

No. 142, Original

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

STATE OF FLORIDA,

Plaintiff,

v.

STATE OF GEORGIA,

Defendant.

STATE OF GEORGIA'S POST-TRIAL BRIEF

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TABLE OF CONTENTS

	Page
INTRODUCTION.....	1
ARGUMENT.....	4
I. FLORIDA CANNOT OBTAIN RELIEF WITHOUT CHANGES TO CORPS OPERATIONS	4
A. Increased Flows In The Flint River Do Not Lead To Increased Releases By The Corps Into Florida	5
B. Modeling By Both Georgia And Florida Confirms That Consumption Caps Would Not Produce A Material Increase In State-Line Flows During Drought	8
C. Florida Has Admitted On Multiple Occasions That The Only Way To Guarantee Reliable Flows Above 5,000 cfs During Drought Is By Changing Corps Operations.....	11
II. FLORIDA BORE THE BURDEN OF PROVING MULTIPLE ELEMENTS BY CLEAR AND CONVINCING EVIDENCE.....	15
III. FLORIDA HAS FAILED TO PROVE INJURY AND CAUSATION BY CLEAR AND CONVINCING EVIDENCE	19
A. Florida’s Attenuated Chain Of Causation Does Not Meet The “Clear And Convincing” Requirement	19
B. Florida Has Not Proven That Georgia’s Water Use Caused Real And Substantial Harm To Apalachicola Bay.....	22
1. Georgia’s Water Use Did Not Cause The Oyster Fishery Collapse	22
2. Florida Mismanaged The Apalachicola Bay Oyster Fishery	27
3. Ecological Experts Have Not Established Clear And Convincing Evidence Of A Connection Between Georgia’s Consumptive Use And Any Other Alleged Changes To The Ecology Of Apalachicola Bay	36
C. Florida Has Failed To Provide Clear And Convincing Evidence That Georgia Has Harmed The River Ecosystem	38
1. Woodruff Dam Has Lowered River Levels 40 Miles Downstream Of The Dam And Fundamentally Changed The Ecology Of The Apalachicola River.....	39
2. Navigational Dredging Lowered The Level Of The River And Continues To Degrade The River Ecosystem.....	40

3.	USFWS’s Biological Opinion Precludes Any Finding Of Clear And Convincing Evidence That Georgia Harmed Endangered Species In The Apalachicola Ecosystem	43
4.	Florida’s Claim That Georgia Caused Changes To The Floodplain Forest Is Undermined By The Evidence	45
5.	Dr. Allan’s Testimony Cannot Justify A Finding Of Clear And Convincing Evidence	47
D.	Florida Previously Blamed The Corps For These Same Injuries It Now Alleges Were Caused By Georgia	50
IV.	FLORIDA HAS FAILED TO PROVE THAT GEORGIA’S WATER USE IS INEQUITABLE	55
A.	Georgia’s Consumptive Use of Water Is Reasonable.....	56
B.	Georgia Has Made Substantial Efforts To Conserve Water For M&I Purposes, Dramatically Reducing Consumptive Use	61
1.	Georgia Is A National Leader In M&I Conservation	61
2.	Georgia Has Already Adopted Any Realistically Achievable Aspects Of Dr. Sunding’s Proposed Conservation Measures.....	65
C.	Georgia Has Made Substantial Efforts To Conserve Agricultural Water Resources	68
D.	Low Flows Are Caused By Drought, Not Georgia’s Consumptive Use	73
1.	Basic Hydrologic Principles Confirm That Streamflow Declines Are Attributable To Precipitation Declines	73
2.	Florida’s Analysis Of Declining Flows And Purported “Trends” Is Misleading And Ignores Evidence Linking Low Flows To Drought	76
3.	Flows Have Declined By Thousands Of cfs Entirely Within Florida’s Borders	78
V.	FLORIDA’S PROPOSED REMEDIES WILL NOT REDRESS ITS ALLEGED HARMS AND WILL IMPOSE EXTREME COSTS ON GEORGIA FAR IN EXCESS OF ANY BENEFITS TO FLORIDA.....	80
A.	Florida Has Failed To Provide Any Evidence Supporting Its Proposed “Wet” Or “Average” Year Remedy	80
B.	Florida’s Proposed “Drought” Year Remedy Is Impossible To Achieve	81
C.	Florida’s Proposed Remedies Would Impose Extraordinary Costs On Georgia.....	84

D.	Florida Failed To Provide Clear And Convincing Evidence That Its Proposed Remedies Would Redress Its Alleged Harms	85
CONCLUSION		88

TABLE OF AUTHORITIES

	Page(s)
Cases	
<i>Aransas Project v. Shaw</i> , 775 F.3d 641 (5th Cir. 2014) (<i>per curiam</i>)	<i>passim</i>
<i>Arizona v. California</i> , 298 U.S. 558 (1936).....	5, 15
<i>Colorado v. Kansas</i> , 320 U.S. 383 (1943).....	17, 80
<i>Colorado v. New Mexico</i> , 459 U.S. 176 (1982) (<i>Colorado I</i>)	<i>passim</i>
<i>Colorado v. New Mexico</i> , 467 U.S.310 (1984)(<i>Colorado II</i>)	15, 16, 19
<i>Connecticut v. Massachusetts</i> , 282 U.S. 660 (1931).....	<i>passim</i>
<i>Idaho ex rel. Evans v. Oregon</i> , 462 U.S. 1017 (1983).....	16, 19
<i>In re MDL-1824 Tri-State Water Rights Litigation</i> , 133 S. Ct. 25 (2012).....	53, 55
<i>Kansas v. Colorado</i> , 206 U.S. 46 (1907).....	17, 55
<i>Pennsylvania v. New Jersey</i> , 426 U.S. 660 (1976) (<i>per curiam</i>)	16
<i>Texas v. New Mexico</i> , 352 U.S. 991 (1957) (<i>per curiam</i>)	5, 15
<i>Washington v. Oregon</i> , 297 U.S. 517 (1936).....	1, 18, 56, 80
<i>Wyoming v. Colorado</i> , 259 U.S. 419 (1922).....	12
Rules	
Fed. R. Civ. P. 11	54

Fed. R. Civ. P. 19.....3, 4, 15
FLA. ADMIN. CODE ANN. R. 68B-027.17.....29
GA. COMP. R. & REGS. 391-3-33-.05(3)(a).....67

Secondary Sources

Restatement (Second) of Torts § 850(b).....18

INTRODUCTION

Florida has failed to prove that it is entitled to an equitable apportionment. The Supreme Court has long recognized that equitable apportionment actions involve the “the exercise [of] extraordinary power” to “control the conduct of one state at the suit of another.” *Washington v. Oregon*, 297 U.S. 517, 522 (1936). Before the Court will exercise that type of power, Florida was required to come forward with clear and convincing evidence proving its case on each of the following points: real and substantial injury, causation, inequitable conduct, and redressability. Florida also had to surmount the additional threshold issue that the United States Army Corps of Engineers (“Corps”) has not been joined as a party to this suit and therefore cannot be compelled to be part of any remedy the Court might order. As trial made abundantly clear, Florida cannot obtain a predictable and dependable increase in flow at the state line during drought or low flow periods without the Corps. And even if Florida did not need the Corps to secure relief, on the merits Florida still has not met its burden to provide clear and convincing evidence on the elements of its equitable apportionment claim. It is one thing to make allegations—and Florida has made plenty of them—but it is another thing altogether to back them up. On that score, Florida’s case fell woefully short.

This case vividly illustrates why the Court imposes such a high burden on States seeking to upset the status quo through an equitable apportionment. As the Court warned in *Colorado v. New Mexico*, “the equities supporting the protection of existing economies will usually be compelling,” because the “harm that may result from disrupting established uses is typically certain and immediate, whereas the potential benefits . . . may be speculative and remote,” 459 U.S. 176, 187 (1982) (*Colorado I*). Here, Florida would have this Court put at risk the economic foundation of the country’s ninth largest metropolitan area as well as a multi-billion dollar agricultural sector that provides key crops and generates thousands of jobs. In contrast, as the

trial record overwhelmingly shows, Florida's alleged harms either do not exist, or they depend on extremely attenuated chains of causation. Florida has alleged harms at the ecosystem level, and proving those types of harms is extraordinarily complex. Florida did not satisfy its burden to show that Georgia's upstream consumption caused its asserted harms when factors like climate, precipitation, timing and amount of releases by the Corps, physical changes to the river and floodplain resulting from dam construction and dredging, and Florida's own mismanagement of the oyster population in Apalachicola Bay are all simultaneously influencing the ecosystem, river flows, or both.

Given the magnitude of what Florida has requested—including remedies that could easily require Georgia to cease all agricultural irrigation in drought years and incur hundreds of millions of dollars of costs in metro Atlanta—the Court rightly should have expected to see hard facts and overwhelming evidence of harm in Florida with causation directly attributable to Georgia. Instead, Florida presented constantly changing testimony, revised models, and shifting calculations. Florida also presented witnesses who were impeached an incredible 49 times throughout trial. Virtually every facet of Florida's narrative fell apart under cross examination and closer scrutiny. As just a few examples:

- Florida claimed the Corps would use additional Flint flows to increase the minimum flow at the state line, but modeling by Florida's own expert showed that those additional flows would have *no material impact on state line flows during drought or low flow conditions* when the Corps would instead keep state line flows close to 5,000 cfs as provided in the Corps' operating plan.
- Florida claimed low flows caused by Georgia's water use caused the oyster collapse in Apalachicola Bay, but independent University of Florida scientists published a peer-reviewed journal paper finding *no scientific basis to support that allegation*—followed by threats of retaliation by the State.
- Florida claimed that the endangered fat threeridge mussels in Florida were being subjected to ongoing harm due to Georgia's water use, but the U.S. Fish and Wildlife Service reported just two months ago that the species is *stable or increasing* with a potential population as high as *18 million*.

- Florida claims an additional 1,000 cfs at the state line would alleviate its harms, but its river ecology expert, its bay salinity expert, and its oyster modeling expert all predicted miniscule changes in the ecology from that additional water, *an amount that would exact a devastating toll on Georgia's economy*.

At every turn, Florida's allegations have come undone, unsupported by the evidence. In the face of its evidentiary issues, Florida dropped experts whose testimony was unhelpful in an effort to keep adverse evidence from the Court; had its other experts create new models or adopt new, unsupported assumptions to compensate where its claims fell apart; and presented fact witnesses with unsupported or fanciful testimony. This type of evidentiary hunt-and-peck is not what the Supreme Court had in mind when it required clear and convincing evidence in original jurisdiction cases, and it cannot justify an equitable apportionment here.

This brief is organized in the following manner. *Section I* explains why this case must be dismissed under Rule 19 for failure to join the Corps. The Court denied this motion at the outset because the evidence in support of this defense had not yet been developed. The evidence now is overwhelming that in drought or low flow periods, this Court cannot provide Florida a predictable and reliable increase in flow at the state line without the United States participating as a party. *Sections II through V* explain why, should the Court proceed notwithstanding the absence of the Corps, Florida's claim fails on the merits. *Section II* addresses Florida's heightened burden of proof, the need for clear and convincing evidence, and why the fact that Georgia and Florida are regulated riparian states does not change the Supreme Court's analysis. *Section III* addresses Florida's failure to prove injury and causation by clear and convincing evidence. Although these elements are distinct under Supreme Court case law, Georgia addresses them together since they are intertwined. *Section IV* addresses Florida's failure to prove by clear and convincing evidence that Georgia's water use has been inequitable and explains that low flows over the last 15 years have not been caused by Georgia's water use, but

rather by a series of three historic, multi-year droughts. And finally, *Section V* explains that Florida's proposed remedy is entirely unworkable, would wreak havoc on Georgia's agricultural sector and overall economy, and generates no benefit to any ecological, biological, or economic interest that Florida claims has been harmed. Indeed, even assuming the Corps would pass through any water saved in a drought by Georgia (itself a flawed assumption), this Court would still be upsetting billions of dollars in existing economic activity and established uses in Georgia for no measurable benefit during the times Florida claims it needs water the most.

For these reasons and the reasons set for the below, Georgia respectfully submits that this action should be dismissed for failure to join a necessary party under Rule 19 or, in the alternative, that judgment be entered in Georgia's favor due to Florida's failure to meet its heightened burden of proof for the Court to order an equitable apportionment.

ARGUMENT

I. FLORIDA CANNOT OBTAIN RELIEF WITHOUT CHANGES TO CORPS OPERATIONS

The evidence presented at trial shows that this action cannot proceed without the United States as a party. At the motion to dismiss stage, this Court found that "the United States was a party required to be joined if feasible" under Rule 19(a), but nonetheless held that the case could proceed "in equity and good conscience" under Rule 19(b) because, at the pleading stage, it was "possible" that Florida could obtain adequate relief through a cap on Georgia's consumptive water use that would not affect the United States' operations in the ACF Basin. Order on State of Georgia's Motion to Dismiss (June 19, 2015) at 8, 11-15. The Court cautioned, however, that Florida would have to meet its burden of proof on that issue at trial: "Having voluntarily narrowed its requested relief and shouldered the burden of proving that the requested relief is appropriate, it appears that Florida's claim will live or die based on whether Florida can show

that a consumption cap is justified and will afford adequate relief.” *Id.* at 13. Florida has not made that showing.

Multiple witnesses—including Florida’s own experts—testified that consumption caps in Georgia could not afford adequate relief to Florida without a change to the Corps’ reservoir operations in the ACF Basin. Because the Corps controls state-line flows into Florida, any change in the amount or timing of flow entering Florida must be coordinated and executed by the Corps. Absent modification of the Corps’ current basin-wide reservoir operating rules and the recently finalized Environmental Impact Statement for the soon-to-be finalized Water Control Manual (published on December 7, 2016), additional water entering the system would not translate automatically into additional flow across the state line—particularly during low-flow and drought conditions. As a result, Florida’s proposed reductions in Georgia’s water use would not materially increase state-line flows without operational changes by the Corps itself. As in prior equitable apportionment cases in which the United States declined to intervene notwithstanding intertwined federal obligations with regard to the system in question, this case must be dismissed. *See Texas v. New Mexico*, 352 U.S. 991 (1957) (*per curiam*); *Arizona v. California*, 298 U.S. 558, 572 (1936).

A. Increased Flows In The Flint River Do Not Lead To Increased Releases By The Corps Into Florida

The Corps’ operation of five federal reservoirs, including at the Georgia-Florida state line creates a “highly regulated system over much of the basin.” GX-544, at 2 (USACE Final Scoping Report). This is especially true at times of low flows and drought, when the Corps operates its reservoirs to guarantee only 5,000 cfs of flow into the Apalachicola River and otherwise conserves water in upstream reservoirs. *See ACF Final EIS for Master Water Control Manual Updates*, at 2-28, 2-33, 2-40 (USACE, December 7, 2016) [hereinafter “USACE FEIS”]

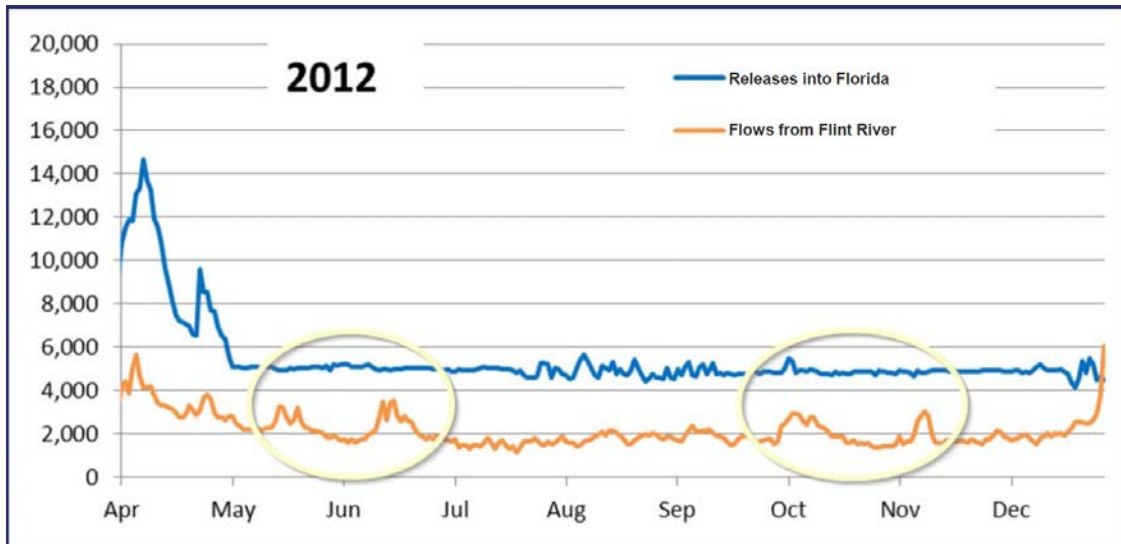
“Under dry conditions when [basin inflows] are reduced, project operations are adjusted to *conserve storage* in [Corps’ reservoirs] while continuing to meet project purposes” (emphasis added)).¹ In its 2016 Biological Opinion, the U.S. Fish and Wildlife Service (“USFWS”) explained that under low flow conditions, the Corps operates its reservoirs to support only minimum flows for downstream fish and wildlife and otherwise operates to conserve reservoir storage for other federal project purposes:

The WCM includes guidelines for continued operation of projects in the ACF Basin in a balanced manner to *achieve all authorized project purposes, while continuously monitoring the total system water availability to ensure that project purposes can at least be minimally satisfied during critical drought periods*. The intent would be to maintain a balanced use of its reservoirs in times of normal, high-flow, and drought conditions. At all times, USACE would seek to conserve the water resources entrusted to its regulation authority.

JX-168, at 15 (2016 Biological Opinion) (emphasis in original).

Streamflow data presented at trial confirms that additional flows on the Flint are not simply passed through by the Corps during low-flow or drought periods. Florida’s remedy theory in this litigation incorrectly assumes that any increases in streamflow in the Flint River would automatically translate to increased releases by the Corps into Florida in excess of 5,000 cfs. As explained by Georgia’s chief hydrologist Dr. Wei Zeng, during low-flow conditions, Flint River flows (shown in orange) can fluctuate by as much as 2,000 cfs without any corresponding change in flows into Florida (shown in blue) (Zeng Demo. 11):

¹ See also GX-544, at 18 (USACE Final Scoping Report) (“The complex hydrology and varied uses of the ACF system require that the USACE operate the system in a balanced operation in an attempt to meet all the authorized purposes while continuously monitoring the total system’s water availability to ensure that *minimum* project purposes can be achieved during critical drought periods.” (emphasis added)).



The reason is simple: when Flint River flow increases during low flow and drought conditions, the Corps follows its operating rules and stores additional water upstream in Chattahoochee reservoirs to maintain a relatively constant flow of approximately 5,000 cfs flow into Florida. *See* Tr. 3332:11-3334:8 (Zeng); USACE FEIS, at 2-76 (under drought conditions, “the minimum release from Jim Woodruff Lock and Dam is 5,000 cfs, and all BI above 5,000 cfs that is capable of being stored may be stored”).

Florida’s own experts have acknowledged the lack of a relationship between Flint River flows and flows into Florida under low-flow conditions. Florida’s lead hydrologist, Dr. George Hornberger admitted that there is no “increase in state line flows” corresponding with increases in Flint River flows of 2,000 cfs. Tr. 1982:21-1985:10 (Hornberger). One of Florida’s experts on reservoir operations, Dr. Peter Shanahan, admitted that “it’s not a one to one correspondence where the flows from the Flint River come up and the discharge from the Jim Woodruff Dam immediately comes up.” Tr. 2512:13-16 (Shanahan). And as Dr. Zeng explained, the reason extra water does not automatically pass through to Florida is because, under low-flow conditions, the Corps maintains release levels from Woodruff Dam into Florida of approximately 5,000 cfs. *See* Tr. 3340:12-23 (Zeng).

The Corps' "overall management principles" involve "meeting the minimum" release of 5,000 cfs while at the same time "trying to refill those reservoirs to the maximum level possible" in order to satisfy "a host of" federal project purposes, of which protection of fish and wildlife in Florida is only one. Tr. 3924:16-3925:12 (Bedient); JX-124, at 2-63 (2015 DEIS). Consistent with this careful balancing act, the Corps regulates inflows to the reservoirs to guarantee as close to 5,000 cfs at the state line as possible, and offsets any increases on the Flint River with decreased releases on the Chattahoochee River. Bedient Direct, ¶¶ 45-47 (explaining how "even if reductions in Georgia's water use occurred only on the Flint River during times of drought or low flows, the increase in inflow to Lake Seminole would not necessarily result in any increase in state-line flow into Florida" because any extra flows would be "offset by corresponding reductions in releases from the reservoirs on the Chattahoochee River"); Bedient Demos. 11-12; Tr. 3341:9-3342:6 (Zeng) (explaining that "[w]hen you do have more water coming in from the Flint side," the Corps will "reduce release from the Chattahoochee side so that the combined water going into Jim Woodruff is just 5,000 cfs"). Put differently, water savings generated on the Flint River would not translate into higher flows into Florida because the Corps targets state-line releases of 5,000 cfs in dry times and drought.

B. Modeling By Both Georgia And Florida Confirms That Consumption Caps Would Not Produce A Material Increase In State-Line Flows During Drought

The Corps' own modeling tools confirm that reductions in consumption during a drought do not materially impact state-line flows into Florida. Dr. Philip Bedient, Georgia's expert in hydrology and reservoir operations, used ResSim, the Corps' official reservoir simulation model for the ACF Basin, to analyze the impact of consumption caps on state-line flow. Bedient Direct, ¶¶ 8-9, 60-61, 75. Dr. Bedient modeled 19 different consumption cap scenarios (including eliminating as much as 40% of Georgia's consumptive use) and found that "additional

water entering the ACF Basin and resulting from Georgia's reduced consumptive use would not translate to *any* increase in flow at the state line during these critical low flow months, due to the manner in which the Corps operates its reservoirs." Bedient Direct, ¶¶ 4, 60-61, 75, 78-87 (emphasis in original).

Florida's own modeling results also confirm that consumption caps would not produce any material increase in state line flows into Florida, especially under dry conditions. Like Dr. Bedient, Dr. Hornberger initially used ResSim to model the impact of consumption caps on state-line flow. Dr. Hornberger's results showed that eliminating as much as *50% of Georgia's total agricultural water use* would not lead to *any* increase in flows into Florida for many dry months of dry years. Tr. 1933:20-1935:23 (Hornberger) (acknowledging that according to his ResSim model results, "a 50 percent reduction in Georgia's agricultural use . . . would produce zero cfs of additional flow at the state line" for hundreds of days under hydrologic conditions similar to 2007, 2011, and 2012). Dr. Hornberger's findings—which are diametrically opposed to Florida's allegations—are not mentioned in any of Dr. Hornberger's expert reports or testimony. Tr. 1935:24-1936:9 (Hornberger) (admitting that although he was "aware of these results before [he] submitted [his] expert report," Dr. Hornberger's "report itself doesn't discuss these results"). Instead, Florida tasked Dr. Hornberger with creating a brand new model that has never before been used by the Corps or anyone else, to generate a different result.

At trial, the Special Master asked why Florida and Georgia experts were obtaining different results when they were using the same models and same inputs. Tr. 4429:20-4430:1. To be clear, when Georgia and Florida used the same model (ResSim) and used similar inputs in an effort to model state line flows under various conditions, *the results were the same*: both showed little to no change in flow at the state line during low flow or drought conditions.

Florida's response was to bury the results from its expert's ResSim modeling and instead engineer a new model that would generate only results that supported Florida's position—the "Lake Seminole Model." Instead of simulating all five reservoirs, like ResSim does, Florida's Lake Seminole Model simulates only Lake Seminole, and can only produce a single result—it forces *all* extra water to pass through to Florida. Tr. 1945:2-8, 1947:3-21 (Hornberger) (admitting that the "Lake Seminole Model does not and cannot do any type of calculation involving the other four reservoirs in the ACF system," and that water simply passes through Lake Seminole). As demonstrated in Georgia's pretrial motion to exclude the Lake Seminole Model and again at trial, Dr. Hornberger's Lake Seminole Model is scientifically unreliable, produces bizarre results, and does not and cannot accurately represent the complex, integrated reservoir system that comprises the ACF Basin. Georgia's Motion to Exclude Opinions and Testimony by Florida based on the Lake Seminole Model (Sept. 16, 2016); Tr. 1964:19-1967:12 (Hornberger). Creating this fundamentally flawed model was the only way Florida could generate a result consistent with its litigation position. This gave the impression that the parties did not agree on the modeling, when in truth both sides got the same results—results that favored Georgia—when they both used the widely accepted Corps' ResSim model.²

When using the model created by the Corps' to analyze potential changes in the system, both Georgia's and Florida's modeling confirm that any extra days on which Florida might

² Georgia and Florida also obtained essentially the same result when they both relied on the same groundwater model—USGS's Jones and Torak (2006) model—with both parties concluding that groundwater pumping on average reduced baseflow to rivers and streams in Georgia by a factor of about 40%. See Panday Direct, ¶ 86 (finding a basin-wide impact factor of about 38-40%); Langseth Dep. Tr. 356:14-19 ("40.6 is the . . . [a]verage . . . transient impact factor for pumping just for the Upper Floridan."); Langseth Dep. Tr. 1079:8-1080:4; Tr. 2030:5-8 (Hornberger); Tr. 2031:13-2033:3 (Hornberger) (acknowledging that from the first day of deposition to the last day of deposition, Dr. Langseth found an impact factor of roughly 40%). As it did when ResSim generated bad results for its case, Florida rejected use of Jones and Torak for groundwater, instead adopting for the first time in its written direct trial testimony a 60% groundwater impact factor generated by an outdated model that its own groundwater expert, Dr. Langseth, rejected as superseded by Jones and Torak. See FX-795, at 37 (Expert Report of D. Langseth); Tr. 2036:23-2037:3 (Hornberger).

receive in terms of additional state-line flow from a consumption cap would be few and far between—and largely during *higher* flow periods, when Florida witnesses have testified no additional water is necessary. *See* Bedient Direct, ¶¶ 53-57. Indeed, Florida submitted sworn declarations in prior litigation explaining that “in years of at least average flows, the Apalachicola River’s flows are more than adequate to . . . sustain the significant biological processes on which the health of the River and Apalachicola Bay relies, and *upstream consumption is not significant enough to interfere with those processes.*” GX-1276, ¶ 31 (Barr *Tri-State* Decl.) (emphasis added). Any additional flows that did result would not occur when Florida purports to need the water the most. For example, Dr. Bedient’s analysis of the Corps’ reservoir operations showed that under 2007 hydrologic conditions, Florida would not receive *any* benefit from cutbacks in Georgia’s water use for 76% of the year (278 days) and only 14 days of streamflow benefits in the dryer periods of the summer or fall. Bedient Direct, ¶¶ 53-54. Under 2012 hydrologic conditions, Florida would receive no benefit for 85% of the year (307 days) and no benefit at all in the dryer periods of the summer or fall. Bedient Direct, ¶¶ 56-57. Dr. Bedient’s analysis confirms that for a significant portion of the year, even draconian reductions in Georgia’s water use would yield zero benefit to Florida.

C. Florida Has Admitted On Multiple Occasions That The Only Way To Guarantee Reliable Flows Above 5,000 cfs During Drought Is By Changing Corps Operations

The record is clear that in order to deliver a reliable or predictable flow greater than 5,000 cfs under dry or drought conditions, the Corps would have to change its operations and deliver that flow. *See* Bedient Direct, ¶¶ 4, 58 (“In order to generate a material change in state-line flow on a reliable or predictable basis, especially during low-flow conditions, the Corps must change its operating rules to deliver that flow.”); Tr. 3346:25-3347:6, 3347:7-12 (Zeng) (to get a predictable or reliable increase in flow into Florida during a drought, “the Corps would need to

change its operation”); Tr. 3075-3076:6, 3103:8-16 (Turner) (explaining that the only way to increase flows above the minimum 5,000 cfs in periods of drought is through changes to Corps operations and its revised interim operating plan). And the unpredictable additional flows Florida might be able to receive without Corps involvement do not provide the kind of reliable remedy that equitable apportionment cases demand. *Wyoming v. Colorado*, 259 U.S. 419, 480, 483-84 (1922) (asking whether plaintiff state can be assured streamflows which are “fairly constant and dependable.”) (decree vacated on other grounds).

Florida has reached the same conclusion. James Barton, Florida’s reservoir expert with 30 years of experience in Corps reservoir operations testified that “because the Corps operates the Woodruff Dam and that’s what releases the water into Florida, there would probably need to be some involvement of the Corps” in order to guarantee any increase in flows into the Apalachicola River. Barton Dep. Tr. 204:6-16. When asked directly whether the Corps would have to be involved to guarantee Florida a reliable or predictable flow above 5,000 cfs, Mr. Barton put it bluntly: “I don’t see how else you would do it.” *Id.* at 205:14-20. Florida dropped Mr. Barton as a witness shortly before trial, presumably because of the testimony quoted above.

Florida state officials and representatives have also reached similar conclusions. Steve Leitman—Florida’s chief hydrologic modeler during the ACF Compact negotiations, a Florida employee of 16 years, and now a lecturer on river basin planning at Florida State University—testified:

Q: So under the current [Corps operating plan], even if Georgia decreases its consumptive uses of water, the benefit of increased flows will not reach the Apalachicola River without a change in the operations of the Army Corps of Engineers[?]

A: Yes.

GX-1354, at 207:21-208:2 (Leitman Dep. Tr.). Mr. Leitman went on to conclude that “under those conditions, in extreme low flow events, even if irrigation in the Flint River Basin was reduced, the resulting increased flow would result in the same flows into the river because the Army Corps would be releasing less water from the upstream reservoirs.” *Id.* at 213:2-10, 214:4-11; GX-1131 (Leitman *et al.*, Management Options During the 2011-2012 Drought on the Apalachicola River: A Systems Dynamic Model Evaluation (2015)) (“under the current operating guidelines, demand management alone is unlikely to lead to significant increases in Apalachicola River discharge during drought.”).

Prior to this litigation, when it was seeking increases to minimum flows from the Corps, Florida also repeatedly acknowledged that the Corps’ participation and involvement is critical to any long-term solution. In federal court filings and official correspondence, Florida’s officials have long noted that additional inflows above 5,000 cfs do not automatically translate to increased flows into Florida, and instead would typically be stored in the Corps reservoirs. For example, Florida stated in a federal court pleading that the Corps’ drought operation “allow[s] the Corps to store 100% of the water that would otherwise flow to the Apalachicola from the Chattahoochee River.” FL-ACF-01457637, ¶ 131 (Fla. 2d Amended & Supplemented Compl. for Declaratory & Injunctive Relief, *In re Tri-State Water Rights Litig.*, M.D. Fla., 3:07-cv-00250-PAM-JRK (filed Jan. 10, 2008)). Florida also wrote to USFWS in 2012 that “there is no requirement [imposed on the Corps] to share the added storage with Florida to provide increased flow during the spring spawning period or for low flow augmentation in the summer and early fall.” GX-420, at FL-ACF-02290908 (7/20/12 Letter from Douglas Barr, Executive Director, Northwest Florida Water Management District, to Dr. Donald Imm, USFWS). And in all of Georgia’s prior negotiations with Florida over the ACF Basin, “the options on the table focused

on Corps involvement and Corps operational changes to deliver more water to Florida.” Turner Direct, ¶ 39; *see* Tr. 3075:5-18 (Turner); Tr. 3347:23-3348:5 (Zeng) (testifying that he did not “ever hear of a workable proposal that did not include a change to Army Corps operations” and did not “ever hear Florida propose a remedy during those negotiations that did not include the Corps in some fashion”). Florida’s integration of the Corps into past negotiations reflects the fundamental role played by the Corps in managing water resources in the ACF Basin, including at the state line.

The ACF Stakeholders (“ACFS”), an independent group of interested parties that attempted to develop a proposal for managing water resources in the ACF Basin, confirmed Georgia’s view that Corps operational changes are necessary for changing the timing or amount of water flowing into Florida. All of the major actions recommended in its Sustainable Water Management Plan “involved changes in the Corps’ operations for the [ACF] Basin.” Tr. 3034:4-16 (Turner); ACFS Sustainable Water Management Plan, at 4 (“ACFS recommends that USACE . . . implement[] the following suite of actions”). And the “most important recommendations [of the ACFS] are changes to the Corps operation throughout the basin,” as opposed to changes in water use. Tr. 3348:11-3350:15 (Zeng). As Mark Masters, a founding member and Executive Manager of ACFS, testified “the bulk of the recommendations that the [ACF S]takeholders approved by consensus that they determined made the basin better off as a whole were related to the operation of the system by the Corps of Engineers.” Tr. 3714:7-12 (Masters). The stakeholders came to a consensus that it was necessary to modify Corps operations after “seven years of [] deliberative work and a lot of technical work[.]” Tr. 3715:11-13 (Masters). ACFS determined that “in order to achieve a better basin across the board,

including downstream, [they could not] extract the Corps of Engineers.” Tr. 3715:17-19 (Masters).

The evidence thus clearly establishes that the United States Army Corps is a required party. Without the Corps, a consumption cap is inappropriate because it cannot provide relief at the times when Florida claims additional water is needed. *See* Order on State of Georgia’s Mot. to Dismiss for Failure to Join a Required Party, at 13 (June 19, 2015). This case therefore must be dismissed because the United States has not consented to waive its sovereign immunity and cannot be bound by any remedial order of this Court. *See Texas v. New Mexico*, 352 U.S. 991 (1957); *Arizona v. California*, 298 U.S. 558 (1936).

II. FLORIDA BORE THE BURDEN OF PROVING MULTIPLE ELEMENTS BY CLEAR AND CONVINCING EVIDENCE

Separate and apart from the Rule 19 problem, Florida failed to present clear and convincing evidence proving each required element of its case. In an equitable apportionment case like this one, Florida must prove its case by “clear and convincing” evidence, *Colorado v. New Mexico*, 467 U.S.310, 316 (1984) (*Colorado II*), a “much greater” standard than what applies in the ordinary civil case, *Connecticut v. Massachusetts*, 282 U.S. 660, 669 (1931). That standard is met only by hard facts that leaves the factfinder with “an abiding conviction that the truth of [the plaintiff’s] factual contentions are *highly probable*.” *Colorado II*, 467 U.S. at 316 (emphasis added). This demanding standard will be satisfied only if the proof “*instantly tilt[s]* the evidentiary scales in the affirmative when weighed against the evidence . . . offered in opposition.” *Id.* (emphasis added).

Florida’s task is particularly difficult in this case because it proposes remedies that would greatly upset (and potentially devastate) substantial and longstanding economies in Georgia. The Court has long recognized that “the equities supporting the protection of existing economies will

usually be compelling.” *Colorado I*, 459 U.S. at 187; *see also Colorado II*, 467 U.S. at 316. As a result, the Court puts substantial burdens on a State that seeks to upset the status quo through an equitable apportionment action. *Id.* Florida thus bears the burden of proving, by an exceedingly high standard of proof, that the substantial disruption it seeks to cause in Georgia’s upstream economies is justified.

To make that showing, Florida was required to prove the following elements by clear and convincing evidence:

1. that it is suffering “real and substantial injury or damage,” *Idaho ex rel. Evans v. Oregon*, 462 U.S. 1017, 1027(1983), **and** that its injury is proximately caused by Georgia’s upstream water use, and not caused by Florida’s own activities or other factors outside Georgia’s control, *see Pennsylvania v. New Jersey*, 426 U.S. 660, 663 (1976) (*per curiam*) (“[A] plaintiff State must first demonstrate that the injury for which it seeks redress was directly caused by the actions of another State”); **and**
2. that Georgia’s upstream water uses are inequitable, as measured by a number of factors, *Colorado I*, 459 U.S. at 183; **and**
3. that Florida’s proposed remedy would redress its alleged injuries **and** that the benefits of Florida’s proposed remedy would “substantially outweigh the harm that might result” to Georgia if those remedies were imposed, *id.* at 187.

Each of these issues is addressed in turn in the remaining three Parts of this brief.

Florida largely ignored these legal requirements in its pretrial brief and instead focused on the common law doctrine of riparian rights. Florida’s reliance on riparian rights misses the mark. The Supreme Court has long recognized that “[t]he determination of the relative rights of contending States in respect of the use of streams flowing through them does not depend upon the same considerations and is not governed by the same rules of law that are applied in such States for the solution of similar questions of private right.” *Connecticut*, 282 U.S. at 670. In short, the Supreme Court has been clear that “state law is not controlling” in equitable apportionment actions, and instead that the Court applies its own body of federal common law to such disputes. *Colorado I*, 459 U.S. at 183-84; *see also Connecticut*, 282 U.S. at 670 (explaining

that riparian rights doctrine does not “constitute a dependable guide or just basis for the decision of controversies such as that here presented”).³

There are significant differences between the common law of equitable apportionment, which applies to cases such as this, and the common law riparian rights doctrine that Florida would have this Court apply. For example, under governing Supreme Court case law, Florida is not entitled to an equitable apportionment merely because a private landowner might be entitled to additional water under state law. “The governing rule is that this Court will not exert its extraordinary power to control the conduct of one State at the suit of another, unless the threatened invasion of rights is of serious magnitude and established by clear and convincing evidence.” *Connecticut*, 282 U.S. at 669. Florida thus bears the burden of proving that it is suffering a real and substantial injury caused by Georgia’s upstream water use (as well as the other elements described above) before the Court will undertake the extraordinary remedy of an equitable apportionment. That burden is significantly higher than what might be borne by a plaintiff in a common-law riparian rights action.

In addition, Florida is not, as it argues, “entitled to the river’s usual and natural flow.” Fla. Pretrial Br. at 11 (emphasis omitted). The Supreme Court rejected that argument over 70 years ago: “The lower state is not entitled to have the stream flow as it would in nature regardless of need or use.” *Colorado v. Kansas*, 320 U.S. 383, 393 (1943); *see also Connecticut*, 282 U.S. at 669-70 (rejecting the argument that “each riparian owner has a vested right in the use of the flowing waters and is entitled to have them flow as they were wont, unimpaired as to quantity and uncontaminated as to quality”); *Kansas v. Colorado*, 206 U.S. 46, 98 (1907). The Court’s analysis therefore should not focus on whether Florida is being assured the “natural” flow of the

³ In any event, Florida significantly misstates the law of riparian rights as it is applied in Georgia and Florida. *See* Amicus Br. of the Atlanta Regional Commission at 9-11.

Apalachicola River. Nor could it, since the Corps has erected five dams and reservoirs on the Georgia side of the state line and has detailed rules governing the release of water into Florida, making it impossible to ensure a “natural flow.” In fact, during recent droughts, Corps operations supplemented flows into Florida to ensure that Florida received *more* water than what nature alone would have delivered. And because substantial existing economies have been developed in Georgia that heavily rely on the waters of the ACF Basin, Florida bears the weighty burden of proving that the benefits of upsetting those existing economies significantly outweigh the extreme costs that could result. *Colorado I*, 459 U.S. at 183, 187.⁴

Finally, under the federal common law that the Supreme Court has developed in this area, a bare claim to “more water” is not sufficient to justify an equitable apportionment. The Supreme Court will not engage in an equitable apportionment merely to “vindicate a barren right” to have more water flow downstream. *Washington v. Oregon*, 297 U.S. 517, 523 (1936). Instead, Florida must show that the deprivation of water is causing it some real and substantial injury beyond the denial of water itself. Florida conceded this key point in its pretrial brief when it admitted that it cannot satisfy its burdens in this case merely “by establishing that Georgia is diminishing the usual and natural flow of the Apalachicola River.” Fla. Pretrial Br. at 14. It must also prove that any such reductions have caused some real and substantial harm “to Florida’s sovereign interests,” which include its “environment, wildlife, commerce, [or] industry.” *Id.* As explained below, Florida has not made that showing.

⁴ Even if state law did apply, both Florida and Georgia abandoned the “natural flow” theory many years ago. See Amicus Br. of the Atlanta Regional Commission at 10. Instead of following a “natural flow” theory, intrastate law in Georgia and Florida holds that “reasonable use” of the waters in question is the “primary interest” to be protected. *Id.* (quoting Restatement (Second) of Torts § 850(b)).

III. FLORIDA HAS FAILED TO PROVE INJURY AND CAUSATION BY CLEAR AND CONVINCING EVIDENCE

Florida's claim fails because Florida has not proved that it has suffered a real and substantial injury caused by Georgia's upstream water use. The Supreme Court requires proof of causation and injury by "clear and convincing" evidence as a necessary prerequisite to even proceed with the equitable apportionment analysis. *Colorado II*, 467 U.S. at 316. Florida's failure to meet this burden alone requires that its request for relief be denied. *See, e.g., Connecticut*, 282 U.S. at 672 (denying equitable apportionment because there was "nothing . . . to justify an inference that any real or substantial injury or damage will presently result to Connecticut from the diversions by Massachusetts"); *Idaho*, 462 U.S. at 1029 (denying relief because "Idaho ha[d] not carried its burden of demonstrating a substantial likelihood of injury").

A. Florida's Attenuated Chain Of Causation Does Not Meet The "Clear And Convincing" Requirement

As the Special Master noted on several occasions during trial, determining the cause of harm at the ecosystem level can be complex. Changes to ecosystems can be caused by any number of factors—including rainfall patterns, geomorphological changes, weather shifts, temperature changes, and human activity, among numerous other factors. Determining which cause (or combination of causes) is to blame can be extremely difficult. *See* Tr. 4200:3-4202:3 (Menzie) (testifying that it is important to "recogniz[e] that this is a very complex problem and that ecosystems are complex"). Here, Florida has failed to show injury and causation with any level of certainty at all—much less clear and convincing.

Florida's alleged harms rely on highly attenuated causal chains with intervening and confounding factors every step of the way. The Fifth Circuit's decision in *Aransas Project v. Shaw*, 775 F.3d 641 (5th Cir. 2014) (*per curiam*) rejected a similar attempt to establish liability under the Endangered Species Act (ESA) through an elaborate (and speculative) chain of

causation. While this case involves a claim for equitable apportionment, the causation principles espoused under ESA in *Aransas Project* are generally applicable black-letter law, and the same analysis counsels in favor of rejecting Florida's even more attenuated effort in this case.

In *Aransas Project*, plaintiffs alleged that “the state defendants’ actions and failures to act in managing water diversion in the San Antonio and Guadalupe River systems” harmed endangered whooping cranes “[d]uring a severe drought in the winter of 2008-2009.” *Id.* at 645-46. After a trial, the district court enjoined Texas from issuing any new water permits in the basin. *Id.* at 647. On appeal, the Fifth Circuit reviewed “whether the actions of [Texas] in administering licenses to take water from the Guadalupe and San Antonio rivers for human, manufacturing and agricultural use foreseeably and proximately caused the deaths of whooping cranes in the winter of 2008–2009.” *Id.* at 656. The strained chain of causation is strikingly similar to Florida’s allegations in this case:

[Plaintiffs] offered evidence, which the court accepted, that the licensed withdrawals of water from the rivers resulted in a decline in freshwater inflows to the San Antonio Bay. Continuing with the court’s findings, with less freshwater inflows, the bay’s salinity increased in various gradients by a few parts per thousand. In turn, the increased salinity of the estuary and marsh water affected the conditions in which blue crabs and wolfberry plants grow. These are principal food sources of whooping cranes following their thousands-mile migration across North America to their winter habitat. There were then fewer blue crabs and wolfberries for the cranes to eat. The cranes succumbed to “food stress,” causing them to search for “upland” sources of food and water. Necropsies of two cranes that died during the 2008–2009 winter showed signs of emaciation, and overall an estimated 23 cranes died.

Id. at 660. Even accepting those facts as true, the Fifth Circuit found that “proximate cause was lacking as a matter of law.” *Id.* The court reasoned that the “forces of nature” that “dramatically affect salinity within and throughout the bay” like “weather, tides and temperature” are “unpredictable and uncontrollable.” *Id.* at 662. There were many other confounding causal factors like “ongoing blue crab decline” “since the 1980s” from “overfishing.” *Id.* Thus,

“[f]inding proximate cause and imposing liability on the State defendants in the face of multiple, natural, independent, unpredictable and interrelated forces affecting the cranes’ estuary environment goes too far.” *Id.* at 663.

In this case, Florida alleges harm to two ecosystems: (1) Apalachicola Bay; and (2) Apalachicola River. For each, Florida’s allegations of harm rely on remote and attenuated causal chains even more speculative to those alleged—and rejected—in *Aransas Project*. For example, Florida’s claimed harm to oysters involves a complex chain of alleged causation: Georgia allowed upstream water use which resulted in the Corps releasing less water into Florida; these lower flows resulted in a decline in freshwater inflows into the Apalachicola Bay; with less freshwater inflow, Apalachicola Bay increased in salinity by a few parts per thousand; the increased salinity provided more hospitable conditions for the oyster’s natural predators; as a result, those predators entered the Apalachicola Bay; natural predators killed so many oysters that the entire oyster fishery ultimately collapsed in 2012. Florida’s causal theory for other harms to the Bay is similarly speculative: Florida claims that Georgia’s upstream water use resulted in the Corps releasing less water into Florida; the change in flows from the Apalachicola River into the Bay resulted a shift in the types of algae that live in the Bay; the organisms that regularly eat algae do not grow and reproduce as quickly eating algae during low flows as they otherwise would grow and reproduce eating algae during high flows; the things that eat the algae-eating organisms in turn, do not grow as quickly and the “process carries through up the food chain.” Glibert Direct, ¶ 5.

But despite years of discovery and analysis by no fewer than *twenty* experts, Florida has failed to prove by clear and convincing evidence that it is Georgia’s water use, as opposed to a host of other “natural, independent, unpredictable and interrelated forces affecting the . . .

environment,” that caused any of its purported harms in either the Bay or the River. *Aransas*, 775 F.3d at 663.

B. Florida Has Not Proven That Georgia’s Water Use Caused Real And Substantial Harm To Apalachicola Bay

1. Georgia’s Water Use Did Not Cause The Oyster Fishery Collapse

a. University Of Florida Research Precludes A Finding By “Clear And Convincing Evidence” That Low River Flow Caused The Oyster Collapse

Florida has utterly failed to support its opening allegation about harm to oysters—specifically, that it suffered a “real and substantial injury” to the oyster fishery caused by Georgia’s water use. *See* Compl. ¶¶ 6, 43, 54, 56. Trial evidence confirms that there is no scientifically reliable evidence, let alone “clear and convincing” evidence, that low river flows were responsible for the oyster crash. Independent University of Florida scientists exhaustively analyzed the basis for this assertion and, contrary to Florida’s allegations, *found no correlation between low river flows and the oyster collapse*. The work of these independent scientists, standing alone, precludes any possible finding that the evidence supporting Florida’s contrary theory is “clear and convincing.”

The University of Florida research was initiated by a request from Florida Governor Rick Scott to determine “what research needs to be done to figure out what happened to the oysters in Apalachicola Bay and what actions need to be taken to prevent it from happening again.” GX-496, at 2. As head of the Florida Sea Grant Program, Dr. Karl Havens formed a team of experts from various Florida universities to study the issue. GX-1349, at 33:23-34:9 (Havens Dep. Tr.). That team included Dr. William Pine, a University of Florida marine fisheries expert, who was asked to assess Apalachicola Bay oyster population trends and likely causes of the oyster crash.

Id. at 59:2-59:16.⁵ When asked why he chose Dr. Pine, Dr. Havens testified that Dr. Pine “was the most qualified person that I knew at the university to do it,” that “[h]e has a long history of doing stock assessment of fish,” and is “[a] very well respected scientist.” *Id.* at 59:2-16.

In April 2013, Dr. Havens’ team published the Apalachicola Bay Oyster Situation Report. GX-568. Although Florida selectively quoted this document to try and suggest otherwise at trial, the Oyster Situation Report did not reach *any* conclusions about what caused the collapse—and certainly did not attribute it to low river flow. *See, e.g.*, GX-568, at 14 (2013 Oyster Situation Report) (“Without more data, we cannot reach a conclusion about what proximal factor(s) contributed to the decline.”); *id.* at 29 (“Research is needed to quantify how oyster population dynamics, product quality, and the fishery are affected by interactions between river flow, nutrients, salinity, harvesting intensity, and restoration methods.”). Dr. Pine and Dr. Havens, the Report’s principal authors, confirmed in sworn testimony that as of the date of publication (April 2013), they had not reached any conclusions about the “connection between oyster population dynamics and river flow,” “nutrients,” or “salinity.” *E.g.*, GX-1355, at 222:13-18, 223:19-225:5 (Pine Dep. Tr.). Dr. Havens likewise agreed that as of publication of the Oyster Situation Report in April 2013, his team “did not have a definitive cause and effect understanding of the linkages between environmental conditions and oyster populations.” GX-1349, at 128:19-24 (Havens Dep. Tr.).

After publication of the Oyster Situation Report, Dr. Pine and his colleagues continued researching the potential connection between low river flows and the 2012 oyster collapse. The culmination of that work was a peer-reviewed journal article published in 2015 entitled “The curious case of eastern oyster *Crassostrea virginica* stock status in Apalachicola Bay, Florida.”

⁵ Both Dr. Pine and Dr. Havens were deposed in 2015 as part of this case.

GX-789. After thousands of hours spent studying the issue, Dr. Pine and his colleagues reached an unambiguous conclusion:

We did not find correlations between Apalachicola River discharge measures . . . and our estimated relative natural mortality rate . . . or oyster recruitment rates[.] The overall relationships between freshwater flows, drought frequency and severity, oyster recruitment, and harvest dynamics *remain unclear*, and this is an area of ongoing work.

GX-789 at 6 (emphases added); *see* GX-1355, at 288:4-16, 289:13-20, 290:6-291:13 (Pine Dep. Tr.). When asked under oath whether he had seen evidence to support the allegation in Florida’s complaint in this case that “reduced freshwater inflows . . . caused a collapse of the Apalachicola Bay oyster fishery,” Dr. Pine’s answer was unequivocal: “No.” GX-1355, at 307:15-308:6 (Pine Dep. Tr.) (addressing allegation in ¶ 54 of Florida’s complaint). Dr. Pine’s sworn testimony on this subject was unambiguous: he has not seen “clear” or “convincing” evidence “of a connection between Apalachicola River flows and oyster mortality.” *Id.* at 291:14-292:14. Dr. Havens similarly testified that his independent team of scientists “never found any quantitative linkage between flow from the [Apalachicola] river and the crash with the oysters.” GX-1349, at 175:3-21 (Havens Dep. Tr.). This evidence completely undermines Florida’s principal harm allegation in this case—that low flows due to Georgia water use caused the 2012 oyster collapse.

Florida’s legal team clearly understood the negative impact Dr. Pine’s findings would have on Florida’s case against Georgia. Dr. Pine described in detail how his research on the Apalachicola Bay oyster collapse triggered threats of retaliation from Florida’s legal team. As Dr. Pine reported at the time:

On Thursday morning I received a call from a colleague at FWC as a “heads up.” The purpose of the call was to let me know that following a meeting on Wednesday in Tallahassee with the legal team representing Florida in the Florida versus Georgia case pending the U.S. Supreme Court that the lead attorneys were “not happy” with two manuscripts I have in journal review on oyster populations in Apalachicola Bay. I was told by my FWC colleague that *the attorneys thought*

the papers should be withdrawn, and if they were published . . . they could “make things difficult for me.”

GX-778 (12/20/14 Pine Email) (emphasis added); GX-1355, at 344:25-346:4 (Pine Dep. Tr.). The Florida Fish and Wildlife Commission (“FWC”) official told Dr. Pine that his research “may be disadvantageous to Florida’s legal position in the current litigation.” GX-782 (12/30/14 Pine Email); GX-1355, at 363:13-364:4 (Pine Dep. Tr.). As Dr. Pine reported then, “[a]t issue is the perception that the work I’ve led undermines the State of Florida’s assertion in the ongoing lawsuit that the Apalachicola oyster collapse was caused by water policy in Georgia,” GX-778 (12/20/14 Pine Email), and ultimately “weakens their legal position.” GX-770 (11/25/14 Pine Email to Hellgren). Dr. Havens likewise recognized in an email to a federal government official that “[r]esults from some of the [Sea Grant] funded research *strongly supports the [Georgia] case.*” GX-799 (2/9/15 Dr. Havens email to NOAA official) (emphasis added); GX-1349, at 175:18-21 (Havens Dep. Tr.). Florida has no credible scientific evidence to refute the findings of Dr. Pine and his colleagues. And, even if it did have evidence pointing the other way, at most it would amount to a disputed issue among scientists as to the cause, not the clear and convincing evidence the Supreme Court requires.

b. Expert Testimony At Trial Confirms That Low River Flows Did Not Cause the Oyster Collapse

At trial, expert analysis from both Georgia and Florida corroborated Dr. Pine’s principal conclusion that low river flows were not responsible for the oyster crash. Georgia’s expert, Dr. Romuald Lipcius, is an oyster ecologist and fisheries management expert from the Virginia Institute of Marine Sciences at the College of William & Mary. Dr. Lipcius has more than three decades of experience researching the eastern oyster, the species of oyster that lives in Apalachicola Bay. Dr. Lipcius performed several analyses to assess the relationship, if any, between low river flows and the Bay’s oyster population, and like Dr. Pine, he found none. For

instance, he studied oyster populations in the Bay before and after the oyster collapse at oyster reefs that were both heavily fished and not heavily fished, and reefs that were both closer to the River's mouth and farther away. Lipcius Direct, ¶¶ 37-38. If "low river flow were the cause of the fishery collapse in Apalachicola Bay," "the number of oysters on all bars, whether harvested or not, should have declined in a similar fashion." Lipcius Direct, ¶ 34. But "the official oyster survey data instead reveals the unsurprising fact that [o]yster bars that were not heavily fished generally did the same, or even better, post-collapse than pre-collapse." Lipcius Direct, ¶ 45. Dr. Lipcius further examined, but found no relationship between, river flows and oyster landings data, a common analysis used by marine scientists to study the effect of low flows on oyster populations. Lipcius Direct, ¶¶ 54-61; Tr. 4386:2-4387:23 (Lipcius). Dr. Lipcius' findings here were also consistent with those from the University of Florida scientists. Lipcius Direct, ¶ 57.

Finally, Dr. Lipcius considered, and after extensive analysis rejected, the so-called "predation theory" advanced by Florida's oyster experts Dr. David Kimbro and Dr. J. Wilson White. Lipcius Direct, ¶ 65. None of the existing data, including data collected by Dr. Kimbro himself, or Dr. White's own modeling, support Florida's claim that marine predators in the Bay "crashed the entire oyster population within one or two years." Lipcius Direct, ¶ 71. Instead, Dr. White's model, which relies extensively on Dr. Kimbro's research, "supports the position that [low] river flow did not cause the collapse," because White's model shows *at most* a 1.2 percent "maximum difference in the population" if Georgia eliminated 50% of its agricultural irrigation (among other cuts). Tr. 4409:24-4411:2 (Lipcius). Simply put, credible, scientific evidence does not show, and cannot show, what Florida alleges in this case: a connection between river flows and the Apalachicola Bay oyster crash in 2012.

2. Florida Mismanaged The Apalachicola Bay Oyster Fishery

This Court's inquiry into the oyster collapse begins and ends with the question of whether Georgia's consumption caused the oyster collapse, and Florida has certainly not proven that causal chain by clear and convincing evidence. The burden is not on Georgia to prove, by clear and convincing evidence or otherwise, an alternative cause. Even so, evidence developed throughout discovery and at trial points decisively to another cause: Florida's mismanagement of its oyster fishery. Document after document reveals that Florida's short-sighted management decisions had an obvious and devastating effect on Apalachicola Bay oyster populations before, during, and after the 2012 collapse. These decisions included allowing oystermen to harvest record amounts of oysters during a drought period; failing to restore oyster habitat by reshelling while the record harvests occurred; and failing to enforce size and bag limits in the Bay during the same time period. Each of these is discussed below.

a. Florida Allowed Unsustainable Levels Of Harvesting In The Years Prior To The Collapse

In the two years immediately prior to the oyster collapse, Florida allowed unprecedented levels harvesting of oysters in the Bay. Florida removed restrictions on oyster harvesting in response to concern that oil from the BP oil spill "might reach the shores and [] harm the wildlife." Tr. 767:7-11 (Berrigan). Mark Berrigan, former Florida Department of Agriculture & Consumer Services (FDACS) Bureau Chief in charge of monitoring oyster resources in the Bay for more than 30 years, explained that after the spill: "[t]here were -- there were changes in management to allow additional harvesting to harvest a crop that would otherwise or was potentially at risk of loss." Tr. 769:2-5 (Berrigan). *See also* GX-1304, at 13 (History of FWC Oyster Management Rules and Regulations). As expected, the lax regulations led to historic levels of harvesting by Apalachicola Bay oystermen. *See* Tr. 4388:1-22 (Lipcius); Lipcius

Direct, ¶¶ 116, 119; Sutton Cross Demo. 6. Indeed, Florida allowed more oysters to be harvested in 2011 and 2012 than in *any of the prior 25 years*. See Sutton Cross Demo. 6 (relying on GX-1248 and FX-839, official landings data from FWC).⁶

Before it decided to file this lawsuit, Florida readily acknowledged the negative effects of FWC’s management decisions in the wake of the oil spill. In Florida’s September 2012 federal fishery disaster declaration request, Governor Scott reported to the federal government that:

[h]arvesting pressures and practices were altered to increase fishing effort, as measured in reported trips, due to the closure of oyster harvesting in contiguous states during 2010. This led to overharvesting of illegal and sub-legal oysters further damaging an already stressed population.

JX-77, at FL-ACF-03386187 (2012 Fla. Disaster Request & 2012 FDACS Report).

Florida’s risky decision to loosen oyster harvesting restrictions from 2010 onward—including permitting additional harvesting during a severe drought period—ultimately caused the 2012 oyster crash. The 2011 FDACS Report, one of Florida’s first official reports to document the harm caused by Florida’s management decisions, observed that oyster harvesting was already putting substantial pressure on the fishery:

- “Fishing effort throughout the winter and spring of 2011 placed added pressure on Cat Point and East Hole Bars, which, in conjunction with fishing effort that was placed on these reefs during the summer of 2010 in response to the oil spill event, resulted in a cumulative increase in harvesting pressure from a relatively limited resource”
- “[I]t remains uncertain whether oyster populations on Cat Point and East Hole Bars can sustain concentrated harvesting effort for the remainder of the Winter Harvesting Season.”
- “[S]ubstantially increasing harvesting pressure and/or the unabated harvesting of sublegal stocks may alter the production/harvesting balance. Again in 2011, there are reports that the harvest and sale of oysters below the legal size limit is still common practice.”

⁶ See also JX-78 (9/11/12 email among FWC officials) (reflecting increases in the amount of landings in each of the first 6 months of 2012 compared to 2011, which was itself a record landings year); Tr. 952:4-953:17 (Berrigan).

JX-50, at 3, 4-5 (2011 FDACS Report). Notwithstanding these warnings, Florida did nothing to limit harvesting or step up enforcement efforts for another calendar year, all during a period of severe drought. *See, e.g.,* JX-77, at FL-ACF-03386197 (2012 FDACS Report) (“The practice of harvesting sub-legal oysters appears to be an extension of a *‘use it or lose it’* attitude that prevailed during the fall and winter of 2010.”) (emphasis added).

By the time FDACS issued its 2012 Report, the agency had enough information in hand to state that FWC’s management actions were a cause of the collapse. Specifically, the Report pointed to *both* the existing environmental conditions caused by the drought *and* Florida’s reckless management decisions. *See* JX-77, at FL-ACF-03386190, FL-ACF-03386196 (2012 FDACS Report). The FDACS Report was clear that “the poor condition was the result of a combination of environmental factors and fishery practices,” including “the management decision to allow harvesting from these reefs during the summer of 2010 in response to the oil spill event,” which “resulted in an intense harvesting effort” and “precluded any recovery time for the resource.”⁷ As Mr. Berrigan explained in 2012, “in the past, with Apalachicola, . . . you’ve been able to fish them hard. You’ve been able to take the adults, you’ve been able to take smaller oysters and the population has come back. We’ve seen it come back time and time again. In this case, we probably bent it too far. We bent until we broke, now, so, things are going to have to change as far as management is concerned.” GX-1357; FX-608, at 5. Thus, Florida’s own agencies have recognized that Florida’s negligent management of its oyster fishery caused the 2012 oyster collapse and has prolonged the recovery period following it.

⁷ Despite having “serious concerns about the health of the oyster fishery” as of August 2012, Florida did not take any action to limit oyster harvesting in the Bay until November 2012, when it prohibited harvesting on Saturdays and Sundays, restrictions imposed automatically pursuant to FWC’s oyster fishery regulations. *See* FLA. ADMIN. CODE ANN. R. 68B-027.17. Since 2012, Florida has only fully closed the Bay on a single occasion—and only for three days. GX-1304; *see* Sutton Cross Demo. 2.

b. Florida Failed To Effectively Restore Oyster Reefs To Account For The Excessive Harvesting Levels

Florida compounded the effect of its decision to permit unsustainable harvesting in the Bay from 2010 to 2012 by failing to reshell adequately its depleted oyster reefs. There is no dispute that reshelling is critical to maintaining the long-term sustainability of the oyster population. *See, e.g.*, Tr. 1374:9-13 (Sutton); Tr. 908:19-909:10 (Berrigan). The need to reshell stems from the unique nature of oyster fisheries themselves: oyster larvae must settle on “substrate” (dead or living oyster shells) in order to survive, and harvesting oyster shells removes that critical habitat. *See, e.g.*, GX-1349, at 131:15-17 (Havens Dep. Tr.) (explaining that when oystermen “harvest oysters, [they are] removing the oysters and some of the materials that [the oysters] need to grow on”).

But at the same time Florida was permitting unprecedented amounts of harvest, it was “reshelling at some of the lowest levels” ever. Tr. 4397:18-4398:7 (Lipcius). Florida officials contemporaneously documented the threat posed by overharvesting and the simultaneous lack of re-shelling. In the 2012 FDACS Report, Mr. Berrigan noted that “[o]yster populations over much of the reef area [of East Hole and Cat Point] are depleted and the quality of the substrate is degraded to a point where spat settlement and recruitment have been disrupted.” JX-77, at FL-ACF-03386192 (2012 FDACS Report). Yet while Florida did some small-scale shelling in certain parts of the Bay in the years leading up to the collapse, Florida chose not to reshell any of the major oyster bars in the bay (East Hole, Cat Point and Dry Bar/St. Vincent oyster bars) for more than a decade leading up to the crash. JX-150 (Berrigan Notes for FDACS Report, July 2012); Tr. 958:10-959:15 (Berrigan) (discussing same). Florida’s approach conflicted with more than a century’s worth of experience by “oyster fisheries and management agencies” for the eastern oyster, who all identify re-shelling “as a requisite for sustainable harvest.” Tr. 4390:12-

4391:15 (Lipcius); *see also* GX-568, at 5, 15 (2013 Oyster Situation Report) (advice from the University of Florida Oyster Task Force recommending 200 acres of reshelling for a five-year period). Florida’s negligent failure to restore its oyster beds has only increased the amount of reshelling that is necessary now. As Dr. Pine notes in his *Curious Case* paper, the most recent scientific analysis on the topic of reshelling the Bay, “intense shelling [approximately 400 acres] should be immediately undertaken each year to counter the risk of irreversible fishery collapse[.]” GX-789.

Florida’s reshelling numbers, given the significant levels of harvest in 2011 and 2012, are indefensible. Florida reshelled a *total* of only 131 acres out of more than 7,000 acres of public oyster bars from 2009-2012—despite the dramatic increase in oyster landings and Mr. Berrigan’s consistent warnings that oyster substrate was being depleted. *See* Lipcius Demos. 4 and 5; Sutton Cross Demo. 9. Even after the collapse, Florida did not begin meaningful reshelling until 2014, and then at nowhere near the amounts urged by the Florida Sea Grant Team. As Dr. Havens put it in 2014 once the drought was over: “[y]es there are higher flows, but without a large scale reef restoration we may be looking at a 10 year recovery time with existing harvest pressure.” GX-1349, at 140:14-23 (Havens Dep. Tr.). Florida’s failure to reshell is an obvious and recognized cause of the depletion of its oyster population.

c. Florida’s Explanations For Its Mismanagement Are Not Credible And Are Unsupported By Trial Evidence

i. Overfishing Of The Major Oyster Producing Bars Was Not The “Inevitable Consequence” Of Localized Mortality And Predation

Evidence at trial showed that Florida’s novel theory that overfishing was an “inevitable consequence” of increasing salinities was simply a poor excuse for bad fishery management. Mr. Berrigan testified that the overharvesting and utter depletion of the major oyster bars at East

Hole and Cat Point “was the inevitable consequence of not being able to fish anywhere else.” Tr. 976:24-25 (Berrigan). According to Mr. Berrigan, the oyster bars on the outer edge of the Bay suffered localized mortality due to increased salinity from the drought, which, he says, “compressed all of the fishing” on East Hole and Cat Point. *Id.* at 976:19-20; 983:5-11 (Berrigan).

This novel argument was presented for the first time at trial, is unsupported by contemporaneous documents or scientific evidence, and defies common sense and elementary fisheries management principles. Florida presented this testimony as a way to excuse its decision to allow rampant and unchecked harvesting on the Bay’s principal producing oyster reefs. In truth, this testimony only confirms that Florida’s management practices hastened and ultimately caused the oyster collapse. There was nothing “inevitable” about the overharvesting of East Hole and Cat Point—Florida could have simply limited the amount of harvesting and allowed the remaining stock to reproduce and recover. Instead, it did the opposite, eliminating harvest restrictions and allowing oystermen to take as many oysters as they could until the fishery ultimately collapsed.

Although he was trying to justify Florida’s poor fishery management with his novel “inevitable consequence” testimony, it was actually Mr. Berrigan who laid bare the fact that Florida’s negligent mismanagement was the real culprit. As Mr. Berrigan explained in his trial testimony:

The value [of oysters] was extremely high, highest they ever had. The demand was the highest it’s been, because the other states [affected by Deepwater Horizon] weren’t producing. ***So yes, there was extreme harvesting pressure. Did it have a debilitating effect? Yes, it did, on those standing stocks.***

Tr. 977:4-10 (Berrigan) (emphasis added). The “standing stocks” Mr. Berrigan references were East Hole and Cat Point reefs—the lifeblood of the oyster resources in the Bay, which Florida

management allowed oystermen to harvest from until they both looked like “gravel parking lots.” GX-1297 (7/3/2012 email from J. Shields to M. Berrigan); JX-150. The oystermen did not harvest the oysters because those oysters were going to die. They harvested those oysters because the market prices were high, and Florida management did nothing to stop them. This created, in Mr. Berrigan’s own words, a “tragedy of the commons.” Tr. 846:9-10 (Berrigan). The oyster fishery’s unchecked impulses to harvest more of the resource than could be sustained, not the consumption of water upstream by Georgia, decimated the oyster population on the main oyster producing bars.

ii. NOAA’s Decision To Award Funds To Florida’s Oyster Fishery Does Not Establish That Low Flows Caused The Collapse

Florida’s attempt to establish that the National Oceanic and Atmospheric Administration’s (“NOAA”) decision to grant Florida’s fishery disaster declaration implies (a) that NOAA rejected over-harvesting as a cause of the collapse, and (b) establishes that low flows caused the collapse fails on both scores. First, the so-called “Petes Memorandum,” an analysis drafted by NOAA Scientist Dr. Laura Petes in September 2012 (just 15 days after Governor Scott submitted the request), concluded that “[h]arvesting pressure and practices are also contributing to low oyster numbers,” and “[h]arvesting of sub-legal sized oysters . . . has also been occurring due to lack of enforcement.” FX-412, at NOAA-0003818. That memorandum was later used by NOAA in deciding whether to grant the disaster declaration. *See generally* FX-413 (NOAA Decision Memo). Second, both Florida’s disaster request itself and NOAA’s decision memorandum make clear that the disaster declaration applies to oysters in other counties outside Apalachicola Bay that are in no way dependent on Apalachicola River flows and are unaffected by Georgia water consumption in the ACF Basin. *See* JX-96, at 30 (Cover Letter to May 2013 Oyster Disaster Report) (explaining to NOAA that Florida seeks a “fishery

resource disaster for Florida's oyster harvesting areas *in the Gulf of Mexico*, particularly those in Apalachicola Bay”) (emphasis added); FX-413 at NOAA-0022898 (NOAA Disaster Decision Memorandum) (granting Florida’s disaster request for “oyster stocks *along the west coast of Florida*, primarily in the Apalachicola Bay area”) (emphasis added).

Further, the facts developed at trial demonstrate that Florida ultimately attempted to downplay—if not hide—the influence of overharvesting in its dealings with NOAA. Indeed, a NOAA scientist early on in the disaster request process admonished David Heil, the FWC official charged with writing the disaster report, that Florida needed “to address the statements about Florida continues to allow harvest of undersized oysters, big time,” before Florida could secure a disaster declaration from the federal government. *See* GX-572 (4/22/13 Email from NOAA official to D. Heil); GX-569, at FL-ACF-02016452 (4/23/13 Email from D. Heil to J. Estes). Florida took note, and promptly excised all references to overharvesting and harvesting pressure in its final disaster submission to the federal government. JX-91, at 30 (May 2013 Oyster Disaster Report); Sutton Cross Demo. 13 (comparing language of 2012 Oyster Assessment Report and May 2013 Draft Oyster Disaster Declaration Report). This artful drafting was intentional, as reflected in contemporaneous correspondence between Mr. Heil and Jim Estes, Deputy Division Director for the FWC Marine Fisheries Management Division. *See, e.g.,* GX-569, at FL-ACF-02016441 (highlighting “excerpts from the DACS Report addressing fishery practices, over-harvest and or [sic] undersized-harvest” and stating: “**I WILL NEED ASSISTANCE TO ADDRESS THIS.**”) (emphasis in original).⁸

⁸ *See also* GX-1243 (5/7/13 E-mail from Knickerbocker to Conti) (“[A]ny reference to harvesting pressure or undersized harvest or regulatory of the resource have been conveniently removed from the report.”); GX-1244 (5/8/13 E-mail from Knickerbocker to Conti) (According to Mr. Knickerbocker, FWC officials’ revisionist history was an attempt “to build a stronger case” for a federal fisheries disaster request, but that “by partial omission certain statements [from the 2012 FDACS Report] are now being misrepresented and subsequently false conclusions can be drawn.”)

NOAA's decision to grant Florida's Gulf-wide oyster fisheries disaster decision was based, in part, on FWC's misleading report that purposely omitted overharvesting as a cause. *See* FX-413, at NOAA-0022896 (NOAA Disaster Decision Memorandum). When considered along with the 2012 FDACS Report and the April 2013 Florida Sea Grant Report, NOAA reasonably granted Florida's request and cited drought-related conditions as being the central factors. FX-413, at NOAA-0022898. Significantly, NOAA still found that "overfishing" was a factor, and it noted that certain oyster bars in the Bay that were not "primary harvest reefs" "did not show similar declines" in oyster populations. FX-413, at NOAA-0022896-8. NOAA's decision to grant the request by finding environmental factors were "more central" than overfishing does not reflect a definitive or binding analysis, given the complexity of the issue. After all, Dr. Pine's definitive analysis, which found no connection between low river flows and the oyster collapse, required at least *two more years* of work before it was completed and published. *See* GX-789.

Boiled down, the disaster declaration Florida received "for the oyster fishery of the west coast of Florida" is properly viewed as a mechanism to help oystermen affected by the collapse—not as definitive evidence of what caused it. Dr. Lipcius, who himself has been "directly involved" in the NOAA disaster declaration process for the blue crab fishery in Chesapeake Bay, Tr. 4424:25-4425:10 (Lipcius), summed it up best: "[I]t's not unreasonable that NOAA reached this decision to approve the request [because] the disaster relief is meant to help those in most need, . . . and if you're not absolutely certain of the cause, which is what NOAA was, then you tend to be liberal in trying to help out these fishing communities." Tr. 4424:9-19 (Lipcius); *see also* Lipcius Direct, ¶ 17. But in this case, a different standard applies.

3. Ecological Experts Have Not Established Clear And Convincing Evidence Of A Connection Between Georgia’s Consumptive Use And Any Other Alleged Changes To The Ecology Of Apalachicola Bay

Once it became clear that Florida could not find scientific support for its attempts to blame the oyster collapse on Georgia’s water use, Florida expanded its claims of injury to include harms to an array of fish and shellfish at upper levels of the food web in Apalachicola Bay. The only expert testifying at trial who actually analyzed historic fish data was Georgia’s ecologist, Dr. Charles Menzie. Dr. Menzie analyzed decades of fish data taken from four different data sets, three of which are maintained by Florida agencies.⁹ He found no evidence of harm to any fish species, no evidence of harm to blue crab, no evidence of harm to white shrimp, no evidence of harm to East Bay plants or juvenile fish, and no evidence of any harm to any species in Apalachicola Bay. Tr. 4234:18-4235:18 (Menzie).¹⁰

Florida presented no evidence to contradict these findings. Florida withdrew its fish expert, Dr. Kenneth Jenkins, and did not present any testimony from him at trial. Presumably, this was because Dr. Jenkins was unable to answer the straightforward question of which fish or other species had been harmed in the Bay. As shown in the video clip played at trial, Dr. Jenkins was silent and unable to answer for *a full six minutes*. GX-1352, at 65:18-70:21 (Jenkins Dep. Tr.). When he did answer, Dr. Jenkins failed to identify any harm to fish species, *see* Tr. 1847:11-18 (Glibert), and only identified harm to the nursery function for blue crab in East Bay. *Id.* Yet Dr. Jenkins later admitted that he could not tell “what value of salinity change impacts the nursery function for *any* species in East Bay.” Jenkins Dep Tr. 206:6-11 (emphasis added).

⁹ GX-988 (1972-1984 Livingston trawls, file “BioticData.mdb” from Jenkins reliance materials); GX-393 (2002-2012 ANERR trawls); GX-976 (2014-2015 ANERR trawls); GX-1061 (1998-2014 FIM trawls, file “Apalachicola_FIM_data.mdb” from Jenkins reliance materials).

¹⁰ Based on his analysis of nutrient availability for fish and shellfish, Dr. Menzie concluded that nutrients continue to be available for oysters as well. Menzie Direct, ¶ 138. Otherwise, the status of the oyster population was addressed by Dr. Lipcius.

Rather than looking at actual data of how fish are faring in the Bay, Florida advanced a theory that changes in the base of the food web could have cascading effects up the food web and impact the whole ecosystem. Tr. 1825:16-19 (Glibert). Yet, as became clear at trial, this theory is entirely unsupported by any data from the Apalachicola Bay. If there were actual harm to the food web, that should be reflected in the fish population. Menzie Direct, ¶ 115 (stating that the fish data is a better indicator of the overall health of the bay ecosystem because it “allows for an assessment of food web conditions that are not subject to the annual removal of large portions of biomass for commercial purposes, as is the case for oysters”). But Florida’s algae expert, Dr. Patricia Glibert never analyzed any fish data. Tr. 1849:2-4 (Glibert) (“analyz[ing] fish data” was “outside the scope of [her] work.”). Dr. Glibert also did not analyze “the impact of changes in the algae community” at the base of the food web “on blue crab . . . [or] on white shrimp.” Tr. 1850:6-12 (Glibert). And Dr. Glibert admitted that she has no “data or information indicating that any fish species in Apalachicola Bay has been negatively impacted by impaired food availability” as a result of low flows. Tr. 1852:7-11 (Glibert).

Dr. Menzie’s uncontradicted testimony established that “fish populations are being sustained and [the] fish supported by a plankton-based food web continue to predominate in the Bay.” Menzie Direct, ¶ 124; *see also id.* ¶ 137 (“Dr. Glibert incorrectly presumed that shifts in phytoplankton composition [*i.e.*, algae] at lower river flows would translate into cascading effects on the Bay’s plankton-based food web . . . [but] the available data on the abundance and composition of plankton-feeding fish strongly refutes her contention.”). Put simply, the cascading effects that Florida theorizes are “non-existent.” Menzie Direct, ¶ 124. As with oysters, Florida has not carried its burden of proving any harm to any other species in the Bay caused by Georgia’s water use. *See generally Aransas Project*, 775 F.3d 641 (5th Cir. 2014).

C. Florida Has Failed To Provide Clear And Convincing Evidence That Georgia Has Harmed The River Ecosystem

Florida's allegations of harm to the Apalachicola River ecosystem fare no better than its allegations of harm to the Apalachicola Bay. With respect to the River ecosystem, Florida argues that Georgia's water use has reduced the amount of water flowing through Woodruff Dam, which in turn has lowered the overall water levels of the Apalachicola River. Florida claims these lowered water levels lead to less floodplain inundation, which purportedly harms plant and animal species in the floodplain and river.

There are multiple problems with Florida's attempts to prove such an attenuated chain of causation. Testimony from Georgia and Florida witnesses, and multiple reports issued by federal agencies, establish that changes in water levels were principally caused by river channel changes from the construction of Jim Woodruff Dam and historical dredging operations by the Corps—not by Georgia's water use. The United States Geological Survey ("USGS"), in cooperation with Florida agencies, found that "[f]rom 1954 to 2004, water levels declined in the nontidal reach of the Apalachicola River," and concluded that "[c]hannel widening and deepening, which occurred throughout much of the river, apparently caused the declines." GX-88, at 1 (Light *et al.* (2006)). Florida's geomorphology expert, Dr. Mathias Kondolf, agrees: "upstream of RM [River Mile] 23, I conclude that the change in water surface elevation is due to the changes in channel geomorphology." Kondolf Direct, ¶ 35.

In addition to these geomorphological channel changes, Florida's claims of harm to plant and animal species in the Apalachicola River fail on their own terms. The USFWS has repeatedly studied the health of endangered species in the Apalachicola River and has repeatedly found that the populations of those species are stable or improving and are adequately protected by the current flow regime established by the Corps. Moreover, Florida has not proven that it

was Georgia's water use, as opposed to climatic or geomorphological factors, that have caused changes to the floodplain forest composition. And the testimony of Florida's lone riverine ecologist falls woefully short of identifying any clear or convincing evidence of substantial harm to plant or animal species in the Apalachicola River ecosystem.

1. Woodruff Dam Has Lowered River Levels 40 Miles Downstream Of The Dam And Fundamentally Changed The Ecology Of The Apalachicola River

The Corps' impact on the Apalachicola River is plain. Dr. Kondolf testified that the construction of Woodruff Dam led to "scouring of the river bed immediately below the dam" which caused the "channel bed [to] lower[] about five feet." Kondolf Direct, ¶ 17; *see also* Tr. 554:13-18 (Allan) ("the dam operated by the Army Corps has resulted in significant lowering of the channel bed."); Tr. 123:2-20 (Hoehn) (discussing a presentation by Mr. Hoehn titled "Apalachicola River Damage" that shows a five-foot decline in river levels, GX-72). As a result, Dr. Kondolf agreed that "for the same flow of water from upstream," "the river level is 5 feet lower." Tr. 2565:7-15 (Kondolf). And as Dr. Kondolf was also forced to concede, "[w]hen the river stage goes down 5 feet, it doesn't flood as often." Tr. 2567:7-10 (Kondolf); *see* Tr. 123:2-20 (Hoehn) ("Q: With the channel being down-cut by 5 feet, that means it takes more water to get to the same depth of the river. Correct? A: That's correct."). Florida's former chief hydrological modeler for the ACF Compact negotiations, Steve Leitman, agrees: "the riverbed degradation in the Apalachicola River caused by the Woodruff Dam results in a reduction in the duration of flows into the . . . tributary streams and the floodplain." GX-1354, at 129:3-12 (Leitman Dep. Tr.).¹¹

¹¹ Both USGS and Dr. Kondolf found that while the impact decreases the further downstream from the dam, nevertheless the impact is felt as far as "40 river miles downstream." GX-88, at 1 (Light *et al.* (2006)); *see* Kondolf Direct, ¶ 17 (same).

The change in river elevation caused by Woodruff Dam has impacted the ecology of the River. According to Ted Hoehn, a biologist at FWC, the lowered water levels have “reduc[ed] river habitats in size and quality,” “reduced mussel populations,” and “degraded the floodplain forest.” Tr. 135:14-24 (Hoehn) (discussing Mr. Hoehn’s presentation “Apalachicola River Damage” (GX-72)). Florida’s own expert on river ecology, Dr. David Allan, found that the damage to the river near the dam was so extensive that he “could not reliably identify any quantitative mechanism to show the influence of any water depletions from upstream or any changes in water level that could be meaningfully quantified.” Tr. 554:22-555:4 (Allan). Thus, Dr. Allan’s “report does not include metrics [purporting to show ecological harm by Georgia] for the upper section of the river.” Tr. 555:4-6 (Allan).

The construction of Woodruff Dam also limited the habitat of important migratory fish. Gulf sturgeon “declined due to overfishing throughout most of the 20th century,” but “[t]he decline was exacerbated by habitat loss associated with the construction of dams” like Woodruff Dam. JX-168, at 62-63 (2016 Biological Opinion). The construction of the Dam “severely restricted sturgeon access to historic migration routes and spawning areas.” *Id.* at 63. And “[Woodruff Dam] remains a permanent impediment to Gulf Sturgeon accessing habitat in the Flint and Chattahoochee Rivers.” Menzie Direct, ¶ 189.

2. Navigational Dredging Lowered The Level Of The River And Continues To Degrade The River Ecosystem

The other major cause of physical change to the ecosystem was a long history of dredging and the placement of dredge spoils on the banks and floodplain. The Corps conducted “dredging throughout the river in the upper, middle and lower reaches.” Tr. 2569:2-6 (Kondolf). “The Corps’ dredging program was intended to create a deeper, wider channel.” Kondolf Direct, ¶ 20. In its natural condition, “the river channel was smaller and it would over bank [and flood]

more frequently.” Tr. 2599:2-6 (Kondolf). But as multiple Florida witnesses acknowledged at trial, after the Corps enlarged the channel, “less water would make it into the floodplain because of that deeper channel.” Tr. 141:15-18 (Hoehn). As Dr. Kondolf recognized in a 2009 paper, “[c]hannel enlargement has meant more flow is contained within the channel, lowering water levels for the same flows from upstream, such that overflows onto the floodplain (and through sloughs) occur less frequently and for shorter periods of time.” GX-248, at 43 (Kondolf, Restoration Prospects for the Apalachicola River).

In addition to the change in the channel, the Corps dumped the sand and silt it removed from the bottom of the river onto the river’s banks, further degrading the ecology. Mr. Leitman, who “developed a dredge disposal plan when [he] worked for Florida DEP,” testified at his deposition that the Corps’ activities resulted in “a whole lot of material being moved.” GX-1354, at 130:13-25, 131:12-22 (Leitman Dep. Tr.); *Id.* at 131:12-16 (the Corps removed “roughly 800,000 to a million cubic yards” annually through the 1980s and 1990s); Tr. 2591:15-21 (Kondolf) (admitting that would take 50,000 large dump trucks to reach a million cubic yards) (discussing Kondolf Demo. 3).

The disposal of this massive amount of sand has severe impacts on the ecosystem. For example, when the Corps removed dredged sand and placed it on the floodplain, it “killed everything that lived under it.” Tr. 2585:5-7 (Kondolf); *see* GX-248, at 33 (Kondolf, Restoration Prospects for the Apalachicola River) (Dr. Kondolf, describing one disposal site where a “15-ft-high pile of sand” smothered a “15 [acre] patch of forest”). According to Mr. Hoehn, “[w]hen the Army Corps dredges,” the disposal of sand “is destructive of the channels and the riparian areas.” Tr. 130:15-23 (Hoehn). As he admitted at trial, “[w]hen sand . . . was put on habitats,” it

“change[d] the habitat from highly productive ones to one of the least productive habitats in the main channel.” Tr. 131:24-132:5 (Hoehn).

The effects are still present along the River today. For example, one “locally famous” location is Sand Mountain, a huge pile of dredge spoils 20 or 30 feet high. Tr. 2584:15-21, 2587:13-17 (Kondolf). And while Dr. Kondolf was put forward to testify that the River is “beginning” to heal itself, he testified unequivocally that “Sand Mountain *today* is very actively delivering a lot of sand to the Apalachicola River channel.” Tr. 2588: 13-18 (Kondolf) (emphasis added); *see* Tr. 2727:19-24 (Kondolf) (“remaining dredge spoils are a persistent source of sand to the river channel”) (citing GX-1335, at 8 (Kondolf, 2015 Memo to State of Florida)).

This “persistent” delivery of sand into the River channel from historical navigation practices continues to cause negative ecological impacts. Spoils deposited by the side of the river are washed into the River and clog sloughs and floodplain habitats, cutting those areas off from the River and causing them to dry out. According to Dr. Kondolf, “[w]hen the Army Corps digs up sand and puts it on the side . . . sometimes it can disconnect the floodplain.” Tr. 2574:11-24 (Kondolf). As Dr. Kondolf admitted in his written direct even before cross-examination, “[t]he Corps pumped dredged sand into some sloughs or disposed of dredge spoils upstream of some slough mouths, such that the sand would be carried into the sloughs by inflowing river water. This built up sediment in the entrances to some sloughs, thereby reducing flows of water into them.” Kondolf Direct, ¶ 18; *see also* Tr. 2574:11-24 (Kondolf) (“These impacts of the Army Corps operations [have] impacted mussel habitat in the slough channels through loss of perennially flowing water, deposition of sediment carried from areas of the

mainstem disturbed by dredging, or outright desiccation.”) (discussing GX-1335, at 10 (Kondolf, 2015 Memo to State of Florida)).

Swift Slough provides a clear example of the consequences of these Corps activities. In 2000, Swift Slough was connected to the Apalachicola River at flows below 4,500 cfs, which meant that it would have been connected to the river even during Corps-maintained minimum flows of 5,000 cfs. GX-1272 (7/13/06 USGS Letter to J. Zeiwitz). USFWS found that between 2002 and 2006 “Swift Slough . . . substantially aggraded (filled) with sediment.” GX-123, at 63 (2006 Biological Opinion). Dr. Kondolf explained the cause of this change: “Swift Slough is located in an area of the River that experienced significant historical dredging. . . . [S]and put into circulation by the disturbance caused by dredging deposited in Swift Slough, raising its bed elevation and thus increasing the flow needed to connect it to the main river.” Kondolf Direct, ¶ 48. As a result, Swift Slough “is now disconnected from the main channel at a flow of about 5,600 cfs”—a change of *over 1,000 cfs* that has nothing to do with Georgia’s consumption of water. GX-123, at 63 (2006 Biological Opinion); *see also* GX-1272 (7/13/06 USGS Letter to J. Zeiwitz). This means that at Corps-maintained minimum flows of 5,000 cfs, Swift Slough is now disconnected from the main river and can dry out, again, for reasons having nothing to do with Georgia.

3. USFWS’s Biological Opinion Precludes Any Finding Of Clear And Convincing Evidence That Georgia Harmed Endangered Species In The Apalachicola Ecosystem

Wholly apart from the historical harm caused by construction of Woodruff Dam and decades of dredging, Florida’s claims of harm to the ecosystem are also undermined by official findings from USWFS. As reported by USFWS just a few months ago in connection with its review of the Corps’ proposed changes to the Water Control Manual, USFWS’s 2016 Biological

Opinion shows that the flow regime established by the Corps is protecting the endangered species in the river.

For the endangered fat threeridge mussel, USFWS found in a September 2016, 300+ page report on species on the Apalachicola River that “[a]lthough periodic drought-induced mortality may cause some localized population declines, we currently consider the species’ status to be *stable or improving*. In suitable habitat, the fat threeridge is common to *abundant* and recruitment is occurring.” JX-168, at 133 (2016 Biological Opinion) (emphases added). Whereas USFWS previously thought the population of fat threeridge to be around 1 million, *see* JX-72, at 81 (2012 Biological Opinion), USFWS now believes that there are up to *18.6 million individuals*. JX-168, at 124 (2016 Biological Opinion). The fat threeridge is now so abundant that USFWS is considering removing it from the list of endangered and threatened species. JX-168, at 119 (2016 Biological Opinion) (“The status of fat threeridge is scheduled to be fully reviewed and evaluated in 2019.”); Tr. 4223:14-4224:4 (Menzie) (“the species is one that could be taken off of the list or delisted because it seems to . . . be quite abundant now”).¹²

Similarly, for the endangered Gulf Sturgeon “USFWS characterizes the overall status of the [Gulf sturgeon], and the status of the Apalachicola River system population as ‘stable.’” JX-168, at 63 (2016 Biological Opinion). USFWS recently identified threats and potential threats to the Gulf sturgeon and included factors such as “impact to habitat from dams, dredging,” and pollution. JX-168, at 63 (2016 Biological Opinion). “The USFWS did not include ‘consumptive use’ among the threats to the Gulf sturgeon.” Menzie Direct, ¶ 196 (discussing JX-168, at 63 (2016 Biological Opinion)). The fact that these populations are stable and increasing even after

¹² There are two other federally listed mussel species in the Apalachicola: the Chipola slabshell and the purple bankclimber. But Dr. Allan does not claim that Georgia harmed these other endangered mussels. Tr. 466:17-30 (Allan) (“Q: And, in fact, you’re not claiming that Georgia did anything to harm the Chipola slabshell. Right? A: No. I’m not.”); Tr. 468:2-5 (Allan) (“Q: Your analysis does not pursue the issue of harm to the purple bankclimber given where it lives in the river. Correct? A: Correct.”).

three severe, multi-year droughts fundamentally undermines Dr. Allan's assertion that the "system is severely stressed" and that harm to species like endangered mussels and Gulf sturgeon has "significantly increased over time." Allan Direct, ¶¶ 3(c), 63, 72.

Florida's projections of future harms are also undermined by USFWS's analysis of the Corps' proposed changes to its operating rules for the reservoirs in the ACF Basin. The "proposed action" analyzed by USFWS included changes to operational parameters that included forecasted increases of consumptive uses in Georgia. JX-168, at 208-209 (2016 Biological Opinion). After modeling the proposed changes that included this increased water use by Georgia, USFWS stated: "It is the U.S. Fish and Wildlife Service's biological opinion that the proposed action: 1) will not jeopardize the continued existence of the Gulf Sturgeon" or the federally listed mussels; and "2) will not destroy or adversely modify designated critical habitat for the Gulf sturgeon" or the federally listed mussels. JX-168, at 3 (2016 Biological Opinion) (discussing both Gulf sturgeon and mussels); *see also* Tr. 4221:2-14 (Menzie).

4. Florida's Claim That Georgia Caused Changes To The Floodplain Forest Is Undermined By The Evidence

Both Georgia and Florida acknowledge that "[c]hanges in floodplain forest composition" "have occurred since the construction of the dam" and that less floodplain inundation and flooding caused those long-term changes in the forest. Tr. 4167:22-4168:8 (Menzie); *see* Menzie Direct, ¶ 175; Allan Direct, ¶ 60. Dr. Allan claims that "[f]orest composition of these Apalachicola Floodplain swamps is changing in large part due to reduced river flows." Allan Direct, ¶ 60. But Dr. Allan provided no evidence to support his claim that Georgia's water use caused the shift in forest composition.

USGS, however, did analyze these changes to the floodplain forest, and its findings undermine Dr. Allan's attempt to blame floodplain forest changes on Georgia. *See* Menzie

Direct, ¶ 176. In a study conducted *with the cooperation of the same Florida environmental agencies now pointing the finger at Georgia*, USGS found that “[w]ater-level decline *caused by physical changes in the channel* is probably the most serious anthropogenic impact that has occurred so far in the Apalachicola River and floodplain.” GX-88, at 49 (Light *et al.*(2006)) (emphasis added). Florida’s own biologist, Mr. Hoehn, likewise admitted that the dam’s down-cutting of the river “degraded the floodplain forest” in “the upper part of the river.” Tr. 135:20-24 (Hoehn). And he testified further that in the rest of the river “the floodplain forest received less water inundation” as “less water would make it into the floodplain because of the deeper channel” due to dredging and sand disposal. Tr. 141:11-22 (Hoehn). In a report submitted as recently as November 2015, Dr. Kondolf similarly told Florida that “[d]egradation of the river bed and channel widening of the river has decreased connectivity to the floodplain and slough channels, *causing floodplain desiccation and loss of riparian tree species characteristic of swamps*, such as tupelo.” GX-1335, at 10 (Kondolf, 2015 Memo to State of Florida) (emphasis added); *see also* Tr. 2728:22-2729:25 (Kondolf) (discussing GX-1335, at 10).

Dr. Menzie was the only expert to assess the relative influence of the factors impacting water-levels. Tr. 4203:19-4204:16 (Menzie). Dr. Menzie found that “[t]he biggest [cause] turns out to be climatic differences between years” which “can account for [about] 60 percent change in the amount of flooding.” Tr. 4217:23-4219:2 (Menzie); *see also* Menzie Direct, ¶¶ 181-182. Rainfall, of course, is beyond the control of either State, and reductions in rainfall certainly cannot be blamed on Georgia. Consistent with the findings of USGS, Dr. Menzie testified that the largest human-caused change in inundation was “change in the physical . . . features of the river” which “accounts for about a 20 percent change in the flooding.” Tr. 4217:23-4219:2 (Menzie); *see also* Menzie Direct, ¶¶ 8, 176-180. Finally, Dr. Menzie found that “the

incremental influence of the consumption of water [by Georgia] came out to be a couple of percent.” Tr. 4217:23-4219:2 (Menzie). Florida offered no evidence to contradict that finding and did not even cross-examine Dr. Menzie on this point.

In the face of this overwhelming evidence, Dr. Allan’s conclusions about causation are unreliable because he failed to analyze any potential cause other than Georgia’s water use. Floodplain inundation “is a complex function of upstream discharge, in-stream channel modification, downstream water usage, and climatic influences (e.g., precipitation and evaporation).” Menzie Direct, ¶ 175; *see also* GX-88, at 5 (Fig. 3) (Light *et al.* (2006)) (identifying at least seven “[p]ossible causes of long-term water-level decline”). When Dr. Allan encountered “harm caused by multiple factors,” he “did not attempt to partition out . . . the impact of Georgia’s consumption versus another cause.” Tr. 516:6-18 (Allan). He “did not do any separate analysis of different causes of harm.” Tr. 514:21-515:1 (Allan). And “for harms caused by multiple factors,” Dr. Allan “does not estimate the relative contribution of any causal factor” because his “analysis focused on a single factor”—Georgia. Tr. 516:19-517:1 (Allan).

5. Dr. Allan’s Testimony Cannot Justify A Finding Of Clear And Convincing Evidence

Given the USFWS’s finding that populations of endangered species identified by Florida are stable or improving, and that changes in flood-plain inundation and slough connectivity are driven primarily by weather and channel changes, Dr. Allan’s testimony and opinions cannot possibly justify a finding of clear and convincing evidence of harm caused by Georgia. In fact, Dr. Allan waffled on so many issues and changed his testimony so many times that he had to be impeached *14 times*, an astounding number for an expert witness.

Dr. Allan “didn’t do any study to determine whether [the three threatened or endangered mussels] are increasing, decreasing, or stable.” Tr. 389:17-390:3 (Allan). He “[doesn’t] know if

there's been a decline in any of the three endangered species since they became listed." Tr. 390:14-18 (Allan). For "other mussels that aren't threatened or endangered," Dr. Allan does not have any "information about those species as to whether they are increasing or decreasing over any period of time." Tr. 392:9-17 (Allan). Similarly, Dr. Allan also does not "have any information about changes in Gulf sturgeon population over any period of time." Tr. 396:11-14 (Allan). Dr. Allan testified that there are "142 freshwater and estuarine fish species in the Apalachicola River" but that he had no "data that would indicate whether any fish species in the Apalachicola River is increasing or decreasing." Tr. 395:2-10 (Allan).

Nor can Dr. Allan's "harm metrics" possibly be considered clear and convincing evidence of harm. For example, Dr. Allan's mussel metrics cannot "tell you how many mussels died in each year," they cannot "describe changes in mussel populations" caused by particular flows, and they "do not describe changes in mussel populations." Tr. 399:6-20 (Allan). Dr. Allan testified that his metrics "are a representation of the probability of harm under certain conditions," Tr. 458:21-459:11 (Allan), but unlike the work of USFWS and Dr. Menzie, they cannot and do not tell the Court anything about whether the populations of any of the studied species are improving, stable, or deteriorating. Dr. Allan's study gives the Court absolutely zero information about the critical question of actual harm, a prerequisite imposed by the Supreme Court before this proceeding may even begin to assess an equitable apportionment.

In fact, Dr. Allan's metrics show harm even when there is no evidence that any real-life harm actually occurred. Dr. Allan's metrics indicate that harm occurred to mussels in Swift Slough when flows fell below "5700 cfs for 30 days in the summer," Tr. 425:17-20 (Allan), because "Swift Slough becomes disconnected from the River at 5,700 cfs." Allan Direct, ¶ 45. But in 2000-2002, Swift Slough was connected to the Apalachicola River at flows as low as

4,500 cfs, a fact Dr. Allan was unaware of before trial. *See* GX-1272 (7/13/06 USGS Letter to J. Ziewitz). As a result, even though Dr. Allan's metrics indicate harm to mussels in Swift Slough in 2000-2002, USFWS did not observe any mussel die-offs because Swift Slough remained connected to the river. Tr. 441:19-442:3 (Allan) (discussing GX-123, at 42 (2006 Biological Opinion)) ("Q: Now, you're showing harm under your analysis at a time when the Fish and Wildlife service says they did not observe a mussel die-off; is that correct? A: That's correct."). Dr. Allan also personally visited Swift Slough during the 2011-2012 period when his metrics showed "harm to the mussels in Swift Slough." Tr. 462:24-463:1, 465:7-10 (Allan). But Dr. Allan witnessed no harm. In fact, when Dr. Allan was asked, "you didn't visually see harm yourself, correct?" he could not recall a single example. Tr. 463:19-464:7 (Allan). Dr. Allan has been working on this case for four years, but, other than that single trip that showed no evidence of harm to mussels, he "never went out to the river to see if there were actually mussels being harmed when [his] metrics predicted harm." Tr. 465:23-466:1 (Allan).

Even when Dr. Allan's metrics correspond with documented instances of harm, he cannot attribute that harm to Georgia. Dr. Allan's metrics show harm occurring to mussels in Swift Slough in 2006, which corresponds to a documented mussel mortality event. In his direct testimony, Dr. Allan touts this 2006 event as "site-specific evidence showing that this harm has already occurred." Allan Direct, ¶ 45. But (as discussed in more detail below), Florida claimed that those mussels died not because of anything Georgia did, but because of actions clearly traceable to the Corps: Swift Slough became blocked off by dredged sand up to flows of 5,700 cfs, and the Corps refused to release more than 5,000 cfs from Woodruff Dam, notwithstanding

Florida's repeated requests for additional flow.¹³ And for his part, when pressed, Dr. Allan could not say one way or the other if Georgia was responsible for the mortality event in 2006. *See* Tr. 460:24-461:3 (Allan) (“Q: Do you contend that Georgia killed the mussels in Mr. Hoehn’s picture [of dead mussels in Swift Slough in 2006]? A: I don’t think it’s a yes or no answer.”).

D. Florida Previously Blamed The Corps For These Same Injuries It Now Alleges Were Caused By Georgia

In prior litigation, Florida has emphasized time and again that the Corps and its operations—not Georgia—were the primary cause of its alleged ecological injury, and that changes to Corps operations were the only way to redress those alleged ecological injuries. *See, e.g.*, GX-91, at 3 (Florida Mem. in Supp. of Mot. for P.I., *Alabama v. U.S. Army Corps*, No. cv-90-BE-1331-E (N.D. Ala., Jan. 31, 2006)) (“Corps operations specifically harm three species protected under the ESA: [t]he threatened Gulf Sturgeon, . . . the endangered fat threeridge, . . . and the threatened purple bankclimber.”); Tr. 155:9-156:6 (Hoehn) (referencing GX-1270, ¶ 207 (Fla.’s 3d Am. & Suppl. Compl., *Alabama v. U.S. Army Corps*, No. cv-90-BE-1331-E (N.D. Ala., Sept. 7, 2005), ECF No. 339) (alleging that the Corps is “jeopardizing the continued existence of the Gulf sturgeon, the fat threeridge, and the purple bankclimber, and is adversely modifying and destroying Gulf sturgeon critical habitat” in violation of the Endangered Species Act)).

Throughout the course of the Tri-State Water Rights litigation and up until the point of bringing this original action against Georgia, Florida consistently blamed Corps operations and the effects of dam construction as a principal cause of its purported ecological harms in the

¹³ Admittedly, the Corps was proceeding in line with its operating plan at the time—balancing the multiple federally authorized purposes for the reservoirs. These operational rules are routinely reviewed and approved by USFWS. *See, e.g.*, JX-168 (2016 Biological Opinion); JX-72 (2012 Biological Opinion).

Apalachicola River and Bay. See Tr. 301:4-17 (Hoehn) (“the Corps operations are reducing appreciably the value of designated Gulf sturgeon habitat”) (discussing GX-1281, ¶ 11 (Suppl. Decl. of T. Hoehn Supporting Fla. Mot. for P.I., *Alabama v. U.S. Army Corps*, No. cv-90-be-1331-e (N.D. Ala., Apr. 10, 2006), ECF No. 437); Turner Direct, ¶¶ 21, 30-38 (testifying that “up until the point of bringing this original action against Georgia, Florida blamed Corps operations and the anthropogenic and geomorphologic effects of dam construction as a principal cause of their purported ecological harms in the Apalachicola River and Bay”); Tr. 3069:24-3070:25, 3071:19-3072:14 (Turner) (describing how Florida’s arguments in prior litigation were primarily directed against the Corps). Florida has consistently emphasized that Corps’ operations caused “clear impacts on the ACF species,” Tr. 166:1-4 (Hoehn), and that Corps operations “have the potential to impact dramatically the well-being of the river ecosystem.” Tr. 160:10-22 (Hoehn) (referencing GX-1271, ¶ 15 (Decl. of T. Hoehn in Supp. of Fla. Mot for P.I., *Alabama v. U.S. Army Corps*, No. cv-90-be-1331-e (N.D. Ala., Jan. 31, 2006), ECF No. 384-1)).

Florida is well aware that the Corps has significantly altered the physical shape of the Apalachicola River, which is why Florida has asserted that the effect of “changes in River morphology and hydrology in the ACF Basin has been to reduce dramatically the area of available habitat inundated. . . . Today, more water is required to inundate the same habitats that previously were inundated at lower flows.” GX-1283, ¶ 65 (Compl., *Florida v. U.S. Fish & Wildlife Service*, No. 4:06-cv-410-PH-WCS (N.D. Fla. Sept. 6, 2006), ECF No. 1-2).

In prior litigation, Florida and its officials have also claimed that the Corps’ management of water in the system caused harm to the endangered species. Mr. Hoehn submitted a sworn declaration taking the position that “the Corps has been retaining water in the upstream reservoirs, primarily Lake Lanier, while reducing releases to the Apalachicola River.” GX-1281,

¶ 10 (Suppl. Decl. of T. Hoehn, *Alabama v. U.S. Army Corps*, No. cv-90-be-1331-e (N.D. Ala. Apr. 10, 2006), ECF No. 437). Mr. Hoehn explained that in the ACF Basin “the rivers [are] in an altered and managed state . . . [and] that Corps operations . . . are the primary factor in flows coming down the Apalachicola.” Tr. 299:15-300:5 (Hoehn). In other words, “the Corps controls the water that comes into and flows into the Apalachicola.” Tr. 167:14-168:22 (Hoehn) (referencing GX-1280, at 61:23-62:12 (Hoehn *Tri-State Dep.* Tr.)).

Florida also took the position in prior litigation that the “reservoirs [in the ACF] are operated in conjunction with one another as a unified system.” GX-91, at 10-11 (Fla.’s Mem. in Supp. of Mot. for P.I., *Alabama v. U.S. Army Corps*, No. cv-90-be-1331 (N.D. Ala. Jan. 31, 2006)); *see also* Tr. 174:24-175:6 (Hoehn) (discussing GX-91). In fact, Florida sued the Corps because the Corps was not releasing water *even when Florida claims the Corps had water available*. *See* GX-1276, ¶ 42 (Barr *Tri-State* Decl.). During this trial, Florida witnesses again repeated the claim that in 2006, “the Army Corps had the power and ability” to “fully water Swift Slough,” but instead the Corps released only minimum flows. Tr. 206:23-208:22 (Hoehn); Tr. 209:24-210:6 (Hoehn) (discussing GX-1276, ¶ 42 (Barr *Tri-State* Decl.)). Florida has consistently maintained that it was those decisions by the Corps—not any action by Georgia—that led to minimum state-line flows in the 2006 drought and the resulting ecological harm Florida has identified in this case.

Illustrating its inconsistent positions on the causes of its alleged harm, in its current case against Georgia, Florida relies heavily on a mussel mortality event that occurred in 2006 in Swift Slough. Dr. Allan has cited to that site-specific event to support his harm analysis, Allan Direct, ¶ 45, and in his direct testimony, Mr. Hoehn included pictures of dead mussels stranded in Swift

Slough in 2006 because he “want[ed] this Court to know that something important happened at Swift Slough.” *See* Tr. 175:24-176:1 (Hoehn) (discussing Hoehn Direct, p. 29).

But that site specific mortality event had nothing to do with Georgia, and Florida knows it. Three days after Mr. Hoehn took the picture of dead mussels in Swift Slough in 2006, he requested that USGS “survey the controlling sill elevation of Swift Slough” “to determine when Swift Slough would become disconnected from the river.” Tr. 182:1-183:8, 184:11-22 (Hoehn). That USGS survey found that in 2000, “the disconnection flow for Swift Slough was 4500 cfs” but that in “2006, six years later, the disconnection flow . . . increased to 5600 cfs.” Tr. 186:15-17, 187:13-16 (Hoehn) (discussing GX-1272 (7/13/06 USGS Letter to J. Ziewitz)). As Mr. Hoehn admitted at trial, “[t]hat’s an increase in the amount of water needed to connect Swift Slough of 1100 cfs,” Tr. 187:17-19 (Hoehn), and it was caused by dredge spoils clogging the entrance to Swift Slough, Kondolf Direct, ¶ 48. In other words, Corps dredging and maintenance of the federal navigation channel approved by Florida resulted in a 25% *increase* in the amount of water required to connect Swift Slough to the River and keep the mussels under water. It was not the result of anything Georgia had done.

The second cause of the mussel die off identified by Florida was the Corps’ decision to maintain minimum flows at 5,000 cfs—a Corps operational requirement that again was not a decision of Georgia and not the result of Georgia’s consumptive use. Florida thus alleged in the *Tri-State Water Rights Litigation* that even though “release of 6,300 cfs at Swift Slough was feasible,” “the Corps refused to agree to that flow, causing the disconnection from the main stem of the Apalachicola River of key habitats the Corps is obliged to protect.” GX-1276, ¶ 42 (Barr *Tri-State* Decl.). Because Florida believed that the Corps was responsible for both of these

causal factors, it was explicit about who was ultimately responsible for the mussel mortality event:

With the [US Fish and Wildlife] Service's approval, *the Corps reduced flows* in the Apalachicola River to 5,000 cfs for extended periods during 2006 and 2007, *and killed essentially all of the mussels in Swift Slough.*

GX-1274, at 48 (Fla. and City of Apalachicola's Joint Mot & Memo for Summ. J. on Phase 2 Claims, *In re Tri-State Water Rights Litig.*, No. 3:07-MD-1-PAM/JRK (M.D. Fla. Dec. 9, 2009), ECF No. 309) (emphasis modified). Confronted with Florida's devastating admissions in federal court—submitted consistent with FRCP 11 and supported by sworn testimony from Florida witnesses—Mr. Hoehn had no choice but to admit that Florida was trying to get the Supreme Court to make factual findings that are directly undermined by Florida's own position in prior litigation:

Q: And I just want to confirm, Mr. Hoehn, when the State of Florida tells the federal court that the Corps killed essentially all of the mussels in Swift Slough in 2006 and 2007, they're talking about the same mussels in the picture you have advanced in this court. Correct?

A. That is correct.

Tr. 217:12-19 (Hoehn). This Court should recognize Florida's new positions for what they are—a baseless attempt to rewrite history and blame Georgia for harms Florida previously blamed on the Corps.

Florida also told *this* Court unequivocally in 2012 that “when the Corps structures its operations to retain water in Lake Lanier and release it for local water supply instead of for hydropower,” that creates “low-flow conditions” that “lead to devastating consequences for the ecology and species of the Apalachicola River and Bay.” GX-402, at 29 (Fla. Cert. Petition *In re MDL-1824 Tri-State Water Rights Litig.* (U.S. No. 11-999) (filed Feb. 1, 2012)); Turner Direct, ¶ 34 (collecting examples where Florida previously blamed the Corps for the same harms alleged

in this case); Tr. 3072:20-3074:8 (Turner). Florida argued that the purported ecological harms it suffered from Corps operations—the very same harms it now attributes solely to Georgia’s water use—would be fully redressed by a ruling that required the Corps to change its operations to release more water to provide dependable increases in flows at the state line in Florida. Turner Direct, ¶ 30; Tr. 3071:19-3072:7, 3074:4-5 (Turner); State of Alabama’s and State of Florida’s Joint Mot. and Mem. in Supp. of Partial Summ. J. on All Phase I Claims, at 71, *In re Tri-State Water Rights Litig. (Phase I)*, No. 3:07-md-00001-PAM-JR, ECF No. 191. Florida was ultimately unsuccessful in achieving additional flows through APA litigation against the Corps. *See In re MDL-1824 Tri-State Water Rights Litigation*, 133 S. Ct. 25 (2012) (denying cert.). As a result, Florida has repackaged its arguments against the Corps and shifted the blame from the Corps to Georgia.

IV. FLORIDA HAS FAILED TO PROVE THAT GEORGIA’S WATER USE IS INEQUITABLE

Even if Florida proved both injury and causation, it would still need to prove by clear and convincing evidence that Georgia’s upstream water use is inequitable. Florida has failed to do so. The evidence instead shows that Georgia’s water use is reasonable by any measure. Georgia consumes only a small fraction of water as compared to the total state-line flows into Florida. In all years—including in drought years—Florida receives the overwhelming majority of water in the ACF Basin. Nevertheless, Georgia has invested billions of dollars to develop and implement conservation measures that have reduced Georgia’s total consumptive use. The fraction of available ACF water that Georgia does consume is put to highly beneficial uses, supporting millions of people and billions in economic output. As such, the Court should “decline[] to grant any relief . . . on the ground that the great benefit to [the upstream state] outweigh[s] the detriment to [the downstream state].” *Colorado I*, 459 U.S. at 186; *Kansas*, 206

U.S. at 117 (denying relief notwithstanding “perceptible injury” where upstream use “transform[ed] thousands of acres into fertile fields”); *Washington*, 297 U.S. at 523 (denying relief where remedy would injure upstream state with no benefit to downstream state).

A. Georgia’s Consumptive Use of Water Is Reasonable

The evidence at trial demonstrated clearly that Georgia’s consumption of ACF waters is reasonable and that the vast majority of ACF water flows over the state line into Florida. *First*, in normal years, Georgia’s total annual average consumptive use in the ACF Basin is around 500 cfs. Zeng Direct, p. 6 (Zeng Demo. 1). That is only about 2.5% of the amount of water crossing the state line into Florida. Tr. 3302:23-3303:16 (Zeng). Similarly, in dry or drought years, Georgia’s total annual average consumptive use has never exceeded 900 cfs, or only 4-5% of state-line flows. Tr. 3303:17-3304:2 (Zeng). And in extreme drought conditions (*i.e.*, the driest months of driest years), Georgia’s maximum monthly consumptive use has only once exceeded 1,800 cfs, and even then, Florida still received a minimum of 5,000 cfs in flow from the Corps throughout the drought. Zeng Direct, ¶¶ 5, 22-23. The vast majority of available water in the Basin thus flows through to Florida, even in times of severe drought when water is generally in its greatest demand and flows are at their lowest.

Second, Florida wrongly estimates that Georgia’s consumptive use approaches or even exceeds 5,000 cfs—an amount Florida itself says is “enough water both to supply approximately 19 million people *and* irrigate approximately four million acres of farmland.” Fla. Mot. *in Limine* to Preclude Expert Testimony by Dr. Philip Bedient and Dr. Sorab Panday, at 3 (Sept. 16, 2016) (emphasis in original). The notion that Georgia’s consumption approaches 5,000 cfs is implausible and not supported by the evidence. Not only is consumption of 5,000 cfs more than three times higher than the maximum monthly consumptive use ever recorded in Georgia

(roughly 1,800 cfs), Tr. 3308:5-14 (Zeng), it is also simply “not possible” for Georgia to consume as much water as Florida suggests. Tr. 3309:6-9 (Zeng).

Georgia’s consumptive use data is routinely shared with federal government agencies, including the Corps and USGS. Independent assessments by those federal agencies confirm Georgia’s calculations of total annual consumption. Tr. 3312:18-3313:7 (Zeng). As former EPD Director Judson Turner testified, the Corps conducts a “rigorous review” of Georgia’s consumptive use data and assesses the overall impact of Georgia’s water withdrawals in light of the Corps’ various authorized purposes. Tr. 3041:10-3042:4 (Turner). The Corps has reviewed and accepted Georgia’s consumptive use numbers, as described in a detailed technical appendix to the recently published Final EIS for the ACF Basin. *See* USACE FEIS Appendix O,¹⁴ at 28-50 (reporting total M&I consumptive use in Georgia’s ACF Basin of 200-400 cfs from 1994-2012 and total agricultural consumptive use in Georgia’s ACF Basin of between 200 and 600 cfs from 1994-2012, both of which are consistent with Georgia EPD’s estimates, *see* Zeng Demos. 4 and 10). No federal agency has ever suggested that Georgia’s estimates were three times too low, as Florida now claims in this litigation. Tr. 3312:18-3313:7 (Zeng).

Furthermore, recent estimates of consumptive use throughout the ACF Basin compiled by the ACF Stakeholders as part of its Sustainable Water Management Plan relied on “the best available water withdrawals and return data” and show consumptive use values “very close to Georgia’s numbers”—and not “anywhere near” the 5,000 cfs Florida has alleged. Tr. 3313:14-3314:20, 3315:12-19 (Zeng); GX-1325, at 2. The Corps’ and the ACF Stakeholders’ verification of Georgia’s consumptive use data are not surprising given the effort and resources Georgia has devoted to compiling measured, accurate consumptive use data. Georgia’s consumptive use

¹⁴ http://www.sam.usace.army.mil/Portals/46/docs/planning_environmental/acf/docs/14_ACF_FEIS_Dec%202016_Volume%207.pdf?ver=2016-12-07-164651-237.

estimates are based on over a decade of work and thousands of hours of analysis and modeling by Georgia EPD. Zeng Direct, ¶ 5.

Third, the evidence also confirms that Georgia puts the small fraction of water it does consume to highly beneficial uses, a critical element of the equitable apportionment analysis. ACF waters are the principal municipal and industrial water supply for the Atlanta Metropolitan Area, the ninth largest metropolitan area in the United States. Kirkpatrick Direct, ¶ 11; Tr. 3447:19-20 (Kirkpatrick). Approximately 5.1 million citizens in Georgia rely on the ACF Basin for their domestic water supply, including drinking, cooking, cleaning, and other everyday uses. Mayer Direct, ¶ 22; Tr. 3529:3-19 (Mayer); Kirkpatrick Direct, ¶ 9; GX-863, at Att. A, p. 2 (4/29/2016 Zitsch Memo to Turner). As this Court has noted, “[d]rinking and other domestic purposes are the highest uses of water[,]” and “[a]n ample supply of wholesome water is essential.” *Connecticut*, 282 U.S. at 673. ACF Georgia is also home to many industries and businesses for which water is a key input, including manufacturing industries such as poultry processing, pharmaceutical manufacturing, and aircraft manufacturing, and green industries such as greenhouse production, landscaping, and horticultural services. Stavins Direct, ¶ 16; Tr. 4507:21-4509:2 (Stavins); *see also* Kirkpatrick Direct, ¶ 11 (noting that Atlanta Metropolitan Area “is home to the world’s busiest airport, nearly 150,000 businesses, and approximately 3,000 international facilities that employ more than 169,000 people”). Together, these water-dependent industries and businesses alone contribute nearly \$31 billion in economic output and employ nearly 50,000 people in Georgia. Stavins Direct, ¶¶ 14-16; Tr. 4507:21-4509:2 (Stavins).

ACF waters also provide an essential input to Georgia’s agricultural industry, which is one of the largest and most productive in the nation. Total agriculture revenues were \$4.7 billion

in 2013, with \$1.3 billion generated from three key row crops alone (corn, cotton, and peanuts). Stavins Direct, ¶ 17; Tr. 4509:3-15 (Stavins). ACF Georgia is responsible for approximately one-quarter of the nation's total cotton and peanut production. Stavins Direct, ¶ 20. Within the ACF Basin, substantial economic activity depends on output from the agricultural sector, contributing an additional \$687 million per year to Gross Regional Product (GRP). Stavins Direct, ¶ 18.

Farmers must irrigate to ensure the viability of their crops and produce the agricultural commodities on which Georgia and our nation depend. Without irrigation, farmers lack a dependable source of water for their crops, particularly during dry periods. As Georgia's expert economist, Dr. Robert Stavins, testified at trial, if irrigation in Georgia is limited, "[w]e would have a very large falloff of production and profitability and huge impacts to agriculture." Tr. 4525:7-13 (Stavins). Crop yield data bears this out. Without irrigation, Georgia farmers would produce 51 percent lower peanut yields, 78 percent lower cotton yields, and 93 percent lower corn yields during dry years. Stavins Direct, ¶ 23; Tr. 4521:13-4522:6 (Stavins). Moreover, the vast majority of crop production in Georgia occurs on irrigated acres. In a typical dry year, irrigated acreage produces 94 percent of corn, 77 percent of cotton, and 63 percent of peanuts grown in the ACF Basin. Stavins Direct, ¶ 25; Tr. 4523:20-4525:13 (Stavins). As Florida's own expert economist, Dr. David Sunding, admitted at trial: "farmers who practice dryland farming face an increased risk of crop failure in dry years compared to farmers who irrigate," Tr. 2828:15-18 (Sunding), and the presence of irrigation could influence a farmer's ability to secure a loan to finance his farm. Tr. 2829:5-9 (Sunding).

Fourth, Georgia's level of consumptive use is entirely reasonable when compared to its proportional share of the population, employment, economic activity, and land area in the ACF

Basin. ACF Georgia is home to 5 times the land area of ACF Florida, 80 times more employees than ACF Florida, 56 times the population than in ACF Florida, and generates 129 times the GRP. Stavins Direct, ¶ 30; Tr. 4527:9-4528:13 (Stavins). In 2014, the population of the Florida portion of the ACF basin was less than 3% of the total population of the Basin. Mayer Direct ¶ 27 (“approximately 92.2% of the ACF Basin’s population resides in Georgia, while just 2.2% reside in Florida.”). As of 2015, approximately 96% of the employment within the ACF Basin was located in Georgia, while Florida accounted for just 1.2% of employment in the basin. Mayer Direct, ¶ 28; GX-863, at Att. A at 2 (4/29/2016 Zitsch Memo to Turner). ACF Florida accounts for less than 1% of the economic activity in the basin. Stavins Direct, ¶ 33. Florida has no large metropolitan area in ACF Florida that must be supported. Even the oyster industry Florida seeks to protect generates only between \$5-8 million in revenue per year. JX-77 (2012 Fla. Disaster Request & 2012 FDACS Report). These facts may be why Florida declined to bring Dr. Daniel Phaneuf to trial—the expert it previously hired to value the economy in ACF Florida, but who never valued any economic *changes* to the Florida ACF economy due to Georgia’s water use.

It is clear from these stark differences that Florida is demanding a share of water in the ACF Basin that is highly disproportionate to its share of population and economic activity. Florida currently receives over 90% of the water in the ACF basin even though it accounts for only a comparatively trivial percentage of the population and economic activity. Given the relative sizes of the economies and populations of ACF Georgia and Florida compared to the amount of water Georgia uses, Dr. Stavins stated the obvious: “Florida is currently getting a very good deal.” Tr. 4529:15-25 (Stavins).

Finally, Florida failed to produce any evidence to suggest that Georgia’s consumptive water use will materially increase in the near future. Georgia’s water consumption for the entire ACF Basin through 2040 for a typical dry year is projected to increase by only 62 cfs. Bedient Direct, ¶ 117. As Georgia’s hydrology expert Dr. Bedient testified, such a minor increase in consumption would yield no change—*0 cfs*—in terms of streamflow at the state line during low-flow periods, as a result of the Corps’ regulation of water in the Basin. Bedient Direct, ¶ 120.; *see also* Zeng Direct, ¶ 38. Thus, Florida cannot show by clear and convincing evidence that it will suffer harm from Georgia’s water use in the future.

B. Georgia Has Made Substantial Efforts To Conserve Water For M&I Purposes, Dramatically Reducing Consumptive Use

Georgia has taken extraordinary steps to conserve water for municipal and industrial (M&I) purposes, and as a result M&I water usage in Georgia dropped dramatically—both in terms of per capita consumptive use and total M&I consumptive water use. Georgia’s total M&I consumptive use was around only 100 mgd in 2013. Mayer Direct, ¶ 35. Faced with these facts, Florida dropped Dr. John Dracup, the sole expert it had retained to critique Georgia’s M&I conservation measures, and has all but abandoned its initial position in this litigation that Georgia’s water use for M&I purposes was “[l]arge and ever-increasing.” Compl., ¶ 5. Apart from a few conservation measures that Dr. Sunding says Georgia could adopt (several of which Georgia is already implementing), Florida put on essentially no case at trial to support its claim that the Atlanta Metropolitan Area has not been a good, efficient steward of water resources.

1. Georgia Is A National Leader In M&I Conservation

Georgia has mandated that all water systems and local governments within the Metro Water District enact comprehensive water conservation measures, including:

- mandatory “conservation pricing” in which the cost of water increases with the amount each customer uses;

- water loss auditing and leak detection using industry best practices and standards;
- programs to replace inefficient plumbing fixtures with new, high-efficiency models;
- toilet rebate programs and low-flow retrofit kits to encourage residents to replace old and inefficient toilets;
- requiring outdoor irrigation systems to utilize rain sensor shut-offs to reduce unnecessary irrigation;
- the installation of “sub-meters” for each individual unit in new multifamily buildings, which encourage conservation by ensuring that residents pay the full cost of the water they use; and
- award winning education and public awareness programs to encourage water conservation and efficiency.

Kirkpatrick Direct, ¶¶ 19-20; Tr. 3430:9-19 (Kirkpatrick); Mayer Direct, ¶ 55; JX-121 (Metro North Water Planning District Amendments to Water Supply & Conservation Mgmt Plan); JX-37, § 5 (2009 Water Supply and Water Conservation Mgmt. Plan); GX-52, at GA00893191 (2003 Metro District Water Supply and Conservation Plan).

Georgia has invested heavily in infrastructure that treats and returns the water it withdraws for M&I purposes to the ACF Basin, after which that water is available to meet needs throughout the Basin, including downstream in Florida. Water utilities in the Georgia ACF “have spent billions of dollars in recent years to return water to the [ACF] system.” Tr. 3530:5-11 (Mayer). As a result of these efforts, the Metro Water District has returned on average more than 70% of the water it withdraws back to the ACF Basin. Mayer Direct, ¶ 34; Tr. 3530:12-21 (Mayer); GX-829, at GA02451997-98 (Georgia’s Comments on Water Control Manual Update); Turner Direct, ¶ 63. And due to continued investment and ongoing conservation and efficiency programs, return rates are projected to exceed 75% by 2050. Turner Direct, ¶ 63; GX-829, at Table 3, GA02451998-99 (Georgia’s Comments on Water Control Manual Update).

Additionally, Georgia supplemented the Metro Water District's aggressive conservation and efficiency programs with the passage of the Georgia Water Stewardship Act in 2010, which was designed "to create a culture of water conservation in the state of Georgia." Mayer Direct, ¶ 60; JX-44, § 1 (S.B. 370). The Stewardship Act required local governments, public water systems, and state agencies to adopt permanent outdoor water use restrictions, increasing block rate pricing for all residential customers, sub-metering in all new buildings, and annual water loss audits for public water systems statewide. Mayer Direct, ¶¶ 61-62; JX-44, §§ 2-3, 10 (S.B. 370). The Act is "perhaps the most comprehensive piece of state water conservation and management legislation enacted anywhere in the United States." Mayer Direct, ¶ 60.

Georgia's comprehensive conservation measures have significantly driven down M&I water usage. "[T]he overall trend in total municipal and industrial consumptive use in the Georgia portion of the ACF Basin over this 20-year period remained constant—and even declined slightly—despite a roughly 50% increase in population." Mayer Direct, ¶ 7. In fact, "[m]unicipal and industrial consumptive use in the Georgia ACF Basin was lower in 2013 than it was in 1994," which "is a remarkable achievement given that ACF Georgia's population increased by 1.6 million users—or 48%—over the same period." Mayer Direct, ¶ 35; Tr. 3531:7-16 (Mayer). And since the creation of the Metro Water District in 2001, consumptive use has declined by over 55%, even as Georgia's population in the ACF Basin increased by approximately one million people. Mayer Direct, ¶ 36.

Per capita water use in the Metro Water District has also declined rapidly since 2000—dropping by 36.7% from 155 gallons per capita per day (gpcd) in 2000 to 98 gpcd in 2013. Mayer Direct, ¶ 44; Tr. 3536:3-14 (Mayer); Kirkpatrick Direct, ¶ 26; Tr. 3435:20-3436:3 (Kirkpatrick); GX-786, at 5 (2015 Metro North Activities & Progress Report). This reduction

reflects the significant impact of water conservation measures and investments in water efficiency across the Atlanta Metropolitan Area. Mayer Direct, ¶ 44; Tr. 3536:24-3537:3 (Mayer); *see also* Kirkpatrick Direct, ¶ 27; Turner Direct, ¶ 66; GX-785, at 4-2 (2015 Utility Climate Resiliency Study, CDM Smith) (outside consultant study finding “that declines in per capita use were mainly the result of these conservation measures, independent of other factors like weather and economics”). Florida’s own M&I expert, Dr. John Dracup, admitted in his deposition that “[s]omething below a hundred gallons per day per capita” would indicate that “water conservation measures are being appropriately implemented.” Dracup Dep. Tr. 132:12-18. With per capita use in Atlanta at 98 gpcd, Florida decided not to bring Dr. Dracup to trial. And per capita water use in the Metro Water District is lower than Florida’s per capita rate in its portion of the ACF Basin. Mayer Direct, ¶¶ 47-50.

Florida’s claim that Georgia’s consumption is poised to somehow increase significantly in the future has no factual basis. Georgia’s projected water supply needs for M&I purposes through 2050 represent just around a 45 mgd increase from 2011 levels. Mayer Direct, ¶ 89; GX-829, at GA02451996-99 (Georgia’s Comments on Water Control Manual Update). This is a small growth in water demand that will be used to supply millions of additional people in the ACF Basin over the next three decades. Mayer Direct, ¶ 89; Tr. 3501:11-20 (Mayer). What’s more, Georgia’s water conservation efforts have been so successful that in December 2015 Georgia submitted a modified water supply request to the Corps asking for *less storage* for water supply through 2050 than Georgia requested in the 2013 water supply request. Turner Direct, ¶¶ 51-52, 64; Tr. 3047:14-3049:6 (Turner); Zeng Direct, ¶ 41; JX-126 (Georgia’s 2015 Water Supply Request). Georgia reduced its demand projections by more than 12% from 705 mgd to a maximum of 621 mgd through 2050—which is less than the withdrawal amounts the Corps has

deemed acceptable in its Draft EIS released in October 2015. Turner Direct, ¶¶ 52, 57; Tr. 3049:7-17 (Turner); Zeng Direct, ¶ 42; JX-126, at GA02337385-506 (Georgia’s 2015 Water Supply Request); GX-829, at Table 3, GA02451998-99 (Georgia’s Comments on Water Control Manual Update). The “biggest driver” for the reduction in demand was the dramatic decline in total M&I consumption and per capita use in the Metro Water District resulting from the water conservation measures adopted by the District and Georgia. Turner Direct, ¶¶ 53, 64; Tr. 3049:18-3050:3 (Turner); JX-126, at GA02337385-506 (Georgia’s 2015 Water Supply Request); GX-829, at GA02451860 (Georgia’s Comments on Water Control Manual Update).

Finally, Georgia has been repeatedly recognized for its M&I conservation efforts:

- In October 2015, the Metro Water District won the 2015 EPA WaterSense Award for Excellence in Outreach and Education in recognition of the District’s M&I conservation education and outreach programs.
- In October 2016, the EPA awarded two of only five 2016 WaterSense Promotional Partner of the Year awards to each of the Metro Water District and the Cobb County Water System.
- The Metro Water District was specifically recognized for replacing more than 100,000 inefficient toilets with higher efficiency models, resulting in a savings of approximately *949 million gallons each year*.
- With the 2016 award, Cobb County Water System became a five-time Partner of the Year Award winner.
- Other counties within the Metro Water District and the City of Atlanta have received dozens of other awards for their efforts in water use education, outreach, and conservation.

Kirkpatrick Direct, ¶¶ 22, 52-55.

2. Georgia Has Already Adopted Any Realistically Achievable Aspects Of Dr. Sunding’s Proposed Conservation Measures

In light of the overwhelming evidence that Georgia is a conscientious and effective steward of water resources for M&I purposes, Florida essentially abandoned any attempt to prove that Georgia’s M&I water use is unreasonable. Florida’s lead economist, Dr. Sunding,

now limits himself to arguing that Georgia should do three things to conserve M&I water use in the basin: (1) impose a mandatory 50% reduction in outdoor water use during times of drought, (2) implement a “municipal leak abatement” program, and (3) “eliminate” interbasin transfers in its portion of the ACF Basin. Sunding Direct, ¶ 90, Table 4. Georgia already has in place conservation measures with respect to the first two and the third is not only technically infeasible, but also cost prohibitive.

First, Georgia already has in place several aggressive measures designed to reduce outdoor water use—both in times of plenty and particularly in drought. Water providers in the Georgia portion of the ACF Basin have implemented increasing block rate, conservation pricing—an important practice reducing indoor and outdoor water use. Kirkpatrick Direct, ¶¶ 19, 22; Tr. 3431:9-20 (Kirkpatrick). “Today, 100 percent of water utility customers in the District are subject to tiered block rate conservation pricing.” Kirkpatrick Direct, ¶ 22; Tr. 3431:9-20 (Kirkpatrick). Atlanta’s water and sewer rates are now among the highest in the country. Tr. 3431:21-25 (Kirkpatrick); Mayer Direct, ¶ 131.

Georgia has also adopted other measures that directly limit outdoor water use, including permanent state-wide outdoor water use restrictions that ban all outdoor watering (with certain exceptions) between the hours of 10 a.m. and 4 p.m. on all days of all years. Tr. 3442:8-15 (Kirkpatrick); Tr. 3537:25-3540:21(Mayer). Georgia also has a series of drought management rules that it can implement during a drought to drastically reduce outdoor watering. Georgia applied these measures during the 2007-2009 drought, banning virtually all outdoor water use in 61 counties and, by mandate, requiring water suppliers in metropolitan Atlanta to reduce water withdrawals by 10%. Mayer Direct, ¶ 69; Tr. 3514:14-16 (Mayer); JX-25, at GA01210159 (10/23/2007 Press Release). In 2015, Georgia EPD adopted even more aggressive drought

management rules and policies that replaced the former rule provisions. Turner Direct, ¶ 81; Tr. 3050:12-3051:6 (Turner). These new rules implemented pre-drought mitigation strategies aimed at maximizing M&I water use efficiency in advance of the next drought, and established specific drought response strategies that provide for a full ban on outdoor water use if warranted by drought conditions. Turner Direct, ¶ 81; GX-935 (2015 Drought Management Rules).

Second, “Georgia is a national leader in water loss control and leak abatement.” Tr. 3541:3-19 (Mayer). In 2016, the American Water Works Association (AWWA), a national organization that develops industry guidelines for water loss practices and procedures, highlighted Georgia as a “national example” in water loss control and the “standard by which [you] conduct . . . water loss audits.” Tr. 3432:15-3433:3 (Kirkpatrick); Mayer Direct, ¶ 63.

As compared to other states, Georgia’s water loss control and leak abatement efforts are considered “among the best, if not the best.” Tr. 3541:20-23 (Mayer). Georgia requires its utilities to conduct water loss audits every year, and each utility must demonstrate year-over-year progress in water loss control based on the annual water audit. Kirkpatrick Direct, ¶ 50; Tr. 3407:6-9, 3443:20-24 (Kirkpatrick); GX-1090, at GA. COMP. R. & REGS. 391-3-33-.05(3)(a) (Georgia Regional Water Planning Rules). And Georgia is one of only five states or regulatory entities in the United States to require water loss audits using the best practices and standards developed by the AWWA—and the only state to require that its water audits be validated by a third party. Mayer Direct, ¶ 61; GX-792, at 5 (2015 EPA Water Audits Report).

In a very short period, Georgia has made substantial accomplishments in leak abatement. Between 2009 and 2014, water systems in the Metro District identified and repaired *over 42,000 leaks*. Kirkpatrick Direct, ¶ 22; GX-350, at GA00566279 (2010 Metro North Activities and Progress Report); GX-697, at GA00566171 (2014 Metro North Activities and Progress Report).

From 2012 to 2015, the City of Atlanta allocated more than \$55 million for distribution system rehabilitation and repair projects to decrease water loss and return more water to the ACF Basin. Kirkpatrick Direct, ¶ 22; GX-1103 (Metro North: Did You Know). Dr. Sunding ignores these accomplishments and the fact that Georgia’s existing leak abatement program is a model for the rest of the country.

Finally, Dr. Sunding’s suggestion that Georgia eliminate interbasin transfers is completely impractical. As multiple Georgia fact and expert witnesses testified, interbasin transfers are an inevitable part of any municipal water system, particularly a water system like that of Atlanta Metropolitan Area that sits atop a ridge line and encompasses six different river basins. Kirkpatrick Direct, ¶ 31; Turner Direct, ¶ 71; Zeng Direct, ¶ 28; Mayer Direct, ¶¶ 102-103. Eliminating interbasin transfers would not only be technically infeasible, but it is also plainly cost-prohibitive. Tr. 3439:16-3440:13 (Kirkpatrick). Even though Dr. Sunding assigns zero cost to his proposal, evidence at trial showed that it would actually require re-piping the water-utility and wastewater treatment infrastructure that has been built up over two-hundred years and that now lies beneath Atlanta Metropolitan Area and the Georgia ACF—estimated to cost “in the hundreds of millions if not billions of dollars”. Tr. 3545:8-15 (Mayer); Tr. 3440:4-23 (Kirkpatrick); Mayer Direct, ¶ 104.

C. Georgia Has Made Substantial Efforts To Conserve Agricultural Water Resources

Irrigation is “critical to the continued survival and productivity of agriculture and the broader economy in [ACF] Georgia.” Masters Direct, ¶ 20. Irrigation “provide[s] farmers stability in yield and crop quality, even with the variability of precipitation and potential for periods of drought during the growing season.” Masters Direct, ¶ 20; Tr. 3690:20-3691:18 (Masters). Without access to sufficient water for irrigation, crop productivity would decline,

farmers would be “exposed to high risk of financial loss,” Masters Direct, ¶ 20, and the economy of the state and the region could suffer significantly. Tr. 3689:16-3690:9 (Masters) (“agriculture really is the lifeblood of Southwest Georgia and the Flint River Basin . . . jobs and employment, tax base, schools, are all heavily dependent on ag[ricultural] production”). Fortunately, the Upper Floridan Aquifer, the primary source for irrigation withdrawals in the ACF Basin, provides an easily accessible and quickly rechargeable source of water for farmers. “[T]he [Upper Floridan Aquifer] is quickly rechargeable with precipitation events, unlike other slow recharging aquifer systems like those in Texas that take hundreds of years to recharge.” Panday Direct, ¶ 27. “The highly productive [and rechargeable] nature of the [Upper Floridan Aquifer] is the reason that most groundwater pumping for irrigation in the ACF River Basin occurs from” this aquifer. Panday Direct, ¶ 28.

The evidence at trial shows that Georgia farmers are using irrigation water efficiently and are good stewards of water resources in the ACF Basin. As Florida’s own expert found, the vast majority of Georgia farmers underwater, applying less water than the crop requires for maximum yield. Tr. 2822:23-2823:8 (Sunding) (“Georgia farmers in the aggregate are underwatering compared to” “the biological maximum”). Indeed, Dr. Sunding’s own analysis shows that up to 90% of the irrigated acreage in Georgia is “under-watered” in certain years relative to his estimate for irrigation required to maximize yield. TR. 4525:14-4527:8 (Stavins) (“for the years 2008 to 2013 there was underwatering by ACF Georgia farmers that varied from almost 70 percent to close to 90 percent”); Stavins Trial Demo. 6. That makes sense. Farmers in Georgia have strong incentives not to over-irrigate their crops, because of the “cost of withdrawing water and applying it to their fields” and because “[i]t can be just as harmful to irrigate a crop too much as for a crop to not have enough water.” Tr. 3696:4-3697:7 (Masters).

Moreover, over several decades, Georgia has taken a number of significant and wide-ranging measures to enhance water management and conserve agricultural water resources in the ACF Basin:

- In 1998, Georgia EPD initiated *a six-year Sound Science Study* to better understand agricultural water use in the ACF Basin and its potential impact on streamflows. Couch Direct, ¶¶ 13-14; Tr. 3137:6-18 (Couch). Georgia studied and documented how many acres were being irrigated; how much water was being used for agricultural purposes; and the impact of agricultural pumping on streamflows in the Flint River Basin. Reheis Direct, ¶ 37; Tr. 697:9-698:10 (Reheis). With the support of technical experts and USGS, Georgia developed improved stream-aquifer computer models to better understand the relationship between irrigation use and streamflow. Reheis Direct, ¶¶ 38-39. The outcome of that study was the development of the 2006 FRB Plan, which “represented Georgia’s efforts to implement the best available science at the time to responsibly manage its water resources.” Couch Direct, ¶¶ 16, 21; Tr. 3137:19-23 (Couch).
- In 2000, Georgia also passed the *Flint River Drought Protection Act (“FRDPA”)*, which empowered the Director of EPD to issue a prediction of “severe drought conditions” by March 1st of each year, and to administer an irrigation auction to pay farmers not to irrigate a certain number of acres during the growing season. Turner Direct, ¶ 86; Couch Direct, ¶ 30; Reheis Direct, ¶¶ 52-53; JX-9 (FRDPA). EPD auctions conducted in 2001 and 2002 resulted in the removal of 33,000 and 41,000 acres from irrigation, respectively, at a combined cost of about \$10 million. Reheis Direct, ¶¶ 54-56.
- In 2003 Georgia passed legislation *requiring the installation of flow meters* on irrigation withdrawals. Reheis Direct, ¶ 60. All told, as part of its Agricultural Metering Program, Georgia has installed over 12,000 meters throughout the state, including over 6,000 in the ACF Basin. See Tr. 3713:2-8 (Masters); GX-1251 (GSWCC Metering Program Website). This includes about 80% of the irrigated acreage in the Lower Flint region. See Masters Direct, ¶ 41; Tr. 3713:9-16 (Masters); GX-1133, at 3 (GWPPC Field Mapping).
- In 2004, Georgia initiated *a statewide water planning* process “to study conservation and potential storage needs in a comprehensive way.” Couch Direct, ¶ 46; GX-64 (2004 Act); GX-210 (2008 State Water Plan). Georgia’s water planning “has been used as a model in other states, particularly in our neighboring states of South Carolina and Alabama.” Tr. 3146:1-3 (Couch).
- In 2006, Georgia “significantly changed how agricultural water use was managed in the Flint River Basin” *limiting the areas in which new permits could be issued depending on hydrologic sensitivities and imposed conservation requirements on irrigation systems*. Couch Direct, ¶ 12; see Couch Direct, ¶ 22; JX-21 (2006 Flint River Reg’l Water Dev. & Conserv. Plan). Georgia divided the Basin into different “zones” based on hydrologic sensitivity to groundwater withdrawals and severely restricted new irrigation

permits in the most sensitive zones, termed “Capacity Use Areas.” Cowie Direct, ¶¶ 6, 12-14; JX-21, at 26 (2006 Flint River Reg’l Water Dev. & Conserv. Plan). Georgia also imposed advanced conservation requirements on new or modified permits in the remaining zones. Cowie Direct, ¶¶ 17-19; JX-21, at 33-35 (2006 Flint River Reg’l Water Dev. & Conserv. Plan).

- In February of 2008, Georgia adopted a *State Water Plan*, which established ten Regional Councils and required each one to develop a *Regional Water Plan*. Cowie Direct, ¶¶ 41-42. The first round of regional planning began in 2009 and was completed in 2011, with EPD’s approval of all ten Regional Water Plans. Cowie Direct, ¶¶ 41-42. Georgia invested nearly \$30 million and over 15,000 volunteer hours to support the first round of regional water planning. Cowie Direct, ¶ 43. Since the adoption of the Regional Water Plans, a substantial number of management practices identified by those plans have been implemented. Cowie Direct, ¶ 44; Tr. 2315:8-2316:10 (Cowie); GX-1249, at GA00704448 (2014 Georgia Water Resource Planning Update).

In addition to these measures, Georgia has collected accurate irrigated acreage data for the entire ACF Basin as well as detailed, on-the-ground information about irrigation practices in the most critical portions of the ACF Basin. Masters Direct, ¶¶ 25, 26, 34, 61; Tr. 3699:11-14, 3700:24-3701:24 (Masters). Georgia’s comprehensive agricultural metering program has metered about 78% of the irrigation systems and 80% of the irrigated acreage in the Lower Flint region. Masters Direct, ¶ 41 (“Based on the Center’s field mapping in the Lower Flint River Basin, I know that approximately 80% of irrigation systems are metered”); Tr. 3713:9-16 (Masters); GX-1133 (GWPPC Field Mapping). Georgia also has established a number of state institutions that work directly with farmers to promote efficient agricultural water management and water conservation throughout the ACF Basin. Tr. 3688:10-3689:15 (Masters) (describing the Georgia Water Policy Planning Center, University of Georgia’s Stripling Irrigation Park, University of Georgia’s Extension Service, Georgia Soil and Water Conservation Commission, and the Flint River Soil and Water Conservation District).

Georgia has implemented aggressive efficiency requirements for irrigation equipment in the ACF Basin. Notwithstanding the advanced efficiency requirements required by the Flint River Basin Plan, Georgia passed legislation in 2014 mandating that all center-pivot irrigation

systems—by far the most common irrigation systems—“achieve a minimum of 80% irrigation efficiency by January 1, 2020.” Turner Direct, ¶ 110; Cowie Direct, ¶¶ 53-57; JX-105(S.B. 213); GX-765 (2014 Proposed Amendments to Flint River Drought Protection). Georgia has also funded programs designed to increase the irrigation efficiency of irrigation systems. These efforts have worked. Currently, “approximately 90% of the center pivots in Lower Flint River Basin employ low pressure sprinklers or low pressure drop nozzle technology” which are highly efficient. Masters Direct, ¶ 67. In the Lower Flint River Basin, highly efficient “low pressure systems irrigate approximately 93% of the acreage the Lower Flint River Basin.” Masters Direct, ¶ 68; Tr. 3697:17-24, 3710:23-3711:18 (Masters); GX-1133 (GWPPC Field Mapping).

In addition, Georgia has effectively capped further growth of irrigated acreage in the ACF Basin that most impact streamflow, ensuring that future agricultural use will not materially increase impact on streamflow (if at all). In 2012, “Georgia suspended the acceptance of new agricultural withdrawal permit applications from groundwater and surface water sources in the ACF Basin, including the Floridan Aquifer.” Turner Direct, ¶ 96; Tr. 3058:6-11 (Turner); JX-73. The “moratorium on new permits [is] still in place” today and protects existing resources because it has “essentially . . . capped acreage in the Basin.” Tr. 3060:24-3061:7 (Turner); *see* Turner Direct, ¶ 97; Tr. 3060:24-3061:2, 3061:4-7 (Turner).

In addition to suspending the acceptance of new agricultural permit applications in the ACF Basin, Georgia has taken meaningful action to investigate and remove from irrigation any existing unpermitted withdrawals. In October 2016, Georgia’s Governor appointed a special task force to investigate claims by Florida that some individuals are irrigating without a permit in the Georgia ACF. Turner Direct, ¶ 127. “The initial stages will focus on those acres that have the greatest impact on streamflows.” *Id.* “On October 21st, EPD issued 30 Notices of Violation to

permit holders suspected of irrigating acreage that is not properly permitted. Pursuant to Georgia law, these individuals will be given an opportunity to respond to the notices, and EPD will follow-up with site visits to confirm that these individual are indeed out of compliance.” *Id.* Importantly, “even if it turns out that one or more individuals are irrigating without a permit, the irrigated acreage is still accounted for in Georgia’s Wetted Acreage Database and included in the State’s agricultural water demand estimates.” Turner Direct, ¶ 126.

The efforts described above have had meaningful positive impacts on agricultural water use in ACF Georgia. Together, those initiatives demonstrate that Georgia has taken a reasonable, responsible, and conscientious approach to agricultural water conservation.

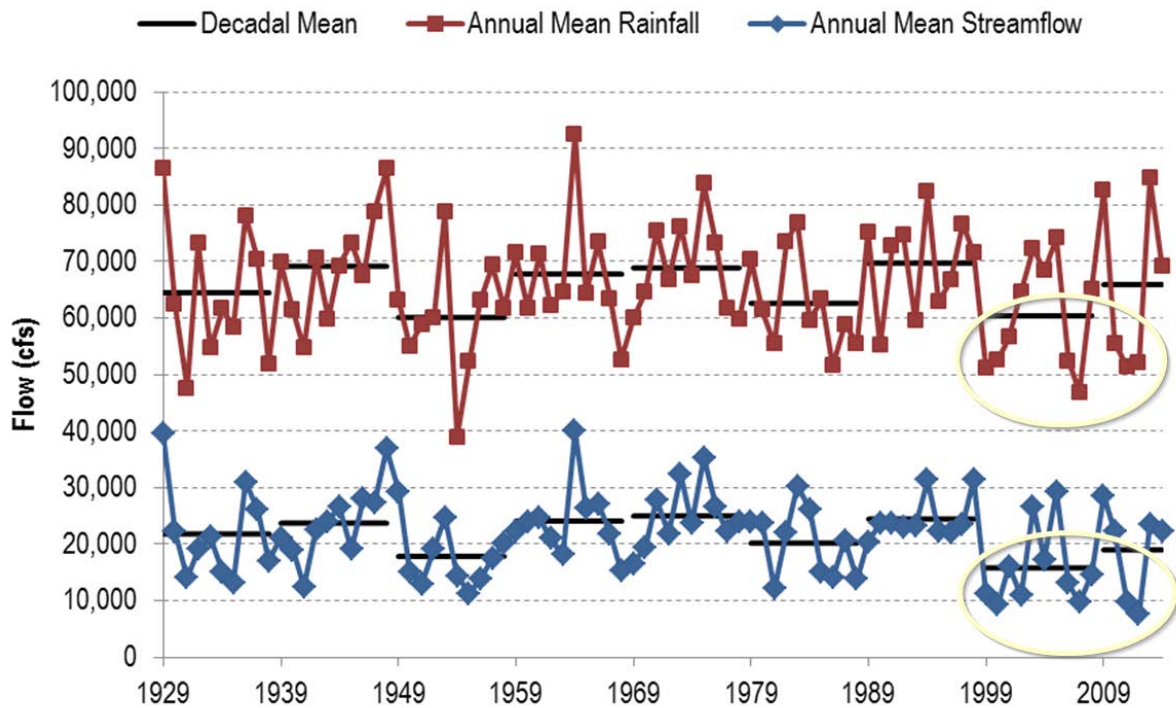
D. Low Flows Are Caused By Drought, Not Georgia’s Consumptive Use

The evidence at trial contradicts Florida’s argument that recorded low flows on the Apalachicola and Flint Rivers over the last fifteen years are “obvious” evidence of the impact of Georgia’s consumptive water use on Florida. *See, e.g.*, Hornberger Direct, ¶¶ 42-48 (claiming that Georgia’s consumptive use is “the only . . . possible cause for” low flows in recent drought years); Fla. Pretrial Br. at 1, 19-20 (arguing that low-flow days are “undeniable” evidence of Georgia’s consumptive use). Instead, the facts show that the increase in the number, frequency, and duration of droughts in the region since 1998 caused the low flows recorded at gages in the ACF Basin—not Georgia’s water use.

1. Basic Hydrologic Principles Confirm That Streamflow Declines Are Attributable To Precipitation Declines

It is a fundamental principle of hydrology—and basic common sense—that more rain equals more streamflow, and less rain equals less streamflow. *See* Tr. 4017:23-4018:6 (Bedient) (“That’s just the way a hydrologic system works”); Tr. 3906:25-3907:6 (Panday) (“[Q:] It seems to me, as a layman, the more rain you get, the more water you get; the less rain you get, the less

water you get. Is that right? [A:] That is correct, your Honor.”). Dr. Bedient, who has over 40 years of experience evaluating precipitation and streamflow data, found a “strong, direct correlation” between rainfall and streamflow in the ACF Basin. Bedient Direct, ¶¶ 124-129; Tr. 4010:18-22 (Bedient) (testifying that “lower rain, especially significantly lower rain” caused “lower flows measured at the gage”). Dr. Bedient’s analysis of NOAA rainfall and USGS streamflow data show that low flows recorded at stream gages throughout the basin since 2000 are closely associated with rainfall declines in the ACF Basin from three severe, multi-year droughts:



As the red line in Bedient Demo. 34 shows, the last 15 years have seen multiple, multi-year droughts in the ACF Basin (1999-2000, 2006-2007, and 2011-2012), unlike prior decades in which droughts were largely single-year events. The yellow circles show where decreased streamflow is associated with decreased rainfall for multiple multi-year droughts in the past 15 years. Dr. Zeng testified that the back-to-back nature of recent droughts is “absolutely” a strong

factor influencing streamflow levels. *See* Tr. 3320:17-20 (Zeng). Dr. Bedient concluded: “This strongly indicates that lower rainfall, not Georgia’s water use, is the primary cause of lower streamflow over the past 15 years.” Bedient Direct, ¶ 129. Dr. Sorab Panday, Georgia’s expert in groundwater hydrology, likewise testified that “[t]he precipitation record . . . indicates more frequent, longer duration, back-to-back droughts for the post-1992 period over the ACF River Basin.” Panday Direct, ¶ 60; Tr. 3336:11-21 (Panday). The Corps has recognized the “serious” and exceptional nature of recent multi-year droughts. *See* USACE FEIS, at 1-6, 2-7 to 2-9 (describing the 2006-2008 drought as “the most devastating recorded in Alabama and western Georgia” and describing the impacts of drought in 2011-2012 on streamflow in the Flint River Basin as “ranging from severe to extreme”); *see also id.* at 2-7 to 2-9 (explaining that these historic droughts were characterized by “decreased streamflow rates (measured in cfs), lake levels, and groundwater levels”).

The existence of severe multi-year droughts late in the record explains why the increased frequency of low flow days identified by Florida is almost exclusively limited to drought years from the past 15 years. *See* Fla. Pretrial Br. at 19-21 (discussing post-2000 low flows, including in 2007, 2008, 2011, and 2012). In fact, while Dr. Hornberger admitted that his “opinion is that Georgia’s consumptive use has caused a fundamental change to the Basin over the past 45 years,” in reality “there’s actually no discernible impact in [his low flow metric] until almost 2000.” Tr. 1974:8-23 (Hornberger). Similarly, Dr. Dennis Lettenmaier, Florida’s climate expert, admitted that streamflows actually *increased* over a nearly 50-year period from 1950-1998 (even though there was rapid growth of Georgia’s water use over this period of time). Tr. 2380:1-2381:10 (Lettenmaier). The lack of any discernible impact in streamflow for the half

century during which Dr. Lettenmaier alleges impacts from Georgia's consumptive use is further evidence that droughts, not Georgia, are causing the low flows of which Florida complains.

Droughts also explain why the same declining trend in streamflow has been observed in other rivers in the region that are not influenced by Georgia's consumptive use. *See* Zeng Direct, ¶¶ 149-152; GX-658, at 3 (8/23/13 Georgia EPD Senate Submission) (showing similar declining patterns in rivers in Florida, including the Chipola River, Suwannee River, Yellow River, and Choctawhatchee River); Tr. 3356:5-3357:20 (Zeng) (explaining how "all of them are showing the same type of declining trend" and "that regional pattern certainly was not the result of Georgia's consumptive water use"). Dr. Menzie analyzed "[h]istorical flow data for all seven rivers in northern Florida." *See* Menzie Demo. 5. As Dr. Menzie explained, "[i]f water consumption were the primary driver of variation, the Apalachicola River flow record would diverge from that of other regional rivers. Instead, Menzie Demo. 5 shows that the Apalachicola River reflects similar flow trends as other regional rivers, indicating that regional climatic variation is the predominant cause of these variations in flow." Menzie Direct, ¶ 28.

2. Florida's Analysis Of Declining Flows And Purported "Trends" Is Misleading And Ignores Evidence Linking Low Flows To Drought

Florida's focus on the differences between 1954-55 and 2011-2012 compares apples to oranges. Florida focuses on a single comparison of one recent drought (2011-12) with one prior drought (1954-55) to support its contention that recent droughts in the ACF Basin are no more severe than historic droughts and therefore that any change in flow must be due to Georgia's consumptive use. *See* Fla. Pretrial Br. at 20; Fla. Opening Presentation, at slide 18; Hornberger Direct, ¶¶ 50-52. But the evidence shows that this comparison is "false and misleading" because the rainfall patterns were very different: "the end of 1953 had one of the largest rains on record. And it happened in the very end of the year, and then flows just carried over into 1954 [and]

generat[ed] a higher value.” Tr. 4008:18-4010:12 (Bedient). In plain terms, more rain led to more water in the river immediately before the 1954 drought began. The higher streamflow in 1954 compared to 2011 is thus largely the result of a “rain spike that comes in at the very, very end of 1953” and “just carries over” into 1954, and does not reflect impacts of Georgia’s consumptive use in the later drought. *Id.*

Florida’s reliance on “basin yield” (*i.e.*, the amount of rainfall converted to streamflow) is similarly misleading. Florida’s experts claim that Georgia’s consumptive use has caused a decline in “basin yield” (*i.e.*, the amount of rainfall converted to streamflow) “since 1970.” Tr. 1971:13-16 (Hornberger). Dr. Bedient found that Dr. Hornberger’s data showed that there was actually an *increase* in basin yield for the first 30 years of that period when agricultural irrigation grew rapidly in southwest Georgia (*i.e.*, from 1971-1998), and that “[i]t is only once the severe, multi-year droughts since 1999 are included does the overall ‘trend’ from 1970 actually show a decline.” Bedient Direct, ¶¶ 210-211. Dr. Hornberger admitted on cross-examination that his own analysis “actually showed an increase for the first 30 years of [the post-1970] period” and the decline he describes only exists once the major multi-year droughts post-1998 are included. Tr. 1998:17-1999:14 (Hornberger). Thus, while Florida’s experts claim that Georgia’s consumptive use has caused a decline in basin yield “since 1970,” there was no such decline until drought years post-1998 are included, strongly indicating that these droughts, not Georgia’s consumptive use, are responsible for the overall declining “trend.”

The evidence further shows that there has been a marked shift in the intra-annual rainfall pattern—*i.e.*, while annual average rainfall has not changed significantly over the decades, the seasonal pattern of when that rain falls within the year has changed significantly in recent decades. Analysis of NOAA precipitation data by Georgia EPD’s Hydrology Unit shows that

the ACF Basin is “having a drier summer in comparison to the past; and we’re having a wetter winter in comparison to the past.” Tr. 3354:10-16 (Zeng); GX-1042 (Dr. Zeng’s statistical rainfall analysis). For example, when analyzing the seasonal rainfall patterns during droughts, the decades from 1895-1974 had more than 50 percent more rainfall in the month of July compared to more recent decades (1975-2013). See Zeng Direct, ¶¶ 144-148. These changes in the timing of rainfall can have a significant impact on streamflow levels, especially during the summer months and during dry and drought times. Zeng Direct, ¶ 148. Dr. Lettenmaier, Florida’s climate expert, found a similar decline in late spring and summer precipitation in recent decades compared to earlier decades. See Tr. 2416:14-2421:5 (Lettenmaier) (acknowledging that his data show less rainfall in April, May, July, and August for 1980-2011 compared to 1916-1970); Lettenmaier Cross Demo. 7.

Dr. Lettenmaier admitted that cumulative declines in rainfall of 2.2 inches in the late spring and summer translate to a cumulative rainfall reduction of approximately 8,274 cfs for every single day. Tr. 2429:4-8 (Lettenmaier). The intra-annual precipitation shifts he identified have been confirmed by multiple statistical analyses, which establish that this is a real phenomenon. Tr. 3351:15-3355:22 (Zeng) (explaining that “we’re beyond doubt that these differences are not because of chance”). These significant shifts in intra-annual rainfall are further evidence that natural climatic changes, not Georgia’s consumptive use, are driving the summer streamflow trends identified by Florida.

3. Flows Have Declined By Thousands Of cfs Entirely Within Florida’s Borders

Florida’s attempt to blame recent trends in Apalachicola River flow entirely on Georgia’s consumptive use is particularly ironic given evidence presented at trial showing that a significant amount of Apalachicola River water is being lost *entirely within Florida’s borders* for reasons

having nothing to do with Georgia. Independent analysis by three of Georgia’s hydrologists—Dr. Bedient, Dr. Panday, and Dr. Zeng—shows that today, the amount of streamflow being generated in Florida’s portion of the ACF Basin has declined by *thousands of cfs* compared to what was being generated in Florida over the past several decades. *See, e.g.*, Bedient Direct, ¶¶ 130-141 (observing a “long-term average decline of approximately 4,000 cfs” from 1978-2014); Panday Direct ¶ 83 (concluding that “since 1992, Florida has contributed an average of 2,640 cfs less water to the Apalachicola River and Bay than during the 1975-1992 time period”). The loss of Apalachicola River flow of approximately 4,000 cfs is occurring “at a faster rate than other river stretches in the region.” Zeng Direct, ¶ 153. This decline “is not attributable to anything that takes place north of the state line” because it is occurring entirely in Florida between an upstream and downstream point on the Apalachicola River. Bedient Direct, ¶ 138; *see also* Zeng Direct, ¶ 153 (noting that the decline “obviously is not caused by Georgia’s consumptive use or the Corps’ reservoir operations” because it is occurring entirely below the state line).

As Florida’s contribution of flows to the Apalachicola River has shrunk by thousands of cfs over time, Georgia’s relative contribution of flows to the river has increased. Zeng Demo. 14 (showing a decline in Florida’s contribution of flows from 28% in 1979 to 10% in 2011); Bedient Direct, ¶ 140 (concluding that “the upstream states [Georgia and Alabama] now contribute an average of around 92% of flows to the Apalachicola River,” compared to 80% in the 1970s). Florida cannot justify calling for consumption caps on Georgia to make up for the fact that Florida is contributing 4,000 cfs less flow in the Apalachicola River than it was decades ago. *See* Tr. 3360:25-3361:8 (Zeng) (testifying that Florida is “seeking higher flow coming from

north of the state line as a solution to their problems”). In a very real sense, Florida is asking Georgia to make up for water that Florida has lost within its own borders.

V. FLORIDA’S PROPOSED REMEDIES WILL NOT REDRESS ITS ALLEGED HARMS AND WILL IMPOSE EXTREME COSTS ON GEORGIA FAR IN EXCESS OF ANY BENEFITS TO FLORIDA

In addition to having to prove injury, causation, and inequitable use by clear and convincing evidence, Florida also bears the burden of proving (1) that its proposed remedies will redress its alleged harms; and (2) that the benefits of its proposed remedies substantially outweigh the harms they will do to Georgia. *See Colorado I*, 459 U.S. at 187 (party requesting change to status quo must “demonstrate[] by clear and convincing evidence that the benefits of the diversion substantially outweigh the harm that might result.”). Unless Florida proves both of these elements by clear and convincing evidence, the Court must deny relief. *Colorado v. Kansas*, 320 U.S. at 385-386 (denying relief, in part, because “[b]efore the developments in Colorado consequent upon irrigation were to be destroyed or materially affected, Kansas must show not merely some technical right but one which carried corresponding benefits.”); *Washington*, 297 U.S. at 543 (denying Washington’s requested relief, in part, because “[t]o limit the long established use in Oregon would materially injure Oregon users without a compensating benefit to Washington users”). Florida did not make either showing at trial: the drastic cuts to Georgia’s water use that Florida seeks are simply impossible for Georgia to achieve, and (in any event) so costly to Georgia, with no resulting benefits to Florida, that they are neither “justified” nor “equitable.”

A. Florida Has Failed To Provide Any Evidence Supporting Its Proposed “Wet” Or “Average” Year Remedy

The first component of Florida’s proposed remedy is a consumption cap on “Georgia’s annual average consumptive use and streamflow depletions” during *wet or average years*. *See*

Fla. Pretrial Br. at 37 (describing Florida’s proposed remedy). That proposed remedy lacks any basis in the factual record in this case, and runs contrary to sworn testimony submitted by Florida in another case. Specifically, Florida previously told the Middle District of Florida that “in years of at least average annual flows, the Apalachicola River’s flows are more than adequate to . . . sustain the significant biological processes on which the health of the River and Apalachicola Bay relies, and upstream consumption is not significant enough to interfere with those processes.” GX-1276, ¶ 31. At trial, Dr. Sunding admitted that he had never presented an “average” or “wet” year remedy scenario until he submitted his Direct Testimony. Tr. 2808:11-24 (Sunding). Dr. Sunding also candidly acknowledged that Florida’s focus was on the drier years: “[t]he discussions I had especially with [Florida’s expert] biologists and the hydrologists were . . . almost exclusively focused on dry years”; he could not recall “any” issues raised by Florida’s other experts about average or wet year problems. Tr. 2811:1-8 (Sunding). Likewise, at trial, none of Florida’s witnesses (expert or fact) presented any evidence that Florida has been harmed by Georgia’s water use during “wet” or “average” years, much less that a consumption cap in those years would redress any harm to Florida. For these reasons, Florida’s request for an “average” or “wet” year consumption cap should be rejected at the outset—Florida has simply presented no evidence that it needs more water at those times.

B. Florida’s Proposed “Drought” Year Remedy Is Impossible To Achieve

The other component of Florida’s proposed remedy is a consumption cap requiring Georgia to generate an undetermined amount between 1,000 to 2,000 cfs in additional streamflows during “drought years.” *See* Fla. Pretrial Br. at 37 (describing Florida’s proposed remedy). This request is unsupportable. The cuts contemplated by these consumption caps are so draconian they that exceeded Georgia’s total consumptive use as previously calculated by Florida’s own experts. For example, in his report, Dr. Sunding proposed a 2,000 cfs scenario

that required at least a 546 cfs reduction in M&I usage—an amount that exceeded the 500 cfs estimate of Georgia’s total M&I consumptive use presented by one of Florida’s expert hydrologists, Dr. Samuel Flewelling. Tr. 2766:8-23 (Sunding); FX-801, at 2 (Sunding Report); FX-786, at 3 (Flewelling Report); Sunding Trial Demo. 3. Similarly, in his direct testimony, Dr. Sunding’s 2,000 cfs scenario contemplates a **1,685 cfs** increase in streamflow from reductions in Georgia’s agricultural water use, even though another of Florida’s hydrologists, Dr. Langseth, testified that eliminating all agricultural pumping from surface water and the Upper Floridan Aquifer would only lead to a peak monthly streamflow increase of 1,252 cfs. Sunding Direct, at 44, Table 4 (2,000 cfs scenario); Tr. 2775:13-21 (Sunding); Panday Direct, ¶¶ 107-108.

Between releasing their expert reports and submitting their pre-filed direct testimony, Florida’s experts significantly changed their assumptions, apparently in an effort to make Florida’s drastic remedy scenarios appear at least theoretically possible. Dr. Sunding, for example, reduced the M&I cuts in his 2,000 cfs scenario by 42%. Tr. 2770:23-2772:11 (Sunding) (admitting his M&I cuts “did go down by -- I’ll accept your number, 42 percent”). When it became clear that the streamflow benefits from cuts to agricultural irrigation under Dr. Sunding’s 2,000 cfs were simply not possible under the original findings of Florida’s expert hydrologists, those hydrologic experts ***changed their opinions*** to allow Dr. Sunding to claim a larger benefit to streamflow. Tr. 2843:20-2844:21 (Sunding) (“Q. The first time you offered any numbers for streamflow based on a .6 connectivity factor was in your direct testimony that we’re looking at now which we received on October 14, 2016. Correct? A. That’s the first time I modeled that numerically, yes.”).

These are dramatic changes. But even using the new assumptions presented by Florida’s experts at trial, Florida’s remedy scenarios would still require extraordinary reductions in

Georgia's water use. Dr. Sunding admitted that his scenarios would *each* require more severe cuts to Georgia's water use than the remedy Florida originally requested in its Complaint: an order capping Georgia's depletive water uses at 1992 levels. Tr. 2781:22-2782:8 (Sunding); Compl., at 21 (Prayer for Relief). Under Dr. Sunding's own assumptions, his 2,000 cfs remedy scenario would eliminate up to **73 percent** of all irrigation water use during drought years. Stavins Direct, ¶ 134. And Dr. Sunding admitted that his 2,000 cfs scenario would still require Georgia to eliminate **60 percent** of Georgia's total M&I consumptive use, as calculated by Dr. Flewelling. Tr. 2773:3-5 (Sunding).

Dr. Hornberger proposed a similarly draconian remedial scenario at trial. Florida labels this remedy scenario "very conservative," but in truth, it requires reducing Georgia's total agricultural irrigation by **50%**, eliminating *half* of all man-made small impoundments, and eliminating *all* interbasin transfers. See Tr. 1969:9-14 (Hornberger); see also Allan Direct, ¶ 73 (referring to Dr. Hornberger's "very conservative" remedy scenarios). Several of Florida's ecological experts used this "very conservative" remedy scenario in their modeling efforts; significantly, they still show minimal to no benefit from these draconian cuts.

When the correct hydrological assumptions from Georgia's witnesses are used, it is clear that Florida's proposed remedy scenarios are not only draconian but are also impossible for Georgia to achieve. Dr. Zeng testified at length at trial regarding Georgia's consumptive use estimates. Those estimates were developed in the regular course of business at EPD and are based on over a decade of work and thousands of hours of analysis and modeling. Zeng Direct, ¶ 5. As Dr. Zeng explained, Georgia's total annual average consumptive use has never exceeded **900 cfs**, or about 4-5 percent of the amount of water crossing the state-line. Tr. 3303:17-3304:2 (Zeng). A cut of 1,500 cfs is not a feasible remedy scenario either, because it is over **80%** of

Georgia’s consumptive use. Tr. 3310:20-3311:14 (Zeng). As noted above, Georgia’s total consumptive use has *never* reached 2,000 cfs, and has only exceeded 1,400 cfs on rare occasions, during extreme drought conditions. See Zeng Direct, ¶¶ 5, 22-23. Florida’s 2,000 cfs remedy scenario simply “cannot be physically accomplished because that number is more than [Georgia’s] total consumptive use.” Tr. 3310:13-19 (Zeng). Indeed, using hydrologic assumptions from Georgia’s experts, Dr. Stavins concluded that Dr. Sunding’s 2,000 cfs scenario would require the *complete elimination of agricultural water use in Georgia*. Stavins Direct, ¶ 134. Likewise, Peter Mayer, Georgia’s M&I expert, concluded that Dr. Sunding’s proposed cuts to M&I water usage would *completely eliminate and even exceed Georgia’s 2011 total M&I consumptive use in three months* of the year and would reduce consumptive use in remaining months “at a draconian level.” Mayer Direct, ¶ 127; Tr. 3553:20-3554:1 (Mayer).

C. Florida’s Proposed Remedies Would Impose Extraordinary Costs On Georgia

Notwithstanding the factual impossibility of his remedy scenarios, Dr. Sunding proposes a suite of “conservation measures” that he says could generate the streamflow increases Florida seeks. But the costs of these measures to Georgia would be extraordinary. Dr. Stavins concluded that just three of the measures in Dr. Sunding’s 2,000 cfs scenario—cutting outdoor water use by 50%, reducing irrigation for row crops, and municipal leak abatement—would result in direct costs to Georgia of *over \$800 million* every year those measures are implemented. Tr. 4512:20-4514:4 (Stavins); Stavins Direct, at 38, 55-58. On top of that, Dr. Stavins estimated that the cuts to row crop irrigation water use proposed by Dr. Sunding alone would severely impact Georgia’s economy, reducing economic activity by *\$322 million* annually, and eliminating over *4,000 jobs* in agricultural and related sectors. Stavins Direct, ¶ 90. Mr. Mayer testified that another of Dr. Sunding’s measures, eliminating interbasin

transfers, would require development of substantial new wastewater infrastructure and would “cost in the *hundreds of millions if not billions* of dollars.” Tr. 3545:10-15 (emphasis added) (Mayer).

While they would impose staggering costs on Georgia, Florida’s remedy scenarios still would not generate nearly the amount of water that Florida asserts. Dr. Sunding estimates that his cuts to outdoor water use and leak abatement measures would generate 249 cfs in streamflow benefits. Sunding Direct, at 44, Table 4. Georgia’s analysis, however, shows that those extremely expensive measures would add at most only 134 cfs in streamflows. Stavins Direct, at 38, 56. Similarly, while Dr. Sunding estimates that his cuts to agricultural water use scenarios will increase peak summer streamflows by 1,685 cfs, Georgia’s analysis shows that the *complete elimination of all irrigation* in dry years would only generate 961 cfs in additional streamflows. Sunding Direct, at 44, Table 4; Tr. 2770:13-21 (Sunding); Panday Direct, ¶ 100. Moreover, as detailed further in Section I above, even these additional streamflows would not materially increase flows at the state line in peak months in dry years, given how the Corps manages the integrated system of reservoirs in the Basin. For example, Florida’s expert hydrologist, Dr. Hornberger, found that *even a 50% reduction in Georgia’s water use would result in zero increase to flows at the state line*. Tr. 1935:7-23 (Hornberger); *see also* Bedient Direct, ¶¶ 81, 86 (finding even a 1,000 cfs increase in inflow to Lake Seminole would increase outflow from Woodruff Dam by a mere 30 cfs).

D. Florida Failed To Provide Clear And Convincing Evidence That Its Proposed Remedies Would Redress Its Alleged Harms

Florida produced no evidence at trial, much less of the clear and convincing sort, showing that the flow increases Florida requests will redress the ecological harms of which it complains. Florida’s failure to articulate the amount of flows that would remedy its alleged harms has a

history dating back well over a decade, and that failure continued at trial. Dr. Carol Couch, Georgia's EPD Director from 2003 to 2009, testified that although she had asked Florida representatives "repeatedly" to identify a level of flow that would be necessary to protect the ecology of the Apalachicola Bay or Floodplain, she "never received an answer." Tr. 3147:14-20 (Couch). Similarly, Florida's ecologist, Dr. Glibert, testified that she has not done any analysis that would permit her to identify minimum levels of flow that would be required for the ecosystem of the Bay not to be in peril. Tr. 1824:7-12 (Glibert). Another of Florida's experts, Dr. Allan, created metrics that purport to identify flows at which harms occur, but he acknowledged that he does not even know if it is possible to deliver the amount of water at the times specified in the particular areas of the river according to his metrics. Tr. 551:19-552:4 (Allan). None of Florida's witnesses purported to articulate the specific amounts of flow they believe necessary to remedy the ecological harm Florida alleges it has suffered in the Apalachicola River and Bay.

Instead, Florida's ecological experts have reviewed Dr. Hornberger's "Remedy Scenario," (which was sometimes called the "50% Cut Remedy" during trial because it required elimination of 50% of irrigation, half of man-made small impoundments, and all interbasin transfers). Georgia's experts analyzed the potential impact of Dr. Sunding's 1,000 cfs scenario (which assumes delivery of 1,000 cfs of peak additional freshwater flow to the system). Yet, both Florida's and Georgia's expert modeling demonstrates that *neither* remedy scenario has any meaningful impact on salinity levels in the Bay, or on the ecology of the Bay, River or Floodplain.

Dr. Greenblatt, Florida's salinity modeler, modeled the effect of Dr. Hornberger's Remedy Scenario on salinity levels in the Bay. She shows on her modeling maps and she

testified at trial that had such a remedy been in place in 2012, the year of the oyster collapse, it would have resulted in changes in salinity throughout the Bay of *less than 1 part per thousand (ppt)*, at almost all locations in the Bay, including at the oyster bars of Cat Point and Dry Bar. Greenblatt Direct, at Att. 1 (salinity modeling maps); Tr. 1775:7-1776:7, 1778:21-1779:1 (Greenblatt). Georgia's salinity expert, Dr. William McAnally, modeled salinity changes in the Bay resulting from Dr. Sunding's 1,000 cfs scenario; he found that scenario would result in similarly *de minimis* changes in salinity in the drought year of 2011. McAnally Direct, at 8-9; Tr. 4120:15-4121:14 (McAnally). Another of Florida's oyster experts, Dr. White, found that applying Dr. Hornberger's remedy scenario would have increased oyster biomass at the Cat Point oyster bar by *at most 1.2%* from 2007 through 2013. Tr. 1724:24-1725:4 (White). Since the oyster population declined by more than 80% in 2012, it is clear that an additional 1,000 cfs would have had no impact on oyster population under Dr. White's analysis. JX-96 at 4. As explained by Georgia's ecologist, Dr. Menzie, these minor changes in salinity are "within the range of natural variability" to which organisms have adapted in the Bay, Menzie Direct, ¶ 7, and therefore would "essentially be unnoticeable." Tr. 4240:14-23 (Menzie). Even increasing streamflows by 1,000 cfs would not "have any effects at all on the ecology of the Bay." Tr. 4240:6-13 (Menzie). Florida has no evidence to contradict that determination.

The analysis of Dr. Allan, Florida's riverine expert, demonstrates that the impacts of Dr. Hornberger's Remedy Scenario would be similarly negligible in the Apalachicola River. He found that applying Dr. Hornberger's Remedy Scenario would improve the number of what he calls "days of harm" by a miniscule amount; often less than 2.5% of days stretching over the 16-year period he analyzed. Allan Demo. 4; Tr. 551:19-552:4 (Allan). For some of Dr. Allan's metrics, the remedy resulted in no "biologically significant" impact whatsoever. Tr. 409:9-410:3

(discussing fish metrics for Kennedy and Mary sloughs). For others, the remedy actually resulted in *more modeled harm* than if there had been no remedy at all. *See* Tr. 407:23-408:8 (Allan). When asked whether this draconian remedy scenario would actually improve the populations of the species he analyzed, Dr. Allan confessed: “I don’t know.” Tr. 546:9-13 (Allan). Dr. Menzie’s analysis confirms that Florida’s proposed remedies would provide no meaningful ecological benefits to the Apalachicola River and floodplain. When asked whether “the 50 percent cut remedy or the 1,000 cfs additional flow scenario have any effect on the ecology of the bay, the river, or the floodplain,” Dr. Menzie clearly testified: “No.” Tr. 4242:24-4243:4 (Menzie).

If put in place, none of the remedies suggested by Florida would have any meaningful effect on the ecology of the system sought to be remedied. While the benefits of Florida’s proposed remedies are (at best) speculative and uncertain, the hundreds of millions to billions of dollars in costs that those remedies would impose on Georgia are certain and substantial. In such circumstances, Florida’s request for an equitable apportionment must be denied.

CONCLUSION

The evidence shows that Florida cannot obtain adequate relief without a change to the Corps’ reservoir operations in the ACF Basin because the Corps controls state-line flows into Florida. Without the United States as a party, this action must be dismissed.

Florida also failed to prove its case on the merits. The evidence plainly shows that Florida does not have clear and convincing evidence that (1) it is suffering real and substantial ecological injury caused by Georgia’s water use; (2) Georgia’s water use is inequitable; or (3) its injuries would be redressed by a remedy that is realistically attainable or that is justified in light of the substantial costs it would impose on Georgia. Accordingly, Florida’s request for an equitable apportionment must be denied.

Respectfully submitted,

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No. 142, Original

In The
Supreme Court of the United States

STATE OF FLORIDA,

Plaintiff,

v.

STATE OF GEORGIA,

Defendant.

Before the Special Master

Hon. Ralph I. Lancaster

CERTIFICATE OF SERVICE

This is to certify that the STATE OF GEORGIA'S POST-TRIAL BRIEF has been served on this 15th day of December 2016, in the manner specified below:

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