

No. 142, Original

**In The
Supreme Court of the United States**

STATE OF FLORIDA,

Plaintiff,

v.

STATE OF GEORGIA,

Defendant.

**DIRECT TESTIMONY OF
CAROL COUCH, Ph.D.**

October 26, 2016

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I, Carol Couch, Ph.D., offer the following as my Direct Testimony.

1. I was the Director of the Georgia Environmental Protection Division of the Georgia Department of Natural Resources (“EPD”) from October 2003 to October 2009. My testimony focuses on Georgia’s conservation initiatives during my tenure, including the conclusion of the Sound Science Study and development of the 2006 Flint River Basin Conservation Management Plan, the initiation of the comprehensive state water planning process and finalization of Georgia’s first State Water Plan in 2008, and the administration of drought declarations to manage severe droughts in 2006 and 2007. My testimony also addresses Georgia’s comments and concerns regarding the management of federal reservoirs by the Army Corps of Engineers (“Corps”) for water supply and ecological conservation under the Interim Operations Plan (“IOP”), a temporary set of reservoir operating rules in place during my tenure (March 2006 - June 2008).

I. PERSONAL AND PROFESSIONAL BACKGROUND

2. I have a bachelor’s degree in Health Systems Engineering from the Georgia Institute of Technology, a Masters in Biology from the University of South Carolina, and Ph.D. in Ecology from the University of Georgia. My Ph.D dissertation related to the availability of detrital resources for higher organisms in the Ogeechee River.

3. I am currently the Executive Director of the Phinizy Center, a private nonprofit 501(c)(3) organization in Augusta, Georgia, dedicated to independent water quality research and K-12 environmental education. In cooperation with regional partners, the Phinizy Center for Water Sciences conducts research to characterize chemical, physical and biological status of watersheds such as the Savannah River, which forms the border between Georgia and South Carolina. As part of this project, the Center serves a set of regional clients—federal, local and state—in understanding and contributing to the management of resources in these rivers. One of the Center’s principal projects involves maintaining continuous water quality monitoring stations throughout the lower length of the Savannah River in the coastal plain region. These water quality data are useful to help develop solutions for total maximum daily load permit limitations on dischargers in the river (there are dischargers from both states). Apart from my work at the

Phinizy Center, I have been engaged in interstate dialogue on these issues before, and am familiar with the policies by which states can share the water and wasteload capacities of rivers.

4. Prior to my employment with the State of Georgia, I was an employee of the United States Geological Survey (“USGS”) for ten years in various capacities. From 1992 to 1997, I was a lead biological scientist for an interdisciplinary study of water resources of the Apalachicola-Chattahoochee-Flint River Basin, during which I designed biological and contaminant studies and led all aspects of fieldwork, analysis and publication. In cooperation with the U.S. Fish and Wildlife Service (“USFWS”), I conducted basin-wide surveys of aquatic fauna (fish, mussel species) to understand status and trends in diversity and abundance. From 1998 to 1999, I was the USGS Southeastern Regional Biologist providing technical leadership for biological components of cooperative water-quality and hydrologic investigations conducted by USGS offices located in North Carolina, South Carolina, Georgia, Tennessee, Alabama, Mississippi, Florida and Puerto Rico. From 2000 to 2003, I served as the national ecology program chief for the USGS National Water Assessment Program and was responsible for leading nationally-distributed, interdisciplinary teams of engineers, hydrologists, chemists and biologists studying large watersheds that cover portions of all 50 states as well as lands managed by the Department of Interior.

5. I was appointed as the Director of the Georgia Environmental Protection Division (“EPD”) in October of 2003. I served in that position for six years, until October of 2009. As EPD Director, I led an organization of 1,050 employees in the administration of 26 state environmental laws, and four federally delegated authorities under the Clean Water Act, Safe Drinking Water Act, Clean Air Act, and the Resource Conservation and Recovery Act.

II. EPD DIRECTOR RESPONSIBILITIES

6. During and prior to my tenure at EPD, Georgia took a number of proactive measures to better understand and manage water use across the State. These measures included completing the multi-year Sound Science Study initiated by EPD in 1998, before my tenure, developing and implementing water resource and development plans such as the 2006 Flint River Basin Regional Water Development and Conservation Plan (“2006 Plan”), implementing the then-existing drought management statutes (2003 Drought Management Plan; Flint River

Drought Protection Act), and developing Georgia's first statewide and regional water resource management plans. The statutory authority for each of these responsibilities is outlined below, in relevant sections. As EPD Director, it was also my responsibility to oversee EPD's formal and informal consultation with the Corps regarding its operation of federal reservoirs along the Chattahoochee River.

A. Study and Regulation of Agriculture Water Resources

7. One of the roles EPD fulfills in managing Georgia's agricultural water resources is agricultural water permitting. In 1998, prior to my tenure as EPD Director, I understand that EPD was concerned about the uncertainty surrounding levels of water use in Southwest Georgia and the possible impact of increased agricultural use. In 1999, EPD implemented a moratorium on certain new irrigation permits in key portions of the ACF Basin. The moratorium was targeted to a certain set of identified counties in southwest Georgia, and was focused on withdrawals from the Floridan aquifer. The EPD's understanding at the time was that the Floridan aquifer had a higher level of interconnectivity to stream flow relative to other aquifers. Before the moratorium was put in place, EPD also initiated a Sound Science Study to better understand agricultural water use in the ACF Basin and its potential impacts on streamflows. The purpose of the Study was ultimately to inform the development of a regional water development and conservation plan, which EPD had the authority to implement under Georgia's Water Quality Act. As EPD Director, I coordinated the multi-year effort to draft the 2006 Plan, which I discuss in more detail below. This Plan significantly changed how we at EPD thought about and managed water resources in southwest Georgia.

B. Drought Declaration

8. Another important function of the EPD Director, which was expanded considerably under my tenure, is decision-making regarding the declaration of droughts. Georgia passed the Flint River Drought Protection Act ("FRPDA") in 2000 to give the EPD Director authority to declare severe drought conditions in the lower Flint Basin. JX-009 (Flint River Drought Protection Act). If a drought was declared, EPD was required to conduct an auction to pay farmers not to irrigate a certain number of acres in order to maintain acceptable Flint River stream flow. JX-009 (Flint River Drought Protection Act). My predecessor, Harold Reheis,

conducted two auctions—one in 2001 and one in 2002. The effectiveness of these auctions was hampered, however, by two factors: 1) the auctions were voluntary and suffered from low participation rates and 2) the FRDPA had not defined specific geographical areas where restrictions could be targeted to have the most impact. The FRDPA was later amended in 2006 to give the EPD Director greater flexibility in targeting the auctions to certain capacity use areas as defined by the 2006 Plan. Even under the 2006 Amendments, however, farmers were still able to choose their level of participation in auctions and the value at which they would be willing to participate. GX-1261 (2006 Amendments to the Flint River Drought Protection Act).

9. The decision to declare drought under the FRDPA was based on several sources of information, including consultation with EPD staff and the state climatologist, the use of a drought declaration matrix to predict the likelihood of severe drought in a given year, and other climatic considerations. Ultimately, the decision to declare a drought had to take into account both a range of climatic indicators and the likely effectiveness of implementing an auction, which I describe in more detail below. As EPD Director, I never determined that those conditions were met such that I should declare a drought under the FRDPA.

10. Just before I began my tenure at EPD, Georgia also enacted the Drought Management Plan on March 26, 2003. JX-161 (2003 Georgia Drought Management Plan). Under the Plan, EPD was required to regularly monitor drought conditions by looking at a range of independent climatic indicators. If certain conditions were met, I had the authority, as EPD director, to declare four different levels of drought across the State and place restrictions on municipal and industrial water use. Unlike the FRDPA, drought declarations pursuant to the Drought Management Plan could be tailored to these different levels of the severity of drought, and the restrictions on municipal and industrial water use adjusted accordingly. I declared two state-wide droughts—one in 2006 and one in 2007—and implemented corresponding restrictions on water use.

C. State Water Planning

11. Finally, at the beginning of my time at EPD, Georgia passed the 2004 Comprehensive State-wide Water Management Planning Act, which authorized the development of the State Water Plan. GX-0064 (2004 Georgia Comprehensive Statewide Water Management

Planning Act). The Act gave the EPD Director a key role in chairing a statewide water council to help develop the State Water Plan. Over the course of my time at EPD, we devoted substantial resources to the state water planning process, which culminated in the finalization of the first State Water Plan in 2008.

III. 2006 FLINT RIVER BASIN REGIONAL WATER DEVELOPMENT AND CONSERVATION PLAN

12. As I mention above, the EPD Director had authority to develop a regional water development and conservation plan for purposes of informing permitting decisions. Georgia Water Quality Act, Ga. Code Ann. § 12-5-21. Under my supervision, EPD developed such a plan for the Flint River Basin called the Flint River Basin Regional Water Development and Conservation Plan (the “2006 Plan”). The 2006 Plan was released in March 2006 and significantly changed how agricultural water use was managed in the Flint River Basin. JX-021 (2006 Plan).

A. Background of the 2006 Plan

13. I am familiar with the historical background that pre-dated and gave rise to the 2006 Plan. In 1998, in response to a prolonged drought, increased agricultural irrigation in southwest Georgia since the late 1970’s, and a heightened awareness that Georgia could improve its understanding of the interaction between agricultural irrigation and Flint River flows, then-EPD Director Harold Reheis initiated the Sound Science Study. This Study was aimed at better understanding agricultural water use and its effect on the hydrology of the Flint River Basin.

14. The Sound Science Study began in 1998 and concluded in 2006 with the finalization of the 2006 Plan. Several separate technical studies were included under the Study’s purview. The most important of these studies consisted of regional aquifer models commissioned by EPD to be completed by the United States Geological Survey (“USGS”). Another important set of technical studies on agricultural water use and returns was completed by the University of Georgia under contract with EPD. *See* GX-1245 (Status of the Flint River Regional Water Development and Conservation Plan, Georgia Water Resources Conference (“GWRC Paper”)) (noting that these third-party contractors assisted EPD in compiling and analyzing a suite of supporting information on agricultural water use and returns, stream flows,

groundwater interaction with streamflows, irrigated acreage, and ecological impacts under different flow regimes). EPD did not commission any ecological studies, but relied on the flow guidelines set forth by the United States Fish and Wildlife Service (“USFWS”) to determine what ecological indicators to consider in the Plan’s ultimate policy requirements.

15. While the Sound Science Study was underway, then-Director Reheis made the decision to institute a moratorium on permit applications for the Floridan aquifer in the lower Flint Basin area and on surface water permits from the Flint River Basin. The moratorium applied to a set of specified counties in southwest Georgia, covering all of the lower Flint and portions of the Chattahoochee. Within those counties, the moratorium had the effect of ceasing the forward-issuance of permits for any withdrawals from the Floridan aquifer or surface water sources. EPD focused the moratorium on withdrawals from the Floridan aquifer because that was the aquifer thought to be most consequential for the possibility of having a direct influence on surface water flows in the Flint River.

16. When I became EPD Director, we began to work on distilling the results of the Sound Science Study to formulate a conservation plan for the lower Flint Basin, which ultimately became the 2006 Plan. The purpose of the 2006 Plan was to evaluate agricultural water use and design a regulatory scheme for managing that water use going forward. The Georgia General Assembly funding for the Sound Science Study rolled over to fund this effort, and the General Assembly also provided EPD with additional staff to work on the plan. EPD had one full-time staff member devoted to leading the day-to-day development of the Plan. We also heavily relied on staff in EPD’s Hydrology Unit for the necessary modeling and technical analysis.

17. The 2006 Plan reflected the best available science at the time as well as extensive stakeholder participation. A Stakeholder Advisory Committee (“SAC”) and a Technical Advisory Committee (“TAC”) were formed to assist EPD with development of the 2006 Plan. In addition, EPD commissioned an experienced, professional group of facilitators at the University of Georgia’s Fanning Institute of Leadership to conduct the SAC process. We hoped that involvement of an experienced, neutral facilitator would encourage stakeholder buy-in and ensure the long-term success of the ultimate plan.

18. The SAC was comprised of southwest Georgia residents from a range of agricultural, industrial, municipal and ecological backgrounds who had previously been engaged in discussions around water issues. The SAC's role was to provide EPD with a series of specific recommendations regarding water management strategies in the lower Flint Basin, aimed at balancing both conservation and economic development. GX-1245 (GWRC Paper); JX-021 (2006 Plan). This extensive stakeholder involvement was beneficial for two reasons: 1) it engendered better public policy; and 2) these stakeholders provided important consideration of the scientific data upon which the Plan was ultimately based. As EPD Director, my primary goal was to achieve a plan that all SAC members could support, even if the planning process included some respectful contention and controversy.

19. The complementary TAC was comprised of scientists, including biologists, geologists, economists, and agricultural specialists. The TAC functioned as the scientific "steering committee" that "monitors progress of, and provides input to, the various studies." GX-1245 (GWRC Paper); JX-021 (2006 Plan). The TAC was also charged with helping to educate members of the SAC on technical issues.

20. The planning process began in 2003, and culminated in the issuance of the 2006 Plan on March 20, 2006. The 2006 Plan incorporated both recommendations developed by the SAC as well as the technical findings of the Sound Science Study. As EPD Director, I then approved the Plan.

B. The Plan Reflected the Best Available Scientific Understanding of Sound Water Resource Management Actions

21. The 2006 Plan resulted in a suite of EPD permitting and water resource management actions, all of which represented Georgia's efforts to implement the best available science at the time to responsibly manage its water resources. I think it is important to emphasize that Georgia took these measures voluntarily and invested considerable resources in their implementation.

22. In undertaking the Sound Science Study, we learned that agricultural permitting should be more nuanced and specific to various watersheds. Specifically, hydrogeologic modeling conducted by USGS as part of the Sound Science Study updated our understanding of

the interactions between aquifer pumping and stream flow. The 2006 Plan therefore divided the areas within the Lower Flint River Basin into three categories of watersheds: Capacity Use Areas, Restricted Use Areas, and Conservation Use Areas. These categories were based on then-current understandings of the water use characteristics, hydrology, geology, interconnectivity between surface water and ground water, and ecology unique to each sub-basin. JX-021 (2006 Plan). Not all streams interact with the aquifer, so it was important to understand which streams would be most directly affected by pumping. With an updated understanding of the interactions between aquifer pumping and streamflow, we were able to then place the greatest restrictions on areas where there was the highest degree of connectivity with the Floridan aquifer.

23. When I came into office, we also had to address the issue of “backlogged permits” which had been held in abeyance since the moratorium was put in place by my predecessor, Harold Reheis. These permits were to be re-evaluated following the completion of the 2006 Plan. I had to choose either to issue these “backlogged permits” or to deny them outright. Denying them outright would have presented many challenges to the region’s economy, as farmers with those “backlogged permits” had already invested hundreds of thousands of dollars on equipment and wells. I ultimately decided, based on the scientific findings in the 2006 Plan, that we could issue the permits and still maintain the sustainability of water resources. We therefore issued the backlogged permits, but also subjected them to a number of important restrictions. Under the 2006 Plan, “backlogged permits” issued in Capacity Use Areas were required, as a condition of the permit, to “(1) have end-gun shut off switches installed to prevent irrigation of non-cropped areas by center pivot systems; (2) be maintained to prevent and repair leaks; (3) have pump-safety shutdown systems installed on center pivot systems that will stop water delivery in the event of an irrigation system malfunction; [and] (4) have rain gage shut-off switches for traveler, solid set, or drip irrigation systems.” JX-021 (2006 Plan).

24. EPD also considered whether or not to modify grandfathered permits—that is, permits for water withdrawals approved before July 1991 for which water use was capped at the existing pump capacity. JX-021 (2006 Plan, at 77). Ultimately, however, we decided that placing conditions on new permits more efficiently achieved our conservation goals. The amount of permitted withdrawals allowed for grandfathered permits is fixed by law, and can only

be modified where necessary to allow for reasonable use of water by new permittees or in the case of emergency. It was therefore legally and practically more feasible to implement regulations on *new* permits, making restricted use a condition of those permits, than to retroactively modify existing permits.

25. Aside from the tiered restrictions on use in Capacity Use, Restricted Use, and Conservation Use areas, we also implemented restrictions on use within near proximity to other users' wells and in-channel springs or streams with a connection to the Floridan aquifer. These measures were designed to both protect existing reasonable uses and allow for new reasonable use without overdrawing the resource. JX-021 (2006 Plan). Also, before issuing any new permits, EPD took steps to revoke duplicate permits and any permits for which initial use had not commenced. JX-021 (2006 Plan).

C. Future Revisions Based on Updated Science

26. At the time we created these conservation measures, we were aware that our scientific understanding of the lower Flint River Basin—its ecology, hydrogeology, and hydrology—would likely change with time, and accordingly built into the 2006 Plan the consideration of new technologies. For example, we provided for the consideration of new technologies related to irrigation efficiency that could reduce seasonal water withdrawal amounts during droughts. We also provided that the Plan was to be re-evaluated every 3 years based on new scientific information such as groundwater models or model results, observed impacts on endangered species in the lower Flint, observed impacts on other threatened species, and other criteria as determined by the scientists and stakeholders in the Flint River Basin. JX-021 (2006 Plan).

D. The Plan Appropriately Balanced Conservation and Support for the Agricultural Economy in Southwest Georgia

27. I am proud of EPD's efforts to develop and implement the 2006 Plan. We invested considerable resources towards finding the appropriate balance between conservation and support for the agricultural economy in southwest Georgia. In fact, the 2006 Plan explicitly recognizes that "[a] balance must . . . be struck between acceptable water use that allows for robust economic activity and strong communities, and acceptable conservation that maintains the

aquatic health of the water resources.” JX-021 (2006 Plan). In the end, I believe that we achieved our goal.

28. The 2006 Plan represented one of the conservation efforts in which EPD was directly involved. As EPD Director, I was aware of other conservation measures being studied and developed during my tenure. For example, I was briefed at the Stripling Center in South Georgia, which is an irrigation research center affiliated with the University of Georgia. Both Stripling and the Water Conservation Commission have been devoted to studying and educating the farming community on particular techniques that can contribute to greater efficiency in center pivot irrigation. That Center did, and continues to, play an important role in helping Georgia farmers learn about and implement the most cutting-edge irrigation techniques. In addition, I was also aware of efforts by other divisions of the Department of Natural Resources to study conservation measures in the ACF Basin, specifically in the Flint River. For example, the Wildlife Resources Division is responsible for understanding the aquatic fauna, and EPD regularly consulted with the Division’s biologists. We also worked cooperatively with other state agencies to manage resources, including the Soil and Water Conservation Department and the Georgia Department of Agriculture.

IV. DROUGHT MANAGEMENT PLANS

A. Background

29. Prior to my appointment as EPD Director, the State of Georgia also took proactive steps to predict and respond to drought conditions in the State by passing legislation that would allow the EPD Director to declare drought and implement appropriate water conservation measures. As EPD Director, I had the statutory authority to declare drought under two separate statutes. The first statute was the 2000 Flint River Drought Protection Act, which gave the EPD Director the authority to declare a severe drought in the Flint River Basin. That determination had to be made, pursuant to statute, on or before March 1st of each year. JX-009 (FRDPA). The second statute was the Georgia Drought Management Plan, which gave the EPD Director authority to declare four different levels of drought—statewide—and implement corresponding restrictions on municipal and industrial water use. JX-161 (2003 Georgia Drought Management Plan). Each of these drought statutes involved separate sets of considerations and distinct

processes by which the EPD staff was to evaluate the scientific indicators of drought conditions and determine whether drought should be declared.

B. Drought Declaration Involved a Multi-Factor Decision-making Process Using Scientific Indicators of the Overall Health of the Hydrologic System

1. Flint River Drought Protection Act

30. Georgia passed the Flint River Drought Protection Act in 2000 to give the EPD Director power to declare drought conditions in the lower Flint basin. JX-009 (FRDPA). A declaration of severe drought triggered a statutory requirement that EPD conduct an auction to pay farmers not to irrigate a certain number of acres in order to maintain an acceptable Flint River stream flow. JX-009 (FRDPA). The General Assembly authorized up to \$35 million for auctions under the statute. The funds for an auction, if needed, were requested by the Governor in a formal budget request to the General Assembly.

31. As mentioned above, there were two auctions prior to my tenure in 2001 and 2002. These auctions resulted in a total expenditure of approximately \$10 million dollars to take acres out of irrigation. At the time, however, EPD had limited tools to monitor the effectiveness of these auctions. The program was voluntary, so farmers were able to select which acreage they would auction to EPD. Often, farmers would select acreage that was not heavily irrigated, reducing the impact of taking that acreage out of irrigation. The FRDPA was later amended in 2006 to give the EPD director greater flexibility in targeting the auctions to certain capacity use areas as defined by the 2006 Plan.

32. The FRDPA provided that the EPD Director would make the determination on whether to declare a severe drought based on historical, mathematical, and meteorological indicators, or other scientific conditions. JX-009 (FRDPA). Therefore, as part of the process of determining whether or not to declare a severe drought in the lower Flint, I received annual memos from members of my staff summarizing drought monitoring in the Flint River Basin. I evaluated these memos, and often engaged in some dialogue back-and-forth with members of my technical staff, before deciding whether severe drought conditions existed such that a drought declaration would be justified. One of the limitations of our analysis at the time was the time lag between when the drought indicators were measured and when drought would actually be

declared. The drought indicators were entirely retrospective, and therefore could not actually predict drought conditions into the future. Because of this time lag, there was always significant uncertainty in the trend of drought conditions at the time a declaration had to be made on March 1. In some years, conditions changed dramatically during that time lag.

33. To illustrate that point, in 2007 members of my staff submitted a recommendation that showed that the drought declaration matrix pointed to the existence of drought conditions. The week before the declaration was to take place, however, Georgia received a significant amount of rainfall. I was faced with the difficult choice of deciding to declare a drought under the FRDPA, knowing that farmers would certainly choose to grow their crops rather than participate in the acreage reduction auction, or not to declare a drought at all. As mentioned above, the implementation of a drought declaration under the FRDPA required the Governor to submit a formal budget request to the Legislature to gain access to the already authorized, but not appropriated, funds for irrigation reduction auctions. Therefore, I was always aware that my decision needed to be unassailable and supported by scientific analysis, including analysis that showed an auction could be carried out in a manner that would effectively mitigate drought conditions. In 2007, and throughout my tenure at EPD Director, I was never satisfied that circumstances and scientific analysis presented a level of certainty that would support the implementation of an effective drought declaration under the FRDPA.

2. Drought Management Plan

34. The Georgia Drought Management Plan was passed on March 26, 2003, just before I began my tenure as EPD Director. JX-161 (2003 Georgia Drought Management Plan). As EPD Director, it was solely my responsibility to declare drought through a series of processes that included consultations with state climatologist and statewide drought committee. During my tenure, I made two such statewide drought declarations.

35. Importantly, the Drought Management Plan also included proactive, pre-drought strategies like a non-drought outdoor watering schedule. JX-161 (2003 Georgia Drought Management Plan). The non-drought watering schedule provided that odd-numbered addresses would water on Tuesdays, Thursdays and Sundays and that even-numbered and unnumbered addresses would water on Mondays, Wednesdays, and Saturdays. GX-0116 (June 21, 2006 Press

Release: Georgia Declares Level One Drought Across the State). It also allowed local governments and water utilities to impose more stringent watering schedules.

36. Under the Drought Management Plan, the State Climatologist and EPD routinely monitored and evaluated stream flows, lake levels, groundwater levels, and other climatic indicators supplied by independent entities, including the US Army Corps of Engineers, US Geological Service, and National Drought Mitigation Center. JX-161 (2003 Georgia Drought Management Plan). EPD also relied on the NOAA drought monitor for drought declarations in the northern part of the State.

37. All of these indicators were collectively referred to as “drought indicators.” There were separate indicators for each of Georgia’s nine-climate divisions. JX-161 (2003 Georgia Drought Management Plan). If any of the indicators passed a certain prescribed condition for two consecutive months, the Plan triggered a preliminary evaluation by the State Climatologist and the EPD Director. JX-161 (2003 Georgia Drought Management Plan). If that evaluation identified the need for drought declaration, the EPD Director would then meet with a “Drought Response Committee” to determine the potential severity of drought conditions and expected impacts. JX-161 (2003 Georgia Drought Management Plan). The “Drought Committee” was composed of the EPD Director, senior managers of other DNR divisions, and representatives from DCA, GDOA, GEMA, GFC, GSWCC, GW&PCA, OSC, ARC, GUAC, USGS, USACE, USFWS, one regional drought council, one NGO, and one representative organization each for the business community and the ag community. JX-161 (2003 Georgia Drought Management Plan).

38. The Drought Management Plan provided for four levels of drought declaration, based on different levels of severity of the drought. JX-161 (2003 Georgia Drought Management Plan). The Drought Committee would make a recommendation based on what was reported by the EPD Director, after which the Director would consider their recommendation and make a declaration of drought, notifying local regional drought committees, local governments, and water supply providers. JX-161 (2003 Georgia Drought Management Plan).

39. Drought responses included aggressive outdoor water use restrictions, JX-161 (2003 Georgia Drought Management Plan), in addition to the non-drought outdoor water use

schedules already in effect. GX-0116 (June 21, 2006 Press Release: Georgia Declares Level One Drought Across the State). A sample of these restrictions is included below.

Schedule for Outdoor Water Use during Declared Drought Response Levels:
<u>Declared Drought Responses: Level One:</u>
Water on scheduled days - 12 midnight to 10 a.m. - and - 4 p.m. to 12 midnight.
<u>Declared Drought Response: Level Two:</u>
Water on scheduled days - 12 midnight to 10 a.m.
<u>Declared Drought Response: Level Three:</u>
Water on scheduled weekend day - 12 midnight to 10 a.m.
<u>Declared Drought Response: Level Four:</u>
Complete outdoor water use ban

These restriction guidelines are included in the 2003 Georgia Drought Management Plan (JX-161). As discussed below, the Plan allowed for drought responses to be tailored to particular drought conditions.

40. Although the table above presents general guidelines for implementing outdoor water use restrictions under different levels of drought, there was considerable discretion to tailor drought responses to particular drought conditions. JX-161 (2003 Georgia Drought Management Plan, at GA00098976). This flexibility, in my experience, made the drought declarations all the more effective. During my tenure, I made two separate drought declarations:

41. In 2006, I declared a Level One drought response across all nine climate divisions in Georgia. GX-0116 (June 21, 2006 Press Release: Georgia Declares Level One Drought Across the State). This Level One declaration initiated a set of water use restrictions that replaced the non-drought outdoor water schedule. Under the 2006 Level One drought declaration, odd-numbered addresses were required to only water on Tuesdays, Thursdays, and Sundays from midnight to 10 a.m. and 4 p.m. to midnight. Even-numbered and unnumbered addresses, on the other hand, were required to only water on Mondays, Wednesdays, and Saturdays from midnight to 10 a.m. and 4 p.m. to midnight. Again, local governments and water utilities were allowed to impose more stringent watering schedules.

42. In 2007, I declared a Level Four drought response for all counties in north Georgia, including all of metropolitan Atlanta, Rome, Athens, and Columbus. This Level Four drought declaration prohibited most types of outdoor water use, with some exemptions for commercial uses. JX-024 (Sept. 28, 2007 Press Release: Citing Historic Drought, Georgia EPD Bans Most Outdoor Water Use in North Georgia). Outside of these areas, all other counties were declared to be in Level Two Drought Response with limited outdoor watering from midnight to 10 a.m. on alternating days. JX-024 (Sept. 28, 2007 Press Release: Citing Historic Drought, Georgia EPD Bans Most Outdoor Water Use in North Georgia). The total ban on outdoor water use lasted for over a year for the counties in North Georgia. This was an extreme measure, but one that we felt was necessary to protect water resources in the northern part of the Apalachicola-Chattahoochee-Flint River Basin.

43. The declaration of a Level Four drought in the northernmost counties of the State had a significant impact on the daily lives of Georgia residents. Residents in the affected Level Four counties were not able to perform basic tasks like watering their lawns or washing their cars. The Level Four drought response had significant economic impacts as well. The most significant impacts were on the horticulture industry. In total, industry-wide losses from the outdoor watering ban were estimated at an annual loss of \$3.15 billion dollars and 35,000 jobs. GX-209 (UGA 2008 Urban Agriculture Industries in GA). Several smaller horticulture shops went out of business as a result of the aggressive conservation measures that EPD chose to take in response to drought.

44. The Governor also had the power to declare a state of emergency under his own authority and to organize an emergency response team. The Governor did, in fact, declare a state of emergency in 2007, which was one of the driest years on record. As EPD Director, I chaired an emergency response team, comprised of representatives from several state agencies, that sought to take proactive measures to support communities across the state that were in danger of running out of water.

45. In May 2008, I determined that conditions had improved enough in six counties to lift Level Four restrictions and replace those restrictions with Level Two restrictions. JX-162 (May 6, 2008 Press Release: Level Four Drought Response Continues for Most of North

Georgia). Counties that had formerly been under Level Two restrictions were likewise upgraded to a Level One drought response. JX-162 (May 6, 2008 Press Release: Level Four Drought Response Continues for Most of North Georgia). These restrictions remained in place up until the time I left EPD in October of 2009.

V. STATE WATER PLAN

46. Another measure initiated during my tenure, the state water planning process, represented a significant effort by Georgia to manage water use. The state water planning process was initiated by the 2004 Comprehensive State-wide Water Management Planning Act, which authorized the development of the State Water Plan and gave the EPD Director certain duties and responsibilities in chairing a water council to help develop the State Water Plan. Prior to the Plan, there were already water management activities occurring in all of the basins in the State. This Plan consolidated those efforts and represented a significant move by Georgia to study conservation and potential storage needs in a comprehensive way.

A. Background of the State Water Plan.

47. In 2004, the Georgia Legislature passed the Comprehensive Statewide Water Management Planning Act (the “2004 Act”). GX-0064 (2004 Act). The Act mandated that EPD develop a comprehensive state-wide water management plan (the “State Water Plan”) in order to support Georgia’s economy, protect its natural systems, and enhance the quality of life for its citizens. GX-0064 (2004 Act). EPD pursued this goal in cooperation with state agencies and other stakeholders, working to develop a draft plan which was submitted to an appointed “Water Council.” GX-0064 (2004 Act).

48. The Water Council, comprised of legislators and officials from various government agencies, was then charged with reviewing and approving the plan and recommending the proposed plan to the legislature for their approval. GX-0064 (2004 Act). The Water Council was an inter-agency effort and involved eight different state agencies, all of which had responsibilities in assisting in different aspects of developing the plan.

49. As EPD Director, I chaired the Water Council. We developed the first draft state-wide plan, which went through a public comment and review process, was revised, and then

approved by the Water Council on January 8, 2008. The final State Water Plan was adopted by the Georgia General Assembly and signed by the Governor in February 2008.

50. Georgia invested considerable resources into data collection for the purposes of the State Water Plan and in the development of models and other tools to assist in that purpose. The State Water Plan also tasked EPD with several new, ongoing responsibilities. The State Water Plan charged EPD with performing evaluations of water resources capability for water supply and assimilative capacity within each of ten discrete regions in the state, called “water resource assessments,” to be used as guidance for regional water planning. GA-0210 (2008 Georgia Comprehensive Statewide Water Plan (“2008 State Water Plan”). Furthermore, all water withdrawal permitting decisions made by EPD were required to comply with the State Water Plan, and any political subdivision or local water authority not in compliance with the State Water Plan was ineligible for state grants or loans for water projects. GX-0064 (2004 Act).

B. Establishment of the Regional Water Planning Process.

51. The first State Water Plan represented a monumental effort to inform water planning and conservation across the State. Part of the purpose of the State Water Plan was to encourage better water management at the regional and local levels. Therefore, the State Water Plan established ten new Water Planning Councils (each called a “Regional Council”), which were charged with conducting regional forecasts of water supply and assimilative capacity demands, and compare those with the state’s regional “water resource assessments” to identify steps to be taken to ensure that those forecasted regional water needs could be met. Each of these Regional Councils was then to recommend a Regional Water Development and Conservation Plan (“Regional Water Plan”) to EPD. GA-0210 (2008 State Water Plan). After completion, the Regional Water Plans were reviewed by EPD and, if complete and consistent with established guidance, were adopted by EPD. GA-0210 (2008 State Water Plan). The regional planning process was well underway by the time I left office in October of 2009.

VI. CONCERNS WITH CORPS OPERATIONS UNDER THE IOP

52. Another important responsibility of the EPD Director involved working on submissions to the U.S. Army Corps of Engineers regarding municipal and industrial water-supply related issues. The Corps has a significant influence the timing and delivery of flow in

the ACF Basin and manages a series of federal reservoirs for water supply, along with other purposes such as flood control, hydropower, navigation, and recreation. During my tenure, Georgia regularly interacted with the Corps to request specific water supply storage allocations from Lake Lanier and also to provide comments on the Corps' ongoing operations. Under my leadership, EPD's goal was always to work with the Corps to find the most efficient possible measures for managing water storage in the ACF Basin to serve all state and stakeholder interests—including water supply and the ecological health of the ACF Basin.

53. Throughout my tenure, I worked closely with a team of experts in EPD's Hydrology Unit to evaluate water supply needs and provide the Corps with necessary technical analysis. One of the primary roles of that unit was to independently evaluate the effect of the Corps' operations and to participate in the formal consultation process for revising those operations.

54. In 2006, the Corps initiated the formal consultation on revising its operating plan for the federal reservoirs in the ACF Basin. The Corps also announced its Interim Operating Plan ("IOP"), which laid out an "interim" set of operating procedures that the Corps would follow while the formal consultation was underway. The IOP's purpose was to both minimize effects on listed species in the Apalachicola River and also provide for a number of authorized uses, including water supply. The Corps set a mandatory 5,000 cfs minimum flow requirement at Jim Woodruff Dam in times of drought operations.

55. The Corps' operation of the reservoirs under the IOP proved very inefficient and problematic. One of the IOP's greatest weaknesses was that it limited the amount of basin inflows that could be used to refill the reservoirs due to the needlessly high mandatory thresholds for sturgeon egg spawning. Through the Hydrology Unit, EPD made a number of technical findings in 2006 and 2007 that led us to believe the Corps' operation of the reservoirs was putting system-wide storage in the federal reservoirs in jeopardy, and limiting the ability of the Corps to satisfy numerous other project purposes throughout the Basin.

56. In 2006, EPD's hydrologists discovered through independent monitoring that the Corps was releasing more than 100% of basin inflows. JX-144 (May 5, 2006 Letter from EPD to Corps). The potential consequences of these over-releases were severe. According to analysis

done by senior hydrologist Dr. Wei Zeng, these over-releases could result in Lake Lanier dropping to a level not seen since the 1950's, which would have placed Georgia's water supply, water quality, and biological resources throughout the ACF Basin in jeopardy. JX-144 (May 5, 2006 Letter from EPD to Corps). This was a particular concern given the drought conditions at the time. JX-144 (May 5, 2006 Letter from EPD to Corps). In addition, these over-releases were occurring at the beginning of the summer months, which is the period when the Corps' drought rules would require a minimum flow release of 5,000 cfs at the Chattahoochee Gage. With all of these combined factors, there was a concern that the conservation pools in Lake Lanier, West Point, and Walter F. George would be completely depleted by the end of the season. JX-144 (May 5, 2006 Letter from EPD to Corps); GX-0108 (May 17, 2006 Letter from EPD to Corps).

57. Georgia EPD proposed several changes to the IOP in a series of communications with the Corps that reflected a more balanced and responsible operation of the reservoirs in relation to basin inflows. For example, Georgia requested that the Corps adjust operations so that it was not releasing more than 5,000 cfs from Jim Woodruff at basin inflows of less than 8,000 cfs. JX-145 (June 9, 2006 Letter from EPD to Corps). All of these changes were aimed at modifying the Corps' operations to better account for the need to protect system storage, and with it, basin-wide project purposes such as Atlanta's water supply. Yet, at the same time, EPD's proposals sought to satisfy the Corps' responsibility for protecting sturgeon and mussel habitat in the Apalachicola River. In fact, EPD's analysis and proposals for alternative reservoir management expressly accounted for prospective ecological impacts. As part of our interest in reviewing and commenting on the ESA Section 7 Consultation between the Corps and the U.S. Fish and Wildlife Service's, EPD reviewed ecological data and conducted modeling of impacts to species under different flow levels. EPD's modeling did not show any detriment to species that would be caused by the requested reduction in the Corps' releases of water. GX-0111 (June 2, 2006 Letter from EPD). With respect to mussels, our modeling revealed that the requested changes would actually have a positive impact. JX-145 (June 9, 2006 Letter from EPD to Corps).

58. The ecological analysis surrounding Gulf sturgeon spawning was supported by an independent study conducted by Bill Pine and others and was evaluated by Douglas Peterson at the University of Georgia. GX-0121 (August 26, 2006 Letter from EPD to Corps and USFWS attaching Peterson Memorandum). Dr. Peterson's analysis showed that there was no data

supporting a relationship between any particular flow in the Apalachicola River and spawning success and that there was no scientific evidence that flows under the IOP were necessary for successful Gulf sturgeon spawning. Finally, he showed that the flows provided under the IOP during spawning season were unnecessarily high and could in fact prove harmful to Gulf sturgeon spawning. GX-0121 (August 26, 2006 Letter from EPD to Corps and USFWS attaching Peterson Memorandum).

59. In September of 2007, given severe drought conditions in the Basin and sustained periods of basin inflows lower than 5,000 cfs, EPD was more concerned than ever that IOP operations would deplete system storage. GX-0168 (Sept. 14, 2007 Letter from EPD to Corps). While the Corps implemented some of Georgia's requested changes to its operations, it did not take sufficient action to prevent system storage from dropping to alarmingly low levels during the extreme and prolonged drought conditions in the northern part of the Basin. At one point in late September 2007, the Corps estimated that there was only a three-month supply of water left in Lake Lanier, which serves as Atlanta's primary water source. We at EPD, and the State more broadly, therefore determined that we had no choice but to sue the Corps on October 17, 2007. This lawsuit marked an unfortunate departure from the typically cooperative and productive relationship between EPD and the Corps.

60. After the lawsuit was filed, EPD proposed a neutral, third-party study of the ACF Basin that would involve a joint study between the three states in the ACF Basin—Georgia, Florida, and Alabama—and the Corps, conducted by the National Research Council. The purpose of this study would be to form a more solid, commonly understood scientific foundation for the long-term management of water resources in the Basin. GX-1262 (August 1, 2008 Letter from EPD to FDEP and ADEM). Florida expressed reservations about jointly funding such a study, and stated that the Corps was and should be largely responsible for funding these kinds of studies in the Basin as part of its Water Control Manual updates. GX-1263, (August 29, 2008 Email from Sole to Couch et al.). In the end, because of Florida and Alabama's lack of interest, we did not pursue what I thought would be a reasonable and cost-effective alternative to the legal costs expended by all three states. GX-1264 (Oct. 3, 2008 Email from Couch to NAS).

VII. CONCLUSIONS REGARDING MANAGEMENT OF WATER RESOURCES IN GEORGIA DURING MY TENURE

61. During my tenure as EPD Director, Georgia simultaneously managed water resources throughout a long-term, historic regional drought, and significantly advanced conservation-focused water resource management. EPD was proactive, responsive, and took action in context of the scientific knowledge and authority available at the time.

LIST OF EXHIBITS CITED

- **GX-0064:** This exhibit is a true and accurate copy of the 2004 Georgia Comprehensive Statewide Water Management Planning Act. The Act was passed during my tenure as EPD Director, and provided for the creation of a Statewide Water Plan. As EPD Director, I was responsible for chairing the Water Council that oversaw the development of the Statewide Water Plan.
- **GX-0108:** This exhibit is a true and accurate copy of a May 17, 2006 letter I wrote to the Corps in my role as EPD Director, raising concerns with the Corps operations under its Interim Operating Procedures. As EPD Director, I regularly corresponded with the Corps regarding their operations of reservoirs in the ACF Basin.
- **GX-0111:** This exhibit is a true and accurate copy of a June 2, 2006 letter I wrote to the Corps in my role as EPD Director, raising concerns with the Corps operations under its Interim Operating Procedures. As EPD Director, I regularly corresponded with the Corps regarding their operations of reservoirs in the ACF Basin.
- **GX-0116:** This exhibit is a true and accurate copy of the June 21, 2006 Press Release indicating that a Level One drought was being declared statewide. As EPD Director, I made the decision to declare a Level One drought in June 2006 in accordance with my statutory authority under the 2003 Drought Management Plan.
- **GX-0121:** This exhibit is a true and accurate copy of an August 26, 2006 letter I wrote to the Corps and USFWS in my role as EPD Director, attaching analysis of the status of certain species in the ACF Basin under the Corps' Interim Operating Procedures. As EPD Director, I regularly corresponded with the Corps and USFWS regarding the ecological impacts of the Corps' operations of reservoirs in the ACF Basin.
- **GX-0168:** This exhibit is a true and accurate copy of a Sept. 14, 2007 letter I wrote to the Corps in my role as EPD Director, raising concerns with the Corps operations under its Interim Operating Procedures. As EPD Director, I regularly corresponded with the Corps regarding their operations of reservoirs in the ACF Basin.
- **GX-0209:** This exhibit is a true and accurate copy of a 2008 paper published by the University of Georgia entitled "Urban Agriculture Industries in Georgia." This paper reflects estimates of economic loss to the urban agriculture industry caused by the declaration of a statewide outdoor watering ban in 2007. As EPD Director, I made the decision to implement a statewide outdoor watering ban, and I am familiar with the estimates of economic loss contained in this report.
- **GX-0210:** This exhibit is a true and accurate copy of the 2008 Georgia Comprehensive Statewide Water Plan, which was approved by the Water Council, of which I was chair, and then approved by the Georgia General Assembly.

- **GX-1261:** This exhibit is a true and accurate copy of the 2006 Amendments to the Flint River Drought Protection Act (FRDPA). These amendments were passed by the Georgia General Assembly during my tenure as EPD Director.
- **GX-1262:** This exhibit is true and accurate copy of an August 1, 2008 letter I wrote to the Florida Department of Environmental Protection and the Alabama Department of Environmental Management regarding a jointly-funded study of water resources in the ACF Basin. As EPD Director, I regularly corresponded with my counterparts in Alabama and Florida as part of ongoing negotiations.
- **GX-1263:** This exhibit is true and accurate copy of an August 29, 2008 email I received from Secretary Michael Sole at the Florida Department of Environmental Protection regarding a jointly-funded study of water resources in the ACF Basin. As EPD Director, I regularly received such correspondence from my counterparts in Alabama and Florida as part of ongoing negotiations.
- **GX-1264:** This exhibit is true and accurate copy of an October 3, 2008 email I wrote to Steve Parker at the National Academies of Science regarding a jointly-funded study of water resources in the ACF Basin. As EPD Director, I regularly corresponded with such entities regarding scientific studies in the ACF Basin and other parts of Georgia.