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## New Orleans' levees no match for Katrina

By David Crary  
The Associated Press

Even before Hurricane Katrina struck, experts were warning that the network of earthen, steel and concrete barriers that protected the city was inadequate - and they proved tragically correct.

On Tuesday, a day after the storm barreled past, sections of two levees broke, spilling water into the streets and inundating an estimated 80 percent of the city, much of which lies below sea level. In all, the New Orleans district contains 350 miles of hurricane levees, mostly along Lake Pontchartrain to the north and the Mississippi River on the south - part of an even larger network constructed over many decades along the Mississippi by the Army Corps of Engineers. The earliest levees were erected soon after the city's founding in 1718; the system has been expanded and strengthened ever since. "This levee system is to levees around the world the way that the Great Wall of China is to walls around the world," Tulane University environmental expert Oliver Houck told American RadioWorks in a 2002 documentary.

Repeatedly, almost miraculously, the city escaped major damage in the past century as hurricane after hurricane wreaked havoc elsewhere along the Gulf Coast. But as a consequence of Hurricane Betsy in 1965 - the last major hurricane to strike close to New Orleans - the levees encircling the city and outlying parishes were raised to heights ranging up to 23 feet. Nonetheless, experts repeatedly cautioned that the protective system was unlikely to prevail if a Category 4 or Category 5 hurricane like Katrina hit the city. Marine scientist Ivor van Heerden of Louisiana State University, who has developed flooding models for New Orleans, was among those issuing dire predictions as Katrina approached.

"We're talking about an incredible environmental disaster," said van Heerden. He predicted that floodwaters would overcome the levee system, fill the low-lying areas of the city and then remain trapped there well after the storm passed - creating a giant, stagnant pool with debris, sewage and other hazardous materials. Van Heerden and other experts put some of the blame on the Mississippi River levees themselves, because they channel silt directly into the Gulf of Mexico that otherwise would stabilize land along the riverside and slow the sinking of the coastline.

Despite warnings, the levees may also have contributed to an unwarranted sense of security among residents. Only 34 percent of respondents in a University of New Orleans survey earlier this year said they would definitely leave home if evacuation orders were issued ahead of an approaching Category 3 hurricane. Political scientist Susan Howell, who directed the survey, said many residents didn't realize that areas of southeast Louisiana are not protected by levees from a strong, slow-moving hurricane.

When Betsy struck in 1965, water flowed over the top of the levees and flooded the pumps intended to keep the city dry. The same thing has happened now, except that authorities say it will take far longer to get any pumping operations started.

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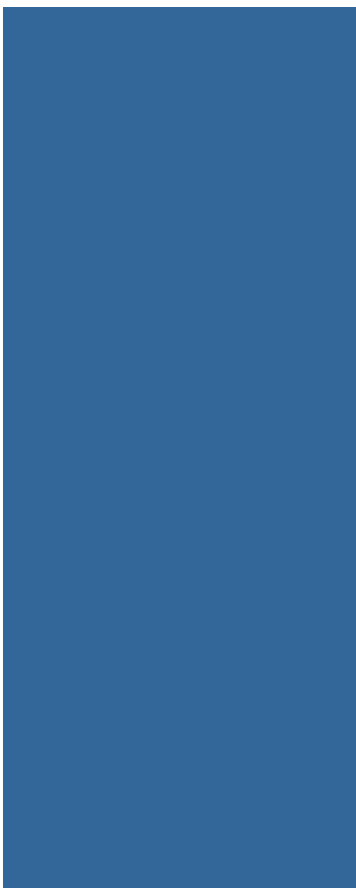
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