

February 15, 2023

Mr. Mark R. Wingate
Mr. Brad L. Inman
U.S. Army Corps of Engineers
Regional Planning and Environment Division South
7400 Leake Avenue
New Orleans, LA 70118

Re: Lower Mississippi River Comprehensive Water Supply Mega Study

Dear Gentlemen,

The Tulane Institute on Water Resources Law & Policy was founded on the premise that good stewardship and wise water resource management are not merely creatures of science, engineering, and public sentiment, but also of law and policy. The Institute is committed to elevating the role of law and policy in water management through timely, interdisciplinary, rigorous research, professional education, and public service. It is through that lens that we write this letter to pass along our thoughts about the Lower Mississippi River Comprehensive Water Supply Mega Study that the Mississippi River Commission and Army Corps of Engineers are embarking upon and to open the door for collaboration on the monumental task ahead.

At the Mississippi River Commission's 2022 annual low-water inspection trip meeting in Morgan City, we expressed our interest in—indeed enthusiasm for—the Mega Study. In our testimony at that meeting, we explained how important we believe this study will be to the future of the Mississippi River watershed and the people and ecosystems that depend on it. Simply put, the combination of a changing river system, a changing climate, and a growing competition for fresh water in the United States and abroad make this study one of the most important undertakings of its kind in our nation's history.

A successful study starts with getting the scope right, something General Holland acknowledged in Morgan City. Her recognition of the fact that understanding and managing the river also means understanding and managing for the relationships between surface waters and groundwater is both ground-breaking and flat out sensible. Those connections may be hydrologically and ecologically undeniable, but they have more often than not been ignored in the laws and authorities governing water resources. The MRC deserves commendation for putting that on the table at the outset.

The surface water/groundwater connection is only one of the challenges this study will have to contend with, as we noted in our testimony in Morgan City. In our testimony we highlighted a range of issues that we believe this study will need to address, and we will elaborate on those comments in this letter.

Comments regarding Focus Areas for the Mega-Study:

1. Corridor and National Water Demand—A Continual Evolution

The MRC has long been tasked with managing the Mississippi River within the context of the ecology, economy, and society that has developed around the river and in turn shaped it. Just as sustainable river management must account for existing water uses and users, it must also consider the inevitability of ongoing change and of new uses and users in the future.

For example, not so long ago, hydraulic fracturing to extract oil and gas was a metaphorical drop in the bucket of water resource uses. The shale gas and oil revolution which can require 1.5-16 million gallons of water for each well has changed that. While that water is not coming from the Mississippi River itself, much of it is coming from the river's tributaries and associated aquifers. Similarly, years ago, we might not have known that we would need a 50-foot-deep navigation channel at the mouth of the Mississippi River, much less the currently authorized 55-foot-deep channel we have today.

Recent low-water episodes on the river are a stark reminder of how channel depth, rising seas, and low flows can combine to threaten navigation and public and industrial water supply, and that it takes a big river to make life and commerce possible here. That may be obvious to the corridor states and the river's traditional constituencies, but it is not obvious to many others. Indeed, at the very time barge traffic was being limited and sills were being constructed to obstruct saltwater intrusion, a growing chorus of voices in the Southwest saw only "surplus" water that would better serve them than the people and ecosystems of the Basin. Those voices are not going away, and their desires and plans will need to be taken into account in the Mega Study one way or another.

At the end of the day, it needs to be widely understood that the outcome of the Mega Study will not be just an informational survey of what we know and don't know about the river, but rather a tool for managing the River and its associated resources. A tool for establishing—and adjusting—a water and sediment budget for the river will help answer the question of whether there really is surplus water. It also needs to be clearly understood that, though the focus of the Mega Study is on the lower River, there is no avoiding the roles that the upper River and other tributaries of the lower River play in shaping the lower River.

2. Evolving River Demand in the River Corridor

Even within Louisiana and along the Mississippi River Corridor there are nontraditional technologies and uses that will be contending for the river. Some of these, like carbon capture, utilization and storage (CCUS), are relatively new, and some, such as water for cooling and public supply, will be new manifestations of old uses. Regardless, they are all going to matter, so at the least we think the Mega Study should consider the following:

a. Carbon Capture, Utilization, and Storage (CCUS). It is already clear that Louisiana is positioning itself as a mecca for CCUS. The novel technology has its advocates and opponents, but very rarely do their exchanges cover the water impacts or consumptive uses of CCUS; this is

because they are largely unknown. Whatever the water requirements are, they are undoubtedly contingent on a quantity and quality of river delivered to Louisiana by the rest of watershed. Yet, when the Institute has broached the subject with the state agencies expected to administer CCUS activities, responses have run the gamut from confusion to indifference. CCUS represents just one example of a new future use. While river management cannot anticipate every use that may arise, it can—and must—anticipate their inevitability.

b. Agriculture. Agriculture is not new to the corridor or to Louisiana, but as changing climate and weather patterns combine with depleting natural water resources it is almost certain that where and how agricultural products (which now go well beyond food) are made will be shifting. In fact, they already are. The struggles over the Colorado River are about more than one state versus another; they are about agricultural uses versus urban, industrial, fisheries, and environmental uses. Whatever the outcome of that, it seems inevitable that some agricultural activities will be moving to places where water is more plentiful and available, and the Mississippi Valley is a prime candidate. The Mega Study needs to incorporate this into its scope and planning.

c. Emerging Industries. The industrial and manufacturing landscape of the United States has changed dramatically over time but there is a common thread through all of it—water dependency. Whether it is a steel mill, refinery, internet server center, or a cryptocurrency hub, they all need water. Indeed, newer uses like fracking and data centers demand more water than the technologies that preceded them and often more than their boosters or host communities realize. While it may not be possible to forecast what tomorrow's industries will be, it is very possible to foresee their need for water, a need that will often add to rather than replace existing demand.

d. Cooling Water. It is not enough anymore for industries and utilities to have access to an adequate volume of water, that water has to be suited to the job it is being counted on to play. That is particularly true where the water is used as a cooling agent in the process of generating electricity or petrochemicals. If the water is too warm it loses some of that cooling capacity which can lead to scaled-back production or the running of risks that ought not be run. While this may seem conjectural to many, it can be a very real problem, as was seen in Europe last summer. Drought and high temperatures drove river temperatures so high on the Rhône River last summer that electrical output at power plants had to be scaled back. Admittedly, the Mississippi is a much bigger river than its European counterparts and their problems do not translate exactly, but they are instructive and the time to learn from them is before trouble is on our table. The Mega Study should take stock of the current cooling water needs served by the river and its tributaries and distributaries and work to develop a forecast of cooling water demand.

e. Coastal Restoration/Environmental Resilience and Enhancement. Coastal restoration and environmental enhancement are fundamental missions of the Corps of Engineers, though they have not often been reconciled with the Corps' other mission areas (navigation, flood control, and irrigation) or funded at comparable levels. As the coastal restoration program advances in Louisiana and environmental resilience and nonstructural flood protection take on greater importance in general, it is becoming clearer and clearer that those efforts are river dependent. The same can be said for salinity and nutrient management. Simply put, it is going to take a much more robust and comprehensive approach to river management than has been the case if we have any hope of

keeping our coast functioning and the Gulf of Mexico at bay. This will involve some basic changes in how the river is viewed and managed.

A prime example of the sort of change that will be needed is a shift away from planning for floods and droughts—terms that inevitably suggest they are deviations from a norm and that they pose problems rather than opportunities. It is well known that the Mississippi River is more than a corridor of water defined by its current and banks, but one would be hard-pressed to see that in the history of river management. From the get-go, it was national policy to hem the river in, shorten its course, and hasten the flow of its water to the Gulf. Lots of economic and community growth came from that, but it came at a price, most notably the loss of much of its floodplain and current delta. This was no secret even 100 years ago, but little was done to prevent that progress at the expense of collapse until the late twentieth century when laws like the Clean Water Act; the Coastal Zone Management Act; and the Coastal Wetlands Planning, Protection and Restoration Act were enacted, largely at the behest of diverse public interest movements. Central to all of those laws and the programs they spawned is the fundamental truth that all water resources matter. High water may need to be fought as a flood in some contexts, but it is also a crucial part of the lifecycle for other vital natural resources. Similarly, low-water events can be more than droughts; indeed, they can be essential to cypress forests dependent on periods of extreme low water to allow for the next generation of trees.

We are not suggesting abandoning or subordinating the traditional reasons for river management, but even those reasons and their goals are increasingly unsustainable or unaffordable without placing them in a broader context. This Mega Study has an opportunity—indeed an obligation—to revisit and recast our collective understanding of what these water resources are, how they fit together, and why they deserve comprehensive stewardship.

f. Water for Human Communities. The Corps of Engineers is no stranger to managing water resources to enhance and secure water supplies for human communities. It has built and operated dams and reservoirs for public supply (usually in addition to other purposes) to facilitate growing cities and economies.¹ It is also no stranger to the conflicts that can come with those projects, as its long history with Lake Lanier and the Apalachicola/Chattahoochee/Flint Rivers bears witness. Those challenges are still with us, but they will soon be compounded exponentially by shifting populations and declining water availability, particularly driven by events in the West and Southwest. The simple fact is that water availability in the West and Southwest is dwindling daily at the same time its population is burgeoning. Water managers and scientists have always known that a reckoning was on the horizon, and it is now dawning. The possibility of dead pool reservoirs, mandatory cuts in Colorado River allocations, and conflicts between irrigation-driven agriculture and residential development in Arizona are fueling that reckoning, and it is just the beginning. As residents and companies accept an increasingly and irreversibly arid environment, they will face two options: move to where water is more plentiful or bring more water to where they are. For those preferring the first option, the Mississippi River Basin as a “water-rich” region can expect to attract many of these relocators. As a region that has hemorrhaged jobs and population over the past sixty years, the Mississippi River corridor states can be expected to welcome that shift, but that does not mean they will be prepared for it. Perhaps the musical icon Paul Simon was speaking of drought-induced migration when he sang, “I have reason to believe we all will be received in Graceland.” But will

Graceland have the water resources to support an influx of thirsty citizens and companies? This Mega Study will be a key element in answering that question.

On the flipside, there are many who will refuse or be unable to move to where the water is and instead will strive to move the water to where they are. This would require technically, financially, culturally, and legally complex inter-basin transfers. The notion of “sharing” the Mississippi with drier places is by no means novel, but the frequency and intensity of such proposals are increasing as years of growing populations and shrinking water supplies push parts of the country closer to breaking points. Certain parts of the Mississippi River Basin have planned for this, but most have not. The Upper Mississippi River Basin Charter requires notification and consultation for any proposed new or increased inter-basin diversions of water resources. No such accord exists for the lower Mississippi River. Since the upper and lower basins are not as hydrologically disconnected as they are politically and legally, a decision to transfer Mississippi River water, at any point along its course, will have ripple effects throughout the watershed.

The take-away here is that water is a fundamental part of the places where it naturally occurs; it is woven into the geology, ecology, cultures, and economies of those places. The Mega Study will have to consider all of these roles. This level of planning requires a comprehensive understanding of the existing rights, authorities, and duties that people, states, and agencies have regarding the river. It also requires a comprehensive understanding of the river and its related water resources, as is achievable through the forthcoming study. And hopefully where our understanding wants, foresight and careful planning will prevail.

3. Competing Legal Systems and Issues of “Waste” and “Surplus”

While proposed inter-basin transfers vary in method, extraction point, and destination, they all embody a common theme: Water in one place would be better used somewhere else. The east-to-west transfer ideas typify the belief that while water scarcity looms over Western communities, Mississippi River water is “wasted” everyday as it flows into the Gulf of Mexico. This reflects fundamental differences in the legal ideologies of the regions. In prior appropriation systems like those employed in Western states, any water which is not diverted and put to a beneficial use is, by definition, wasted. In contrast, under riparian-based systems, rights to water and its use are correlated with land appurtenant to the river and not dependent on diversions or beneficial use. While the states, people, and ecosystems that rely on the Mississippi River may not be accustomed to making legal or semantic arguments to recognize the value of the river in its natural state, accusations of waste are more difficult to refute so long as we cannot articulate the kind of river we need. Framing, much less resolving, these questions of use, waste, and surplus will require an understanding of how water rights are defined under state laws and how those laws are supplemented or supplanted by federal law. It cannot be overemphasized how varied those laws are and how poorly grounded many of them are in science and robust data.

The Mega Study will need to address the legal architecture of river and water management forthrightly as it builds a foundation for a river/water budget. Certainly, there are limits to how specific a budget can be for a resource as vast and complex as the Mississippi River system. Nonetheless, there are large gaps in our understanding of how much water is used and for what purposes throughout the basin. This includes tributaries and distributaries of the river, as well as

groundwater resources that are either hydrologically connected or not connected but relieve demand on the river by providing alternative water sources. This also extends to understandings of suspended sediment and nutrient loads. These knowledge gaps do not exist because the information is unattainable, but because we have not bothered to gather it. The Mega Study needs to draw from the example of the Colorado River: River budgets are important and getting them wrong only sets the stage for trouble down the line.

4. *Groundwater Connections with Surface Water*

It is sadly commonplace for law and policy to diverge from scientific consensus. Such is the case with surface water and subsurface water, which are commonly regarded as distinct entities and governed by completely separate areas of law despite existing as connected parts of a hydrologic cycle. Surface-water law developed in accordance with how we observe and experience rivers: existing between high and low water marks, navigable or non-navigable, permanent or ephemeral, etc. Groundwater, on the other hand, has been described by some courts as too “occult and unknowable” to manage.ⁱⁱ Where groundwater management frameworks emerged, they more closely resembled the law of subterranean minerals. Yet, what happens to subsurface water happens to surface water.

Groundwater is used throughout the Mississippi River basin as a primary source for irrigation and public supply. Aquifer decline has been reported since the early twentieth century which means withdrawals are occurring at an (often significantly) higher rate than the aquifers recharge via precipitation and infiltration. As connected components of an integrated hydrologic system, declines in aquifers naturally impact surface waters. Groundwater depletion can also put strain on surface waters indirectly. As aquifers decline, the need for their water does not go away, it just shifts elsewhere. The most obvious choice is often surface streams. That is exactly what happened in Louisiana when the Haynesville Shale fracking boom began. Threats to well fields led Louisiana to create a “cooperative endeavor” arrangement (essentially a permit system) to allow for and regulate the use of surface streams for nonriparian purposes. As larger aquifer systems decline in the corridor and in the broader basin (e.g., the Ogallala/High Plains aquifer), the pressure to shift from groundwater to surface water will become more pronounced. Those trends need to be factored into the Mega Study’s scope.

The point to be made here is that, whether addressed as discrete or united, existing frameworks are insufficient to address the nuanced relationship between surface and groundwater. Therefore, new law, policy, and management frameworks must be developed to adequately encompass all of the resources that comprise the Mississippi River system. It is not the job of the MRC and the Corps to create those frameworks, but they should recognize that state and regional efforts are underway to address this disunity that could have profound ramifications on mandates and activities that do fall within their purview. Since 2014, our Institute has played a large role in the development of a Water Code that integrates all of Louisiana’s water resources. This means creating a legal framework that is comprehensive, purposeful, predictable, and adaptable. These tenets must also inform the Corps’ management of groundwater throughout the Mississippi River basin.

Conclusion:

For much of our nation's history the Mississippi River system was seen as a defining strategic and cultural resource. More than two centuries of damming, leveeing, draining, and channelizing have changed the river system and our relationship with it so much that most people in public and private life take for granted that it has been tamed and optimized. Neither of those assumptions is true and this nation is about to be reawakened to the river's power, potential, and importance. If the nation had not had the wisdom to create the Mississippi River Commission before, we would need to create it now. With this Mega Study, the MRC may be reintroducing itself and the true importance of the river to much of America, but in truth this is really just the MRC keeping faith with its mission. The Mega Study will be unlike anything the MRC has taken on before and some may say that it is taking on the impossible, but as Mark Twain said in *Life on the Mississippi* after acknowledging that the jetties at the mouth of the river had accomplished what many thought to be impossible, "...we do not feel full confidence now to prophesy against like impossibilities." So it is in that spirit that we offer these comments and suggestions in the hope that what needs to be done to chart this river system's future can be addressed in time for it to matter. If there is anything we can do to help with that, we are more than ready. This is work worth doing.

Sincerely,

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ⁱ CONG. RSCH. SERV., R41002, USING ARMY CORPS OF ENGINEERS RESERVOIRS FOR MUNICIPAL AND INDUSTRIAL WATER SUPPLY: CURRENT ISSUES (2010), *available at* https://www.everycrsreport.com/files/20100104_R41002_c9b4425a201408613a2f28dc692c0a996e7dd0b4.pdf.

ⁱⁱ See *Sipriano v. Great Spring Waters of Am., Inc.*, 1 S.W.3d 75, 76 (Tex. 1999) (quoting *Frazier v. Brown*, 12 Ohio St. 294, 311 (Ohio 1861)).