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OPEN RIVERS : RETHINKING WATER, PLACE & COMMUNITY

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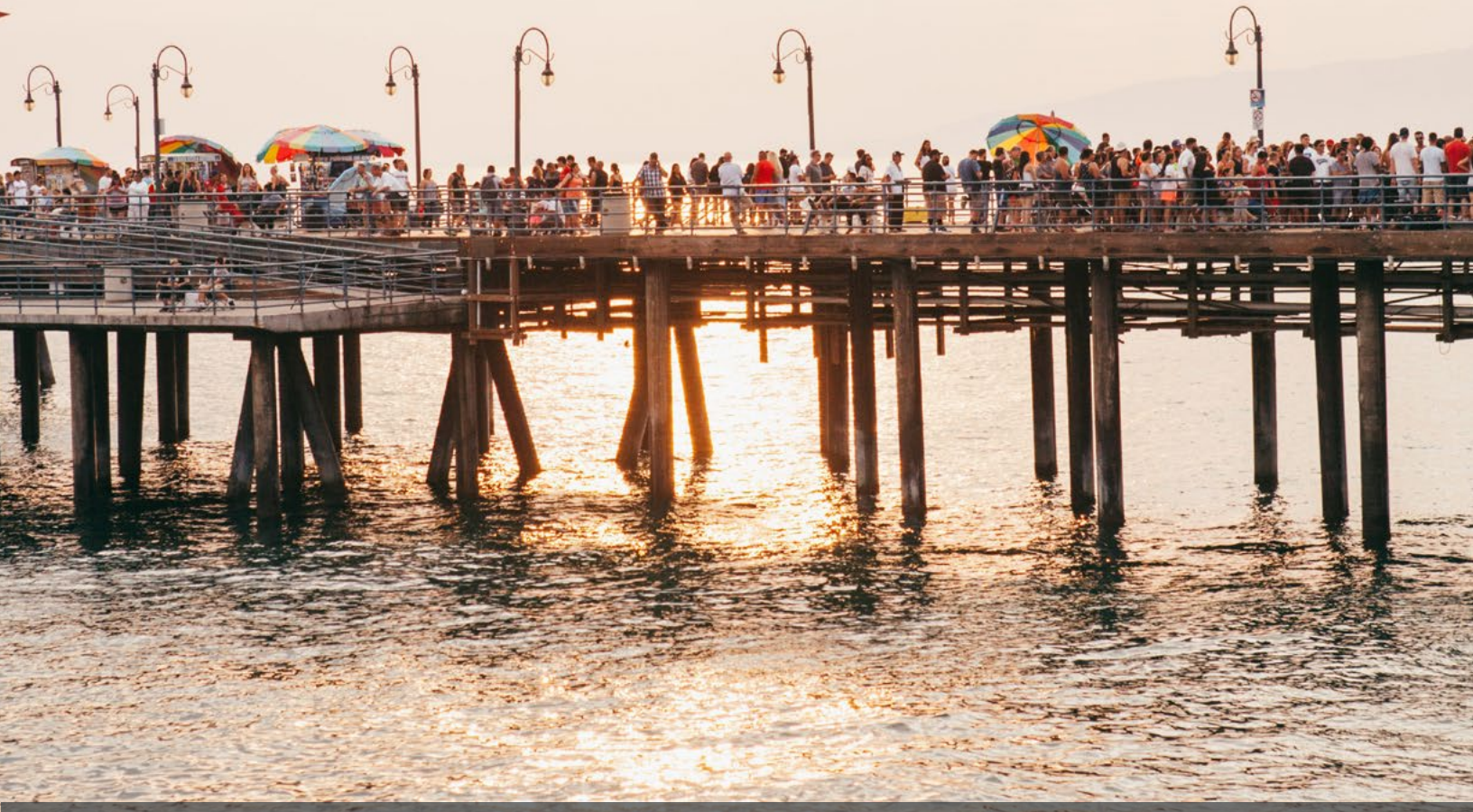

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The cover image of Santa Monica Pier is by Omar Prestwich.

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MEETING THE ATCHAFALAYA

By Joanne Richardson

The Mississippi River flows mostly south from its most northern reaches in Minnesota through the heartland of the United States down to Louisiana and the Gulf of Mexico, collecting and distributing commerce and culture with a multitude of tributaries and distributaries. The river itself is dynamic and changeable, flooding, avulsing, and remodeling its banks and channels continuously. Tentatively held in place with levees, dams, and floodways, this dynamic river is held somewhat in check, allowing towns and farms to reach right to the river's edge, and providing some continuity and control for navigation of the famous river barges that carry a wealth of commodities up and down the river. All of this is largely contingent upon the success of a single series of floodgates and levees in Louisiana known as the Old River Control Structure that stands between the Mississippi and its near neighbor and distributary, the Atchafalaya, holding each to its own banks, meting out water between them and keeping the Mississippi flowing towards New Orleans, preventing that city from being stranded with a much-reduced trickle of a river. John McPhee, in his 1989 work The Control of Nature elegantly explains this storied structure that keeps the Atchafalaya River and the Mississippi River separate; otherwise the Mississippi would, in the way of rivers, change course and take the Atchafalaya's shorter, steeper path to the Gulf of Mexico.

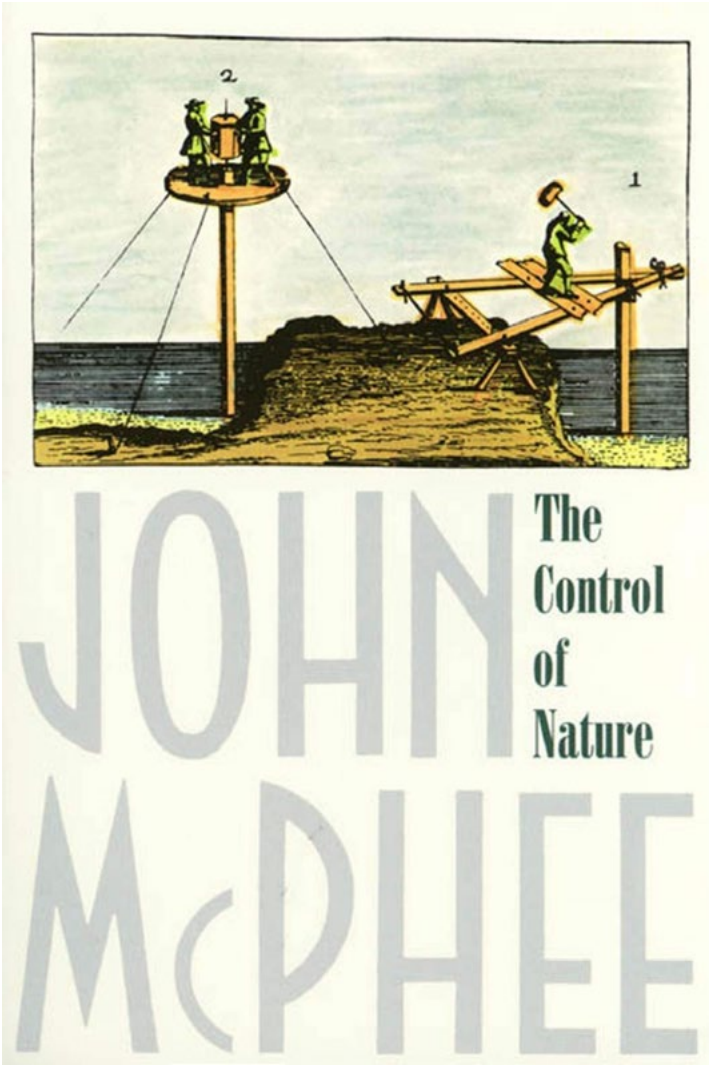
Jean Bonneville and Joanne Richardson at the Old River Control Auxiliary Structure in spring 1992. Image courtesy of John and Alta Fossum.

In the spring of 1992, I was seventeen years old and just about to graduate from high school. My best friend's parents had just read *The Control of Nature* and had decided that they simply must see the Old River Control Structure for themselves. Consequently, permission secured from my own parents, we all loaded up in their maroon minivan, and set off to go see for ourselves this feat of engineering.

I had taken no convincing to agree to come along. I spent my childhood trailing after my dad in the various landscapes of the United Kingdom and the United States inspecting the rocks and the hills and inferring what we could about the stories of the landscapes, my mum and brother solidly in tow, thinking about other things. I learned to love geology through these experiences and consequently, I've spent my life torturing people on car trips with Very Interesting Facts about the land we're driving through.

On this drive from Minnesota down to New Orleans, the tables were turned. This time, I was the listener, hearing all about the New Madrid Seismic Zone (and how to pronounce it correctly—MAD-rid) and how when the fault popped in 1812, the land boiled with sand and church bells rang as far away as Boston. The very river itself flowed briefly north. You can still see the sand blows to this day, lighter streaks and blobs in the fields, visible as you drive by.

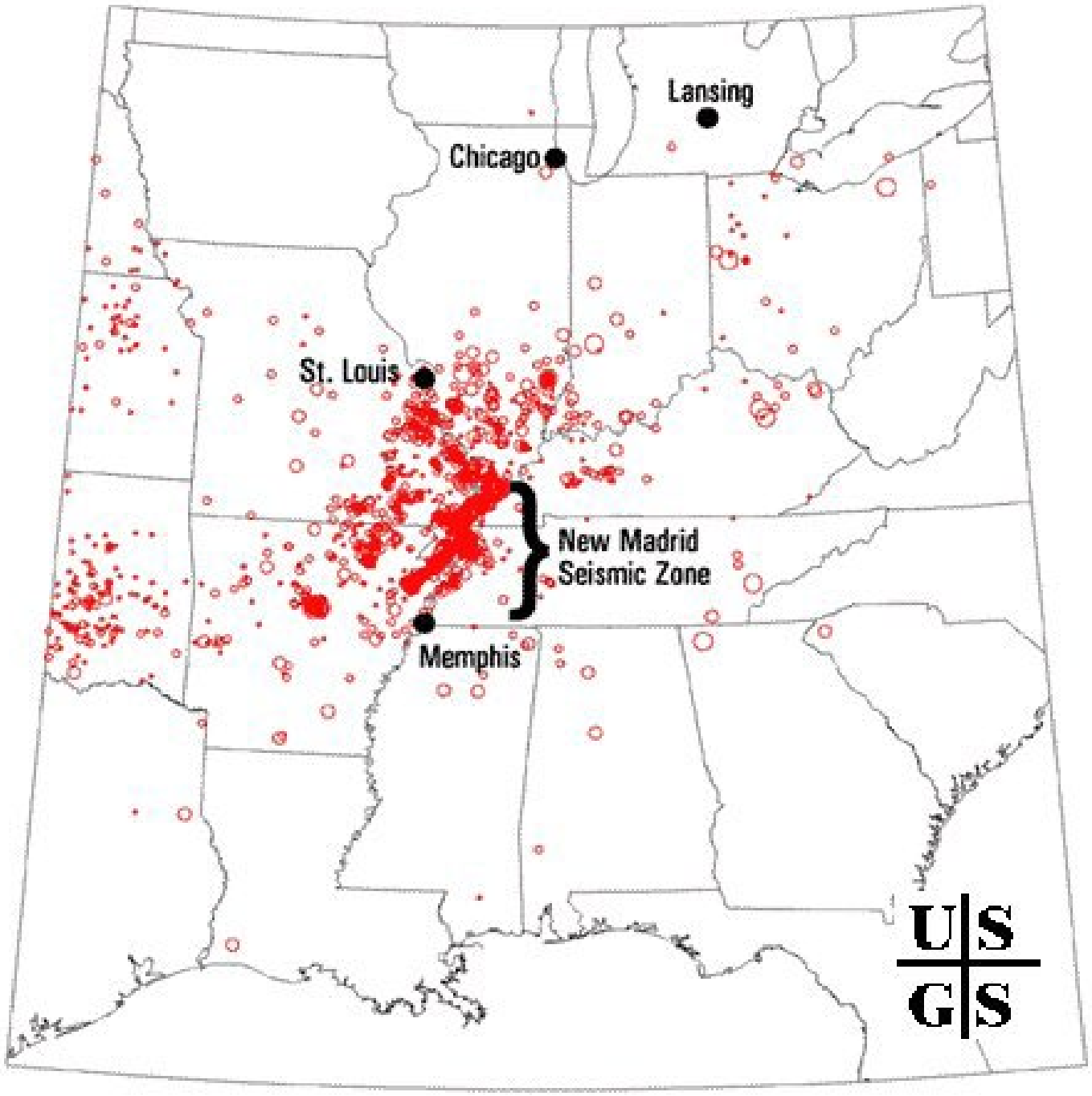
My friend's parents explained all about the Old River Control Structure and the US Army Corps of Engineers' attempts to keep the Mississippi and Atchafalaya rivers separate. Rivers avulse or change course frequently within their floodplains as erosion and deposition continually change and are changed by the flow of water. The Mississippi is known for its meander bends, caused by small variations in the flow of the river resulting in erosion at the outer edge of the bend where the water flows faster, and deposition on the inner bank of the bend where the water flows more slowly and sediment can drop out. These processes cause the great loops of river to wind their ways into deeper and more extreme s-curves. When the river erodes a path back to itself, oxbow lakes form in the abandoned loops and the process starts again. The Old River Control Structure exists to keep a meander bend of the Mississippi from joining with the Atchafalaya, which is at a lower elevation and would capture the flow of the Mississippi River, stranding New Orleans on high ground, and inundating the mouth of the Atchafalaya.



"The Control of Nature" chronicles three attempts (with varying success) to control natural processes. It is divided into three long essays, 'Atchafalaya,' 'Cooling the Lava,' and 'Los Angeles Against the Mountains.'

In my mind, the mighty Mississippi became fragile and tenuous, artificially held to higher ground while the Atchafalaya stormed away below, pulling on the land and the water to win this tug of war. Surely, I thought, it can't work?

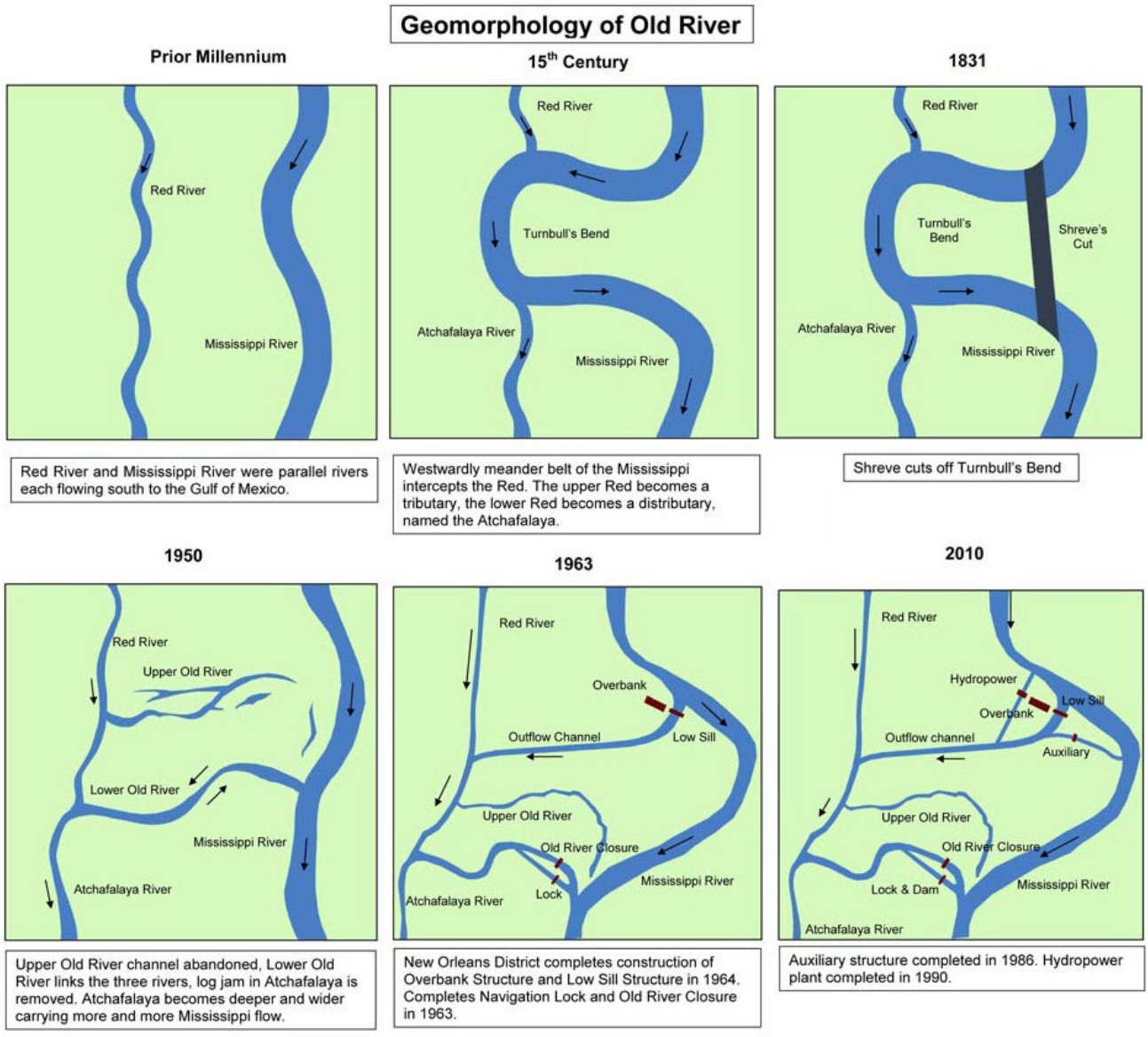
To this day, I've been convinced of the inevitable failure of the structure, certain that the Atchafalaya will win. Will the levees and floodgates breach? Will the water surge from the Mississippi River, and churn down the



The New Madrid Seismic Zone stretches roughly from St. Louis, Missouri to Memphis, Tennessee, roughly tracking along the path of the Mississippi River. Image via USGS.

Atchafalaya's steeper path, eroding, flooding, and dropping sediment in great new sandbars and mud flats? What of the people living in its inevitable way? What of the barges stolidly working their ways up and down the main channel? Currently, the Control Structure metes out the water, carefully balancing the two rivers, sending only 30 percent of the Mississippi's water westward down the Atchafalaya. What might the new ratio be? Shipping up and down the current industrial corridor of the Mississippi would be fouled by turbulent currents and dropping water levels. Will dredging be able to craft a new channel from the old, and restore the precarious balance? Will New Orleans be perched above a much-reduced river with ships and their industries stranded, the communities along the Atchafalaya inversely inundated? The structure of the very gulf itself would change with terrible rapidity, with devastating consequences for the people living there and the entire U.S. economy.

In 1992, we travelers did make it to the Control Structure and drove along a road precariously



This series of maps shows the formation of the Atchafalaya River and the construction of the Old River Control Structure in Louisiana. Image via USAC.

perched between the two waterways. With the Mississippi on one side, Atchafalaya on the other, the structures between them seemed insufficient to me—too small and too fragile. In my memory, the water swirls and pulls and gurgles on either side, and the very levees and structures themselves shudder and groan. We stood and admired the rivers, the structures, then beat a hasty retreat to more solid-feeling ground.

Curiosity temporarily sated, we finished our trek south in New Orleans, and I was struck again and again by the pull between two thoughts: New Orleans is high ground; New Orleans is low ground.

Approaching New Orleans, though I intellectually know that it is all low ground comparatively close to sea level, it felt like it was "up," having so recently seen the Atchafalaya, and knowing that it is lower and has a more direct route flowing down to the gulf. However, I was astonished when we were walking around in New Orleans, replete with beignets, and I asked where the river was and found that it was at the top of what looked like a hill at the side of the road. It seemed reckless and dangerous. And understandable. The levees keep the river out of the city, the Control Structure keeps the river from avulsing to the west. The bird's foot delta, formed by the

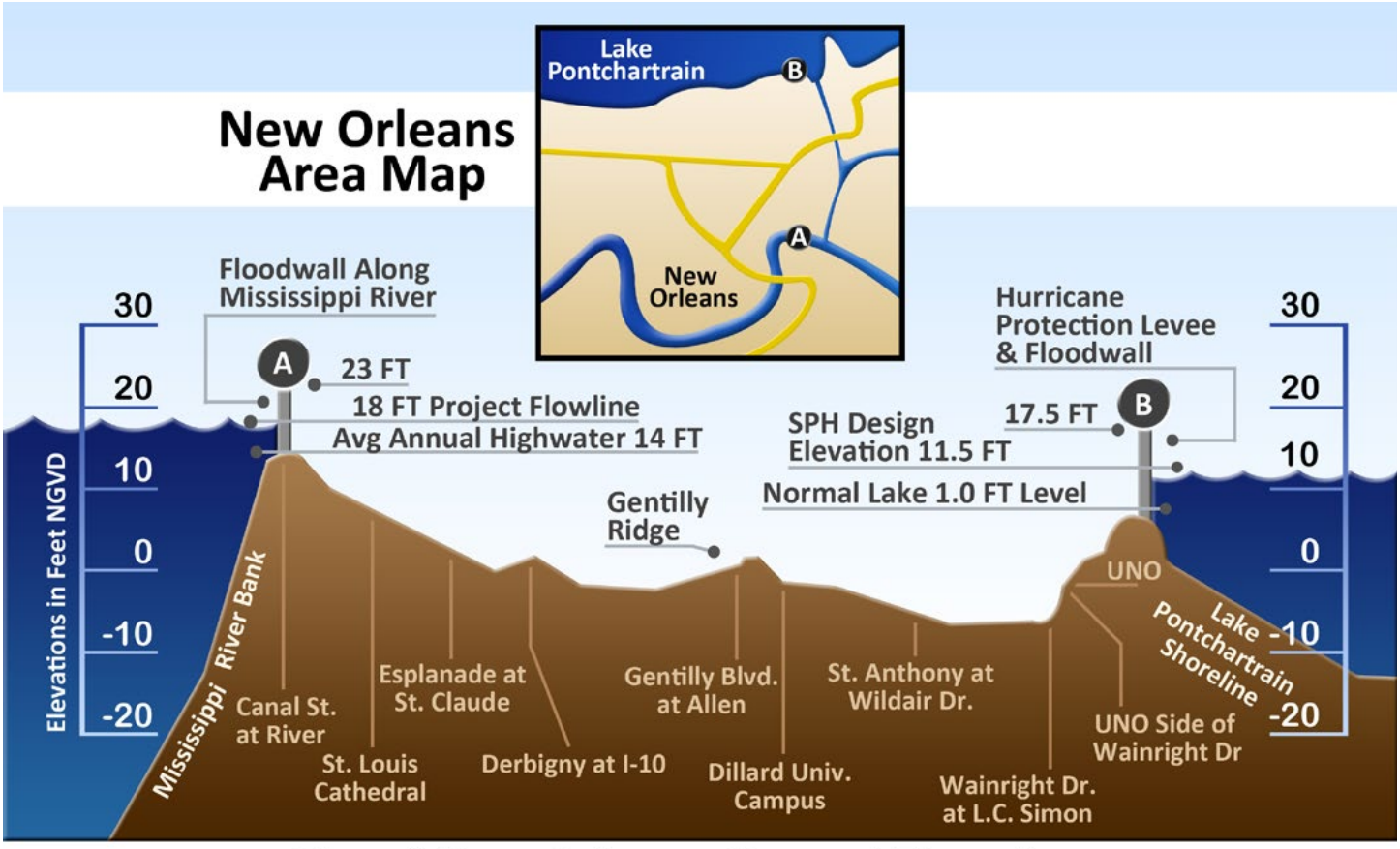
This photograph of the Old River Control Structure in Louisiana shows some of the intricate arrangement of floodgates and levees keeping each river to its course. This image was taken during the flood of 2011 and clearly shows inundation along the banks. Image by Tobin Fricke, via Flickr (CC BY-SA 2.0).

deposition of sediment at the ever lengthening and branching mouth, is longer by the year, but the marshes in the vicinity are starving for sediment that is now dropped on the riverbed and sent futilely into the gulf. If the levee fails, the city is inundated. If the Control Structure fails, the city is high and dry. If the delicate balance is maintained, the levees must get higher and higher, the bird's foot delta will get ever longer, the marshes will continue to starve, and the potential collapse of the system is yet more devastating to imagine. I kept my eye on the levee for the rest of our visit, imagining the story of the Dutch boy who put his finger in a dike to prevent a flood.

In due course we returned home and returned to our lives at the top of the river system. I'd nervously watch the news during each spring flood and wonder "Is this the year?"

In time, my academic peregrinations brought me to a study of geology itself. We learned about the New Madrid Seismic Zone, and I found it was shockingly helpful to have been there—to have stood on that very ground, to have seen the sand blows, and to have imagined the distance to Boston. Learning that the fault zone is the failure of an ancient rift that formed in the protocontinent Rodinia 750 million years ago, I felt personally connected to some of the most ancient history of our planet, and it was magical. I also felt the looming threat of it and was consistently reminded by my professors that what has happened can happen. The fault zone will inevitably quake again.

We also studied the Old River Control Structure. We learned in detail how rivers avulse across floodplains, and how the history of the hubris of



City of New Orleans Ground Elevations

From Canal St. at the Mississippi River to the Lakefront at U.N.O.

This diagram illustrates the relationship of New Orleans to the Mississippi River on one side and Lake Pontchartrain on the other. Image by Alexdi (CC BY-SA 3.0).

humans to try and control avulsion with levees and dams has so often led to tragedy. There is a saying about levees, that there are two kinds: those that have failed and those that are going to fail. My thoughts returned again and again to the experience of being between these two powerful rivers, and however the engineering may be impressive on paper, in real life it seems so small and fragile.

My continued fascination with the ways that the land frames the experiences of humanity led me, some years later, to the acquisition of a master's degree in landscape architecture where the readings from *The Control of Nature* popped up again and again in syllabi. We discussed why the Control Structure was at once an excellent idea, well executed, and how it is a potential point of failure propping up unsustainable systems. We discussed what else we could have done, would have done, how things might be different if it had never been built, and what may happen when or if it one day fails.

Then I found myself working in river studies at the University of Minnesota, high up on gorge walls above the very same Mississippi. Working with colleagues across a multitude of disciplines, I found again and again how this experience of standing on the fault zone and standing on

People relaxing on the levee itself during Algiers Riverfest, New Orleans, 2010. Image by Marie Carianna (CC BY-SA 2.0).

the levees became central to my life's work. It gave me a practical understanding of theoretical unknowns and gave me access to deep emotional memories of these special places, ranging from fascination and curiosity to trepidation.

With hope, I imagine a future in which the control structure becomes a joining of peers, rather than rivals, and that the New Madrid Seismic Zone releases its pressures with polite rumbles and not a mighty bang. I don't know what is going to happen, and I certainly don't know what to recommend. With regard to these two phenomena, I can only hope that should disaster strike, that we are ready and able to help all affected.

I am also convinced of the value of experiencing these landscapes first-hand. That simple road trip, now many years ago, has been such an unexpected lifelong gift of knowledge and memory, that it makes me hope that I can pass that gift onto the next generation. I wonder how my sons may react to standing on the fault zone and between the rivers? What will happen? Will they, as I did, feel the pull between the delicate balance we currently have and the potential of what the future holds? It's time, I think, for a long drive and another look.

This Landsat image shows the classic formation of the bird's foot delta as the Mississippi River makes its way into the Gulf of Mexico. Also visible is the Old River Control Structure to the north, and the Atchafalaya River to the west. For more information, visit https://landsat.visibleearth.nasa.gov/view.php?id=85519. Image by NASA.

Acknowledgements

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About the Author

Joanne Richardson is the production manager for *Open Rivers*, and has a background in landscape architecture, geology, and computer science.