed project would "ensure an adequate municipal and industrial waters supply for the Atlanta metropolitan area."

Long Answer: The public notice stated the following about Buford Dam:

> "[T]he report recommends ... that a multiple purpose reservoir be provided on the Chattahoochee River at the Buford site ... to regulate the stream flow for navigation below Columbus and for the economical operation of the existing and proposed power plants downstream, **to ensure an adequate municipal and industrial water supply for the Atlanta metropolitan area**, and to reduce flood stages and damages ..."

Public Notice (March 30, 1946)

1.9. What did the Corps say about the purposes of the Buford Project in the "Definite Project Report"—the report that was the basis of congressional appropriations for Buford Dam?

Short Answer: that water supply was one of the "principal" and "primary" purposes of the project that Congress authorized.

Long Answer:

The Definite Project Report for Buford Dam describes the authorized purposes of the project in two places, both of which include "water supply for Atlanta":

> "In addition to flood control discussed above, the **primary purposes** of the Buford project are production of hydroelectric power, increased flow for navigation in the Apalachicola river and an **increased water supply for Atlanta**."

Definite Project Report at 34 (1949).

> "As previously stated, the principal purposes of the Buford project are: to provide flood control; to generate hydroelectric power; to increase the flow for open-river navigation; and to assure a sufficient supply of water for Atlanta."

Definite Project Report at 41 (1949).

2. Questions about the litigation

2.1. Has the authority issue been presented to any court?

The authority issue is presented in several pending cases, but it has never been decided by any court. Specifically, the issue is pending in *Georgia v. United States Army Corps of Engineers*, 3:07-cv-251 (M.D. Fla.) and *Alabama v. United States Army Corps of Engineers,* 3:07-cv-249 (M.D. Fla.). It is also a peripheral issue in *Southeastern Federal Power Customers v. Caldera*, Appeal No. 06-5080, which is currently pending before the United States Court of Appeals for the District of Columbia.

2.2. Has any court issued a decision regarding the authorized purposes of Buford Dam?

No.

The issue is directly presented in *Georgia I* and was partially briefed to the court in 2001. Briefing was interrupted, however, when the court decided to stay proceedings to avoid any conflict with proceedings in the *Alabama* case.

After Georgia raised the authority issue in *Georgia I*, the Alabama and Florida amended their pleadings in the *Alabama* case to allege that water supply is *not* an authorized purpose of Lake Lanier. There have been no substantive proceedings no these claims in the *Alabama* case, however.

2.3. Does the decision of the United States Court of Appeals for the D.C. Circuit (Southeastern Federal Power Customers v. Geren) invalidating the Settlement Agreement for Lake Lanier mean that water supply is not an authorized purpose of Lake Lanier?

No. The issue was not directly presented in the *SeFPC* appeal and the court specifically declined to address it.

The *SeFPC* appeal related to a settlement agreement between the Water Supply Providers, the Southeastern Federal Power Customers ("SeFPC"), the United States and Georgia. The settlement agreement provided for the execution of interim contracts between the Corps and the Water Supply Providers to secure water supply

storage space in Lake Lanier. Alabama and Florida challenged the Corps' authority to enter into this agreement and the D.C. Circuit sustained this challenge.

The court's decision, however, is strictly limited to the authorization provided by the Water Supply Act of 1958 (the "WSA"). There are two potential sources of authority for the Corps' water supply operations—the WSA is one, and the original authorization for the project under the Rivers and Harbors Act of 1946 is the other. The settling parties disagree about the original authorization. Therefore, for settling purposes only, the settling parties agreed to rely exclusively on the WSA in constructing and defending the settlement agreement.

The WSA provides general authority for the Corps to include water supply storage in all of its projects subject to certain constraints. The authority provided by the WSA is limited to projects that do not severely impact other project purposes or require a "major operational change." These constraints do not apply to projects that were originally authorized for water supply.

The *SeFPC* court determined that the settlement agreement could not be authorized under the WSA because the agreement would require a "major operational change." Although we disagree with this holding, it does not have any bearing on the authority provided by the original authorizing legislation. Therefore this issue is still pending and will decided in subsequent litigation.

2.4. I've seen a quote from an Eleventh Circuit opinion that appears to address this issue. Doesn't that mean the issue has been decided by the Eleventh Circuit?

The quote is from *Alabama v. United States Army Corps of Engineers,* 424 F.3d 1117, 1122 (11th Cir. 2005), in which the United States Court of Appeals for the Eleventh Circuit vacated a preliminary injunction issued by the Northern District of Alabama. Before getting to the substance of a scathing opinion holding that the Northern District of Alabama had abused its discretion in multiple instances in its handling of the litigation, the Eleventh Circuit stated as "background" that "Lake Lanier was created for the explicitly authorized purposes of flood control, navigation, and electric power generation." The court also stated that, "although not explicitly authorized by Congress, the Corps has historically maintained that water supply use is an "incidental benefit" flowing form the creation of the reservoir." *Id.*

These incorrect statements are included in the "Background" section of the opinion because they were not relevant to the issues addressed in the substance of the Eleventh Circuit opinion. None of the parties to the case discussed the issue in their briefs to the court. In legal terms this language is "*dicta*" with no legal effect.

The United States and the Southeastern Federal Power Customers—who strongly disagree with Georgia and the Water Supply Providers about the authorized purposes of Buford Dam—are both on record that the Eleventh Circuit's statement is *dicta* that should be disregarded.

We have no idea why the 11th Circuit included this language in the opinion or where it got its information. The court did not cite any authority to support its statement. It is clear that court did not actually read the authorizing legislation for Lake Lanier, because the authorizing legislation does not "explicitly" authorize any purpose (contrary to the court's statement). What appears to have happened, instead, is that court may have searched the internet for newspaper articles or other similar sources for background information to fill out its opinion. Not realizing that the issue is a source of controversy, the Court appears to have accepted as true statements that parties with an interest in the litigation have made about the authorized purposes of Buford Dam.

EXHIBIT B

Streamflow Depletions in the Flint River Basin Caused by Irrigation Pumping from the Floridan Aquifer in Drought Years

	Depletions Caused by Groundwater Pumping*			Depletions Caused by Surface Water Withdrawals	Total**	
	Spring Creek Gage (cfs)[1]	Bainbridge Gage (cfs)[2]	Total GW (cfs)[3]	Total SW (cfs)[4]	cfs	mgd[5]
January	-	-	-	-	-	-
February	-	-	-	-	-	-
March	3.8	42	46	48	94	60
April	8.8	79	88	92	179	116
May	32.9	252	285	297	582	375
June	40.9	320	361	376	737	476
Jul	33.7	338	372	388	759	490
Aug	29.5	352	382	398	779	503
Sept	21.9	341	363	378	741	478
Oct	10.5	220	231	240	471	304
Nov	8.3	171	179	187	366	236
Dec	4.7	130	135	140	275	178
Average			**203 cfs**	**212 cfs**	**415 cfs**	**268 mgd**

Source: Flint River Basin Regional Development and Conservation Plan (Mar. 20, 2006)

*Actual groundwater withdrawals for irrigation are much higher.

**Depletions for municipal and industrial use within the Flint River Basin are not included.

---

[1] *See* Flint River Basin Regional Development and Conservation Plan ("FRB Plan") at 111, Table 6.2(c) ("Backlog" column). Spring Creek is a former tributary of the Flint River that now flows directly into Lake Seminole.

[2] *See* FRB Plan at 112, Table 6.2(e) ("Backlog" column).

[3] Numbers in this column exclude minor streamflow reductions from irrigation pumping within the Ichawaynochaway Creek drainage area. See FRB Plan 110, Table 6.2(a).

[4] The FRB Plan does not provide monthly data for surface water withdrawals. It does state, however, that "approximately 250 mgd [387.5 cfs] are used basin wide by agricultural surface water withdrawals in July (the peak month) of a typical irrigation season during a drought year." FRB Plan at 15. The estimates of monthly use and yearly average provided in this column were derived by assuming that surface water withdrawals vary seasonally in the same manner as groundwater withdrawals, which we believe is a safe assumption.

[5] The conversion between mgd (millions of gallons per day) and cfs (cubic feet per second) is as follows: 1 mgd = 1.55 cfs; 1 cfs = .646 mgd.

EXHIBIT C

PROPOSED REVISION TO THE INTERIM OPERATIONS PLAN FOR JIM WOODRUFF LOCK AND DAM FOR THE IMPLMENTATION OF "REASONABLE AND PRUDENT MEASURE #3"

January 10, 2007
(Corrected January 26, 2007)

Prepared for
the Atlanta Regional Commission
the City of Atlanta, Georgia
Fulton County, Georgia
Atlanta-Fulton County Water Resources Commission
Cobb County-Marietta Water Authority
DeKalb County, Georgia
Gwinnett County, Georgia and
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ATTACHMENTS

1. Daniel P. Sheer, *Analyzing the Risk of Drought: The Occoquan Experience*, 72 Journal of the American Water Works Association 246-253 (May 1980).

2. Robert M. Hirsch, *Stochastic Hydrologic Model for Drought Management*, 107 Journal of the Water Resources and Management Division, ASCE 303-313 (October 1981).

3. CD Containing Input and Output files for MSRR Model Results.

1. EXECUTIVE SUMMARY

The Atlanta Regional Commission is pleased to propose the following revision to the Interim Operations Plan ("IOP") for Jim Woodruff Lock and Dam ("JWLD") for implementation of Reasonable and Prudent Measure #3 ("RPM3") in accordance with the Biological Opinion issued by the Fish and Wildlife Service ("USFWS") on September 5, 2006.

The basic concept of the proposed revision is to provide the Maximum Sustainable Release that can be supported by JWLD, up to 10,000 cfs. The Maximum Sustainable Release is calculated each week as a function of the total available storage using forecasting techniques established by USGS. A release is deemed to be "sustainable" if the storage is available to support it without comprising the long-term performance of the system, including ability of the system to refill by June 1 each year. Calculations necessary to implement the proposed alternative are easily made using a spreadsheet and real-time data maintained by USGS.

As is shown in greater detail below, the proposed alternative is superior or equal to other alternatives for the implementation of RMP3 for almost every operational objective. This alternative substantially improves the performance of the IOP on the key biological performance measures evaluated by USFWS in the Biological Opinion. In some cases there are trade-offs, but the costs are generally marginal and the benefits are high. Overall the proposed alternative would have a substantial beneficial impact on protected species. At the same time, by keeping significantly more water in storage, the proposed alternative would provide substantial benefits to other project purposes. The proposed alternative would not have any adverse impact on flood plain connectivity, hydropower generation, flood control, or, to our knowledge, any other operating objective.

Although the proposed alternative substantially improves the IOP on every important operational objective, the IOP can be improved still further. Therefore the IOP should *still* be considered an "interim" plan, even after it is revised by adopting the Maximum Sustained Release Rule as per RPM3. Additional modifications to the revised IOP will need to be made, in particular, to accommodate long-term water supply demands. For now, however, the proposed revision should be adopted.

2. BACKGROUND

This proposal is submitted in response to a Biological Opinion issued by USFWS on September 5, 2006 to review the Interim Operations Plan for Jim Woodruff Lock and Dam ("JWLD"). The Biological Opinion (BiOp) studies the effect of the Interim Operations Plan ("IOP") for JWLD on certain threatened and endangered species present in the Apalachicola River — the threatened Gulf sturgeon and three species of threatened or endangered mussels.

As is explained further below, the Biological Opinion concludes that reservoir operations under the IOP are generally acceptable. The BiOp also recommends, however, that the IOP be revised to provide minimize instances when discharge at the Chattahoochee gage (below JWLD) is less than 10,000 cfs.

2.1 Legal Framework

The Endangered Species Act protects threatened and endangered species in two ways — by prohibiting "takings" and by prohibiting federal agencies from supporting or taking action that would "adversely impact" critical habitat.

The prohibition on "takings" is contained in Section 9. 7 U.S.C. § 1538. The act defines "take" to mean "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" it. 16 U.S.C. § 1532(19). Although "takings" "may include significant habitat modification or degradation," that is true only if the action "actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering." *See* 50 C.F.R. § 17.3. *See also Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*, 515 U.S. 687 (1995). The prohibition against takings applies to all persons.

The second set of protections, applicable only to federal agencies, are contained in Section 7. *See*16 U.S.C. § 1536. Section 7 requires federal agencies to consult with the Fish and Wildlife Service ("USFWS") (or, for marine species, with the National Oceanic and Atmospheric Administration Fisheries Service (formerly known as the National Marine Fisheries Service), to ensure that their actions do not "jeopardize the continued existence" of any protected species or result in the "destruction or adverse modification" of "critical habitat." *Id.*

The result of formal consultation under Section 7 is a Biological Opinion indicating whether the proposed activity is likely to jeopardize the continued existence of listed species and/or result in the destruction or adverse modification of critical habitat. When USFWS issues a no-jeopardy opinion but concludes that "takings" of individual animals are nonetheless likely, USFWS is required to include an Incidental Take Statement (ITS) as part of the Biological Opinion. *See* 7 U.S.C. § 1536(b)(4). The ITS authorizes "takings" that would otherwise be prohibited by Section 9 of the ESA. *See* 7 U.S.C. § 1536(o)(2) ("any taking that is in compliance with the terms and conditions specified in [an ITS] shall not be considered to be a prohibited taking of the species concerned.").

2.2 Threatened and Endangered Species Potentially Affected by Reservoir Operations

The Corps initiated formal consultation with USFWS on March 7, 2006 to study the effects of reservoir operations on the Gulf sturgeon and the three mussel species. Detailed information concerning these species is provided in the Biological Opinion.

2.2.1 Gulf sturgeon

The Gulf sturgeon was listed as a "threatened" species in 1991. The Apalachicola River was designated critical habitat for the sturgeon in 2003. The Apalachicola River Critical Habitat Unit constitutes approximately 10% of the total river miles included within the designation.

According to USFWS reservoir operations have the potential to affect Gulf sturgeon habitat by reducing the flow of the river at times when flows are stored (i.e., when cumulative storage is increased) and by increasing flows in the river when reservoir storage is released (i.e., when stored water is released to augment the flow of the river). BiOp at 107. Such operations could potentially affect "flow regime" and "water quality" elements of the Gulf sturgeon critical habitat. The primary concern is for spawning habitat during the spring spawning season.

USFWS has identified 117 acres of potentially suitable spawning habitat, including about 30 acres at two sites where sturgeon eggs have been collected. BiOp at 69. Two sites are known to support sturgeon spawning within the action area. BiOp at 69. The most important spawning site is a rough limestone outcrop at RM 105. *Id.* The other known site is a smooth consolidated clay outcrop at RM 99. USFWS has also identified eight other sites that contain hard-bottom substrate potentially suitable for spawning. *Id.*

2.2.2 Mussels

The other species of concern are two species mussels — the endangered fat threeridge and the threatened purple bankclimber.[1] The main concern for the mussel species is to provide them with flowing water at all times.

USFWS has also indicated that "floodplain connectivity" may be important for the host fishes that support the larval stages of these animals. The Biological Opinion nonetheless concludes that reservoir operations are not likely to have a substantial effect on floodplain connectivity.

2.3 The IOP

The Interim Operations Plan for Jim Woodruff Lock and Dam ("IOP") was included as an attachment to the letter initiating formal consultation. The IOP was developed to ensure that operations at JWLD will not adversely affect Gulf sturgeon spawning grounds or critical habitat for listed mussels. The IOP sets flow levels for the spring spawning season based on a

[1] The Biological Opinion also addresses one other species — the Chipola slabshell — but notes that only one individual of this species has ever been documented within the action area. Therefore USFWS concluded that the probability of adverse impacts to this species resulting from reservoir operations was negligible. BiOp at 67.

percentage of "basin inflow." The plan also establishes certain minimum flow levels for the protected mussels.

The Corps adopted the Interim Operations Plan ("IOP") for Jim Woodruff Lock & Dam (JWLD) on March 7, 2006. A revised plan was adopted on June 12, 2006. The IOP was revised again on September 5, 2006 in accordance with the Biological Opinion issued on that date by USFWS.

2.3.1 Flow requirements in the IOP

Flow requirements under the IOP are computed in relation to Basin Inflow ("BI"). Basin inflow is the total inflow into the ACF Basin above Jim Woodruff Dam, less any water lost through evaporation or water withdrawals.

Specific flow requirements in the IOP, as amended through September 5, 2006, are as follows:

Time period	**Basin inflow (BI) (cfs)**	**Minimum Release (cfs)**
March – May	37,400 ≤ BI	Not less than 37,400
	20,400 ≤ BI < 37,400	≥ 70% of BI Not less than 20,400
	BI < 20,400	≥ BI, but not less than 5,000
June - February	23,000 ≤ BI	Not less than 16,000
	10,000 ≤ BI < 23,000	≥ 70% of BI, but not less than 10,000
	BI < 10,000	≥ BI, but not less than 5,000

2.3.2 Ramp-down requirements in the IOP

The IOP also imposes certain "ramp-down" requirements to ensure that river levels do not fall too rapidly all at once. The "ramp-down" is the speed with which river levels are allowed to fall after periods of high flow. Ramp-down requirements are prevent animals from getting stranded on the margins of a stream when the water recedes.

The ramp-down restrictions in the IOP are as follows:

Release range	**Maximum fall rate (ft / day) measured at Chattahoochee gage**
Flows greater than 30,000 cfs	No ramping restriction
Flows greater than 20,000 cfs but <= 30,000 cfs	1.0 to 2.0 ft / day
Exceeds powerhouse capacity (16,000 cfs) but <= 20,000 cfs	0.5 to 1.0 ft /day
Within powerhouse capacity and > 8,000 cfs	0.25 to 0.5 ft /day
Release within powerhouse capacity, but less than 8,000 cfs:	0.25day / less

2.3.3 Drought Operations

The IOP does not specify how the reservoirs will be operated in the event that there is insufficient storage to meet the 5,000 cfs minimum flow requirement.

2.4 The Biological Opinion

USFWS issued the Biological Opinion on September 5, 2006. The Biological Opinion is a "no jeopardy opinion" -- USFWS concluded that operations under the IOP will not threaten the survival of any listed species or adversely affected critical habitat. The Biological Opinion does, however, conclude that "takings" of individual mussels species "may occur" when flows fall below 10,000 cfs. BiOp at 140.

A more detailed overview of the "effects analysis" for each species is provided below.

2.4.1 Gulf sturgeon

For the Gulf sturgeon, the Biological Opinion concludes that the IOP will have a "small beneficial effect relative to the baseline on habitat availability at known spawning sites downstream of JWLD. BiOp at 137.

The Biological Opinion is primarily concerned with effects of the IOP on the flow regime for spawning habitat during the spring spawning season. The primary analysis employed to evaluate these effects was to quantify the amount of habitat at known and potential spawning sites inundated during the spawning season to depths appropriate for spawning. BiOp at 111. Based on egg collections during 2005 and 2006, USFWS considers habitat to be "available" if

the habitat is inundated to depths between 8.5 feet and17.8 feet. BiOp at 70-72 (text) & 103-04 (figures). Channel configuration dictates that habitat availability is not necessarily proportional to flow, as intermediate flows can make some areas too deep while newly inundated areas are not deep enough for expected spawning.

Operations under the IOP provide slightly more water to the potential spawning grounds at the appropriate depths than historical or "run-of-river" operations. Therefore USFWS concluded that the IOP will result in a small benefit to the Gulf sturgeon.

2.4.2 Fat threeridge and purple bankclimber

For the fat threeridge and the purple bankclimber, the Biological Opinion concludes the IOP will have a "small, but not appreciable additional impact on the survival and recovery" of the species. Although the BiOp concludes that the IOP "will not appreciably diminish the ability of proposed critical habitat to function for the conservation of" either species, BiOp at 123, USFWS concluded that "takings" — in the form of "habitat modification" — "may occur" when flows are less than 10,000 cfs. BiOp at 123.

Of the five constituent elements of purple bankclimber and fat threeridge habitat, the BiOp concludes that the IOP is likely to adversely affect only the "flowing water" element. BiOp at 121. USFWS developed low-flow measures to assess this impact.

a) Low flow effects

The Biological Opinion is primarily concerned with the potential for mussels to be exposed during periods of low flow. Although mussels move in response to changing water levels, they sometimes are caught in areas too far from the receding shoreline or areas in which down-slope movement does not lead to adequately deep water. BiOp at 78. This risk of stranding is greatest when high flows are followed by low flows because mussels that move to higher ground during the high flow period may be stranded when the water level falls. Therefore, to evaluate the effect of reservoir operations, USFWS is primarily concerned with (1) rate of flow change and (2) the frequency and duration of low flows.

To study the potential impact of reservoir operations, USFWS considered the location of known mussel beds and determined whether and how often these areas would be exposed during low flows. Because the purple bankclimber prefers deeper portions of the channel, this animal is not as vulnerable to low-flow impacts as the fat threeridge. BiOp at 139. According to the Biological Opinion, fat threeridge mussels have been found in locations that are exposed at discharges as high as 10,000 cfs.

The BiOp acknowledges that flows less than 10,000 cfs occur "in almost all years" on the Apalachicola River — and hence that most mussel beds are located in areas that would not require flows of this magnitude to remain inundated. BiOp at 140. Nonetheless, USFWS speculates that, "during a series of wet years with few or no low-flow events, a fraction of the population may naturally occur at relatively high on the stream bed." BiOp at 140. USFWS also notes that "mussels may be deposited at higher elevations during flood events." *Id.* The BiOp concludes that "adverse effects will occur when low flows follow an extended period without

low flows or follow a flood event that reshapes mussel habitat and/or redistributes mussels." BiOp at 141.

b) Host fish

USFWS also noted a concern for host fish necessary to support the larval stages of the protected mussels. Although host fish for the purple bankclimber are not known, the Biological Opinion indicates that the fat threeridge is a host fish "generalist" that may infect at least three different fish families, including certain species that utilize floodplain habitat. BiOp at 120. USFWS studied "floodplain spawning habitat availability" as the principal measure of effects to potential host species. BiOp at 121.

2.4.3 Reasonable and Prudent Measures

As a condition of the ITS, USFWS is required to impose mandatory "reasonable and prudent measures" ("RPMs") to minimize the take that will occur.

The third RPM is the subject of this proposal. RPM3 provides as follows:

> **RPM3. Drought provisions**. Develop modifications to the IOP that provide a higher minimum flow to the Apalachicola River when reservoir storage and hydrologic conditions permit.
>
> As proposed, the IOP uses reservoir storage to support a 5,000 cfs minimum flow. The available data indicates that higher flows can be supportable during normal and wet hydrologic periods, and during dry periods when the reservoirs are relatively full. Conversely, during extended drier than normal conditions, it may be prudent to store more water than allowed under the IOP during certain times of the year to insure (sic) minimum water availability later.

3. CONCEPTS PRESENTED BY THE CORPS TO IMPLEMENT RPM3

At a technical workshop on December 12, 2006, the Corps presented four "concepts" in response to RPM3. For each concept, the Corps has provided detailed modeling results; these output files were used to prepare the comparative graphs in the evaluation of alternatives in Section 4.

The Corps has described the four concepts under consideration as follows:

3.1.1 Concept #1

The first concept presented was to determine the maximum low-flow the system can support. As a modeling exercise, the Corps increased the 5,000 cfs minimum flow in the IOP to higher values — 6,000 cfs, 6,300 cfs, 6,600 cfs and 8,000 cfs. The Corps reported that the results were not acceptable for any of these increased minimum flows.

3.1.2 Concept #2

The second concept presented was to decrease spawning period high flows in connection with an increase in the low flow target. The 37,400 cfs high-flow target in the IOP was reduced to 25,000 cfs; the intermediate target of 20,400 cfs was reduced to 16,000 cfs; and the 5,000 cfs minimum flow was increased to 5,800 cfs (variation 1), 6,500 cfs (variation 2) and 7,000 cfs (variation 3). Again, the Corps reported that the results were not acceptable for any of these variations.

3.1.3 Concept #3

The third concept presented was to use "system composite storage" as a drought trigger for "desired flow" of 6,500 cfs and the "required flow" of 5,000. Under this concept, the drought trigger is activated when "system composite storage" is in Zone 3. The drought trigger would be deactivated when the system composite storage recovers to Zone 1. The Corps reported that het results for this concept appeared to be promising.

3.1.4 Concept #4

The fourth concept was to increase the percentage of flows that can be stored when Basin Inflow is greater than 10,000 cfs from 30% to 50%. This concept was modeled as an "add-on" to Concept #3. The Corps stated that this concept appeared to produce few benefits in addition to Concept #3.

4. PROPOSED ALTERNATIVE CONCEPT FOR THE IMPLEMENTATION OF RPM3

The proposed alternative for RPM3 is superior or equal to Concept #3 for almost every operational objective. This alternative, which will be called the Maximum Sustainable Release Rule ("MSRR"), substantially improves the performance of the IOP on the key biological performance measures evaluated by USFWS in the Biological Opinion. In some cases there are trade-offs, but the costs are generally marginal and the benefits are high. Overall the proposed alternative would have a substantial beneficial impact on protected species. At the same time, by keeping significantly more water in storage, the proposed alternative would provide substantial benefits to other project purposes. The proposed alternative would not have any adverse impact on flood plain connectivity, hydropower generation, flood control, or, to our knowledge, any other operating objective.

4.1 Overview

The basic concept of the MSRR is to provide the maximum sustainable release from Jim Woodruff Dam, up to 10,000 cfs, that can be maintained while also allowing the reservoirs upstream in the Chattahoochee Basin to refill by the following June 1. The maximum sustainable release is calculated based on the current storage in the reservoirs and a forecast of future inflows. The forecast is made using probabilistic streamflow forecasting techniques developed and published by the USGS.

Although the MSRR does not utilize reservoir storage to provide flows in excess of 10,000 cfs, such flows occur from Flint River flow and when the reservoirs are full. Because the MSRR allows the reservoirs to refill early and often, flows in excess of 10,000 cfs are provided in a pattern that is at least as beneficial (and often more beneficial) for the protection and enhancement of threatened and endangered species than the flows provided by the IOP, as demonstrated in the evaluation below.

The MSRR increases the minimum flow whenever sufficient water is available to meet the increased minimum, provide for the long-term support of all uses, and still refill the reservoirs by the following June 1. The calculation of the water available includes a conservative forecast of expected inflows (inflows expected to be exceeded 90% of the time) based on basin conditions. The forecast is done using a USGS developed technique that relies only on antecedent inflows, and not on weather forecasts. Documentation of this technique is available from the USGS, and is attached.

As stated above, the refilling of the reservoirs is crucial to the improved performance of the MSRR relative to the IOP for the protection of endangered and threatened species. Because the reservoirs fill early and often in the spring, crucial spawning flows are most often maintained at levels equal to the full basin inflow. Moreover, because the reservoirs do not often empty, there is usually sufficient water to maintain minimum flows well in excess of 5000 cfs, as envisioned in RPM3.

The MSRR stores the water necessary to meet the increased minimum whenever the inflow between Lake Eufala and Lake Seminole, including the Flint River inflow, rises above the maximum sustainable release. A new maximum sustainable release is computed each week so that as storage improves, the maximum sustainable release also rises. In addition, the MSRR restricts releases to 5000 cfs whenever there is not enough water in the system to sustain that flow over a repeat of the worst historical drought and still have a margin of safety. This ensures enough water will remain in the system to "insure minimum water availability later."

As will be shown below, the rules contained in the MSRR implement RPM3 in a manner that substantially improves the IOP in its protection threatened and endangered species and many other performance measures.

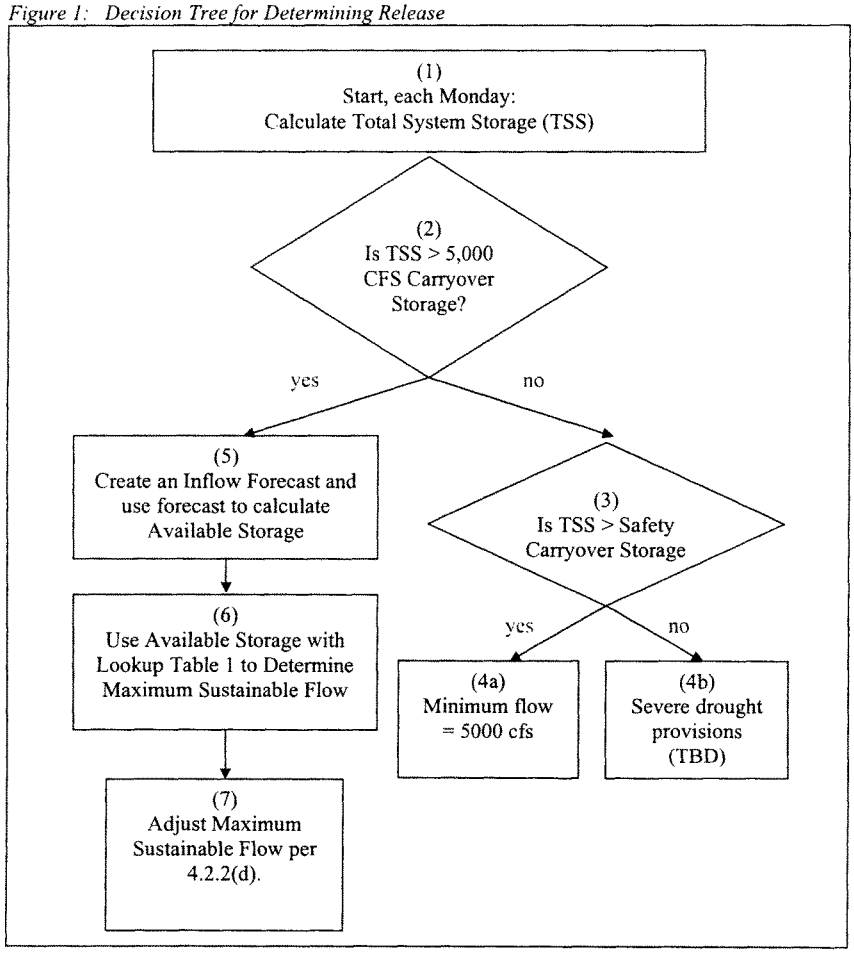
4.2 The Maximum Sustainable Release Rule (MSRR)

The basic concept of the proposed revision is to provide the Maximum Sustainable Release that can be supported by JWLD, up to 10,000 cfs. The Maximum Sustainable Release is calculated each week as a function of the total Available Storage using forecasting techniques established by USGS. A release is deemed to be "sustainable" if the storage is available to support it without comprising the long-term performance of the system, including ability of the system to refill by June 1 each year. Calculations necessary to implement the proposed alternative are easily made using a spreadsheet and real-time data maintained by USGS.

A decision tree is provided below (Figure 1) to show how to determine the Maximum Sustainable Flow on a weekly basis. The right side of the decision tree — dealing with "Carryover Storages" — is discussed in Section 4.2.1 below. The left side — calculation of the

Maximum Sustained Release when Total System Storage exceeds Carryover Storages — is discussed in Section 4.2.2.

Figure 1: Decision Tree for Determining Release



4.2.1 Carryover Storages

The primary goal of the MSRR is to provide the maximum sustainable flow at Woodruff as requested by RPM 3. Carryover Storages are storages that need to be preserved to meet critical needs over the long term. These storages are used to determine when flows must be

curtailed to meet such needs. Two critical needs are given top priority: the protection of public health and safety and protection of endangered species. The amount of "Carryover Storage" necessary to support each of these needs throughout a critical drought has been calculated and is shown in Figure 3.

a) Public Health and Safety

Losing the ability to provide drinking water and fire protection to the citizens of Alabama, Georgia, and Florida would be devastating to the region. Therefore the volume of water needed to protect public health and safety through a multi-year drought, called the Public Health and Safety Carryover Storage (or Safety Storage), should be maintained in storage at all times. In the MSRR, this volume was determined by running a simulation with 2030 demands and minimum flow requirements at Atlanta and Columbus only. The maximum drawdown in the four major reservoirs over the historic record is designated as the Public Health and Safety Storage — this is the volume of water that would have been needed to get through the worst drought on record.

b) 5,000 CFS Carryover Storage

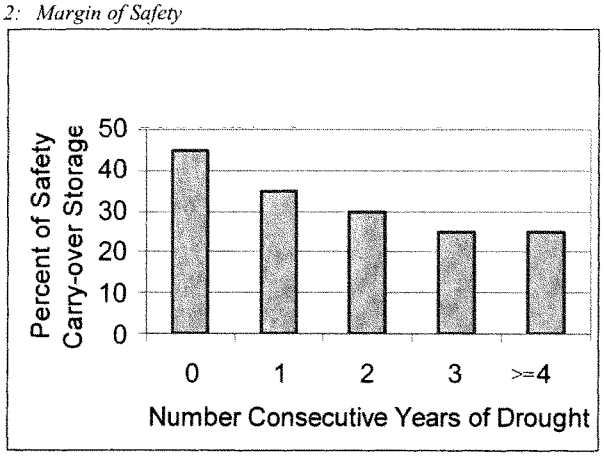
In addition to public health and safety, endangered species must be protected throughout a critical drought. Therefore the amount of storage needed to support threatened and endangered species must be preserved in system storage at all times. The storage set-aside to meet these needs is called the 5,000 CFS Carryover Storage.

In the MSRR, the 5,000 CFS Carryover Storage is set-aside to meet the 5,000 cfs minimum flow requirement and also to meet the ramping rates specified in the IOP. Larger minimum flows are supported when possible, but these are the minimum requirements. The amount of 5,000 CFS Carryover storage was determined using the same method as for the Public Health and Safety Carryover Storage: simulations were done with demands, minimum flow requirements at Atlanta and Columbus, and the releases at Woodruff listed above. The maximum drawdown in the four major reservoirs over the historic record is the volume of water that would have been needed to sustain the 5,000 cfs minimum flow and IOP ramping rates throughout the worst historical drought.

c) Margin of Safety

Because future droughts may be worse than the historical drought of record, a margin of safety is added to both Carryover Storages. The margin of safety decreases each year of an ongoing drought to balance the impacts of lower flows on the environment and water-use restrictions on public health and welfare against the risk that the drought will continue. The margins of safety used in the demonstration run are shown in Figure 2; these percentages are multiplied by the Public Health and Safety Carryover Storage to set-aside an additional volume of water. Although calculated as a percentage of the Public Health and Safety Carryover Storage, the Margin of Safety is divided evenly between the two Carryover Storages.

Figure 2: Margin of Safety



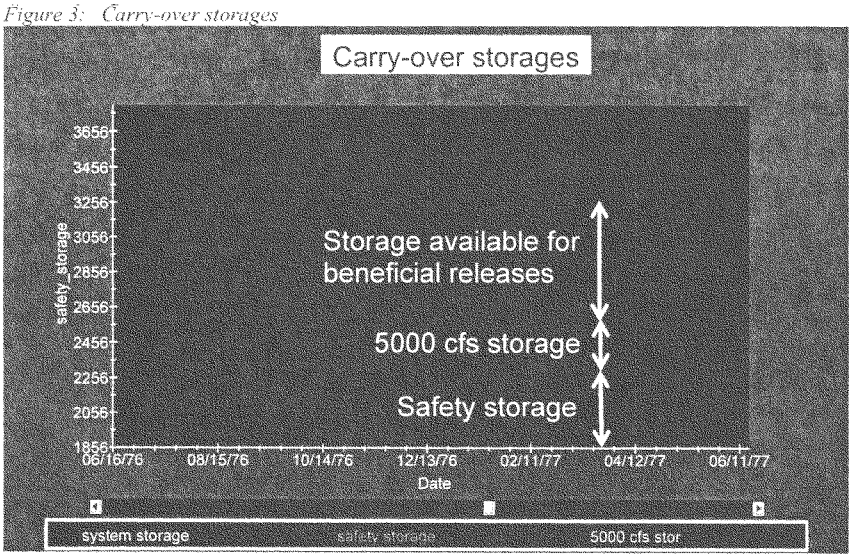
It is important to note that the MSRR manages storage in such a way that available storage will not reach or approach levels below those needed to maintain public health and safety during a repeat of any historical drought period. The provision of a margin of safety adds an additional measure of security, ensuring that the system can adapt to future droughts worse than those in the historical record. Further, it is important to understand that the performance of the MSRR will not be enhanced by reducing Carryover Storage or the Margin of Safety. The success of the MSRR is based on its strategy of allowing the reservoirs to refill early and often. Thus, providing a margin of safety would not conflict with achieving environmental objectives during a repeat of any historical drought. Also note that a similar margin of safety is provided for meeting critical instream flow needs below Woodruff Dam, as detailed below.

Figure 3 illustrates the Carryover Storages in relation to Total System Storage. The Carryover Storages vary seasonally following the drawdown pattern of the tops of conservation pools. A representative year, 1976, is shown in the figure; the seasonal pattern is the same in all other years. The margin of safety varies from year to year depending on the number of consecutive drought years. In 1976, there was no drought, so there is a 45% margin of safety added to the Carryover Storage. During prolonged droughts, this can drop to as low as 25%. The margin of safety was divided evenly between the Public Health and Safety Storage and the 5,000 CFS Carryover Storage. Therefore, the green line in Figure 3 shows the Public Health and Safety Carryover Storage — the maximum historical drawdown to meet public health and safety needs plus 22.5%. The distance between the yellow and green lines is the 5,000 CFS Carryover Storage—the maximum historical drawdown to support at least 5000 cfs at Woodruff and the ramping rates defined in the IOP plus 1/2 of the Margin of Safety.

The white line in Figure 3 shows the Total System Storage in 1976. System storage is defined as the sum of the storages in Lanier, West Point, and WF George. Whenever Total System Storage is less than the amount required for 5,000 CFS Carryover Storage, releases are curtailed unless necessary to meet the 5,000 cfs minimum and the IOP ramping rates. *This only*

happens once during the entire period of record in the MSRR, for about three months in 2000. If Total System Storage were ever to fall below the amount required for Safety Storage, extreme drought provisions would be triggered and the 5,000 cfs minimum might need to be relaxed by necessity. This *never* happens in the historical simulation of the MSRR. The system storage remains above the Carryover Storages in large part because releases to benefit protected species are made so as to be sustainable. The process used to determined beneficial releases is described in the next section.

Figure 3: Carry-over storages



d) Operations During Extreme Drought: Release Decisions Based on Carryover Storage Levels

As stated above, the Carryover Storages are established to indicate when releases must be curtailed to preserve the ability of the system to meet critical needs over the long term. If Total System Storage is less than Instream Flow Carryover Storage, releases are restricted to the amount necessary to meet the 5,000 cfs minimum flow and IOP ramp-down provisions. If Total System Storage is less than the Safety Carryover Storage, the MSRR does not specify any definite minimum flow.

The IOP does not specify what emergency measures would be taken if a more severe than historical drought were to occur, either. Thus, the only way to compare the MSRR and the IOP with regard to extreme droughts is to look at the storage levels likely to occur when operators realize that the potential for such a drought exists and begin to take emergency measures. The more storage available at that time, the more flexibility the operators will have to deal with the situation.

By setting aside Carryover Storages based on the most severe drought on record plus a sufficient margin of safety, the MSRR is designed to minimize or eliminate the likelihood that such provisions will ever be triggered. Minimum system storage under the MSRR is considerably higher than the minimum storage that would have occurred using the IOP. This indicates that the MSRR provides a considerably higher level of reliability in the face of extreme drought than does the IOP.

4.2.2 Determining the Maximum Sustainable Flow When Total System Storage Exceeds Carryover Storages

The steps used to determine the Maximum Sustainable Flow when Total System Storage exceeds the Carryover Storages are discussed below. The logic of the rule is to increase the minimum flow whenever (1) Total System Storage exceeds the Carryover Storages, and (2) sufficient water is available in storage to allow the reservoirs to refill by the following June 1; and (3) such releases can be made without compromising the ability of the system to meet critical needs. The calculation of available storage includes a conservative forecast of expected inflows (inflows expected to be exceeded 90% of the time) based on basin conditions. This rule provides a rational, sustainable basis for determining how much water to release in excess of the minimum requirements. Enhancement releases are determined such that system storage will refill each year with a high level of certainty.

a) Create an Inflow Forecast

The first step is to create an Inflow Forecast to provide expected amounts of inflows corresponding to different levels of probability. This information is used to determine the maximum flow that can be maintained at Woodruff while still allowing the system to refill each year with a high level of certainty.

While future rainfall cannot be accurately predicted, there are two sources of information to guide operational decision-making: historical statistics and forecasts of inflow. Forecasting methods make use of the correlation between current and future conditions: if inflows have been low, they tend to stay low, and vice versa. This is essentially because when conditions are dry, there is more evaporation and infiltration and hence less runoff, and vice versa.

Within about four month's time, the inflows forecast by conditional forecast methods converge to the inflows that would be forecast using historical statistics. In other words, although streamflow conditions are strongly autocorrelated from one month to another, the correlation weakens as the forecast period is lengthened, and the correlation is essentially zero by the time the forecast period is extended to four months. At this point, historical statistics provide the best available forecast.

There are a number of forecasting techniques, all of which give a shift in mean and variance based on antecedent inflows. A technique has been developed by Robert Hirsch of the USGS, and that program has been adapted for ease of use and integration with HECDSS by HydroLogics Inc. Documentation of this technique from the USGS is attached. The USGS technique is easy to implement. The adaptations made by Hydrologics do not affect the underlying methodology, and the forecast program can be made available to the USACE free of

charge. Alternatively, the USACE could obtain the original program from the USGS. In practice, running the forecast program requires that antecedent inflow data be kept current and formatted to suit the program. The data is already kept current and formatting can be easily automated. Running the forecast program takes less than one second.

Hydrologics has used the program to re-create the forecasts that would have been made each week in the hydrologic record. These "historical" forecasts were used to show how the MSRR would have performed in the past, using the forecasts. The results prove that the combination of the forecasting technique and the MSRR is effective given the existing accuracy and precision of the USGS forecasting technique. Producing and using forecasts in the manner incorporated in the MSRR is eminently practical. Such forecasts are currently being used operationally by a number of agencies, including the North Carolina Department of Natural Resources.

b) Calculate Available Storage — Storage in Excess of the Amount Necessary to Allow the System to Refill by June 1

The next step is to calculate "Available Storage" based on the Inflow Forecast at the 90% probability level (such that inflow has a 90% probability of exceeding the forecasted value). Available Storage is the amount of storage on hand in excess of the amount necessary to allow the system to refill by June 1.

Available Storage is calculated as the forecasted 90% inflow less (1) water supply (expected demand for all users above and including Whitesburg); (2) minimum flow requirements at Atlanta (number of days till June 1 times 750 cfs); (3) evaporation (average between now and June 1); and (4) void (volume in Lake Lanier between current storage and top of conservation pool on June 1[2]). The resulting volume — Available Storage — is roughly the amount of water that can be released from Lake Lanier while maintaining a 90% chance of refill by the following June 1.

c) Calculate the Maximum Sustainable Release

The Maximum Sustainable Release is determined as a function of Available Storage. This determination is made each Monday in the simulation. The Maximum Sustainable Release is given as a function of Available Storage in the lookup table provided in Table 1.

[2] For this calculation, Lake Lanier is used as a surrogate for system storage — it is assumed that the entire system will be full if Lake Lanier is full. Lake Lanier is a reasonable surrogate for the entire system because Lake Lanier takes much longer to refill than any of the other reservoirs.

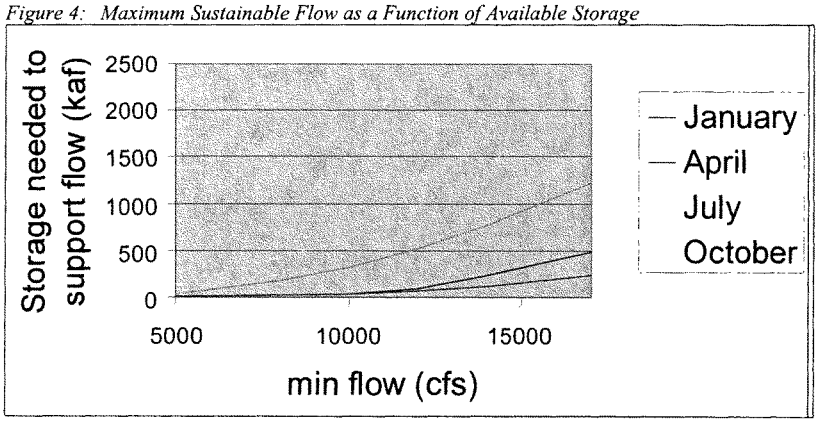
Table 1: Maximum Sustainable Release from Woodruff (cfs)

Available Storage (af)	1/1	2/1	3/1	4/1	5/1	6/1	7/1	8/1	9/1	10/1	11/1	12/1
0	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
7000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
14000	5000	6432	6544	6544	6546	5000	5000	5000	5000	5000	5000	5546
21000	5571	9700	9700	9704	9707	5000	5000	5000	5000	5000	5522	6155
28000	6243	10000	10000	10000	10000	5000	5000	5000	5000	5000	5720	6672
42000	9106	10000	10000	10000	10000	5000	5000	5000	5000	5088	6184	9238
49000	9753	10000	10000	10000	10000	5000	5000	5000	5000	5213	6391	10000
56000	10000	10000	10000	10000	10000	5000	5000	5000	5000	5313	8683	10000
63000	10000	10000	10000	10000	10000	5000	5000	5000	5000	5432	8922	10000
77000	10000	10000	10000	10000	10000	5000	5000	5000	5046	5853	9345	10000
84000	10000	10000	10000	10000	10000	5000	5000	5000	5302	5942	9369	10000
98000	10000	10000	10000	10000	10000	5000	5000	5000	5470	6171	10000	10000
105000	10000	10000	10000	10000	10000	5000	5000	5000	5554	6282	10000	10000
112000	10000	10000	10000	10000	10000	5000	5000	5000	5607	6597	10000	10000
126000	10000	10000	10000	10000	10000	5000	5000	5043	5985	6817	10000	10000
133000	10000	10000	10000	10000	10000	5000	5000	5128	6068	6924	10000	10000
140000	10000	10000	10000	10000	10000	5094	5000	5307	6118	6990	10000	10000
154000	10000	10000	10000	10000	10000	5359	5084	5476	6280	8988	10000	10000
161000	10000	10000	10000	10000	10000	5501	5148	5557	6360	9111	10000	10000
168000	10000	10000	10000	10000	10000	5315	5282	5616	6635	9175	10000	10000
182000	10000	10000	10000	10000	10000	5577	5409	5932	6795	9407	10000	10000
189000	10000	10000	10000	10000	10000	5717	5471	6009	6874	9519	10000	10000
196000	10000	10000	10000	10000	10000	5932	5517	6058	6920	9867	10000	10000
210000	10000	10000	10000	10000	10000	5777	5747	6203	8780	10000	10000	10000
217000	10000	10000	10000	10000	10000	5916	5807	6272	8874	10000	10000	10000
231000	10000	10000	10000	10000	10000	6286	5904	6592	9017	10000	10000	10000
238000	10000	10000	10000	10000	10000	6450	5960	6660	9109	10000	10000	10000
245000	10000	10000	10000	10000	10000	6097	6097	6725	9506	10000	10000	10000
259000	10000	10000	10000	10000	10000	6463	6245	8494	9633	10000	10000	10000
266000	10000	10000	10000	10000	10000	6623	6299	8569	9701	10000	10000	10000
273000	10000	10000	10000	10000	10000	6791	6352	8642	9769	10000	10000	10000
287000	10000	10000	10000	10000	10000	6625	6600	8733	10000	10000	10000	10000
294000	10000	10000	10000	10000	10000	6782	6651	8801	10000	10000	10000	10000
308000	10000	10000	10000	10000	10000	8655	6725	9251	10000	10000	10000	10000
315000	10000	10000	10000	10000	10000	8878	6773	9315	10000	10000	10000	10000
322000	10000	10000	10000	10000	10000	6927	6927	9377	10000	10000	10000	10000
336000	10000	10000	10000	10000	10000	8818	8498	9826	10000	10000	10000	10000
343000	10000	10000	10000	10000	10000	9034	8553	9875	10000	10000	10000	10000
357000	10000	10000	10000	10000	10000	9499	8660	9970	10000	10000	10000	10000
364000	10000	10000	10000	10000	10000	8966	8943	9960	10000	10000	10000	10000
378000	10000	10000	10000	10000	10000	9397	9045	10000	10000	10000	10000	10000
385000	10000	10000	10000	10000	10000	9624	9095	10000	10000	10000	10000	10000
399000	10000	10000	10000	10000	10000	9308	9308	10000	10000	10000	10000	10000
406000	10000	10000	10000	10000	10000	9521	9501	10000	10000	10000	10000	10000
420000	10000	10000	10000	10000	10000	10000	9547	10000	10000	10000	10000	10000

427000	10000	10000	10000	10000	10000	10000	9591	10000	10000	10000	10000	10000
430000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000

The flows in Table 1 were derived from a series of graphs similar to Figure 4. To determine the Maximum Sustainable Flow on July 1 from Figure 4, first determine the Available Storage. If Available Storage is 500 kaf, the Maximum Sustainable Flow is about 8500 cfs. This is the flow can be supported at Woodruff without compromising the ability of the reservoirs to refill by June 1. Note that the same amount of Available Storage in April could be used to support a much higher minimum flow.

Figure 4: Maximum Sustainable Flow as a Function of Available Storage



Curves similar to those shown in Figure 4 have been developed for each month of the year, as reflected in Table 1. These graphs were generated by calculating the difference between the desired flow and historical inflows each day to give the water needed from storage that day, if any. These daily values were then summed between present and June 1. To provide a high level of reliability, the 90th percentile of historic inflows were used, meaning that if all years in the historic record were ranked from wettest to driest, 10% of the years would be drier and 90% wetter than the inflows used in the analysis. 90th percentile inflows to the basin remain above 7000 cfs for much of the year, so the average of the driest three years was used in place of the 90th percentile below 7000 cfs and values were interpolated between these values and the 90th percentile at 9000 cfs.

In addition, when the value of Maximum Sustainable Flow obtained from the curves is greater than 7,000 cfs, it is adjusted upward by 20%. Trial and error has shown that the upwardly adjusted flows can be maintained without impact on other objectives. The boosted values are reflected in Table 1.

d) Adjust the Maximum Sustainable Flows

Finally, once the Maximum Sustainable Release is determined from Table 1, it is subject to three possible alterations developed by trial and error to enhance the performance of the operating rules: (1) a ramping rate restriction and (2) a limitation on maximum sustainable releases over 10,000 cfs. Again, all three of these alterations improved the performance of the MSRR on the performance measures shown in the previous section.

i *Ramping rate restriction.*

To avoid extreme jumps in the minimum flow requirement from week to week, a ramping rate restriction of 1,400 cfs / week is imposed. The daily change in releases from Woodruff, and thus impacts due to ramping on by endangered species in the Apalachicola, are controlled by the ramping rates used in the IOP.

ii *Limitation on Maximum Sustainable Releases Over 10,000 cfs.*

In the MSRR, flows above 10,000 cfs are not supported from storage. Imposing this limit resulted in significantly better flows for the mussels and caused little change in sturgeon spawning habitat or floodplain connectivity. Flows above 10,000 cfs are still common due to inflows from the Flint River and spill from the reservoirs — this is the reason the MSRR performs well on the sturgeon spawning performance measure.

4.2.3 Other Operational Criteria

a) Hydropower Releases

In the MSRR, releases equivalent to three hours of generation at capacity are made under the following conditions: (1) stages are above initial recreation impact level, (2) the day-ahead projected prices are above average, and (3) forecasted inflows for the year are above the 35th percentile. Otherwise, there is no provision for making hydropower releases, or even for reducing releases on weekends to increase the value of power generated during the week. In spite of this limited attention to hydropower, the MSRR produces slightly more power, and slightly more valuable power than does the IOP. In evaluating the value of hydropower, it is assumed that releases are made during peak hours whenever possible.

For this generation rule, the current stage at Lanier and forecasted inflows to Lanier were used to flag days when power releases should be made. For day-ahead projected prices the average daily day-ahead ERCOT prices from 2002-2005 were used; the first Mondays in January for each of these years were aligned to determine the average, and leap-day was accounted for.

b) Reservoir Balancing

The MSRR moves water from upstream reservoirs to downstream reservoirs to balance storage in zones, as does the IOP. The MSRR zones have been adjusted to provide a balance of recreation impact days between the three reservoirs. All three reservoirs are drawn down together insofar as possible to the level where initial recreational impacts begin to occur. Below

that level, the reservoirs are emptied by zones, from downstream to upstream. Details of the reservoir balancing scheme and its performance relative to the IOP are discussed below.

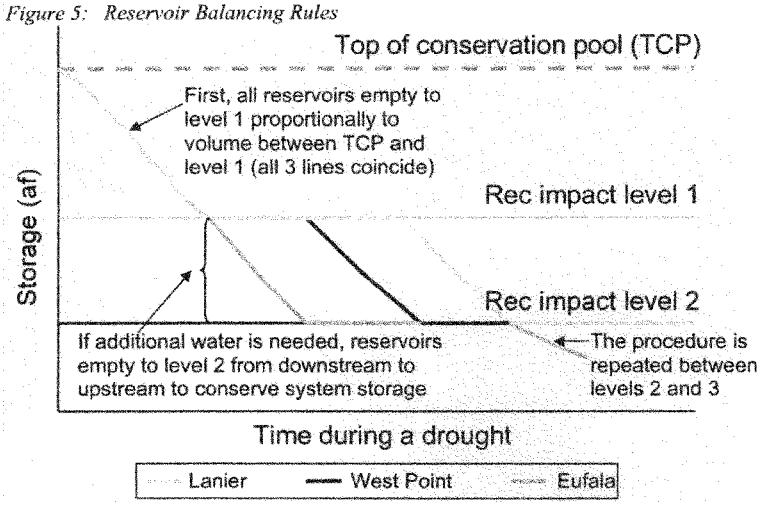
Recreation impact levels were taken from the USACE 1989 Draft Water Control Plan; the values are shown in Table 2. In the following discussion, initial recreation impact is referred to as level 1, recreation impact as level 2, and water restriction as level 3, as shown in columns A and B. Note that applying these impact levels at Eufala for reservoir balancing resulted in stages below historical, so the numbers were increased as shown in the table: Eufala was balanced according to the amended values (column F), while recreation impact was assed with the EIS values (column E).

Table 2: Corps Recreation Impact Levels

A	B	C	D	E	F
Recreation impact level	Terminology from EIS	Lanier (ft)	West Point (ft)	Eufala EIS (ft)	Eufala MSRR (ft)
Level 1	Initial impact	1066	632	187	187
Level 2	Impact	1063	628	185	186.5
Level 3	Water restriction	1060	627	184	185.5

When water is needed from storage, the Lanier, West Point, and Eufala stages are reduced together between their top of conservation pools and recreation Impact Level 1. Specifically, the percentage of the volume between Impact Level 1 and the top of conservation pool is kept the same for the three reservoirs. This is shown in Figure 5, which illustrates the reservoir balancing rules implemented in the MSRR. Note that the shape of these lines depends on the rate of storage emptied from the system. The recreation impact levels and top of conservation pool are in equivalent storages.

Figure 5: Reservoir Balancing Rules



Once the stages of the three reservoirs are at Impact Level 1, there is the real possibility that the system will not refill in the spring, so water is conserved upstream. Specifically, Lanier and West Point are kept at level 1, while Eufala's stage is reduced to Impact Level 2; then Lanier and Eufala are kept at levels 1 and 2 respectively as West Point is reduced to Impact Level 2; and finally Lanier is reduced to level 2, while West Point and Eufala stay at Impact Level 2 (see Figure 5). If more water is needed from storage, the procedure is repeated between recreation Impact Levels 2 and 3. In theory, the same procedure would be used between level 3 and dead storage, but the only time the reservoirs fall below level 3 in the MSRR period of record run is in the 2000 drought, and in this case, all three reservoirs empty below level 3 as they meet local flow requirements and consumptive demands.

One of the reasons reservoir levels do not drop further in the 2000 drought is that by preserving water upstream when the reservoirs fall below impact level 1, there is more system storage entering the drought (May 2000) in the MSRR that the IOP or historically. By preserving water upstream when necessary, all the reservoirs benefit in the following year, as evidenced by the dramatically better performance of the MSRR on the recreation performance measures.

In practice, the reservoir stages do not follow Figure 5 exactly. While this is the guiding principle, the reality is complicated by two issues: water cannot be moved from downstream to upstream and there are physical limitations on the rate at which water can be moved downstream. For example, water from Lanier must be used to meet all of the demands and instream flow requirements north of West Point. As a result, Lanier may be pulled down more rapidly to meet these needs, but the reservoirs are rebalanced when possible.

Recreation impact levels were not included in the EIS for Lake Seminole. In the MSRR, Seminole is kept at top of conservation pool until the stages of other three reservoirs reach level 1. Seminole is then brought down to bottom of conservation pool (76 feet) before Eufala is taken below level 1. Eufala drops below bottom of conservation pool in the 2000 drought only; in this case, the stage is kept above 75.5 feet at all times. Operations at Seminole can be further refined with appropriate recreation impact information.

The stages for top and bottom of conservation pool was taken from the IOP: the MSRR does not alter flood control rules.

4.3 Summary

The required releases from Woodruff are summarized in Table 3.

Table 3: Summary of Required Releases

Level of System Storage	**Minimum Release from Woodruff**
Total System Storage > full	100% of Basin Inflow
Total System Storage > Instream Flow Carryover Storage	Maximum Sustainable Release
System Storage > Public Health and Safety Carryover Storage	5000 cfs + IOP Ramping
System Storage < Public Health and Safety Carryover Storage	Severe Drought Provisions (TBD)

5. IMPLEMENTATION

5.1 Similarities and Differences Between MSRR and IOP / Concept #3

The MSRR is a refinement of Concept #3 in that both use a measure of available storage to determine whether flows higher than the 5,000 cfs minimum can be provided. The main difference between this plan and Concept #3 is (1) the use of a conditional forecasting technique to determine when flows *higher* than the "desired flow" of 6,500 cfs can be provided; and (2) the use of "available storage" to determine the *maximium* flow that can be sustained, instead of using "system composite storage" as an on-off "drought trigger" to toggle between "minimum flow" of 5,000 cfs and the "desired flow" of 6,500 cfs. This alternative also incorporates elements of concept #4, which was to increase the amount of basin inflow that can be stored when basin inflow exceeds 10,000 cfs. Under the MSRR, flows in excess of 10,000 cfs are stored to permit the reservoirs to refill.

Other provisions of the IOP (and/or "existing operations") are directly incorporated in the MSRR. These include:

1) Top of conservation pool rule curves and flood control operations,

2) Bottom of conservation pool assumptions,

3) Instream flow requirements upstream of Jim Woodruff dam,

4) Water supply requirements

5) Ramping rates

6) Minimum flow requirement of 5000 cfs at Jim Woodruff Dam

In addition, the MSRR is based on many concepts that are implemented in the IOP, although in a different form. These include the following:

1) In the IOP, release requirements at Jim Woodruff Dam are based on Basin Inflow and time of year. Concept #3 also includes consideration of system storage in determining releases. In the MSRR, releases below Woodruff are based on those factors, and on storage in the system as a whole and on forecasts. These changes are necessary to implement the requirement of RPM3 to base minimum releases on basin conditions.

2) Releases in both the IOP and the MSRR seek to maintain natural patterns of flows below Woodruff Dam. The IOP does this by specifying that the releases be a percentage of Basin Inflow. The MSRR achieves this objective more effectively by ensuring that the reservoirs fill early in most years. Once the reservoirs are full, they must pass 100% of Basin Inflow in order to maintain flood control storage. The result of this change in implementation strategy is better performance for all the biological performance measures used in the BiOP. The change in strategy is an implementation of the RPM3 directive to "store more water than allowed under the IOP during certain times of the year to insure minimum water availability later." The water stored by filling the reservoirs early is used to establish appropriate sustainable minimum flow (which ca be any value between 5000 and 1000 cfs). In most years that flow is substantially in excess of 5,000 cfs, per the directives in RPM3.

3) Both the IOP and the MSRR contain provisions for maintaining hydropower generation. The IOP requirements provide for setting a number of hours of weekday generation at individual reservoirs based on the storage in each reservoir. The MSRR bases this requirement for all reservoirs on a variety of conditions, including storage in Lake Lanier, forecast inflows, and historical day-ahead energy prices. All of this information should be readily available to operators in real time. The reason this is done is, again, to "store more water than allowed under the IOP during certain times of the year to insure minimum water availability later." The result of implementing this strategy is improved biological performance, slightly higher overall power generation, and slightly higher value of power generated. The changes in power benefits are not significant in our opinion.

4) Both the IOP and the MSRR contain provisions for balancing storage among reservoirs. In the MSRR this is designed to balance two objectives: (a) maintain the highest level of system storage over the long run, and (b) equalize the number of days of recreation impacts among the reservoir pools.

The balancing strategy employed by the MSRR effectively equalizes recreational impacts among the lakes without significantly affecting water supply reliability or environmental or any other purposes. Coupled with the strategy of storing water to ensure higher minimum flows, the balancing strategy results in a wholesale reduction in recreational impacts compared to the IOP and Concept #3.

5.2 Ease of Implementing the MSRR

The MSRR is an extremely practical operating rule. All the data needed to evaluate releases each day are available, the forecast technique is available, uses only up to date flow data, which is also available, and takes very, very little time and almost no training to run. Historical day-ahead energy prices are also available. The calculations necessary are easily implemented in a spreadsheet. We see no practical impediments to expeditiously implementing the MSRR.

That said, we recognize that USACE will need to validate the results presented below before implementing MSRR as RPM3. ARC and Hydrologics will make available to USACE any information, data or other resources necessary to validate the rule. Copies of the input and output files are attached.

Moreover, although the MSRR is superior in performance to the IOP and Concept #3, we are certain that operating rules superior to the MSRR can be developed. We stand ready to work with the USACE towards the development of better operating policies. However, we will firmly oppose the implementation of operating policies that are clearly inferior to the MSRR.

6. EVALUATION OF PROPOSED ALTERNATIVES FOR RPM3 BASED ON SPECIFIC OPERATIONAL OBJECTIVES

As is shown in greater detail below, the MSRR significantly out-performs the IOP on many objectives and does not perform significantly less well on any of the others. This alternative provides superior protection to threatened species while, at the same time, keeping significantly more water in storage and thus benefiting other project purposes. The proposed alternative would not have any adverse impact on flood plain connectivity, hydropower generation, flood control, or, to our knowledge, any other operating objective.

The parameters of an operating rule (e.g. the exact values in lookup tables relating available storage to releases, or the exact levels (rule curves) used for balancing storage among reservoirs) are derived by trial and error using simulation models (i.e. the parameters of the rule are "tuned" to achieve superior performance). This was done, at least to some degree, in developing the IOP. Lack of time has prevented us from extensive tuning of the parameters of the MSRR. Therefore, we are certain that the rule presented below can be tuned for even better performance. In addition, it is likely possible to invent alternative forms for operating rules. Such rules could be superior to the MSRR. We urge the USACE to work with stakeholders to develop better forms of operating rules, and we stand ready to assist.

The following sections compare the performance of the proposed implementation of the MSRR with historical operations and operations under the IOP.

6.1 Protection and Enhancement of Threatened and Endangered Species

The conclusions in the Biological Opinion are based on the "biologically relevant" characteristics of the flow regime for each species. USFWS developed graphs developed to plot these characteristics for the "baseline" (historical) and "run-of-river" scenarios against the IOP. USFWS then used following chart to determine whether the IOP would have an "adverse" or "beneficial" effect on the species.

Figure 6 (BiOp Figure 4.2.A): Evaluation of Effects

Biologically Relevant Flow Regime Characteristic

	Adverse ← Condition Gradient → Beneficial			Interpretation of IOP Alteration
1	Baseline	IOP	RoR	Beneficial, but not attributable to the IOP
2	Baseline	RoR	IOP	Beneficial
3	IOP	Baseline	RoR	Adverse
4	IOP	RoR	Baseline	Adverse
5	RoR	Baseline	IOP	Beneficial
6	RoR	IOP	Baseline	Adverse, but not attributable to the IOP

The same graphs, and the same chart, should be utilized to evaluate any proposed revision to implement RPM3. The actual graphs utilized by USFWS in the Biological Opinion are reproduced in Section 4, except that one line has been added to each graph to represent the Corps' "Concept #3" and another has been added to represent the revision proposed by ARC (the "Maximum Sustainable Release Rule").

Based on these performance measures, the proposed alternative out-performs the IOP and Concept #3 in the protection and enhancement of habitat for threatened and endangered species. The proposed alternative also performs better than or at least equal to the "baseline" and "run-of-river" alternatives for every performance measure evaluated by USFWS in the Biological Opinion.

6.2 Mussel Species

Figure 7 (BiOp Figure 4.2.2.A): Flow Frequency at the Chattahoochee Gage

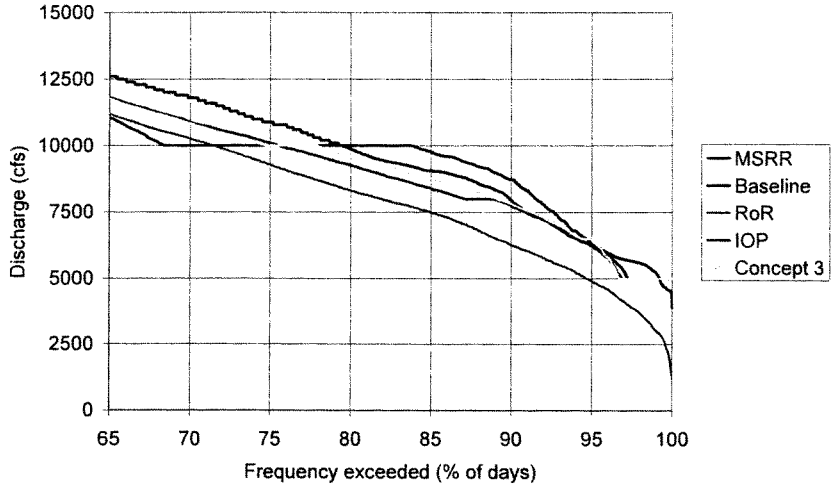


Figure 7 (BiOp Figure 4.2.2.A) shows the flow frequency at the Chatahoochee gage. Higher values are better According to the BiOp, fat threeridge mussels may occasionally be affected by flows below 10,000 cfs. The graph shows the distribution of such flows for each of the cases. The MSRR has significantly lower frequencies of flows from 10,000 cfs to approximately 6000 cfs, and approximately the same frequency of flows lower than 6000 cfs compared to the IOP and Concept 3. Therefore the MSRR is more desirable in terms of this performance measure.

Figure 8 (BiOp Figure 4.2.5.A): Inter-Annual Frequency of Discharge Events

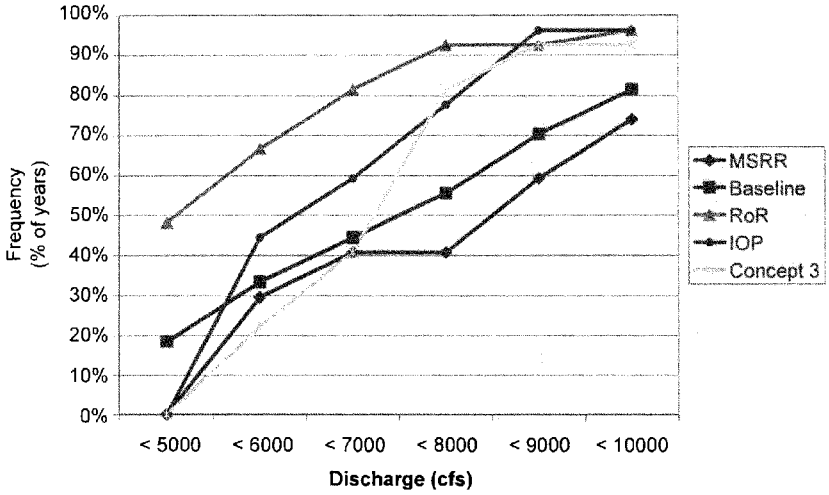


Figure 8 (BiOp Figure 4.2.5.A) shows the percent of years with flows below thresholds from 5,000 to 10,000 cfs in 1,000 cfs increments. Lower numbers are better. With the minor exception of Concept 3 at flows of 6,000 cfs, the MSRR performance is superior.

Figure 9 (BiOp Figure 4.2.5.B): Number of Low-Flow Days in the Worst Year

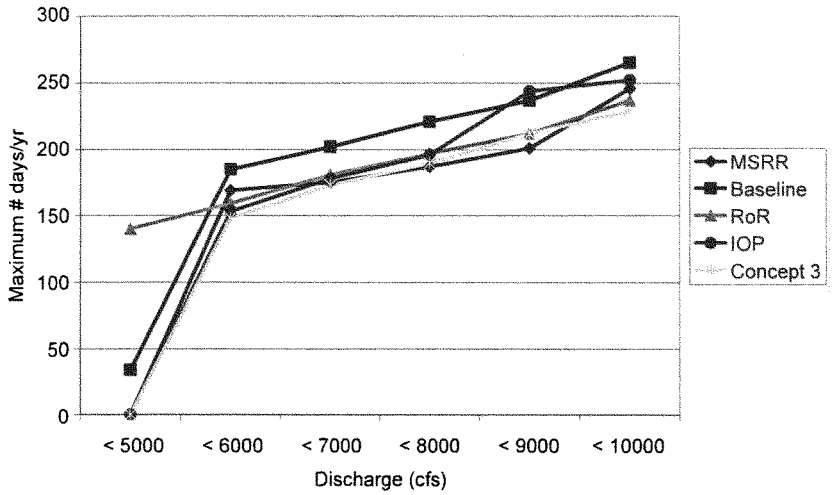


Figure 9 (BiOp Figure 4.2.5.B) shows the number of low flow days in the worst year to the record for the same thresholds as the previous figure. Fewer days are better. The performance of the MSRR is not significantly different in this performance measure than either of the other operating rules.

Figure 10 (BiOp Figure 4.2.5.C): Number of Consecutive Low-flow Days in Worst Year

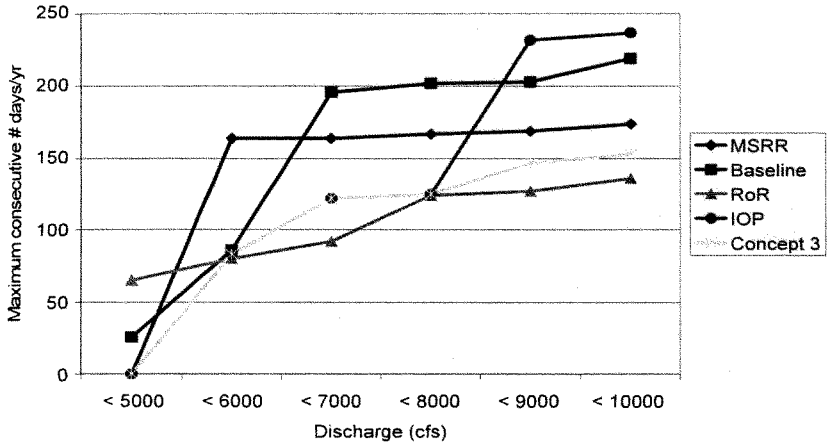


Figure 10 (BiOp Figure 4.2.5.C) shows the number of consecutive days of low flow in the worst year. Lower numbers are better. While the MSRR does not perform as well as the IOP or Concept 3 on this measure, the difference is not significant. This is especially true because the total number of days in the year is approximately the same, and mussels are impacted primarily when the flows fall. Arguably, for the same number of days of low flow, it is better for the mussels if the flows fall only once as opposed to several times. More days of consecutive low flow imply fewer rises. This is beneficial because those rises could induce mussels that have survived by moving to lower elevation habitats to move back to higher elevation habitats where they would again be vulnerable if flows fell again. In other words, at extreme low flows, it more important to provide stable flows than it is to provide higher flows that can be sustained for only a short period of time.

Figure 11 (BiOp Figure 4.2.5.D): Number of Low-flow Days in Median Year.

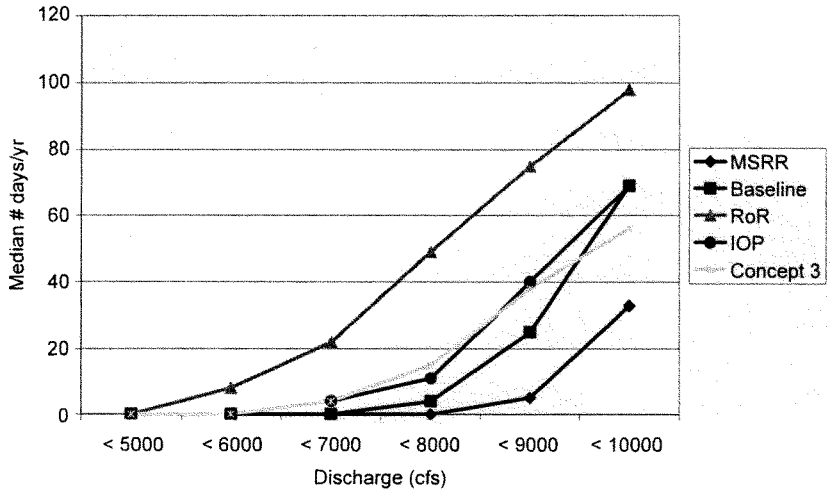


Figure 11 (BiOp Figure 4.2.5.D) shows the median number of days of flow below thresholds in a given year. Lower is better. The MSRR performance with regard to this criteria is clearly and substantially superior for mussels. The figure reflects the fact that more than half of the years have no days with less than 8000 cfs under the MSRR. The corresponding flow for the IOP and Concept 3 is 6000 cfs. Note that the MSRR is the only operating rule that outperforms historical flows for this performance measure.

Figure 12: Frequency of Sustained Low Flows 1975-2001

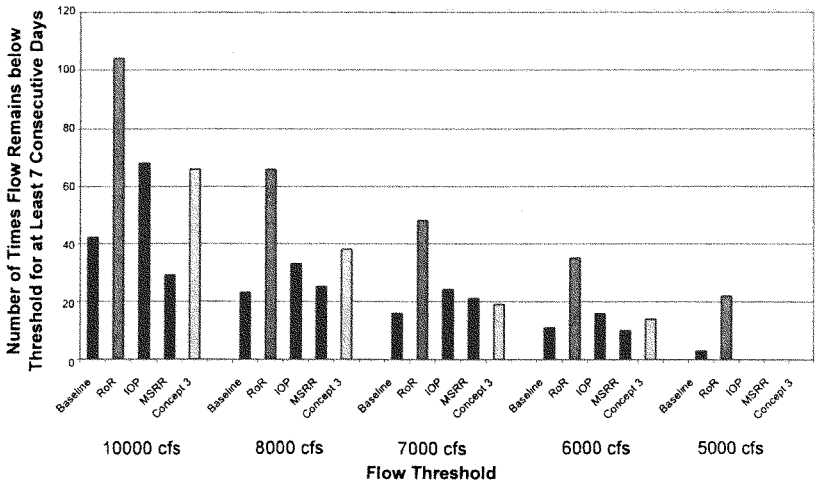


Figure 12 is not contained in the BiOp, but clearly shows the superior of performance of the MSRR with regard to benefits to endangered mussels. It shows the number of times in the simulated record that flows fall below thresholds for at least seven days. This is important because mussels can survive short periods of dewatering. The MSRR clearly outperforms the IOP and Concept 3 at the 10,000 8.000 and 6,000 cfs thresholds, and is equivalent to both rules at the 7,000 cfs threshold.

Figure 13: (BiOp Figure 4.2.4.A): Max Number of Consecutive Days per Year of Flow Less than 16,000 cfs

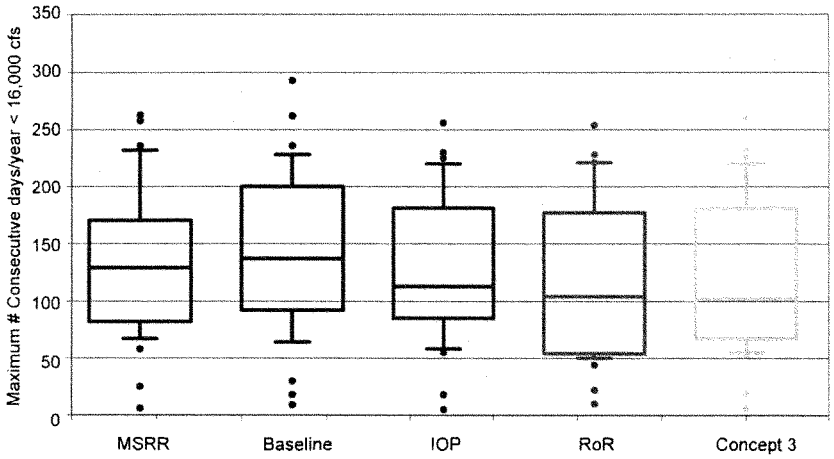


Figure 13 (BiOp Figure 4.2.4.A) shows the distribution of the number of days per year below 16,000 cfs for all cases. It is difficult to distinguish the performance of the alternatives based on this performance measure.

The mussels are also affected by the daily change in stages, which is why ramping rates on the reduction of flows at Woodruff is part of the IOP. The next two performance measures are designed to evaluate the rate of change of stage experienced by the mussels. The first of these, Figure 14 (BiOp Figure 4.2.5.F), shows the rate of stage change for flows under 10,000 cfs only. Based on the IOP ramping rates, all days should fall under the first two categories: rising or stable or <= 0.25 ft/day. The MSRR respects the ramping rate restrictions at these low flows much better than the IOP or Concept 3; however, this may be because OASIS is able to enforce the ramping rates more closely than HEC 5 rather than an actual difference in the operating policies.

This difference in the modeling tools also affects the next performance measure, Figure 15 (BiOp Figure 4.2.5.E). Given these differences it is difficult to evaluate these performance measures. They are included for completeness, nonetheless.

Figure 14 (BiOp Figure 4.2.5.F): Frequency of Daily Stage Changes When Releases from Woodruff are Less than 10,000 cfs

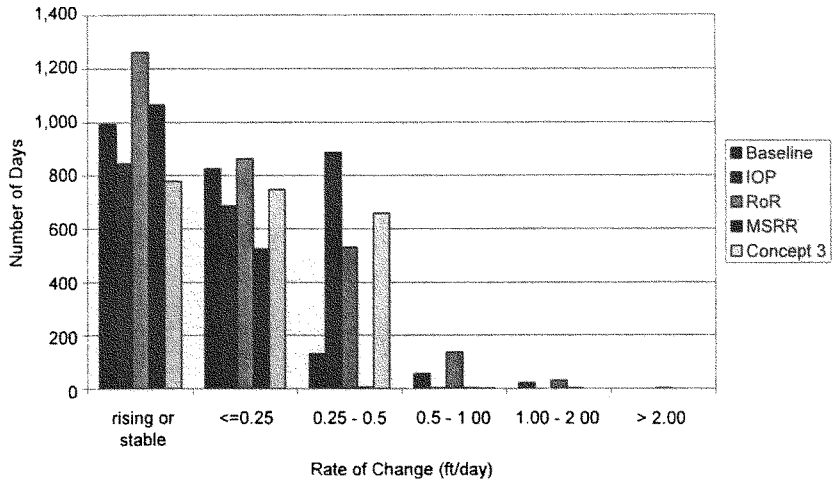
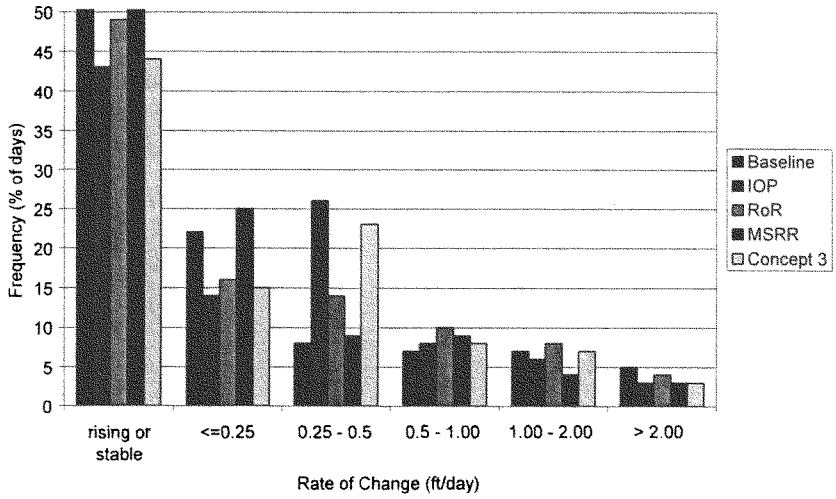


Figure 15 (BiOp Figure 4.2.5.E): Frequency of Daily Stage Changes



Floodplain connectivity is important for the lifecycle of the host fish that support the mussel species. The next two performance measures, Figures 16 and 17, quantify the number of floodplain acres connected to the main channel during growing season. Note that the relationship between acres of connected floodplain and flow was estimated from BiOp Figure 3.3.2.B, so the lines do not match those in the BiOp figures exactly.

Figure 16 (BiOp Figure 4.2.6.A) shows the percent of days in which amounts of habitat area are connected. Most of the runs follow the same trend, with the IOP higher for some habitat areas, lower for others.

Figure 16 (BiOp Figure 4.2.6.A): Frequency of Floodplain Connectivity to the Main Channel During Growing Season

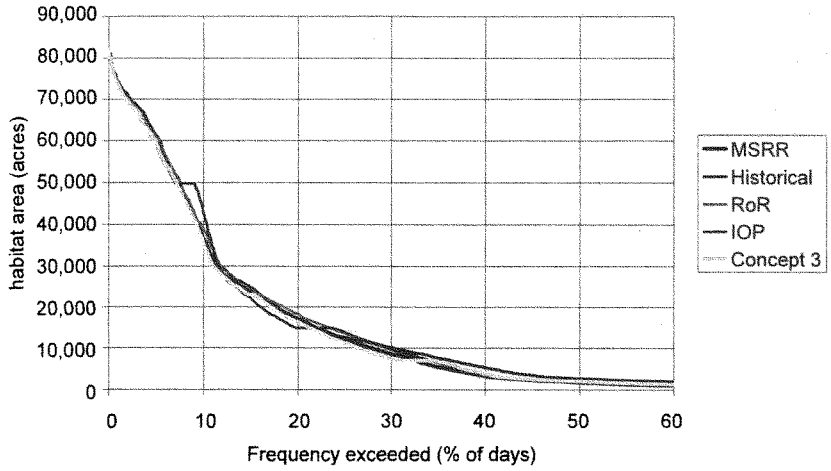
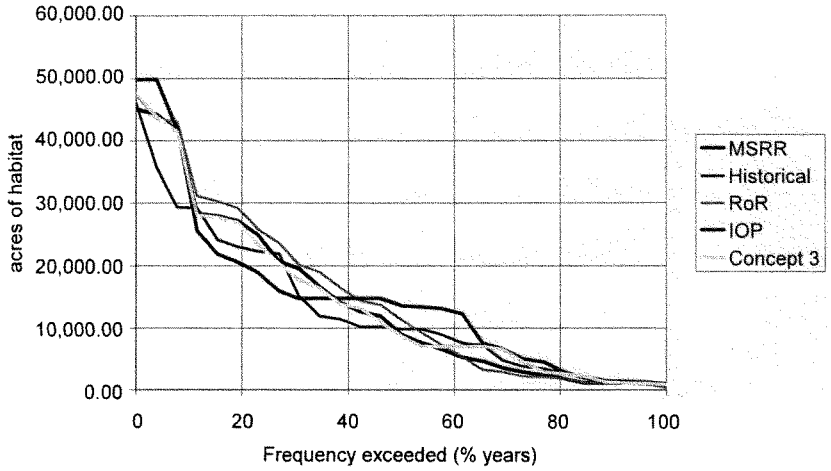


Figure 17 (BiOp Figure 4.2.6.B), the next performance measure, looks at the amount of habitat area connected for at least 30 days each year. The IOP is higher for some ranges, the MSRR for others. In general, the runs are comparable and do not appear to be inferior to historical. Note that storing more water in the spring under Concept 3 shifted the IOP trace closer to that of the MSRR. The MSRR more closely mimics run-of-river (ROR) than does the IOP. This may be desirable.

Figure 17 (BiOp Figure 4.2.6.B): Max Floodplain Habitat Connected to the Main Channel for at least 30 Days During Growing Season

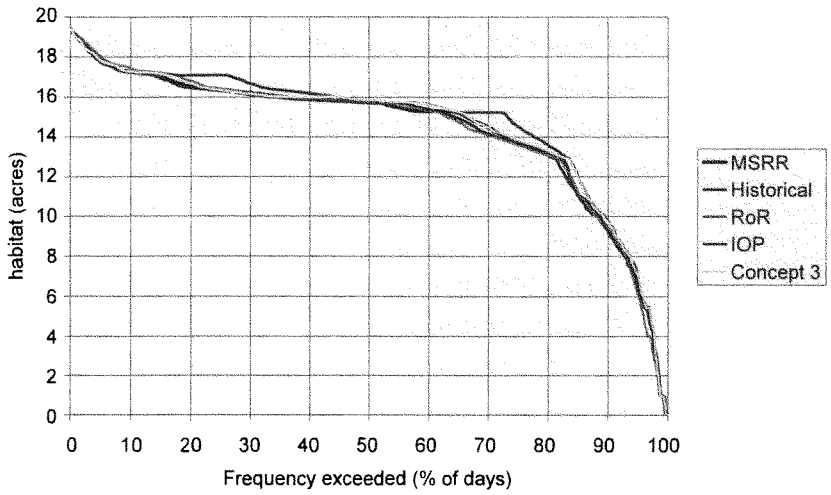


6.2.1 Gulf Sturgeon

As demonstrated in the previous section, the MSRR is clearly superior for the mussels overall. Based on the gulf sturgeon habitat measures from the BiOp, the MSRR is no worse for the sturgeon. We do recommend that these performance measures be refined for the reasons discussed below.

The first performance measure, Figure 18 (BiOp Figure 4.2.3.A), shows the frequency of days that different amounts of habitat are available during spawning season. The traces are not significantly different with the exception of the IOP, which provides spawning habitat around 15 acres and 17 acres more frequently than the other scenarios. Note that the increase in stored water in the spring under Concept 3 removes these features of the IOP trace, and Concept 3 follows the other traces more closely. The differences are small and do not appear to be significant.

Figure 18 (BiOp Figure 4.2.3.A): Frequency of Spawning Habitat Availability



The next performance measure, Figure 19 (BiOp Figure 4.2.3.B), shows the maximum amount of habitat sustained for at least 30 days during spawning season each year. The IOP performs somewhat better than the other traces on this measure. The increase in sustained habitat, however, is at most about 1.5 acres, which is not likely to significantly affect such a small population of spawning fish. Furthermore, the changes planned to the IOP by the USACE illustrated by Concept 3 reduce the advantage of the IOP on this measure. The MSRR provides more sustained habitat than the Baseline or RoR, signifying no impact to the sturgeon based on the BiOp criteria. Finally, the performance on this particular measure is greatly influenced by the bathymetry at RM 99.5, the location at which very few eggs have been collected compared to RM 105.

The relationship between flow and sturgeon habitat is shown in Figure 20 (BiOp Figure 3.6.1.4.C). Note that at flows greater than 50,000 cfs, the available habitat decreases down to zero at 150,000 cfs. In addition, habitat at RM 99.5 decreases dramatically at 23,000 cfs. Therefore, high flows do not necessarily correspond to higher availability of spawning habitat. Further, the decrease in habitat at RM 99.5 at flows above 23,000 cfs causes a dip in total habitat below 14 acres between 29,000 and 34,000 cfs. Avoiding flows in this particular range can have a significant impact on the sustained habitat performance measure. In 1979, for example, flows at the Chattahoochee gage fall in the range for the MSRR on May 3, causing the habitat to fall from about 15 to 13 acres. Flows in the IOP fall between May 6 and 10 as well, but they skip the habitat dip, dropping from 37,000 to 24,000 cfs in a single day. The flows and corresponding habitat are shown in Figure 21. Since these days in May fall within the 30-day maximum sustained habitat time frame, the value for the MSRR is about 13 acres for this year, while the

value for the IOP is about 15 acres. This reduction in sustained habitat for the MSRR happens again in 1980.

Figure 19 (BiOp Figure 4.2.3.B): Max Habitat Sustained for At Least 30 Days During Spawning

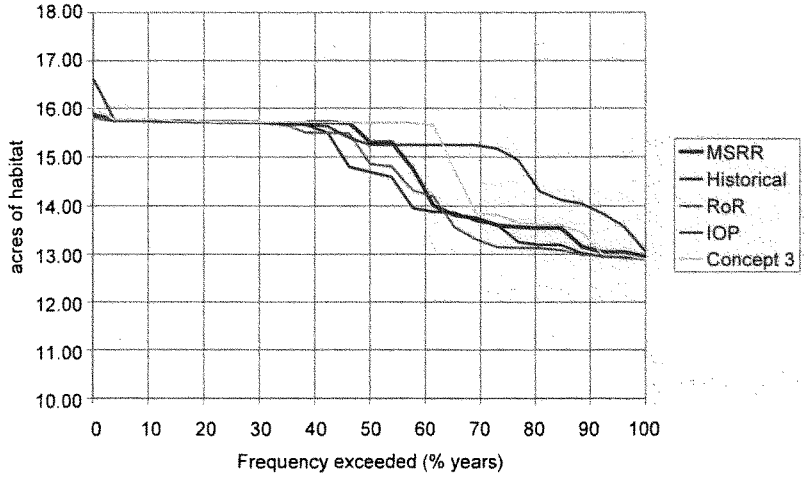


Figure 20 (BiOp Figure 3.6.1.4.C): Area of Gulf Sturgeon Spawning Habitat

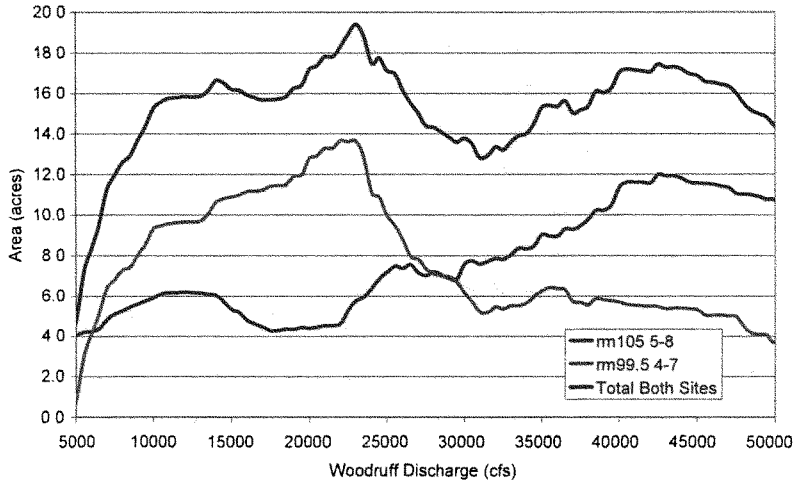
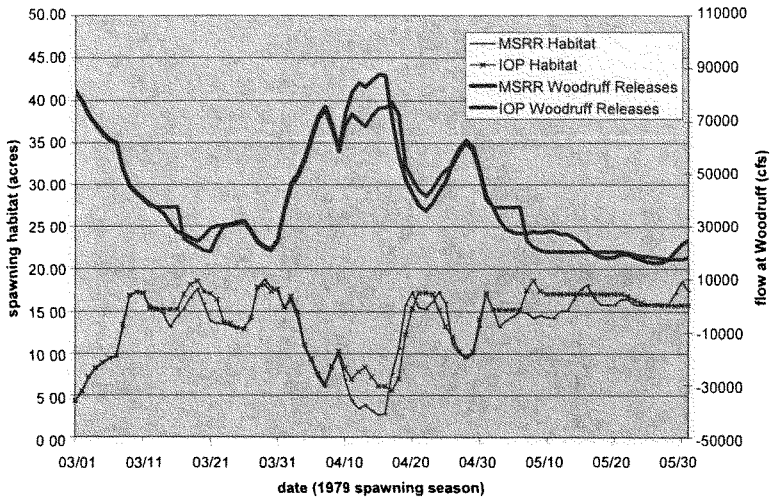


Figure 21 Spawning Habitat and Woodruff Releases in 1979



The MSRR could be tuned to avoid the problematic range of flows. We have not yet done so, however, for two reasons. First, the dip in habitat may or may not reflect an actual decline in usable habitat. Based on the "range of spawning depths observed" after the removal of the outliers, there will be some amount of habitat loss as flows increase simply as a matter of channel geometry. This is because at some point under increased flows, depths will increase to greater than 18.0 feet before other areas of the rock shoal are inundated with at least 8.5 feet of water. While the range of depths in the BiOp may be optimal based on this depth range rule, it is obvious from the 2005 and 2006 data that sturgeon will spawn at depths outside of this range. Habitat may not be lost as water depth increases in the main channel in response to flows that result in channel depths greater than 18 ft with shelf depths less than 8.5 ft. This casts doubt on differences in apparent available habitat among various management scenarios at intermediate flows.

In addition, the MSRR currently performs as well or better than the IOP at RM 105, the more important of the two spawning sites, as seen in Figures 22 and 23. Figure 22 shows that the MSRR has more days that fall below habitat in the 8 to 10 acre range, but less days that fall below habitat in the 4 to 6 acre range. Figure 23 shows that the MSRR supports more sustained habitat than does the IOP in the range of 5 to 7.5 acres, and equally as much as the IOP for all other values of habitat. We believe that the sustained habitat measure is the more critical of these two and so conclude that the performance of the MSRR with regard to sturgeon habitat is at least as good if not better than the performance of the IOP. The same holds true for the comparison of the MSRR and Concept #3. The performance of the MSRR is clearly no worse than the baseline or RoR, as well.

Figure 22 (BiOp Figure 4.2.3.A): Frequency of Spawning Habitat Availability at RM 105

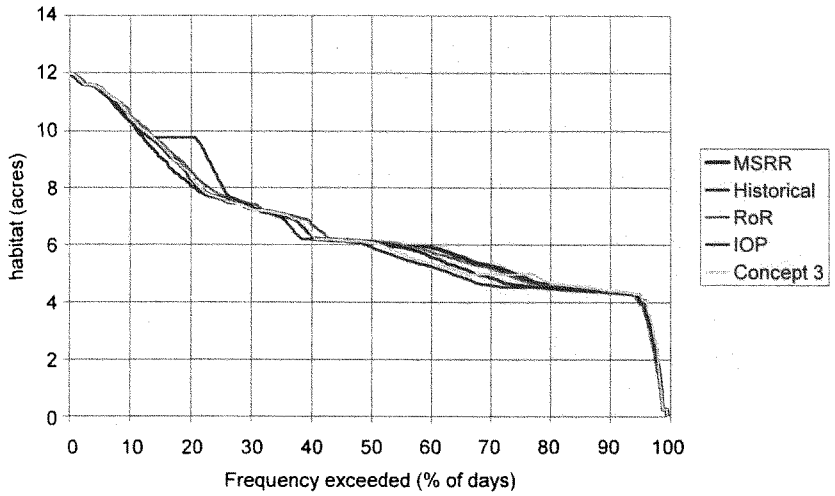
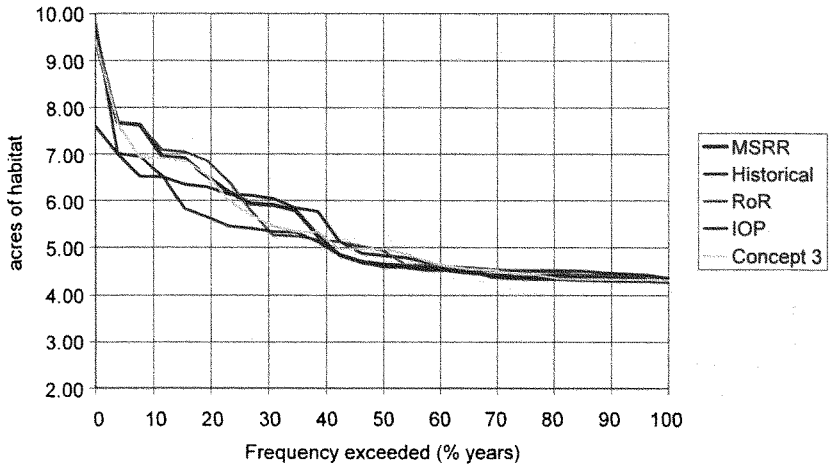


Figure 23 (BiOp 4.2.3.B): Max Habitat Sustained for At Least 30 Days During Spawning Season at RM 105



6.3 Other Operational Objectives

6.3.1 System Storage

Figure 24: System Storage 1940-2001

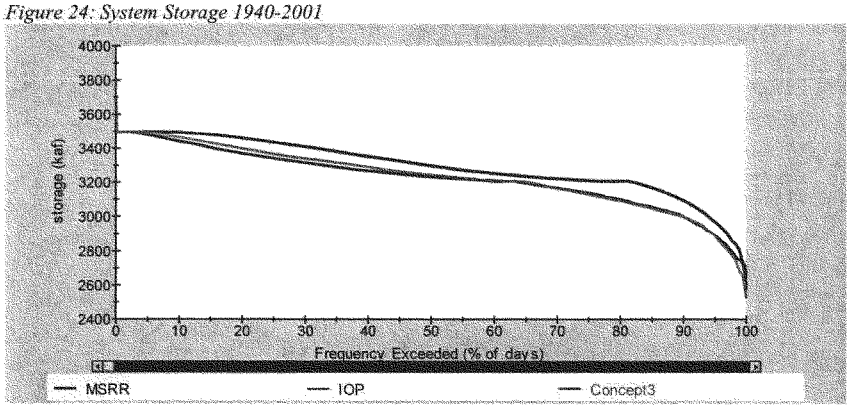


Figure 24 shows the cumulative distribution of system storage for all three operating rules. The graph indicates MSRR produces consistently higher values of storage under almost all operating conditions. This strongly suggests that the system will be better able to respond to drought events more extreme than historical droughts if operated using the MSRR.

6.3.2 Recreation Impacts

Figures 25, 26 and 27 show the benefits of implementing the MSRR relative to recreation impacts. Higher lines are better. The graph for Lanier (Figure 25) shows a wholesale reduction in impacts measured in recreation days at all impact levels.

The graph for West Point (Figure 26) is somewhat more complicated because operations for flood control lower the top of conservation pool, and thus reservoir storage, to the level 2 impact stage every year. The dotted orange line shows the recreational impact of maintaining the reservoir at the top of the seasonally-varying conservation pool at all times, with no other other lowering of the reservoir stage. The impact of operations for all other purposes is the difference between the orange line and the line corresponding to each operating rule. Again, the MSRR is substantially superior to either of the operating rules with regard to this performance measure for all levels of recreational impact.

The graph for Lake Eufala (W. F. George, Figure 27) shows that the MSRR produces more days of initial recreational impact at Eufala than the other two rules. The reservoir balancing scheme in the MSRR makes this happen because it tries to balance impacts among the three reservoirs while minimizing the total impact. The small additional drawdown in Lake Eufala allows that lake to capture water that would otherwise be spilled without significant

benefit to other operating objectives. The drawdown contributes significantly to the achievement of all other operating objectives by preserving system storage upstream. The additional drawdown is quite equitable, as shown in Figure 29-31, and is substantially superior to historical conditions. The same is true for Lake Seminole (Woodruff), as shown in Figure 28. We have no estimates of recreational impact levels for Lake Seminole.

Figures 29, 30 and 31 summarize the recreational impacts for Lake Lanier, West Point Lake and Lake Eufala at each of the impact levels. The overall recreational impacts of the MSRR are clearly less than those of the other two rules, and more equitably apportioned between the lakes.

Figure 25: Frequency of Stages at Lake Lanier

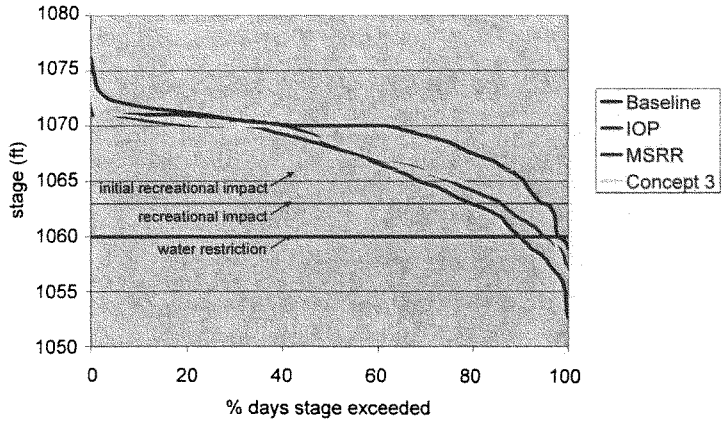
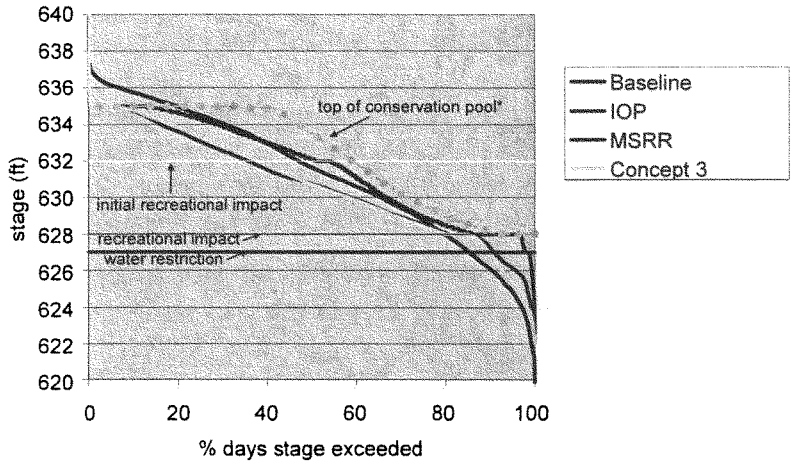


Figure 26: Frequency of Stages at West Point



**This line indicates reservoir levels when West Point is kept at the top of the seasonally-varying conservation pool every day.*

Figure 27: Frequency of Stages at Walter F. George

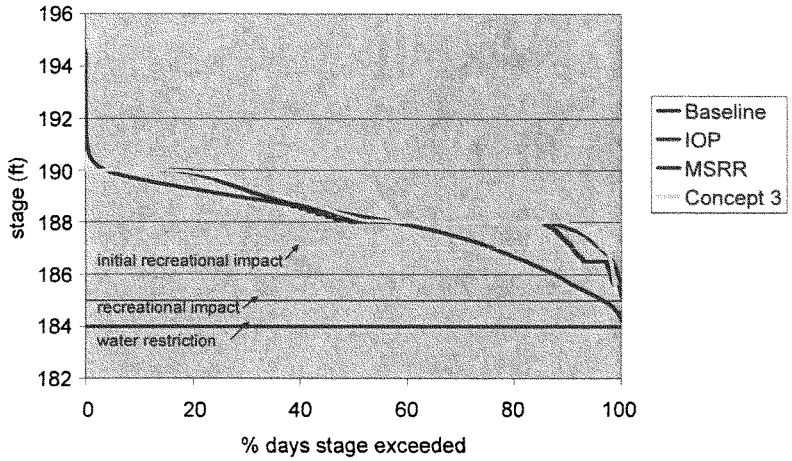


Figure 28: Frequency of Stages as Woodruff

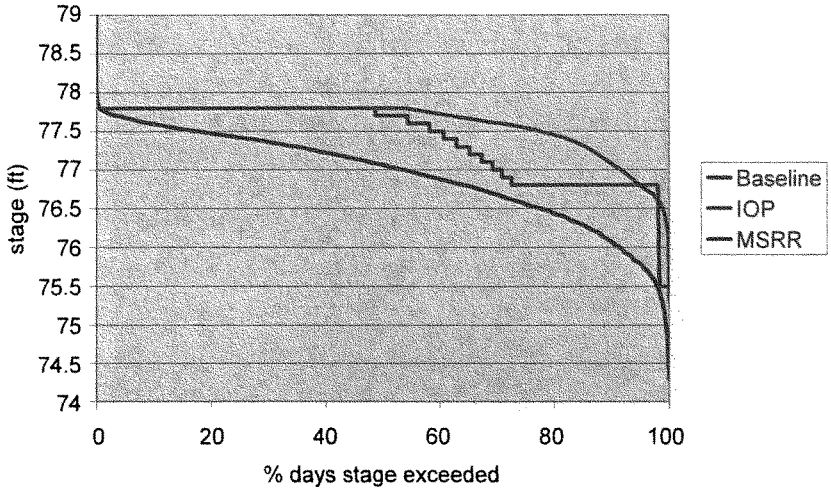


Figure 29: Recreation Impact (1975-2001) - Impact Level 1 (Initial Impact)

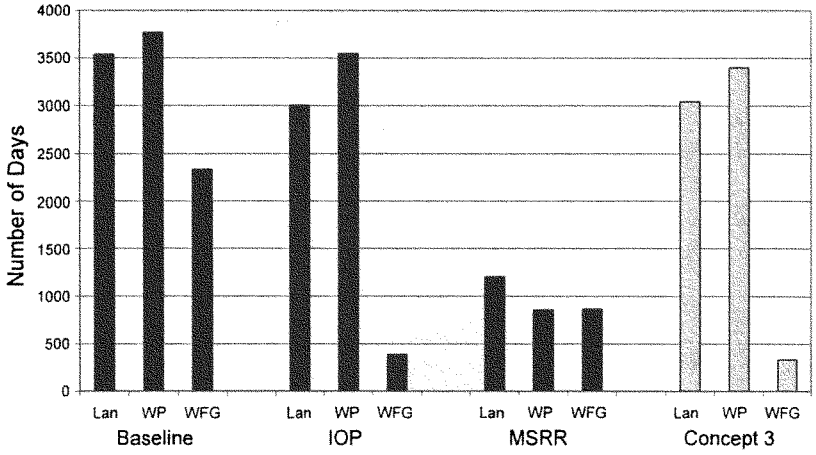


Figure 30: Recreation Impact (1975-2001 - Impact Level 2 (Recreation Impact)

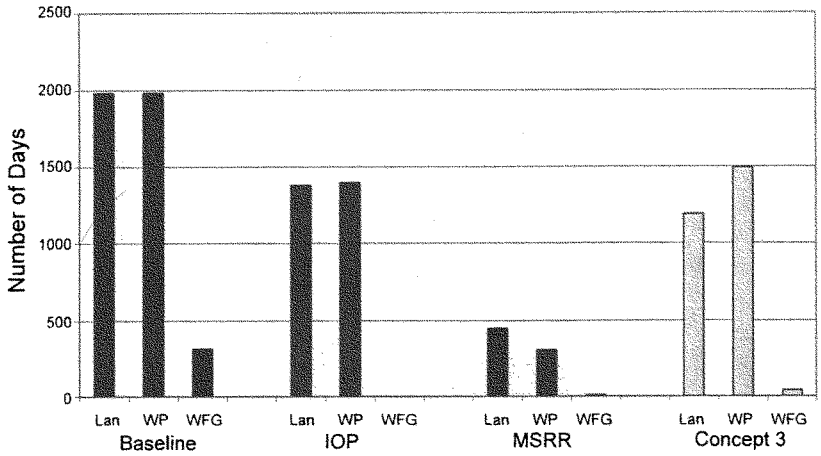
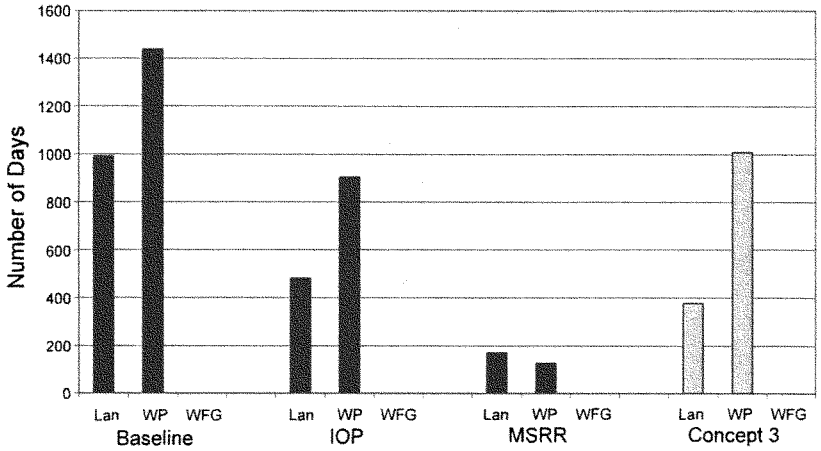


Figure 31: Recreation Impact (1975-2001) - Impact Level 3 (Water Restriction)



6.3.3 Hydropower

Figure 32 shows monthly hydropower generation for the IOP and for the MSRR, and the standard deviation for each month. The difference in total generation is insignificant, although the monthly distribution shows minor differences.

Figure 32: Average Monthly Energy Generated (1940-2001)

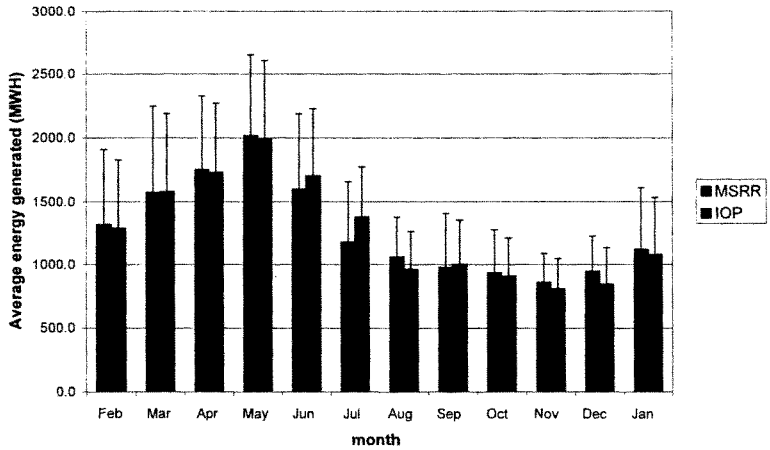
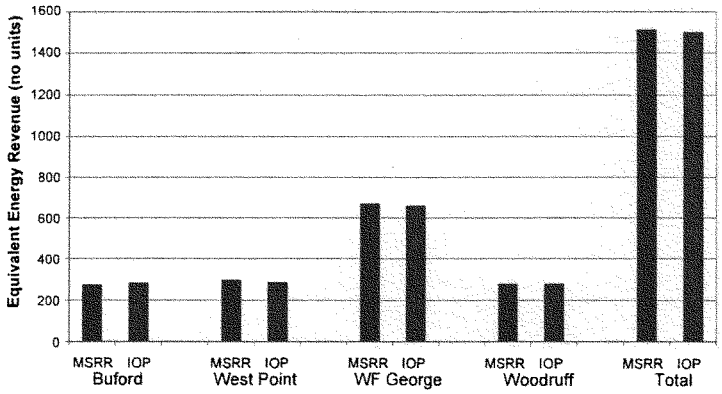


Figure 33 shows an estimate of the value of the power produced. This value is estimated using the average of 2001-2005 day-ahead peak power generation prices from the ERCOT hub. An individual price was generated for each day in the calendar year. The power generation for the day is divided by the generating capacity of the powerhouse for the day to give the number of hours of generation. At Buford, the capacity is a function of elevation, and at the other powerhouses it is constant. This is the same as the method used in HEC5. The first 3 hours of generation are priced at peak price levels, and the remaining hours at 1/3 of peak price levels to estimate the value of power generated for the day. We believe this is a reasonable first order estimate of value. The MSRR produces an insignificantly higher value for power produced even though it has minimal provisions for optimizing power generation.

It is important to note that the MSRR generates energy only when prices are high rather than everyday. As seen above, this not only increases the value of power generated, it also produces better biological performance.

Figure 33: Average Equivalent Energy Revenue



6.3.4 Flood Control

The proposed alternative does not include any requirements concerning flood control operations beyond those associated with the seasonal curve for specifying the top of conservation pool in each reservoir. Top of conservation rule assumptions are unchanged from current levels. Therefore, implementing the proposed alternative will not impact flood control performance.

7. CONCLUSION

The Maximum Sustainable Release Rule ("MSRR") is proposed as a revision to the IOP for the implementation of RPM3:

- The MSRR responds to RMP3 by increasing minimum flows below Woodruff to the maximum sustainable flow whenever basin conditions permit.
- The MSRR ensures that such releases will not compromise the ability of the system to meet critical needs over the long-term.
- The MSRR performs better in terms of many operating objectives, including but not limited to those relating to the protection of threatened and endangered species. MSRR does not perform significantly worse in terms of any operating objective.
- The MSRR provides improved ability to cope with droughts worse than the drought of record with regard to maintaining environmental flows and maintaining public health and safety.
- The MSRR is a practical rule that is easily implemented.
- We appreciate the Corps' consideration of this approach and will make available to any information, data or other resources necessary to validate the rule. We also stand ready to assist the Corps in any way possible.

ATTACHMENTS

1. CD Containing Input-output files for the MSSR.
2. Robert M. Hirsh, *Stochastic Hydrologic Model for Drought Management,* Journal of the Water Resources Planning and Management Division, ASCE, Vol. 107, No. WR2 , Proc. Paper 16558, October 1981, pp. 303-313.
3.

EXHIBIT D

Alternative ACF Reservoir Operations

Overview of the Maximum Sustainable Release Rule

March 2008

Daniel P. Sheer, Ph.D, P.E
HydroLogics, Inc.

Lewis B. Jones
King & Spalding LLP

The Interim Operations Plan (IOP) Operations for the ACF

- The IOP was hastily adopted in 2006 in response to litigation by Florida.
- It is demonstrably flawed and not sustainable.
  - It prevents the reservoirs from refilling and requires the Corps to use reservoir storage to artificially maintain high flows in the Apalachicola River.
  - The IOP nearly emptied the ACF reservoirs in 2007.
- The IOP was suspended by the EDO in November 2007. However, the EDO is scheduled to terminate on June 1, 2008 and will be lifted if Composite Storage reaches Zone 2.
- We simply cannot return to the IOP. Therefore, a new interim plan must be developed until the Water Control Manuals can be updated.

There Are Alternative Management Options Available That Can Accommodate the Demands of All Users

- We need a new operating plan based on facts and sound science.
  - The facts will show that metro area water use is reasonable … just 1% of the annual water budget in the ACF River Basin in an average year and just 2% in an extreme drought year.
  - The system can accommodate these demands if the reservoirs are properly operated.
- We have proposed on plan of operations—the "Maximum Sustainable Release Rule" or "MSRR"—that would perform better than the IOP for almost all operational objectives that have been identified.
  - While the MSRR can be improved based on input from other stakeholders, it demonstrates that sound alternatives to the IOP are available.

Maximum Sustainable Release Rule: Three Main Principles

1. Make release decisions based upon a "Balanced Budget Rule"
   - Consider available reservoir storage and forecasted inflow
   - Provide a 90% probability of refill by June 1
2. Maintain "Reserve Storages" as a failsafe
3. Adjust operations to meet specific operational objectives

1. Balanced Budget Rule

- The Annual Water Budget is the total amount of water available for all purposes in a given year.
- Reservoir storage is available to *manage* the annual budget, but reservoirs do not *increase* the budget.
  - Releasing water from storage is like spending money from a savings account in anticipation of future income to solve a cash-flow problem.
- An operating plan is sustainable only if annual releases (expenses) are roughly equivalent to annual inflow (income).
- A "Balanced Budget Rule" for the reservoirs will ensure that releases from storage do not exceed expected income.
  - The major flaw in the IOP is that it places high demands on reservoir storage to support minimum flows in the summer and fall without allowing the reservoirs to refill in the winter and spring. Therefore annual demands under the IOP substantially exceed annual income.
- The Balanced Budget Rule provides necessary security for water supply (by ensuring that reservoirs will not be emptied) but also produces a more natural flow regime.

1. Balanced Budget Rule

- To implement the balanced budget rule, follow these steps each week:
  - Determine how much water is in storage in the reservoirs
  - Prepare an inflow forecast to estimate the volume of inflow expected before June 1
  - Based on the status of system storage and the inflow forecast, calculate the amount of water that must be kept in storage to provide a high probability that all reservoirs will refill by June 1.
    - Water in excess of this amount is the "available storage"
  - Budget for all available storage to be released in accordance with a schedule adjusted to maximize benefits.

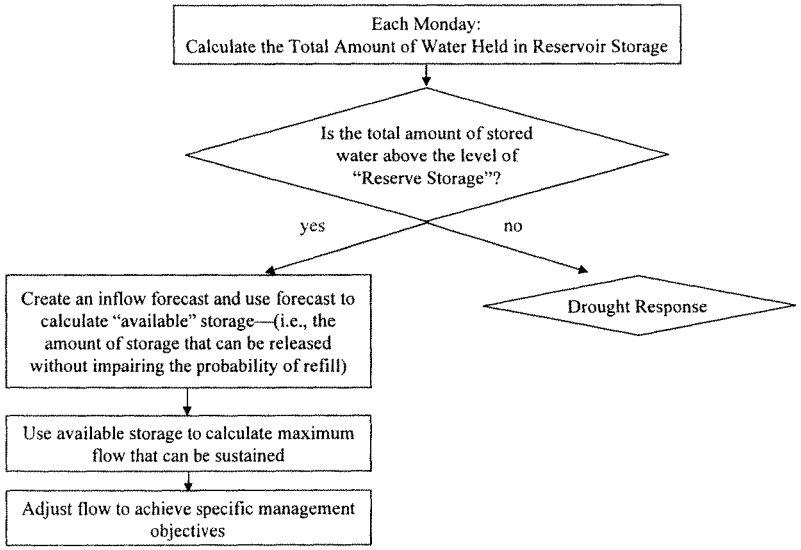
2. Reserve Storages

- "Reserve Storages" provide a failsafe in case the forecasts are wrong
  - The Reserve Storages are storages that must be available *at the beginning* of a drought to ensure that essential needs can be met throughout the drought.
  - Initiate drought contingency measures (minimum flows) when available storage falls below the level of the Reserve Storages.
  - Rarely be triggered in practice
- To calculate Reserve Storages, follow these steps:
  - Use simulation models to calculate the amount of storage required meet essential needs (water supply as well as minimum environmental flows) throughout a record drought
  - Add an appropriate margin of safety

3. Adjustments To Meet Specific Operational Objectives

- Adjust operations to meet specific, measurable operational objectives
- Our proposal includes two adjustments in particular:
  1. Releases from reservoir storage should never be used to augment flows at the Chattahoochee gage above 10,000 cfs
     - No apparent value to mussels
     - Little increase in sturgeon spawning habitat
     - Stored water can be budgeted for other purposes, including the support of low summer flows for mussels
  2. Maximum ramping rates (40 cfs/day)
- Our proposed adjustments are just a starting point—operational objectives should be balanced among all stakeholders

Maximum Sustainable Release Rule: Decision Tree



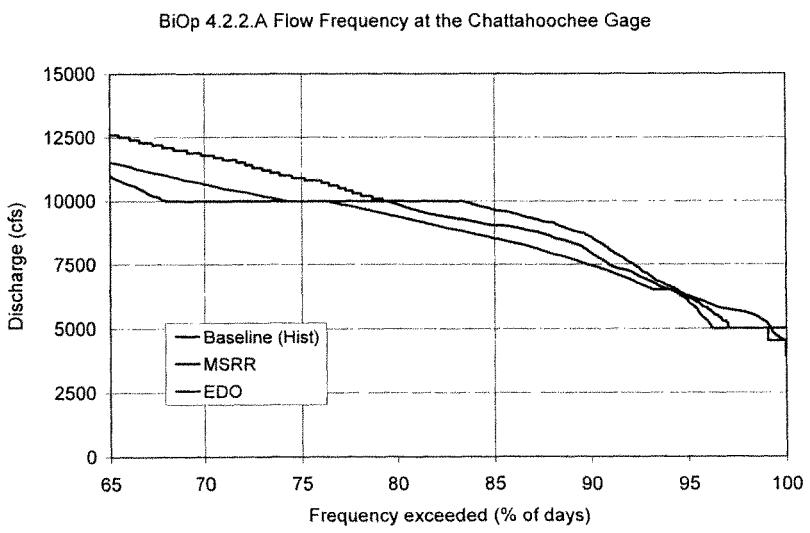
Summary of Results

- Our alternative…
  - Outperforms the IOP/EDO on many important measures, including the key environmental measures, and perform at least as well on all others.
  - Can be improved with input from other stakeholders, but already clearly better than the IOP/EDO.
- Evaluate results using performance measures for the following objectives:
  - Mussel flows (low flows)
  - Sturgeon Habitat
  - Floodplain connectivity
  - Lake levels and system storage
  - Recreation impact
  - Power generation
- The remaining slides compare the MSRR to the IOP on these performance measures.

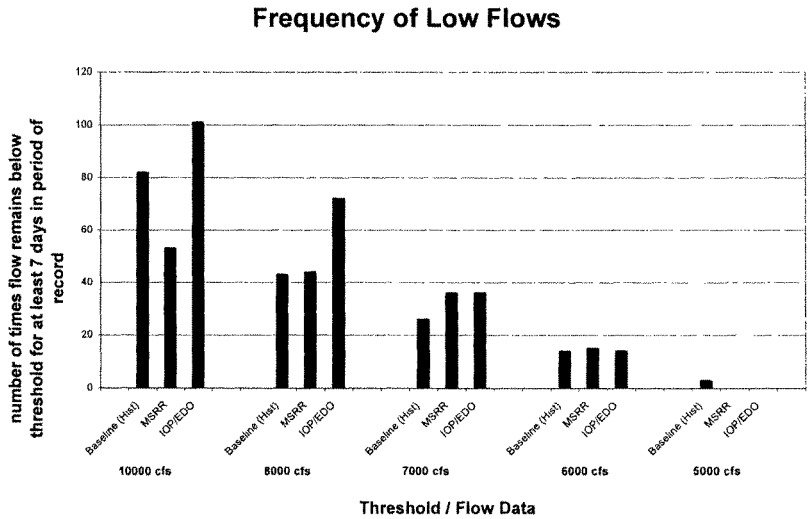
Mussel Flows: The MSRR Outperforms the IOP/EDO

- According to the US Fish & Wildlife Service, endangered and threatened mussels may be adversely affected by Apalachicola River flows less than 10,000 cfs.
- The MSRR has significantly lower frequency of flows less than 10,000 cfs when compared to the IOP/EDO.
- The MSRR is clearly superior based upon this performance measure and better protects the threatened and endangered mussels.

Higher Flows in Critical Range for Mussels



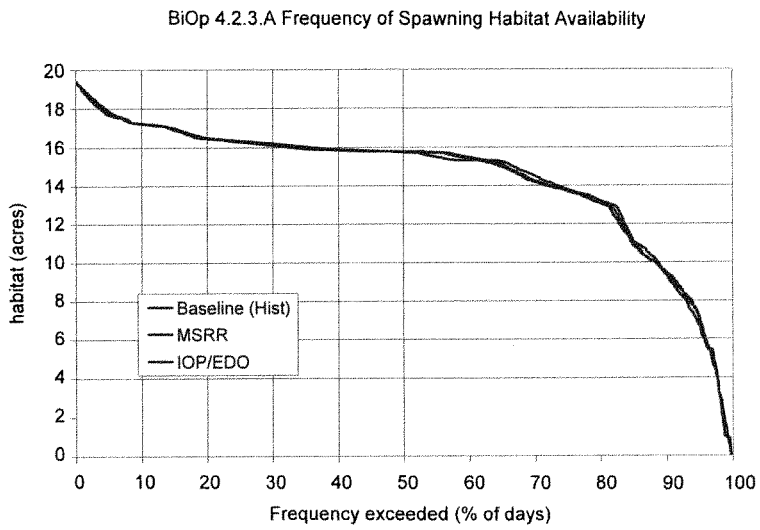
Fewer Occurrences of Sustained Low Flows



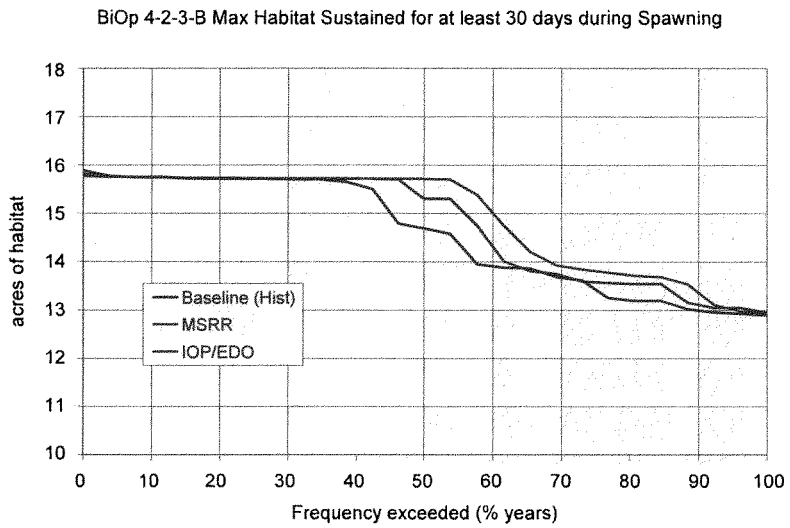
Sturgeon Habitat: The Amount of Available Spawning Habitat is Functionally Equivalent

- The US Fish and Wildlife Service has examined the relationship between river flow and available sturgeon spawning habitat.
- The MSRR performs as well or better than the IOP/EDO in protecting these critical sturgeon spawning areas.

There is no Functional Difference in Available Sturgeon Spawning Habitat

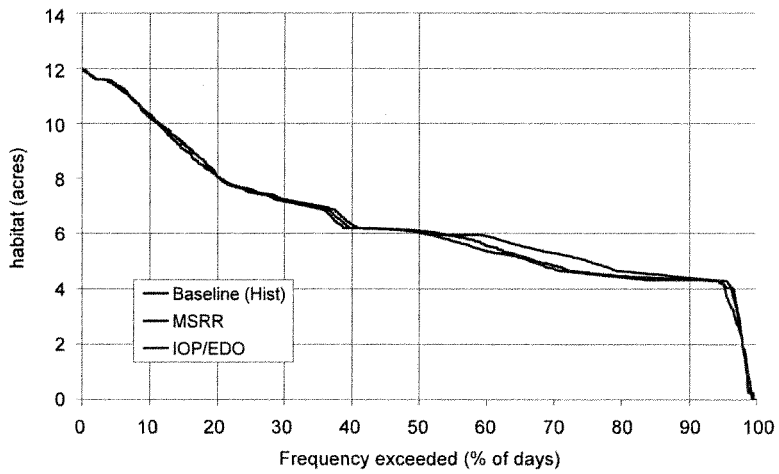


Little Reduction in Total Sustained Sturgeon Spawning Habitat

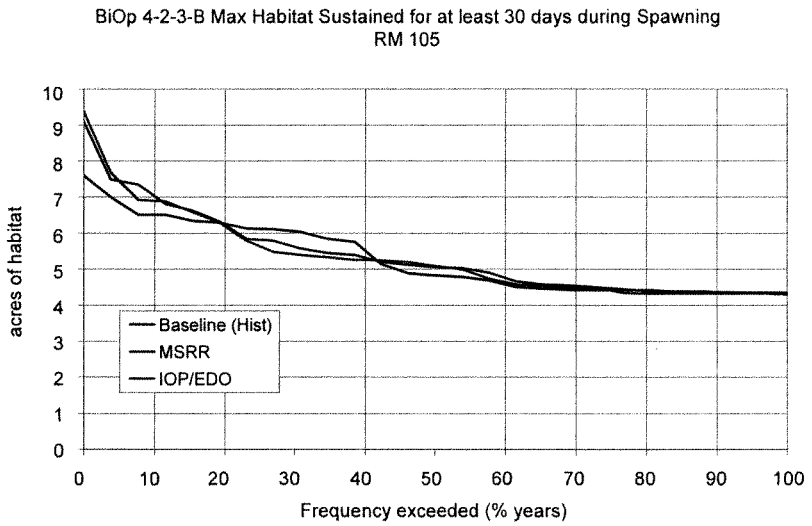


The MSRR Performs As Well or Better Than the EDO/IOP for the Most Important Sturgeon Spawning Habitat

BiOp 4.2.3.A Frequency of Spawning Habitat Availability RM 105



The MSRR Performs As Well or Better Than the EDO/IOP for the Most Important Sturgeon Spawning Habitat



This is Due to the Relationship Between Spawning Habitat and Flow

Biological Opinion for Woodruff Dam Interim Operations Plan September 5, 2006

Habitat (acres)

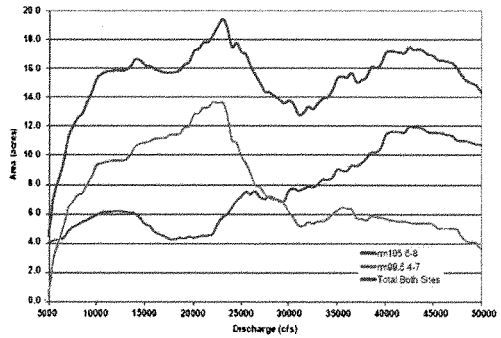


Figure 3.6.1.4.C. Area (acres) of hard substrate inundated to depths of 8.5 to 17.8 ft deep at the two known Gulf sturgeon spawning sites on the Apalachicola River (RM 105 and RM 99) at flows of 5,000 to 50,000 cfs, based on the cross sections located closest to egg collections during 2005 and 2006.

Flow (cfs)

Given this relationship between habitat and flow...

It is important to assess operations based on *performance measures* rather than volumes of water

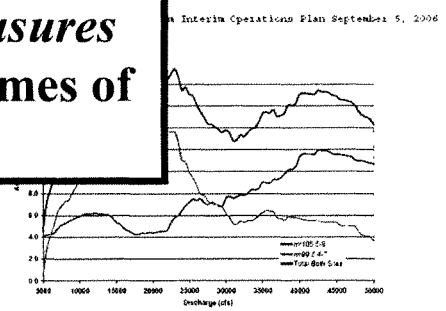
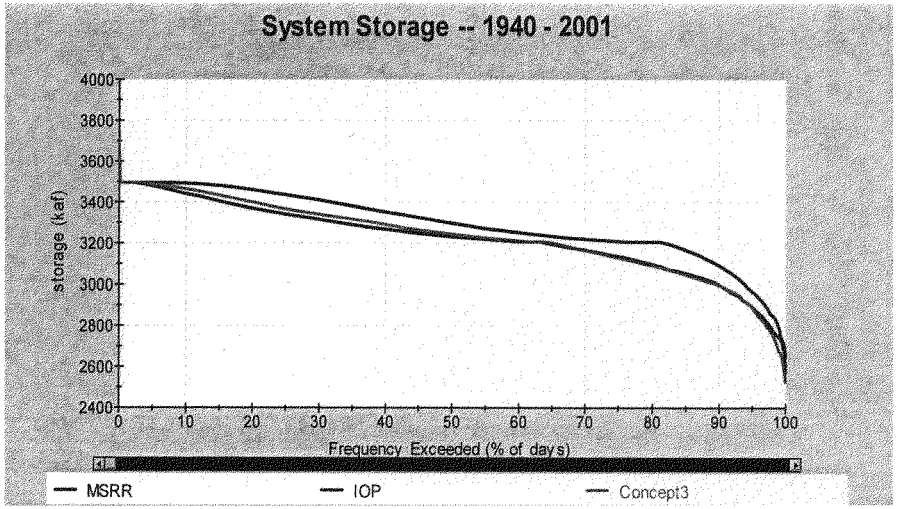


Figure 3.6.1.4.C. Area (acres) of hard substrate inundated to depths of 8.5 to 17.8 ft deep at the two known Gulf sturgeon spawning sites on the Apalachicola River (RM 105 and RM 99) at flows of 5 000 to 50 000 cfs based on the cross sections located closest to egg collections during 2005 and 2006.

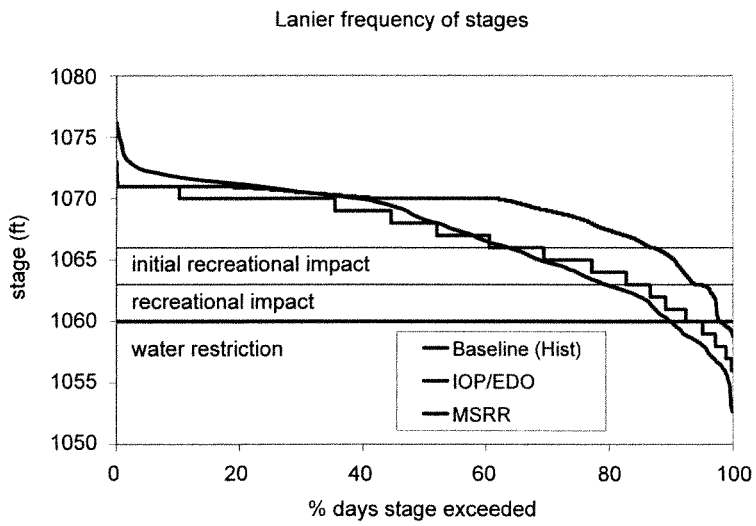
Lake Levels and System Storage: The MSRR Maximizes Both River Flows and Reservoir Storage

- The MSRR produces consistently higher reservoir levels under nearly all operating conditions while providing sufficient flows to meet other identified purposes.
- Higher reservoir levels increase management flexibility and help to ensure system integrity under extreme drought conditions.

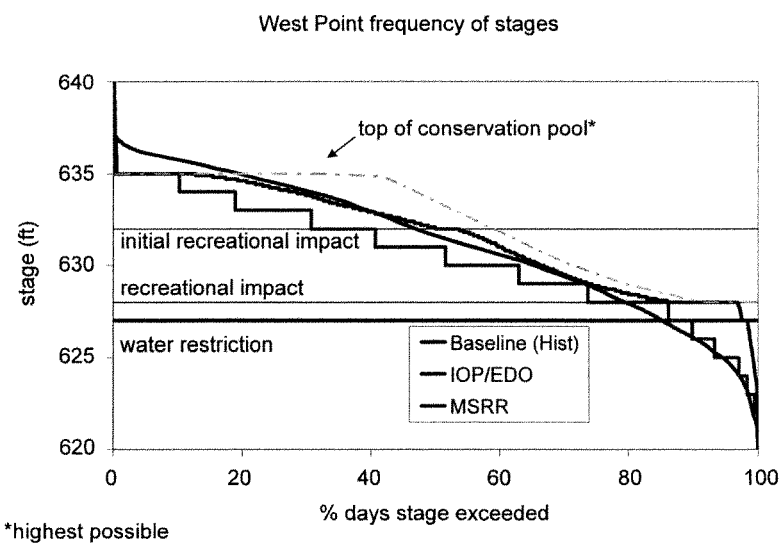
More water in system storage



More water in Lanier

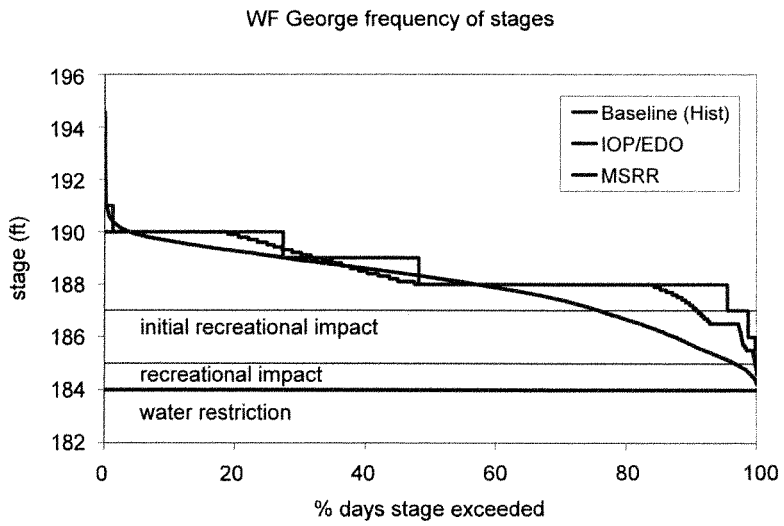


More water in West Point



*highest possible stages under current flood control rules

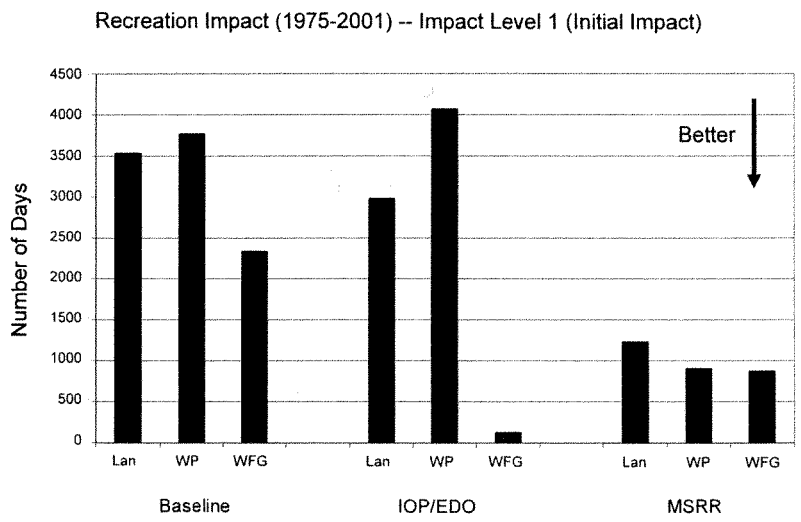
More water in WF George than historical



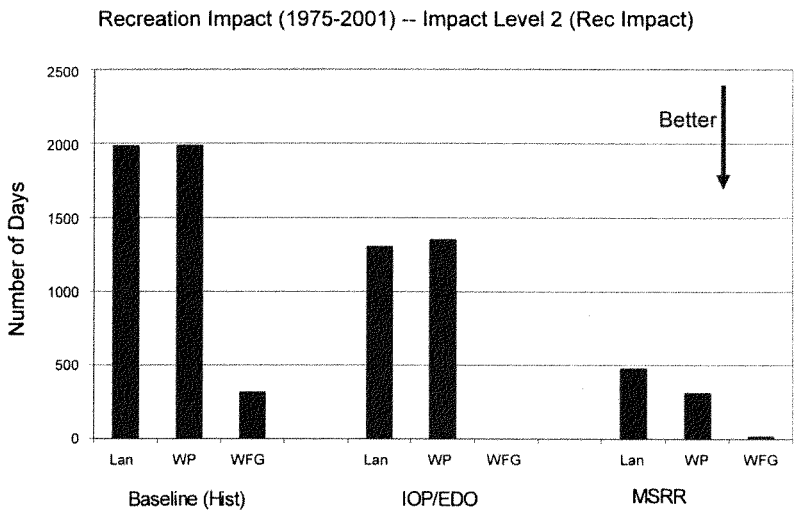
Recreation

- Recreation on the federal reservoirs in the ACF Basin is "big business."
- The economic impact of Lake Lanier alone has been estimated at more than $5 billion.
- The MSRR enhances these economic benefits by maximizing reservoir levels and thus increasing recreational opportunities while providing sufficient flows to meet other identified purposes.

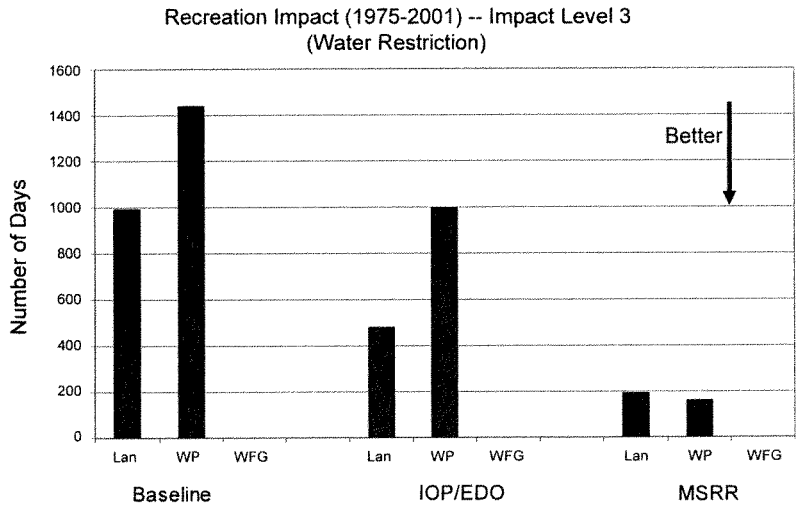
Fewer Days of Initial Recreation Impact



Fewer Days of Recreation Impact



Fewer Days of Severe Rec. Impact



COMPLETE STATEMENT OF

BRIGADIER GENERAL JOSEPH SCHROEDEL

COMMANDER, SOUTH ATLANTIC DIVISION
U.S. ARMY CORPS OF ENGINEERS

BEFORE THE
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE

ON

COMPREHENSIVE WATERSHED MANAGEMENT AND PLANNING:
DROUGHT-RELATED ISSUES IN THE SOUTHEASTERN UNITED STATES

11 MARCH 2008

U.S. Army Corps of Engineers
60 Forsyth Street
Rm 9M15
Atlanta, Georgia 30303
404-562-5006

Introduction

Madam Chair and members of the Subcommittee, I am Brigadier General Joseph Schroedel, Division Commander, South Atlantic Division, U.S. Army Corps of Engineers. Thank you for the opportunity to provide this testimony on comprehensive watershed management at it pertains to drought-related issues in the southeastern United States.

I will start my testimony with an overview of the current drought situation. I will follow that with basic information about the Corps roles and responsibilities; our engagement on drought issues in the states of Alabama, Florida, Georgia, North Carolina and South Carolina; coordination with other federal agencies; and my views on future programs and actions that could increase communication and coordination among all affected parties.

Status of the Southeastern United States Drought

Drought conditions in the southeastern United States began in 2006 and continued to worsen over most of the southeast during 2007. These conditions are exacerbated by higher water demand. The latest U.S. Drought Monitor (http://drought.unl.edu.dm) indicates over 70% of the southeast is classified as being in a drought. The condition in almost 20% of that area is classified as "exceptional," which is the worst drought category. Record rainfall deficits reached 20-25 inches (about 50% of normal) for much of the southeast during 2007. Many streams also reached record low flows during the fall of 2007. Record low lake levels were observed at Lanier, Carters, and Falls (about 2 feet lower than previous lowest level). Municipal and industrial water supply, agriculture, navigation, recreation, hydropower and the environment all have been severely affected by the drought.

U.S. Army Corps of Engineers Role and Responsibilities

The Corps generally constructs and operates multi-purpose water resource projects. Purposes can include flood damage reduction, production of hydropower, recreation, navigation, water supply, water quality, irrigation, and fish and wildlife conservation. Day-to-day operation of our multi-purpose projects seeks to balance these competing and often conflicting purposes. During drought, these conflicts are magnified due to the limited water resources and higher demands.

Under the authority of the 1958 Water Supply Act, the Corps may make water supply storage available for municipal and industrial (M&I) uses. By making storage available, it conveys the right to store a resource in a Corps reservoir project but this does not include a guarantee that the water will be available. The federal government makes no representation with respect to either the quantity or quality of water and assumes no responsibility for the treatment or availability of the water.

Corps South Atlantic Division Engagement in the Southeastern U.S. Drought

The South Atlantic Division's jurisdiction includes all or significant portions of the states of Georgia, Florida, South Carolina, Alabama, Mississippi and North Carolina. There are four

districts within the South Atlantic Division that have water management functions – Jacksonville, Mobile, Savannah and Wilmington. Our district water managers routinely engage federal, state and local agencies, industry and other concerned stakeholders. We strive for both continual communication and complete transparency. Due to the nature of this drought, coordination and information sharing has increased significantly.

Corps Coordination on Drought Conditions in North Carolina, South Carolina and Southeastern Florida

North Carolina. The drought situation in North Carolina is very serious. The Wilmington District has "hands on" responsibility for water resource management in North Carolina. The Wilmington District has done an exemplary job of engaging the state and local agencies, industries and stakeholders. District staff has held weekly conference calls with the affected parties since the drought of 2002. Since November 2007 of the current drought, the district has added monthly face-to-face meetings to the conference calls. These meetings focus on five projects in North Carolina and Virginia. The Wilmington District senior water manager is also an advisor to the North Carolina Drought Council and the U.S. Drought Monitor.

South Carolina. The situation in South Carolina has been serious since mid 2006. In 2007, precipitation levels across the state were approximately 50% of normal. At the time of this hearing, drought conditions have improved somewhat due to very recent rainfall events; only 4-percent of the state is classified in the worst intensity level of "exceptional" compared to 20% at the start of 2008. However, NOAA's 3 to 6 month precipitation forecasts indicate that South Carolina will experience drier than normal conditions.

Since July 2006, Savannah District staff has held bi-weekly teleconferences with affected stakeholders. These calls continued through January 2007 when reservoir levels began to climb. After a short time during the period of reservoir recovery, the drought conditions resumed and the drought teleconferences resumed during the month of June and continue today. These calls engage federal agencies, state agencies from both Georgia and South Carolina and other major stakeholders. The Savannah District also held several public meetings last November and December to provide information to attendees and allowed stakeholders and the public to express their concerns to district water management, environmental and operations staffs. The Savannah District is a standing member of the state of Georgia's Drought Management Committee.

Southeastern Florida. Southeastern Florida is in the grip of a historic drought. Lower than average rainfall for multiple years has depleted ground water levels that supply the vast majority of drinking water and water for agricultural and industrial use. Of particular concern is the low level of Lake Okeechobee, which acts as the back up supply when ground water supplies are low.

Presently, the level of water in Lake Okeechobee is just above 10 feet, which is approximately 4 feet below average for this time of year. If this year's wet season is not productive, hydrologic modeling indicates we could experience a lake level as low as 8 feet; a level never witnessed before. Due to water control structure limitations, at elevations below 10 feet, water must be pumped out of the lake to supply agricultural users. Pumps will only provide benefits for a short period of time, however, if the lake level continues to fall below 10 feet.

Management of Lake Okeechobee, for its flood control and navigation functions, is carried out by the Jacksonville District. Management actions are always worked closely with the state's local watershed management agency, the South Florida Water Management District (SFWMD). As a normal practice, the Jacksonville District water management staff holds weekly teleconferences with the operations staff of the SFWMD. In April 2007, as drought conditions worsened, an additional weekly operations coordination call was instituted for the purpose of focusing solely on drought coordination. Also in April 2007, the principal leadership of the Jacksonville District, Department of Interior, South Florida Water Management District and several Florida agencies including the Florida Departments of Environmental Protection and Agriculture and Consumer Services began to hold regularly scheduled teleconferences to discuss both policy and technical issues.

Corps Coordination on Drought in the Alabama-Coosa-Tallapoosa Rivers (ACT) and Apalachicola-Chattahoochee-Flint Rivers (ACF) Basins

The ACT Rivers system is a multipurpose system authorized for flood control, hydropower, navigation, water supply, water quality, recreation and fish and wildlife conservation. The system has five Corps projects and ten Alabama Power Company (APC) dams. The Corps projects consist of two major storage projects, Allatoona and Carters in Georgia at the upper end of the basin and three run-of-the-river projects at the lower end of the basin in Alabama. Alabama Power Projects are located on the Coosa and Tallapoosa Rivers and are operated in conjunction with Corps projects to provide a minimum seven day average flow in the system. The Corps oversees the Alabama Power Projects for purposes of flood control operations.

The ACF Rivers system is also a multipurpose system authorized for flood control, hydropower, navigation, water supply, water quality, recreation and fish and wildlife conservation. The federal projects on the basin system begin with Lake Sidney Lanier at the headwaters, West Point Lake, Lake Walter F. George, George W. Andrews and Lake Seminole at the lower end of the basin. There are also several lakes with hydropower facilities operated by private and public utilities along the system.

Under normal circumstances, the Corps operates and manages these reservoirs to meet all project purposes in accordance with the draft water management plans developed in the late 1980s. These plans establish certain zones of water levels that trigger actions when these levels are reached. It is when drought occurs that complicated issues begin to develop within these basins. The Corps continues to operate and manage the systems based on the draft water control plans. This calls for balancing the various reservoirs with available water to maintain project purposes as long as possible as water supplies continue to dwindle. As drought conditions worsen, some project purposes may be adversely affected temporarily. These purposes can include water supply, water quality, hydropower, recreation, and fish and wildlife conservation. Fortunately, we are often able to simultaneously meet several of these needs with one action. For example, water released for water quality can also be run through a generator to produce hydropower.

The ACT Rivers Basin. On May 15, 2007, APC requested permission to reduce the required flows from its projects measured at Montgomery, Alabama by up to 40-percent. The Mobile District prepared an Environmental Assessment. This assessment resulted in a Finding of No Significant Impact on July 20, 2007, for an immediate flow reduction of 10-percent with the

provision to increase the flow reduction up to 20-percent with additional monitoring. The 10-percent flow reduction at the APC projects was implemented on July 20, 2007.

As conditions deteriorated this spring, the South Atlantic Division and Mobile District held a Drought Summit for the ACT basin in Columbus, Georgia on June 25, 2007. Affected stakeholders in Georgia and Alabama, as well as state and federal agencies that deal with the system attended the summit. The summit allowed the Corps to gain a better understanding of their views and concerns, and allowed them to share technical information with the Corps. During this meeting, the Corps briefed the current and future operations in the system.

As the drought worsened through the late summer of 2007, the Mobile District and division staffs have worked closely with state agencies in Georgia, Alabama and the APC to coordinate and develop drought management policies. On November 14, 2007, the Corps began coordination with the state of Alabama and the APC and jointly developed ten proposals for drought management within Alabama. The action items included short and long-term items. To date, seven of the ten proposals have been implemented, and work continues on the three long-term proposals.

The ACF Rivers Basin. In addition to the extreme heat and drought conditions this summer in Georgia, flow requirements in the Apalachicola-Chattahoochee-Flint system were causing system storage to be depleted at a rapid rate. In particular, flow requirements at the Jim Woodruff Dam at Lake Seminole to support industry and endangered species were driving water management decisions. On November 16, 2007 and in consultation with the U.S. Fish and Wildlife Service, the Mobile District was able to lower the flow requirements and increase the storage provisions of the Corps Interim Operating Plan to conserve water in the system. We are currently working with the Fish & Wildlife Service to extend these provisions.

Open and continual communication has figured prominently in our approach to managing the ACT and ACF basin systems during this historic drought. On July 11, 2007, the Mobile District and South Atlantic Division began holding weekly and or bi-weekly teleconferences on the ACT Basin. On September 20, 2007, the Corps began bi-weekly teleconferences on the ACF Basin. These teleconferences allow all to hear the latest information on system conditions, to anticipate future changes, and to respond with necessary adjustments. The calls also provide a venue through which participants transmit information to the Corps.

Division and district community outreach has been robust. Corps staff has engaged in hundreds of community forums including meetings, local news programs, and radio and newspaper interviews, all in an effort to inform the public about the roles and responsibilities of the Corps and the challenges it faces. We have gained an in-depth understanding of the concerns of the industry, user groups and supply groups, and the public at large.

Coordination with other Federal Agencies

Coordination with other federal agencies such as the Department of Interior, U.S. Fish and Wildlife Service, the U.S. EPA, the National Oceanic and Atmospheric Administration (NOAA) and the Federal Energy Regulatory Commission (FERC) is extremely important. We believe it is vitally important that we act as an integrated federal team given the complexity of the issues

that span multiple state and local governments, and affect numerous user groups and private industries such as those which provide hydropower.

Our work with NOAA is an excellent example of federal cooperation as we look to their expertise in drought monitoring and prediction to assist our programs and actions. They have briefed us extensively during this drought and we value their continued support.

Our coordination with the Fish and Wildlife Service has been extremely successful. Under drought conditions, the impacts of our actions on endangered species, such as three species of mussels and the Gulf sturgeon on the Apalachicola River and the wood stork and snail kite in the Everglades, require consultation under Section 7 of the Endangered Species Act (ESA). During informal consultation and as new scientific information became available, the Corps adjusted its operations at the Jim Woodruff Dam as needed to provide adequate flow conditions to afford protection for the Gulf sturgeon and protected mussel species in the Apalachicola River. Our team approach to ESA coordination has allowed both agencies to reduce review times down to a duration we would never have imagined possible.

In southeastern Florida, the Corps faces issues associated with the endangered snail kite's ability to nest and reproduce as water levels on Lake Okeechobee fall. We have always maintained a very close working relationship with the Fish and Wildlife Service staff in south Florida.

Consideration of the potential impacts on drinking water supplies and energy production has prompted us to coordinate with the Department of Homeland Security (DHS). The Corps has been working with DHS at the highest level. My staff in Atlanta, along with Headquarters staff provided a briefing for DHS staff on the drought on January 11, 2008, with a follow-on briefing on February 12, 2008. We provide weekly data to DHS on the status of the projects where water shortages are most acute.

My division staff has also participated in two meetings sponsored by the Department of Energy. The first meeting was held on November 16, 2007, with a follow-up meeting in January 8, 2008. These meetings included the major power producers in the southeast and focused on developing contingency plans for power production if drought conditions worsened.

Near Term Drought Mitigation Strategy: Updates of Water Control Plans

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 plans 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). Updates or revisions to the water control plans are typically integrated with the National Environmental Policy Act (NEPA) public involvement and documentation process.

The district water managers in the southeast have been diligent in adjusting operating and drought plans to manage the limited water resources during this drought. When conditions became so severe that our approved plans could no longer support the systems in accordance

with our regulations, the district water managers sought approval for temporary deviations from the South Atlantic Division.

Current water control plans are the most important management tool water managers have. Without updated water control plans, the Corps runs the risk of any or all of the following: adversely affecting water quality downstream; failing to provide sufficient water where and when needed to meet the authorized purposes of our projects and the needs of stakeholders, whether domestic or municipal and industrial; adversely affecting endangered species; expending water resources too early, thereby reducing our ability to maintain the system to meet project purposes and the needs of the stakeholders; and flooding people and facilities that are within flood plains.

Updates of water control plans are done in accordance with statutory (Flood Control Act of 1944) and regulatory requirements (Engineering Regulation (ER) 1110-2-240 and ER 1110-2-8156), that comply with NEPA and account for demographic, hydrologic, environmental and technological changes that have occurred within the basins. The Water Resource Development Acts (WRDA) of 1988 and 1990 also provide for public involvement of all interested stakeholders during the development of new or revised water control plans, which ensures consideration of the current public interests within the basin.

The South Atlantic Division is now in the process of updating several water control plans in accordance with Corps regulations. The Mobile District has recently been directed by the Secretary of the Army to update the water control plans for the ACF and the ACT River basins. These water control plans were being updated in the late 1980s and early 1990s when work was stopped due to litigation. The Jacksonville District is finishing a two-year effort to update the Lake Okeechobee Water Control Plan. Following the hurricanes of 2004 and 2005, which caused Lake Okeechobee to experience extended periods of high water levels, the Jacksonville District studied ways to manage the lake at lower levels. The result is a new operating plan which will result in lower lake levels while still meeting authorized project purposes.

Future: Southeast Regional Water Resource Council Concept

If any of the agencies - whether federal or state, industry or the public - are to successfully manage water, we must find a way to work more closely and cooperatively across boundaries, missions and jurisdictions. Towards this end, almost a year ago I introduced the concept of a state-led forum to develop a regional vision for integrated solutions to water resource challenges in the southeastern region. My intent was to establish a process whereby the Corps and other federal partners could ensure our programs and priorities are in concert with states needs and priorities across the region and to foster a more collaborative and consistent effort for development and use of water resources in the region.

Early informal feedback from our contacts with governors and state government officials was generally favorable, but cautious. Initial feedback from a variety of constituent groups with direct interest in water resources issues was quite favorable. They saw the regional council of states as an opportunity to reduce fragmentation, establish more consistent approaches to water resources issues across the region, set some overarching regional water resource priorities, and build a collaborative working relationship among states and federal partners. We have since

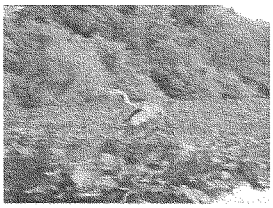
assigned a team of division and district staff to refine the concept and to further communicate with the states and stakeholders. We are in the process of that coordination now.

The concept, as it is now defined, is a state-led forum among the southeastern states to address existing and emerging regional water resources challenges in the region. A regional water resources forum in the Southeast would provide a means to: (1) maintain ongoing multi-state regional dialogue on water resources issues and priorities; (2) develop regional strategies and establish regional priorities for water resources management and investments; and (3) promote creation of innovative interstate partnerships to address critical water resources issues.

I strongly believe establishing a southeastern water resources council could provide enormous benefits to the states, federal partners and residents of the region.

Conclusion

Madam Chairwoman, Members of the Subcommittee, thank you for this opportunity to testify before you. This concludes my testimony. I would be happy to answer any questions you might have.



Apalachicola Riparian County Stakeholder Coalition

March 31, 2008

Honorable Eddie. Bernice Johnson
Chairwoman
Subcommittee on Water Resources and the Environment
U.S. House of Representatives
B-376 Rayburn Building
Washington, D.C. 20515

RE: Complete the Record Comments; Hearing on Drought in the Southeast (3/11)

The purpose of this letter is to seek your approval for the Apalachicola Riparian County Stakeholders Coalition (RCSC) to provide the following supplementary information in addressing specific issues raised in questions by Rep. Westmoreland and the NOAA witness during the course of the March 11th Hearing.

Specifically, the issues and supplementary comment are as follows:

1. Issue: "Isn't it true that sometimes you get more water downstream in the River and Bay than what you need?" RCSC Comment: Sometimes the Bay is temporarily closed to shellfish harvesting due to high flows combined with heavy rainfall; however, these closures are brief, and such high flow conditions are an absolutely necessary "out-of-banks" event so as to accomplish the natural eco-system services of water filtration and nutrient enrichment provided by the fully functioning floodplain of the Apalachicola River.
2. Issue. "Isn't there undesirable silting-in around Blountstown that hampers navigation on the River?" RCSC Comment: Since the cessation of destructive dumping of dredge spoil into the creek mouths and distributaries of the Apalachicola, the River has begun the slow but steady natural recovery of the floodplain and recreational fish spawning habitat.

Issue. "Wouldn't it be desirable through the joint management of the Chattahoochee and Flint Rivers to provide a constant, guaranteed flow level into the Apalachicola River and Bay?" RCSC Comment: A natural flow regime that fluctuates between high and lower freshwater flows is what is required for the health and productivity of our Apalachicola River, Floodplain and Estuary system. A guaranteed, "flatline" flow such as the recent reduced flows under the Corps' Exceptional Drought Operations plan was especially harmful to both our commercial seafood and recreational sports fishing and the Florida communities dependent on them. The biological diversity and productivity of the ACF River Basin are intrinsically dependent upon a flow regime that embodies the natural variability in magnitude, frequency, duration, timing, and rate of change of flow. Further, since much of the flows into the Apalachicola during drought conditions come from the spring-fed Flint River, we would not look favorably on new, upstream impoundments of those flows.

3. Issue. "Do you know what the "Natural Flows" you say you're seeking in the Apalachicola River and Bay would be?" RCSC Comment. We know the Corps of Engineers has expended considerable effort trying to construct a reliable, computerized model of the "unimpaired flows" in the ACF system. In doing so they exclude the effects of man-made activities such as dams, reservoir operations, diversions for water supply and power generation, diversions for agriculture, and so on. In order to be useful as "natural flow" indicators, these calculated "un-impaired flows" need to be vetted and adjusted by comparison with historical "observed" data for key periods.

Complementary data. In discussing the millions of dollars expended by Federal and State agencies to preserve and protect the Apalachicola River and Bay, the discussion failed to point out that the U.S. Department of Commerce through the National Oceanic and Atmospheric Agency provides 50% of the annual operating funds and 100% of the research funding for the Apalachicola National Estuarine Research Reserve, the second largest of 27 NOAA-designated estuarine research reserves in the United States. The Apalachicola National Estuarine Research Reserve encompasses 246,000 acres including Apalachicola Bay with its associated marshes and bayous, two barrier islands and 52 miles of the lower Apalachicola River and its floodplain.

Thank you and sub-committee staff for this opportunity to provide complementary information for the permanent record of the March 11th Hearings into the impact of Drought on the Southeast. If you have any questions, please call the undersigned.

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Apalachicola Riparian County Stakeholder Coalition
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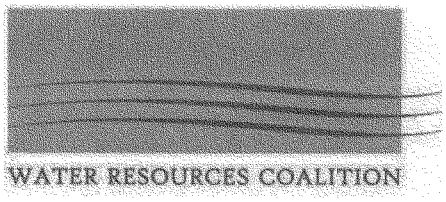

TESTIMONY

OF

THE WATER RESOURCES COALITION

FOR THE RECORD

OF THE U.S. HOUSE OF REPRESENTATIVES

COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE

SUBCOMMITTEE ON WATER RESOURCES AND THE ENVIRONMENT

CONCERNING COMPREHENSIVE WATERSHED MANAGEMENT

AND PLANNING: DROUGHT-RELATED ISSUES IN THE SOUTHEASTERN UNITED STATES

MARCH 11, 2008

improve, prevent, save

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"And it never failed that during the dry years the people forgot about the rich years, and during the wet years they lost all memory of the dry years. It was always that way."

-----John Steinbeck

East of Eden

Madam Chairwoman, Members of the Subcommittee, the Water Resources Coalition was established in 2007 to promote the development, implementation and funding of a comprehensive national water resources policy. Our membership is made up of organizations representing state and local governments, conservation, engineering and construction, waterways and transportation services. We believe that it is important the United States has a comprehensive, national water resources policy, that is developed, implemented, and funded so as to provide a sustainable, productive economy, a healthy aquatic ecology and provides for public health and safety.

It is fortunate and unfortunate this hearing has to be held today. In 1998, Congress passed the National Drought Policy Act, which created the National Drought Policy Commission and challenged the participants to recommend a better to mitigate the effects of droughts. As the report noted, drought occurs somewhere every year in the United States. It can and does extend over long periods and large areas, and it brings hardship as witnesses at this hearing have testified. As an editorial from South Carolina recently noted, "the drought that continues to plague the Southeast shows we cannot count on water being an unlimited resources to be taken at whim."

History can be a strict instructor when it comes to teaching a lesson. Studies show that the Federal government spent $3.3 billion responding to the 1953-1956 drought, at least $6.5 billion during the 1976-1977 drought, and about $6 billion during the 1988 -1989 drought. The National Drought Policy Commission contends that we can reduce this nation's vulnerability to the impacts of drought by making preparedness the cornerstone of national drought policy. How do we get there from here?

This Subcommittee, in its foresight, led an effort over the past seven years that culminated in the passage of the Water Resources Development Act of 2007. The Act provided several important tools to meet this challenge head on. They are:

1. Section 2010. Watershed and river basin assessments. This section amends section 729(f)(1) of the Water Resources Development Act of 1986 to provide a 75 percent Federal share for watershed and river basin assessments carried out under that section to encourage States and local

governments to engage in regional planning. By changing the non-Federal cost share to 25 percent, non-Federal interests may now satisfy their full cost share by credits for in-kind services.

2. Sec. 2013. Technical Assistance. This section facilitates increased Corps support to states, tribes and localities through modest adjustments to Section 22 of the Flood Control Act of 1970. By authorizing in-kind services to meet non-Federal cost-sharing, we see this legislation creating opportunities for Corps partnerships with States, tribes and interstate organizations.

3. Sec. 2017. Access to water resource data. This section empowers partnerships between the Corps and non-Federal interests to share data and develop analysis tools to support integrated water resources management.

4. Sec. 2033. Planning. This Section emphasizes Corps planning and scientific knowledge by supporting Planning Centers of Expertise to position the Corps to lead complex, science-based and integrated planning.

5. Sec. 5119. Statewide comprehensive water planning, Oklahoma. This is a groundbreaking authority to support state water resources planning through the unparalleled water resources planning, engineering and technical knowledge of the Corps. This section is an excellent example of what the new trend line should be the future in water resources planning.

As a result of these tools being made available, Coalition members found themselves in complete disappointment when the President's FY09 Budget was released for the U.S. Army Corps of Engineers program. We believe this subcommittee shares that disappointment as a result of your Budget hearing in early February. The country cannot continue to afford an ongoing failure to invest in this nation's water infrastructure. Those decisions can be guided by the tools provided to assist those charged with the responsibility to meet the future economic and human water resource needs in a timely manner.

It is time for the Federal government's water resource agencies to collectively "get their act together" and better assist Tribal, regional, state and local governments by listening to those "partners" and strategically plan for supporting them through the Federal government's own human, financial and knowledge capital. We believe Congress has provided the Corps' program a model that should be considered on a national scale for proper water planning. As we noted above, Section 5119 of the WRDA 2007 authorizes Statewide

Comprehensive Water Planning for the state of Oklahoma. This authorized technical assistance directs the Secretary of the Army to assist in : 1) acquisition of hydrologic data, groundwater characterization, database development, and data distribution; 2) expansion of surface water and groundwater monitoring networks; 3) assessment of existing water resources; 4) numerical analysis and modeling necessary to provide an integrated understanding of water resources and water management options; 5) participation in state planning forums and planning groups; 6) coordination of federal water planning efforts; and 7) technical review of data, models, planning scenarios, and water plans developed by states.

Looking to the states for non-Federal leadership is critical for making this work. The state of Oregon is engaged in an effort – Headwaters 2 Ocean – Ensuring Sustainable Water Resources for Oregon's Future, that recognizes the importance of water to a healthy state economy and one of the pillars of its quality of life that many have noted. They have recognized and built upon their past models for innovation and partnership in the water resource planning arena. And they have a long list of potential partners – including the Federal government – to help move forward this vision. They look to their "tool box" of – economic incentives, technical guidance, planning documents, regulatory requirements, legal opinions, case studies and best management practices, partnerships and treaties, and technology assistance – as the foundation for moving forward.

We have attached a list of Water Resource Planning Principles that are from a book sponsored by one of our member organizations. The book, State Water Resource Planning in the United States is an excellent tool to assist with the use of the tools that have been provided by WRDA 2007. We don't need another study or another commission to move forward in this area. As Congress begins the effort to move forward with the development of WRDA 2008, the Coalition would encourage you to seek out from the Tribes, states, regional and local government organizations the need for changes in the existing authorities that might better assist them in moving forward in this critical area.

One area that many have been talking about, and this Committee has confronted in the National Energy/ Climate Change legislative effort, has been what to do with regard to the future water resource programs meeting climate change challenges. An idea that we would like to put forward is the authority to develop single purpose water supply projects to capture the melting snowpack that is expected to occur as a result of climate change. Looking at and examining those possibilities in the context of state water resource planning would seem logical in this context.

The Coalition would like to thank the Subcommittee for considering our views as you look at the issues surrounding comprehensive watershed management and

planning. We recognize your jurisdiction over the U.S. Army Corps of Engineers, the Maritime Administration and the EPA in this arena. It is important to reach out to other Congressional Committees with jurisdiction over the Bureau of Reclamation, the U.S. Geological Survey, the U.S. Fish and Wildlife Service, Bureau of Indian Affairs, National Oceanic and Atmospheric Adminstration and the Department of Energy. Given the large Federal footprint in this country, in particularly in the West, it is important for a coordinated effort by Congress take place.

Thank you again for including this statement in your hearing record on this important area to the nation's future. Leadership is key to making this happen in a timely manner.

WATER RESOURCE PLANNING PRINCIPLES

Management of water resources should be sustainable so as to ensure that present and future generations have adequate supplies of good quality water to support their needs as well as those of natural systems.

Water resources planning processes should address ways to instill citizens with a stewardship obligation to conserve and protect their water resources.

Water resource planning and management should be founded on sound science, recognizing the interdependence of economic development and environmental quality.

Identification and prioritization of critical water-related issues and the development of strategies for addressing them should be ingrained in water planning processes.

Attributes of accountability and performance should be evident in water resources plans.

Available data and information technology should be optimally used to aid in setting priorities, assessing plan effectiveness, and to facilitate public access to information.

Water quality, water quantity, surface water, and ground water are interrelated and should be considered in that context, along with that of reasonable and beneficial use.

Effective water resources management requires meaningful participation, coordination, and collaboration among all affected stakeholders, including all relevant levels of government.

Working partnerships between water resources planning agencies and relevant stakeholder organizations foster plan acceptance and implementation.

Stakeholder involvement should be up-front, open, and collaborative.

Water planning agencies should design and maintain data systems that contain the scientific, demographic, institutional and economic information needed to develop sound plans and support good decisions.

Water resources planners should seek and incorporate innovative practices in their planning processes.

Water resource planners should consider partnering with water research organizations to aid them in developing databases and approaches to support planning and decision making processes.

Periodic revision of water plans will be required to accommodate new scientific and policy developments, and changing social, economic, cultural, and environmental conditions.

Water resource assessments should include current water sources and uses as well as forecasts of future water requirements for humans and ecosystems.

To the extent practical, the potential impact of global climate change should be considered in water resources plans.

Given concern for homeland security, water resources planners should incorporate measures that focus on water security, namely robustness, resiliency, emergency response, and the sustainability or recovery of services under catastrophic conditions.

Monitoring criteria for measuring the effectiveness of implemented alternatives should be included in water resources plans.

Mediation services to facilitate reaching consensus on water planning issues should be incorporated into the planning processes.

Water planners should consider the use of adaptive management as a planning tool. This process provides planning flexibility by incorporating scientific feedback as plans are implemented. The process encourages learning as plan implementation unfolds so that future decisions will have an enhanced database to support them.

An emerging tool applicable to water resources planning is share vision modeling. These models are suited for collaborative planning processes. They provide the technical rigor needed to identify options and tradeoffs while permitting stakeholders without modeling experience to participate in the process.

Educational programs directed towards children, the public, decision making bodies, NGO's, and others should be considered part of the planning process. Such programs support understanding among stakeholders, reaching consensus, and informed decision making.

Water planners should consider the need for research to support planning processes. This could be in-house, accomplished by partner organizations, or provided by contractors.

OVERVIEW OF ELEMENTS FOR CONSIDERATION AT THE STATE LEVEL FOR PLANNING PURPOSES

Published State Water Plan

Goal, vision, mission

Direct stakeholder involvement

Shared vision planning

Monitoring and assessment

Compartmentalized planning

Regional, river basin, watershed

NGO involvement

Federal & local government involvement

Coordination/collaboration

Adaptive management

Integrated planning

Comprehensive planning

Plan implementation strategy

Research component

Education component

Drought management component

Climate change

Plan revision timetable

Sustainability considered

Water supply planning only

Excerpted from: State Water Resources Planning in the United States by Warren Viessman, Jr. and Timothy D. Feather. Published in 2006 by the American Society of Civil Engineers.

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