

New Orleans and Hurricane Katrina. I: Introduction, Overview, and the East Flank

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Abstract: The failure of the New Orleans regional flood protection systems, and the resultant catastrophic flooding of much of New Orleans during Hurricane Katrina, represents the most costly failure of an engineered system in U.S. history. This paper presents an overview of the principal events that unfolded during this catastrophic hurricane, and then a more detailed look at the early stages of the event as the storm first drove onshore and then began to pass to the east of the main populated areas. The emphasis in this paper is on geotechnical lessons and it also includes broader lessons with regard to the design, implementation, operation, and maintenance of major flood protection systems. This paper focuses principally on the early stages of this disaster, including the initial inundation of Plaquemines Parish along the lower reaches of the Mississippi River as Katrina made landfall, and the subsequent additional early levee breaches and erosion along the eastern flanks of the regional flood protection systems fronting Lake Borgne that resulted in the flooding of the two large protected basins of New Orleans East and St. Bernard Parish. Significant lessons learned include (1) the need for realistic assessment of risk exposure as an element of flood protection policy; (2) the importance of considering erodibility of embankment and foundation soils in levee design and construction; (3) the importance of considering all potential failure modes; and (4) the problems inherent in the construction of major regional systems over extended periods of multiple decades. These are important lessons, as they are applicable to other regional flood protection systems in other areas of the United States, and throughout much of the world.

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