

The Extent of Geologic Control on the Storm Surge Flooding by Hurricane Katrina along the North Shore of Lake Pontchartrain, Southeastern Louisiana

Thomas P. Van Biersel

Louisiana Geological Survey – Louisiana State University, 3079 Energy, Coast and Environment Bldg.,
Baton Rouge, LA 70803

ABSTRACT

On August 29, 2005, and again on September 21, 2005, Hurricanes Katrina and Rita struck the Louisiana coast. The heavily developed areas along the north shore of Lake Pontchartrain, between the cities of Slidell and Madisonville, were flooded by Katrina's hurricane storm surge. The surge moved saline lake water from the lake onto the low-lying dry land. Many residences and businesses that were built close to the shore were damaged or destroyed by the surging waters. The extent of flooding is visible from NASA satellite and has been delineated.

Based on a review of geologic maps, it can be observed that the extent of flooding along the north shore of Lake Pontchartrain is bound to the north by the trace of the Baton Rouge Fault System. This set of listric faults, which includes the Baton Rouge, Denham Spring-Scotlandville, Madisonville Point, Causeway, Goose Point, and other unnamed faults, separates the Prairie Terrace uplands from the marshes and swamps surrounding the lake. The faults dip to the south and have been speculated by others as the source of the formation of Lake Pontchartrain. The surface expression of the fault-line scarps can be seen on LIDAR imagery. This expression represents a topographic rise of 5-10 feet near Ponchatoula, Lee's Landing, Slidell and Treasure Island; and 10-20 feet near Mandeville, Madisonville and Lacombe. The aerial extent of storm surge damage was greatest in the vicinity of Slidell, which was closest to the center of Hurricane Katrina and exhibits a gentler rise in topography.