

New study calls for old methods of coastal management

July 6 2016

Almost 90 years ago, the Mississippi River showed the world its power for destruction with the Great Flood of 1927. Now the river's power is once again on display, this time as a stabilizing force to maintain Louisiana's disappearing coastline.

Historically as the Mississippi River wandered across the Louisiana landscape, it forged different paths, abandoning previous ones. The resulting basins were supplied with fresh sediment and nutrients during flood events, a source that has dried up as the river became increasingly managed with locks and levees. However, one part of Louisiana's delta system with restored access to riverine sediment has withstood the rising waters: the Atchafalaya Basin.

A recent collaborative research effort published in *Sustainability Science* seeks to highlight this enclave of stability against the stark reality of Louisiana's predominantly sediment-starved, sinking deltaic systems.

"The Atchafalaya Basin is one of the few coastal deltaic basins where land has emerged above mean sea level in the last four decades," said lead author Robert Twilley, LSU Department of Oceanography and Coastal Sciences professor and executive director of the Louisiana Sea Grant College Program.

The study allowed the team of authors to contrast these positive findings with work that began decades earlier by Sherwood "Woody" Gagliano, who was a geologist at LSU. Gagliano combined historic data with then-

present day research to forecast coastal land loss for the Terrebonne Basin and surrounding areas, places where ties with the river had been severed. With the benefit of time, Twilley's team has compared Gagliano's predictions for the Terrebonne Basin with actual changes to the coast.

Unsurprisingly, the researchers found that Gagliano's predictions fell short, especially in the Terrebonne Basin. There, the Gulf of Mexico is six miles farther inland than Gagliano projected. Since 1932, the Terrebonne Basin has migrated on average 10 miles northward. And not only is the Gulf of Mexico migrating landward, but the rate at which it does is increasing - from 75 meters per year in 1973 to over 200 meters per year in 2010.

By comparison, the Gulf of Mexico has inched upward only 72 feet into the Atchafalaya Basin, where the Mississippi River is fortifying the shoreline.

"The Atchafalaya region will not see as fast an impact of relative sea-level rise as other basins because it still has the power of the river," Twilley said.

The Atchafalaya Basin is also more protected during storm surges, as there is more land in the [basin](#). Over the past 60 years, vegetative cover expanded in the Atchafalaya Basin with forested wetlands increasing by 82 percent. Conversely, Terrebonne has lost 59 percent of these forests as saltwater has intruded. These vast stretches of open water allow greater wave formation and resulting erosion, which puts Terrebonne at an increased risk of further coastal flooding.

Louisiana struggles with the consequences of hurricanes, [sea level](#) rise, subsidence, river management, dredging and will face many more challenges in the years to come. Despite the myriad of threats, the

Atchafalaya Basin still stands strong, however, which is something that needs to be considered as the 2017 Master Plan is being crafted, say the study authors.

"We need to celebrate the power of the Mississippi River to maintain a delta coast with subsidence and [sea level rise](#)," Twilley said. "That power is significant."

More information: Co-evolution of wetland landscapes, flooding, and human settlement in the Mississippi River Delta Plain, Sustainability Science:

[www.laseagrant.org/wp-content/ ... illey-et-al-2016.pdf](http://www.laseagrant.org/wp-content/uploads/2016/07/Twilley-et-al-2016.pdf)

Provided by Louisiana State University

Citation: New study calls for old methods of coastal management (2016, July 6) retrieved 25 April 2024 from <https://phys.org/news/2016-07-methods-coastal.html>

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