

# NAVIGATION ISSUES

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# QUESTION 5

## IS LOUISIANA'S NAVIGATION INDUSTRY SUSTAINABLE WITHOUT LARGE SCALE COASTAL RESTORATION?

When it comes to managing the Mississippi River, business as usual is proving problematic on a number of different fronts. Lower Mississippi River flood levels are on the rise from Natchez to Belle Chasse, and Louisiana's ongoing wetland loss crisis continues—situations that are both directly affected by the way the river's water is distributed. In addition, with a new, larger lane of the Panama Canal scheduled to open in 2014, ships carrying much of the cargo in and out of Asia will require a greater draft than the 45 foot deep navigation channel currently maintained by the U.S. Army Corps of Engineers (Corps). We considered whether these challenges have a common solution: reengineering the Lower Mississippi River to support coastal restoration as well as the future competitiveness of the New Orleans port industry and the inland barge operators that depend on connections to deep draft shipping.

### OUR ANALYSIS

Current Mississippi River management, enshrined in the 80-year-old Mississippi River and Tributaries Project (MR&T), is increasingly at odds with the way the river works today. We present the scientific and engineering consensus about these trends, a consensus that acknowledges the problems inherent in the current approach while pointing the way toward a new management paradigm. This paradigm can improve regional flood protection and navigation access while also unleashing the power of the river to save the Mississippi River Delta for future generations. Our analysis took the long term view asking whether both the coast and Louisiana's navigation industry could be sustained. In so doing, we considered the effects of climate change, rising energy costs, and trends in global shipping.

We also considered the history of flood control in the Mississippi River Delta. The 1928 Flood Control Act was passed after the disastrous 1927 Mississippi River flood.

The act established the federal Mississippi River and Tributaries (MR&T) Project to provide a multi-pronged approach to flood protection, including earthen levees, flood relief outlets, and cut offs. The act also provided for the maintenance of a dredged channel for deep draft navigation access as far as Baton Rouge (now 45 feet), and for shallow draft barge traffic (12 feet) throughout the Mississippi River and its principal tributaries.

In the 1950s, the Mississippi River Commission, which was assigned responsibility for operating the MR&T Project, determined that a gated control structure was required to keep the Mississippi River from changing course. The river's established path to the Gulf of Mexico past New Orleans was much longer than the more direct route offered by the Atchafalaya River, one of the Mississippi's western tributaries. The Mississippi would normally have changed its course to take advantage of the shorter route down the Atchafalaya. To prevent this, three gated dams were built 75 miles upriver from Baton Rouge. Called the Old River Control Structure, these dams allow only 30 percent of the river's flow down the Atchafalaya and keep the remaining 70 percent moving down the channel that ends with the Bird's Foot Delta.

The 1928 Flood Control Act had two goals: keep property dry during high river flows and keep navigation routes functional during normal river flows. Those writing the law did not consider environmental impacts or how hurricanes could affect the deltaic landscape. This narrow focus has remained in force for the last 80 years; the 1928 Flood Control Act has not been changed since it was written. The original law still determines how the Corps manages the river for navigation and flood protection even though the Mississippi River Delta is disappearing and threats posed by flooding and hurricanes worsen each year.

## WHAT THE SCIENCE SAYS

The artificial separation of the Mississippi River from its delta, both by closure of side channels and by levee construction, has been a major contributor to the loss of over 1,800 square miles of deltaic wetlands since the 1930s. This landscape level ecological collapse has had many effects, not the least of which is increased flooding. Wetlands can slow or spread storm surge, reducing threats to developed areas. The loss of so many wetlands, coupled with increased development, means that today flood risks for the two million residents of coastal Louisiana are higher than anything imagined when the Flood Control Act was passed. The delta region has experienced more than \$150 billion in hurricane property losses and recovery costs in the last decade alone.

The lower Mississippi River and Missouri River floods of 2011 shed further light on the problem. It is true that the Mississippi River flood protection system prevented widespread flooding in Louisiana. No levees were breached unintentionally. However, despite use of all the MR&T emergency spillways, flood stages from Natchez through New Orleans reached levels two to five feet higher than the previous flood of record in 1973. The Corps estimates that just repairing damage to the MR&T flood control infrastructure will cost between \$1 and \$2 billion.

It is important to note that because of the ways that sediment has filled in areas of the riverbed, the river now runs higher than it did when the MR&T Project began. A flow of 1.75 million cubic feet per second flowing by Vicksburg, Mississippi is now flowing about six feet higher than that same flow 66 years ago. This does not bode well for the system's resilience in the face of future flooding.

If the MR&T Project no longer provides the most effective way to prevent flooding in the lower Mississippi's deltaic communities, it is also undermining the navigation industry. The Bird's Foot Delta at the river's mouth is used by 6,000 deep draft vessels a year and is one of the world's busiest shipping channels. The Bird's Foot also experiences the nation's highest rates of subsidence, about 0.5 feet per decade. When sea level rise is factored in, the Bird's Foot could see an increase in sea level of one foot per decade.



The combined effects of sea level rise and subsidence are leading to an upstream retreat of the river mouth. This geological shift is pushing more and more of the Mississippi River's flow out of the main channel between New Orleans and Head of Passes at the mouth of the river. With less river water coming through the Bird's Foot, the navigation channel has become increasingly prone to shoaling upstream. The Corps is not equipped to rapidly mitigate this deposition and has forced pilots to limit draft on ships to less than the river's authorized 45 foot channel depth. The Corps has also been obliged to reduce the effective channel width to less than what is authorized, which could impact safety. Emergency appropriations are required almost every year to dredge the channel, even as federal dredging budgets grow more constrained. As the shipping channel becomes less reliable, vessels will have to decrease their payloads to conserve draft and bypass New Orleans in the long term. If the narrowing channel increases the risk of groundings, or, far worse, collisions, traffic in both directions may be suspended for weeks or months.



We believe that the MR&T mandated river flows passing New Orleans are no longer capable of scouring the navigation channel's entrance at Head of Passes. This presents challenges and opportunities. For example, there is the potential to accelerate removal of sediment from the main channel by upstream diversions and arrange for sediment deposition in shallow wetland building sites beyond the flood control levees. Doing so would address the root causes of wetland loss in Louisiana and help restore the coastal ecosystem. Perhaps as importantly, this approach could be compatible with a redesigned river navigation entrance, one that could be reliably maintained with less dredging at between -50 and -55 feet at extreme low tide and at the full authorized width.

This reconfiguration will become a critical economic issue when the new lane of the Panama Canal is complete and a new generation of container ships and bulk carriers arrive in the Gulf in 2014. These "Post Panamax" ships have approximately three times the cargo capacity of current vessels, but require far less energy per ton to move than any other type of transport. Ports along the eastern seaboard are deepening channels and upgrading their facilities to handle these new ships. Unless significant changes are made at the mouth of the Mississippi River for a deeper entrance, fully loaded Post Panamax ships will not be able to reach ports along the lower river in Louisiana. This, in turn, will affect the terminal operators and shallow draft shippers that use the inland waterway system radiating from New Orleans.



## IMPLICATIONS FOR POLICY MAKERS

Reconfiguring the river and revising the decades old MR&T project is imperative if we are to secure the long term viability of Louisiana's navigation industry. These needs dovetail with the state's plans to build sediment diversions to address coastal land loss.

- As this new approach to river management is refined, possible options to consider include: expanding the controlled use of diversions designed to extract sediment upstream of Head of Passes, separating the current Southwest Pass navigation channel at the mouth of the river, or creating a new outlet that is separate from the channel carrying river discharge. The latter option has been done in the Netherlands for the lower Rhine River.
- Even the most modest climate change projections suggest that larger river floods, such as the record 2011 discharge, will occur more frequently on the Mississippi River and its tributaries. Higher peak river flows may bring larger volumes of sandy sediment to the coast, particularly when bypassing of sediment around the major dams on the Missouri River begins. Rather than simply adding to the dredging burden already borne by the U.S. taxpayer, river diversions could extract sediment from the river during floods to rebuild wetlands while also lowering flood flowlines.
- Energy scarcity will complicate the current approach to operating the MR&T system for navigation on the river. Dredging costs will increase with energy prices. It makes sense to reconfigure the lower river to take advantage of the river's power to move sediments, while also upgrading the navigation system and lowering our reliance on costly fossil fuels.