No. 142, Original

In the
Supreme Court of the United States

STATE OF FLORIDA,

Plaintiff,

v.

STATE OF GEORGIA,

Defendant.

STATE OF GEORGIA'S SUPPLEMENTAL BRIEF

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INTRODUCTION

In remanding this case, a divided Supreme Court was unanimous in one key respect: Florida cannot prevail unless it "prove[s] by clear and convincing evidence that the benefits of an equitable apportionment decree substantially outweigh any harm that might result." Case Mgmt. Order ("CMO") No. 25, at 3 (citing *Colorado v. New Mexico*, 459 U.S. 176, 187 (1982) (*Colorado I*); *Florida v. Georgia*, 138 S. Ct. 2502, 2527 (2018)); *see Florida*, 138 S. Ct. at 2536 (Thomas, J., dissenting). Florida has not met that heavy burden. The potential benefits to Florida from its proposed cap are small and speculative, while the harms to established economies in Georgia are certain and severe. "Imposing an enormously high cost on one State so that another State can achieve a hollow victory is 'not the high equity that moves the conscience of the court in giving judgment between states.'" *Id.* at 2548 (quoting *Washington v. Oregon*, 297 U.S. 517, 523 (1936)). The Special Master should therefore recommend that Florida's request for an equitable apportionment be denied.

The record is clear that Florida's proposed cap would impose enormous costs on Georgia while yielding at most *de minimis* benefits to Florida. Florida's own expert estimated that a cap would cost Georgia more than $100 million each year it was implemented, and even that number is understated. In truth, the per-implementation costs would range from $335 million to well over a *billion* dollars, not including the one-time costs that Florida seeks to inflict on Georgia. Those costs dwarf the entire value of, and outweigh any potential benefits to, the Apalachicola Bay oyster industry—the only industry for which Florida offered evidence of specific harm. Even before its 2012

collapse, the oyster industry produced annual revenues of only $5-8 million. And even a draconian cap on Georgia would increase oyster biomass in the Bay by only 1.4% and generate (at most) another $40,000 per year.

Imposing such heavy costs on Georgia in an attempt to obtain minimal, if any, benefits for Florida would be particularly unjustified because Georgia uses an equitable amount of water in the Apalachicola-Chattahoochee-Flint ("ACF") Basin. Georgia accounts for 92% of the population, 99% of the economic production, and 96% of the employment in the ACF Basin. And Georgia uses ACF waters to support a population of more than 5 million and an economy that generates around $283 billion in Georgia's Gross Regional Product ("GRP") each year. Yet Georgia consumes only a small portion of available water in the ACF Basin: On average, Georgia uses only 2.4% of the water crossing the state line during non-drought years (*i.e.*, normal or wet years) and 6.1% during dry years. At all times, the vast majority of available water in the ACF Basin flows into Florida.

Because Georgia consumes only a small amount of ACF waters, imposing a cap on Georgia's use would not provide Florida materially more water at the times it purports to need it. Florida's proposed cap would not generate anywhere close to the 2,000 cfs in additional Flint River streamflow that Florida told the Supreme Court it could obtain. And even if Flint River flows did increase to some small extent, that extra water would not flow across the state line at the times and in the amounts necessary to redress Florida's alleged injuries. That is because the U.S. Army Corps of Engineers ("Corps") exerts an overriding influence on water flows in the ACF Basin through its operation of multiple dams and

reservoirs. Even if severe cutbacks were imposed on Georgia, the Corps has confirmed that it would not materially increase its releases from Woodruff Dam into Florida during drought operations or extreme low flows, but would instead use that water to refill its upstream reservoirs. And despite Florida's speculation to the contrary, the Corps' ability to store additional water upstream would not meaningfully shorten drought operations. The simple truth is that, given the Corps' operations and the relatively small amount of water that might be generated by a cap on Georgia, flows across the state line would be roughly the same with or without a cap during the drought conditions that are the exclusive focus of Florida's case.

Below, Georgia addresses the questions posed by the Special Master in CMO No. 25. In the final analysis, answering those questions yields a simple conclusion: Florida has not proven, by clear and convincing evidence or otherwise, that the potential benefits of its requested cap substantially outweigh the resulting harms. The evidence shows just the opposite: "If we contrast the *de minimis* benefits that Florida might receive from small amounts of additional water during nondroughts with the massive harms that Georgia would suffer if this Court cut its water use in half during droughts, it is clear who should prevail in this case." *Florida*, 138 S. Ct. at 2547 (Thomas, J., dissenting). The Special Master should reach the same conclusion that four Justices have already reached and recommend that the Court enter judgment for Georgia.

ARGUMENT

I. Florida Failed To Prove Harm And Causation.

Florida's alleged injuries are non-existent, speculative, or not caused by Georgia. As an initial matter, Florida presented no evidence of any injuries during non-drought years. Ga.'s Proposed Findings of Fact & Conclusions of Law ("SOF") ¶¶ 1-2; *see also* Report of the Special Master ("Report") at 63; Hornberger Direct, ¶¶ 32, 51-53; Tr. 2811:1-12 (Sunding). Instead, Florida focused its case exclusively on drought periods, alleging injuries in both the Apalachicola River and Bay. Florida failed to prove its case on either score. As to the River, Florida either failed to identify actual injury or tried to blame Georgia for harm caused by Corps activities. In the Bay, there is no clear and convincing evidence that Georgia's water use caused harm to the oyster (or any other) industry.

A. Florida Failed To Prove That Georgia Harmed The River.

Florida's allegations of harm in the River failed in two ways. First, Florida failed to prove any population-level harm to any species in the River. Second, to the extent it points to changes in the floodplain or isolated mussel die-offs, Florida failed to prove they were caused by Georgia as opposed to Corps activities or natural drought. *Florida*, 138 S. Ct. at 2514 (explaining that the plaintiff State must have "suffered a wrong through the action *of the other State*" (emphasis added)).

First, Florida tried to prove River harm through its expert Dr. Allan, whose analysis focused on a handful of species including mussels, sturgeon, and fish. But Allan admitted that he had no evidence of actual harm to any of those species. Allan "didn't do any study to determine whether [populations of endangered mussels] are increasing, decreasing, or

stable," Tr. 389:17-390:3, 390:14-18, 392:9-17, did not "have any information about changes in Gulf sturgeon population over any period of time," *id.* at 396:11-14, and had no "data that would indicate whether any fish species in the Apalachicola River is increasing or decreasing," *id.* at 395:2-10. Allan also offered no evidence of harm to any other species, such as birds, reptiles, amphibians, or mammals. *Id.* at 546:17-548:1; *see also* SOF ¶ 3.

Instead of evaluating actual harm, Allan created artificial metrics that defined "harm" as occurring whenever streamflow dropped below specific thresholds for a certain length of time during a specific time of year. Allan Direct, ¶ 34. That is not an accurate or reliable methodology for identifying real-world "harm." Allan admitted that his metrics are merely "a representation of the *probability* of harm under certain conditions," Tr. 458:21-459:11 (emphasis added); they are not evidence of *actual* changes in the health or number of any species in the ecosystem, *see id.* at 399:6-20 (admitting that his metrics "do not describe changes in mussel populations"); Menzie Direct, ¶¶ 153-54. Allan's metrics therefore cannot provide clear and convincing evidence that any harm actually occurred.

Allan's methodology also generates results that conflict with government data. The U.S. Fish and Wildlife Service ("USFWS") issued a Biological Opinion in 2016, which found that key mussel populations that Allan claimed were harmed were in fact "stable or improving" and, in suitable habitat, "common to abundant." SOF ¶ 4. USFWS estimated the population of that same mussel species was as high as 18.65 million, *id.*—well above its 2012 estimate of 1.14 million, JX-72, at 81. USFWS also characterized the "overall status" of the Gulf sturgeon as "roughly stable or slightly increasing." SOF ¶ 5; JX-168, at 3.

Second, Florida blames Georgia for lower water levels in the River, but the Corps—not Georgia—caused those lower river levels through congressionally authorized activities in the ACF. As Florida's own witnesses conceded, the Corps' construction of Woodruff Dam lowered water levels in the upper River by up to five feet. SOF ¶ 6. The Corps' dredging activities further lowered water levels by creating a deeper, wider channel throughout the River. SOF ¶ 7. Dredging also damaged the ecosystem because the Corps pumped the sand it removed from the River directly onto the floodplain forest, "kill[ing] everything that lived under it." SOF ¶ 8. These piles of dredged sand also clogged the tributaries and sloughs, thereby cutting off those waterways from the main stem of the River. *Id.*

Those changes had significant consequences. Swift Slough, a stream Florida highlighted at trial, formerly connected to the Apalachicola River at 4,500 cfs, but Corps-driven channel changes have resulted in it now connecting only at 5,600 cfs. SOF ¶ 9; *see also* Ga. Post-Trial Br. at 43; Ga. Post-Trial Resp. Br. at 47. Thus, as a result of the Corps' actions, it now takes an additional 1,100 cfs to connect Swift Slough, resulting in decreased floodplain inundation in that slough that has nothing to do with Georgia. Similarly, the Corps' channel deepening caused the very changes to the floodplain forest that Florida now claims were caused by Georgia's water use. SOF ¶ 10.

B. Florida Failed To Prove That Georgia Harmed The Bay.

Florida's evidence of harm to the Bay reduces solely to oysters; its attempt to prove broader harm cratered at trial. *See* Ga. Post-Trial Br. at 36-37; Ga. Post-Trial Resp. Br. at 39-40. But the evidence does not support Florida's allegation that Georgia caused the 2012

oyster collapse. Instead, other causal factors, such as Florida's poor resource management and natural low flows from drought, were the overriding causes.

Extreme oyster-harvesting pressures were a major cause of the 2012 collapse. SOF ¶ 11. In the two years prior to the collapse, Florida removed restrictions on oyster harvesting out of concern that oil from the Deepwater Horizon spill might reach the Bay and cause the fishery to be closed. SOF ¶ 12. Florida therefore adopted a "'use it or lose it' attitude" toward oyster harvesting in the Bay, JX-77, at FL-ACF-3386197, and allowed more oysters to be harvested in 2011 and 2012 than in any of the prior 25 years, SOF ¶ 12; *see also* Sutton Cross Demo. 6. Florida knew that such overharvesting harmed the oyster fishery; it told the federal government that "[h]arvesting pressures and practices were altered to increase fishing effort …, [which] led to overharvesting of illegal and sub-legal oysters further damaging an already stressed population." JX-77, at FL-ACF-3386187.

Florida's own data shows that fishing pressures were a key reason for the oyster decline. Georgia's oyster expert, Dr. Lipcius, analyzed data collected by the Florida Department of Agriculture and Consumer Services comparing pre-collapse (May 2008-July 2012) and post-collapse (October 2012-August 2014) oyster abundance at nine oyster bars in the Bay. Lipcius Direct, ¶¶ 39-40; *see also* SOF ¶ 13. That data shows that oyster density at heavily fished bars *dropped* by 78%, while oyster density at bars that were not heavily fished *rose* by 3-13%. SOF ¶ 13. That objective data further confirms that Florida's overharvesting significantly damaged oyster populations leading up to the 2012 collapse.

Although Florida now tries to blame Georgia's water use for the collapse of its oyster industry, prior studies by Florida fishery experts found no correlation between low river flows (whatever their cause) and oyster populations. At the request of Florida's governor, two University of Florida professors, Drs. Pine and Havens, conducted an exhaustive study to determine the cause of the oyster decline. GX-568; *see also* SOF ¶ 14. They ultimately concluded they "did not have a definitive cause and effect understanding of the linkages between environmental conditions and oyster populations," GX-1349, at 128:19-24, and had not found any "connection between oyster population dynamics and river flow" or "salinity," GX-1355, at 222:13-18, 223:19-225:5. *See also* SOF ¶ 14. Pine continued studying the issue (despite threats from Florida's legal team, *see* Ga. Post-Trial Br. at 24-25), and published a peer-reviewed journal article in 2015 that concluded:

> 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; *see also* SOF ¶ 15. Pine unequivocally rejected Florida's claim that "reduced freshwater inflows … caused [the] collapse," Tr. at 307:15-308:6, and testified that there is no "clear" or "convincing" evidence "of a connection between Apalachicola River flows and oyster mortality," *id.* at 291:14-292:14. *See also* SOF ¶ 16.

Even if there were clear evidence that reduced freshwater flows into the Bay increased salinity and contributed to the oyster decline, the primary cause of those reduced flows was *drought*—not Georgia's consumptive use. Florida's oyster expert admitted that the "commercial harvest and natural abundance of oysters in Apalachicola Bay would have

declined in 2012 as a result of natural drought and natural reductions in freshwater discharge from the Apalachicola River," even if Georgia had used no water at all. Kimbro Direct, ¶ 101. That is because Georgia's water use is too small to meaningfully affect Bay salinity; natural drought plays a far larger role than Georgia's water use ever could.

Modeling by Florida's salinity expert, Dr. Greenblatt, confirms that Georgia's water use does not meaningfully affect salinity in the Apalachicola Bay. She ran a model to determine how Bay salinity would change if the Court were to cap (or even entirely eliminate) Georgia's water use. Her results show unequivocally that Georgia's water use has only a *de minimis* effect on Bay salinity. For 2012, the year of the oyster collapse, her model showed that cutting 50% of Georgia's agricultural water use (in conjunction with other cuts) would not have changed salinity by more than 1 ppt for the vast majority of the Bay. SOF ¶ 18. Her model also showed that even eliminating *all* of Georgia's water consumption would rarely change salinity in most of the Bay by more than 3 ppt. *Id.* Such small changes would not materially affect oyster populations or oyster-snail predation: Florida's own expert found that reductions in salinity of 20 ppt or more are required for "significant" reductions in oyster predation. SOF ¶ 17. And there is no evidence that Georgia's water use ever increased (or could increase) Bay salinity by 20 ppt.[1]

[1] CMO No. 25 asked the parties to address three other questions concerning salinity in the Bay. First, the parties did not submit evidence on the effect of Sikes Cut. Second, the Corps' dredging and dam-construction activities have significantly altered the Apalachicola *River*, but Georgia has not argued they affected salinity in the *Bay*. Third, Florida's ditching and draining of swamp areas like Tate's Hell have affected Bay salinity, including on the oyster bars. Tr. 4077:16-4078:6 (McAnally); Menzie Direct, ¶ 85.

II. Georgia's Use Of Flint River Water Is Equitable.

Georgia consumes a reasonable amount of water from the Flint River, and it puts that water to highly productive uses. Moreover, during all hydrologic conditions, the vast majority of available water in the ACF Basin flows across the state line into Florida.

A. Georgia Consumes Only A Small Fraction Of ACF Streamflow.

Georgia consumes only a small fraction of total streamflow in the ACF. Basin-wide, Georgia's total annual consumptive use (*i.e.*, the streamflow depletions caused by all municipal, industrial, and agricultural withdrawals) amounts to just 2.4% of state-line flow in a non-drought year, and only 6.1% of state-line flow in a dry year. SOF ¶ 19. Florida thus receives the vast majority—more than 93%—of total annual Basin streamflow even during drought years. *Id.*

Georgia's consumption from the Flint River has an even smaller effect on flow from Georgia to Florida. In non-drought years, Georgia uses an annual average of 282 cfs from the Flint River, or 1.2% of water flowing across the state line into Florida (22,812 cfs). SOF ¶ 20. In dry years, Georgia uses an average of 425 cfs from the Flint, or only 3.4% of state-line flow in those years (12,424 cfs). *Id.*[2]

Even considering only the summer months—when agricultural water use typically peaks—Georgia's consumption from the Flint is reasonable. Zeng Direct, ¶¶ 20-21. In May-September of non-drought years, Georgia's Flint River water use averages 425 cfs,

[2] The "Flint" numbers technically reflect Georgia's total agricultural use in the ACF Basin, which is 94% from the Flint and 6% from the Chattahoochee. JX-129. Thus, actual use from the Flint is slightly lower than the numbers reported here.

or 2.4% of state-line flow (17,913 cfs). SOF ¶ 21. In the same period during dry years, Georgia's Flint River water use averages 804 cfs, or 10.2% of state-line flow (7,892 cfs). *Id.* Thus, even considering only the dry months of dry years, Florida still receives nearly 10 times the water Georgia consumes from the Flint.

Indeed, Florida received the great majority of ACF waters even when Georgia's water use was at an all-time high. Georgia's highest ever consumptive use from the Flint River in a single month was 1,407 cfs during extreme drought conditions in July 2012. SOF ¶ 23. At that time—as during all droughts—the Corps guaranteed Florida a flow of 5,000 cfs into the Apalachicola River regardless of basin inflow or upstream use. U.S. Post-Trial Br. 12-13; Zeng Direct, ¶¶ 90-105; *see also* SOF ¶ 47. Thus, even during the worst drought month on record, Florida received more than 3.5 times the total amount of water Georgia consumed from the Flint.

B. Georgia Uses Flint River Water For Highly Beneficial Purposes.

Georgia's water use from the Flint is eminently reasonable in light of its overwhelming share of the population, economic output, and land area in the ACF Basin. Georgia accounts for 92% of the population and 99% of the economic output in the ACF Basin. SOF ¶ 31. Georgia's population in the ACF Basin is 56 times larger than Florida's, and its GRP is 129 times greater, generating $283 billion in GRP each year. *Id.*; Stavins Direct, ¶ 30. Georgia accounts for 96% of the employment in the ACF Basin, with more than 80 times the employees and 148 times the total labor income of Florida. SOF ¶ 31; Mayer Direct, ¶ 28; Stavins Direct, at p. 16 (Demo. 7). And Georgia's land area in the

ACF Basin is five times as large as Florida's. SOF ¶ 31. By any measure, Georgia's total water use in the ACF Basin is therefore "disproportionately small." Stavins Direct, ¶ 28.

Georgia also puts the water it consumes to highly beneficial uses, supporting billions of dollars in economic output. Flint River water is critical to supporting Georgia's agricultural industry in the ACF Basin, which accounts for annual revenues of approximately $4.7 billion. SOF ¶¶ 33-34. Row crops and other agricultural commodities are also key inputs to businesses that contribute an additional $687 million to Georgia's GRP. SOF ¶ 33. Other ACF waters provide daily water supply to more than 5 million Georgians, many of whom live around Atlanta (the ninth largest metropolitan area in the country). SOF ¶ 32. Florida, in contrast, engages in only minimal economic activity in the ACF Basin. Stavins Direct, ¶ 31; *id.* at pp. 16, 18 (Demos. 7, 8). In particular, even before the 2012 collapse, the oyster industry in Apalachicola Bay generated only $5-8 million in revenue per year, SOF ¶ 93, a small fraction of the billions in revenue generated by Georgia's agricultural industry, SOF ¶¶ 33-34.

C. Georgia's Calculations Are Based On A Highly Reliable Methodology.

Georgia's calculations of its total consumptive use are accurate and based on a reliable, well-established methodology. SOF ¶ 24. Georgia relies on real-world data and thousands of field measurements systematically collected over decades by "state agencies, state universities, contractors, and regional and local water planning districts." Zeng Direct, ¶ 5. Multiple federal agencies—including the Corps, U.S. Geological Survey ("USGS"), and USFWS—have reviewed and accepted Georgia's water-use data and streamflow-depletion calculations. SOF ¶ 24.

In contrast to Georgia's well-accepted figures, Florida has offered consumptive-use estimates that far exceed the actual amount of water that Georgia uses. According to Florida, Georgia's peak streamflow depletions in dry years exceed 5,000 cfs. Hornberger Direct, ¶ 95 (Table 8). In truth, Georgia's consumptive use is nowhere close to that. Florida's estimate of 5,000 cfs inflates Georgia's consumptive use by *10 times* in a non-drought year, more than *5 times* in a dry year, and *3 times* what Georgia consumed in its single-highest month ever. *See* Tr. 3308:1-3309:9 (Zeng). Tellingly, none of the federal agencies that have accepted and relied on Georgia's water-use data have ever suggested that Georgia's calculations are understated by thousands of cfs, as Florida now alleges. *Id.* at 3312:18-3313:2.

In contrast to Georgia's calculations—which were developed in the ordinary course and are based on decades of data collection and analysis—Florida's grossly inflated estimates were developed solely for purposes of this litigation and are the product of a wholly unreliable methodology. Florida tried to reverse engineer Georgia's consumptive use by simulating purported "unimpacted" flow conditions and comparing those numbers to historical flow levels, positing that the difference between modeled and recorded flows must reflect Georgia's consumption. *See* SOF ¶ 25. That method of modeling water use is unreliable and ignores the real-world data on which Georgia's calculations are based. Bedient Direct, ¶¶ 215-17; Tr. 2007:20-25, 2013:10-2015:14 (Hornberger). It also relies on models that, to Georgia's knowledge, have never before been used by any state or federal agency to estimate water use in the ACF Basin or elsewhere.

Florida's models are also fraught with significant error and bias, which cause them to artificially exaggerate Georgia's water use by thousands of cfs. SOF ¶¶ 25-29. Dr. Hornberger, Florida's hydrology expert, admitted that his model contains inherent error of *2,000 cfs* to *6,000 cfs*. SOF ¶ 26. Put differently, the margin of error in his model is so large that it exceeds the total amount of streamflow depletions he attributes to Georgia. Modeling by another Florida expert, Dr. Lettenmaier, fares even worse: his suffers from inherent error of as much as *10,000 cfs*—more than *twice* the peak streamflow depletions he attributes to Georgia. SOF ¶ 28. These inherent errors are even greater for dry and drought years, Bedient Direct, ¶¶ 216, 230-44, which causes Florida to overstate Georgia's water use even more in the very years that are the focus of Florida's case. Given the substantial inherent error and bias in Florida's models, they are "completely unreliable" for estimating Georgia's water use. *Id.* at ¶¶ 217, 227; *see also* SOF ¶ 29.

III. Florida Greatly Overstates The Extent To Which A Cap On Georgia's Water Use Might Increase Streamflow In The Flint River.

These exaggerated estimates of Georgia's consumptive use led Florida to overstate significantly the extent to which a cap on Georgia could increase streamflow. Dr. David Sunding—an economist who is not a qualified expert in surface-water or groundwater hydrology, Tr. 2847:2-2848:12 (Sunding)—claimed that Georgia could institute various conservation measures that would increase streamflow by 2,000, 1,500, or 1,000 cfs in the peak summer months of drought years. Sunding Direct, at pp. 44-45 (Tables 4-6). The Supreme Court referred to that testimony in remanding this case, but noted that Georgia disputed those estimates, that Special Master Lancaster had not validated them, and that

the Court itself was reserving judgment. *Florida*, 138 S. Ct. at 2520. For a host of reasons, Sunding's estimates are inaccurate, unreliable, and cannot justify a cap on Georgia.

To begin, Sunding's baselines need adjustment. A substantial portion of Sunding's 2,000, 1,500, and 1,000 cfs scenarios required reductions in municipal and industrial ("M&I") water use on the Chattahoochee River. Sunding Direct, at pp. 44-45 (Tables 4-6). But the Special Master asked the parties to focus on potential increases in streamflow on the Flint, CMO No. 25, at 4, and the Supreme Court focused its remand on the Flint. So the accurate starting points for evaluating Sunding's scenarios are the increases he believes could be generated on the Flint: 1,687 cfs, 1,251 cfs, and 834 cfs, respectively.[3]

Even those revised numbers are greatly overstated. As an initial matter, Sunding's scenarios are facially implausible because they exceed or approach Georgia's *total* consumptive use on the Flint River. As explained, Georgia's average consumptive use from the Flint in the summer of dry years (May-September) is only 804 cfs, and its highest *ever* monthly use was 1,407 cfs during extreme drought conditions in July 2012. *See supra* at 11. It therefore would be physically impossible for Georgia to generate 1,687 cfs in additional streamflow in the Flint. SOF ¶ 36. And even attempting to achieve Sunding's lower scenarios would require completely eliminating nearly *all* agricultural irrigation in ACF Georgia, *id.*; Tr. 3310:20-3311:14 (Zeng)—a devastating result for Georgia's farmers that would cost hundreds of millions of dollars, Stavins Direct, ¶¶ 136-37. Sunding's

[3] Lest there be any doubt, Sunding also significantly overstated the streamflow increases that would result from his M&I conservation measures. SOF ¶ 44. Those estimates would need correction if the Court were to consider those measures.

streamflow-savings estimates are so excessive that they not only exceed *Georgia's* calculations of its Flint water use, but also exceed the savings that *Florida's* groundwater hydrologist calculated would be generated by eliminating all agricultural use from hydrologically connected sources. SOF ¶ 36.

Sunding's calculations are also replete with methodological errors that cause him to drastically overstate the impact of his proposed cuts. *First*, Sunding overstated irrigated acreage in ACF Georgia by more than 35%. Sunding based his estimates on 793,613 irrigated acres in 2011, but in reality any streamflow-benefit calculations should have been based on only 582,516 irrigated acres. SOF ¶ 37. Sunding's estimates are inflated because he erroneously included acres irrigated by deeper, disconnected aquifers. SOF ¶ 38. As Georgia's expert, Dr. Panday, explained, the streamflow impact of pumping from aquifers deeper than the Upper Floridan Aquifer ("UFA") is negligible because they are not hydrologically connected to the Flint, so both he and other experts excluded those deeper aquifers from streamflow-impact calculations. *Id.* Indeed, Sunding himself elsewhere concedes that "lower aquifers do not connect directly to the Flint River or its tributaries in a large portion of the Flint basin" which is why he suggested that Georgia could increase streamflow in the Flint by "shift[ing] to deeper groundwater irrigation sources that do not affect Apalachicola River streamflows." Sunding Direct, ¶ 86.

Second, Sunding overstates the impact of groundwater pumping on streamflow by using an inflated groundwater-impact factor. SOF ¶ 39. Groundwater irrigation in the ACF Basin does not have an immediate, 1-to-1 impact on streamflow; instead, the impact is distributed over time and depends on a number of variables. Panday Direct, ¶ 16.

Georgia's groundwater expert testified that 0.4 is the appropriate impact factor—meaning that for every 100 cfs pumped from the UFA, streamflow is reduced by about 40 cfs on an average annual basis. *Id*. at ¶ 86. Florida's groundwater expert agreed with that conclusion, Langseth Dep. Tr. 356:12-19, and Sunding relied solely on a 0.43 impact factor in his expert report, *see* Sunding Direct, ¶ 48. In his direct testimony, however, Sunding for the first time applied a 0.6 impact factor, which was derived from a 1990s-era model that "is now out-of-date and no longer reflects the USGS's best understanding of the UFA and groundwater pumping distribution." Panday Direct, ¶¶ 6, 88. The 0.4 factor, in contrast, comes from the USGS's Jones & Torak Model (2006), is "based on more accurate data," and is the best available tool for modeling stream-aquifer interactions. *Id*.; *see* SOF ¶ 39. Sunding gave no reasoned explanation for why he changed his connectivity factor to 0.6, and doing so wrongfully inflated his streamflow-benefit estimates. *See* Sunding Direct, at pp. 44-45 (Tables 4-6); Tr. 2843:20-2844:21.[4]

Far from generating additional streamflow of up to 1,687 cfs as Sunding projected, capping Georgia's agricultural water use would only minimally increase Flint River

[4] Sunding's analysis errs in other ways, too. He erred in converting annual-average-streamflow data to monthly streamflow estimates by using an incorrect 2.28 "monthly conversion factor." SOF ¶ 40. Monthly conversion factors can be used by hydrologists to derive monthly streamflow impact from annual data, but they are only accurate if the monthly data used to calculate the conversion factor is the same data used to generate the groundwater model results. Panday Direct, ¶ 94. Florida did not do that, and as a result, Sunding's conversion factor is greatly overstated. *Id.* ¶¶ 93-97. Nor does any evidence support the purported streamflow increases Sunding claims would stem from reduced farm-pond evaporation (182-279 cfs) because those estimates were derived entirely from the analysis of a separate expert who did not testify at trial and whose testimony was not admitted into evidence. SOF ¶ 43.

flows—even in the driest months of the driest years. For example, imposing a 30% cap on Georgia's average peak monthly use on the Flint River during dry years (956 cfs in July) would result in only 287 cfs in average additional flow. And cutting Georgia's highest peak consumptive use ever recorded (1,407 cfs on one occasion during extreme drought) by 30% would yield only 422 cfs in additional Flint River flow. SOF ¶ 41. Even those cuts would not result in an immediate flow increase during the summer because there is a time lag of many months between when pumping stops and any corresponding increase in streamflow is realized. SOF ¶ 42.

In sum, Sunding's estimates of how much additional streamflow could be generated by his proposed conservation measures are unreliable and significantly overstated. SOF ¶ 35. The Special Master should not adopt those error-riddled estimates.

IV. A Cap On Georgia Would Not Meaningfully Increase Flows Into Florida.

A cap on Georgia's water consumption would be futile in any event because even drastic cuts would not meaningfully increase state-line flows during the drought conditions that are the focus of Florida's case. As the United States has repeatedly confirmed, the Corps' releases of water into Florida during drought operations or extreme low flows (*i.e.*, basin inflow below 5,000 cfs) would remain at or around 5,000 cfs "with or without a consumption cap" on Georgia. U.S. Post-Trial Br. 17-18; *see also* SOF ¶ 47. Likewise, Florida would not meaningfully benefit during non-drought operations from extra "pass-through" flows, which would be "rare and unpredictable" during actual drought. Bedient Direct, ¶ 58; *see also* SOF ¶¶ 55-56. And contrary to the majority's and Florida's speculation, a cap on Georgia would not materially shorten drought operations. SOF ¶ 58.

Because Florida cannot obtain meaningful flow increases under the Corps' *existing* reservoir operations, Florida's case now hinges on the possibility of the Corps adopting hypothetical "reasonable modifications" to its Master Manual. *See Florida*, 138 S. Ct. at 2527. But any such hypothetical changes cannot justify relief because they are speculative and would require administrative action by a third-party not bound by this proceeding.

A. A Cap On Georgia Would Not Materially Increase Flows Into Florida During Drought Operations Or Extreme Low Flows.

Even if inflows to Lake Seminole from the Flint River increased by as much as 1,687 cfs—an amount that far exceeds Georgia's total consumption from the Flint—the Corps would not materially increase its releases from Woodruff Dam into Florida during drought operations or extreme low flows. The Corps itself has confirmed this fact. The Corps has repeatedly told the Court that "Apalachicola River flows would be very similar with or without a consumption cap until enough water is stored to return the system to normal operations." U.S. Post-Trial Br. 17-18; *see also* SOF ¶¶ 45-46. Instead of passing that extra water through to Florida, the Corps "will 'offset' additional basin inflow from the Flint River by storing more water on the Chattahoochee River" and "maintaining flow into Florida of roughly 5,000 cfs." U.S. Post-Trial Br. 12-13; U.S. Amicus Br. 18, 23; *see also* SOF ¶ 47.[5]

The hydrologic data confirms that, during drought, the Corps offsets flows on the Flint River as high as 2,000 cfs. For example, once the Corps began drought operations in

[5] For further discussion, *see* U.S. Post-Trial Br. 3-12; U.S. Amicus Br. 4-12; Ga.'s Reply Br. 5-9, 38-40; Bedient Direct, ¶¶ 14-59; Tr. 3332:6-3338:7 (Zeng).

May 2012, inflows to Lake Seminole from the Flint River increased on multiple occasions by up to 2,000 cfs (as a result of natural variations in rainfall and streamflow), but the Corps did not pass that extra water through to Florida. SOF ¶ 45; Bedient Direct, ¶¶ 145-47; Tr. 3340:24-3343:19 (Zeng). Rather, as Georgia demonstrated at trial, the Corps offset those extra flows by releasing less from its upstream reservoirs to maintain flows into Florida of roughly 5,000 cfs. *See id.*; Bedient Direct, at p. 63 (Demo. 41); *see also* SOF ¶¶ 45-47. This evidence is so clear that even Florida's experts conceded that up to 2,000 cfs in extra Flint flows are effectively held back by the Corps during drought. SOF ¶ 45; Tr. 1982:21-1985:10 (Hornberger) (acknowledging "no corresponding increase in state line flows" from a 2,000-cfs increase in Flint flows); Tr. 2512:22-2514:10 (Shanahan) (same).

Both parties' reservoir modeling further shows that, during drought, additional inflows to Lake Seminole would not result in increased flows in the Apalachicola because of Corps protocols. Georgia used HEC-ResSim, "the Corps' official model for reservoir simulation … for the ACF Basin," to model various cap scenarios. Bedient Direct, ¶¶ 60-62. Those simulations showed that even severe cutbacks on Georgia's peak water use "would provide little to no increase in the amount of water crossing the state line, especially during low flow months of dry and drought years." *Id.*; *see also id.* at ¶ 82; SOF ¶¶ 45-50.

For example, in a year matching 2007 drought conditions, a 30% cap on Georgia's highest-ever water use (from both the Chattahoochee and Flint) would increase flows into Florida by *0 cfs* in June-September, and by an average of 183 cfs, or just 2.6%, in May. SOF ¶ 51. Likewise, in a drought year matching 2011 conditions, a 30% cap on peak use would increase flows into Florida by *0 cfs* in all of August-November, and by an average

of 182 cfs, or just 2.6%, in May-July. SOF ¶ 53.[6] These negligible increases would provide Florida no material benefit while imposing heavy costs on Georgia.

Even a more extreme scenario—cutting Georgia's total consumption (from both the Chattahoochee and Flint) by nearly 50%—would generate no material flow increase to Florida during drought. SOF ¶¶ 51, 53. In a year matching 2007 hydrologic conditions, a nearly 50% cap on peak use would increase flows into Florida by *0 cfs* in all of June-September and just 183 cfs, or 2.6% in May. SOF ¶¶ 51. And in a year matching 2011 conditions, Florida would receive virtually no increase during a prolonged 7-month stretch of drought—*0 cfs* in September-November, and an average of just 189 cfs in May-August, a mere 2.9% flow increase that would provide no ecological benefit to Florida. SOF ¶ 53.

A cap on Georgia's consumption from only the Flint River would have even less of an impact. In a year matching 2007 conditions, a 30% Flint River cap would increase flows into Florida by *0 cfs* during all of May-September. SOF ¶ 50. In a year matching 2011 conditions, a 30% Flint River cap would increase state-line flows by *0 cfs* in August-November and an average of 176 cfs, or just 2.5%, in May-July. GX-986. Looking beyond only the extreme drought years to include *all* dry years over the entire 37-year hydrologic record, a 30% Flint River cap would increase state-line flows in the May-September months by an average of 218 cfs, or just 2.9%. SOF ¶ 50. These results show that even

[6] Even this potential increase is overstated for two reasons. First, the caps are modeled as fixed-percentage reductions to Georgia's *peak* water-use levels, Bedient Direct, ¶ 61, and thus they would generate far less water at other times when Georgia is not using water at peak levels. Second, the flow increase of a cap would not be fully realized for many months due to the time-lag effect of reducing groundwater pumping. Panday Direct, ¶¶ 68-71.

drastic cuts on Georgia would not make a material difference in the Corps' releases of water into Florida over the full range of historically observed conditions in the dry months of dry years.

Georgia also modeled how much Apalachicola River flows would increase if Georgia were able to increase inflows into Law Seminole from the Flint River by as much as 1,000 cfs during peak summer months. Bedient Direct, ¶ 84. Even assuming counterfactually that a realistic cap could ever create that much extra water, this scenario still showed no material flow increase to Florida during drought. In a year matching 2007 conditions, a peak 1,000 cfs flow increase on the Flint would increase state-line flows by *0 cfs* during all of June-August, 183 cfs (2.6%) in May, and a mere 43 cfs (0.9%), in September. SOF ¶ 52. In a year matching 2011 conditions, this extra 1,000 cfs would increase state-line flows by just 177 cfs (2.9%) in all of May-September. SOF ¶ 54.

Florida's reservoir modeling, like Georgia's, showed no material state-line flow increase during drought from even drastic cutbacks to Georgia's consumption. At trial, Hornberger admitted that his own modeling showed that a 50% cap on all of Georgia's agricultural water use would increase flows into Florida by *0 cfs* for critical drought periods in years with hydrologic conditions similar to 2000, 2007, 2011, and 2012. SOF ¶¶ 45, 49. Thus, even using Florida's highly inflated estimates of Georgia's water consumption, eliminating *half* of all irrigation in the Flint River Basin would still make no difference to Florida at the times it claims to need the extra water.

B. Florida Would Not Receive A Material Increase In Pass-Through Flows During Dry Summer Months.

Florida likewise would not receive any meaningful increase in state-line flow in the form of "pass-through" flows. Pass-through flows in the summer occur *only* when the Corps is in non-drought operations *and* basin inflow is more than 5,000 cfs but less than 10,000 cfs (in June-September) or 16,000 cfs (in May). Bedient Direct, ¶¶ 39-58; *see also* SOF ¶ 56. When both of those two things are true, the Corps will release 100% of basin inflow from Woodruff Dam, meaning that it will "pass through" to Florida additional water flowing into Lake Seminole. In remanding this case, the majority surmised that Florida might materially benefit from increased "pass-through" flows because "the Corps may remain in 'nondrought operations' even during the driest summer months of the driest years." *Florida*, 138 S. Ct. at 2521.

In truth, any benefit to Florida from increased pass-through flows would be "rare and unpredictable." Bedient Direct, ¶ 58; SOF ¶ 56. During actual droughts, it is exceedingly uncommon for the Corps to engage in pass-through operations. For example, in the drought year of 2012, pass-through operations occurred 0% of the time "during the summer and fall months, when streamflow was at its lowest." Bedient Direct, ¶ 57; SOF ¶ 56. Rather, for the overwhelming majority of time during droughts, one of two things will be true: either (1) basin inflow will be below 5,000 cfs, *or* (2) the Corps will be in drought operations. Bedient Direct, ¶ 39; *id.* at pp. 27, 29 (Demos. 13, 14). And in either of those circumstances, the Corps does not pass-through flows to Florida, but instead keeps

releases from Woodruff Dam at roughly 5,000 cfs and stores extra basin inflow in its upstream reservoirs. U.S. Post-Trial Br. 12-13; U.S. Amicus Br. 23; SOF ¶¶ 45-47.

For those reasons, even a severe cap on Georgia would yield, at most, negligible and sporadic increases in pass-through flows during the dry months of dry years. For example, in years matching the hydrologic conditions of 2000, 2002, 2007, and 2008 (recent years with significant dry periods), a 30% Flint cap would generate *0 cfs* in pass-through flows into Florida during the dry summer months. SOF ¶ 56.[7] In a year matching 2011 hydrologic conditions, Florida would receive 20 total days of pass-through flows in May-September, but average flow would increase by only 350 cfs (or 2.9%) over those 20 days. *Id.* And in a year matching 2006 conditions, Florida would receive 31 total days of pass-through flows in May-September, but average flow would increase by only 28 cfs (or 0.19%) over those 31 days. *Id.* Florida offered "no evidence" at trial to refute these modeling results, and Florida itself "did not quantify at trial the benefits from … increased pass-through flows during non-drought conditions." Report at 65; SOF ¶ 57. Georgia's unchallenged modeling is thus the only evidence in the record on this issue, and it shows

[7] The majority wrongly claimed that there were 19 days of "pass-through" flows in the summer of 2007. *Florida*, 138 S. Ct. at 2521-22. The Court misread Dr. Bedient's analysis, which is not a *historical* analysis of what actually happened in 2007, but a *hypothetical* analysis applying the RIOP rules to 2007 conditions. Bedient Direct, ¶¶ 49-54. In any event, under the rules that *currently* govern Corp operations, there would not be 19 days of "pass-through" flows in a year matching 2007 conditions. Under the Master Manual—which triggers drought operations more often than the RIOP, U.S. Post-Trial Br. 11—there would be 0 days of pass-through in a year like 2007. GX-986.

that any pass-through flows in the dry months of dry years would be rare, unpredictable, short-lived, and of a negligible magnitude.

C. A Cap On Georgia Would Not Materially Shorten Drought Operations.

The Court also raised the possibility that, even though a cap would not yield additional flow to Florida during drought operations or extreme low flows, a cap might still create a "cushion" of reservoir storage that could benefit Florida by shortening the Corps' drought operations. *See Florida*, 138 S. Ct. at 2520-25. The theory is that any extra water held back by the Corps could boost reservoir storage enough to either delay the onset of drought operations or quicken the return to non-drought operations. Whatever this theory's surface appeal, the actual evidence proves otherwise: Even an extreme cap on Georgia would not materially shorten drought operations or increase the length or frequency of non-drought operations. SOF ¶ 58.

Once again, just like for pass-through flows, Florida offered no evidence to support this theory. Report at 65. Despite having every opportunity to do so, Florida "did not quantify at trial the benefits from shortened drought operations." *Id.* Likewise, the United States has only ever theorized that a cap may shorten drought operations. It has never presented evidence on the issue and, indeed, has expressly taken no stance on whether a cap on Georgia would in fact shorten drought operations. U.S. Post-Trial Br. 2-3.

By contrast, Georgia's evidence shows that a cap would not materially shorten drought operations. *See* Bedient Direct, ¶¶ 60-65 (explaining that ResSim accounts for the dynamic between caps, reservoir-storage levels, and reservoir releases, including length of drought operations); *id.* at ¶¶ 78-87, *id.* at p. 38 (Demos. 20-21) (showing that large

cutbacks on Georgia do not increase state-line flows during drought or materially change the 5,000 cfs state-line flows resulting from drought operations); GX-866, at 69 (showing that a cap would generate only a negligible amount of reservoir storage).

Georgia's ResSim modeling, which calculated "how long the Corps could avoid drought operations given different Basin inflows" under various cap scenarios, Report at 66, showed that a 30% Flint River cap would not shorten drought operations by *a single day* during any dry year over the entire 37-year hydrologic record, SOF ¶¶ 59-60. To the contrary, the length of drought operations would be the exact same with or without a cap for every dry year simulated: 1981, 1986, 1988, 1999, 2000, 2006, 2007, and 2011. SOF ¶ 60. The only times a 30% Flint River cap would affect the duration of drought operations are in two isolated instances during wet conditions in 2001 and 2009, when the Corps would exit drought operations one and two months earlier, respectively. SOF ¶ 62. But because daily flows into Florida would be as high as 128,000 cfs at those times, JX-128, extra flows of a few hundred cfs would not provide Florida any meaningful benefit.

A cap on the Flint River would not meaningfully shorten drought operations for two reasons. *First*, a cap simply would not generate enough extra water to create a significant "cushion" in reservoir storage. Even a nearly 50% cap on Georgia's total water use (from both the Chattahoochee and Flint Rivers) would have boosted reservoir storage by just 180 cfs in a year matching 2000 hydrologic conditions, 57 cfs in a year matching 2006, 187 cfs in a year matching 2007, 21 cfs in a year matching 2008, and 234 cfs in a year matching 2011. SOF ¶ 64. Increasing storage by those small amounts would not shorten drought operations by a single day in any of those years. SOF ¶¶ 63-64.

Second, a cap does not materially shorten drought operations because of the timing of the Corps' decision points. The Corps decides whether to enter or exit drought operations only on the first day of the month. SOF ¶ 63. As a result, adjustments in storage levels that take place *within* a single month have no impact on the length of drought operations. *Id.* For example, in a year matching 2011 hydrologic conditions, a 30% Flint cap would delay storage dropping into Zone 3 by one day—from May 8 to May 9. SOF ¶ 61. But this extra day of "cushion" would not result in a one-day delay in drought operations because the Corps would, in either case, wait until June 1 to commence drought operations. *Id.*

All of this evidence also refutes Florida's unsubstantiated claim—which the majority opinion cited but did not evaluate—that a cap could have prevented the Corps from entering drought operations at all in 2011-2012. *Florida*, 138 S. Ct. at 2523. Florida first made this assertion in briefing after the trial record was closed, *see* Fla.'s Exceptions Br. 48-49, and thus never supported it with actual evidence or subjected it to cross examination. In any event, Florida's theory is wrong. As an initial matter, Florida's own reservoir modeling shows that even with a 50% agricultural cap on Georgia the Corps *would have* in fact entered drought operations on May 1, 2012—no different from what happened in the real world (without a cap). SOF ¶ 61. Thus, Florida's own modeling, even with its numerous flaws and greatly overstated water-savings projections, disproves its theory.

In addition, Florida's theory misrepresents the workings of a highly complex system. If Florida were correct that a cap would have prevented the Corps from entering

drought operations on May 1, 2012, then—under the rules for non-drought operations—the Corps would have had to continue making releases higher than 5,000 cfs for the month of May (and any time thereafter when basin inflow exceeded 5,000 cfs). Those extra releases would have depleted reservoir storage throughout May and June, when basin inflow exceeded 5,000 cfs, *see* Zeng Direct, at p. 37 (Demo. 17), causing reservoir levels to drop sharply. But Florida never accounts for those extra releases or explains how the reservoirs could have avoided dropping to levels that would have eventually triggered drought operations (for instance, on June 1 or July 1).

What is more, Florida's hypothetical, which describes "Zone 4" as the point at which drought operations are triggered, is based on outdated operating rules. Under the new Master Manual, drought operations begin after storage drops into Zone 3, a higher level than Zone 4. U.S. Amicus Br. 11. Thus, even accepting everything else about Florida's hypothetical as true, it is still irrelevant to this case because under *today's* rules, drought operations could not be avoided if a drought year matching 2012 hydrologic conditions were to happen again.

Florida's crude example does not support its case. As ResSim confirms, a cap would not have materially shortened drought operations at all—much less "avoided drought operations entirely," Fla.'s Exceptions Br. 49—during any drought period over the full 37-year hydrologic record, even with a draconian cap on Georgia.

D. Florida Cannot Satisfy Its Burden Of Proof Based On Speculative Modifications To The Corps' Reservoir Operations.

Florida has indicated that it intends to argue in these remand proceedings that even if it cannot obtain material flow increases under the Corps' *current* operating manual, it nonetheless *could* obtain relief if the Corps were to make "reasonable modifications" to its manual. This argument represents a startling reversal of Florida's longstanding representations to the Court. At the start of this case, Florida was adamant that a cap on Georgia alone—without *any* changes to Corps operations—would give Florida relief. *See, e.g.*, Hr'g. Tr. at 27 (June 2, 2015). Now that the trial is over and the evidence is in, however, Florida pivoted to arguing that the Corps could make "reasonable modifications" to its operations to facilitate a cap—implicitly conceding that the only way for it to get any meaningful flow increase is for the Corps to alter its operations to deliver it. *See* Fla.'s Mot. for Clarification of CMO No. 25.

The problem for Florida is that the Court cannot force the Corps to make any changes to its Master Manual because the United States is "not a party" to this suit and "would not be bound by any decree issued by th[e] Court." *Florida*, 138 S. Ct. at 2541 (Thomas, J., dissenting); *see also* U.S. Amicus Br. 23 ("The Corps … would not be formally bound by the Court's decree, which would impose a cap on Georgia's consumption without directing a change in the Corps' operations."). To the contrary, the Corps would have to propose and formalize any "reasonable modifications" as part of a separate administrative process, the outcome of which would be entirely speculative. *Id.* at 5-6. The last time the Corps updated its Master Manual, the administrative process

dragged on for nearly 10 years; involved multiple rounds of federal agency review and public notice-and-comment; included three separate scoping periods and a total of 3,621 comments from 965 individuals, organizations, and agencies; and spawned separate, multi-party, still-ongoing litigation. Corps, *ACF Signed Record of Decision*, at 1 (Mar. 30, 2017) ("*Record of Decision*"), http://bit.ly/2sSRdp6; GX-544, at ES-2.

Even if the Corps were to initiate this lengthy process, there is no guarantee that the Corps would actually change any of its rules in Florida's favor. That is particularly true because the Corps' congressionally mandated duty in operating the reservoirs is to "balance" all project purposes—not cater to a single state or single project purpose. JX-124, at 4-6; GX-544, at 18. It is especially unlikely that the Corps would make further changes because it has recently determined that the newly adopted Master Manual already "best balances the authorized project purposes," JX-124, at ES-16, and "best serves the overall public interest," *Record of Decision*, at 1. And the outcome of any new administrative process would itself be subject to litigation. In short, Florida cannot meet its heavy burden of proof in this case by proposing speculative changes to the Master Manual that the Court cannot order and that the Corps may or may not adopt in a process that would take place entirely outside the bounds of this proceeding.

V. Florida Failed To Prove That A Feasible Remedy Would Significantly Ameliorate Its Alleged Harms.

Even if Florida could prove that it would receive material and reliable flow increases from the Corps during periods of drought, Florida would still need to prove that those flow increases would significantly ameliorate the harms it alleges. Florida has failed completely

on that score: At trial, Florida presented almost no evidence identifying the specific flows needed to address its alleged harms. And the little record evidence that does address that issue shows that even a draconian cap on Georgia would not significantly increase the populations of species Florida claims have been injured.

A. Florida Has Not Proven What Specific Flow Increases Would Remedy Its Alleged Harm.

The question of how much water will significantly ameliorate Florida's alleged harms cannot be answered in this case because Florida has put forth no evidence on that question. Florida has never presented evidence showing how much water it actually needs, the specific times at which it needs that water, or what specific harms those flows would alleviate. SOF ¶ 66. That failure is not due to lack of asking. Georgia posed the following interrogatory to Florida in January 2015:

> Identify the minimum volumetric flow-rate (or flow-rates), including timing and duration of such, or any other flow-rate requirements that you contend must be maintained at the Florida/Georgia border in order to remedy any alleged injury, including the flow-rate (or flowrates), including timing and duration of such, that Florida contends must be maintained to prevent or alleviate harm to any species of wildlife (including oysters, mussels, and sturgeon).

GX-800, at 7. Florida refused to answer that interrogatory and never presented evidence about the specific flow-rates that would remedy its alleged harms. *Id.* at 7-8; *see also* GX-803, at 3-4; GX-804; GX-815; GX-848; GX-856; GX-859.

B. A Cap On Georgia Would Not Materially Decrease Salinity, Increase The Oyster Population, Or Benefit Bay Ecology.

Whatever Florida's reasons for failing to answer this critical question, the evidence is clear that even major cutbacks on Georgia's consumption would yield little to no benefits

to Florida. For example, even a large cut in Georgia's water use would not materially reduce salinity in Apalachicola Bay. Florida's experts modeled a "Remedy Scenario," which assumed a 50% reduction in agricultural water use, the elimination of all interbasin transfers, *and* counterfactually assumed that *all* water generated from that cap passed through to Florida (as opposed to being offset by the Corps). SOF ¶ 67. Florida's salinity expert testified that, if that remedy had been in place during the 2012 drought, salinity at the Bay's oyster bars would have changed by *less than 1 ppt*. SOF ¶ 69. Georgia's salinity expert also modeled the effect of increasing Flint River flows by 1,000 cfs in summer months (without regard to whether a cap on Georgia could actually generate that much water). He found that, even if Flint flows had been 1,000 cfs higher in 2011, salinity would not have changed by more than 1 ppt *anywhere* in the Bay. SOF ¶ 70. Georgia's ecology expert also found that adding 1,000 cfs to the Apalachicola River would result in changes of just 0.15-1.2 ppt on the Bay's oyster bars. Menzie Direct, ¶ 76. Salinity changes within that range do not affect Bay ecology and would not remedy any alleged harm. SOF ¶ 71.

Similarly, Florida's own modeling confirms that a remedy would not materially improve oyster populations. Florida's oyster expert, Dr. White, constructed a population model for two oyster bars in Apalachicola Bay. White Direct, ¶ 30. White ran the model under the Florida Remedy Scenario and found that oyster populations would never have improved by more than 1.4% at any time on any oyster bar modeled. SOF ¶ 72. Florida presented no evidence that such a small difference would have prevented the oyster population decline or could do anything to improve oyster populations in the future.

C. A Cap Would Not Improve The Ecosystem Of The River.

The Corps—not Georgia—caused the changes to the Apalachicola River about which Florida complains. *See supra* Part I. Imposing a cap on Georgia would not change the fact that the Corps, with Florida's approval, lowered the River floor by five feet or dredged the middle section of the River, deepening and widening the channel and leaving dredge spoils that block tributaries and sloughs.

Even setting that aside, Florida's claim that the River ecosystem will benefit from a few hundred additional cfs is speculative and unsupported. In remanding this case, the Court noted that Florida's expert, Dr. Allan, claimed that a cap would provide ecological benefits. *Florida*, 138 S. Ct. at 2520. In that cited testimony, Allan claimed that an increase of 300-500 cfs could raise water levels in sloughs in one section of the River by 3 to 5 inches, which would inundate some microhabitats. Allan Direct, ¶¶ 26, 67. But that testimony cannot satisfy Florida's burden because Allan never quantified the actual ecological benefits that such inundation would provide. In fact, he offered no quantitative analysis at all as to how an additional 300-500 cfs might benefit the ecosystem.

To the extent Florida claims that a remedy would reduce the number of "harm days" under Allan's metrics, such changes are meaningless because his metrics are not evidence of real harm. *See* SOF ¶ 74. But even under Allan's flawed metrics, the Remedy Scenario would have little impact: 11 of Allan's 15 metrics showed a less-than-2.5% reduction in "harm days." SOF ¶ 73. Allan admitted that such small changes are "probably not biologically significant," and did not know if they would have any impact at all. Tr. 409:22-410:3, 544:4-546:13. The remaining metrics showed similarly small changes, SOF

¶ 73, and Allan could not quantify how any changes to his metrics would actually affect the population of any species, Tr. at 399:1-20. In any event, he testified only about the effect of Florida's draconian Remedy Scenario and admitted any potential reduction in harm from any *other* remedy "is, indeed, speculation." *Id.* at 417:5-418:14; SOF ¶ 67.

Dr. Kondolf likewise failed to identify any realistic ecological benefit. He testified about the number of sloughs that could be connected with additional flow and opined that "from 5,000 to 7,000 cfs there are 37 sloughs that connect to the river." Tr. 2629:7-15. But it is impossible for any cap on Georgia's water use to generate an additional 2,000 cfs of state-line flow. Even setting aside that impossibility, Kondolf never "quantif[ied] the ecological benefit that would accrue [from connecting sloughs based on] any given increase in flow," because it was not his "responsibility" to do so. *Id.* at 2630:22-2631:5. Nor was it apparently anyone else's—no other Florida expert quantified what ecological benefits (if any) would result from 37 sloughs being connected to the Apalachicola River.

In contrast, Georgia's expert, Dr. Menzie, did analyze how much of the floodplain would be inundated under different remedy scenarios. He first analyzed the impact of increasing Flint River flows by 1,000 cfs in summer months and found that differences in floodplain inundation in Florida were insignificant. Menzie Direct, ¶¶ 159-63. Menzie also used computer modeling and found that increasing Apalachicola River flows by 1,000 cfs would result in an increase of a mere 1% in floodplain inundation. SOF ¶ 75. There is no evidence that such small changes would remedy Florida's claimed harms.

VI. Georgia Employs Extensive Measures To Conserve Water In The ACF Basin.

Georgia has invested billions of dollars to develop and implement conservation measures that have reduced Georgia's water use and saved hundreds of millions of gallons of water each year. As explained in prior briefing, Georgia is a national leader in M&I water conservation. Ga. Post-Trial Br. at 61-68; Ga. Post-Trial Resp. Br. at 75-76. Georgia has made substantial investments in water conservation and efficiency programs in the metropolitan Atlanta region, including leak-abatement programs, bans on outdoor water use, and dozens of other conservation measures. SOF ¶ 76; *see also* Ga. Post-Trial Br. at 61-68. Georgia also treats and returns to ACF waterways more than 70% of the water it withdraws for M&I purposes. As a result of the billions that Georgia has spent on wastewater infrastructure, Georgia now treats and returns an annual average of 742 cfs to the ACF Basin. SOF ¶ 77.

By any metric, those efforts have been extraordinarily successful. Even as the population of the metro-Atlanta region increased by 50% from 1994 to 2013, Georgia's total M&I consumptive use remained flat (and even declined slightly). SOF ¶ 78. Georgia also has seen a 36.7% decline in daily per-capita water use since 2000, a key metric that nationwide water-planning entities use to evaluate the overall effectiveness of water-conservation programs. SOF ¶ 79. Even Florida's M&I expert acknowledged that the per-capita water use maintained by Georgia shows that "water conservation measures are being appropriately implemented." Mayer Direct, ¶ 8 (quoting Florida's expert, Dr. Dracup).

Georgia farmers are also good stewards of water resources in the ACF Basin. Florida's own expert recognized that the vast majority of Georgia farmers *under-water*

their crops, applying less water than required for maximum yield. SOF ¶ 80. Even so, Georgia has implemented a number of "scientifically-informed conservation measures" to conserve agricultural water resources that are "among the best" on the eastern seaboard and have been "used as a model" in other states. Tr. 3145:2-3146:5 (Couch). Specifically, in 2006, Georgia "significantly changed how agricultural water use was managed in the Flint River Basin," by dividing the Basin into three different zones based on hydrologic sensitivity to groundwater withdrawals. Couch Direct, ¶¶ 12, 22; SOF ¶ 81. Georgia also required all new or modified permits in the Flint River Basin to meet advanced conservation requirements that varied by zone—with the most-stringent requirements for permits in areas where withdrawals had the greatest potential impact on streamflow. SOF ¶ 81. Georgia also has effectively capped the growth of irrigated acreage in areas that most affect streamflow in the Flint River: In 2012, Georgia stopped accepting new applications for agricultural-withdrawal permits for UFA groundwater and surface waters in the ACF Basin. SOF ¶ 82.

Finally, Georgia has adopted new, even-more-aggressive efficiency requirements for irrigation equipment in the ACF Basin. In addition to the advanced efficiency requirements Georgia mandated in 2006, Georgia passed more 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." SOF ¶ 83. Those efforts have worked. As of 2016, approximately 93% of the acreage in the Lower Flint River Basin had irrigation systems with at least 90% center-pivot-irrigation efficiency. SOF ¶ 84.

VII. Florida Has Not Proven By Clear And Convincing Evidence That The Potential Benefits Of Its Proposed Cap Substantially Outweigh The Harm To Georgia.

All of the various issues discussed above ultimately distill into a single legal question: Whether Florida has proven, by clear and convincing evidence, that the benefits of an equity-based consumption cap substantially outweigh the harms that such a cap would impose. *See Colorado I*, 459 U.S. at 187; *Florida*, 138 S. Ct. at 2527; CMO No. 25, at 3. Florida has not met its burden of proof on that question. Far from showing that the equitable-balancing inquiry tips "substantially" in Florida's favor, the record shows just the opposite: The costs Florida's proposed caps would impose on Georgia greatly exceed the negligible and highly speculative benefits those caps would generate for Florida.

As explained, Florida proposes a laundry list of purported "conservation measures" and claims that Georgia can implement those measures to increase streamflow in the Flint River by up to 1,687 cfs. *See* Sunding Direct, at pp. 44-45 (Tables 4-6). Under correct hydrological assumptions, it is physically impossible for Georgia to generate an additional 1,687 cfs in streamflow in the Flint River. *See supra*, pp. 15-16. To even approach that amount, Georgia would have to completely eliminate *all* agricultural water use in the Flint Basin. SOF ¶ 86. And even if one were to accept Florida's hydrological assumptions as accurate (which they are not) and believe that it *were* possible to generate that much water (which it is not), Florida's experts themselves recognize that generating that much additional streamflow would require extraordinary reductions in Georgia's water use, including drought-year elimination of up to 73% of agricultural irrigation. *Id.*

Implementing a cap of that magnitude would impose extraordinary costs on Georgia. Florida's proposed "deficit irrigation" measure—which is just one of its proposed conservation measures on the Flint and which would dramatically decrease row-crop irrigation in drought years—would cost Georgia more than $335 million. SOF ¶ 87. Those cuts would also result in an *additional* $322 million in lost GRP and $15.4 million in lost tax revenue, affecting the broader region and economy (which is dependent on the agricultural sector), and would eliminate 4,173 jobs annually. SOF ¶ 88. And those costs reflect only the "deficit irrigation" measure that Florida proposes. The other measures would have high costs too. For example, Florida proposes that Georgia buy back irrigation permits for 20% of its irrigated acreage, which would result in costs of $809 million due to lost crop yields. SOF ¶ 89.[8]

The costs on Georgia would increase even more if the Court were to adopt Florida's proposed cuts to M&I usage in the Chattahoochee Basin. Sunding Direct, pp. 44-45 (Tables 4-6). The leak-abatement measures that Florida proposes would cost Georgia at least $260 million to implement, not including an additional $1.2 to $2.4 billion for line-replacement costs. SOF ¶ 90. Florida's proposal to eliminate 50% of municipal outdoor water use in drought years would generate welfare losses in Georgia of more than $445 million each year the cuts were implemented. SOF ¶ 91. And Florida's proposal that Georgia completely eliminate interbasin transfers would cost hundreds of millions, if not

[8] Sunding used a "hedonic analysis" to calculate a cost of only $20.7 million for his irrigation-buyback program. Sunding Direct, at p. 44 (Table 4). As explained by Dr. Stavins, Sunding's hedonic analysis is flawed and unreliable. Stavins Direct, ¶¶ 102-10.

billions, to implement because it would require the development and construction of substantial new wastewater infrastructure. SOF ¶ 92; *see* Stavins Direct, ¶ 137.

Florida disputes Georgia's cost estimates, but even it concedes that its proposed cuts would cost Georgia hundreds of millions of dollars. Florida, moreover, has sought to diminish the true costs of its proposals throughout this litigation. In his expert report, Sunding initially estimated that Georgia could generate 1,000 cfs in streamflow at a cost of $190 million each year the cap was implemented. *Id.* at 2787:10-13. At trial, Sunding changed his opinion. Now he says Georgia could deliver twice the streamflow at half the cost: 2,000 cfs for less than $105 million a year. Sunding Direct, at p. 44 (Table 4); Tr. 2786:12-2787:9. Sunding's cost estimates dropped so dramatically because he *removed* millions of dollars in costs by narrowing the definition of "costs" to exclude anything but costs associated with market transactions. *Id.* at 2791:17-2792:23. Thus, although Sunding originally included indirect economic costs in his expert report, he simply removed those concededly "real" costs from his direct testimony without explanation. *Id.* at 2792:9-14, 2798:2-13. As a result, all of Sunding's cost estimates are drastically understated—a reality further underscored by his implausible finding that Georgia would suffer $0 in costs for two-thirds of his proposed conservation measures. Sunding Direct, at pp. 44-45 (Tables 4-6); Stavins Direct, ¶ 133; *Florida*, 138 S. Ct. at 2533 (Thomas, J., dissenting).

Florida's proposed cap would impose these enormous costs of Georgia without producing any material benefit to Florida. As explained, Florida presented no evidence quantifying the purported benefits it could receive from its proposed cap, *see supra* Part I, and Georgia's expert calculated that the potential benefits to Florida's oyster and blue crab

industries would be merely $40,000 per year, SOF ¶ 94. And the record evidence shows that, even with a cap, salinity in the Bay would not change, oyster biomass would not materially increase, and the populations of allegedly harmed species would not grow. *See supra* Parts I, V. Florida's case thus lacks any evidence of meaningful benefits from the severe cap it asks the Court to impose on Georgia.

In light of these facts, the outcome of the balancing inquiry is clear: Florida has not met its burden. SOF ¶¶ 85, 94. Florida's proposed cap would cost Georgia hundreds of millions—if not billions—of dollars. At the same time, that cap would result in no meaningful benefits to Florida. Indeed, the costs the cap would impose on Georgia exceed the *entire value* of the industries and economies that Florida alleges have been harmed in this case—let alone any incremental benefits the cap might provide those industries. SOF ¶¶ 93-94. Even before the 2012 collapse, the oyster industry in Apalachicola Bay generated only $5-8 million in revenue per year. SOF ¶ 93. That is orders of magnitude less than the costs that Florida's cap would impose on Georgia and its citizenry. By any measure, therefore, Florida has failed to prove, by clear and convincing evidence, an entitlement to an equitable apportionment under well-established precedent. *Colorado I*, 459 U.S. at 186-87.

CONCLUSION

For these reasons, the Special Master should recommend that Florida's request for an equitable apportionment be denied.

Dated: January 31, 2019

Respectfully submitted,

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No. 142, Original

In The
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STATE OF FLORIDA,

Plaintiff,

v.

STATE OF GEORGIA,

Defendant.

Before the Special Master

Hon. Paul J. Kelly, Jr.

CERTIFICATE OF SERVICE

This is to certify that the STATE OF GEORGIA'S SUPPLEMENTAL BRIEF has been served on this 31st day of January, 2019, in the manner specified below:

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