

**Testimony to the Subcommittee on Disaster Prevention and Prediction  
of the Committee on Commerce, Science and Transportation  
of the United States Senate**

**September 20, 2005**

**Statement of  
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President, American Association for Wind Engineering**

**On behalf of the LSU Hurricane Center**

Mr. Chairman and members of the subcommittee, my name is Marc Levitan. I am Director of the Louisiana State University Hurricane Center and the Charles P. Siess, Jr. Associate Professor of Civil and Environmental Engineering at Louisiana State University. I am also the elected President of the American Association for Wind Engineering and a member of the American Society of Civil Engineers.

I am appearing today on behalf of the Louisiana State University Hurricane Center. Louisiana State University is the flagship institution of the state, classified by the Carnegie Foundation as a Doctoral/Research-Extensive University. The university has a long history of research in hurricanes, coastal sciences and engineering. The LSU Hurricane Center was founded and approved by the Louisiana Board of Regents in the year 2000 to provide a focal point for this work, with a mission to advance the state-of-knowledge of hurricanes and their impacts on the natural, built and human environments, to stimulate interdisciplinary and collaborative research activities, to transfer new knowledge and technology to students and professionals in concerned disciplines, and to assist the state, the nation, and world in solving hurricane-related problems. Research efforts that have been translated into practice in support of emergency management agencies include: Implementation of real-time storm surge modeling, improvements in hurricane evacuation planning and operations (particularly contraflow evacuations), and improvements in hurricane shelter analysis and design methods.

**LSU Hurricane Center's Role in Preparing for and Responding to  
Hurricane Katrina**

The LSU Hurricane Center has put its research expertise into helping prepare for and respond to Hurricane Katrina. Over the past few years, our faculty, staff, and students

have: helped redesign Louisiana's contraflow evacuation plan, one of the few bright spots in the Katrina Response; worked with many local and state government agencies to provide hurricane shelter assessments and mitigation plans for hundreds of buildings; provided training in hurricane shelter assessment methodology and GIS applications for emergency management, developed hurricane exercises for the Louisiana Office of Homeland Security and Emergency Preparedness and the Louisiana Department of Transportation and Development, and was a partner in the design of last year's Hurricane Pam catastrophic hurricane planning exercise.

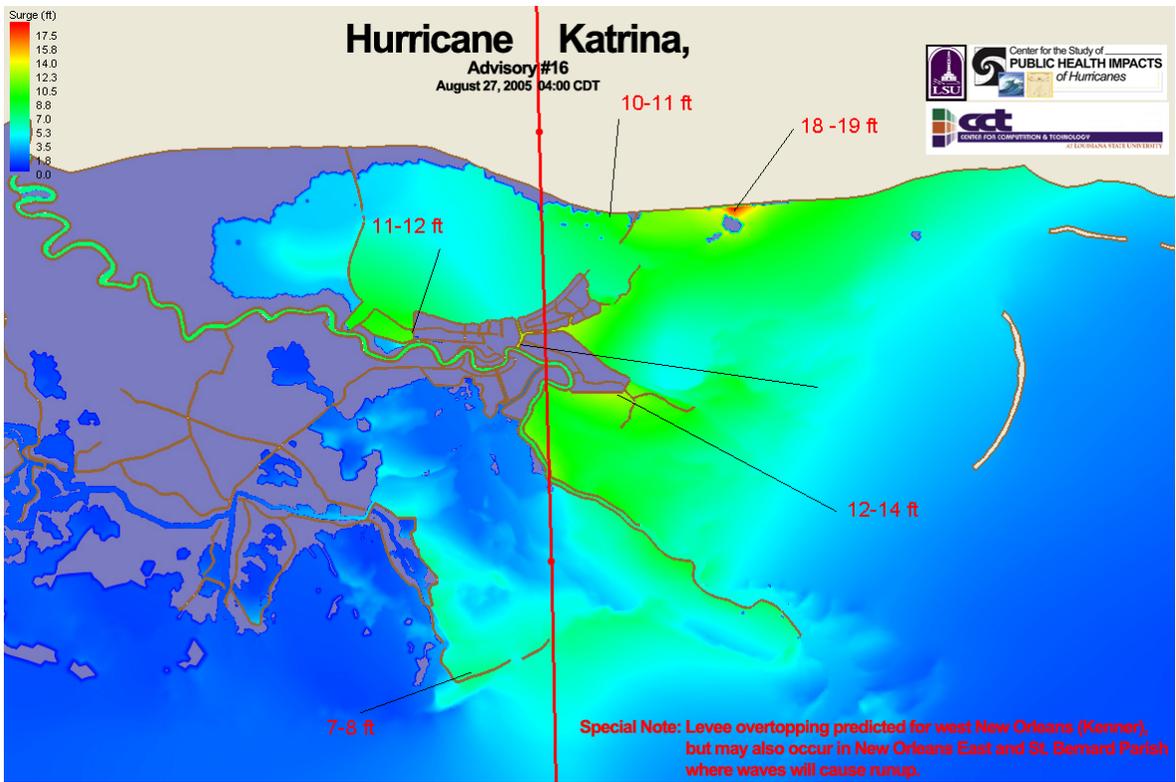
As Hurricane Katrina approached, we were activated by the Louisiana Office of Homeland Security and Emergency Preparedness (LOHSEP) on Saturday morning August 27. The LSU Hurricane Center team, along with staff from the Southern Regional Climate Center, Earth Scan Lab, and the Center for the Study of Public Health Impacts of Hurricanes then began providing 24 hour operational support. This support included:

- satellite storm tracking
- local meteorological condition information and support
- storm surge flood estimation
- wind damage estimates

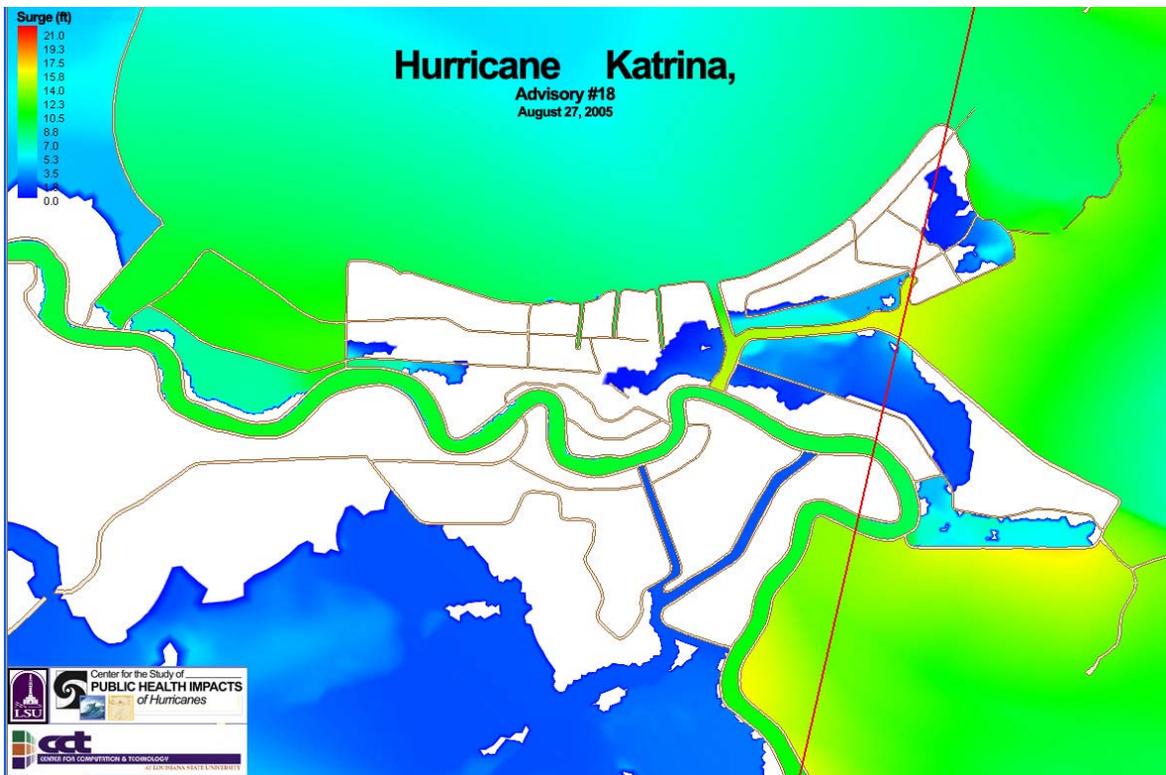
Other support activities included consultations on evacuation and sheltering decisions as the storm was approaching, flood casualty estimates, and mapping/GIS/remote sensing support ever since the storm made landfall, which is still continuing. Maps have been made for many of the major federal and state agencies, including mapping 911 calls which helped direct rescue crews.

One of the most important facets of this operational support was real-time storm surge modeling. Using the ADCIRC Model, our surge modeling team, funded by the Louisiana Board of Regents, provided surge flooding estimates based on the National Hurricane Center forecast predictions. These models were posted on a web site available to Louisiana emergency managers and the results were included in the regular briefings put on by the LSU team in the Emergency Operations Center. The first model run was based on Advisory 16 and was completed on Saturday afternoon. It indicated flooding in the low-lying areas outside the main levee protection areas, but no overtopping in the city. The model run for Advisory 18 was completed very late Saturday night, and showed overtopping of the levees in the eastern part of the city.

The ADCIRC model is a very powerful tool to examine surge flooding for single track scenarios right now. It is a research product that has been pressed into service to assist with operations, but needs additional work and testing to become a true operational tool. LSU researchers are working right now to update the underlying physical grid to account for the damaged state of the levee systems in New Orleans in case another storm approaches before they are repaired.



Forecast advisory 16 storm surge estimate



Forecast advisory 18 storm surge estimate

## **The Critical Role of Coastal Protection, Land Use, Zoning and Building Codes in Reducing Loss of Life and Property**

Hurricane Katrina has demonstrated numerous failures and shortcomings in how we have managed both the natural and built environments. Coastal land loss, changes in land use and building construction practices, and the continued lack of adoption and enforcement of a modern, statewide building code have all contributed to the Katrina disaster.

No plan to rebuild southeastern Louisiana can ultimately be successful without a comprehensive effort to protect and restore the coast. A large and healthy system of wetlands between New Orleans and the Gulf of Mexico has historically been the first line of defense for the city, protecting it from the worst of the hurricane storm surges and winds. This buffer has largely disappeared over the last 75 years. Levees on the Mississippi River prevent sediments and nutrients from renewing the land. Construction of canals for the oil, gas and shipping industries has disrupted the natural hydrology and allowed saltwater to penetrate the marshes, causing serious damage. These and other factors have led to the highest rate of land loss in the world. Louisiana loses approximately 25 square miles of protection each year due to subsidence and erosion. A comprehensive coastal restoration program must be put in place and funded immediately, before the wetlands disappear entirely.

Areas that have been protected from flooding by levee systems have witnessed changes in land use and building construction practices that tend to *increase* their vulnerability to floods. Many areas of southern Louisiana traditionally experienced flooding often enough that standard construction practice was to either build on high ground or elevate the structures. The proliferation of flood protection levee systems over the past several decades has reduced the frequency of flooding and, in some cases, lowered the mapped base flood elevation. These changes have led to the development of lower lying areas and construction of homes and businesses using either slab-on-grade or minimally elevated foundations. These structures are now extremely vulnerable to flooding when levee systems fail, when drainage pump systems fail, and/or when events larger than the design flood occur.

The lesson here is clear – when buildings are constructed in flood-prone areas, *whether protected by levee systems or not*, they should still be elevated in order to reduce potentially catastrophic flood losses.

Suppose the majority of homes in New Orleans had been constructed with open parking or enclosed garages beneath the homes, meaning that the elevation of the first floor would be eight to 10 feet above grade. This change could have saved many lives and many thousands of homes. As I have often heard Jesse St. Amant, Director of Plaquemines Parish Emergency Management say, “Elevation is the salvation from inundation.”

One of the most urgent needs in the wake of the disaster is building code reform. We simply cannot afford to spend billions of dollars rebuilding homes and businesses that will not stand up to the next hurricane. Studies conducted by the Institute for Business and Home Safety and several Florida universities concluded after last year's hurricanes that the new Florida Building Code was very effective at reducing hurricane damage. Analysis of thousands of homes showed that buildings constructed to the new code, on average, experienced only about half as much damage and loss as those built to previous codes. Additionally, a much larger percentage of homes built to the new code were undamaged or only minimally damaged so that the structures were still inhabitable.

Louisiana learned a lesson from Florida's hurricanes of 2004, and has begun taking steps toward building code reform. In the Regular Session ending in June 2005, the Louisiana Legislature called for the creation of a Uniform Building Code Task Force in House Concurrent Resolution 135, with the purpose being "...to study current laws and regulations related to the construction of buildings and structures, make recommendations regarding legislation that would best ensure adequate maintenance of buildings and structures throughout the state, and to adequately protect the health, safety and welfare of the people." The primary motivation for this legislation was the reduction of catastrophic damage from hurricanes and other severe storms.

The first meeting of the Uniform Building Code Task Force was originally scheduled for August 31, two days after Katrina made landfall. This meeting was canceled for obvious reasons and has tentatively been rescheduled by the Louisiana Department of Insurance to October 4, 2005. It is imperative that this body make recommendations for immediate changes while the longer term solution is under deliberation. One such possibility would be to immediately require all residential construction to meet the requirements of SSTD 10-99, the Standard for Hurricane Resistant Residential Construction, or a variation of that document.

## **National Windstorm Impact Reduction Program**

The recent devastation along the Gulf Coast of the United States brought upon by Hurricane Katrina pointed out the vulnerability of the nation to severe wind storms such as hurricanes. This vulnerability was recognized by Congress last year when it enacted Public Law 108-360, which authorized the creation of the National Windstorm Impact Reduction Program. The program has been authorized for FY 2006, but as of yet, there is no funding in the relevant appropriations bills.

**For Fiscal Year 2006 the law authorizes \$22.5 million dollars in spending, spread over four agencies. I urge Congress to appropriate no less than the following funding levels through supplemental appropriations. Specifically, the law authorizes:**

- **\$8.7 million for the Federal Emergency Management Agency;**

- **\$3 million for the National Institute of Standards and Technology at the Department of Commerce;**
- **\$8.7 million for the National Science Foundation; and**
- **\$2.1 million for the National Oceanic and Atmospheric Administration.**

This legislation represents five years of work in which stakeholders representing a broad cross section of interests, including research, technology transfer, design and construction, financial communities, materials and systems suppliers, state, county and local governments and the insurance industry, all participated in crafting. This bill presents a consensus of all those with an interest in the issue and a desire to see the benefits this legislation will generate.

The Wind Hazard Reduction Coalition represents associations and companies that are committed to the creation and success of the National Windstorm Impact Reduction Program. The Coalition shares the goals of the Program to significantly reduce loss of life and property damage in the years to come. The Coalition includes professional societies, research organizations, industry groups and individual companies with knowledge and experience in dealing with the impact of high winds.

Members of the Wind Hazard Coalition worked closely with members and staff in the House and Senate in crafting the language contained in H.R. 2608, which became P.L. 108-360. I strongly support the results and believe that, if fully carried out, the new law will result in reduced vulnerability to high winds and lead to real and significant reduction in the loss of life and property. The United States currently sustains billions of dollars per year in property and economic loss due to windstorms. The Federal government's response to such events is to initiate search and rescue operations, help clear the debris and provide financial assistance for rebuilding. With this legislation, the Federal government can provide increased research funding to mobilize the technical expertise already available to help reduce the significant annual toll on casualties and property in the aftermath of windstorms.

## **Conclusion**

In the wake of this national catastrophe, we must take every advantage of opportunities to prevent this from happening again. Immediate steps include: moving forward with plans to rebuild the coast, our first line of defense against the storm; bold land use and zoning changes to discourage rebuilding in the most hazardous areas; and immediate adoption of new hurricane resistant construction and inspection requirements while permanent changes are under deliberation. Beyond that, Congress should immediately fund Public Law 108-360, which authorized the creation of the National Windstorm Impact Reduction Program but has not been funded to date. This program will provide research and technology transfer to improve building codes and construction practices based on the lessons learned from the recent hurricanes.

Once again, thank you for the opportunity to present the views of the many organizations I am representing here today. I would be happy to answer any questions you might have.