IN THE SUPREME COURT OF THE UNITED STATES
NO. 143, Original

STATE OF MISSISSIPPI,
Plaintiff,

v.

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


CANADA
MEXICO
GULF OF MEXICO
PACIFIC OCEAN
ATLANTIC OCEAN

EXPLANATION

Unconsolidated and semiconsolidated sand and gravel aquifers

- Sand and gravel aquifers north of the limit of Quaternary continental glaciation and east of the Rocky Mountains. The aquifers are mostly in glacial deposits – Gray is combined with color of underlying aquifer
- 1 Basin and Range basin-fill aquifers
- 2 Rio Grande aquifer system
- 3 California Coastal Basin aquifers
- 4 Pacific Northwest basin-fill aquifers
- 5 Columbia Plateau basin-fill aquifers
- 6 Snake River Plain basin-fill aquifers
- 7 Puget Sound aquifer system
- 8 Willamette Lowland basin-fill aquifers
- 9 Northern Rocky Mountains Intermontane Basins aquifer system
- 10 Central Valley aquifer system
- 11 High Plains aquifer
- 12 Pecos River Basin alluvial aquifer
- 13 Mississippi River Valley alluvial aquifer
- 14 Seymour aquifer
- 15 Surficial aquifer system
- 16 Unconsolidated-deposit aquifers (Alaska)
- 17 South Coast aquifer (Puerto Rico)
- Coastal Plain aquifer systems in semiconsolidated sand
  - 18 Coastal lowlands aquifer system
  - 19 Texas coastal uplands aquifer system
  - 20 Mississippi embayment aquifer system
  - 21 Southeastern Coastal Plain aquifer system
  - 22 Northern Atlantic Coastal Plain aquifer system

Sandstone aquifers

- 23 Colorado Plateaus aquifers
- 24 Denver Basin aquifer system
- 25 Lower Cretaceous aquifers
- 26 Rush Springs aquifer
- 27 Central Oklahoma aquifer
- 28 Ada–Vamoosa aquifer
- 29 Early Mesozoic basin aquifers
- 30 New York sandstone aquifers
- 31 Pennsylvanian aquifers
- 32 Marshall aquifer
- 33 Cambrian–Ordovician aquifer system
- 34 Jacobsville aquifer
- 35 Lower Tertiary aquifers
- 36 Upper Cretaceous aquifers
- 37 Upper Tertiary aquifers

Sandstone and carbonate-rock aquifers

- 38 Edwards–Trinity aquifer system
- 39 Valley and Ridge aquifers – Carbonate-rock aquifers are patterned
- 40 Mississippian aquifers
- 41 Paleozoic aquifers

Carbonate-rock aquifers

- 42 Basin and Range carbonate-rock aquifers
- 43 Roswell Basin aquifer system
- 44 Ozark Plateaus aquifer system
- 45 Blaine aquifer
- 46 Arbuckle–Simpson aquifer
- 47 Silurian–Devonian aquifers
- 48 Ordovician aquifers
- 49 Upper carbonate aquifer
- 50 Floridan aquifer system
- 51 Biscayne aquifer
- 52 New York and New England carbonate-rock aquifers
- 53 Piedmont and Blue Ridge carbonate-rock aquifers
- 54 Castle Hayne aquifer
- 55 North Coast Limestone aquifer system (Puerto Rico)
- 56 Kingshill aquifer (Virgin Islands)

Igneous and metamorphic-rock aquifers

- 57 Southern Nevada volcanic-rock aquifers
- 58 Pacific Northwest basaltic-rock aquifers
- 59 Snake River Plain basaltic-rock aquifers
- 60 Columbia Plateau basaltic-rock aquifers
- 61 Hawaiian volcanic-rock aquifers – Locally overlain by sedimentary deposits
- 62 Piedmont and Blue Ridge crystalline-rock aquifers

Other

- Rocks that are minimally permeable but may contain locally productive aquifers

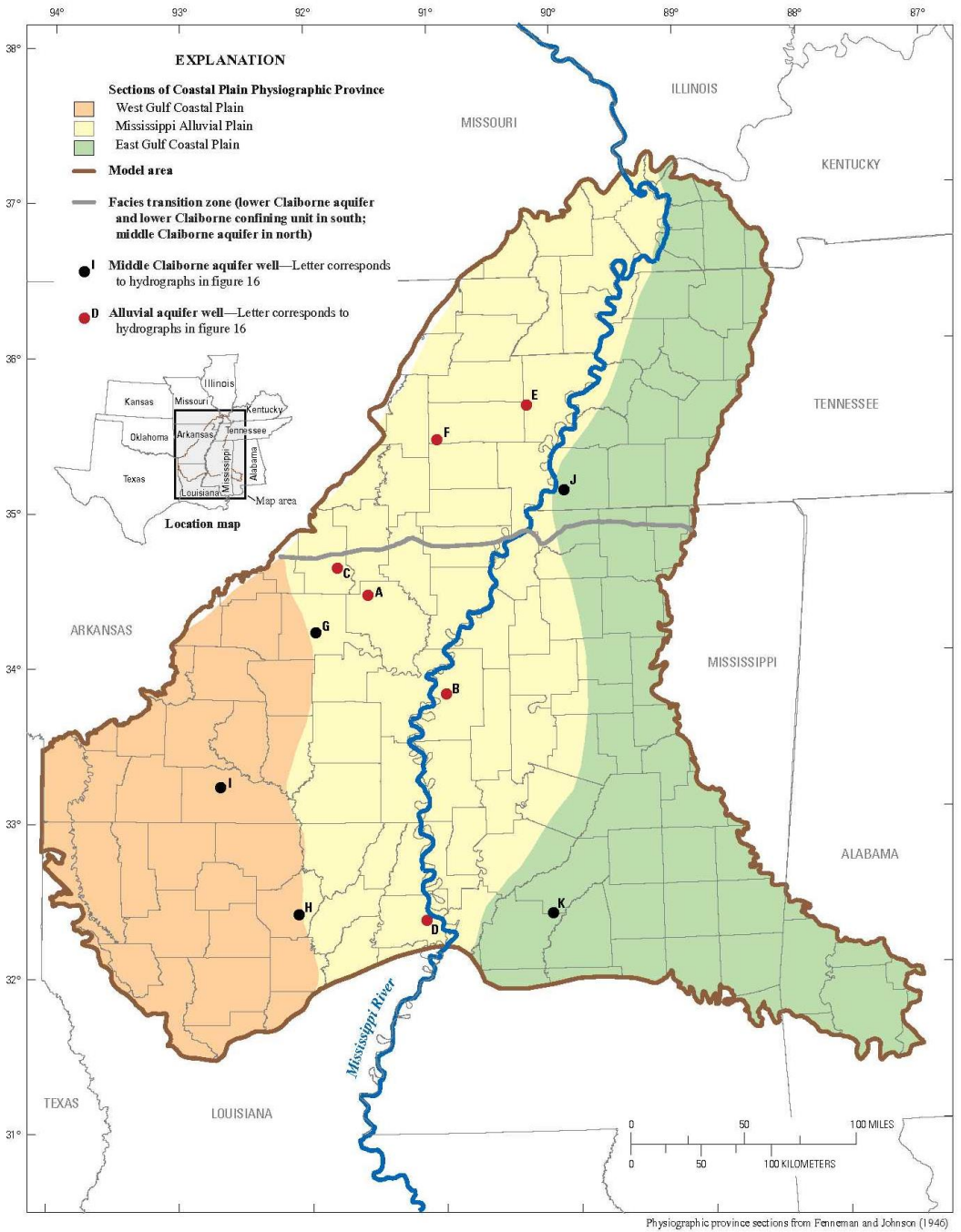


Figure 1. Location of the model area and Coastal Plain physiographic province sections.

Table 1. Hydrogeologic and geologic units and their correlation across the States within the Mississippi Embayment Regional Aquifer Study.

ERATHEM	SYSTEM	EPOCH	GROUP	LOUISIANA	ARKANSAS		MISSOURI	KENTUCKY	TENNESSEE	MISSISSIPPI	ALABAMA	Hydrogeologic units	Model layer number
					Southern	Northeastern							
CENOZOIC	QUATERNARY	HOLOCENE		Alluvium and terrace deposits				Alluvium and loess deposits		Alluvium, terrace, and loess deposits	Alluvium and terrace deposits	Mississippi River Valley alluvial aquifer	1
		PLEISTOCENE											
	TERTIARY	OLIGOCENE	Vicksburg	Vicksburg Formation	Not present in study area					Vicksburg Formation		Vicksburg-Jackson confining unit	2
		EOCENE	Jackson	Jackson Formation									
			Claiborne	Cockfield Formation							Gosport Sand	Upper Claiborne aquifer	3
				Cook Mountain Formation								Middle Claiborne confining unit	4
				Sparta Sand		Memphis Sand		Sparta Sand	Memphis Sand	Sparta Sand	Lisbon Formation	Middle Claiborne aquifer[4]	5–7
				Cane River Formation				Tallahatta Formation		Zilpha Clay Winona Sand Tallahatta Formation	Tallahatta Formation	Lower Claiborne confining unit[2]	8–9
				Carrizo Sand						Meridian Sand Member		Lower Claiborne aquifer[1]	10
		UPPER PALEOCENE	Wilcox	Dolet Hills Formation	Undifferentiated	Flour Island Formation		Wilcox Formation	Flour Island Formation	Undifferentiated	Hatchetigbee Formation	Middle Wilcox aquifer	11
						Fort Pillow Sand		No Wilcox deposits identified as being of Paleocene age	Fort Pillow Sand		Bashi Formation Tuscahoma Sand Nanafalia Formation	Lower Wilcox aquifer[3]	12–13
				Undifferentiated Naborton Formation		Old Breast-works Formation			Old Breast-works Formation				
			Mid-way	Midway Group								Midway confining unit	Base of model

[1] Lower Claiborne aquifer includes the upper Wilcox aquifer in some parts of Mississippi.
[2] Winona-Tallahatta Formation is included with lower Claiborne confining unit in Hart and others (2008).
[3] Old Breastworks confining unit is included with middle Wilcox aquifer in Hart and others (2008).
[4] El Dorado confining unit and El Dorado Sand are included with middle Claiborne aquifer.

Modified from Hosman and Weiss, 1991

Summary of Mississippi's Facts/Law

- Mississippi was admitted to the Union (20th state) on December 10, 1827, on an equal footing with the original thirteen States

- Mississippi is sovereign over all matters not ceded to the federal government under the Constitution of the United States (10th Amendment)

- All water naturally residing within Mississippi's borders is a natural resource belonging to the people of Mississippi over which Mississippi holds exclusive dominion and control to the exclusion of its neighboring States. *Kansas v. Colorado*, 206 U.S. 46, 95, 97 (1907); Miss. Code Ann. §51-3-1 (2003)

- Defendants have knowingly undertaken well field development near the Mississippi-Tennessee border to produce Mississippi groundwater, materially reduced Mississippi's total available groundwater drawdown, increased Mississippi's groundwater development costs, and negatively changed the natural hydraulic conditions in the aquifer in Mississippi putting high quality Mississippi groundwater at risk of degradation

Summary of Defendant's Facts/Law

- The entire Mississippi Embayment covering about 97,000 square miles is one uninterrupted, flowing body of water underlying parts of eight states

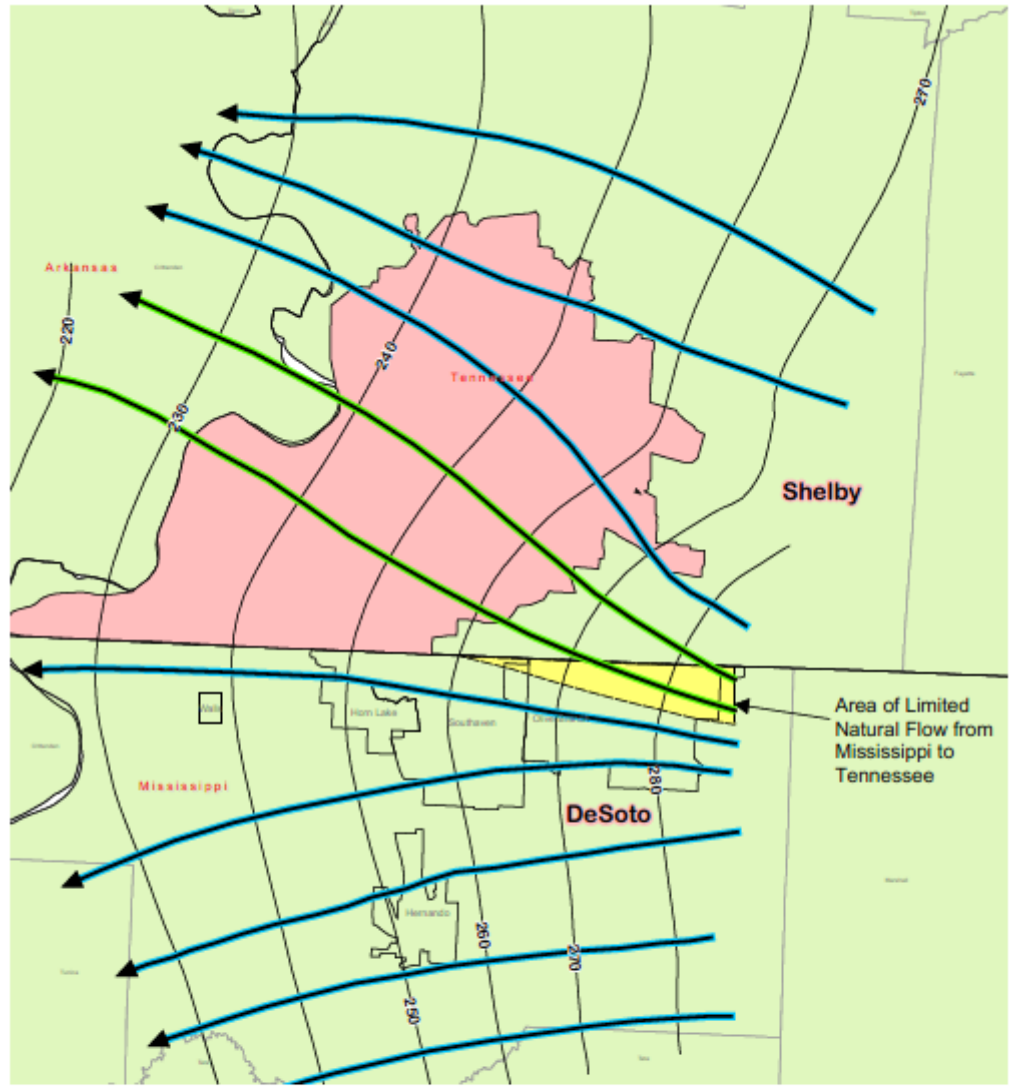
- The fact that absent pumping, over time periods measured in hundreds and thousands of years, some of the deep confined groundwater within this 97,000 square mile Aquifer would cross from Mississippi into Tennessee under natural conditions makes State borders irrelevant

- The fact that surface waters are hydrologically connected to the confined aquifer systems in Mississippi makes State borders irrelevant

- The fact that Mississippi groundwater can be pumped out of storage in Mississippi into Tennessee means the Mississippi groundwater is a shared interstate natural resource just like the Arkansas River in *Kansas v. Colorado*

- Because Mississippi has denied that it seeks equitable apportionment, its case should be dismissed

So Let’s Briefly Look At Some Historical Facts



SOURCE: BRAHANA WRI 89-4131

N

0 3 6

Miles

- Flow Lines Showing Pre-Development Groundwater Flow Direction
- Flow Across State Line
- Flow Within State
- Potentiometric Surface Contour Lines

UPDATE REPORT ON DIVERSION AND WITHDRAWAL OF GROUNDWATER FROM NORTHERN MISSISSIPPI INTO THE STATE OF TENNESSEE

1886 ESTIMATED POTENTIOMETRIC SURFACE MAP FOR PREDEVELOPMENT CONDITIONS

PREPARED BY: LEGGETTE, BRASHEARS & GRAHAM, INC.
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N

0 5 10 Miles

Particle Tracking Analysis			
Simulated Velocity to Particle Discharge Location			
Average (feet/Year)	**Median (ft/year)**	**Maximum (ft/year)**	**Minimum (ft/year)**
40.61	44.71	52.76	13.75
Average (feet/day)	**Median (ft/day)**	**Maximum (ft/day)**	**Minimum (ft/day)**
0.11	0.12	0.14	0.04

Simulated Travel Time		
	Days	**Years**
Minimum	1,416,080	3,877
Maximum	8,104,420	22,189
Average	2,754,800	7,542

Legend

- Sparta Sands Flow Paths
- Pre-Development Heads
- Memphis Aquifer Outcrop (unconfined) Approximate Limits
- Transition Zone
- Middle Claiborne Aquifer Extent

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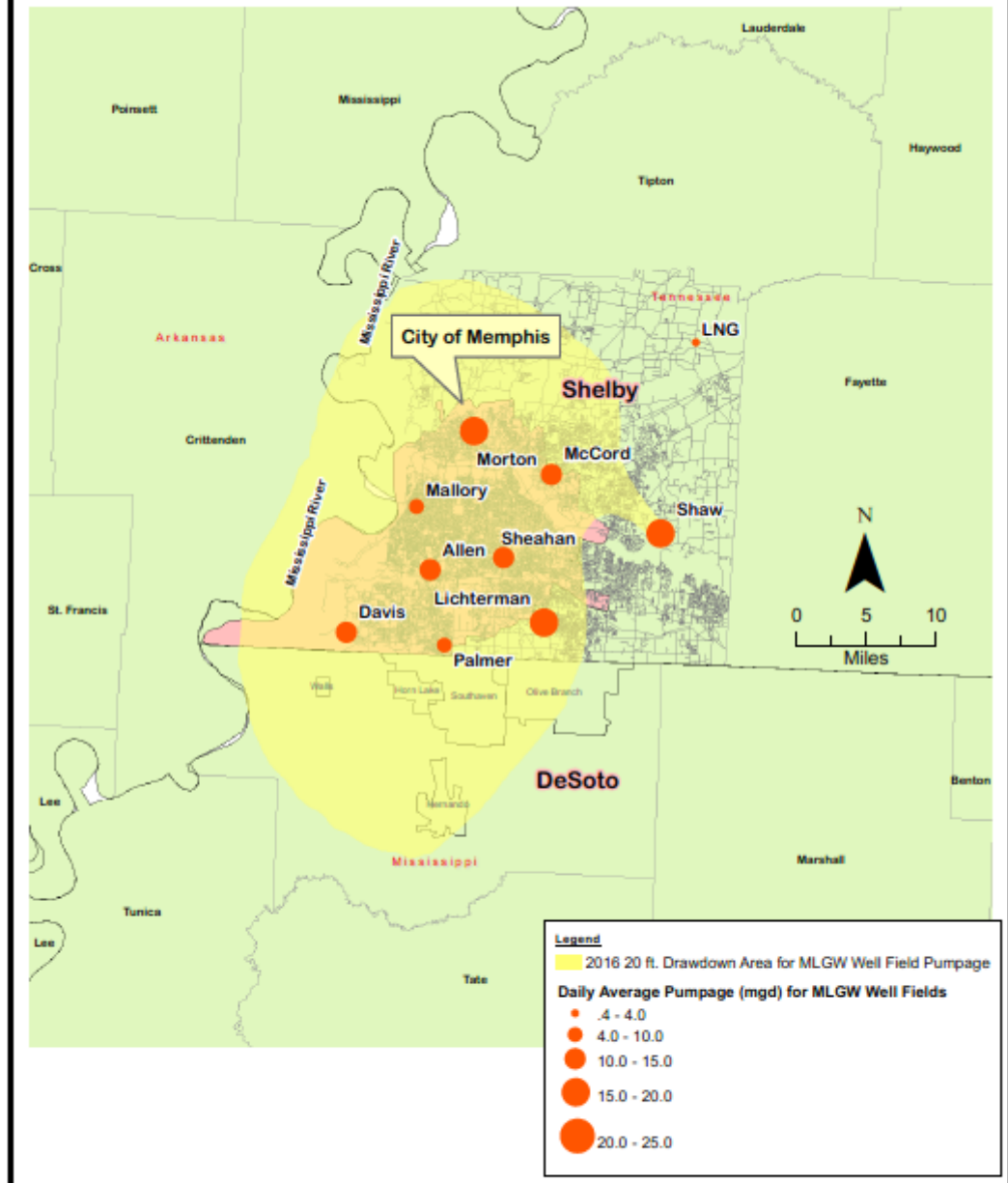
UPDATED REPORT ON DIVERSION AND WITHDRAWAL OF GROUNDWATER FROM NORTHERN MISSISSIPPI INTO THE STATE OF TENNESSEE

PRE-DEVELOPMENT FLOW PATHS IN NORTHWESTERN MISSISSIPPI



UPDATE REPORT ON DIVERSION AND WITHDRAWAL OF GROUNDWATER FROM NORTHERN MISSISSIPPI INTO THE STATE OF TENNESSEE

PROJECT AREA

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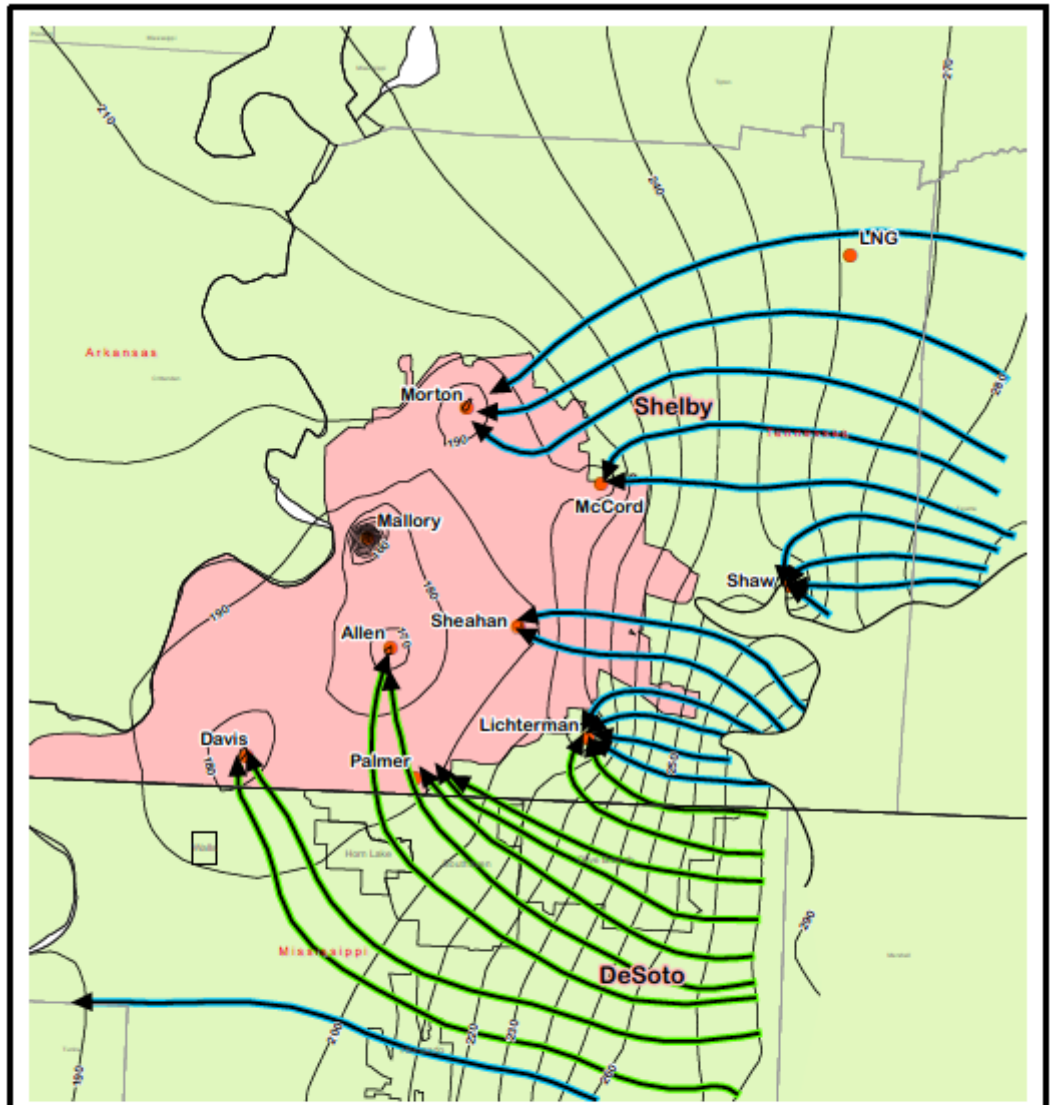

UPDATE REPORT ON DIVERSION AND WITHDRAWAL OF GROUNDWATER FROM NORTHERN MISSISSIPPI INTO THE STATE OF TENNESSEE

2016 POTENTIOMETRIC SURFACE MAP
DEVELOPED FROM GROUNDWATER MODEL

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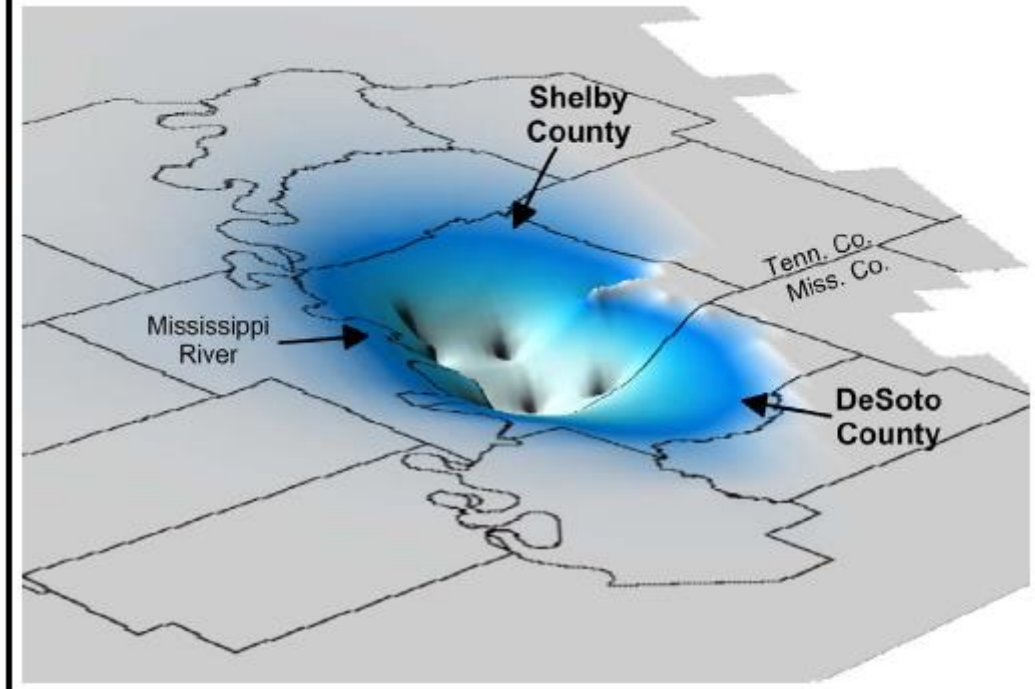

UPDATE REPORT ON DIVERSION AND WITHDRAWAL OF GROUNDWATER FROM NORTHERN MISSISSIPPI INTO THE STATE OF TENNESSEE

THREE-DIMENSIONAL ILLUSTRATION
SHOWING CONE OF DEPRESSION

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FIGURE NO.:	3

Table 3 - Volume of Groundwater Taken From Mississippi Due to MLGW Pumpage

Year	MGD
1965	12.9
1966	14.5
1967	15.3
1968	16.0
1969	16.5
1970	18.6
1971	19.8
1972	21.1
1973	22.5
1974	22.9
1975	21.8
1976	21.9
1977	23.5
1978	23.6
1979	24.0
1980	25.1
1981	23.6
1982	23.8
1983	23.9
1984	23.9
1985	24.3
1986	25.8
1987	25.6
1988	27.2
1989	25.8
1990	26.1

Year	MGD
1991	25.1
1992	24.5
1993	24.8
1994	25.3
1995	23.1
1996	23.5
1997	22.7
1998	24.3
1999	24.8
2000	24.4
2001	22.9
2002	23.2
2003	23.0
2004	22.9
2005	22.7
2006	21.6
2007	22.3
2008	20.5
2009	18.6
2010	19.8
2011	20.2
2012	18.6
2013	15.7
2014	16.2
2015	14.1
2016	13.5

Mississippi's Positions:

- Supreme Court must recognize and protect Mississippi's territorial sovereignty over its most important natural resource

- Defendants' actions violate Mississippi's sovereignty; MLGW has no lawful authority to capture groundwater residing in Mississippi

- Under the Constitution, the Supreme Court cannot, under the guise of equitable apportionment, authorize MLGW or others in Tennessee to capture groundwater that naturally resides in Mississippi and is subject to the exclusive dominion and control of Mississippi as a sovereign State

Relief Sought by Mississippi:

- Declaration affirming Mississippi's sovereignty over the natural resources residing within its borders as between Mississippi and neighboring States

- Declaration affirming Mississippi's exclusive sovereign authority to protect, preserve, regulate, and control all waters within its borders subject only to laws passed by Congress

- Injunctive relief, including such changes to MLGW's operations as may be necessary to shrink the cone of depression (cease or minimize MLGW's cross-border extractions)

- Monetary damages for groundwater knowingly and wrongfully taken by Defendants without right or permission

Practical Consideration:
What Outcome Best Manages, Preserves, and Protects Groundwater?

- Because of the vast differences within the local natural geology and resulting hydrology of groundwater resources, each State is in the best position to manage, preserve, and protect the groundwater resources within its borders

- Reaffirming the territorial sovereignty of each State over all of its groundwater resources would incentivize neighboring States to better control groundwater production by their citizens and governmental subdivisions, and to negotiate and enter interstate compacts where necessary

- Equitable apportionment is not practical because (a) the complexities of local geology and hydrology, and limitations of data, make equitable apportionment virtually impossible in most cases; and (b) allowing one state to pump groundwater out of a neighboring State without that State's agreement will encourage water wars