

THE FEDERAL RESPONSE TO HURRICANE KATRINA
(draft 05/12/06)

AMS Summer Policy Colloquium Case Study
June 2006
Prepared by William H. Hooke

BACKGROUND

New Orleans has known permanent settlement at its present location since about 1714, although the area had been intermittently occupied in years prior. The city has had a history of flooding, due to hurricanes (most notably 1909, 1915, 1947, and 1965, 1969) and other causes (e.g., 1927, 1995). Historically, the city had been somewhat protected from the full force of hurricanes by coastal wetlands to the south. However, these had been built up over millennia by silt deposits from the Mississippi River. Beginning in the 1850's levee construction along the length of the Mississippi River had the side effect of reducing this silting, leading to gradual but steady coastal erosion (currently at a rate of about 20 square miles/year). That erosion has been aggravated by subsidence associated with the local geology and with oil extraction in the area.

Over time, the city grew to a population of perhaps 400,000 (1,300,000 in the larger area). Oil refineries and port facilities concentrated in the area. Some 60% of U.S. exports pass through this port.

Throughout this period, the federal policy with respect to flood protection has focused on levee construction. Historically, this has been welcomed not only because of the direct measure of protection afforded by the levees, but also the economic boost to the area resulting from the construction itself, and the buildup of population and economic activity behind the levees. Levee design, location, and maintenance have been determined not just by safety but by a range of competing economic considerations.

For decades, experts had warned that New Orleans' vulnerability to flooding was worsening. They pointed out the deteriorating coastal protection, the population increase, the vulnerability of critical infrastructure (especially the levees themselves as well as the highways and causeways available for evacuation) to flooding, the presence of populations too sick (10,000) or too poor (60,000) to evacuate, and the period of a month or so that would be required to pump the city dry should the levees fail or be overtopped. In 2003, the Times-Picayune ran a series of articles on this subject. In 2004, Hurricane Ivan demonstrated that evacuation was problematic. A federal preparedness exercise, "Hurricane Pam," reached the same conclusion.

THE EVENT

The 2005 hurricane system was an active one. Hurricane Katrina made landfall on August 29th. Damage was immediate and extensive, especially along the Louisiana and Mississippi coasts, and into Alabama. Storm surge from several directions, including Lake Pontchartrain, surmounted and in some instances breached levees, flooding 80% of the city. The resulting death toll now exceeds 1300, with hundreds more still unaccounted for. Many of these died trapped in their homes by the flooding. Many were elderly, some dying in care facilities.

Hundreds of thousands were forced to evacuate. Tens of thousands more were stranded in the city, including over 20,000 at the Super Dome.

Some 60% of businesses in the area closed. Many have yet to reopen. Gas prices spiked after the event, not just regionally, but nationally. Many nations wondered whether, and how long, grain shipments from the United States would be interrupted.

Months after the event, hundreds of thousands have yet to return to the flooded areas. Some 200,000 still remain unemployed. Many schools, hospitals, and other infrastructure have yet to reopen. Recovery has barely started. The storm and its aftermath have hollowed out the region economically, drastically altered its political landscape, not just in the region, but nationally.

THE FEDERAL RESPONSE

Hurricane Katrina by all accounts was well forecast. To quote from the House of Representatives report (available, e.g., at <http://www.c-span.org/pdf/katrinareport.pdf>):

The Select Committee began at a logical place: a hearing to establish a record of who was told what, and when, about the nature of the hurricane in the days immediately before the storm. We explored the timeline of Katrina progressing from a tropical depression to a major hurricane, and asked when warnings were issued to the public and to federal, state, and local officials. We reaffirmed what we already suspected — at least two federal agencies passed Katrina's test with flying colors: the National Weather Service (NWS) and the National Hurricane Center. Many who escaped the storm's wrath owe their lives to these agencies' accuracy. This hearing provided a backdrop for the remainder of our inquiry. We repeatedly tried to determine how government could respond so ineffectively to a disaster that was so accurately forecast. How accurately?

- Storm-track projections released to the public 56 hours before Katrina came ashore were off by only 15 miles. The average 48-hour error is 160 miles, and the average 24-hour error is 85 miles.
- The Hurricane Center's predicted strength for Katrina at landfall, two days before the storm hit, was off the mark by only 10 miles per hour.
- NWS Director Max Mayfield personally spoke by telephone with the governors of Mississippi and Louisiana and the mayor of New Orleans two days prior to landfall to warn them of what was coming. He also gave daily pre-storm video briefings to federal officials in Washington, including top Federal Emergency Management Agency (FEMA) and DHS brass.
- The day before Katrina hit, the NWS office in Slidell, Louisiana issued a warning saying, "MOST OF THE AREA WILL BE UNINHABITABLE FOR WEEKS...PERHAPS

LONGER...HUMAN SUFFERING
INCREDIBLE BY MODERN STANDARDS.”
The Select Committee determined — despite
more recently revised reports that Katrina was
actually a strong Category 3 storm at landfall,
not a Category 4 — that Katrina’s strength and

the potential disaster it could bring were made
clear well in advance through briefings and
formal advisories. Inadequate response could
not be blamed on lack of advance warning.

The White House and Senate reports reached similar favorable conclusions with respect to the performance of the National Weather Service. This favorable view of the National Weather Service was shared as well by the White House and the Senate reports.

The good news stops there. The federal response to events as they unfolded was slow, uncoordinated, and in many ways ineffective. Communications were poor across local-state-federal interfaces, from agency to agency within these respective spheres, and even between career civil servants and their political bosses and within the military. Authorities were slow to realize that levees had been breached, slow to appreciate the consequences of those failures, and slow to respond. Law and order, public health, and other essential public services were quickly compromised. Intensive media coverage made any shortcomings quite visible to the American public. The media also overplayed some aspects of the emergency. Families were separated, and critical data were unavailable to help restore contact. Recovery will take decades.

THE REPORTS

In the wake of Katrina, the U.S. House of Representatives, the White House, and the U.S. Senate mounted separate studies, leading to separate, but for the most part mutually consistent and supportive reports. They are available in pdf format on-line:

A Failure of Initiative: Final Report of the Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina, U.S. House of Representatives, February 2006:

<http://www.c-span.org/pdf/katrinareport.pdf>):

The Federal Response to Hurricane Katrina: Lessons Learned, The White House, February 2006:

<http://www.whitehouse.gov/reports/katrina-lessons-learned.pdf>

Hurricane Katrina: A Nation Still Unprepared, the U.S. Senate, May 2006:

<http://hsgac.senate.gov/files/Katrina/FullReport.pdf>

Generally speaking, they agree on the following points:

- the accuracy and timeliness of NWS forecasts prevented further loss of life.

- all levels of government knew of the dangers.
- levees protecting New Orleans were not designed or built for a worst-case scenario.
- failure of complete evacuations led to preventable deaths, great suffering, and further delays in relief.
- critical elements of the national response plan were executed late, ineffectively, or not at all.
- DHS and the states were unprepared.
- Massive communications damage and lack of alternatives impaired situational awareness, command and control, and response.
- The military played an invaluable role, but lacked coordination.
- Collapse of law enforcement and ineffective public communications led to civil unrest and delayed relief.
- Medical care and evacuations suffered from a lack of advance preparations, inadequate communications, and difficulties coordinating efforts.
- FEMA responded poorly because of long-standing weaknesses and the magnitude of the disaster.
- The Red Cross and other NGO's were overwhelmed.

Recommendations from the three reports were consistent in tenor but distinct with respect to particulars. The reports agreed on the need for measures like the following:

- improving the coordination among federal, state, and local agencies with respect to emergency response.
- Improving the standards for and interoperability of emergency communications

However, the recommendations of three differed in some particulars. The House largely confined its efforts to findings, stopping short of detailed recommendations. The White House report called for a more activist role for all federal agencies across the board. This included drawing more heavily on and making better use of military and National Guard capabilities; DoT evacuation planning to supplement that at the state level, HHS involvement in public health, DoJ contributions to maintaining law and order, etc. The Senate called for abolishing FEMA and replacing it with a stronger, more capable structure, to be known as the National Preparedness and Response Authority (NPRO). They called for this agency to have a full suite of responsibilities, including mitigation, preparedness, and recovery in addition to response.

DISCUSSION QUESTIONS:

1. New Orleans' growing vulnerability to flooding had been widely known for decades. Despite this widespread awareness, the disaster nevertheless occurred, the scenario unfolding almost exactly as predicted. Why?

2. Could forecasts of Katrina have been better? How might this have made a difference?
3. Does the U.S. face other similar disaster scenarios that we know about? What are some of these?
4. What options are available to federal, state, and local governments to mitigate against such hazards?
5. Suppose the evacuation had been accomplished perfectly? What outcomes would have changed?
6. Why is recovery so slow?
7. What lessons has the United States learned? Will we be safer the next time a hurricane strikes New Orleans?
8. What are the advantages to making greater use of the military in emergency response and recovery? The disadvantages?
9. What are the advantages to doing away with FEMA? The disadvantages?
10. What steps should our own science and services community take with respect to future threats?