No. 143, Original

IN THE
Supreme Court of the United States

STATE OF MISSISSIPPI,

Plaintiff,

v.

STATE OF TENNESSEE, CITY OF MEMPHIS, TENNESSEE, AND MEMPHIS LIGHT, GAS & WATER DIVISION,

Defendants.

On Bill of Complaint
Before the Special Master, Hon. Eugene E. Siler, Jr.

PRE-TRIAL BRIEF OF DEFENDANTS THE CITY OF MEMPHIS, TENNESSEE, AND MEMPHIS LIGHT, GAS & WATER DIVISION

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December 20, 2018

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D__	In the Joint Statement, D__ refers to facts submitted by Defendants that Mississippi purports to dispute.
Hood Amend. Compl.	First Amended Complaint, *Hood ex rel. Mississippi v. City of Memphis, et al.*, Civil Action No. 2:05CV32-D-B (N.D. Miss. filed Oct. 5, 2006)
Hood Compl.	Complaint, *Hood ex rel. Mississippi v. City of Memphis, et al.*, Civil Action No. 2:05CV32-D-B (N.D. Miss. filed Feb. 1, 2005)
Hood v. Memphis	*Hood, ex rel. Mississippi v. City of Memphis, Tenn.*, 533 F. Supp. 2d 646 (N.D. Miss. 2008), *aff'd*, 570 F.3d 625 (5th Cir. 2009), *cert. denied*, 559 U.S. 904 (2010)
Joint Statement	Plaintiff's and Defendants' Joint Statement of Stipulated and Contested Facts, *Mississippi v. Tennessee, et al.*, No. 143, Orig. (U.S. filed Feb. 28, 2018) (Dkt. No. 64)
Plaintiff's Resp. to D__	In the Joint Statement, Plaintiff's Resp. to D__ refers to Mississippi's response to Defendants' fact.
S__	In the Joint Statement, S__ refers to the stipulated facts submitted by the parties.
SPECIAL MASTER OPINIONS	
Mem. Dec. 2016	Memorandum of Decision on Tennessee's Motion to Dismiss, Memphis and Memphis Light, Gas & Water Division's Motion to Dismiss, and Mississippi's Motion to Exclude, *Mississippi v. Tennessee, et al.*, No. 143, Orig. (U.S. Aug. 12, 2016) (opinion of

	Special Master) (Dkt. No. 55)
Mem. Dec. 2018	Memorandum of Decision on Defendants' Motion for Summary Judgment, *Mississippi v. Tennessee, et al.*, No. 143, Orig. (U.S. Nov. 29, 2018) (opinion of Special Master) (Dkt. No. 93)
GOVERNMENT AGENCIES	
USGS	United States Geological Survey
SCIENTIFIC PAPERS AND TREATISES	
Arthur & Taylor (1998)	J. Kerry Arthur & Richard E. Taylor, *Ground-Water Flow Analysis of the Mississippi Embayment Aquifer System, South-Central United States: Regional Aquifer System Analysis – Gulf Coastal Plain*, USGS Professional Paper 1416-I (1998), *available at* https://pubs.er.usgs.gov/publication/pp1416I
Clark & Hart (2009)	Brian R. Clark & Rheannon M. Hart, *The Mississippi Embayment Regional Aquifer Study (MERAS): Documentation of a Groundwater-Flow Model Constructed to Assess Water Availability in the Mississippi Embayment*, USGS Scientific Investigations Report 2009-5172 (2009), *available at* https://pubs.usgs.gov/sir/2009/5172/pdf/SIR2009-5172.pdf
Criner & Parks (1976)	James H. Criner & William Scott Parks, *Historic Water-Level Changes and Pumpage from the Principal Aquifers of the Memphis Area, Tennessee: 1886-1975*, USGS Water-Resources Investigations Report 76-67 (1976), *available at* https://pubs.er.usgs.gov/publication/wri7667
Freethey & Cordy (1991)	Geoffrey W. Freethey & Gail E. Cordy, *Geohydrology of Mesozoic rocks in the upper Colorado River basin in Arizona, Colorado, New Mexico, Utah, and Wyoming, excluding San Juan Basin*, USGS Professional Paper 1411-C (1991),

	available at https://pubs.er.usgs.gov/publication/pp1411C
Groundwater Atlas	The Ground Water Atlas of the United States, USGS Hydrologic Atlas 730 (2000), *available at* https://water.usgs.gov/ogw/aquifer/atlas.html
Hart, et al. (2008)	Rheannon M. Hart, Brian R. Clark, and Susan E. Bolyard, *Digital Surfaces and Thicknesses of Selected Hydrogeologic Units within the Mississippi Embayment Regional Aquifer Study (MERAS)*, USGS Scientific Investigations Report 2008-5098 (2008), *available at* https://pubs.usgs.gov/sir/2008/5098/
Heath (1983)	Ralph C. Heath, *Basic Ground-Water Hydrology*, USGS Water-Supply Paper 2220 (2004 rev.), *available at* https://pubs.er.usgs.gov/djvu/WSP/wsp_2220.pdf
Waldron & Larsen (2015)	Brian Waldron & Daniel Larsen, *Pre-development groundwater conditions surrounding Memphis, Tennessee: Controversy and unexpected outcomes*, J. Am. Water Res. Ass'n. DOI: 10.1111/jawr.12240. (2014).
Masterson, et al. (2016)	John P. Masterson, et al. *Assessment of Groundwater availability in the Northern Atlantic Coastal Plain aquifer system From Long Island, New York, to North Carolina*, USGS Professional Paper 1829 (2016), *available at* https://pubs.er.usgs.gov/publication/pp1829
Renken (1996)	Robert A. Renken, *Hydrogeology of the Southeastern Coastal Plan aquifer system in Mississippi, Alabama, Georgia, and South Carolina*, USGS Professional Paper 1410-B (1996), *available at* https://pubs.er.usgs.gov/publication/pp1410B
USGS (1984)	U.S. Geological Survey, *National Water Summary 1983 - Hydrologic Events and Issues*, USGS Water-Supply Paper 2250 (1984), *available at*

	https://pubs.er.usgs.gov/publication/wsp2250
EXPERT REPORTS	
Langseth Rebuttal	David E. Langseth, Rebuttal Report on the Interstate Nature of the Memphis/Sparta Sand Aquifer (July 28, 2017)
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DEPOSITIONS	
Waldron Dep.	Deposition of Brian Waldron (Sept. 27, 2017)
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Wiley Dep.	Deposition of David Wiley (Sept. 26, 2017)
Wiley (2007) Dep.	Deposition of David Wiley (Nov. 15-16, 2007)
Spruill Dep.	Deposition of Richard Spruill (Sept. 28, 2017)
Crawford Dep.	Deposition of Jamie Crawford (July 30, 2007)
Hoffman Dep.	Deposition of Jim Hoffman (July 30, 2007)

Defendants City of Memphis, Tennessee, and Memphis Light, Gas & Water Division respectfully submit their Pre-Trial Brief in this matter. This Brief is intended to provide an overview of the hydrogeologic setting in which this dispute is centered, to summarize Memphis and MLGW's position that the aquifer at issue is an interstate resource, and to preview the proof they will offer at the evidentiary hearing. The Brief will also point out the significant factual and legal flaws in Plaintiff's position and explain why Plaintiff's position is unworkable as a method for resolving interstate groundwater disputes.

I. INTRODUCTION

The State of Mississippi ("Mississippi" or "Plaintiff") brought this original action against The State of Tennessee ("Tennessee"), The City of Memphis, Tennessee ("Memphis"), and Memphis Light, Gas & Water Division ("MLGW"), alleging that Defendants have wrongfully taken groundwater that is "owned" by Mississippi. The groundwater Mississippi claims to "own" is in a massive aquifer that lies beneath Mississippi, Tennessee, and six other states. Mississippi alleges that the lawful pumping of groundwater from wells located in Tennessee has caused groundwater to move from the portion of the aquifer beneath Mississippi to the portion of the aquifer beneath Tennessee. Mississippi does not allege that Defendants' pumping has caused a groundwater shortage. Rather, Mississippi seeks money damages based solely on the number of gallons it claims have been

"diverted" from Mississippi into Tennessee by reason of Defendants' pumping. Mississippi asserts claims of conversion and trespass and also seeks a declaratory judgment.

Before filing this Original Action, Mississippi filed two unsuccessful lawsuits over the same aquifer. Mississippi first sued Memphis and MLGW in the United States District Court for the Northern District of Mississippi. *See Hood v. Memphis*, 533 F. Supp. 2d 646 (N.D. Miss. 2008), *aff'd*, 570 F.3d 625 (5th Cir. 2009), *cert. denied*, 559 U.S. 904 (2010). At the same time Mississippi petitioned for a writ of certiorari in that case, it also filed a Motion for Leave to File Bill of Complaint in an Original Action (No. 139, Original) against Tennessee, Memphis, and MLGW. The Supreme Court denied Mississippi's petition for a writ of certiorari and its motion for leave to file an original action on January 25, 2010. A detailed procedural history of these cases can be found in Memphis and MLGW's Motion for Judgment on the Pleadings and Memorandum of Law in Support. (Dkt. No. 28, § III(A) at 8-9).

II. THE HYDROGEOLOGICAL FRAMEWORK

This is a dispute about rights to use the groundwater in an interstate aquifer that underlies part of eight states. The aquifer at issue is part of a larger hydrogeologic feature called the Mississippi Embayment. The hydrogeologic framework of the Embayment and the aquifer at issue are described below.

A. The Mississippi Embayment

Hundreds of millions of years ago, the Gulf of Mexico extended further inland, as far north as the area that is today eastern Missouri, southern Illinois, and western Kentucky. Over millions of years, the ocean waters repeatedly retreated and advanced until reaching their current, familiar "gulf coast" shoreline. The repeated flux of the sea deposited alternating layers of permeable material (such as sand) and less permeable materials (such as clay). Langseth Rep. (Vol. 1) at 8 (attached as Exhibit 1); Arthur & Taylor (1998) at 17 (excerpts attached as Exhibit 2). These layers became saturated with water. The more permeable layers are called aquifers.[1] The less permeable layers are referred to as confining layers. Heath (1983) at 6 (excerpts attached as Exhibit 3). The resulting "layer cake" of aquifers and confining layers in the void where the sea had once been constitutes the Mississippi Embayment. *See generally* Langseth Rep. (Vol. 1) at 8.

Figure 1 below shows the geographical extent of the Mississippi Embayment (outlined in brown). Figure 2 is a representation of an east-west cross section of the Embayment showing the alternating layers of aquifers and confining layers. Figure 3 is a north-south cross-section of the Embayment also showing the alternating hydrogeological layers.

[1] An "aquifer" is a formation, group of formations, or part of a formation that contains sufficient saturated, permeable material to yield usable quantities of water to wells and springs. S17 (Dkt. No. 64).

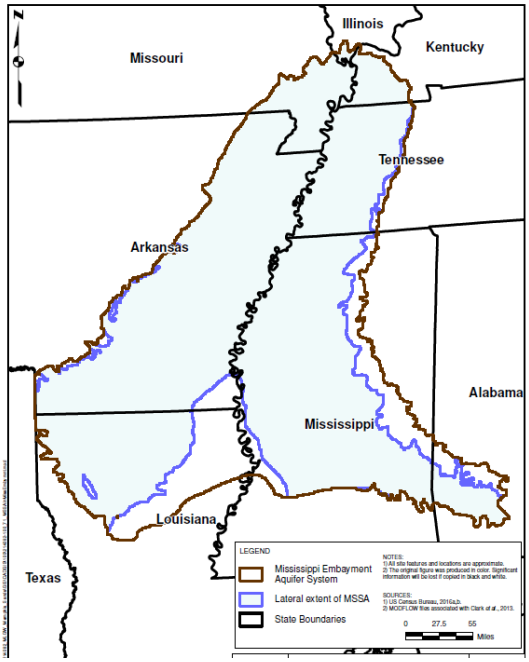

Figure 1

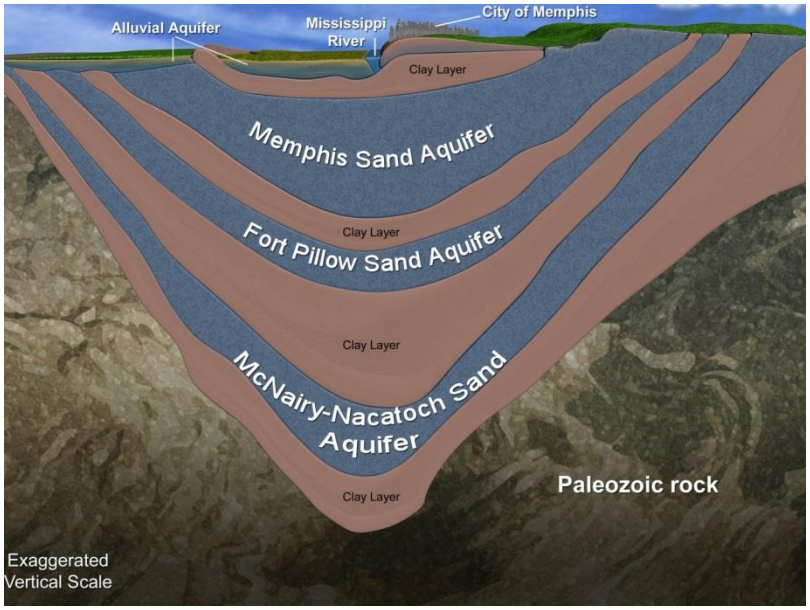

Figure 2

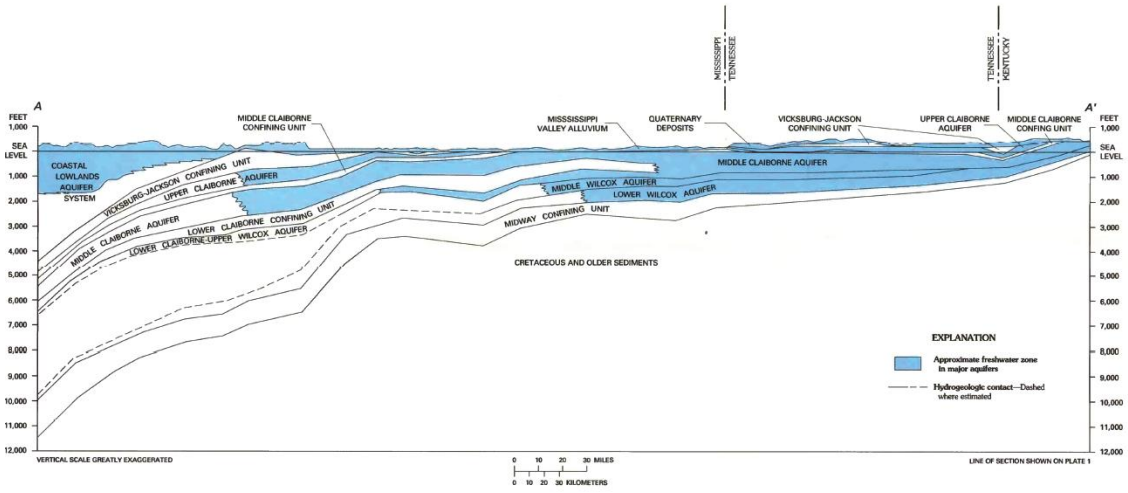

Figure 3

The aquifers of the Mississippi Embayment are not static. They are constantly recharged by precipitation falling in the "outcrop" areas where the aquifers become thinner and closer to the earth's surface. Figure 4 shows the natural flow of groundwater from the outcrop areas, through the aquifers toward their deepest point, and then moving upward, discharging to the surface or rivers. This movement of water into, through, between, and out of the layers of the Mississippi Embayment is continuous and ongoing.

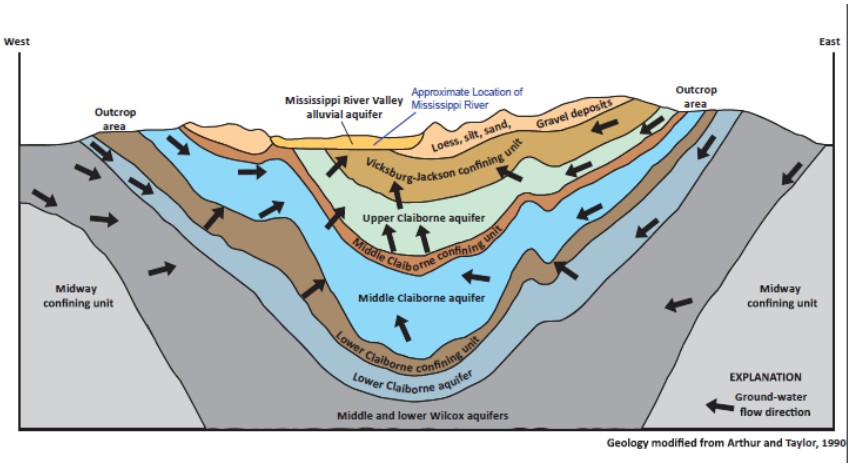

Figure 4

B. The Aquifer At Issue

At issue here is one of the aquifers in Mississippi Embayment. The aquifer at issue is a large and expansive underground resource comprised of geologic materials that are saturated with water (groundwater). It lies beneath portions of eight states: Tennessee, Mississippi, Alabama, Louisiana, Arkansas, Missouri, Illinois, and Kentucky. The geographical extent of the aquifer is shown outlined in purple in Figure 1. As shown on Figure 1, the northern half of the aquifer is roughly co-extensive with the Embayment. Langseth Rep. (Vol. 2) Fig. 2.2.1c (attached as Exhibit 4). The high quality of the groundwater in the aquifer is due, in large part, to its constant movement through the sand which acts as a natural filter. Langseth Rep. (Vol. 2) Fig. 2.2.2.

The aquifer at issue is referred to locally by various names. The United States Geological Survey ("USGS") often calls it the "Middle Claiborne Aquifer" (*see, e.g.*, Fig. 3 above). In Tennessee, northern Mississippi, and northern Arkansas, the aquifer is commonly called the "Memphis Sand" or "Memphis Sand Aquifer" (*see, e.g.*, Fig. 2 above). In much of Mississippi, Louisiana, southern Arkansas, and Kentucky, the aquifer is commonly called the "Sparta Aquifer" or "Sparta Sand Aquifer." In Alabama, the aquifer is sometimes called the "Lisbon Formation." *See* Clark & Hart (2009) Table 1 (excerpts attached as Exhibit 5).

Over the course of the litigation, the parties and their respective experts have used many different names interchangeably to refer to the aquifer, including "Middle Claiborne Aquifer," "Memphis-Sparta Aquifer," "Sparta-Memphis Sand," "Memphis Sand," "Memphis Aquifer," "Memphis Sparta Sand Aquifer," "MSSA," "Sparta Aquifer," and "Sparta Memphis Sand." All of these names, however, have been used to refer to the same resource – the aquifer at issue (the "Aquifer").[2]

Near its deepest point, the Aquifer can reach or exceed 900 feet in thickness (roughly beneath the Mississippi River). On its eastern side, the Aquifer becomes thinner and comes to or near to the surface east of Shelby County, Tennessee, and DeSoto County, Mississippi. This area, where the Aquifer has no confining layer above it, is referred to as the "outcrop" area.

In Figure 3 above (the north-south cross section of the Mississippi Embayment), the Aquifer (referred to as the "Middle Claiborne Aquifer") is shown as a continuous hydrogeological formation extending from Kentucky, through Tennessee, and into Mississippi. In Mississippi, the Aquifer eventually becomes shallower as it continues above and below an intervening layer of lower permeability called the Lower Claiborne Confining Unit.

[2] A comprehensive list of names used by Plaintiff's experts to refer to the Aquifer at issue can be found in Defendants' Motion in Limine to Preclude Mississippi from Arguing that there are Two Aquifers at Issue (Dkt. 78) at 6-10, Appx. A-B.

III. APPLICABLE LAW AND THE LIMITED ISSUE IDENTIFIED BY THE SPECIAL MASTER

A. Disputes Between States Over Their Rights To Use An Interstate Water Resource Are Governed By Equitable Apportionment

"[I]n the absence of an interstate compact, the Court has authorized only one avenue for States to pursue a claim that another State has depleted the availability of interstate waters within its borders: equitable apportionment." Mem. Dec. 2016 at 35; *see also Florida v. Georgia*, 138 S. Ct. 2502, 2513 (2018) (citing *Colorado v. New Mexico*, 459 U.S. 176, 183 (1982), and *Virginia v. Maryland*, 540 U.S. 56, 74 n.9 (2003)) ("Where, as here, the [Supreme] Court is asked to resolve an interstate water dispute raising questions beyond the interpretation of specific language of an interstate compact, the doctrine of equitable apportionment governs [its] inquiry."); *Virginia v. Maryland*, 540 U.S. at 74 n.9 (2003) ("Federal common law governs interstate bodies of water, ensuring that that the water is equitably apportioned between the States and that neither State harms the other's interest in the river."); *Colorado v. New Mexico*, 459 U.S. at 183 ("Equitable apportionment is the doctrine of federal common law that governs disputes between states concerning their rights to use the water of an interstate stream.").

The Supreme Court has applied the doctrine of equitable apportionment broadly. The Supreme Court has held that equitable apportionment is the appropriate mechanism to adjudicate disputes over rights to interstate rivers,

several of which share a direct hydrological connection with groundwater,[3] and anadromous fish, whose migratory journey crosses state borders. *See Idaho v. Oregon*, 462 U.S. 1017, 1024 (1983) (finding a dispute over migratory fish "sufficiently similar" to water rights litigation "to make equitable apportionment an appropriate mechanism for resolving allocative disputes").

The Special Master has held that "groundwater pumping generally resembles surface water pumping; both could have an effect on water in another state through the operation of natural laws," and, therefore, "equitable apportionment appears to apply to disputes between States over interstate groundwater." Mem. Dec. 2016 at 20, 25; *see also* Mem. Dec. 2018 at 21 ("And when a resource is interstate in nature, equitable apportionment supplies the proper method for determining rights.").

B. The Limited Issue Designated By The Special Master For The Evidentiary Hearing Is Whether The Aquifer Is An Interstate Resource

Mississippi wrongly contends that the doctrine of equitable apportionment does not apply to its claims because the Aquifer is "*neither* interstate water *nor* a naturally shared resource." Compl. ¶ 50.[4] In fact, Mississippi "has explicitly

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[3] *See Hood v. Memphis*, 570 F.3d 625, 630 n.5 (5th Cir. 2009) (citing *Texas v. New Mexico*, 462 U.S. 554, 556-57 nn.1-2 (1983), and *Wisconsin v. Illinois*, 449 U.S. 48, 50 (1980)).

[4] Every court that has considered Mississippi's claims has found that the Aquifer is an interstate resource and that equitable apportionment is Mississippi's

stated that it does not seek an equitable apportionment of the Aquifer." Mem. Dec. 2016 at 19 (citing Compl. ¶¶ 38, 48); Mem. Dec. 2018 at 21. Instead, Mississippi asserts novel causes of action under tort law – conversion and trespass.[5]

To determine whether the Aquifer is subject to equitable apportionment, the Special Master identified the threshold – and potentially dispositive – issue to be "whether the Aquifer is an interstate resource." Mem. Dec. 2016 at 36. The Special Master ordered "an evidentiary hearing on the limited issue of whether the Aquifer and the water constitutes an interstate resource." *Id.*[6]

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only cause of action. *See Hood v. Memphis*, 570 F.3d at 629-30 ("We find that the district court made no error of law as to the necessity of equitably apportioning the Aquifer. The Aquifer is an interstate water source, and the amount of water to which each state is entitled from a disputed interstate water source must be allocated before one state may sue an entity for invading its share. . . . The fact that this particular water source is located underground, as opposed to resting above ground as a lake, is of no analytical significance."); *Mississippi v. City of Memphis, Tennessee, et al.*, 559 U.S. 901 (2010) (citing *Virginia v. Maryland*, 540 U.S. 56, 74, n. 9 (2003) ("Federal common law governs interstate bodies of water, ensuring that the water is equitably apportioned between States and that neither State harms the other's interest in the river."), and *Colorado v. New Mexico*, 459 U.S. 179, 187 n.3 (1982)).

[5] *See infra* Section V.

[6] Mississippi bears the burden to prove its contention that the Aquifer is not an interstate resource. Compl. ¶ 50. In an original action case "a complaining State must bear a burden that is 'much greater' than the burden ordinarily shouldered by a private party seeking an injunction." *Florida. v. Georgia*, 138 S. Ct. 2502, 2514 (2018) (citing *Connecticut v. Massachusetts*, 282 U.S. 660, 669 (1931)); *Colorado v. Kansas*, 320 U.S. 383, 393 (1943).

C. Factors Indicating The Interstate Character Of The Aquifer And Its Groundwater

The Special Master has held that "[i]f a body of water is such that the removal of water within a State's borders can have a direct effect on the availability of water in another State, the resource is likely interstate in nature." Mem. Dec. 2016 at 31. Evidence relevant to the threshold question would include the "nature and extent of hydrological and geological connections between the groundwater in Memphis and that in Mississippi, the extent of historical flows in the Aquifer between Mississippi and Tennessee, and similar considerations." *Id.* at 36. Specifically, the Special Master has identified the following as facts to be consistent with an interstate resource:

- "[B]ecause Mississippi had conceded that the Sparta Sand extends into Tennessee, that the Memphis Sand is 'supplied in large part by the Sparta Sand,' and that natural seepage causes water to move between Mississippi and Tennessee, the water at issue is likely interstate in nature." Mem. Dec. 2018 at 13 (citing Mem. Dec. 2016 at 32) (quoting Compl. ¶¶ 18-19, 22-24).

- "If the water Mississippi claims is part of a larger interstate resource – such as an interstate Aquifer – then the water is likely interstate in nature. Mem. Dec. 2018 at 14.

- "'The fact that Mississippi has less groundwater available to it than it would have in the absence of MLGW's pumping does not tend to show that the relevant water lacks an interstate character.'" Mem. Dec. 2018 at 14 (quoting Mem. Dec. 2016 at 29).

- "'[I]f a body of water is such that the removal of water within a State's borders can have a direct effect on the availability of water in another State, the resource is likely interstate in nature.'" Mem. Dec. 2018 at 14 (quoting Mem. Dec. 2016 at 31).

- "[B]ecause MLGW's pumping within Tennessee affects the availability of water in Mississippi, the water is likely interstate in nature." Mem. Dec. 2018 at16 (citing Mem. Dec. 2016 at 31).

- "[W]hen 'the removal of water within a State's borders can have a direct effect on the availability of water in another state, the resource is likely interstate in nature.'" Mem. Dec. 2018 at 17-18 (quoting Mem. Dec. 2016, at 31).

- "Thus, because Mississippi limits its claims to only water that would remain in Mississippi, the theory goes, that water is intrastate in nature. This argument fails for the reasons discussed in the pumping-effects section: "Since MLGW's pumping causes water to migrate out of Mississippi, the water is likely interstate in nature." Mem. Dec. 2018 at 18.

- "If anything, the fact that some water has already left Mississippi suggests that 'the extent of historical flows in the Aquifer between Mississippi and Tennessee' support an interstate character." Mem. Dec. 2018 at 19 (quoting Mem. Dec. 2016 at 36).

IV. MEMPHIS AND MLGW'S POSITION AND PROOF

A. The Aquifer Is An Interstate Resource

The proof will show that the Aquifer, including the groundwater in it, is an interstate resource. Memphis and MLGW's position is based on and supported by the meaning of "interstate" in common usage and in scientific journals, the expert reports and testimony in this case, and the undisputed facts – all of which are consistent with the factors identified by the Special Master as proving that a resource is interstate.

1. The Aquifer, including its groundwater, underlies multiple states, including Tennessee and Mississippi

Based on the common meaning of the word "interstate" and the use of the term "interstate aquifer" in scientific literature, "if some portion of an aquifer is beneath one state and another portion is beneath another state, that aquifer is an interstate aquifer." Langseth Rep. (Vol. 1) at 15.[7] Thus, "if a state line crosses over some portion of an aquifer, that aquifer is an interstate aquifer." *Id.* The Aquifer at issue is in fact interstate for the reasons set out below:

a. The Aquifer at issue is part of a larger, hydrologically interconnected regional aquifer system, the Mississippi Embayment

Memphis and MLGW's expert witness Dr. David Langseth will testify that the Aquifer at issue is one of several aquifers in the Mississippi Embayment. Langseth Rep. (Vol. 1) at 7, 15-16; *see also* Section II(A) above. Dr. Langseth

[7] Defining an interstate aquifer as one that lies beneath two or more states is also consistent with the use and definition of the analogous term "transboundary aquifer." *See, e.g.*, United States-Mexico Transboundary Aquifer Assessment Act, Pub. L. No. 109-448, § 3(9), 120 Stat. 3328 (2006) (codified at 42 U.S.C. § 1962) ("The term 'transboundary aquifer' means an aquifer that underlies the boundary between a Participating State and Mexico."); The Law of Transboundary Aquifers, G.A. Res. 63/124, Art. 2(c), U.N. Doc. A/RES/63/124 (Dec. 11, 2008) ("'[T]ransboundary aquifer' or 'transboundary aquifer system' means respectively, an aquifer or aquifer system, parts of which are situated in different States."); *see also* D33 (Dkt. No. 64) (citing Wiley Dep. at 22:34-23:1) (testifying that a transboundary aquifer is "[a]n aquifer that exists on two sides of a boundary"); D34 (Dkt. No. 64) (citing Spruill Dep. at 77:4-14) (opining that the Memphis-Sparta Aquifer is a transboundary aquifer because it "underlies multiple states in this region").

will opine that the Aquifer underlies parts of several states including Mississippi and Tennessee. Langseth Rep. (Vol. 1) at 7. The geographic extent of the Aquifer is not disputed. *See* Wiley Dep. at 12:18-13:12 (excerpts attached as Exhibit 6); Spruill Dep. at 32:20- 33:14, 35:9-14 (excerpts attached as Exhibit 7). In cross-section, the Mississippi Embayment appears like a layer cake with alternating layers of aquifers and confining layers. *See, e.g.*, Langseth Rep. (Vol. 2) Fig. 2.2.2. These layers are composed of granular materials. *Id.* Water flows easily through the layers made up primarily of sand – these layers are aquifers. *Id.* Water flows less easily through the layers dominated by silt and clay – these are confining layers. *Id.* Both are saturated with water. *Id.* However, the confining layers generally do not transmit enough water to supply a well and, therefore, are not aquifers. *Id.*

Dr. Langseth will testify that, under pre-development conditions, precipitation entered the aquifers in their outcrop areas, flowed through the aquifers toward the center of the Mississippi Embayment, and then flowed upward through the formations until finally discharging to the surface. *Id.* at 8-9. This process of recharge into, movement through, and discharge from the various aquifers in the Mississippi Embayment is continuous – it never stops. *Id.* at 10.

b. The Sparta Sand and Memphis Sand are different names for the same Aquifer

The Aquifer at issue is known by different names, including the Middle Claiborne Aquifer. *Id*. at 9. In southwest Tennessee and northwest Mississippi, the Aquifer is commonly called the Memphis Sand Aquifer. *Id.* South of the Tennessee-Mississippi border, the Aquifer continues above and below an intervening clay layer. *Id*. Where the Middle Claiborne aquifer continues above the clay layer, it is commonly called the Sparta Sand Aquifer. *Id.* The names Memphis Sand and Sparta Sand are used interchangeably. *Id*. at 2. Dr. Langseth will testify that, since the late 1800s, scientific literature has described the Memphis and Sparta Sand Aquifer as different names for the same Aquifer and has recognized that the Aquifer lies beneath both southwest Tennessee and northwest Mississippi. *Id*. at 10-13.

2. Before pumping began, groundwater in the Aquifer flowed naturally from Mississippi into Tennessee

a. The Aquifer is a dynamic system with its groundwater continually replaced by the processes of recharge and discharge

It is undisputed that before pumping began, there was water entering the Aquifer in Mississippi outcrop areas that naturally flowed northward into Tennessee. Langseth Rep. (Vol. 1) at 16; Spruill Dep. at 142:8-16, Ex. 1, Fig. 17; Wiley Dep. at 14:18-15:14, 71:18-21, 73:3-19, 141:6-142:9, 163:22-164:7, Ex. 1, Figs. 9, 23, Ex. 2, Fig. 5. It is further undisputed that there have never been any

type of barriers in the Aquifer aligning with state borders that impair or impede the interstate flow of groundwater. Spruill Dep. at 37:21-38:9; Wiley Dep. at 135:4-136:2.

b. Analysis of reported data confirms the natural pre-development flow

Dr. Langseth will opine that the natural, pre-development (i.e. pre-pumping) flow from Mississippi to Tennessee is confirmed by two studies that were based on evaluations of observed (i.e. reported or measured) data. Langseth Rep. (Vol. 1) at 16. The first was in 1976 by James Criner and William Parks for the USGS. *See* Criner & Parks (1976). The second was in 2015 by Brian Waldron and Daniel Larsen. Langseth Rep. (Vol. 1) at 16 (citing Waldron & Larsen (2015)). The Waldron and Larsen study included many more data points, and the reported measurements were closer in time to predevelopment than those available to Criner and Parks. *Id.* Nonetheless, both studies showed a natural flow of water in the Aquifer from Mississippi into Tennessee. *Id*. at 17. Waldron and Larsen's study, however, showed significantly more predevelopment flow from Mississippi into Tennessee. *Id*. at 16.

c. Modeling of the Aquifer using the USGS MERAS model confirms the natural pre-development flow

Dr. Langseth will also opine that the natural flow from Mississippi to Tennessee is confirmed by computer modeling. Dr. Langseth will testify that he

has performed "particle tracking" analysis using the USGS's Mississippi Embayment Regional Aquifer Study ("MERAS") computer model. *Id.* at 4, 17. The MERAS model is the USGS's most recent, state-of-the-art, computer simulation of the Mississippi Embayment including the Aquifer. *Id.* at 14. Particle tracking allows scientists to study groundwater flow paths by "releasing" theoretical bundles of water molecules in different areas and under different conditions and track them as they move. *Id.*

Dr. Langseth will testify that his particle tracking studies confirmed the natural flow of water from Mississippi into Tennessee during predevelopment conditions. Dr. Langseth will explain that some water entering the Aquifer in the Mississippi outcrop would naturally flow northward into Tennessee. *Id*. at 17. Specifically, under natural conditions, some groundwater from Mississippi naturally flowed northward into Tennessee and then southwest into Arkansas or back into Mississippi. *Id.*

d. Under pre-development conditions, all groundwater that entered the Aquifer in Mississippi would eventually leave Mississippi, and the groundwater that is leaving would be replaced by recharge

Dr. Langseth will opine that observed data and computer modeling both confirm that under natural conditions – before the influence of pumping – precipitation that recharged into the Aquifer in northern Mississippi would eventually leave Mississippi. *Id.* at 16-18. Dr. Langseth will opine that, even

today, water recharging into the Aquifer in Mississippi will ultimately leave Mississippi if it is not pumped. *Id.* at 23-24. Pumping in Shelby County, Tennessee, does not change that fact. At most, pumping in Tennessee merely impacts the pathway through which the water leaves Mississippi. *Id.* at 24.

3. Pumping in both Tennessee and Mississippi can and does have a direct effect on groundwater in the other state

Dr. Langseth will opine that withdrawing groundwater from the Aquifer in Tennessee can and does directly affect the groundwater in the Aquifer in Mississippi and that the reverse is true – withdrawing water in Mississippi can and does affect the groundwater in Tennessee. *Id*. at 20-22. Dr. Langseth will explain that the interstate impact of pumping from the Aquifer is confirmed by evaluating measured data and by data generated by USGS computer models. *Id.* This cross-border impact of pumping from the Aquifer in Mississippi and Tennessee is also undisputed. *See* Spruill Dep. at 38:10-39:4; Wiley Dep. at 16:9-13.

4. The groundwater at issue is interstate in nature because it is hydrologically connected to interstate surface water

Dr. Langseth will testify that particle tracking analysis using the USGS's MERAS model shows a direct hydraulic connection between the Aquifer and interstate rivers including, for example, the Wolf River. *Id.* at 18. The Wolf begins in Mississippi, flows north/northwest into Tennessee, and eventually empties into the Mississippi River at Memphis. *Id*. Dr. Langseth will also opine

that the water entering the Aquifer in Mississippi is hydrologically connected to other interstate rivers and/or rivers that lie within Tennessee. *Id.*

B. Defendants' Witnesses

1. Memphis and MLGW's Witness: David Langseth

Memphis and MLGW's proof will be presented through the testimony of their expert witness Dr. David E. Langseth, as described above. The credentials of Dr. Langseth were submitted in Memphis and MLGW's Credentials of Expert Witness (Sept. 14, 2018) (Dkt. No. 74).

2. Tennessee's Witnesses: Steve Larson and Brian Waldron

Memphis and MLGW anticipate that Tennessee's experts, Steve Larson and Dr. Brian Waldron, will offer opinions consistent with Dr. Langseth's testimony, which will show that the factors identified by the Special Master all point to the fact that the Aquifer is an interstate resource. For example, it is anticipated that Larson and Dr. Waldron will opine that the Aquifer at issue, including the groundwater in it, exists beneath parts of eight states, including Mississippi and Tennessee;[8] that groundwater in the Aquifer naturally crossed state borders before

[8] Waldron Dep. Ex. 1 at 2-3, Figs. 1, 3 (excerpts attached as Exhibit 10); Larson Dep. Ex. 1 at 2-3 (excerpts attached as Exhibit 11).

pumping began;[9] and that there are no physical barriers in the Aquifer aligned with state borders that impair or impede interstate flow.[10]

3. Rule 30(b)(6) Witnesses from Mississippi: Jamie Crawford and Jim Hoffman

Defendants will present deposition testimony from Mississippi's Rule 30(b)(6) witnesses Jamie Crawford and Jim Hoffman, who testified in the district court litigation in 2007. At the time they were deposed, Mr. Crawford and Mr. Hoffman both worked for the Mississippi Department of Environmental Quality. Mr. Crawford testified that the Aquifer is a resource shared by Tennessee and Mississippi and that both states had an interest in it. *See* Crawford Dep. at 133:10-20, 139:1 (excerpts attached as Exhibit 8). Both Mr. Crawford and Mr. Hoffman testified that the water in the Aquifer was continually flowing under predevelopment conditions and today. *See* Crawford Dep. at 89:12-22, 102:18-19; Hoffman Dep. at 24:15-22 (excerpts attached as Exhibit 9). Mr. Crawford testified that wells in Mississippi and Tennessee are both pumping out of the same aquifer – the Aquifer at issue. *See* Crawford Dep. at 138:21-139:1.

V. PLAINTIFF'S POSITIONS AND PROOF

The evidence relevant to the factors identified by the Special Master as supporting a finding that the Aquifer is interstate is undisputed. Plaintiffs' experts

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9 Waldron Dep. Ex. 1 at 3-4, 13-15; Larson Dep. Ex. 1 at 4.

10 Waldron Dep. Ex. 1 at 10; Larson Dep. Ex. 1 at 9-10.

have conceded that the Aquifer underlies eight states, that groundwater in the Aquifer naturally flowed from Mississippi into Tennessee before pumping began, and that withdrawing water from the Aquifer in Tennessee can impact the water in the Aquifer beneath Mississippi. These core facts support the conclusion that the Aquifer is an interstate resource.

Memphis and MLGW anticipate that Mississippi will attempt to flood the record with irrelevant testimony and opinions that stray far beyond the limited scope of the hearing – a strategy perhaps intended to create confusion and distract from the material facts that show that the Aquifer is interstate.[11] For example, it is anticipated that Plaintiff will seek to introduce evidence of the specific volume of groundwater withdrawn from the Aquifer by MLGW from 1965 to 2016, the annual amount of groundwater Defendants are alleged to have wrongfully taken since 1985 (*i.e.*, alleged damages), the speed of groundwater movement, the so-called "residency time" of groundwater, Mississippi's groundwater regulatory and permitting system, and MLGW's groundwater management practices.[12] None of

[11] The idea of phased litigation was proposed by Mississippi. Mem. Dec. 2016 at 36. The Special Master adopted Plaintiff's suggestion for phased litigation, holding that first phase would address the threshold question – whether the Aquifer, including its groundwater, is an interstate resource. *Id.*

[12] Defendants have moved to exclude this and other irrelevant evidence in their Joint Motion to Exclude Evidence Irrelevant to the Limited Evidentiary Hearing (Dkt. Nos. 81, 94).

this evidence is relevant or material to the question whether the Aquifer is an interstate resource.

The fact that pumping occurs or the amount of groundwater withdrawn does not make the Aquifer more or less interstate in nature. Pumping is relevant to the question at issue only because withdrawing water from the Aquifer in one state impacts the Aquifer in another state – a fact that the Special Master has found to support the interstate character of the resource. Mem. Dec. 2016 at 31. Notably, Mississippi has advanced no argument to suggest how the specific number of gallons pumped by MLGW per day might be relevant to whether the Aquifer is interstate. Mississippi has also failed to explain how MLGW's groundwater practices, Mississippi's permitting system, the residency time of groundwater, or the amount of groundwater allegedly diverted by Defendants will assist the Special Master in determining whether the Aquifer is interstate.

A. Mississippi's Contention That The Aquifer Is "Intrastate" Is Factually Unsupportable

1. Mississippi has repeatedly changed its legal and factual contentions

Since filing its original complaint against MLGW and Memphis in 2005, Mississippi has "changed positions as nimbly as if dancing a quadrille."[13]

[13] *Orloff v. Willoughby*, 345 U.S. 83, 87 (1953).

Mississippi has shifted and even reversed its legal and factual positions, even if the new position directly contradicts a position it has taken previously.[14]

Mississippi's most overt reversal of position has been its change from asserting that the Aquifer is an interstate resource to its present contention that the Aquifer is not an interstate resource. In the district court litigation, Mississippi affirmatively and repeatedly asserted that the Aquifer, and the groundwater in it, is an interstate resource.[15] Mississippi relied on the interstate character of the Aquifer and groundwater as the basis for federal court jurisdiction and the application of federal common law. The district court and Fifth Circuit agreed that

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[14] Asserting conflicting and irreconcilable positions is not new to Mississippi. In *Hood v. Memphis*, the district court noted that "while the Plaintiff contends on the one hand that only Mississippi water is involved in this suit, it also contends that the sole basis for the court's jurisdiction is the existence of a federal question because interstate water is the subject of the suit. The Plaintiff cannot have it both ways." 533 F. Supp. 2d at 649 (emphasis added).

[15] *See, e.g.*, *Hood* Compl. ¶ 9 ("Jurisdiction in this interstate groundwater dispute is proper in this Court under 28 U.S.C.A. Sections 1331 & 1332 inasmuch as, inter alia, there are presented herein certain federal questions calling for application of federal and/or interstate common law . . . .") (excerpt attached as Exhibit 13); *id.* ¶ 11 ("This is an interstate groundwater action."); *Hood* Amend. Compl. ¶ 8 (excerpt attached as Exhibit 14); Mississippi's Principal Brief to the Fifth Circuit at 1 (describing "the Memphis Sand Aquifer [as] an interstate underground body of water") (excerpt attached as Exhibit 15); *id.* at 21 ("The interstate nature of the aquifer confers federal question jurisdiction on the District Court."); Orig. 139, Mississippi's Brief in Support of Motion for Leave to File Bill of Complaint in Original Action at 19 ("That this Court has most frequently exercised its § 1251(a) jurisdiction over suits between states concerning the manner and use of waters of interstate lakes and rivers (albeit not ground water in subterranean geological sand formations) is beyond peradventure.") (excerpt attached as Exhibit 16).

the Aquifer was an interstate resource and that federal common law governed the interstate dispute. However, both courts rejected Mississippi's position that tort law (conversion and trespass) was the governing federal common law,[16] finding instead that Mississippi's claims concerning the right to use the interstate Aquifer would (if substantial harm could be shown) be governed by equitable apportionment. *See supra* notes 3-4.

In its current Complaint, however, Mississippi reversed its position, now alleging that the Aquifer and groundwater it is somehow "*neither* interstate water *nor* a naturally shared resource." Compl. ¶ 50.[17] Mississippi concedes (as it must) that the Aquifer "underlies both Mississippi and Tennessee," but Mississippi argues that the "Court's analysis must distinguish between the location of the geological formation on the one hand, and, on the other hand, the source, location and hydrologic characteristics of the groundwater stored in the formation under natural conditions." *Id.* The Special Master has twice rejected Mississippi's suggestion to separately consider the formation and groundwater, finding that the

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16 These are the same erroneous claims asserted by Mississippi in this case.

17 Mississippi's assertion that the Aquifer is intrastate is belied by its own Complaint in this very case in which it alleges that pumping from the Aquifer in Tennessee is causing groundwater in the same Aquifer to move north from Mississippi – something that is possible only if the Aquifer is both an interstate and shared resource.

"distinction does not appear to be material for purposes of determining whether the water at issue is interstate water." Mem. Dec. 2016 at 31; Mem. Dec. 2018 at 14.

Having first asserted that the Aquifer is interstate, then later claiming that the Aquifer's geology is interstate but its hydrology is intrastate, Mississippi's most recent theory is that the Aquifer is actually two different aquifers that are hydrologically connected.[18] Since 2005, Mississippi, its expert witnesses, and its Rule 30(b)(6) witnesses have used the names "Memphis Sand Aquifer" and "Sparta Sand Aquifer" interchangeably to refer to the same resource. *See supra* note 2. Now Mississippi is no longer acknowledging that there is one resource at issue but is claiming that the "Memphis Sand" and "Sparta Sand" are "distinct aquifers, but hydraulically connected." Plaintiff's Resp. to D25, D27 (Dkt. No.

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[18] Mississippi's "two aquifer" theory attempts to revive an unsuccessful argument made by Colorado in the first equitable apportionment case, *Kansas v. Colorado*, 206 U.S. 46 (1907). Colorado argued that the Arkansas River was actually two different rivers. The Court rejected Colorado's position:

> Equally untenable is the contention of Colorado that there are really two rivers, one commencing in the mountains of Colorado and terminating at or near the state line, and the other commencing at or near the place where the former ends, and, from springs and branches, starting a new stream to flow onward through Kansas and Oklahoma towards the Gulf of Mexico. From time immemorial the existence of a single continuous river has been recognized by geographers, explorers, and travelers. That there is a great variance in the amount of water flowing down the channel at different seasons of the year and in different years is undoubted; that at times the entire bed of the channel has been in places dry is evident from the testimony. In that way it may be called a broken river.

Id. at 115.

64). Mississippi raised its new "two aquifer theory" for the first time only after expert depositions were completed and after the discovery deadline expired.

2. Mississippi has changed positions to avoid equitable apportionment

The inherent interstate character of the Aquifer has not changed over time. Why has Mississippi reversed its original positions and is now denying that there is one Aquifer at issue and that the Aquifer, and its groundwater, is an interstate resource? What has changed is that every court that considered Mississippi's argument has rejected the notion that tort claims govern a dispute between states over an interstate resource. Those courts and now the Special Master all agree that if the Aquifer is an interstate resource, Mississippi's only judicial remedy would be equitable apportionment. Mississippi, however, does not seek or want equitable apportionment: First, Mississippi could not state a viable claim for equitable apportionment because it has not suffered any real or substantial injury. *Colorado v. New Mexico*, 459 U.S. 176, 187 n.13 (1982). Its own expert has testified that the change in the amount of groundwater stored in the Aquifer beneath DeSoto County, Mississippi, from predevelopment times to the present is insignificant. *See* Wiley 2007 Dep. at 90:8-21 (excerpts attached as Exhibit 17); *see also Mississippi v. City of Memphis, Tennessee, et al.*, 559 U.S. 901 (2010) (citing *Virginia v. Maryland*, 540 U.S. 56, 74 n.9 (2003)). Second, equitable apportionment provides no opportunity for Mississippi to recover money damages.

See Idaho v. Oregon, 462 U.S. 1017, 1025 (1983). Only by convincing the Court to abandon equitable apportionment in favor of tort law can Mississippi hope to "provide a windfall to [its] public treasury." *New Mexico v. General Electric Co.*, 467 F.3d 1223, 1247 (10th Cir. 2006) (quoting *Puerto Rico v. SS Zoe Colocotroni*, 628 F.2d 652, 676 (1st Cir. 1980)).

Ultimately, Mississippi's own factual allegations confirm that the Aquifer at issue, including its groundwater, is an interstate resource. The premise of Mississippi's lawsuit is that pumping from the Aquifer in Tennessee is impacting the availability of groundwater from that same resource in Mississippi. The Special Master has found that single factor to be indicative of a resource's interstate character. Any evidence Mississippi might attempt to introduce into the record cannot change that.

B. Mississippi's Position Is Legally Unsupportable

The position urged by Mississippi is antithetical to more than a century of equitable apportionment jurisprudence, the fundamental principles on which equitable apportionment is based, and well-established precedents holding that states do not "own" natural resources in a proprietary sense. Only by ignoring or overturning all of this existing law can Mississippi's case move forward.

Mississippi's tort claims are based on the erroneous notion that a state enjoys "sovereign ownership" of the water resources within its borders – including

water resources that are free to move across state borders into other states. Mississippi contends that, under the equal footing doctrine, it was "apportioned" a share of the Aquifer as a consequence of statehood.[19] That contention, if adopted, would nullify the doctrine of equitable apportionment because there would be no need for the Supreme Court to "re-apportion" those resources. The Special Master correctly found Mississippi's position to be "inconsistent with the Court's existing equitable-apportionment doctrine" and rejected it. Mem. Dec. 2016 at 23; *id.* at 21 ("Mississippi's discussion of equal footing does not appear to show that the doctrine applies to disputes concerning a State's pumping from an interstate resource.").

Mississippi's "strict geographic-sovereignty analysis of an interstate water source appears to be at odds with the equitable-apportionment doctrine." Mem. Dec. 2016 at 24. For example, the Supreme Court has repeatedly rejected the same argument in equitable apportionment cases when raised by states in which an interstate resource originates. *See, e.g.*, *Colorado v. New Mexico*, 467 U.S. 310, 323 (1984) (rejecting "the notion that the mere fact that the [river] originates in Colorado automatically entitles Colorado to a share" and finding that the water's

[19] Mississippi claims are based on what it alleges to be its "sovereign rights to groundwater ownership." Compl. ¶ 46. Mississippi, asserts that "[t]his case presents a state border and sovereignty issue, and the respective States' rights to the groundwater at issue should be determined based solely on Mississippi's and Tennessee's sovereign rights as States over their own territory." Compl. ¶ 51.

source "should be essentially irrelevant to the adjudication of these sovereigns' competing claims"); *Idaho v. Oregon*, 462 U.S. 1017, 1028 n.12 (1983) (noting that, "[w]hile the origin of the fish may be a factor in the fashioning of an equitable decree, it cannot by itself establish the need for a decree"); *Hinderlider v. LaPlata River & Cherry Ditch Co*., 304 U.S. 92, 102 (1938) ("The claim that on interstate streams the upper State has such ownership or control of the whole stream as entitles it to divert all the water, regardless of any injury or prejudice to the lower State . . . has been consistently denied by this Court."). Further, the Supreme Court has held that equitable apportionment is "flexible, not formulaic" and a doctrine that considers "all relevant factors." *Florida v. Georgia*, 138 S. Ct. 2502, 2515 (2018) (internal quotation marks and citations omitted); *see also Colorado v. New Mexico*, 459 U.S. 176, 183-84 (1982) ("Our aim is always to secure a just and equitable apportionment 'without quibbling over formulas.'") (quoting *New Jersey v. New York*, 283 U.S. 336, 343 (1931)). "For these reasons, Mississippi's equal-footing theory does not appear to apply to disputes over depletions of interstate water." Mem. Dec. 2016 at 24.

The Supreme Court has rejected the notion of a state's proprietary ownership of its resources – a fundamental assumption underlying Mississippi's claims. In a series of cases culminating in *Sporhase v. Nebraska*, 458 U.S. 941 (1982), the Supreme Court held that states do not hold absolute title to groundwater. The

theory of "public ownership" – urged by Mississippi in this case – is "'a fiction expressive in legal shorthand of the importance to its people that a State have power to preserve and regulate the exploitation of an important resource.'" *Id*. at 951 (quoting *Hughes v. Oklahoma*, 441 U.S. 322, 334 (1979)).[20]

Mississippi's "ownership" theory would undermine equitable apportionment and other fundamental legal concepts:

> [Mississippi's] remarkable claim departs from the almost uniformly established position that states do not "own" the water within their borders, but instead are authorized to manage that water for the "use" of their citizens. It also departs from the U.S. Supreme Court doctrine of "equitable apportionment" under which the Court has resolved interstate surface water conflicts, determining relative rights of use rather than awarding monetary damages based on water ownership.
>
> This conflation of use and ownership has the potential to affect the outcome of this case, as well as distort future litigation involving equitable apportionment, regulatory takings, state water rights law, and other legal doctrines.

Christine A. Klein, *Owning Groundwater: The Example of* Mississippi v. Tennessee, 35 Va. Envtl. L.J. 474, 474 (2017).

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[20] *See also* 2 Water and Water Rights § 36.02, pp. 36-8 and 36-9 (Amy L. Kelley, ed., 3rd ed. LexisNexis/Matthew Bender 2011) ("[T]he Supreme Court has made it abundantly clear that it has little patience with claims of absolute 'ownership' [of ground water] by either [state or federal] government[.]") (excerpts attached as Exhibit 18); *id.* at § 36.02, pp. 36-9 and 36-10, n.17 ("Even the dissent in *Sporhase*, 458 U.S. at 961-65, did not argue for recognition of absolute state 'ownership' of water, but rather for recognition of the authority of the state to define water rights.").

Mississippi's attempt to recover money damages directly conflicts with the Supreme Court's reason for precluding such damages in equitable apportionment cases. "Because apportionment is based on broad and flexible equitable concerns rather than on precise legal entitlements, … a decree is not intended to compensate for prior legal wrongs. Rather, a decree prospectively ensures that a State obtains its equitable share of a resource." *Idaho v. Oregon*, 462 U.S. 1017, 1025 (1983). Mississippi has produced no legal support to move forward and seek damages under its conversion and trespass theories. The Special Master should reject them.

C. The Position Urged By Mississippi Is Unworkable, Will Encourage State-Against-State Litigation, And Will Discourage States From Cooperating To Benefit Shared Resources

1. Mississippi's position is illogical and unworkable

Mississippi asks the Special Master to ignore the plain meaning of the word "interstate" and to adopt different definitions of "interstate" for surface water and underground water. Mississippi does not dispute that a river is interstate if it crosses a state boundary or forms the boundary between two states – without regard to the speed or origin of the water running through it, or whether the water even stops running during a dry season.[21] However, Mississippi contends that the

[21] The characteristics of the interstate rivers that have been considered by the Supreme Court in equitable apportionment cases and interstate compact disputes vary drastically. The existence of variations in flow (or even the lack of flow) has never been found to have changed the interstate character of the river. *See Kansas v. Colorado*, 206 U.S. 46, 115 (1907) (describing the Arkansas River and noting

determination of whether an aquifer is interstate requires a detailed analysis of the amount of recharge entering the aquifer in each state overlying it, the speed of the groundwater, the time each water molecule spends in the state in which it enters the aquifer, and consideration of the benefit or detriment to each state if the aquifer is deemed to be an inter- or intrastate resource. It is noteworthy that neither Mississippi nor its expert, Dr. Spruill, who invented this "test," is able to quantify what combination of water speeds, recharge percentages, and/or residency times might be sufficient to qualify the resource as interstate or intrastate. This is not surprising. The test is not only illogical, it is also subjective and unworkable. Further, it has no bearing on the straightforward question at issue in this hearing: whether the Aquifer is an interstate resource. The Special Master should reject it.

"[t]hat there is a great variance in the amount of water flowing down the channel at different seasons of the year and in different years is undoubted; that at times the entire bed of the channel has been in places dry is evident from the testimony"); *Hinderlider v. La Plata River & Cherry Ditch Co*., 304 U.S. 92, 97-98 (1938) (describing the La Plata River as "nonnavigable" with a "large run-off in the early spring," followed by a rapid decline in flow with little water available for irrigation in the summer months); *Kansas v. Nebraska*, 135 S. Ct. 1042, 1049 (2015) (describing the Republican River, which is subject to an interstate compact, as having been subject to an extended drought and deadly flooding); *Colorado v. New Mexico*, 459 U.S. 176, 178 (1982) (describing the Vermejo River as "a small, nonnavigable river").

2. Mississippi's position will encourage litigation and discourage cooperation between states over their shared natural resources

Adopting Mississippi's "sovereign ownership" theory and allowing States to sue over disputed rights to use an interstate resource in tort will encourage expensive and protracted original actions filed by states motivated not by a desire to preserve and protect a shared interstate water resource, but instead by the possibility of a windfall to their treasuries.[22] Currently, the expense and uncertainty of an equitable apportionment lawsuit serves as an incentive for states to work together to share and sustain interstate resources through the interstate compact process. *See Hinderlider v. La Plata River & Cherry Creek Ditch Co.*, 304 U.S. 92, 105 (1938) ("But resort to the judicial remedy is never essential to the adjustment of interstate controversies, unless the States are unable to agree upon the terms of a compact, or Congress refuses its consent. The difficulties incident to litigation have led States to resort, with frequency, to adjustment of their controversies by compact, even where the matter in dispute was the relatively

[22] Mississippi shares at least 9 different aquifers with other states: the Middle Claiborne Aquifer (Hart, et al. (2008) (excerpts attached as Exhibit 19) at 16, 20); the Mississippi River Valley Alluvial Aquifer (*id*. at 8, 11); the Lower Claiborne-Upper Wilcox Aquifer (*id*. at 5, 25); the Middle Wilcox Aquifer (*id*. at 23, 26); Lower Wilcox Aquifer (*id*. at 23, 29); the McNairy-Nacatoch Aquifer (Groundwater Atlas at F19); the Pearl River Aquifer (*id*. at A9, G20); the Black Warrior River Aquifer (*id*. at A9, G20; Renken (1996) at B78) (excerpts attached as Exhibit 20); and the Chattahoochee River Aquifer (Groundwater Atlas at A9, G20) (excerpts attached as Exhibit 22).

simple one of a boundary."). If Mississippi's position is adopted, that incentive will be lost. The ability to seek a money judgment without the showing of a real injury to a natural resource would *encourage* litigation between states because the goal of the suit would be to recover money damages, not to benefit the long-term sustainability of the resource.

The potential for a wave of interstate lawsuits is not speculative. The USGS has recognized at least 36 interstate aquifers. Eight of those 36 interstate aquifers collectively lie beneath and, therefore, implicate the rights and interests of 36 different states (75% of the contiguous 48 states):

- The Middle Claiborne Aquifer (at issue here): Illinois, Kentucky, Tennessee, Mississippi, Alabama, Louisiana, Arkansas, and Missouri.[23]
- The Potomac-Patapsco Aquifer: New York, New Jersey, Delaware, Maryland, Virginia, North Carolina, and South Carolina.[24]
- The Chattahoochie River Aquifer: Mississippi, Alabama, Georgia, South Carolina and Florida.[25]
- The High Plains Aquifer: South Dakota, Wyoming, Nebraska, Kansas, Colorado, Oklahoma, New Mexico, and Texas.[26]
- The Entrada-Preuss Aquifer: Wyoming, Utah, Colorado, Arizona, and New Mexico.[27]
- The Columbia River Basalt Aquifer: Idaho, Oregon, and Washington.[28]

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23 *See* Hart, et al. (2008) at 16, 20.

24 *See* Masterson, et al. (2016) at 6 (excerpts attached as Exhibit 21).

25 *See* Groundwater Atlas at A9.

26 *See* Groundwater Atlas at A6.

27 *See* Freethey & Cordy (1991) at C22-28 (excerpts attached as Exhibit 23).

- The St. Peter-Prairie du Chien-Jordan Aquifer: Wisconsin, Michigan, Illinois, Indiana, Missouri, Iowa, and Minnesota.[29]
- The Silurian-Devionian Aquifer: Ohio, Indiana, Illinois, Iowa, Wisconsin, and Michigan.[30]

Under Mississippi's "sovereign ownership" theory, all of the above states would instantly become a putative plaintiff or defendant.

The doctrine of equitable apportionment seeks to ensure the just and equal treatment of states in disputes over interstate resources. For more than a century, equitable apportionment has stood against the very arguments made in this case by Mississippi – many of which were raised and lost in the first equitable apportionment, *Kansas v. Colorado*. Mississippi's willingness to cast aside settled law in the pursuit of a windfall should be rejected.

D. Plaintiff's Experts

Plaintiff has disclosed two experts: Richard K. Spruill, Ph.D., P.G., and Mr. David Wiley. The testimony anticipated by Dr. Spruill and Mr. Wiley is, in large measure, irrelevant to whether the Aquifer is an interstate resource. *See supra* Section V. Defendants' motions to exclude the testimony and opinions of Dr. Spruill (Dkt. Nos. 79, 95), to exclude the testimony of Mr. Wiley (Dkt. Nos. 77, 96), and to exclude irrelevant evidence (Dkt. Nos. 81, 94) describe in detail the

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28 *See* USGS (1984) at 194 (excerpts attached as Exhibit 24).

29 *See* Groundwater Atlas at J22, K12, A10.

30 *See* Groundwater Atlas at K10-11, J18-20.

flaws in the opinions and methodology of Mississippi's experts and explain why many of their opinions are not relevant to the limited issue before the Special Master. At the same time, however, it is important to note that both Dr. Spruill and Mr. Wiley characterize the Aquifer in ways that confirm that it is an interstate resource. *See* Langseth Rebuttal at 3-7 (attached as Exhibit 12).

VI. PENDING PRE-TRIAL MOTIONS

As of the filing of this Pre-Trial Brief, the following motions filed by Defendants State of Tennessee, City of Memphis, and MLGW are pending:

- Joint Motion to Exclude the Testimony of Dr. Richard Spruill (Dkt. Nos. 79, 95);
- Joint Motion to Exclude the Testimony and Opinions of Mississippi's Expert David Wiley (Dkt. Nos. 77, 96);
- Joint Motion *in Limine* to Preclude Mississippi from Arguing that there are Two Aquifers at issue (Dkt. Nos. 78, 97);
- Joint Motion to Exclude Evidence Irrelevant to the Limited Evidentiary Hearing (Dkt. Nos. 81, 94); and
- Joint Motion to Exclude Mississippi's Designated Deposition Testimony (Dkt. Nos. 80, 98).[31]

Along with the above motions, Defendants' joint objections to Mississippi's proposed facts are set out in Docket No. 64.

[31] Defendants have also jointly filed exhibits to their motions and reply briefs. (Dkt. Nos. 83, 99).

VII. CONCLUSION

The limited question before the Special Master is narrow and straightforward: Is the Aquifer an interstate resource? The proof will conclusively show the answer to that question must be "yes." It is undisputed that the Aquifer exists beneath eight different states, including Mississippi and Tennessee. It is undisputed that wells located in both Mississippi and Tennessee are pumping from the same interstate Aquifer. It is undisputed that pumping from the Aquifer in Mississippi or Tennessee impacts groundwater in the Aquifer beneath the other state. It is undisputed that, before pumping began, groundwater in the Aquifer naturally flowed across state lines. It is undisputed that the Aquifer is hydrologically connected to interstate surface water. These are the factors identified by the Special Master as relevant to the limited issue for the evidentiary hearing. All of these factors compel the same result: the Aquifer, including the groundwater in it, is an interstate resource.

The Aquifer is objectively, functionally, and factually an interstate resource. The Aquifer is not subject to an interstate compact, and therefore, the only cause of action available to determine the rights of the states overlying the Aquifer to use it is an equitable apportionment action. Because Mississippi has disavowed equitable apportionment, it has failed to state a viable claim for relief, and the Special Master should recommend dismissal with prejudice.

Respectfully submitted,

/s/ *Leo M. Bearman*

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CERTIFICATE OF SERVICE

Pursuant to Paragraph 3 of the Special Master's Case Management Plan (Dkt. No. 57), I hereby certify that all parties on the Special Master's approved service list (Dkt. No. 26) have been served by electronic mail, this 20th day of December, 2018.

/s/ *Leo M. Bearman*

Leo M. Bearman
Counsel for Defendants City of Memphis, Tennessee and Memphis Light, Gas & Water Division