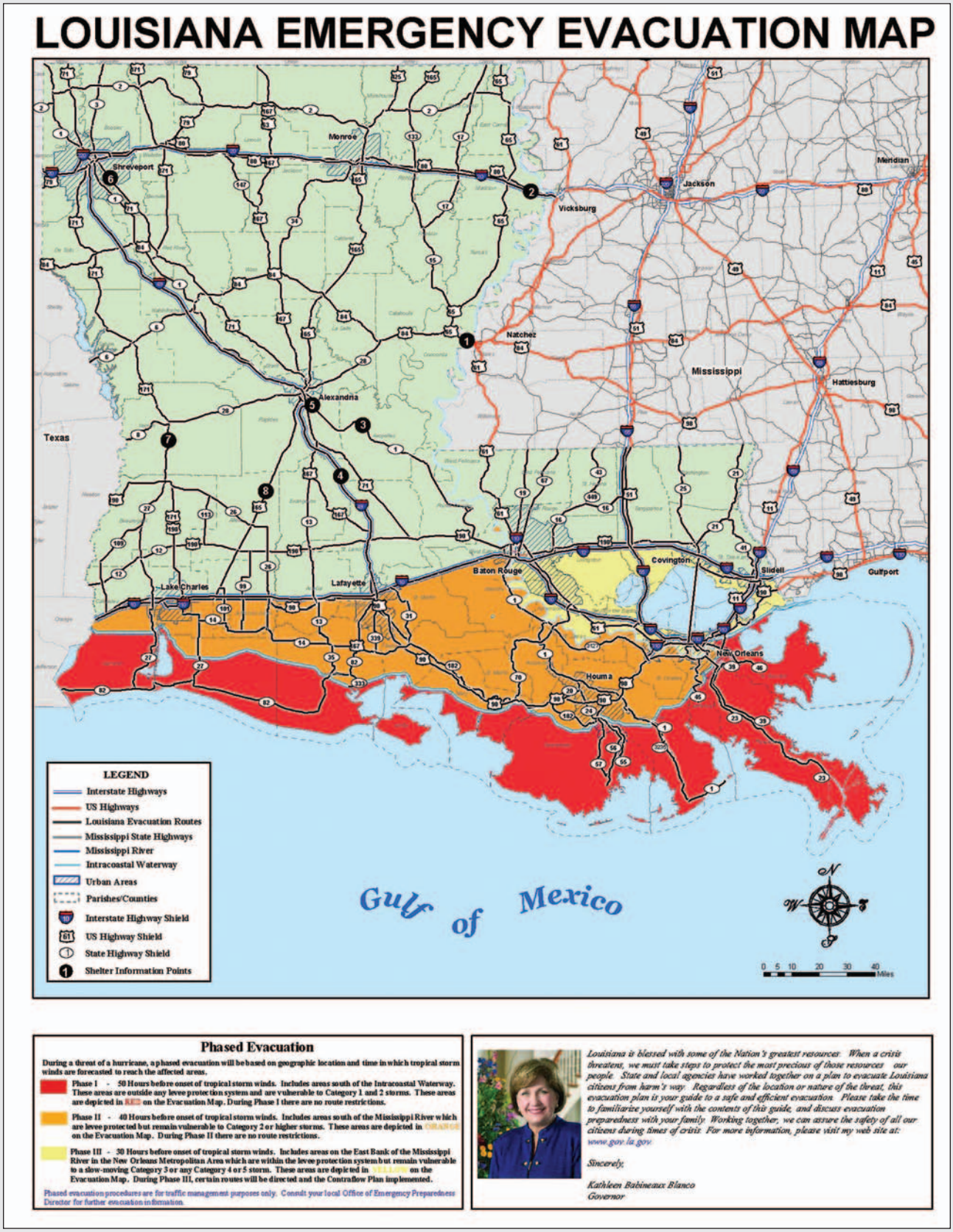

Citizens' evacuation map and message from Gov. Blanco

State of Louisiana

Emergency Management: Louisiana

The Threat

Like its Gulf Coast neighbor states, Louisiana repeatedly finds itself the target of tropical storms and hurricanes coming ashore from the Gulf of Mexico. Louisiana has the added problems of having large tracts of low-lying land that are sinking while sea levels are rising, and of being home to a major city that, on average, lies below sea level.

As the Congressional Research Service (CRS) has noted, "New Orleans' location on the Gulf Coast with water on three sides and below-sea-level terrain makes this densely populated section of Louisiana highly susceptible to flooding from hurricane storm surges" – not to mention the risks it faces from river flooding and trapped rainwater.[1]

The need to protect New Orleans is old and pressing. And it is getting more severe. Three researchers presenting at a U.S. Geological Survey conference observed that "Considering the rate of subsidence [sinking soil levels] and the mid-range estimate of sea-level rise during the next 100 years (480 millimeters) [about 1.9 inches] the areas of New Orleans and vicinity that are presently 1.5 to 3 meters [about 5 to 10 feet] below mean sea level will likely be 2.5 to 4.0 meters [about 8 to 13 feet] or more below mean sea level by 2100."[2] Like other researchers, they also note that the New Orleans area's vulnerability is "aggravated owing to flood-protection measures and disruption of natural drainageways that reduce sediment deposition" that would otherwise compensate for some of the subsidence.[3]

The desire to protect New Orleans is old and powerful. And it continues. French settlers in the early 1700s built earthen levees to protect their high-ground settlement from flood waters rising in the Mississippi River. After Louisiana had passed into American hands in 1803, a succession of private landowners, local levee boards, and later the Army Corps of Engineers (the Corps) added to the protective works.[4] The Corps got its first Mississippi flood-control mandate from Congress in 1850; its authority expanded through major flood-control legislation of 1936, 1944, and 1950, among others.[5]

Most of the current hurricane-protection system around the metropolitan New Orleans area has been built since 1879 by local sponsors or by the Corps.[6] The most intense and protracted program of protection, however, was launched after the 1965 assault by Hurricane Betsy.

On the night of September 9, 1965, Hurricane Betsy made landfall near New Orleans, driving before it a storm surge of water that easily overran levees and flooded more than 5,000 square miles of land, including densely populated areas in Orleans and St. Bernard Parishes, and more rural areas in Plaquemines Parish. The hurricane was the worst up to that point in Louisiana's history: it killed 81 people, injured over 17,600, and drove more than 250,000 to shelters.[7]

President Lyndon Johnson visited New Orleans the next day. He praised the work of state and local first responders – "The agony and the loss of Louisiana would have been far greater without the cooperation, effective work of the Weather Bureau, the Civil Defense Authorities of Louisiana, the Red Cross and other local groups" – then added, "[Y]ou can be sure that the federal government's total resources, with the help of the fine Louisiana Delegation, will be turned toward helping this state and its citizens find its way back from this tragedy."[8]

Congress responded with the Lake Pontchartrain and Vicinity Hurricane Protection Project in the Flood Control Act of 1965. The project envisioned a series of control structures, floodwalls, and levees to provide hurricane protection to areas around Lake Pontchartrain, the large lake lying north of New Orleans. Originally expected to be completed in about 13 years, the project was delayed by technical issues, environmental and legal challenges, and some local opposition that ultimately led to design changes. When Hurricane Katrina struck, the project included some 125 miles of levees, and the completion date had been extended to 2015. The drainage-canal floodwalls that failed during Katrina, however, were complete at that point.[9]

During the 40 years of construction that followed the Flood Control Act of 1965, a succession of powerful hurricanes – Camille in 1969, Andrew in 1992, Georges in 1998, Isadore and Lili in 2002, and Ivan in 2004 – supplied grim reminders of the need to protect the Louisiana coast and the low-lying City of New Orleans, and to perfect evacuation plans to remove people from the impact areas.

The Army Corps of Engineers had built the New Orleans levee system to handle a "standard project hurricane" – a notional, hybrid storm that engineers later described, in terms of the Saffir-Simpson scale adopted in 1977, as "equivalent to a fast-moving Category 3 hurricane."[10] On its five-category scale, the National Weather Service (NWS) classifies Category 3, 4, and 5 hurricanes as "major," and the damage from a Category 5 storm as "catastrophic."[11] Compared to the Saffir-Simpson standards, the Standard Project Hurricane's winds were as fast as a Category 2 hurricane, its storm surge as high as a Category 3, and its central atmospheric pressure as low as a Category 4 – hence the rough description as a fast-moving Category 3 storm.[12]

Assessing the protective strength of the New Orleans-area system was complicated by the region's soil subsidence. Though the Corps periodically "lifted" the levees to compensate for subsiding soils, the levels of the lifts varied, resulting in a system as vulnerable as its lowest component. A Corps of Engineers fact sheet of 2003, "How Safe is New Orleans from Flooding?" took note of these uncertainties about the Lake Pontchartrain project:

> This level of protection [against a fast-moving Category 3 hurricane] was based on the science of storm prediction as it existed in the 1960s. The question remains, however, whether this level of protection would be sufficient to protect the city from a category 4 or 5 hurricane today – or even a category 3 storm that lingered over the city [i.e., a "slow-moving" storm]. Since the 1960s, New Orleans has been sinking – in some areas at the rate of ½ inch per year. The distance from the Gulf Coast to New Orleans has also been shrinking. A century ago, a hurricane would have to cross 50 miles of marshland able to reduce the storm's energy; today only half as much.[13]

By 2003 – 10 years after the start of a new cycle of more active hurricane formation in the Atlantic – new research suggested that the combination of sinking soil and rising ocean water around the Mississippi Delta meant that even some Category 2 storms could produce devastating floods in the New Orleans area. Director Marc Levitan of the Louisiana State University Hurricane Center wrote a paper analyzing the computerized, multi-storm flooding projections of the National Oceanic and Atmospheric Administration's SLOSH (Sea, Lake, and Overland Surges from Hurricanes) program. Examining the mapping results of the program, he wrote,

> clearly demonstrates that New Orleans is at significant risk of flooding from Category 2 and 3 hurricanes. All locations on the West Bank and many points on the East Bank could flood even in Category 2 intensity storms from certain

> directions … locations anywhere within Orleans and Jefferson Parishes can experience significant storm surge flooding in a Category 3 storm. … The situation deteriorates rapidly if Category 4 and 5 storms are considered. Any single storm can easily flood broad areas of both parishes to depths over land of 10 feet or more.[14]

The historic record shows the concern over extreme or catastrophic storms was not idle fretting about some remote possibility. The National Hurricane Center's list of "Most Intense Hurricanes in the United States, 1851-2004" includes six hurricanes measured or estimated as Category 4 or 5 that have struck Louisiana:

Hurricane Andrew	1992	Category 5
Hurricane Camille	1969	Category 5
Hurricane Audrey	1957	Category 4
Unnamed storm	1947	Category 4
Unnamed storm	1915	Category 4
"Last Island" storm	1856	Category 4[15]

Hurricane Betsy, which devastated New Orleans and other Louisiana communities in 1965, had reached Category 5 strength while still in the Gulf of Mexico, though it weakened before landfall. Hurricane Katrina reached the same strength in 2005, and faced a protective system with newly recognized vulnerabilities.

Just as the hurricane-protection system reflected coordinated efforts at different levels of government, Louisiana's response capability for disasters like Katrina is vested in an emergency-management system that coordinates preventive and remedial actions by local, state, and federal governments. As will be seen, that system had deficiencies in its structure and operation.

The State

Louisiana's Emergency-Management Structure

Louisiana law entrusts the Governor with "overall responsibility for emergency management in the state."[16] The Governor delegated her authority to direct emergency operations to the state Adjutant General.[17] As in many other states, when Katrina struck, the Adjutant General was serving both as director of the state emergency-preparedness office and as commander of the National Guard.

The state's lead agency for emergencies is the Governor's Office of Homeland Security and Emergency Preparedness. From 2003 to March 2006 – and therefore during the Katrina disaster – it was known as the Louisiana Office of Homeland Security and Emergency Preparedness (LOHSEP), and will be referred to by that title in this discussion. Since its creation in 1950, the agency has been variously assigned to the Department of Public Safety, the Military Department, and finally the Governor's Office.[18]

LOHSEP says it "has managed over 16 Federal Disaster Declarations and has coordinated several hundred State Disaster Declarations authorized under the Governor's signature" since 1990.[19] Based in Baton Rouge, LOHSEP was directed at the time of Katrina by the

Adjutant General of the Louisiana National Guard, Major General Bennett C. Landreneau; its current Acting Director is Colonel Jeff Smith.

Allocation of disaster-response responsibilities is governed primarily by the Louisiana Constitution, the Louisiana Homeland Security and Emergency Assistance and Disaster Act, and the State Emergency Operations Plan (EOP).

The State's EOP comprises a 21-page "Basic Plan," four Attachments, 15 Emergency Support Function (ESF) Annexes, and seven Supplements. Its purpose is to "establish the policies and structure for state government management of emergencies and disasters."[20] It prescribes phases of emergencies and disasters, and assigns responsibilities for actions the state will take to provide for the safety and welfare of its citizens.[21]

The general principles underlying the EOP's allocation of responsibilities exemplify the long-standing, federal-system approach to disaster planning. The EOP's "Assumptions" section reads, in part:

> 5. The initial actions of prevention, mitigation, preparedness, response and recovery operations are conducted by local government. Local authorities will exhaust their resources, and then use mutual aid agreements with volunteer groups, the private sector and/or neighboring parishes.
>
> 6. State assistance will supplement local efforts and federal assistance will supplement State and local efforts when it is clearly demonstrated that it is beyond local and State capability to cope with the emergency/disaster.[22]

Following the template of the National Response Plan (NRP), the EOP identifies 15 Emergency Support Functions (ESFs), for which 28 state departments, offices and agencies have primary and/or supporting roles. LOHSEP has primary responsibility for five ESFs; the Department of Agriculture and Forestry, the State Police, and the Department of Transportation and Development have responsibility for two; and 10 agencies have a single primary responsibility. The National Guard is unique in being assigned supporting responsibility for all 15 ESFs, but no primary responsibilities.[23]

While most of those departments and agencies took their responsibilities seriously, as discussed elsewhere in this report, the Louisiana Department of Transportation and Development, which acquired primary responsibility for the emergency support function relating to evacuation in 2004, did not. Colonel Smith also acknowledged LOHSEP's shortcomings in this area, saying the agency needed to do more to ensure that all entities assigned lead responsibilities for emergency support functions are "completely aware of what those responsibilities mean."[24]

Governor Blanco failed to provide sufficient resources to LOHSEP. However, the inadequacy of LOHSEP's resources was a chronic issue, known to Louisiana officials well before Katrina. LOHSEP had a pre-Katrina staff of 43 to 45, some of whom were detailed from other offices. Only about 15 agency staff had emergency-management leadership experience.[25] Depressed pay scales both prevented the agency from hiring experienced candidates and led to high turnover.[26] Planning in particular suffered. When the New Orleans medical director sought to put in place memoranda of understanding with Amtrak and other carriers for pre-landfall evacuation in the summer of 2005, LOHSEP was too short-staffed to help finalize the plan.[27]

When Colonel Smith became Acting Deputy Director in late 2004, General Landreneau directed him to undertake a staffing study.[28] While the resulting study showed that LOHSEP's staffing was only about 60 percent of the national average, efforts to persuade the legislature

to fund additional positions – which had the support of the Governor's staff – met with little success. [29]

LOHSEP was also well aware long before Katrina that its emergency plan was not adequate to deal with a catastrophic hurricane, and that it lacked the resources to remedy that inadequacy. It was that very awareness that led to its efforts beginning in 1999 to secure federal assistance in developing a more comprehensive plan (eventually leading to the Hurricane Pam exercise).[30] The extent of that inadequacy only became more apparent as LOHSEP wrestled with the overwhelming problems of responding to the devastation of Katrina.

The State Updates its EOP

In addition to the issues that led to the Hurricane Pam exercise, the state and federal agencies addressed other concerns related to evacuation.

In 2000, the State's Office of Emergency Preparedness finished an update of the state comprehensive emergency operations plan. It included new evacuation and shelter plans produced by the 12 parishes in the Southeast Louisiana Hurricane Task Force. Some parishes, such as Jefferson, updated their plans; some agencies, such as the New Orleans Fire Department, developed new strategies for a catastrophic storm.[31]

This period also exposed the fundamental weakness of the state's approach to pre-storm evacuation of residents without transportation. Under the state's plan, the National Guard was responsible for transportation, but the agency had no buses and intended to parcel out its inventory of troop transport trucks to individual parishes as it had always done.[32] The State's Comprehensive Emergency Management Plan, updated in 2000, left the responsibility for pre-storm evacuation with the parishes. "The primary means of hurricane evacuation will be personal vehicles," the plan said. "School and municipal buses, government-owned vehicles and vehicles provided by volunteer agencies may be used to provide transportation for individuals who lack transportation and require assistance in evacuating."[33]

Solving the problem involved more than assembling large numbers of buses, as the 1994 Hurricane Preparedness Study had emphasized. If no building in New Orleans could serve as a hurricane shelter, then all vehicles had a much longer drive to reach shelters, which influences clearance times.

A month before the start of the 2002 hurricane season, officials from the main state and federal agencies responsible for hurricane evacuations in Louisiana met to discuss the Bi-State Hurricane Evacuation Study – an event that underscored the challenges of arranging mass evacuations in a hurricane-prone region.[34] During the meeting, speakers noted that approximately 30 percent of Louisiana residents would evacuate to or through Mississippi in the event of a hurricane and that Louisiana wanted to begin using the contraflow land-reversal process to route residents eastward into Mississippi – an operation that could conflict with Mississippi's need to evacuate its own at-risk residents and tourists. [35]

By the 2002 hurricane season, the state's preparedness agency had moved into a new Emergency Operations Center in Baton Rouge that would serve as a command center during disasters for state and federal officials. In May 2002, the FEMA Region VI office produced its own "Hurricane Plan for Louisiana" that reflected the plans that the state and FEMA had developed.

When Katrina struck, Louisiana was in the process of bringing its emergency-management systems into conformance with the National Incident Management System (NIMS).[36] The NRP incorporates the NIMS. In its April 2005 revision to the State's EOP, Louisiana adopted a "State of Louisiana Incident Management System" (SLIMS), which is supposed to

use the same flexible structure as NIMS "to manage all types of incidents, particularly those that require the establishment of Incident Command Posts at or near an incident site." However, in Katrina, a local incident-command post was not put into place until the second week of the response. In the first week, the state operated under its pre-SLIMS structure, with operations managed through the LOHSEP chain of command.

Colonel Smith and his operations division chief, Colonel William Doran, had different perspectives on the effectiveness of incident command at the local level. Colonel Doran believed that the differences between the incident-command structure envisioned under NIMS and Louisiana's actual practice were minor: "In our case, we still have a chain of command. It's just – it's set up just a little bit different, but I think in spirit we're doing incident command."[37]

Colonel Smith, on the other hand, saw a need for LOHSEP to educate parishes on incident command, and possibly even for legislation to address the issue:

> Some parishes do a better job of understanding the ICS system, the NIMS structures. Others don't do as good a job. … I will tell you that we have some that work together great and we have others that hardly speak to each other.[38]

LOHSEP's Chief of Operations testified to "holes" in the state plan in several areas, including state control of aviation; transportation and logistics; and prioritizing competing needs for emergency assistance. He saw a need for the state to incorporate the kinds of detail ("who, what, where, why, and how") found in military planning. The absence of that kind of detail made it necessary, in his opinion, to make plans "on the fly."[39]

However, the plan does show some awareness that people lacking vehicles or having mobility problems could require assistance in evacuating. Two annexes to the State's EOP, the Southeast Louisiana Hurricane Evacuation and Sheltering Plan, and the Louisiana Shelter Operations Plan, address that issue.

The former was the creation of the Southeast Louisiana Hurricane Task Force. The revised plan of January 2000 was published by the State's Office of Emergency Preparedness, and lists 12 parish presidents and the mayor of New Orleans as signatories.[40] (In accordance with the EOP, LOHSEP required the plan to be updated at least once every four years; however, the updating due in 2004 did not occur prior to Katrina due to short staffing of the LOHSEP planning division.)[41]

The "situations" which the plan is designed to address are described in terms very similar to the scenario that served as the basis for the Hurricane Pam exercise. They include the following:

> 1. The Greater New Orleans Metropolitan Area represents a difficult evacuation problem due to the large population and it's [sic] unique layout.
>
> 2. This area is located in a floodplain much of which lies below sea level ...
>
> 3. Tidal surge, associated with a "worst case" Category 3, 4 or 5 Hurricane ... could cause a maximum inundation of 20 feet above sea level in some parishes …
>
> 4. The area is protected by an extensive levee system, but above normal water levels and hurricane surge could cause levee overtopping or failures.[42]

The plan also set forth a list of assumptions, including one directed specifically at the need for buses and other conveyances to evacuate those that lacked personal vehicles, stating:

> The primary means of hurricane evacuation will be personal vehicles. School and municipal buses, government-owned vehicles and vehicles provided by volunteer agencies may be used to provide transportation for individuals who lack transportation and require assistance in evacuating.[43]

While the operational sections of the plan lack detail, and place very little responsibility on state government, they clearly envision a role for parish governments in evacuating those who cannot self-evacuate. Those sections divide responsibilities between risk-area parishes (in the hurricane strike zone), host-area parishes (parishes outside the strike zone where evacuees may be sheltered), and the state. No transportation obligations are imposed on host-area parishes. The responsibilities on the other two are further grouped by phases, i.e., precautionary/voluntary evacuation; recommended evacuation; and mandatory evacuation.

In a precautionary/voluntary evacuation, the Plan states that in risk-area parishes, "Local transportation resources should be marshaled and public transportation plans implemented as needed." There are no requirements for the state to marshal transportation resources.

In a recommended evacuation, the Plan directs risk-area parishes to "Mobilize transportation to assist persons who lack transportation or who have mobility problems." The state is directed to "Mobilize State transportation resources to aid in the evacuation of people who have mobility and/or health problems."

In mandatory evacuations, the Plan only directs risk-area parishes to "Assist persons with mobility limitations to find last resort refuge [and to m]obilize all transportation resources and request assistance from the state as needed." The text is unclear whether the resources are to be mobilized solely to transport persons with mobility limitations to last-resort refuges, or for broader purposes. The obligations of the state are even more limited, and no clearer: The state is to "Direct the evacuation and shelter of persons having mobility limitations, including persons in nursing homes, hospitals, group homes and non-institutionalized persons."[44]

Part VI of the plan defines the role of staging areas and last resort refuges. It contemplates that staging areas will be designated, and transportation will be pre-positioned to transport people from those areas to shelters until evacuation routes are closed, at which point the staging areas "will become Last Resort Refuges." Once weather conditions permit, rescue teams are supposed to transport evacuees from last-resort refuges to designated shelters. The plan does not specify who has responsibility to transport people from staging areas to shelters, either before evacuation routes are closed or after they reopen.[45] However, state officials consistently took the position in staff interviews that transporting evacuees was the responsibility of parish or local government.[46]

The Shelter Operations Plan is the creation of the Louisiana Shelter Task Force, made up of in-land parishes, i.e., parishes likely to receive evacuees from low-lying or coastal parishes during a major hurricane.

The plan includes a statement regarding transportation that closely resembles language in the Southeast Louisiana Hurricane Evacuation and Shelter Plan:

> The primary means of hurricane evacuation will be personal vehicles. However, school and municipal buses and, where available, specialized vehicles will be used to transport those hurricane evacuees who do not have transportation.[47]

While this part of the plan is silent on the entity expected to provide the buses and vehicles to transport people lacking personal vehicles, Part III identifies local governments in the Southeast and Southwest Hurricane Task Forces as being responsible to transport evacuees to shelters. The language suggests that the risk-area parishes were already planning

to provide that transportation (although they evidently failed to follow through on those plans). In a subsection labeled "Individual Evacuee" under Section III.B Reception and Care – Planning Considerations, it states:

> Most evacuees are expected to relocate using their personal vehicles. Local governments of the two Hurricane Task Forces (Southeast and Southwest) are expected to assist in evacuating those residents who do not own vehicles. Evacuating parishes plan to transport these people to reception areas in Sector C of the Shelter Area parishes using school and municipal buses, and special purpose vehicles.[48]

The Shelter Operations Plan also required nursing homes to maintain emergency plans that address evacuation and sheltering of their patients, and their patients are not allowed into special-needs shelters "unless the homes' prearrangements have utterly failed."[49] Nursing homes were to contract in advance with commercial carriers for patients, staff, and staff families; the plan cautions that ambulance companies may be overwhelmed with demands for service in emergencies; and it directs home health-care agencies to assist the patient or his caregivers in making transportation arrangements.[50]

All organizations that provide care to special-needs people, but do not have enough transportation in emergencies, were required to arrange for supplemental transportation. If those arrangements failed, they were to notify local OEPs, and the latter are to notify needs in excess of their community capacity to LOHSEP. In turn, LOHSEP was required to report these needs to the Louisiana National Guard, which in turn was supposed to meet them with its own assets or "arrange for supplemental transportation assistance from other state agencies, the Federal Government, private businesses, other organizations, and volunteer groups."[51]

Finally, Katrina revealed a weakness in LOHSEP's use of Standard Operating Procedures (SOP) in managing emergencies. LOHSEP's SOP describe the staffing of the EOC during non-emergency situations as well as progressive levels of threatened emergencies; EOC organization in emergencies; information handling procedures; responsibilities of the principal functional groups; and certain administrative matters. Attached to it are appendices listing the responsibilities of supporting agencies at each level of EOC activation, EOC checklists, and forms for recordkeeping and public notification.

The Shelter Operations Plan Checklists identify actions to be taken at each stage of EOC activation, and provide a place for a LOHSEP to initialize and note the date and time each action is completed. Some of the items are administrative, e.g., faxing forms to parishes and requesting kitchen support for the EOC, while others relate to key aspects of preparing for disaster response. Examples of the latter category are "LOHSEP Executes Evacuation Shelter Plan" and "Begin Mandatory Evacuation Procedures."[52]

While the checklist could have served as an important tool to identify shortcomings in preparedness, its effectiveness in Katrina was limited because LOHSEP had no means to verify the accuracy of input data and information. For example, the list included an important action item relating to whether nursing homes were prepared to evacuate their patients. Specifically, it required the "Louisiana Nursing Home Association EOC Liaison [to] call all nursing homes and other custodial care organizations in the risk area to insure that they are prepared to evacuate their residents." A LOHSEP official checked this item off as having been done even though, as it turned out, preparations for evacuation of nursing homes were far from adequate. As he subsequently acknowledged, the representation of the Nursing Home Association liaison that he had called nursing homes provided no assurance that the calls were effective.[53]

The Parishes

Parish governments, like the state government, often underfunded their emergency-management functions, although in degrees that varied between parishes. As Colonel Smith testified, the problem was primarily a matter of competing demands on finite resources:

> In most cases, not in all, the [parish] emergency-management function does take a back seat. I mean they're interested in roads, they're interested in bridges, they're interested in infrastructure and they don't have the final resources to deal with all of those things that they have to deal with on a day-to-day basis. So the emergency-support functions a lot of times take a back seat due to resourcing primarily.[54]

Local officials have also found it increasingly difficult to navigate the regulations associated with DHS grants for emergency preparedness and homeland security. "You have to be a Philadelphia lawyer and a CPA just to interpret the rules and to get the dollars," according to Colonel Smith.[55]

Orleans Parish

Funding emergency preparedness has clearly not been a priority in Orleans Parish. Terry Tullier, who served in the New Orleans Fire Department (NOFD) before becoming Director of the City's Office of Emergency Preparedness from 2001 through 2004, noted the dramatic difference in staffing of the two organizations. In the NOFD, he said, there were

> probably some 830-840 people who would be happy to say, yes sir, and do pretty much anything I needed for them to do. And suddenly I was confronted with an organization that had three people in it. ... And I very quickly found out that this was going to be a real challenge for me to operate within the confines of such a small structure.[56]

Tullier complained to the city administration about the understaffing of his office, noting that the OEP in neighboring Jefferson Parish (under Walter Maestri) was far higher. In response, Tullier was told "Well, you're never going to have a dozen people in your shop like Walter does over there and just try and do the best you can."[57] Turnover has also been a serious problem at the New Orleans' OEP: There have been five directors since 1993, and the position was vacant from December 2004, when Tullier retired, to March 2005, when Matthews was appointed.[58]

Orleans Parish maintains a Comprehensive Emergency Management Plan (CEMP) that stresses the importance of pre-disaster evacuation. The plan acknowledges that "Approximately 100,000 citizens of New Orleans do not have means of personal transportation."[59] It also says that "The safe evacuation of threatened populations when endangered by a major catastrophic event is one of the principle [sic] reasons for developing a Comprehensive Emergency Management Plan,"[60] and it lists identification of at-risk populations and of transportation resources as two of the "primary tasks of evacuation planning."[61] While the plan assumes that most people will self-evacuate, it appears to envision active government involvement in providing transportation when it says that "The City of New Orleans will utilize all available resources to quickly and safely evacuate threatened areas. … Special arrangements will be made to evacuate persons unable to transport themselves or who require specific life saving assistance."[62] It also says that "Transportation will be provided to those persons requiring public transportation from the area."[63]

The plan also includes a list of assigned tasks for various city personnel and agencies including, among others, the mayor, the OEP, and the Regional Transit Authority (RTA). One

of the RTA tasks is to "Supply transportation as needed in accordance with the current standard operating procedures and to position supervisors and dispatch evacuation buses."[64]

While the plan recognizes the mayor's authority to issue evacuation orders, and specifically refers to mandatory evacuation, it does not specify how (or whether) such orders will be enforced or whether anyone would be excluded from the orders.[65] However, the Louisiana Shelter Operations Plan, which is also an Appendix to the New Orleans CEMP, states that a mandatory evacuation order is "the final, most serious phase of evacuation. Authorities will put maximum emphasis on *encouraging* evacuation and limiting ingress."[66] This suggests that the city (and the state) may not have intended that mandatory orders would be legally enforced.

The NOFD maintains hurricane guidelines that include a provision for last areas of refuge. These refuges are facilities which are multi-level, with a center core stairwell and in strategic locations around the city.[67] Each of the NOFD's eight Districts are required to identify facilities which meet the pre-requisites for last areas of refuge, confirm with the facility that fire personnel can be housed there, and reconfirm that commitment during pre-season preparations.[68] The plan includes multiple last areas of refuge, with some including back-up locations, and notes the contact person and phone number for that facility. The descriptions of each location also note whether the facility includes adequate space to park department apparatus.[69] Personnel report to these refuges upon decision by the superintendent, which will generally occur when winds reach approximately 40 miles per hour prior to landfall.[70]

Jefferson Parish

As noted above, Jefferson Parish has committed far more resources to emergency management than Orleans Parish. It has a Director, Walter Maestri, who has served in that position for nine years, and 11 permanent staff.[71] During times of emergency, the staff swells to more than 100.[72] Prior to Katrina, the EOC had approximately 80 land lines into the building, with two high-capacity T-1 data-transmission lines that connected to all of the office's data systems.[73] The Parish had its own 800 megahertz system for first responders and public works, together with an 800 megahertz system provided by the state.[74] The Parish had a 911 call center, with the calls being routed to four operational units – police, fire, emergency medical, or public works.[75] The Jefferson Parish Emergency Operations Plan was one of only two EOPs in the State of Louisiana that had been officially approved by FEMA. The other was St. Tammany Parish.[76]

The Parish EOP includes detailed provisions addressing the use of municipal buses to transport residents without other means of transportation. [77] It also includes measures for establishment of a backup EOC in the event of a Category 4 or higher hurricane.[78]

Plaquemines Parish

The Plaquemines Parish Homeland Security Office of Emergency Preparedness has a full-time staff of two – a Director, Jesse St. Amant, and his secretary, who also serves as the 911 supervisor.[79] The office coordinates with the Parish EMS Department to manage the evacuation of the Parish's special needs population.[80] EMS monitors the Parish's special-needs population and arranges for their transportation by ambulance to a regional hospital during emergencies.[81]

The Plaquemines Parish Emergency Operations Plan's Basic Plan directly mirrors the State Basic Plan. It is augmented by 20 appendices setting forth organizational charts, government lines of succession, key facilities and workers.[82] A transportation annex notes that approximately 12 percent of the population could require public transportation for evacuation, and commits the Parish to provide buses and trucks for evacuation, as well as make sure that special-needs populations, including inmates, elderly, and the handicapped, all have transportation.[83]

St. Bernard Parish

The St. Bernard Parish Office of Homeland Security and Emergency Preparedness also has a staff of only two – a director, Larry Ingargiola, and his secretary.[84] The staff is supplemented with about 20 volunteers during emergencies. [85] Parish government has never allowed the emergency director to fully open or staff the EOC during a hurricane, including during Katrina. [86]

The St. Bernard Emergency Operations Plan (EOP) also mirrors the State's EOP and includes multiple appendices. The evacuation appendix notes the need to address transportation of people without personal vehicles, but fails to make provision for that transportation.[87]

St. Tammany Parish

The St. Tammany Parish Office of Emergency Management and Homeland Security is staffed with a director, Dexter Accordo, and two deputy directors.[88] The Parish EOC is unusual for southeast Louisiana in having a state-of-the-art communications system that includes a "reverse 911 [system] where you can dial up people by geographic area, and you can broadcast an audio message to them, giving them direction of what's going on."[89] The EOC also maintains an operations center staffed by support agencies such as the Louisiana National Guard, the Louisiana Department of Transportation and Development, the St. Tammany Sheriff's Department, the Fire Department, and EMS.[90] Requests for assistance that cannot be met by these agencies are routed to the state as E-Team requests.[91]

The Parish's Emergency Operations Plan is similar to St. Bernard Parish's plan in that it identifies evacuation of residents without personal vehicles as an issue, but lacks provisions to address it. [92]

Federal Involvement

As discussed elsewhere in the Report, the Federal Emergency Management Agency and the Army Corps of Engineers have statutory authorization – and appropriations – to assist the hurricane planning and response of state and local agencies.[93] Many other federal agencies, perhaps most notably the U.S. Coast Guard, can get involved early and intensely.

There is no question that effective and timely federal assistance in disaster planning and response is vital. Local, state, and federal agencies' response to Hurricane Andrew in 1992 was widely criticized as poorly coordinated and ineffective. The General Accounting Office (GAO, later renamed the Government Accountability Office) concluded later that future hurricanes on the scale of Andrew "will quickly outstrip the capacity of all but the federal government to respond in the critical first 12 to 24 hours with life-sustaining mass care."[94]

On May 18, 1993, nine months after Hurricane Andrew and with a new hurricane season only two weeks away, National Hurricane Center Director, Robert H. Sheets, Ph.D., testified in a U.S. Senate hearing, "Rebuilding FEMA: Preparing for the Next Disaster." [95]

Because of the time it took Andrew to reach the Louisiana coast, authorities had managed to evacuate approximately 1.25 million people from the New Orleans metropolitan area. The process took three days, but officials in New Orleans expected 60 to 80 hours warning to complete evacuation.[96] Sheets knew this was not nearly good enough to prevent mass casualties. "We don't have the skill, meteorologically speaking, to provide a sufficient warning for those long lead times," he explained.[97]

If Hurricane Andrew's track had shifted slightly and hit New Orleans directly, the projected storm surge into Lake Borgne on the eastern side of the city, and on into Lake Pontchar-

train to the northwest would have overflowed the levees into New Orleans. "The city of New Orleans would have gone under 18 to 20 feet of water," he said.[98]

Several federal agencies played an important role in the task of improving protections for Louisiana.

The Army Corps of Engineers

The involvement of the Corps of Engineers reflected the agency's long history of dealing with the impact of major hurricanes, especially in Louisiana. When Hurricane Betsy flooded New Orleans in 1965, the Corps was one of the most important federal responders and handled the disaster-assistance missions later transferred to FEMA. [99] The Corps designed most of the levee system that protected the New Orleans area. By statute, the Corps is authorized to assist state and local agencies, upon their request, with disaster preparedness.[100] Under the Federal Response Plan, FEMA could assign the Corps to conduct search-and-rescue missions and supply water, ice, and fuel.[101] In the event of severe flooding from a hurricane, the Corps was responsible for assisting local levee boards in restoring damaged levees and in removing floodwaters trapped inside them.

The relationship between the Corps and local levee boards and agencies was complex and not without tension. But in carrying out the dewatering program, the Corps "assumed that any emergency response will be fully coordinated with the appropriate levee districts, parish drainage departments, and local and state officials." [102]

The National Weather Service

The National Hurricane Center (NHC) within the National Weather Service (NWS) monitors storms and provides broad-scope advisories on size, track, expected point of landfall, height of storm surge, and flooding. With its 1996 creation of the Hurricane Liaison Team, the NHC also came to serve as a source of situational awareness for emergency managers.[103] Phone calls and visits from NWS forecasters who worked in the agency's four offices in Louisiana supplement the warnings with specific local knowledge.[104]

The NWS was a critical partner with the Corps and FEMA in the Hurricane Evacuation Studies process. The agency's scientists provided the storm-surge projections that gave local emergency managers guidance on when to order an evacuation, what to evacuate, and where it was safe to open shelters. After Hurricane Camille in 1969, the NWS developed the Sea, Lake, and Overland Surges from Hurricanes (SLOSH) computer program to estimate the surge of an incoming hurricane. The SLOSH modeling software could model storm surges for hurricanes of many sizes, strengths, and tracks.[105] The evacuation studies conducted by FEMA and the Army Corps of Engineers use the simulated storm surges as a basis.[106]

The Federal Emergency Management Agency and Hurricane Evacuation Studies

While Louisiana's Disaster Act affirmed local and state officials' authority to compel evacuation, safely evacuating more than a million people from the New Orleans area involves a complex ballet that ranges over three states and requires the cooperation of dozens of local, state, and federal agencies, and the American Red Cross.[107]

In 1994 this collaboration produced the equivalent of a desk reference for hurricane evacuation decision makers, known as the Southeast Louisiana Hurricane Preparedness Study. It established evacuation zones for each parish and provided estimated "clearance times" to evacuate each zone based on hurricanes of different sizes, strengths, and forward speeds.[108]

The 1994 study assumed that the levee system "would be subject to overtopping" by storm surge from a Category 4 or 5 hurricane, and even by some slow-moving Category 3 hurricanes.[109] The study showed that no shelter in New Orleans south of Interstate 12 was safe

from the potential reach of Category 4 or Category 5 storm surge and inundation.[110] The study took note that about 15 percent of New Orleans residents (roughly 75,000 by the 1994 estimate) had no means of personal transportation, and cautioned, "The large number of residents reliant on public transportation could create significant problems during an evacuation and should be accounted for in the planning process." [111]

The 1994 study offered another caution while explaining the limitations of the SLOSH models of potential hurricane impact:

> The performance of a levee or floodwall depends on many factors (design criteria, construction techniques, maintenance, severity of storm, etc.) and these factors cannot be accounted for by the SLOSH model. The SLOSH model runs performed for the Lake Pontchartrain basin assumed that the levees and floodwalls remained intact, even if overtopped. In past storms, such as Hurricane Betsy and Hurricane Juan, portions of levees have failed. The failure of a levee or floodwall could significantly increase the extent and degree of flooding. Emergency-management officials should be aware of the potential for a failure in the protection and the corresponding impacts.[112]

Final Warnings

Ten years later, on June 1, 2004, Wilson Shaffer, Ph.D., a SLOSH-model expert, traveled to Louisiana to provide an informal briefing to parish emergency managers on new SLOSH studies that showed a greater number of Category 3 hurricanes would overtop the levees in New Orleans.[113] In e-mail messages during this period, Brett Herr, the Corps official in charge of the Bi-State Hurricane Evacuation Study in New Orleans, said the "new surge inundation maps show significant portions of Orleans and Jefferson Parishes that are susceptible to flooding from slow-moving Category 2 and fast Category 3 hurricanes. We had previously thought that the city would…fare pretty well for these types of storms. The new maps will result in significantly longer [evacuation] clearance times for these scenarios."[114]

The new studies used in the Hurricane Pam exercise of July 2004 provided further pre-Katrina grounds for caution. FEMA and LOHSEP sponsored the exercise for more than 300 participants, including parish emergency managers, state officials, FEMA and NWS representatives, volunteer agencies, and others involved in emergency management. The hypothetical Hurricane Pam was posited to be a strong, slow-moving Category 3 storm preceded by 20 inches of rain. The exercise projected results including over 60,000 deaths, more than 1 million people evacuated, and 10 to 20 feet of water in New Orleans. Except for the deaths figure, the Hurricane Pam projections were generally close to the real-life experience of Katrina.[115] (See Chapter 8 of this Report for further discussion of the exercise and its results.)

On June 1, 2005, Shaffer returned to Louisiana to present a briefing of the latest storm-surge estimates for New Orleans. His slide presentation was titled "Hurricanes: Nature's Weapons of Mass Destruction." It included a 40-year-old photograph of the severe flooding that occurred during Hurricane Betsy and a color graphic of flooding by a composite of possible Category 3 hurricanes. It showed that more Category 3 storms could cause overtopping of the levee system than the Army Corps of Engineers had previously stated.[116]

Another reminder of the deadly potential of hurricanes was given shortly before Katrina's arrival by the Louisiana Water Resources Research Institute at LSU:

> If a hurricane approaches New Orleans from any number of tracks from the south or southeast, water will be pushed from the Gulf of Mexico into Mississippi Sound, Lake Borgne and Lake Pontchartrain. A FEMA storm surge model, NOAA's SLOSH model, and now … experimental storm surge models

Flooded New Orleans
U.S. Coast Guard photo

> based on the most recent levee heights and detailed land elevation data for southern Louisiana, have verified that *a slow-moving Category 3 hurricane or greater of these tracks have the potential to flood the New Orleans "bowl."* …
>
> Recent survey evidence (UNO [University of New Orleans], July 2005) indicates that while many people do feel threatened by Category 4 storms, and will evacuate oncoming storms such as Hurricane Ivan (2004), some still do not realize how dangerous even a Category 2 or 3 storm from the right direction can be. Because of this they are less likely to evacuate. If you are told by emergency officials to evacuate any incoming hurricane or even tropical storm, you should still go, as early as possible.[117] [Emphasis in original]

In August 2005, the NHC updated its chronicle of hurricane activity and highlighted the growing potential for catastrophic impact:

> Records for the most intense U.S. hurricane in 1935, and the costliest, Andrew in 1992, occurred in years which had much below-average hurricane activity. A large death toll in a U.S. hurricane is still possible. … Continued coastal growth and inflation will almost certainly result in every future major landfalling hurricane (and even weaker hurricanes and tropical storms) replacing one of the current costliest hurricanes. … If warnings are heeded and preparedness plans developed, the death toll can be reduced. In the absence of a change of attitude, policy, or laws governing building practices (codes and location) near the ocean, however, large property losses are inevitable.[118]

Before the month was out, the soundness of that warning would be apparent.

What Were the Emergency-Management Implications of Facts About Levees and Hurricanes?

Whether the New Orleans levees and floodwalls were in fact built to Category 3 standards – much less upgraded to account for sinking soil and rising seas – is an important question. But it has limited bearing on judging the reasonableness and adequacy of preparations for Katrina.

The professional literature on hurricane preparation contained evidence well before Hurricane Katrina that planners would do well to err on the side of caution. A 1990 Army Corps of Engineers and FEMA assessment of the relatively low toll of 40 deaths from Hurricane Hugo's strike on the coast of Georgia and the Carolinas in the previous year concluded that:

> Much of the success in minimizing loss of life during Hugo can be attributed to local directors taking the SLOSH values seriously and evacuating those areas that the SLOSH data and associated mapping said would need to be evacuated.
>
> The most difficult issue regarding Hugo's hazards characteristics revolved around the storms' reported change from a Category 2 to a Category 4 hurricane in such a short period of time immediately before landfall. Fortunately many local directors took action for a Category 3 hurricane and had completed evacuation of the coastal barrier islands several hours before landfall. … Some officials indicated it may be prudent in some situations to take action for one category above that of the threatening hurricane. This proved wise on the part of local officials in Hugo.[119]

FEMA's 1994 Southeast Louisiana Hurricane Preparedness Study seconded the advice, citing a Louisiana state agency as one of its sources:

> To account for inaccuracies in forecasting the behavior of approaching hurricanes, the National Hurricane Center and the Louisiana Office of Emergency Preparedness recommend that public officials faced with an eminent [sic] evacuation prepare for the evacuation as if the approaching hurricane will intensify one category above the strength forecast for landfall.[120]

Ten years later, in 2004, two Louisiana State University researchers, John Pine and Hassan Mashriqui, offered the same counsel in a FEMA training session, "Hurricane Storm Surge Modeling and Analysis." After pointing out that "there is always the uncertainty" about hurricane intensity at landfall, and uncertainty about its track before landfall, they said:

> This is why a rule of thumb for emergency managers is to plan for a storm one category higher than what is forecast. This is a reasonable precaution to help minimize the loss of life from hurricanes. … The path and direction of the storm can change at any point making the actual area impacted by the storm as it makes landfall difficult to predict.[121]

Recent years have given emergency planners more opportunities to prepare for the worst. It is generally accepted that an era of more intense Atlantic hurricane activity began in 1995. The National Oceanic and Atmospheric Administration (NOAA) attributes the activity to naturally occurring cycles in climate patterns near the equator, and says each cycle of "the tropical multi-decadal signal" that influences storm generation may last 20 to 30 years, or longer.[122]

During the below-normal hurricane cycle that ran 1970-1994, NOAA reports, "The Gulf Coast averaged less than one hurricane landfall per season, and the East Coast averaged one hurricane landfall every five years. This is in sharp contrast to the average of three U.S. hur-

ricane landfalls during very active seasons." NOAA foresees "many more landfalling tropical storms, hurricanes and major hurricanes in the United States," with potential impacts multiplied by population growth and new construction in coastal areas.[123]

Whatever the current phase of multi-decadal hurricane variability may be, the NWS has pointed out that an element of unpredictability always remains:

> No outlook can give certainty as to whether or not a particular locality will be impacted by a hurricane in any given year. Residents and government agencies of coastal or near-coastal regions should always maintain hurricane preparedness efforts, regardless of the overall outlook for a given year. … hurricane-spawned disasters can occur even in years with normal (or below normal) levels of activity.[124]

Johns Hopkins University Professor Robert A. Dalrymple, an engineer who represented the American Society of Civil Engineers in post-Katrina assessments of the New Orleans levees, has recently made the point even more starkly:

> There is the possibility of a storm stronger than Katrina. Although a Category 5 hurricane is perhaps a 500-year event, no one knows when it might occur.[125]

Of course, Katrina did reach Category 5 status, though it moderated somewhat before landfall. The NHC's 4 p.m. Friday, August 26, Hurricane Discussion Number 14 warned:

> Katrina is expected to be moving over the Gulf Loop Current after 36 hours ... which when combined with decreasing vertical [wind] shear ... should allow the hurricane to reach Category Four status before landfall occurs. [Ellipses in original.][126]

At 10 a.m. Saturday, the NHC warned in Hurricane Advisory Number 17 that "It is not out of the question that Katrina could reach category 5 status at some point before landfall."[127] And in fact, by Sunday morning, Katrina's maximum wind speeds exceeded 170 miles per hour; Category 5 is 155 mph or higher. It was not quite as strong as Camille, but much bigger.[128] Katrina "made landfall, at the upper end of Category 3 intensity with estimated maximum sustained winds of 110 kt [knots, or about 127 miles per hour], near Buras, Louisiana at 1110 UTC [6:10 a.m. CT] 29 August."[129]

In other words, with reservations about the ruggedness of New Orleans' hurricane-protection system already long established, with a historical record of extreme storms, with recommendations already in print for a prudent one-category-higher standard for disaster planning, with knowledge that a new cycle of more intense hurricane activity was under way, with the limits of prediction and the variability of storms understood, and with Katrina in the Gulf of Mexico and tagged as early as Friday as a potential Category 4 hurricane, officials had multiple grounds for anticipating that the coming hurricane could exceed the nominal strength of the region's defenses.

The prudence of emergency-management response when an approaching storm threatens an area depending on levees is a matter of deep concern beyond Katrina, and beyond Louisiana. It is a national issue, as noted in a recent statement of professional opinion from the National Association of State Floodplain Managers:

> Levees are only built to a certain level of protection, which will be exceeded at some point in the future. Reliance on levees should be an option of last resort. Current levee design and construction standards are inadequate. Levees that protect critical facilities, such as hospitals, emergency operations centers,

police, emergency medical services and fire stations, major infrastructure and large and vulnerable urban centers such as New Orleans must be constructed to a higher level of protection than those protecting rural or sparsely populated areas. A comprehensive and adequate levee policy would recognize the need for these differences. Levees in rural areas can utilize the 100 year flood (1% chance flood) level of protection, but only if local land use requirements prevent the area from becoming a highly urbanized area. Existing urban areas and critical facilities need protection to at least the 500 year (0.2% chance flood, and in coastal areas a category 5 hurricane) standard to avoid the catastrophic consequences, such as those experienced in the New Orleans area. It is important to recognize that levee failures in the New Orleans area is [sic] simply the tip of the iceberg – we have thousands of miles of levees "protecting" large and critical urban communities in this nation.[130]

1 U.S. Library of Congress, Congressional Research Service, Protecting New Orleans: From Hurricane Barriers to Floodwalls," by Nicole T. Carter, Dec. 13, 2005, p. 1.

2 Virginia R. Burkett, David B. Zilkoski, and David A. Hart, "Sea-Level Rise and Subsidence: Implications for Flooding in New Orleans, Louisiana," U.S. Geological Survey Subsidence Interest Group Conference, Nov. 27-29, 2001, p. 63. http://www.nwrc.usgs.gov/hurricane/Sea-Level-Rise.pdf. Accessed on Apr. 4, 2006 [hereinafter Burkett, "Sea-Level Rise Subsidence"].

3 Burkett, "Sea-Level Rise Subsidence," p. 63.

4 Michael Grunwald and Susan Glasser, "The Slow Drowning of New Orleans," *The Washington Post*, Oct. 9, 2005, p. A01.

5 U.S. Library of Congress, Congressional Research Service, *The Civil Works Program of the Army Corps of Engineers: A Primer*, by Nicole T. Carter and Betsy A. Cody, Feb. 3, 2005, pp. 5-6.

6 Burkett, "Sea-Level Rise Subsidence," p. 67.

7 U.S. Army Corps of Engineers, New Orleans District, *Hurricane Betsy, 8-11 September 1965, After Action Report*, July 1966, p. 5.

8 Lyndon Baines Johnson Library and Museum, University of Texas, "Transcript of audio of President Johnson in New Orleans following landfall of Hurricane Betsy, September 10, 1965." http://www.lbjlib.utexas.edu/johnson/AV.hom/Hurricane/audio_transcript.htm. Accessed on Apr. 5, 2006.

9 Written Statement of Anu Mittal, Director, Natural Resources and Environment, Government Accountability Office, for the U.S. Senate, Committee on Environment and Public Works, hearing on *Comprehensive and Integrated Approach to meet the Water Resources Needs in the Wake of Hurricanes Katrina and Rita*, Nov. 9, 2005, pp. 1, 5. http://www.gao.gov/new.items/d06244t.pdf. Accessed on Apr. 5, 2006.

10 U.S. Army Corps of Engineers, New Orleans District, "Project Fact Sheet: Lake Pontchartrain, LA. and Vicinity Hurricane Protection Project, St. Bernard, Orleans, Jefferson, and St. Charles Parishes, LA," May 23, 2005. http://www.mvn.usace.army.mil/pao/visitor/lkpon1.asp. Accessed on Apr. 5, 2006.

11 National Oceanic and Atmospheric Administration (NOAA), Hurricane Research Division, "How Are Atlantic Hurricanes Ranked?" http://www.aoml.noaa.gov/hrd/tcfaq/D1.html. Accessed on Apr. 3, 2006 ("Category 3, 4, and 5 hurricanes are collectively referred to as major (or intense) hurricanes. These major hurricanes cause over 83% of the damage in the USA even though they account for only 21% of tropical cyclone landfalls.").

12 U.S. Army Corps of Engineers, "Frequently Asked Questions." http://www.mvn.usace.army.mil/IPET_13_Mar_FAQ_Public.pdf. Accessed on Apr. 26, 2006.

13 U.S. Army Corps of Engineers, "How Safe is New Orleans from Flooding?" fact sheet, Sept. 11, 2003. http://www.usace.army.mil/civilworks/hot_topics/ht_2003/11sep_msy.htm. Accessed on Apr. 5, 2006.

14 Dr. Marc Levitan, "Comparative Analysis of Hurricane Vulnerability in New Orleans and Baton Rouge," Louisiana State University Hurricane Center, Apr. 2003, p. 1. http://www.publichealth.hurricane.lsu.edu/Adobe%20files%20for%20webpage/LevitanHurrVulnBR&NO.pdf. Accessed on Apr. 5, 2006.

15 National Weather Service, National Hurricane Center, "The Most Intense Hurricanes in the United States 1851-2004," July 27, 2005. http://www.nhc.noaa.gov/pastint.shtml. Accessed on Apr. 5, 2006.

16 Louisiana Office of Homeland Security and Emergency Preparedness (LOHSEP), *Emergency Operations Plan*, Apr. 2005, Section IV.B, p. 8 [hereinafter *Louisiana Emergency Operations Plan*].

17 State of Louisiana, Executive Order KBB 05, Apr. 1, 2005.

18 LOHSEP, "About the Agency," Mar. 20, 2006. http://www.ohsep.louisiana.gov/agencyrelated/aboutagency.htm. Accessed on Apr. 9, 2006.

19 LOHSEP, "About the Agency," Mar. 20, 2006. http://www.ohsep.louisiana.gov/agencyrelated/aboutagency.htm. Accessed on Apr. 9, 2006.

20 *Louisiana Emergency Operations Plan*, Section I, p. 1.

21 *Louisiana Emergency Operations Plan*, Section I, p. 1.

22 *Louisiana Emergency Operations Plan*, Section II, B, pp. 5-6.

23 *Louisiana Emergency Operations Plan*, Attachment 3.

24 Committee staff interview of Col. Jeff Smith, Louisiana National Guard (Ret.), Acting Deputy Director, Emergency Management, LOHSEP, conducted on Jan. 13, 2006, transcript p. 13.

25 Col. Smith interview, Jan. 13, 2006, p. 26; Committee staff interview of Lt. Col. William Doran, Louisiana Air National Guard, Chief, Operations Division, LOHSEP, conducted on Dec. 2, 2005, transcript p. 164.

26 Committee staff interview of Sean Fontenot, former Chief, Preparedness Division, LOHSEP, conducted on Jan. 10, 2006, transcript p. 124; Committee staff interview of Maj. Gen. Bennett Landreneau, Adjutant General, Louisiana, conducted on Jan. 11, 2006, transcript pp. 124-125; Committee staff interview of Terry Ryder, Executive Counsel, Office of the Governor, LA, conducted on Jan. 10, 2006, transcript pp. 138-141; Lt. Col. Doran interview, Dec. 2, 2005, pp. 63, 163; Committee staff interview of Col. Steven Dabadie, former Chief of Staff, Louisiana National Guard, conducted on Jan. 12, 2006, transcript p. 45.

27 Lt. Col. Doran interview, Dec. 2, 2005, pp. 191-193.

28 Maj. Gen. Landreneau interview, Jan. 11, 2006, p. 124; Col. Smith interview, Jan. 13, 2006, pp. 23-24.

29 Ryder interview, Jan. 10, 2006, p. 143.

30 Lt. Col. Doran interview, Dec. 2, 2005, p. 196.

31 Committee staff interview of Capt. Paul Hellmers, Engine 18, Second Platoon, Fifth District, New Orleans Fire Department, LA, and Capt. Joe Fincher, Engine 18, Third Platoon, Fifth District, New Orleans Fire Department, LA, conducted on Nov. 7, 2005, transcript pp. 12-13. Each of the NOFD's eight Districts is required to identify facilities which meet the pre-requisites for a last area refuge, confirm with the facility that fire personnel can be housed there, and reconfirm that commitment during pre-season preparations. *Source*: New Orleans Fire Department, *2005 Hurricane Guidelines*, p. 2–1; Capt. Hellmers and Capt. Fincher joint interview, Nov. 7, 2005, p. 16. The plan includes multiple Last Areas of Refuge, with some including back-up locations, and notes the contact person and phone number for that facility. The descriptions of each location also note whether the facility includes adequate space to park department apparatus. *Source*: New Orleans Fire Department, *2005 Hurricane Guidelines*, pp. A2–1 through A6–2. Personnel report to these refuges upon decision by the superintendent, which will generally occur when winds reach approximately 40 miles per hour prior to landfall. *Source*: Committee staff interview of Charles Parent, Superintendent, New Orleans Fire Department, LA, and Bruce Martin, Deputy of Administration, New Orleans Fire Department, LA, conducted on Nov. 10, 2005, transcript p. 26. In addition to provision of refuges for fire personnel and equipment, the NOFD guidelines are specific as to the types of supplies personnel are to bring with them, including toiletries, clothing, a three-day supply of water, and three gallons of water. Personnel are also encouraged to bring life jackets and/or boats. *Source*: New Orleans Fire Department, *2005 Hurricane Guidelines*, pp. 2–3 through 2–4.

32 Louisiana National Guard, *Emergency Procedures Operations Plans for Military Support to Civil Authorities*, Oct. 24, 2001. Provided to Committee; filed as Bates no. 000153. During 2001, the Guard revised its own operating plans in such areas of law enforcement in ways that illustrate how its personnel were layered into the ranks of the region's law enforcement agencies. "The concept of this operation provides for a massive joint response 24 hours pre-landfall and 48 hours post-landfall of a major hurricane forecasted to strike the Greater New Orleans area," and outlined the planned distribution of soldiers, helicopters, high profile trucks, emergency generators, water trailers and other equipment to the Louisiana State Police and local agencies, assigning a total of 420 Guardsmen to the New Orleans Police Department, with 200 deployed initially at the Superdome, 100 at the Convention Center and 12 at each of eight police district stations.

33 *Louisiana Emergency Operations Plan*, Supplement 1A, "Southeast Louisiana Hurricane Evacuation and Sheltering Plan," Jan. 2000, p. II-2 [hereinafter "Southeast Louisiana Hurricane Evacuation and Sheltering Plan"].

34 FEMA, Bi-State Hurricane Evacuation Study, May 2, 2002. Provided to Committee; filed as Bates no. DHS-FEMA-0058-00001607.

35 FEMA, Bi-State Hurricane Evacuation Study, May 2, 2002, pp. 16-17.

36 Sean R. Fontenot, e-mail to Arthur W. Adelberg, Senate Committee staff member, Feb. 3, 2006, 11:21 a.m.

37 Lt. Col. Doran interview, Dec. 2, 2005, pp. 143-145.

38 Col. Smith interview, Jan. 13, 2006, pp. 17-19.

39 Lt. Col. Doran interview, Dec. 2, 2005, pp. 147-150.

40 "Southeast Louisiana Hurricane Evacuation and Sheltering Plan," pp. i-ii.

41 Fontenot interview, Jan. 10, 2006, pp. 115-122.

42 "Southeast Louisiana Hurricane Evacuation and Sheltering Plan," p. II-1.

43 "Southeast Louisiana Hurricane Evacuation and Sheltering Plan," p. II-2.

44 "Southeast Louisiana Hurricane Evacuation and Sheltering Plan," pp. III-1-6.

45 "Southeast Louisiana Hurricane Evacuation and Sheltering Plan," p. VI-1.

46 Col. Smith interview, Jan. 13, 2006, p. 185; Maj. Gen. Landreneau interview, Jan. 11, 2006, p. 142.

47 *Louisiana Emergency Operations Plan*, Supplement 1C, "Louisiana Shelter Operations Plan," July 2000, p. 9. [hereinafter "Louisiana Shelter Operations Plan"].

48 "Louisiana Shelter Operations Plan," p. 11-12 (emphasis added).

49 *Louisiana Emergency Operations Plan*, "Louisiana Shelter Operations Plan," Annex X, "Special Needs Plan," Apr. 2000, pp. 3-4 [hereinafter Annex X, "Special Needs Plan"].

50 Annex X, "Special Needs Plan," p. 8.

51 Annex X, "Special Needs Plan," pp. 7-8. Presumably the National Guard was assigned this responsibility because of its role as the primary responsible agency for transportation at the time the SN Plan was drafted. Had the plan been updated after Apr. 2005, when DOTD succeeded the Guard as the primary agency responsible for transportation, presumably the plan would have assigned the SN transportation responsibility to DOTD.

52 Louisiana Office of Emergency Preparedness (LOEP), Standard Operating Procedures, EOC Hurricane/Major Event Checklist. The version produced to the Committee bears the date 10/24/2005. The record is unclear as to whether the version includes updates through that date. Committee staff interview of James Ballows, Senior Operations Officer, LOHSEP, conducted on Jan. 4, 2006, transcript pp. 15-16.

53 Ballows interview, Jan. 4, 2006, pp. 13-14.

54 Col. Smith interview, Jan. 13, 2006, p. 19; Lt. Col. Doran interview, Dec. 2, 2005, p. 63 ("Some parishes do a great job, others don't. It's not standardized").

55 Col. Smith interview, Jan. 13, 2006, pp. 19-21.

56 Committee staff interview of Terry Tullier, former Deputy Director, New Orleans Fire Department and Director, New Orleans Office of Emergency Preparedness, LA, conducted on Nov. 22, 2005, transcript pp. 7-8.

57 Tullier interview, Nov. 22, 2005, pp. 10-11.

58 Tullier interview, Nov. 22, 2005, p. 2; Committee staff interview of Chief Joseph Matthews, Director, New Orleans Office of Emergency Preparedness, LA, conducted on Nov. 23, 2005, transcript p. 152. Directors prior to Terry Tullier and Chief Joseph Matthews were Brian Giddings, Robert Eichorn, and Frank Hijuelos. Committee staff interview of Saraya Flores-Arias, Executive Assistant to the Director, New Orleans Office of Emergency Preparedness, LA, conducted on Dec. 19, 2005, pp. 7-9, 14-15.

59 New Orleans Office of Emergency Preparedness, *Comprehensive Emergency Management Plan*, May 2005, p. 19 [hereinafter *New Orleans CEMP*].

60 *New Orleans CEMP*, p. 12.

61 *New Orleans CEMP*, p. 12.

62 *New Orleans CEMP*, p. 14.

63 *New Orleans CEMP*, p. 14. While the term "persons requiring public transportation" is broad enough to include those without personal vehicles, the quoted sentence is followed by the parenthetical "(See Special Needs Transportation, ESF 1)." Precisely what the parenthetical refers to is unclear, but it raises the question whether the sentence was meant only to apply to people with special needs.

64 *New Orleans CEMP*, p. 18. While the plan does not expressly define "Standard Operation Procedures" or "SOP," the term apparently refers to the provisions of the plan.

65 *New Orleans CEMP*, p. 13.

66 *New Orleans CEMP*; Annex X, "Special Needs Plan," p. 4 (emphasis added).

67 Capt. Hellmers and Capt. Fincher interview, Nov. 7, 2005, pp. 12-13.

68 Capt. Hellmers and Capt. Fincher interview, Nov. 7, 2005, p. 16.

69 New Orleans Fire Department, *2005 Hurricane Guidelines*, pp. A2–1 through A6–2.

70 Parent and Martin interview, Nov. 10, 2005, p. 26.

71 Committee staff interview of Walter Maestri, Ph.D., Director, Jefferson Parish Office of Emergency Management, LA, conducted on Oct. 25, 2005, transcript pp. 11-12.

72 Maestri interview, Oct. 25, 2005, p. 12.

73 Maestri interview, Oct. 25, 2005, p. 40.

74 Maestri interview, Oct. 25, 2005, p. 40.

75 Maestri interview, Oct. 25, 2005, p. 41.

76 Maestri interview, Oct. 25, 2005, pp. 25-27.

77 Jefferson Parish Office of Emergency Management, *Emergency Operations Plan*, Aug. 2002, Annex D, p. 13.

78 Jefferson Parish, *Catastrophic Weather Event ("Doomsday") Plan*. Provided to Committee.

79 Committee staff interview of Jesse St. Amant, Director, Homeland Security Office of Emergency Preparedness, Plaquemines Parish, LA, conducted on Nov. 9, 2005, transcript pp. 3, 20-21.

80 St. Amant interview, Nov. 9, 2005, p. 15.

81 St. Amant interview, Nov. 9, 2005, p. 15.

82 Plaquemines Parish, *Multi-Hazard Emergency Operations Plan*, 2003, Basic Plan Appendices.

83 Plaquemines Parish, *Multi-Hazard Emergency Operations Plan*, 2003, Annex D, p. 6–1.

84 Committee staff interview of Larry Ingargiola, Director, Department of Homeland Security and Emergency Preparedness, St. Bernard Parish, LA, conducted on Oct. 26, 2005, transcript p. 8.

85 Ingargiola interview, Oct. 26, 2005, p. 7.

86 Ingargiola interview, Oct. 26, 2005, pp. 13-14.

87 St. Bernard Parish, *Emergency Operations Plan*, June 2004, Annex D, p. D–2.

88 Committee staff interview of Dexter Accordo, Director, Emergency Management and Homeland Security, St. Tammany Parish, LA, conducted on Nov. 10, 2005, transcript p. 19.

89 Accordo interview, Nov. 10, 2005, p. 47.

90 Accordo interview, Nov. 10, 2005, pp. 64-66.

91 Accordo interview, Nov. 10, 2005, p. 71.

92 St. Tammany Parish, *Multi-Hazard Emergency Operation Plan*, 2004, Annex D, p. D–54.

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