



U.S. House of Representatives
Committee on Transportation and Infrastructure

Washington, DC 20515

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March 10, 2008

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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

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
Apalachicola, 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

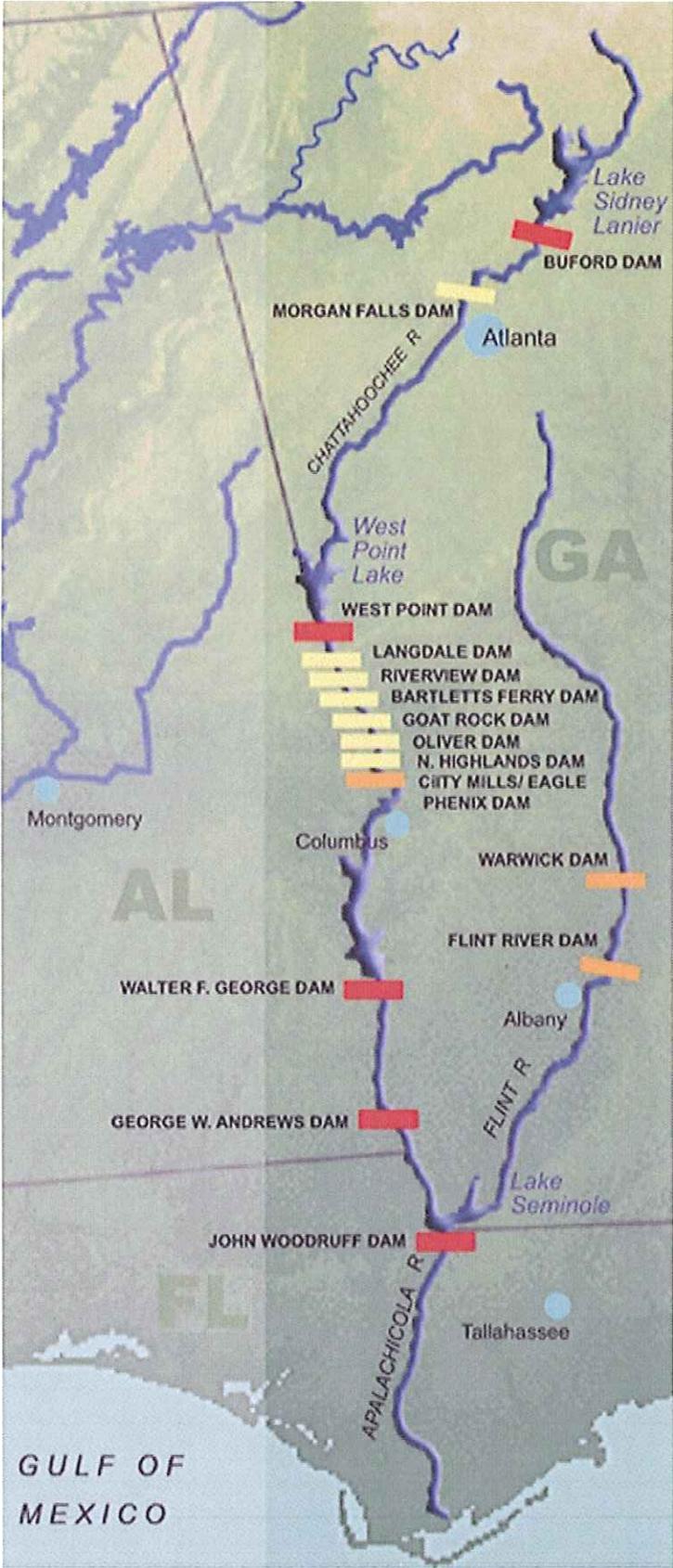
Brigadier General Joseph Schroedel
US Army Engineer Division, South Atlantic
United States Army Corps of Engineers
Atlanta, Georgia

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
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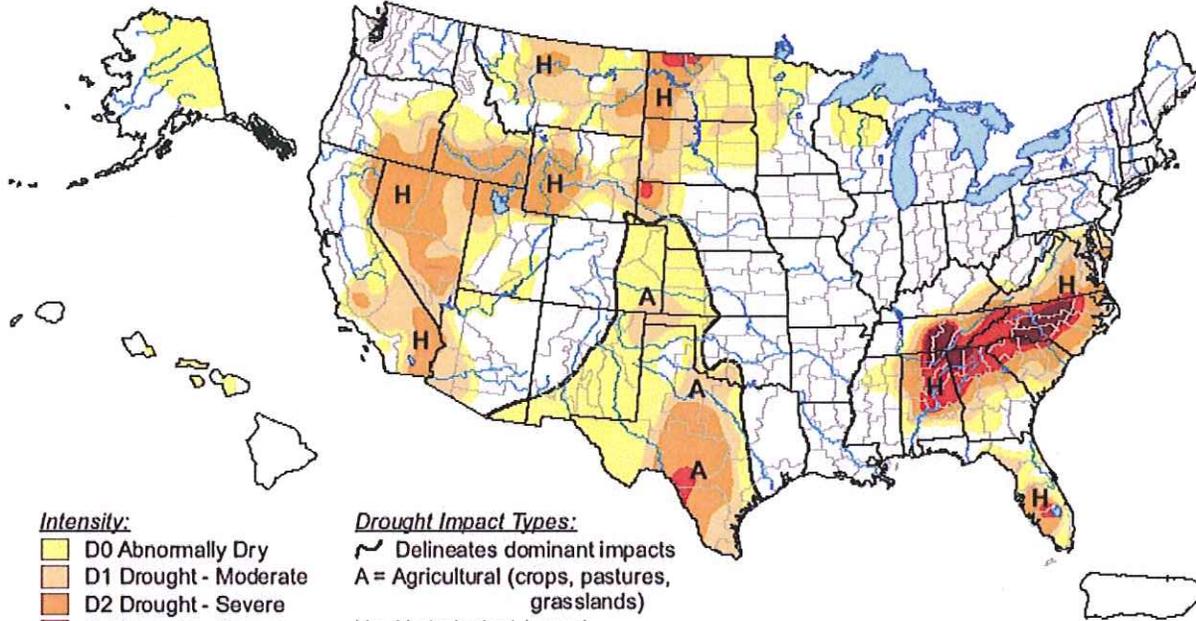
APPENDIX

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>



Released Thursday, March 6, 2008

Author: Brian Fuchs, National Drought Mitigation Center

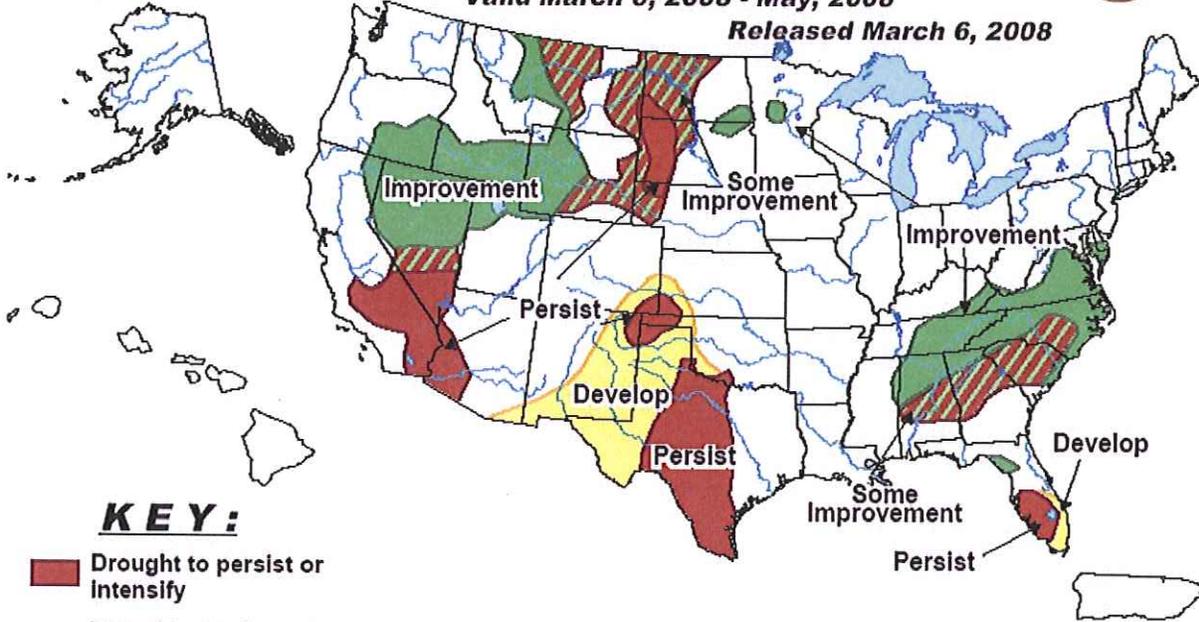


U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid March 6, 2008 - May, 2008

Released March 6, 2008



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.