Large sections of New Orleans' levee system sinking

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1 June 2015

Large sections of the $14.5 billion levee system constructed around the New Orleans area after Hurricane Katrina in 2005 are sinking and will have to be raised by 2025 in order to keep the areas inside the levees qualified for federal flood insurance, according to a report published May 20 by *The Lens*, a local investigative journalism outfit.

The sinking sections include the entire length of levees facing Lake Ponchartrain to the north in suburban Jefferson Parish, as well as the eastern half of the levee system in the large New Orleans East neighborhood, which experienced substantial flooding when the levees failed after Hurricane Katrina.

The current plans for the US Army Corps of Engineers, which is responsible for maintaining the city's levee system, calls for raising the levees over the course of several years, beginning in 2017, finishing most of the levees in 2024, just before the de facto deadline. The final section of the eastern levees will not be completed until 2027.

A key issue is how the raising will impact scheduled work on the levees' "armoring," the topmost layer designed to prevent erosion of the interior side in the event that the levee is topped during a major storm. The levees were originally built with an armoring consisting solely of Bermuda grass, which was later deemed insufficient; it is to be replaced by a more complex system of plastic matting anchored to the levee and then covered in grass. Indications are that this armoring will now not be installed until after the levees have been raised.

The poor design of the pre-Katrina levee system, installed piecemeal over the course of many decades, led to their breach in 2005, resulting in catastrophic flooding in over 80 percent of the city. The faulty design was, in large part, due to extreme funding pressures—improvements to the system planned after Hurricane Betsy in 1965 were still uncompleted when Hurricane Katrina hit.

The subsidence of portions of the levee is expected due to the unstable land that typifies the entire region, created by sediment buildup from the Mississippi River. The construction of the first major levee systems in the area in the 1930s effectively prevented the river from depositing new sediment, and most of New Orleans, especially those neighborhoods developed on top of drained swampland, lies below sea level and continues to sink today.

The rate of subsidence in a given area is difficult to predict, however, and can vary widely over short distances. "You can make your best guess at what's going to happen—but that's all you've really got: guesswork," one civil engineer told *The Lens* in 2013. "This place is moving in three dimensions all the time, so you've got to stay vigilant."

In the past two years, two sections of the eastern portion of the levee system were found to have fallen substantially below design specifications, six inches and three *feet* respectively, before they were even turned over by the Corps of Engineers to local authorities. The former section lies near the crucial Lake Borgne Surge Barrier, which guards the Mississippi River Gulf Outlet (MRGO), a canal that channeled surge waters into the city during Katrina.

Compared to the total cost of constructing the new system, the cost of raising the levees is a relative pittance, estimated to be $17 million for the levees in Lake Ponchartrain and $20 million in New Orleans East. By comparison, the state of Louisiana doled out $222 million in tax credits to the film industry in 2014 alone. However, the way in which the levee system is administered means that being able to pay for even

these minor sums for what is, in essence, routine maintenance is a constant worry.

Construction of the new levee system, like the one it replaced, was carried out by the US Army Corps of Engineers. Funding for maintenance and administration, however, is left to levee boards operated at the local level. Although the patchwork of local boards throughout the area, many of them choked with nepotism, were replaced with a more centralized system after Hurricane Katrina, the system is still divided into separate authorities which are constantly strapped for funds.

For example, the Southeast Louisiana Flood Protection Authority-East, which administers the levees on the more populated east side of the Mississippi River, will have to pay $20 million annually for the next 30 years, on top of an average $14 million annually in maintenance, as part of the state's share of funding for the construction of the levee system. To pay for raising the levees, the authority was forced to divert funding for next year already earmarked for other projects.

Complicating matters is the fact that each levee district within each Flood Protection Authority is required to fund its own maintenance from local sources, and any tax to fund the district must be approved by voters. The Authority is explicitly prohibited by law from paying for improvements in one of its constituent levee districts with funds raised in other districts.

Thus, the Lake Borgne Levee District, located in a crucial but impoverished and depopulated area of the levee system, ran up huge operating deficits by early 2013, four months before responsibility for its section of the system was handed to it by the Corps of Engineers. A millage proposal to fund the levee district, which would have raised $2.5 million annually, was twice defeated at the polls in May and last November. For the past three years, the District has operated a $500,000 deficit, which it has plugged with money from a fund for emergencies and long-term mortgages.

The district's levees are built on highly unstable soil, and a report released in February by the Corps of Engineers expressed concern that the shifting soil under a five mile section of levees could damage the pilings supporting them, undermining their ability to withstand a hurricane.

This divided administration, with different levels of funding and often conflicting agendas, of what was designed as a unified system has also resulted in separate and opposed approaches to maintaining and improving each group's portion of the system. While the Flood Protection Authority for the east bank has directed the Corps of Engineers to use the more robust grass-and-mat armoring system on its levees, its counterpart on the west bank has challenged the corps' plans to use this system on its portion, preferring instead the cheaper and less effective Bermuda grass armoring. "On our side of the river, it makes sense to raise the levee, rather than installing the enhanced turf matting that needs to be picked up in a few years, with all that money wasted," authority president Susan Maclay told the *Times Picayune* .

In January, the Corps of Engineers released a report recommending a "complete reanalysis" of the levee system by 2018, as part of a regular review process that would then be repeated every 10 years. The 2018 time frame was chosen in order to allow sufficient time to make repairs in advance of the National Flood Insurance Program recertification process. The proposed study would cost an estimated $10 to $20 million; where the funding would come from, if at all, "remains unclear," the *Times-Picayune* reported.

Ten years after Hurricane Katrina, the greatest civil engineering disaster in American history, the maintenance of New Orleans' levee system is still in disarray. Billions and billions of dollars are routinely handed out to the financial industry as a matter of routine, but a levee system which protects a major metropolitan area of 1.1 million residents, whose failure resulted in 1,464 deaths and the flooding of 80 percent of the city in 2005, is forced to scrape by.