

Ignore at your own risk

New Orleans was forewarned before Katrina

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WASHINGTON — Despite its great length and considerable girth, Florida's 140-mile Herbert Hoover Dike surrounding Lake Okeechobee could be the nation's next catastrophe in waiting.

A close examination of a 78-page report on the dike's condition reveals a disturbing portrait of danger eerily reminiscent of what's called the "Hurricane Pam" exercise.



An aerial view looking east at a portion of Florida's 140-mile Herbert Hoover Dike at Lake Okeechobee.

This tabletop modeling, organized by the Federal Emergency Management Agency, predicted the Hurricane Katrina disaster in New Orleans months before it happened but was largely ignored.

"The condition of the dike has been deteriorating with time," said Leslie Bromwell, principal engineer for BCI Engineers and Scientists Inc. of Lakeland who led the three-person technical review. "During the last 10 years, many analyses had been made and reports written. Yet they didn't seem to be getting any significant attention. We became very concerned."

With that report in hand, Gov. Jeb Bush earlier announced all neighborhoods below the dikes would be evacuated if a hurricane strikes the area.

The fictitious "Pam" took place in July 2004 when dozens of federal, state and local emergency officials participated in a five-day exercise in Baton Rouge, La. They simulated what their agencies would do after New Orleans was struck by a devastating hurricane and flood.

The pretend storm bore an uncanny resemblance to Katrina and the destruction it wrought.

Officials emerged from the Pam exercise upbeat about the prospects of better coordination and reaction between agencies should the city face a real disaster of such proportions.

After Katrina, it was clear that few, if any, of the lessons learned from the Pam exercise had been applied as thousands of city residents remained stranded in the flood zone and the Federal Emergency Management Agency, state and local officials floundered for days trying to organize aid to the region.

In the case of the Lake Okeechobee dike, the recent report was commissioned by the South Florida Water Management District, the government authority responsible for the elaborate plumbing system that provides water for 6 million people in 16 South Florida counties.

Lake Okeechobee, with its earthen dike, is the heart of that system.

The report relied almost exclusively on the research and periodic reports of the U.S. Army Corps of Engineers, the agency that maintains the dike.

However, Corps officials criticized the consultants' work.

"I believe they used inflammatory language in that report that is irresponsible," said Col. Robert Carpenter, commander of the Jacksonville District of the U.S. Army Corps of Engineers, which oversees the agency's work in most of the state.

Some of the most alarming parts of the document, however, were passages pulled directly from the pages of Army Corps of Engineers documents.

For example, this sentence appeared in a 1998 Corps report from a group described as a "panel of eminent geotechnical specialists:"

"The panel considers the dike to be unsafe from a piping and erosion point of view, and recommends that actions be taken without further delay."

Carpenter did not dispute the accuracy of this or other excerpts contained in the consultants' report.

FLOODING FARMLAND

An uncontrolled release of water from the 730-square-mile lake would submerge vast areas of farmland and small towns around the lake where an estimated 40,000 people live. The flood could threaten the water supplies of the nearby urban corridors on both the Atlantic and Gulf coasts.

The basic problem with the Herbert Hoover Dike is that it was built of porous materials like gravel, rock, limestone, sand and shell. The construction, which began in the 1930s, followed the accepted standards of the time for a temporary levee.

Unlike a hardened concrete dam, the earthen berm and its underlying foundation are vulnerable to erosion and seepage.

Years of rising and falling lake levels, storm surges and extreme drought have left the interior of the dike looking like "Swiss cheese," laced with interconnected voids and open channels, according to Bromwell's team.

When the lake level rises above 18.5 feet, pressure from the wall of water against the dike's slope forces water through to the opposite side in a dangerous process called "piping."

Passing hurricanes can force the water to slosh and break even higher up the lakeside berm.

Severe piping can cause the slope to collapse and ultimately lead to total breach of the dike wall.

Using U.S. Army Corps of Engineers reports, the consultants documented an alarming series of near failures mostly along the berm segments facing the densely-populated counties of Palm Beach and Broward.

Another dike segment, the one facing Fort Myers and Naples, is considered nearly as fragile and prone to failure, according to the Army Corps' own investigations.

Bromwell's report praised Army Corps of Engineers teams for intervening with 100 percent effectiveness to prevent a catastrophic failure of the levee wall.

However, the report criticized the Corps' dependence on emergency repairs as a long-term solution to the dike's ongoing problems.

"This cannot go on indefinitely," the report observed. "A subtle but real danger associated with such situations is that over time and repeated close saves, they can come to be accepted as the norm."

This section of the Herbert Hoover Dike report echoed the troubling findings of two other national tragedies — the Challenger and Columbia shuttle disasters that killed 14 astronauts.

In both of those events, investigators later blamed NASA for discounting repeated equipment malfunctions because they had yet to produce a catastrophic failure.

That's an unfair comparison, said the Army Corps' Carpenter.

"Unlike (the shuttle) example, we have recognized we have a piping problem and we're spending \$300 million to repair the known shortcomings in the dike," Carpenter said.

The Corps has begun a major repair project to strengthen 50 miles of dike slope over the next seven years at a cost of approximately \$300 million, Carpenter said.

CORPS TAKES ACTION

The U.S. Army Corps of Engineers is committed to keeping the Lake Okeechobee level lower than in the past, to avoid the damaging pressure high water can place on the dike slopes.

This should reassure local residents and the nation that the Corps is doing everything it can to keep the public safe from a catastrophic flood, said Carpenter.

But keeping lake levels low isn't foolproof.

The lake has a limited capacity to rid itself of water through its main discharge outlets, the Caloosahatchee River and the St. Lucie Canal.

Under ideal conditions and maximum pumping, engineers can lower the lake level just 0.4 of an inch per day.

Currently, the lake level is at 13.1 feet. But that can change quickly. Last year, Hurricane Wilma raised the lake level by 1.6 feet in a matter of days.

Before the Herbert Hoover Dike was built, a hurricane in 1928 caused extensive flooding of Lake Okeechobee. The floodwaters killed an estimated 2,700, America's second deadliest hurricane behind the unnamed Galveston hurricane that killed more than 8,000. Katrina's estimated death toll is 1,300.