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National Study on Carless and Special Needs Evacuation Planning: Case Studies

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Disclaimer

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Cover Photos: Listed Left-to-Right

Evacuation Pick-Up Point, New Orleans, by Micheal DeMocker, Times Picayune, 2008
http://www.nola.com/hurricane/index.ssf/2008/08/photos_9th_ward_residents_evac.html
Pick-Up Point Sign, Miami-Dade County,
<http://transitnutah.blogspot.com/2007/12/miami-day-5.html>
Downtown Evacuation Drill, Chicago, 2006
<http://cache.daylife.com/imageserve/06mWcux2LDdSg/610x.jpg>

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Acronyms

ABAG	Association of Bay Area Governments (San Francisco)
ADA	Americans with Disabilities Act
AHUA	American Highway Users Association
ARC	American Red Cross
CAEP	Citizen Assisted Evacuation Plan (New Orleans)
CARD	Collaborating Agencies Responding to Disaster (San Francisco)
CERT	Community Emergency Response Team
CEMP	Comprehensive Emergency Management Plan (Florida & New York)
CDOT	Chicago Department of Transportation
CDSS	California Department of Social Services
CHART	Center for Hazard Assessment, Response and Technology
CMAP	Chicago Metropolitan Agency for Planning
COOP	Continuity of Operations Plan
CTA	Chicago Transit Authority
DEM	Department of Emergency Management (San Francisco)
DEM&HS	Department of Emergency Management and Homeland Security (Miami-Dade County)
DOTD	Department of Transportation and Development
DOH	Department of Health (New York)
DPH	Department of Public Health
EEAP	Emergency Evacuation Assistance Program (Miami-Dade)
EMHS	Emergency Management & Homeland Security
EMP	Emergency Management Plan (San Francisco)
EOC	Emergency Operations Center
ESF	Emergency Support Function
FEMA	Federal Emergency Management Agency
GNO	Greater New Orleans
GOHSEP	Governor's Office of Homeland Security and Emergency Preparedness (Louisiana)

GPPL	General Public Pick-up Location (New Orleans)
HUD	Housing and Urban Development
IDOT	Illinois Department of Transportation
IDPH	Illinois Department of Public Health
IEMA	Illinois Emergency Management Agency
JIC	Joint Information Center (San Francisco)
LOP	Louisiana Emergency Operations Plan
MDT	Miami-Dade Transit
MOD	San Francisco Mayor's Office on Disabilities
MOU	Memorandum of Understanding
MSY	Louis Armstrong International Airport
MTA	Metropolitan Transit Authority (New York)
MTC	Metropolitan Transportation Commission (San Francisco)
Muni	San Francisco Metropolitan Transportation Agency
NERT	Neighborhood Emergency Response Team (San Francisco)
NIMS	National Incident Management System
NMR	Person Needing Medical Resources
NOA	New Orleans Arena
NOAA	National Oceanic and Atmospheric Administration
NRF	National Response Framework
NYC	New York City
NYFD	New York City Fire Department
NYS	New York State
OEM	Office of Emergency Management (New York)
OEMC	Office of Emergency Management and Communications (Chicago)
OEP	Office of Emergency Preparedness (New Orleans)
OES	Office of Emergency Services (San Francisco)
REVAC	Regional Evacuation Procedure (Florida)
RTA	Regional Transit Authority (New Orleans)
RPC	Regional Planning Commission (New Orleans)
SCPL	Senior Center Pick-up Location (New Orleans)
SEMO	State Emergency Management Office (New York State)
SEMS	Standardized Emergency Management System

SERT	State Emergency Response Team (Florida)
SNS	Strategic National Stockpile
SPCA	Society for the Prevention of Cruelty to Animals
STS	Special Transportation Services
UPT	Union Passenger Terminal (New Orleans)
USACE	U.S. Army Corps of Engineers

Executive Summary

The Case Study portion of the *National Study on Carless and Special Needs Evacuation Planning* has been created through extensive research into the existing planning efforts and publicly available plans, which address carless and special needs evacuations within five major American cities: Chicago, Miami, New Orleans, New York and San Francisco. The Internet has been the primary tool utilized to acquire copies of existing plans, with the exception of the City of New Orleans, which makes its *City Assisted Evacuation Plan* available to the public only in hard copy. In many cases, plans were not available to the public, particularly city or event specific emergency plans such as Miami-Dade County's plan for the evacuation of the area near Turkey Point Nuclear Facility or the City of New York's *Coastal Storm Plan*. Generally, plans on the state level were all available, with the exception of Illinois. The state emergency management plans almost all followed the National Response Framework. Consequently, special attention was paid to areas where the state's plan went above and beyond this framework with regards to carless and special needs populations.

In the cases where plans were not readily available via the Internet, the information was solicited via telephone. A few interviews offered anecdotal guidance for the case studies, but most information requests were not well received, particularly when requesting information about plans that focus on terrorism preparedness because such plans are typically confidential for security reasons. Given the lack of information readily available, extensive research was required to review newspaper articles, meeting minutes and any document that may have made mention of issues related to carless and special needs evacuations in each of the case study cities.

Introduction:

The *National Study of Carless and Special Needs Evacuation Planning* has constructed an essential outline for carless and special needs evacuation planning. This outline is built from planning efforts in each of the five case study cities. Each city had its strengths and weaknesses. In this study, we have combined the strengths from every city involved to build the criteria used to evaluate their planning efforts. In this sense, we have based our evaluations upon real planning efforts that can and are being done around the United States.

Each of the five case study cities has tailored its planning efforts according to perceived risk, often reinforced by the risk assessment and mitigation portions of the plans at the state level. In Chicago, planning efforts have been focused upon terrorism and radiological emergencies. Consequently, their plans are confidential. However, a strength seen in the Chicago planning efforts was their use of simulations and exercises, although the extent to which carless and special needs persons¹ are considered in these simulations is unclear.

New York has planning efforts focused on two primary areas: terrorism and coastal storms. These plans are kept confidential. The public is made aware of the portion of the plans that pertain to them, particularly the location of the nearest evacuee reception center. The strength in New York has been public awareness. The public education efforts made by the Office of Emergency Management cover a wide variety of circumstances, and are offered in the widest variety of languages of any of the case study cities.

In Miami and New Orleans, the evacuation planning focus is overwhelmingly upon hurricanes. These plans are made public. They involve coordinated public transit and paratransit efforts to evacuate carless and special needs people effectively. Miami has much more experience in this area than New Orleans. In New Orleans, the

¹ *The definition “special needs” used herein has been adopted in the National Response Framework and developed by the Department of Homeland Security’s Office of Civil Rights and Civil Liberties. Special needs populations are “populations whose members may have additional needs before, during, and after an incident in functional areas, including but not limited to: maintaining independence, communication, transportation, supervision, and medical care... those who have disabilities... elderly... children... limited English proficiency... or... transportation disadvantaged.”*

plan existed before Hurricane Katrina in 2005, but it was not successfully executed until Hurricane Gustav in 2008. The strengths in Miami and New Orleans are experience and management of logistics, particularly between organizations, agencies and regions.

In San Francisco, the planning focus is primarily based upon earthquakes. The nature of earthquakes does not facilitate evacuations, nor does it make city-wide evacuations necessary. However, San Francisco brings an enormous strength to these case studies: community involvement. San Francisco has gone beyond the development of Community Emergency Response Teams or volunteer emergency responders. The City of San Francisco has also accounted for community-based resources in its planning efforts, through a concept called the ‘community-hub’.

The outline of each of these case studies has been built from the strengths of all the case study cities combined. Therefore, some of these case studies may appear rather weak under certain topic headings and strong under others. Regardless of content, each city has been evaluated upon these same criteria and it is important that they be listed as topic headings in each case.

It is important to also understand the framework or guidance under which many of these plans have been created. This guidance comes from the federal level in the form of the National Incident Management System (NIMS), developed and administered by the Secretary of Homeland Security since 2003. NIMS is the nation’s authoritative guidance for incident management, standardizing how incident response is managed in order to increase collaboration, efficiency and effectiveness. It essentially establishes how incident command structures are organized. Furthermore, state and local organizations receiving Federal preparedness monies were required adopt NIMS as a contingency.

The federal government uses the incident command structure under NIMS or the National Response Framework, to assign emergency support functions (ESFs) to each of its major agencies. For example, one agency, Housing and Urban Development, has the primary role in ESF 14: Long-Term Community Recovery (FEMA 2008). The ESFs are detailed in the following table.

Table 1: Roles and Responsibilities of Emergency Support Functions

ESF	Scope
ESF #1 – Transportation	Aviation/airspace management and control Transportation safety Restoration/recovery of transportation infrastructure Movement restrictions Damage and impact assessment
ESF #2 – Communications	Coordination with telecommunications and information technology industries Restoration and repair of telecommunications infrastructure Protection, restoration, and sustainment of national cyber and information technology resources Oversight of communications within the Federal incident management and response structures
ESF #3 – Public Works and Engineering	Infrastructure protection and emergency repair Infrastructure restoration Engineering services and construction management Emergency contracting support for life-saving and life-sustaining services
ESF #4 – Firefighting	Coordination of Federal firefighting activities Support to wildland, rural, and urban firefighting operations
ESF #5 – Emergency Management	Coordination of incident management and response efforts Issuance of mission assignments Resource and human capital Incident action planning Financial management
ESF #6 – Mass Care, Emergency Assistance, Housing, and Human Services	Mass care Emergency assistance Disaster housing Human services
ESF #7 – Logistics Management and Resource Support	Comprehensive, national incident logistics planning, management, and sustainment capability Resource support (facility space, office equipment and supplies, contracting services, etc.)
ESF #8 – Public Health and Medical Services	Public health Medical Mental health services Mass fatality management
ESF #9 – Search and Rescue	Life-saving assistance Search and rescue operations
ESF #10 – Oil and Hazardous Materials Response	Oil and hazardous materials (chemical, biological, radiological, etc.) response Environmental short- and long-term cleanup
ESF #11 – Agriculture and Natural Resources	Nutrition assistance Animal and plant disease and pest response Food safety and security Natural and cultural resources and historic properties protection and restoration Safety and well-being of household pets
ESF #12 – Energy	Energy infrastructure assessment, repair, and restoration Energy industry utilities coordination Energy forecast
ESF #13 – Public Safety and Security	Facility and resource security Security planning and technical resource assistance Public safety and security support Support to access, traffic, and crowd control
ESF #14 – Long-Term Community Recovery	Social and economic community impact assessment Long-term community recovery assistance to States, local governments, and the private sector Analysis and review of mitigation program implementation
ESF #15 – External Affairs	Emergency public information and protective action guidance Media and community relations Congressional and international affairs Tribal and insular affairs

Source: FEMA 2008

The ESF structure is very evident in emergency planning at the state and local level. States organize their own agencies according to ESFs and become part of the inherent command structure. The guidance of NIMS and ESFs are carried down from the federal level to the level of local implementation. Therefore, in researching planning efforts that address carless and special needs evacuation, important consideration is given to the guidance for creation of many plans, i.e. NIMS.

The ESFs that most closely address carless and special needs evacuation are ESF1, Transportation, ESF 6, Mass Care, Emergency Assistance, Housing and Human Services, ESF 8, Public Health and Medical Services, and typically, ESF 9, Search and Rescue. Of particular interest to this research is the extent to which these ESFs address carless and special needs evacuations.

State and local agencies are wise to expand upon the roles defined by federal ESFs, particularly concerning carless and special needs evacuation. Thus, creativity and extra effort in planning for such evacuations was given special consideration in this research. Herein are presented five case studies of cities who have tailored their planning efforts according to local hazard-specific risks and the national incident planning guidance. The results are five unique cases, each with strengths; each with weakness; each with varying levels of public accessibility to plans addressing carless and special needs evacuations, and therefore varying research depth among the case studies.

Case Study: Chicago

Carless and special needs planning efforts in Chicago were difficult to assess given the confidentiality of the evacuation plans held by the Illinois Emergency Management Agency and the Chicago Office of Emergency Management & Communications. It was fair to assume that the primary focus of Chicago's incident management planning would be terrorism, given the strict confidentiality. Chicago has evacuation plans that involve contraflow traffic², but the development of these plans to concern carless and special needs planning is either confidential or non-existent, as is the case for any form of special needs registry³ in Chicago. Given this confidentiality, insight into Chicago's evacuation planning was drawn mostly from their incident-training simulations. Additionally, buildings over eighty feet tall and nursing homes are required to develop evacuation plans, but they are limited to merely evacuating the building.

A number of federal, state and local agencies have collaborated in the creation of multiple plans that would address a variety of emergency scenarios within the Chicago region. All of these plans are held in confidence, due to the overriding focus of terrorism and radiological emergency response. This confidentiality has severely limited the ability to assess the level of planning which has addressed carless and special needs evacuations.

At the state level, the Illinois Emergency Management Agency has dedicated much of its efforts in planning for evacuations related to radiological emergencies. These confidential plans call for the evacuation of a 10-mile radius surrounding each facility, the emergency planning zone. These plans include measures for 'immobile populations' (IEMA 2005). The extent and functionality of those measures is also confidential.

² *Contraflow traffic is the utilization of both the inbound and outbound lanes of a highway or interstate as one-way evacuation routes. This can create additional outbound capacity with the goal of decreasing evacuation clearance time.*

³ *A special needs registry or disaster registry is a database of persons who have voluntarily registered themselves for physical assistance during an emergency. The database is maintained by a local emergency management entity or a department of health. Often the phone number associated with the registry is 311, and in many cases, can be called up until the last minute of a planned evacuation.*

At the city level, the Chicago Office of Emergency Management & Communications (OEMC) has an evacuation plan, which brings together elements of Illinois Department of Transportation (IDOT) plans and transit agencies' plans. For example, Chicago's principal transit agencies, Chicago Transit Authority, Metra and Pace, each have evacuation procedures, as do O'Hare and Midway Airports (CMAP 2007). Additionally, IDOT has numerous state level plans, including the *Catastrophic Earthquake Preparedness Plan for the New Madrid Earthquake Zone of 2006* "that would aid in the response and evacuation of affected areas" (IDOT 2008).

State Level Plans: Illinois State

The Illinois Emergency Management Agency (IEMA) has emergency plans that are held in confidence due to their focus on radiological and/or terrorist incidents. However, the state plan would logically follow the National Incident Response Framework. Therefore, state and local agencies are designated with emergency support functions under the Illinois State Emergency Plan. One emergency support function that specifically relates to carless and particularly special needs evacuation planning is the responsibility of the Illinois Department of Public Health.

The Illinois Department of Public Health (IDPH) has the emergency support function of coordinating the dispersal of medication and supplies to hospitals and health departments in the case of an emergency. Medications would come from the Strategic National Stockpile (SNS). The Illinois SNS plan was highly rated, compared to other SNS plans, by the Center for Disease Control. This rating is owed to the IDPH collaboration with multiple agencies, which include the Illinois Emergency Management Agency's (IEMA) distribution support; the Illinois State Police's security support; the Illinois National Guard's warehousing support; the Illinois Department of Transportation's support and the Illinois Department of Corrections' support.

The *Strategic National Stockpile Plan* was simulated in various drills, including two that had an evacuation component: *FLUEX 2006* and the *Prairie Thunder Exercise*.

FLUEX 2006 occurred in May of 2006. It was a simulation of agency response to a widespread health crisis coinciding with terrorist attacks. "More than 50 representatives from state and federal agencies and the American Red Cross reported

to the State Incident Response Center (SIRC) within the State Emergency Operations Center (SEOC) in Springfield to participate in the exercise” (IDPH 2007).

The *Prairie Thunder Exercise* was a five-day simulation of large-scale evacuations and sheltering in response to a theoretical terrorist attack. The variety of federal, state and local agencies involved conducted three scenarios “that included intelligence gathering and response to simulated terrorist attacks, distribution of materials from the Strategic National Stockpile, victim search and rescue efforts and establishment of a field hospital for treating ‘victims’” (IDPH 2007).

TOPOFF 2 was a national terrorism simulation that involved the release of the Pneumonic Plague in Chicago. The simulation involved the Strategic National Stockpile as well (DHS 2003). It appears that *FLUEX 2006*, *Prairie Thunder*, and *TOPOFF 2* all involved mass casualties and victim rescues. It is unclear how many of those rescues involved victims with special needs beyond the infection of the simulated biological agents.

The Illinois Department of Public Health requires that nursing or assisted living homes have an evacuation plan. The extent to which these plans have been developed beyond the basic requirements varies from facility to facility. At the most basic level, these plans simply call for residents to be removed from the facility under defined circumstances such as fire or power outage. This inadequate standard means that nursing home residents could be left standing outside if a hazard does occur and the facility become uninhabitable. They do not mandate that memorandums of understanding (MOUs) be obtained from transportation providers for the evacuation of residents to a sister facility. Nor do they mandate that sister facility relationships be established.

The logistics of an evacuation have been planned regarding those persons with vehicles. The Illinois Terrorism Task Force was delegated planning responsibilities by the Illinois State Police who hold emergency management responsibilities. The Task Force’s Transportation Committee, Evacuation Sub-Group launched the Chicago Area Transportation Study, which was completed for the Chicago area. This study estimated that around 180,000 vehicles could flow out of the central business district in just three hours. Additionally, the study resulted in the inclusion of a contraflow or lane reversal for the expressway system. The City of Chicago and the Illinois Department of Transportation would close 256 ramps and conduct inspections from the air before allowing reversed traffic flow to begin. The study also delineated

alternative evacuation routes, which, along with contraflow, can be found in the Travel Demand Management Annex to the Chicago Evacuation Plan (CMAP 2007). These planning decisions were made based upon a computer traffic modeling software, TRANSIMS, which simulated the movements of a synthetic population, individual by individual (TRACC 2008). Unfortunately, it appears that one consideration was outside the realm of the analysis: the potential for transit and paratransit⁴ vehicles to move about city collecting carless and special needs evacuees.

As of February 2007, the Illinois Terrorism Task Force had also strengthened the city's infrastructure in preparation of a mass evacuation. They have traffic lights with uninterruptible power supply, gates on expressway ramps for contraflow, and even "Changeable Message Boards" which can deliver messages to drivers traveling in contraflow lanes (CMAP 2007).

Metropolitan Planning Organization Plans: CMAP

The Chicago Metropolitan Agency for Planning (CMAP) has been involved in the technological aspect of evacuation traffic planning, particularly contraflow management and infrastructure. However, their role with respect to carless and special needs evacuation planning appears to be limited.

City / County Level Plans: Chicago

The City of Chicago Office of Emergency Management and Communications (OEMC) does not make public its emergency planning efforts. Therefore, research cannot address the extent to which evacuation planning includes consideration for carless and special needs populations. The Chicago focus group notes that snow routes could potentially be used as evacuation routes. Furthermore, contraflow in the state's plan would logically include a local counterpart. However, the details are not publically available.

⁴ "Paratransit is the family of transportation services which falls between the single occupant automobile and fixed route transit. Examples of paratransit include taxis, carpools, vanpools, minibuses, jitneys, demand responsive bus services, and specialized bus services for the mobility impaired or transportation disadvantaged." <http://www.fema.gov/oer/reference/glossary.shtm>

The City of Chicago does not maintain a disaster registry⁵. However, the Chicago Transportation Authority does offer paratransit services to those persons with mobility restrictions who meet the application requirements. The existence of plans to utilize the paratransit service and its client database in the event of an evacuation are either confidential or nonexistent.

The Chicago High Rise Evacuation Ordinance “requires all residential and commercial buildings over 80 feet (ft.) in height to have an evacuation plan.” Buildings are classified in to four height categories; those in the first two categories “MUST file evacuation plans with the (OEMC).” (City of Chicago 2008) Those in the third and fourth categories may voluntarily file evacuation plans with the Office of Emergency Management and Communications (OEMC). These plans do consider special needs by including a list of those who have requested assistance evacuating the building and the type of assistance they require. (City of Chicago, 2008) It is unclear what types of resources (evacuation chairs⁶, paratransit, special needs shelters) have been dedicated to these calls for assistance from special needs persons.

The City of Chicago has several public warning systems. There are 112 traditional sirens throughout the City, which activate for a variety of emergencies including terrorist attacks. The City operates a 911 Callback System, which calls out and gives voice recorded emergency messages. The phone numbers are from the 911 database, which is geographically referenced. Therefore, emergency notification calls can be made to geographic areas as necessary. Chicago also offers the Emergency Alert System, which provides emergency notification via radio and television by collaborating with area broadcast and cable operators (OEMC 2008). The City’s Emergency Information Telephone Bank (312-745-INFO or 877-745-INFO) can be activated by the OEMC to offer information pertaining to the emergency, “such as closures, evacuation areas, access points, and ... financial or family assistance available to victims.” The purpose of the information line is to reduce call volume to

⁵ A ‘disaster registry’ is a list of disabled persons or elderly with mobility needs who have registered for evacuation assistance from the City or other organization.

⁶ Evacuation chairs are essentially emergency-use wheelchairs specifically designed for traveling down stairs by sliding over the top of them with the help of an assistant. The evacuation chairs are also designed for use in tight stairwells of tall buildings. Some models use tank-like rubber tracks that allow the assistant to better control speed.

911 or 311 operators so they may handle more urgent emergency calls. Additionally, the information line operators may provide the name of the hospital or other location where victims have been taken, but not information about any one specific victim. (OEMC, 2008)

The Community Level: Chicago

Given the confidentiality of the City's emergency planning efforts, the involvement of the community could suffer as a consequence. However, the City of Chicago has programs which bring community volunteers into the role of emergency responders, such as the Chicago Citizen Corps, Community Emergency Response Team (CERT) training and volunteer program. The volunteers that wish to participate in the program receive 20 hours of training to assist in disaster response situations. The CERT teams are present in all the case study cities in some form or another.

It is worth mentioning that the American Red Cross offers communication services to evacuees within its shelters, namely the 'Safe and Well' registry. Anyone can register themselves on the American Red Cross website or by calling 1-800-RED CROSS, and leave canned messages for family and friends, such as "currently at shelter," "currently at hotel," "I am currently/remaining at home," etc. Family and friends can then access these messages via telephone or Internet at <http://disastersafe.redcross.org>.

At the city level, the CTA, Chicago Fire Department and Emergency Medical Services conducted an evacuation drill in the Blue Line subway while it was closed for repairs between August 24th and September 7th of 2007. This was a unique and very successful coordination of events. The open access for multiple days to the subway for an emergency drill was an innovative decision (CTA 2007). The simulation was a significant improvement over the previous year's emergency simulation in Chicago.

In September of 2006, the OEMC conducted an evacuation simulation of several buildings in downtown Chicago following an explosion scenario. Participation among the public was voluntary. Participants were allowed to use elevators during the drill rather than staircases, thus not testing a very crucial component of building evacuations. Once on the cleared streets, they were instructed to walk several blocks away from the 'scene' (AP 2006). Approximately 4,000

employees from the financial district participated in the drill, which took 45 minutes (Hassler 2006). The simulation was carried out under optimal conditions: the weather was good, elevators were functioning, and nothing was actually, or hypothetically, wrong. It appeared to be more similar to an organized fundraising walk, than to an actual emergency. The simulation only taught planners “a few simple things such as having comfortable shoes available for an emergency” (CMAP 2007).

Recommendations: Chicago

It has become evident in these case studies that plan disclosure and risk assessment are inter-twined. If the perceived risk is terrorism, then plans are held in confidentiality and rightfully so. However, considering that public outreach would greatly reduce panic and confusion during an evacuation from a natural hazard in particular, it may be a valid argument that certain plans be made available publically. New York City is discussed later in these pages, particularly regarding the wide variety of risks they face, and their ability to involve the public in activities that address carless and special needs evacuation planning, and address general disaster preparation. It is a view shared by New York State representative Richard Brodsky, whose congressional report recommends plan disclosure legislation. Furthermore, New Orleans and Miami have their primary focus on natural hazards, resulting in plans that specifically address carless and special needs evacuations, which are anticipated and very open to the public.

These case studies also revealed a simple, yet important tool for special needs evacuation planning: state review of nursing home evacuation plans. The weakest state standards for such evacuation plans are drawn up from antiquated templates. Such plans would leave a group of evacuees standing outside a burning building, successfully evacuated up to this point, but with no destination planned. The strongest state standards result in plans that have memorandums of understanding with transportation providers and with receiving facilities. Some go further still, monitoring the number of commitments that one provider can make, to avoid over-booking in the case of widespread hazards.

In brief, this study recommends that the OEMC repeat the event simulation involving the downtown building evacuation done in 2006. However, the rules should be slightly different. First, public participation should be encouraged much

more. Second, the elevators should be off-limits. Third, the area should include facilities that have special needs people. This would give the OEMC a chance to evaluate its response to the dynamics of a more realistic evacuation scenario.

Case Study: Miami

Introduction

Miami-Dade County has the most experience with actual evacuations of all the case study cities. The state and local level planning is done in a transparent manner. The focus clearly is hurricane risk. Miami has a strong record of assisting evacuations in past hurricanes.

At the state level, the Florida Division of Emergency Management has prepared and implemented the statewide *Comprehensive Emergency Management Plan of 2004* (CEMP) as mandated by the State Emergency Management Act. The CEMP creates “a framework for an effective system of comprehensive emergency management” (CEMP 2004) which establishes the mechanisms, policies and chain-of-command in order to facilitate mitigation, preparation, response and recovery.

The CEMP also includes hazard specific annexes: *Radiological Emergency Management Plan*, *Terrorism Incident Response Plan*, *SERT Response Guidelines for Wildfire Operations*, and *Emergency Repatriation Plan*. The Radiological Emergency Management Plan contains confidential annexes for each nuclear facility, which outline evacuations with measures for residents, transients, and for those with mobility impairments (CEMP 2004).

The State Management Act delegates certain responsibilities to counties. These responsibilities include the development of county-level comprehensive emergency management programs and intra-county mutual aid agreements. Consequently, the Miami-Dade County Department of Emergency Management and Homeland Security (DEM&HS) has developed the *Miami-Dade Comprehensive Emergency Management Plan* (also called CEMP, but not to be confused with the state level or even the facility level plans that share the same name). Miami-Dade’s plan has been implemented successfully in evacuations due to several past hurricanes. The plan includes carless and special needs evacuation assistance with a disaster registry, paratransit, open-public bus pick-up location, public and special needs

shelters, multilingual public information, and much more. The primary agency carrying out the carless and special needs assisted evacuations is Miami-Dade Transit, guided by the *MDT Hurricane Manual of 2006*.

State Level Plans: Florida

The Florida Division of Emergency Management has developed the *Comprehensive Emergency Management Plan* CEMP in following with the National Response Framework. The CEMP has sections addressing risk assessment, incident command structure, and emergency support functions.

The risk assessment section of the CEMP considers all hazards; but tropical cyclones are the only “hazard category” listed as potentially “catastrophic”, given the history of hurricanes in the State of Florida. The CEMP lists specific “consequences” for each potential hazard. Those hazards, which are considered to have the potential consequence of evacuation, include tropical cyclones, severe weather events, environmental hazards (such as flooding, wildfires, etc), terrorism, and technological events (such as nuclear power plant accidents) (CEMP 2004).

Preparation for hurricanes and the population’s vulnerability is the principal focus in Florida. There have been more than 150 hurricanes and 260 tropical storms, since the National Weather Service began keeping records in 1884. In Florida, 6.13 million people live in storm surge zones (Hurricane Task Force 2005).

The vulnerability of the population of Florida is also expressed in the CEMP. Over eighteen percent of the population is 65 or older. There are three commonly spoken languages in Florida: English, Spanish and French Creole. There are 746 nursing homes in Florida and over 333,000 people are considered “frail elderly”. Florida has over 9,500 hazardous materials facilities and three nuclear power plants. Turkey Point facility’s ten-mile Emergency Planning Zone encompasses much of Miami-Dade County’s Homestead community, which includes 145,171 people (CEMP 2004).

The *State Emergency Management Act* designates the State Emergency Response Team (SERT), which is composed of emergency coordination officers. These officers each represent one of the various state agencies, which have emergency support functions (ESFs) under the CEMP. The ESFs are outlined according to the federally established guidelines of the National Response Framework (see table 2).

Table 2: Emergency Support Functions of State Agencies under Florida CEMP

PRIMARY AGENCY LISTING		
ESF #	FUNCTION NAME	LEAD STATE ORGANIZATION
1	Transportation	Department of Transportation
2	Communications	Department of Management Services/ Division of Communications
3	Public Works & Engineering	Department of Transportation
4	Firefighting	Department of Financial Services/ Division of State Fire Marshal
5	Information & Planning	Department of Community Affairs/ Division of Emergency Management
6	Mass Care	Department of Business and Professional Regulations
7	Resource Support	Department of Management Services/ Division of Purchasing
8	Health and Medical	Department of Health
9	Search & Rescue	Department of Financial Services/ Division of State Fire Marshal
10	Hazardous Materials/ Environmental Protection	Department of Environmental Protection
11	Food & Water	Department of Agriculture & Consumer Services
12	Energy	Public Service Commission
13	Military Support	Department of Military Affairs/ Florida National Guard
14	Public Information	Department of Community Affairs
15	Volunteers & Donations	Florida Commission on Community Service
16	Law Enforcement & Security	Department of Law Enforcement
17	Animal Protection	Department of Agriculture & Consumer Services

Source: CEMP 2004

The Emergency Support Function 1, Transportation is responsible for evacuation as well as multi-modal transportation of evacuees, personnel, equipment, and materials and supplies. ESF 1 considers automobile, rail, air and water modes of transportation.

ESF 6, Mass Care works in coordination with ESF 8, Health and Medical, to meet the needs of evacuees in special needs shelters, and in coordination with ESF 15, Volunteers and Donations, during an evacuation. The Department of Business and Professional Regulation is the primary agency responsible for ESF 6, however they are supported by the American Red Cross, Department of Agriculture and Consumer Services, Department of Education, Department of Elder Affairs, Department of Military Affairs, the Salvation Army, the Florida Voluntary Organization Active in

Disaster, Department of Children and Families, and the Agency of Workforce Innovation.

The ESF 8, Health and Medical Services coordinates the “public health response, triage, treatment and transportation of victims of disaster; assistance in the evacuation of victims out of the disaster area after the event; immediate support to hospitals and nursing homes...” The primary agency responsible for this response function is the Department of Health.

The ESF 15, Volunteers and Donations, designates the responsibilities of eighteen separate volunteer organizations.

The Florida Department of Community Affairs, Division of Emergency Management has been studying evacuation issues since the 1980s. They have defined storm surge areas, potential evacuee counts, routes, clearance times, and destinations. They also worked with the development of the *Regional Evacuation Procedure* (REVAC). During Hurricane Floyd, the areas recommended for evacuation would have resulted in 1.3 million evacuees. However, more than 2 million people evacuated which heavily stressed available resources. The evacuations were completed successfully, despite frustrations with very heavy traffic on the major evacuation routes. The additional evacuees came from areas which were not within threatened areas. They choose to evacuate regardless of directives, therefore increasing the number of evacuees; a phenomena called the *ashadow* evacuation (Hurricane Task Force 2005).

The ‘Preparedness’ portion of the CEMP’s ‘Method of Operation’ deals with evacuation procedures. REVAC integrates the operations of local emergency management, law enforcement, sheltering, public information and neighboring states. The REVAC designates the Governor as the director of major evacuations. It also designates a State Coordinating Officer with the power to activate county emergency operations centers and shelters. The REVAC also calls for contraflow or ‘Reverse Laning’ to optimize traffic flow out of the evacuation zones.

Metropolitan Planning Organization Plans: Miami-Dade MPO

The Miami Metropolitan Planning Organization (MPO) began in 1977 to guide interlocal agreements between government agencies; thus allowing them to act jointly. Furthermore, the MPO develops transportation and evacuation plans for the metropolitan area. The MPO's evacuation planning draws heavily from existing plans, namely the state level and city/county level plans. After all, the authority on county emergency evacuation planning would be the Miami-Dade Department of Emergency Management and Homeland Security, and the agency executing the evacuation is Miami-Dade Transit. Both of these agencies and their plans, will be discussed in the following section: City/County Level Plans.

The MPO's governing board is appointed by the Florida Governor and connected to Miami-Dade County. The board is advised by several committees: Citizens Transportation Advisory Committee, the Bicycle Pedestrian Advisory Committee, Transportation Aesthetics Review Committee, and Freight Transportation Advisory Committee (MPO 2006).

The Citizens Transportation Advisory Committee commissioned a study in 2007: *Simulation and Analysis of Potential Mass Evacuation of Miami-Dade Residents* (Gannet Fleming 2007). The focus of the study was on traffic volume and capacity during a mass evacuation, namely a large, atypical, mass evacuation. Given Miami's relatively low storm surge risk and strict building codes, hurricane evacuation orders typically involve only those areas of the County that lay within the narrow storm surge risk area and trailer parks. This study of mass evacuation was somewhat inspired by the disasters associated with Hurricane Katrina and Rita.

The *Simulation and Analysis of Potential Mass Evacuation of Miami-Dade Residents* was intended to identify strategies to perform such a massive evacuation with so few inbound and outbound major traffic routes. The analysis evaluated contraflow strategies, road shoulder driving, and gas station locations. The study gave extra consideration to carless and special needs populations by mapping such populations as, disabled, carless, low-income, and those belonging to one of two age cohorts (under 18 and over 65). This information has been translated into the strategic placement of the Miami-Dade Transit pick up sites, which at the time of the study, numbered 130 throughout the county.

City / County Level Plans: Miami-Dade County

The *State Management Act* delegates certain responsibilities to the county level. These responsibilities include the development of county level comprehensive emergency management programs. In the case of an emergency incident, the Miami-Dade Department of Emergency Management and Homeland Security (DEM&HS) is the lead agency coordinating the emergency response.

The DEM&HS developed the county's *Comprehensive Emergency Management Plan* (Miami-Dade CEMP). Although it addresses multiple hazards, hurricane response is the majority of the plan. The 'Response' portion of the Miami-Dade CEMP outlines a timeline for response efforts. The timeline is based upon the hurricane impact as hour zero. The CEMP response timeline begins at 72 hours before landfall and lasts until 48 hours after landfall. During that timeframe, activities outlined within the CEMP are carried out: contraflow evacuation traffic, paratransit pickup of those on the County's disaster registry list, bus pickup of carless populations, etc. These activities are carried out by the providers and agencies that have agreements with the OEM&HS and that fulfill a role within the Miami-Dade CEMP. The most prominent of these agencies would be Miami-Dade Transit and the American Red Cross, for their evacuation and sheltering services, respectively.

Miami-Dade Transit (MDT) designates many of its employees as "essential" during an emergency, including bus operations, maintenance and paratransit. These "essential" employees have a clear emergency response role as part of their job description. The paratransit operations are obligated to the Special Transportation Service, Medicaid Transportation Services, and those registered with the Department of Emergency Management and Homeland Security (DEM&HS) as Persons with Special Needs. The paratransit operations and bus operations would continue until each person needing assistance is evacuated or until weather conditions threaten operations (MDT 2008).

Paratransit's first priority is the Special Transportation Services and Medicaid clients, especially those on dialysis. Paratransit efforts, assisted by contracted service providers are prioritized towards the Special Transportation Services and Medicaid clients, and then all others including those registered as 'Persons with Special Needs' (MDT 2008).

Miami-Dade Transit manages sixty-three evacuation-bus pick-up sites throughout the storm surge evacuation zones (see Figure 1). Each pick-up site is appropriately signed with a tri-lingual sign 36” tall by 24” wide. Furthermore, the MDT has seventy-five additional pick-up points at mobile home parks, which are located throughout Miami-Dade County and are not limited to the storm surge evacuation zones due to the increased risk faced by mobile home residents. The evacuees are brought to one of the twenty Red Cross evacuation centers (MDT 2008).

Figure 1: Pick-Up Site Signage

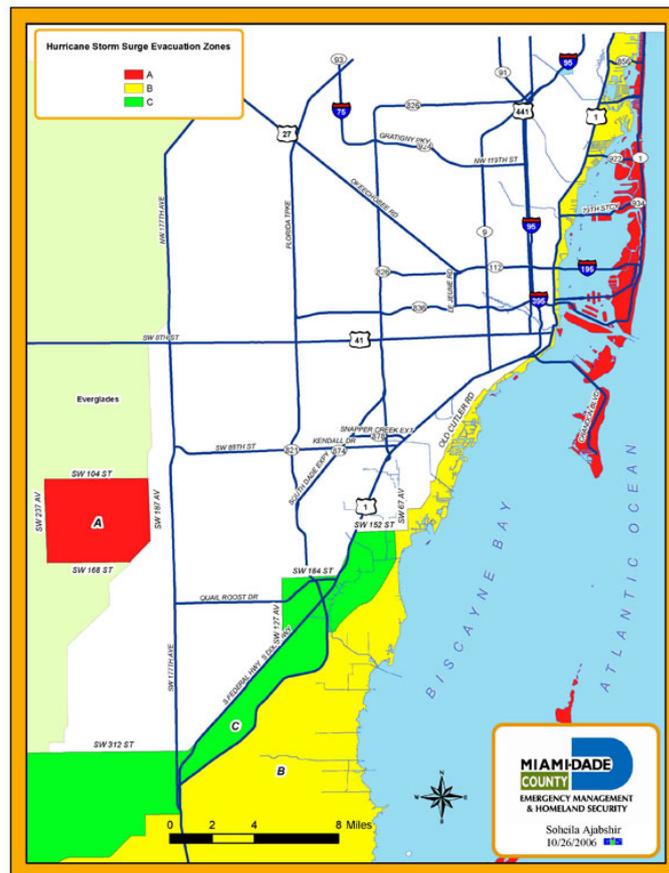


Source: MDT 2008

Additional information about the evacuation process is available to the public on the Miami Dade County website and through brochures such as the *Hurricane Guide* which is also available in English, Español and Creole. Location is one of the most important pieces of information for the public that influences their decision to evacuate. Only certain portions of the city face the possibility of a mandatory evacuation, a clear distinction from the New Orleans evacuation plan.

The storm surge evacuation zones are limited to coastal storm surge areas and a block-shaped area of 8.5 square miles (marked in red with the letter ‘A’ in Figure 2). The storm surge areas were designated using computer modeling. Additionally, the 8.5 square mile area is designated for evacuation because it would be inaccessible to first responders following a large storm (MDT 2008).

Figure 2: Miami-Dade County Hurricane Storm Surge Evacuation Zones



Source: MDT 2008

Evacuees from the general population are encouraged to seek shelter with family or friends inland from the evacuation zones. There are approximately fifty-one Red Cross Evacuation Centers available with an estimated total occupancy of around 60,000 to 70,000 people, but not every shelter would necessarily be open during a given evacuation. Citizens must tune into the local news or call the ‘Answer Center’ (305-468-5900) to receive information regarding which shelters will be open (Mogen 2008). Additionally, shelters are equipped with electric generators for persons with special needs.

The DEM&HS also operates a special needs evacuation registry, known as the Emergency Evacuation Assistance Program (EEAP). As of November 2007, approximately 2,500 people were registered with the EEAP (Renne et al. 2008 page 9). People who need mobility and/or medical assistance to evacuate are encouraged to apply to the EEAP program. They will be provided appropriate transportation and shelter in a special needs evacuation center. They are allowed to be accompanied by a caregiver if necessary.

The EEAP application must be signed by a doctor. The application information is used by DEM&HS to determine the applicant's eligibility and specific needs in case of an emergency. The application is offered in three languages English, Creole and Spanish; additionally, Braille application forms are available.

When a situation occurs which may require evacuation, emergency response personnel call the registered person and request that they prepare for evacuation. They are asked to bring any required medical equipment and/or medications, such as personalized mobility devices. Additionally, evacuees are asked to bring blankets, water, food (particularly for those with a special diet), clothes, money, identification, important papers. The Special Needs Evacuation Centers are equipped with electric generators to power medical support equipment (EEAP 2008).

The DEM&HS promotes registration by encouraging care providers to assist in the registration of their clients by calling 311. Additionally, the DEM&HS gives priority to those persons who have registered before an impending emergency. Last minute registrations are addressed, but DEM&HS reminds potential applicants that in an emergency with little preparation time, other than a hurricane, persons who are already registered will be assisted. During a hurricane evacuation, the Emergency Operation Center will make public media announcements to notify the public when the 311 Answer Center will stop accepting registrations for special needs assisted evacuation (EEAP 2008).

During the National Study on Carless and Special Needs Evacuation Planning Focus Groups in 2007, the DEM&HS mentioned their considerations for sheltering-in-place to compliment the EEAP. They were concerned that participation in this program has been historically low, anecdotally around twenty percent. An evacuation of all, one hundred percent, of the registered persons would have to begin very early, possibly even before a hurricane's point of landfall has been accurately forecasted. (Renne et al. 2008)

Evacuation planning is not exclusive to hurricane planning in Miami-Dade County. The Miami-Dade CEMP plans for risks other than hurricanes. Planning has also been done for potential emergencies related to Turkey-Point Nuclear Facility, particularly a mandatory area within a ten-mile radius of the facility, which includes nearly all of the Homestead community. Miami-Dade County Code, Chapter 8 B, Section 15 calls for certain facilities such as assisted living, schools, hospitals, day care centers, and other facilities, to have a self-sufficient emergency plan, including

evacuation. Special facilities are institutions that include, but are not limited to assisted living facilities, schools (public and private), daycare centers, elderly centers or other organizations. These plans must be developed for both natural and technological disasters. The primary planning difference for consideration is the sudden notification of a technological disaster. The Miami-Dade Emergency Operations Center will transmit emergency information to media sources within 15 minutes of the appropriate response decision. Additionally, these special facilities maintain all-hazard radios and receive basic emergency notifications from the DEM&HS via the National Weather Service (DEM&HS 2004).

The DEM&HS is currently running a pilot program for *Miami-Dade Alerts*. It is a system which will send emergency text message alerts to subscribing emails, cell phones, and mobile devices. Citizens can sign up for the alerts online which may be selected in English, Spanish, or Creole. However, these alerts are text only, thus restricting access for the sight-impaired. Additionally, subscribing for the service can only be done online, thus restricting access for those without Internet.

The Community Level: Miami

There are several Community Emergency Response Teams (CERTs) in the Miami area. The Miami Beach team does receive “some training to deal with people with mobility impairments as part of the fire safety, evacuation, and suppression (training) module” particularly in regard to high-rise building evacuations (Mogen 2008). Additionally, there is “some training in the curriculum to address hurricane evacuation for persons with special needs,” particularly by spreading the word about the disaster registry (Mogen 2008). During an actual evacuation, the CERT volunteers evacuate just as a normal citizen would. They do not serve as volunteers during the event (Mogen 2008).

Hospitals and nursing homes must do evacuation planning in Miami-Dade County. There have mandatory evacuation plans and two agreements with receiving facilities. The private ambulance companies assist these evacuations; their involvement is an ambulance-licensing requirement. DEM&HS sends out the evacuation list and Red Cross coordinates the evacuation of such hospitals and nursing homes. Three major hospitals, Homestead, Mercy and Mount Sinai, have been cleared to shelter-in-place through a category five hurricane (Renne et al. 2008).

Discussion of Planning Efforts: Miami

At the state level, the Florida Division of Emergency Management has clearly outlined the *Comprehensive Emergency Management Plan* with designations of responsibilities, particularly Emergency Support Functions. Regarding carless and special needs evacuations; ESF 1, Transportation, and ESF 8, Health and Medical Services, as written in the CEMP, designate the responsibilities of assisting the evacuations of carless and special needs persons to specific state agencies.

However, the thoroughness with which these ESFs have been developed in order to address carless and special needs is unclear. In the case of Miami-Dade County, a carless and special needs evacuation would occur utilizing solely the county's resources, particularly the Miami-Dade Transit buses and paratransit vehicles. This also distinguishes an evacuation of Miami from an evacuation of New Orleans which relies heavily upon transportation resources from the State of Louisiana.

Emergency Support Function 8 in the Florida CEMP, states its responsibilities as including "public health response, triage, treatment and transportation of victims of disaster; assistance in the evacuation of victims out of the disaster area after the event; immediate support to hospitals and nursing homes..." (CEMP 2004, appendix VIII). However, Miami-Dade County Code requires that these facilities, hospitals and nursing homes, develop self-sufficiency plans. Whether or not the state agencies of ESF 8 intend to provide their services regardless of existing facility plans or merely as back up when existing facility plans fail is unclear. Although this may seem unclear within the plans themselves, the reality is that Miami-Dade has ample experience with evacuations. Consequently, this issue could be easily clarified by translating their operational knowledge into the documented plans.

The logistical issues surrounding carless and special needs evacuations are designated as responsibilities within the CEMP. It appears that the majority of specific efforts addressing these needs occur at the county level with some notable exceptions such as an executive order regarding prescription medications. The order mandates the state's health insurance companies and Health Maintenance Organizations (HMOs) to lift certain restrictions on prescription refills, which would allow people to adequately prepare for evacuation (Gallagher 2005).

The ‘Sheltering’ portion of the CEMP’s ‘Method of Operation’ deals with the efforts which have been made to address the sheltering deficit. In 2000, the sheltering deficit was measured to be 1,501,932 evacuees more than shelter space allowed in the case of a Category Five hurricane. This deficit has been reduced to 1,035,371; and the state continues to execute a shelter deficit elimination strategy, which involves surveying buildings and even designing new public building projects according to shelter-design criteria.

In Miami-Dade County, shelter availability, the 63 Miami-Dade Transit (MDT) bus pick-up locations throughout the storm surge areas with tri-lingual signs, the disaster registry and paratransit evacuation assistance all come together and function in a tried and true manner. The experience that DEM&HS has is irreplaceable with any training simulation. Their *Emergency Management Plan* and their work in collaboration with the state and other counties as outlined in the state’s *Regional Evacuation Procedure* cumulate into valuable experience. Unfortunately, the extent to which this valuable experience has been translated into logistical improvements of the carless and special needs evacuation effort is unclear because the county’s *Emergency Management Plan* is not available to the public. Additionally, the MDT’s *Hurricane Manual* simplistically designates responsibilities and procedures, yet yields little information about real experience.

Lastly, the State of Florida funds a portion of its emergency management in a unique way. A tax levied on insurance premiums goes towards a municipal firefighters’ trust fund, a police officers’ retirement trust fund, and an emergency management fund. This alternative funding source for emergency management may have viability in other states as well.

Recommendations: Miami

Miami’s carless and special needs evacuation is exemplar among the case study cities. The primary recommendation would be for the Miami-Dade Department of Emergency Management and Homeland Security to continue to openly share its planning efforts with other cities’ emergency management offices. Knowledge of the finer points of Miami’s evacuation planning efforts could save other cities from committing mistakes that Miami has already learned from long ago.

Case Study: New Orleans

Introduction

In Louisiana, evacuation planning is a shared responsibility between parish governments and the state government. At the state level, the Governor's Office of Homeland Security & Emergency Preparedness (GOHSEP) has developed the *State of Louisiana Emergency Operations Plan of 2007*. This plan serves to coordinate the activities of multiple state agencies to provide evacuation services from defined pick-up locations in each of the state's 64 parishes. It is the responsibility of each parish to transport persons needing evacuation assistance to these pick-up locations by implementing *Parish Emergency Operations Plans*. In the case of Orleans Parish, the New Orleans Office of Emergency Preparedness has created *The New Orleans City Assisted Evacuation Plan (CAEP)* and neighboring Jefferson Parish created the *Publically Assisted Evacuation Plan*.

The CAEP is of particular interest due to Hurricane Katrina. The plan was obviously not implemented, and carless and special needs people were given no evacuation transit assistance before the hurricane. The recent form of the CAEP, currently updated annually, is a major improvement to the City's efforts for carless and special needs populations. After all, how could the nation's largest failed evacuation in 2005 effect evacuation planning throughout the nation and not in the very city where the failure occurred? The new CAEP calls for a coordinated evacuation involving open-public bus evacuation, elderly and disabled train evacuation, paratransit assistance, a registry, and even pet evacuation and sheltering. Hurricane Ike in 2008 was the first time that the CAEP was executed in response to a real threat. Clearly, the eyes of the nation were upon New Orleans' response to Hurricane Ike, namely the evacuation process. Luckily, the research within this case study was still in its final stages when the 2008 evacuation occurred.

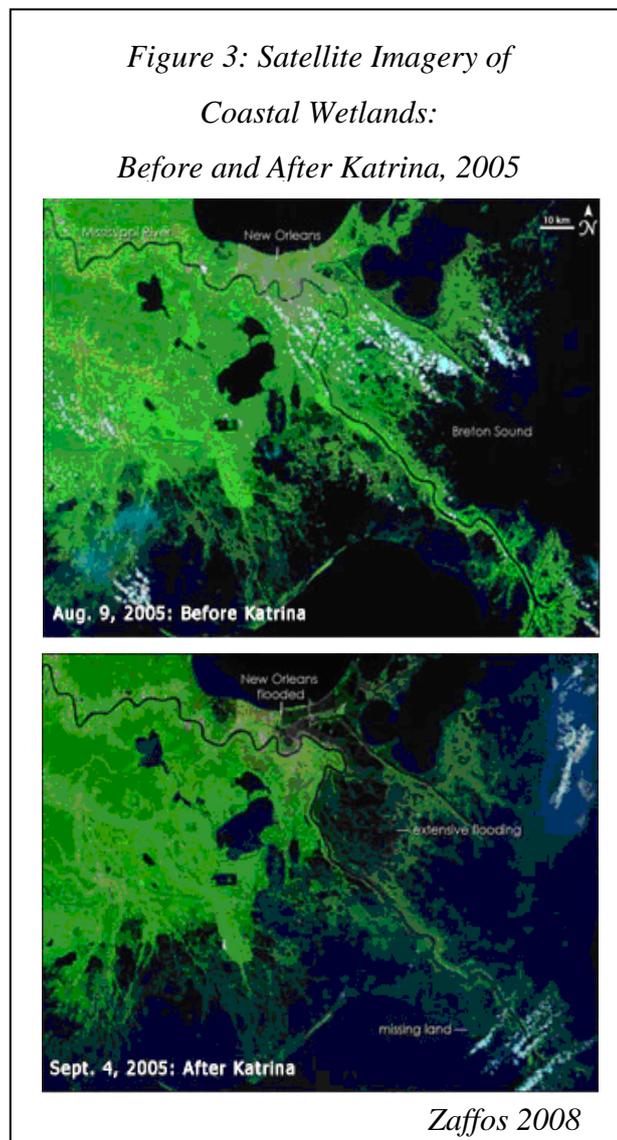
State Level Plans: Louisiana

The Governor's Office of Homeland Security & Emergency Preparedness (GOHSEP) has the responsibility of directing emergency and/or disaster operations in the State of Louisiana by an executive order from the Governor. Part of this responsibility includes the development of the *State of Louisiana Emergency Operations Plan*. The plan's central purpose is to delineate a chain-of-command and designate responsibilities and tasks among various state, local and other entities.

Emergency management is divided in five phases in the plan: prevention, mitigation, preparedness, response and recovery. Nearly a third of the *State of Louisiana Emergency Operations Plan* deals with risk assessment. The state's vulnerability has been assessed for each of a long list of natural, technological, intentional acts, and biological hazards. As expected, the state's vulnerability to hurricanes and storm surges is considered catastrophic. Additionally, the plan lists coastal erosion as a natural hazard with a high vulnerability rating. Coastal erosion equals a loss of wetlands that serve as hurricane and storm surge protection for places like New Orleans.

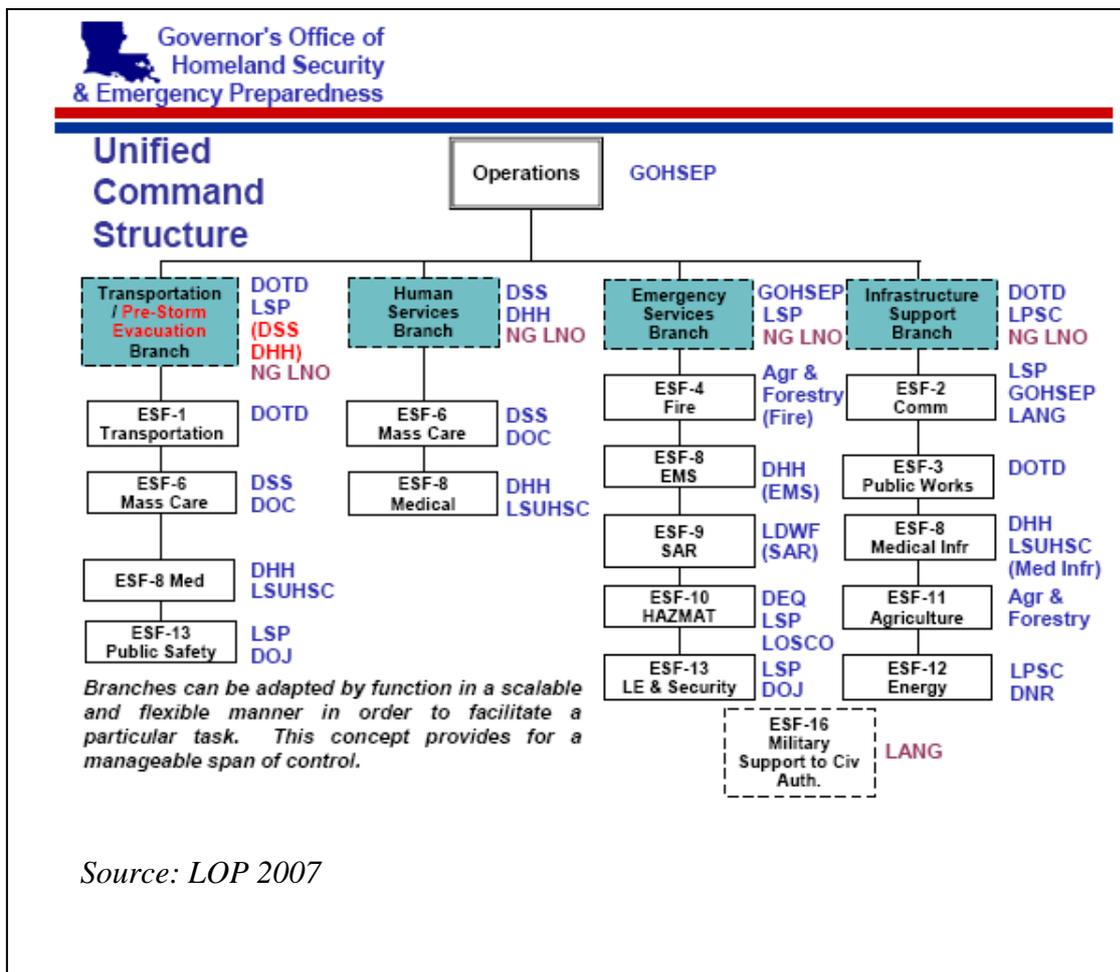
The City of New Orleans has even less natural protection from storm surges, considering that 217 square miles of Louisiana coastal wetlands were lost after Hurricane Katrina and Rita (USGS 2006). A common anecdote in New Orleans is that the loss due to

the hurricanes was equal to 50 years of loss at normal rates (see figure 3).



In addition to the risk assessment portion of the *State of Louisiana Emergency Operations Plan*, the plan designates a Unified Command Structure, which outlines the chain-of-command and the designation of responsibilities. This command structure is a reflection of the national policy guidance within the National Response Framework. GOHSEP is at the top of the organizational tree, managing four branches: transportation, human services, emergency services, and infrastructure. The agencies within each branch are assigned using the common nomenclature: emergency support functions (see figure 4).

Figure 4: GOHSEP's Unified Command Structure



As Figure 4 depicts, the Transportation/Pre-Storm Evacuation Branch under GOHSEP consists of several ESF's or Emergency Support Functions. ESF-1 Transportation consists of the Department of Transportation and Development (DOTD) which is responsible for providing the transportation resources to evacuate people in need. The DOTD is able to coordinate private, volunteer transportation

resources outside of the state's fleet of vehicles and even National Guard assistance, to facilitate the evacuation effort. This includes provisions for transportation resources for 'at-risk populations' as well. The ESF 1 has a designated Coordinator which collaborates with other entities in developing evacuation plans and transportation resource inventories. Those entities include:

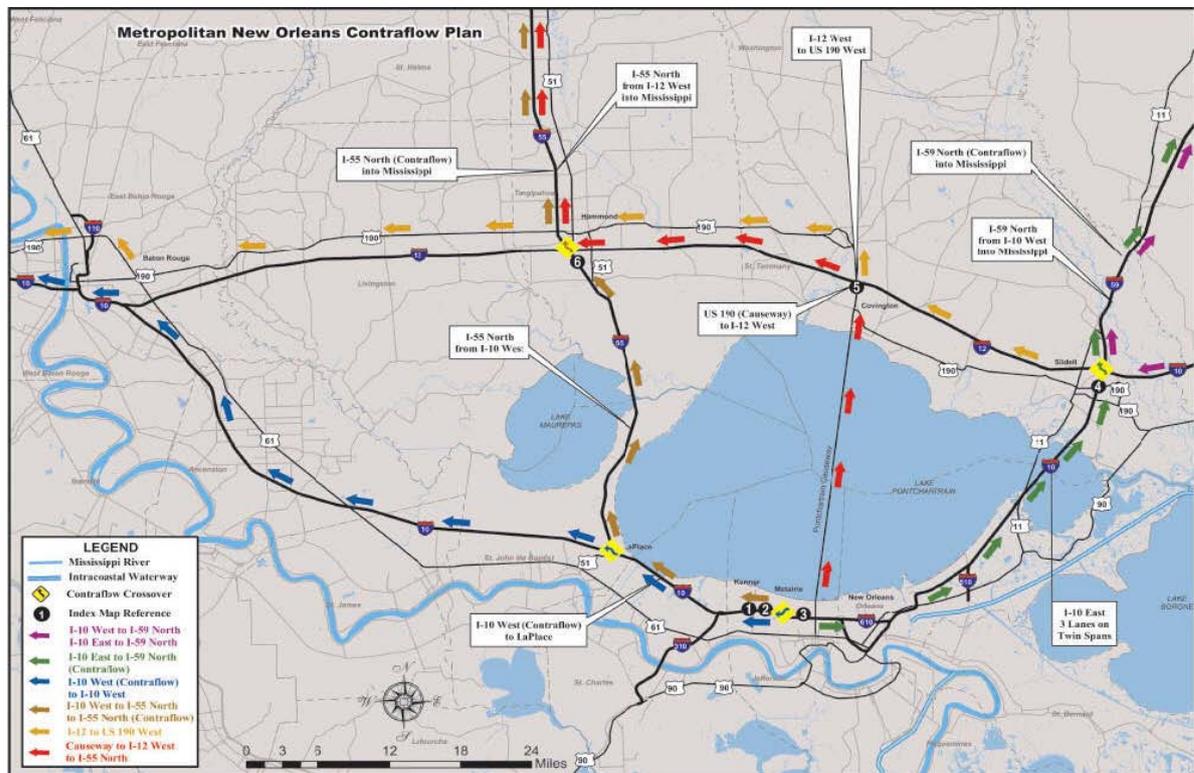
1. The Louisiana National Guard
2. Department of Agriculture and Forestry
3. The Department of Corrections
4. The Department of Education
5. Governor- Office of Elderly Affairs
6. Department of Health and Hospitals
7. The Public Service Commission
8. Louisiana Board of Regents
9. Louisiana State Police
10. The Department of Wildlife and Fisheries
11. Volunteer Organizations

Certain ESFs are more closely relate to carless and special needs evacuation planning than others. The Emergency Support Function 6 (ESF 6): Mass Care, Housing and Human Service Annex is responsible for sheltering and feeding programs. The Department of Health and Hospitals coordinates the ESF 6 to provide medical assistance at the shelters. The ESF 6 includes responsibility for collecting and providing information about the evacuees through the Disaster Welfare Information System. This system assists in reuniting family members separated during an emergency.

Emergency Support Function 8: Public Health and Medical Services Annex is primarily overseen by the Department of Health and Hospitals whose responsibility is "for public health, sanitation, medical and health assistance to Special Needs shelter operations" (LOP 2007, page ESF 8-1).

ESF 13: Public Safety is primarily controlled by the State Police and the Department of Justice. They have a wide-ranging responsibility to protect public safety by, among other things, controlling evacuation traffic. In the case of New Orleans, evacuation traffic was well managed during Hurricane Katrina by the use of the contraflow model (see figure 5).

Figure 5: Metropolitan New Orleans Contraflow Plan



Source: http://www.ohsep.louisiana.gov/evacinfo/no_contraflow.htm

Emergency Support Function 1, Transportation is most applicable to carless and special needs evacuees, it is the responsibility of each parish to transport persons needing evacuation assistance to the pick-up locations by implementing *Parish Emergency Operations Plans* such as the *City Assisted Evacuation Plan (CAEP)* of the New Orleans Office of Emergency Preparedness. The *State of Louisiana Emergency Operations Plan 2007* takes over when the parish transfers evacuees to the transportation providers contracted by the Department of Transportation and Development (DOTD). They take evacuees to American Red Cross shelters throughout the region. During Hurricane Ike in 2008, many evacuees were discouraged by the state's secrecy regarding shelter locations, and the sheltering experiences varied greatly among evacuees. Some evacuees were sheltered with all accommodations, while others lacked sufficient facilities and staff. GOHSEP has created the *State of Louisiana Hazard Mitigation Plan Update Volume 1*. This second plan repeats the key responsibilities as outlined in the *Louisiana Emergency*

Operations Plan with regards to evacuations. As the title suggests, it is a mitigation plan focused upon reducing the ill effects of natural disasters. Although critical for New Orleans, the *State of Louisiana Hazard Mitigation Plan Update Volume 1* was not further researched due to its lack of information specific to evacuation planning.

Metropolitan Planning Organization Plans: New Orleans

The Regional Planning Commission (RPC) is the metropolitan planning organization of the greater New Orleans area. Although they do not have a primary emergency support function, they have offered invaluable technical assistance to emergency planners. They assisted the Louisiana State Police by using traffic simulation models to calibrate the contraflow traffic, which was first used in the Hurricane Ivan evacuation in 2004. Additionally, they worked with the University of New Orleans Center for Hazard Assessment, Response and Technology on a project to identify special needs populations within New Orleans, as well as related GIS mapping assistance. (Pedro, RPC 2009)

City / County Level Plans: New Orleans

The New Orleans Office of Emergency Preparedness has developed the *City Assisted Evacuation Plan* (CAEP) to offer evacuation assistance to the people of Orleans Parish who cannot self-evacuate before a hurricane. The CAEP functions to pick up people throughout New Orleans at various locations including four senior center bus pick-up locations, thirteen general public pick-up locations, two hotel pick-up locations, paratransit residential pick-up locations, and in addition, people may arrive directly to one of the appropriate staging areas. The hotel pick-up locations are intended for tourists who already have airline tickets; their staging area is the Louis Armstrong International Airport (MSY) and their evacuation is dependent upon the airlines. Other tourists without cars or airline tickets may enter the CAEP as a member of the public via general public pick-up locations.

At the general public pick-up locations, evacuees are transported on Regional Transit Authority (RTA) buses to their staging area, the New Orleans Arena; their evacuation then becomes dependent upon the evacuation planning of the State of Louisiana, GOHSEP; and their destination was to be confidential for security reasons.

However, emergency planners realized that this secrecy discouraged people from evacuating and the policy has been revised.

The senior center pick-up locations and paratransit residential pickups are intended for seniors or persons who need medical resources (NMRs). The NMRs and/or seniors may be accompanied by one caregiver. Their staging area is the Union Passenger Terminal. Their evacuation is dependent upon Amtrak, and their destination is Memphis, Tennessee. For cases requiring a higher level of medical assistance, they may be transported to Belle Chase Naval Air Field, other helicopter interceptor sites, or other airfields.

The general public, seniors and NMR's may arrive at either the general public pick-up locations (GPPL's), the senior center pick-up locations (SCPL's), directly at the Union Passenger Terminal (UPT) or the New Orleans Arena (NOA) staging areas. Transportation will be offered between the UPT and the NOA staging areas so that evacuees may arrive to the appropriate staging area regardless of their point of entry in the CAEP.

An integral part of the CAEP is the classification of NMR and senior evacuees in one of four categories. The CAEP uses a colored wristband system to easily identify these evacuees. Blue wristbands are for seniors of 65 years of age or older who will evacuate by bus or rail. Green wristbands are self-manageable patients who will evacuate by bus or rail. Yellow wristbands are for general NMRs whose transportation needs are determined by the Transportation Triage Officer. Red wristbands are for NMRs who require immediate medical assistance. The Red wristbanded NMRs are transported by ambulance to Belle Chase Naval Air Field, a helicopter interceptor site, or other location.

The City of New Orleans estimated that 20,000 people would be evacuated under the CAEP. An estimated 14,000 would travel through the NOA staging area and 6,000 seniors or NMR's would travel through the UPT staging area. An additional 5,000 to 50,000 tourists could be in the city at any given time, in addition to the 20,000 people to be evacuated by the CAEP. However, the City of New Orleans takes into consideration that most of these tourists have cars or, at least, airline return tickets. The plan designates two hotel pickup locations and begins using local charter buses to move tourists to the airport. This phase of the plan begins at H-58, or 58 hours before the hurricane makes landfall on the Gulf Coast.

The CAEP begins a process called ‘leaning forward’ as early as 84 hours before the hurricane’s coastal landfall. The ‘leaning forward’ phase includes the preparation of the staging areas, coordination of buses, railcars, etc. At H-54, the CAEP takes effect for all evacuees. At that time, the general public and senior center pick-up locations open, designated RTA buses begin running evacuation services (2 buses per pick-up location), while 40 more buses continue to offer normal routes (limited), the first Amtrak train is available for loading, the New Orleans Arena is receiving evacuees, 100 state buses arrive at the Arena, and paratransit begins residential pick-ups.

The paratransit operations for residential pick-ups are coordinated by the 311 Center and the *Residential Evacuation Assistance Pickup (REAP) Operations Plan*. The 311 Center functions as the control center for these operations. The City of New Orleans promotes pre-registry with the 311 system, however evacuees needing residential assistance may call 911 or 311 at the onset of an emergency. Call center operators will screen the callers to determine their need level. The information is then passed through the Area Commander who dispatches a bus, ambulance or other transportation. The operations of REAP will continue until everyone requesting assistance has received it. Broadening the definition of ‘residential’ in the REAP, the Area Commander sends buses to locations where seniors often congregate, other than the 17 planned pick-up locations, such as homeless shelters.

The CAEP includes a Hospital and Care Centers Evacuation Operations Plan, which has very close coordination with the ESF 8 of the *Louisiana Emergency Operations Plan* which includes such things as ambulances. Each hospital has developed various plans to stay-in-place, partially evacuate or completely evacuate. Additionally, each hospital initiates one of these various plans at different storm levels. For example, Children’s Hospital has a stay-in-place plan for Category 3 and 4 hurricanes, and a full evacuation plan for a Category 5 hurricane. On the other hand, University Hospital initiates a full evacuation for a Category 3 hurricane.

The Louisiana Department of Health and Hospitals requires an evacuation plan before nursing home and home health agencies can be licensed. Although, it is unclear if these plans have over-booked local transportation resources. One step to limit this conflict by the CAEP has been to develop contracts with coach buses from outside the City, therefore leaving local companies available for local nursing home contracts.

The CAEP also includes a Pet Evacuation Plan. The City of New Orleans anticipates offering shelter for some 10,000 pets. These pets are not allowed in American Red Cross Shelters; therefore, they will be sheltered separately. The Louisiana Society for the Prevention of Cruelty to Animals (SPCA) has developed extensive planning to pick up pets at both the UPT and NOA staging areas. Pets in carriers or muzzled will be allowed on RTA buses which will bring the evacuees and their pets to the staging areas. The SPCA will barcode pets and owners to facilitate later reuniting of pets with their families.

In August of 2008, Hurricane Gustav provided the opportunity to give the CAEP a trial run. The storm could have been disastrous for New Orleans, but luckily damage was minimal; except for the power outages which were wide spread throughout the region.

The wristband identification system will need revisiting; during the evacuation for Hurricane Gustav the logistics of this system were cumbersome due to the crowds attempting to board buses after long waits at several pickup locations. In many cases, the evacuees were registered while aboard the buses or trains. This was risky however because the registry also serves as the manifest for that vehicle, and if an accident were to have occurred before the manifest was completed there could potentially be hundreds of unidentified victims.

The wait time at the 17 pick up locations varied greatly from location to location. The CAEP initially dedicates two buses per pick up location. However, many pick up locations are farther from the staging area than others, thus having longer round trips for the buses that will not be able to pick up the same number of evacuees per hour as the buses servicing closer pick up locations.

The sheltering experience varied greatly among evacuees as well. Some of the shelters were heavily criticized for having inadequate services, while others were praised. This and other Gustav experiences will be discussed in the discussion section.

Discussion of Planning Efforts: New Orleans

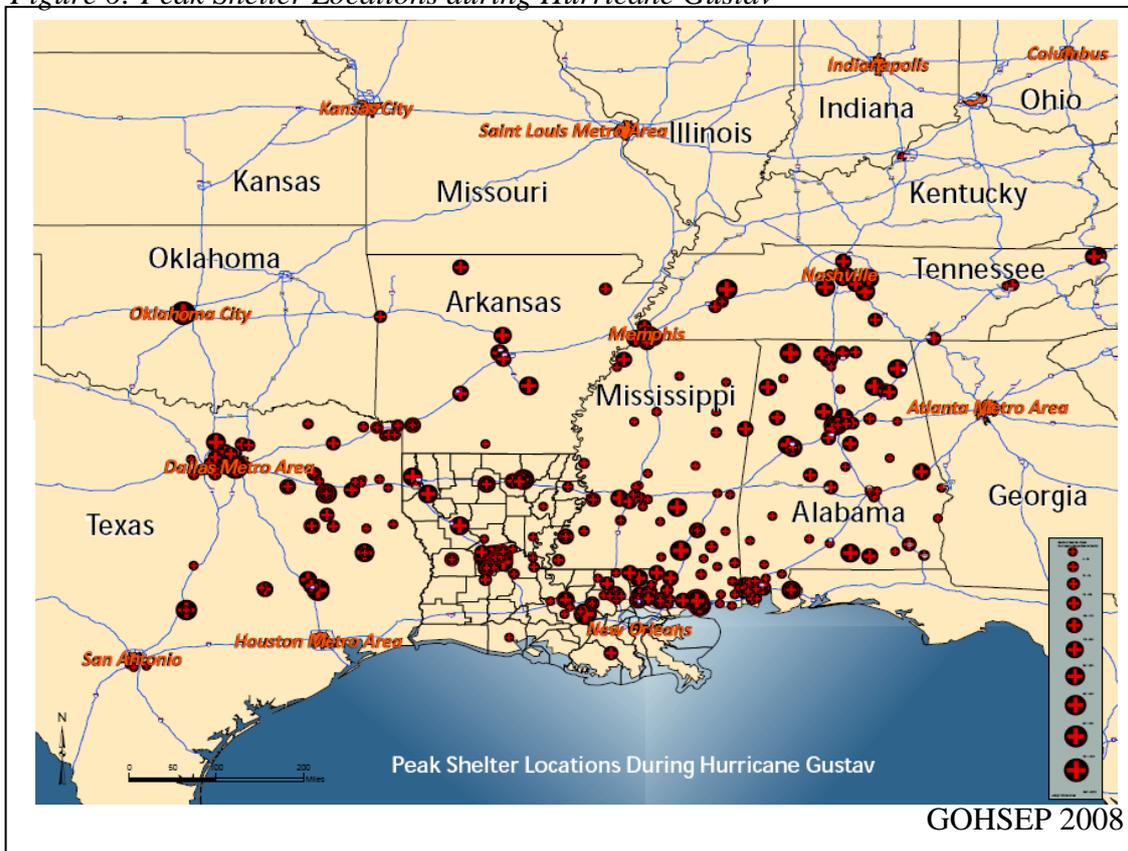
The *Louisiana Emergency Operations Plan* (LOP) does not include the type of specific details regarding evacuation planning that can be found in the parish-level plans. The LOP does, however, clearly designate responsibilities and duties of the

various entities that will participate in emergency management. One such notable designation of responsibility for special needs evacuees is the Emergency Support Function 8: Public Health and Medical Services Annex. This is an important designation because of the clear, indisputable responsibility to special needs populations.

The LOP did not originally disclose the location of the state shelters for security reasons. However, for many people it was unclear what those security reasons would be, particularly concerning hurricane evacuations, ‘confidentiality’ seemed inappropriate. This policy has since been revised because planners saw that evacuees in New Orleans would be reluctant to go to the New Orleans Arena staging area because they would not have any idea where the state buses will take them.

During the evacuation from Hurricane Gustav, many people wanted to know their destination and wanted to arrive at the same shelter as family and friends. The coordination of the shelters alone was a logistical challenge. The American Red Cross provides a total of 343 shelters in 10 different states, sheltering around 60,000 evacuees (ARC 2008). The registration of evacuees with wristbands is very crucial when considering the complexity of the sheltering network and the public’s desire to be located with family and friends (see figure 6).

Figure 6: Peak Shelter Locations during Hurricane Gustav



The LOP essentially serves the purposes of transporting evacuees from the parish staging areas. The collection of evacuees at these parish staging areas is the parish's responsibility. In the case of Orleans Parish, this effort is executed according to the City Assisted Evacuation Plan (CAEP). The CAEP and LOP declare that the New Orleans Arena staging area will initially have 100 buses dedicated to the state's evacuation effort. In total, the state had agreements with providers for 700 buses, of which only 150 buses were initially provided for the Hurricane Gustav evacuation. The National Guard provided drivers for an additional number of school buses utilized in the leg of the evacuation from the parish staging area to the state shelters. FEMA sent an additional 150 ambulances to assist with the special needs evacuation, mostly from homes to the train station/staging area. Ultimately, 9,000 persons needing medical assistance were evacuated, including 8,000 nursing home residents (GOHSEP 2008, Jervis 2008).

In order to bring evacuees to the staging area, the CAEP initially designates two RTA buses for every one of the 17 pick-up locations throughout the city. The plan allows more buses to be assigned to the pick-up locations as necessary. This is an important consideration because more buses will most likely be needed as the hurricane draws or the number of evacuees arriving to pick up locations increases. However, the CAEP should consider certain other factors, which would affect the number of buses needed per pickup location, namely the concentration of carless population in certain areas and the distance from the pick-up locations to the staging area. Longer distances will increase travel times, particularly during high evacuation traffic. Increased travel times will decrease the efficiency of people evacuated per hour, thus necessitating more buses. For example, the travel time from the pick-up at Mary Queen of Vietnam in eastern New Orleans to the staging area is approximately 40 minutes on a normal day, which means that one bus with a 44 person occupancy can only achieve an overall efficiency of 23 evacuees per hour. However, the pick-up at the Municipal Auditorium is only five minutes away from the staging area, which means that one bus can achieve an efficiency of 59 evacuees per hour (assuming loading and unloading times totaling 35 minutes in both cases). Dedicating more buses to the distant pick up locations and those locations with high numbers of evacuees could reduce the wait times experienced during the Gustav evacuation.

Recommendations: New Orleans

One of the main critiques of the Hurricane Gustav evacuation was the delayed return of the assisted evacuees after the storm. Power outages in New Orleans delayed the return of the evacuees to the city. This delay amplified the discontent felt by evacuees in state shelters. A more prompt return of evacuees has numerous benefits and this aspect of the evacuation plan should be more clearly addressed for future events. An evacuation is expensive for everyone, individuals, businesses and governments. For many individuals, the days spent away from home are also days without work and without pay. For businesses, the days spent closed result in lost revenue. For local governments, each day that business aren't generating sales tax or paying income tax are akin to tax holidays and decrease the city's revenue. The individual costs of evacuating have been partially addressed by the State of Louisiana Department of Social Services with the issuance of disaster relief monies in the form of food stamp debit cards valuing up to a few hundred dollars, depending upon the applicant's circumstances.

During the Gustav evacuation, the evacuee registration system (wristbanding) was cumbersome. This will also need to be addressed in future planning. One possible way to do this would be self-registration kiosks at pick up locations.

The dedication of buses to particular pick up locations will also need to be addressed. Ideally, more buses would be provided to distant pick up locations and/or pick up locations with a high concentration of carless people.

The above recommendations were discussed by evacuation planners in a recent tabletop exercise. The notes from this important and informative meeting are included in the appendix.

Case Study: New York

The New York State Emergency Management Office (SEMO) developed the *Comprehensive Emergency Management Plan*, which consists of three volumes: *Volume 1: All-Hazard Mitigation Plan*, *Volume 2: Response and Short-Term Recovery* and *Volume 3: Long-Term Recovery Plan*. The *All-Hazard Plan* focuses on reducing property damage and loss of life from natural hazards. One might expect emergency planning in New York City to focus on terrorism; however the City faces high risk from storm surge flooding as demonstrated thoroughly in SEMO's *Comprehensive Emergency Management Plan's* risk assessment. Therefore, the state supports the City's efforts in the development of an evacuation plan for the storm surge risk areas.

In New York City (NYC), evacuation planning is the responsibility of the Office of Emergency Management (OEM), supervised by the Mayor. The efforts of the OEM depend upon the cooperation of approximately 130 state and local entities, which include government authorities, nonprofits and private corporations (Brodsky 2006). The OEM has developed several plans that include evacuation efforts, including the *Coastal Storm Plan*, the *Trans-Hudson Emergency Transportation Plan* and other confidential plans, which primarily address security threats. The OEM developed many of these plans in collaboration with the New York State Emergency Management Office (SEMO). These plans are held in confidentiality, with only select information available online for the public such as the location of shelter reception centers.

In the 2005 New York State Legislature, the Assembly Committee on Corporations, Authorities and Commissions, chaired by Assemblyman Richard L. Brodsky, launched a six-month study on New York City's evacuation planning. Their study included public hearings and subpoenas for key documents. The resulting report, issued March 23, 2006 (referred to herein as the *Brodsky Report*), offered key insights into the planning process that otherwise could not have been discovered given the confidentiality of the plans.

New York planning efforts have been focused on two primary areas: terrorism and coastal storms. These plans are kept mostly confidential; the public is made aware of things like the location of the nearest evacuee reception center in case of hurricane risk. The strength in New York has been the public's awareness of the need

for emergency planning on the personal and family level. The public education efforts made by the Office of Emergency Management cover a wide variety of circumstances, and offer the widest variety of languages compared to any of the other case study cities.

State Level Plans: New York State

Every three years, SEMO updates the *New York State Standard Multi-Hazard Mitigation Plan*, which fulfills their obligation to mitigate the effects of potentially disastrous natural hazards, as outlined in the Federal *Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988* and the *Disaster Mitigation Act of 2000*. In addition to fulfilling a requirement for such things as Federal disaster assistance, the *New York State Standard Multi-Hazard Mitigation Plan of 2008* is a guide for local governments to create mitigation plans, as required by the *Disaster Mitigation Act*.

The format of the *Standard Multi-Hazard Mitigation Plan* clearly follows the requirements of the *Disaster Mitigation Act of 2000*. Although the plan did an excellent job of fulfilling each requirement, it did little to go beyond those concerning special needs populations. The plan did not offer any mandates requiring that special needs populations be addressed. One could assume that those responsibilities fell under the larger scope of the designation of responsibilities to execute evacuations. However, the list of participating state and local entities was too short to properly address the breadth of issues surrounding special needs evacuations.

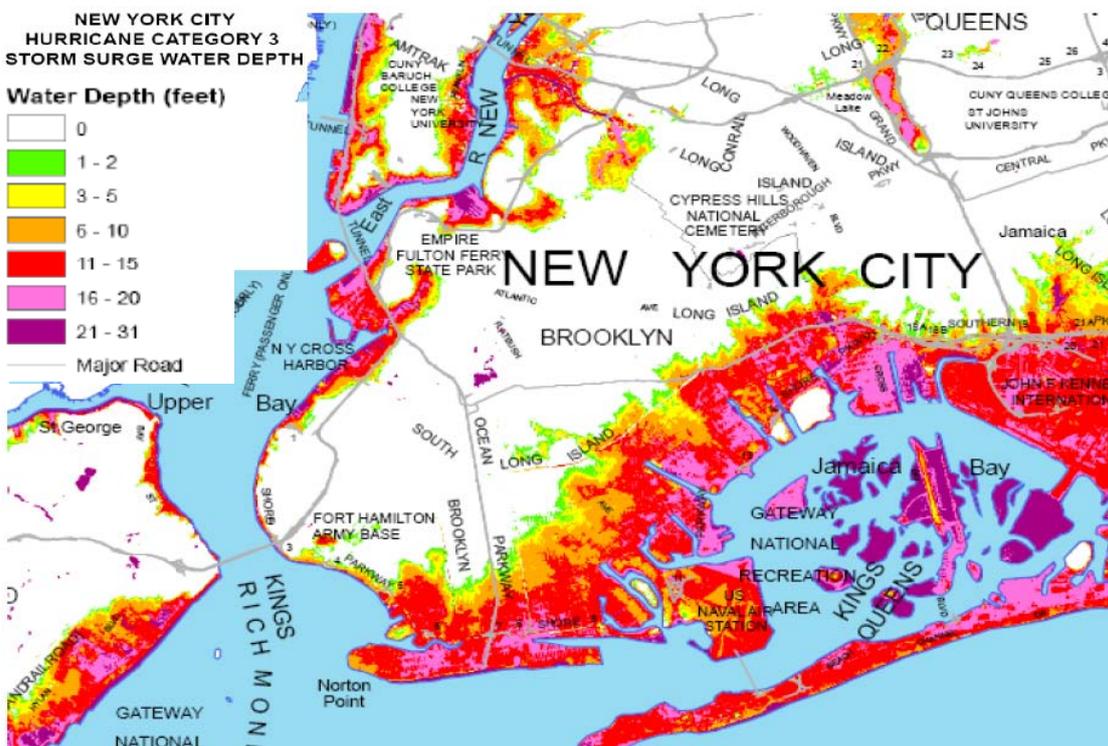
The *Standard Multi-Hazard Mitigation Plan of 2008: Section 3: Hurricane Hazard Profile* includes an important analysis of the potential disaster that a hurricane could cause throughout New York State. SEMO utilized computer modeling software to estimate damages to NYC if it were hit directly by a storm identical to hurricane Katrina. They estimated a \$300 billion loss in just wind damage to buildings. A slow moving category three hurricane with a direct hit to NYC was estimated to cause 40 million tons of debris, 1.8 million displaced households and one-half million people with short-term shelter needs.

Although many people do not associate hurricanes with New York City, history speaks otherwise. Storm surge floods have damaged the City in the past, such as the 1821 hurricane that flooded Lower Manhattan and the 1938 hurricane with 120

mph winds and a death toll of 600 people (Drye 2006). In total, 11 hurricanes have struck the region in the last 120 years.

In the case of a Category 3 hurricane, storm surges could flood everything west of 7th Avenue, south of Broome Street, and east of 1st Avenue including Chelsea, Greenwich Village and East Village (Naparstek 2005). Additionally, vast stretches of Brooklyn and Queens surrounding Jamaica Bay, including JFK International Airport, could be flooded during a Category 1 hurricane. SEMO included an analysis of the potential storm surge due to a Category 3 hurricane in the *New York State Standard Multi-Hazard Mitigation Plan of 2008: Section 3: Hurricane Hazard Profile*. Figure 7 shows the extent of potential storm surge.

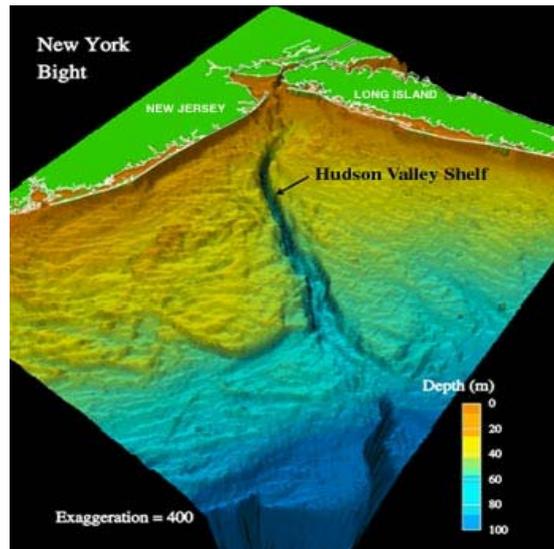
Figure 7: NYC Hurricane Category 3 Storm Surge Water Depth Map



Source: SEMO GIS

The potential storm surges in New York are the highest of the entire east coast due to the New York bight (Naparstek 2005). The *bight* refers to the topography of the coast and the expansive shallow sea floor. Long Island creates a right angle with the New Jersey shoreline (Stoffer 1996). These factors form a funnel-like topography, as seen in Figure 8, which results in an increase to the storm surge index. If identical storms were to strike NYC and anywhere else on the eastern seaboard, NYC would have higher storm surges due to the bight.

Figure 8: The New York Bight



Source: USGS 2001

The *New York State Standard Multi-Hazard Mitigation Plan of 2008, Section 2 State Coordination Efforts & Capabilities* describes the interagency collaborations and stakeholder involvements. During the development of this plan, SEMO solicited input from stakeholders in New York State. Of the participating entities, those with roles most directly connected to carless and special needs planning concerns included: the New York State Department of Health, the Department of Transportation, the Office of Mental Health, the Office of Temporary and Disability Assistance, the Metropolitan Transit Authority, and the American Red Cross.

Metropolitan Planning Organization Plans: New York

The New York Metropolitan Transportation Council (NYMTC) is the metropolitan planning organization for New York City and surrounding areas, as far as Putnam, Rockland, and Suffolk Counties. NYMTC focuses on regional transportation issues in a planning forum that brings together members from such agencies as the Federal Highway Administration and the New York Metropolitan Transportation Authority. However, the presence of carless and special needs evacuation planning in the forum of the NYMTC is not evident.

City / County Level Plans: New York

The New York City Office of Emergency Management (OEM), much like SEMO, has two types of evacuation and emergency response plans: natural and un-natural or “area evacuations, in which specific areas of the entire City will be evacuated because of a serious disaster, including incidents without any advance notice (i.e. un-natural)” (Brodsky 2006, page 6). The research for this case study was restricted by the OEM’s protection of confidentiality for both types of evacuation plans. Requests for a copy of the *Coastal Storm Plan* are answered by the OEM with directions to the OEM’s website, which offers only public education materials; although beneficial to the average citizen, it offers little help to planning researchers. Therefore, the research for this case study relies heavily upon the *Brodsky Report*. However, even the *Brodsky Report* was narrowly focused on the *Coastal Storm Plan* because of the security-sensitivity of the other types of plans (Brodsky 2006).

The *Coastal Storm Plan* directly addresses the hurricane risk faced by NYC as outlined in SEMO’s risk analysis portion of the *Multi-Hazard Mitigation Plan*. The OEM is faced with the daunting task of reducing loss of life and property in one of the most densely populated places in the United States. The bulk of the plan is focused on the evacuation of the low-lying coastal areas which would flood during a hurricane-induced storm surge. The OEM has divided these coastal evacuation areas into three zones. Zone A is the area to be evacuated in the case of a category one hurricane. Zone B pertains to a category two, and Zone C is for category three hurricanes or stronger. The population of all three zones is over 2.2 million people, 45 percent of whom do not own a vehicle and might need some type of extra assistance to evacuate (see Table 2).

Table 3: New York City's Vulnerable Populations in Evacuation by Zone

New York City's Vulnerable Populations in Evacuation

Zones

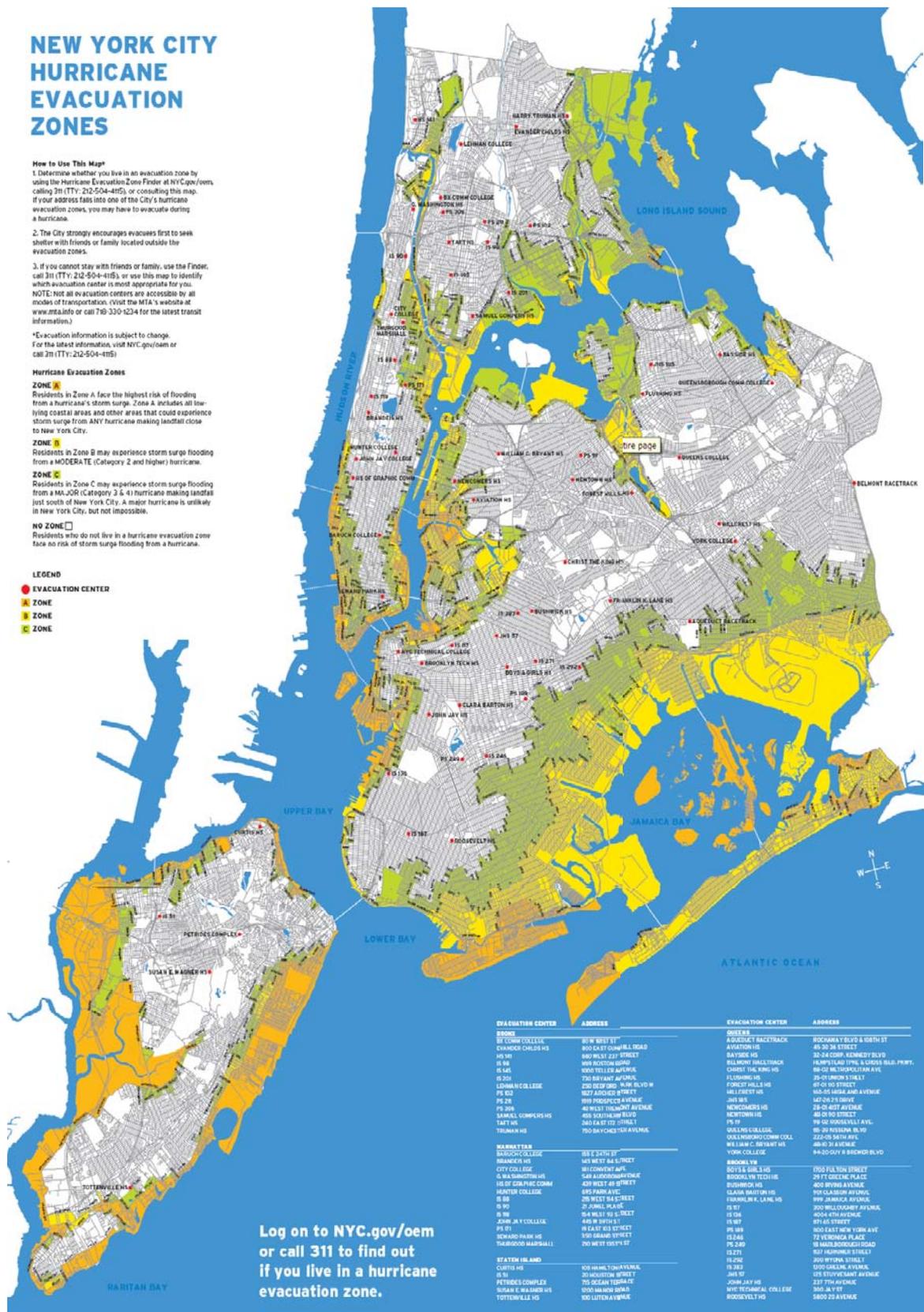
Demographic	All Zones	Zone A	Zone B	Zone C
Total Population	2,267,196	246,695	711,737	1,308,764
Below Poverty Line	290,843	40,276	93,865	156,702
Residents with Mobility Disability	471,798	56,043	140,698	275,057
Non-English Speakers	257,896	31,086	78,264	148,546
Households	870,734	101,571	260,020	509,143
Number of Households w/out Vehicle	389,034	44,185	130,068	214,781
Percentage NYC Households w/out Vehicle	44.7%	43.5%	50.0%	42.2%

Source: OEM Citywide Asset and Logistics Management System (CALMS), based on 2000 Census data.

Source: Qtd. Brodsky 2006

As one might expect, the evacuation zones are in direct following with SEMO's Storm Surge Water Depth map. The OEM's Hurricane Evacuation Zone Map is shown in Figure 9.

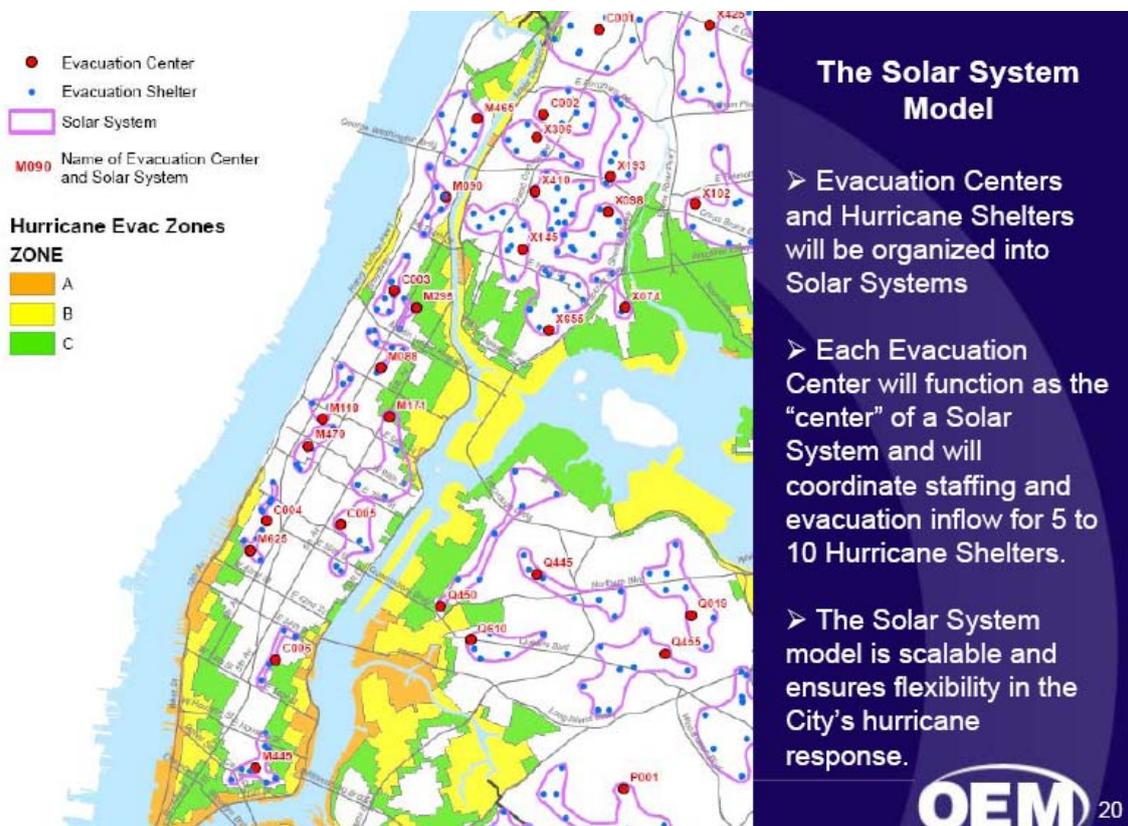
Figure 9: New York City Hurricane Evacuation Zones



Source: OEM 2008

In Figure 9, the larger dots indicate the 23 reception centers throughout the city. The *Coastal Storm Plan* creates 23 “solar systems” throughout the city (outside evacuation zones) which each have a reception center at their core and public shelters scattered around the area (see Figure 10). In the first stage or tier one, evacuees are responsible for arriving at the reception centers. In tier two, the evacuees are bussed to one of the 881 shelters throughout the city. The *Coastal Storm Plan* calls for the evacuation to be phased or stepped. To reduce the traffic congestion caused by the large number of anticipated evacuees, Zone A residents shall evacuate first, followed by Zone B, and lastly Zone C, in the case of a Category three hurricane.

Figure 10: Example of NYC Solar System Model for Sheltering



Source: OEM 2008

Citizens can find the closest evacuation center via the OEM website⁷, the OEM telephone hotline⁸, or by consulting the Hurricane Evacuation Zone map. The

⁷ www.nyc.gov/oem

⁸ Number for non-emergency services: 311 (TTY: 212-504-4115).

OEM has been doing public outreach that focuses on such things as go-bags⁹, emergency supply kits, and household/business evacuation plans. The *Ready New York: Preparing for Emergencies in New York City* guide and the *Hurricanes and New York City* guide are both available in eleven languages¹⁰. The *Ready New York: for Seniors and People with Disabilities* is available in four languages¹¹. Additionally, the OEM website allows users to sign-up for email alerts regarding emergency updates and advisories.

The *Brodsky Report* noted serious deficiencies in evacuation planning regarding special needs persons living independently throughout the City. The MTA reported having 800 paratransit vehicles. The *Brodsky Report* stated this would be severely inadequate for transporting the special needs population in NYC, which the OEM estimates to be “893,867 residents with a mobility disability” (OEM 2006, page 13). However, the 893,867 residents include those living independently and those living in institutions, which may be able to provide evacuation transportation to their residents. NYC may have difficulties locating those residents living independently who need paratransit services to evacuate. The evacuation plan identifies those needing paratransit by utilizing the databases of various agencies such as Meals on Wheels, NYS Department of Health, Department of Aging, and NYC Human Resources Administration. A centralized special needs registry would facilitate the process, and New York’s Mayor pledged to create it. As of the date of creation of this report, no such registry had been developed.

More evacuation planning efforts, besides the *Coastal Storm Plan*, came to light in this research via the *New York Post*. The *Trans-Hudson Emergency*

⁹The ‘go-bag’ is a backpack with the absolute essentials to evacuate suddenly: important documents, keys, bankcards, cash, water, food, radio, prescriptions, etc.

English Kreyòl Ayisyen العربية اردو 한국어 বাংলা 中文(繁體)
¹⁰ **Русский | Español Français Polski**

English Español 中文(繁體) Русский Français Kreyòl Ayisyen עברית
¹¹ **한국어 Italiano**

*Transportation Plan*¹² is designed to evacuate millions of people from Manhattan Island across the Hudson River to a staging area at New Jersey's Liberty State Park. The plan incorporates the use of over 100 private vessels and the New York Harbor ferries. Evacuees would be notified and given specific directions to the boats via television or radio. The piers at West 39th Street and the World Financial Center would be utilized, as well as other undisclosed berths on the Hudson River. This plan's creation began following the 2003 blackout, which closed the subways and stranded millions (Alvarez, 2008). The plan appears to be intended primarily for disasters that disable the subways by lack of electricity or flooding. Unfortunately, more information regarding this plan is confidential.

The Community Level: New York

The *Brodsky Report* criticized the OEM's public outreach and education. In the U.S. Army Corps study:

- Over 85 percent did not recall seeing the OEM's *Ready New York Household Preparedness Guide*, their principle outreach for weather-related disasters.
- Over 75 percent of the people living in evacuation zones did not know they lived in a zone.

The *Brodsky Report* noted that the OEM was developing a better outreach strategy in cooperation with Columbia University. Despite these critiques, the Army Corps study also noted that 25 percent of the respondents had prepared go bags.

The State Assembly critiqued these planning efforts on two distinct categories of special needs populations: those in institutions (hospitals, nursing homes, children's homes, shelters, prisons, etc.) and those living independently throughout the New York City.

The *Brodsky Report* noted that 19 hospitals and 58 nursing homes are located within the hurricane evacuation zones. Since 1985, law has required these facilities to have evacuations plans. As of 2005, most of the institutions' evacuation plans were only limited to simple facility evacuations due to localized fire or other factors. The Assembly's Preliminary Report noted these flaws in 2005 and the Department of

¹² *The information herein concerning the Trans-Hudson Emergency Transportation Plan is entirely secondary, courtesy of a New York Post article by Jimmy Alvarez in 2008. The NYC OEM would not confirm or deny the existence of this plan to researchers in this study.*

Health (DOH) and the Office of Emergency Management responded by requiring that all nursing homes and hospitals submit updated evacuation plans. Unfortunately, many of these plans did not include transportation, or listed the same transportation contractor as several other plans, which would result in over-bookings and shortages if a regional evacuation were mandated. Additionally, the *Brodsky Report* noted a complete absence of evacuation planning for group homes, shelters and other institutions with special needs persons, with the exception of jails and prisons.

Discussion of Planning Efforts: New York

Given the confidentiality of the Office of Emergency Management's Coastal Storm Plan, the *Brodsky Report* is an invaluable resource regarding the analysis of the plan. The *Brodsky Report* noted that the two-tiered shelter system is "cumbersome" (Brodsky 2006). Interestingly, FEMA and the Army Corps of Engineers conducted a behavior analysis in 2004 by surveying over 1,500 New Yorkers about hurricane evacuation. In the survey, for those people who said they would evacuate to the city's shelters, surveyors explained the reception center two-tier system and asked again if they still intended to evacuate to the City's shelters. Only 60 percent still said they would still evacuate after hearing the explanation (USACE 2005). In this two-tiered system, evacuees are responsible for arriving at the reception centers. Unfortunately, the NYC OEM has not investigated the number of people that plan to reach the reception centers via public transportation, although the OEM does recommend that people use public transportation. The OEM assumes that 1.8 million of the 3.4 million evacuees will use public transportation. The *Brodsky Report* noted that:

"The MTA asserts that they have the capacity to move over a half a million people per hour via subway and 300,000 via bus, which the OEM believes is sufficient to evacuate all those needing transport. However, officials testified that there has been no formal study to analyze the number of people who would evacuate via bus versus the number of people who would use the subway system (Brodsky 2006, page 31)."

Problems exist even for those driving private vehicles. Only eleven reception centers, none of which is in Manhattan, have parking. Additionally, nine reception centers are not accessible by subway. Four more are not accessible by bus, including three centers that are not accessible by either bus or subway.

The *Brodsky Report* cited an inadequate shelter capacity for NYC. The OEM reported a shelter capacity to the State Assembly of 800,000 people, which is much less than the anticipated 3.4 million evacuees that would go to city shelters according to the Army Corps of Engineers (Brodsky 2006; USACE 2005). The *Brodsky Report* highlighted the case of Staten Island which will have 86,518 evacuees seeking shelter according to the Army Corps of Engineers, but a shelter capacity of about half that. It criticized the OEM's "wishful thinking," quoting Commissioner Bruno's testimony, "we hope that not that many people will come to shelters" (Brodsky 2006). However, despite the Assembly Committee's critiques, the Commissioner may be right; the Army Corps of Engineers study did note that more than 70 percent of the people who indicated that they would go to a shelter also indicated that they have friends or family in other safe locations where they could go.

Timelines for the initiation and length of an evacuation are unclear, at least partially because no traffic congestion modeling has been developed. Any anticipated timeframes could also be lengthened by the additional traffic congestion caused by "self evacuation," the 71 percent of residents living outside evacuation zones who intended to also evacuate, as reported by the Army Corps of Engineers. The central notion is that an evacuation notice to a specific geographic area incites evacuation throughout the surrounding area despite the potential consequences suffered by the population originally intended for evacuation. For this same reason, the Assembly's report explained that the Plan's intention to phase the evacuation would not work. There are no mechanisms in place to prevent the residents living in Zones 2, 3, or non-evacuation zones from also evacuating at the same time, congesting the City's street and putting those in Zone 1 in danger. Additionally, the *Brodsky Report* criticized the inadequate travel lanes for inbound emergency vehicles and an unclear designation of responsibilities of agencies and authorities.

The capacity for evacuation based solely upon the physical structure of the city was studied by the American Highway Users Association (AHUA). The AHUA considers automobiles to be the "Principle Evacuation Resource" since most households have one, and even carless households would most likely evacuate on bus (AHUA, p. 4). The AHUA created an evacuation capacity index based upon 'exit capacity,' 'internal traffic flow,' and 'automobile access.' The AHUA analyzed the nation's 37 urban areas with populations greater than one million. New York scored a very low 14 out of 100 on its 'exit capacity', a score of 61 for its 'internal traffic

flow,' and the lowest score of all cities studied for its automobile access, i.e. the percentage of households that own cars (AHUA 2006). Consequently, New York has the highest transit dependence in the United States. New Orleans was number two on the list. In New York, many people simply “choose not to have a car, despite having sufficient income” (AHUA 2006 p. 27).

An evacuation of NYC is a complicated issue due to many of the factors listed above. During a focus group held in October of 2007, it was revealed that an evacuation of the entire city of New York would be a daunting and nearly impossible task (Renne et al. 2008). NYC officials commented that pedestrian evacuations, i.e. on foot, might be the most efficient in the short-term (Renne et al. 2008). In 2005, a poll revealed that 62 percent of New Yorkers “felt it was not possible to evacuate their neighborhoods” (McShane 2005).

The *Brodsky Report* made several recommendations to correct the errors highlighted in its report; and the Assembly Committee introduced legislation to facilitate the process. The legislation proposes the required training of public employees on disaster preparedness, required public education, power to the State Emergency Management Agency to resolve disputes of cross-jurisdictional emergency planning, required public disclosure of plans, use of best technology available, required cooperation by institutions with local authorities, required reporting of planning efforts to the governor, and funding of \$25 million for the City towards evacuation planning.

Regarding the public disclosure of plans, obvious conflicts arise when planning for an evacuation during a terrorist attack; an attack, which could utilize a publicly available evacuation plan to strategize its terror. A suggestion to remedy this would be to create two distinct planning efforts: one for natural disasters (open to the public) and one for man-made disasters (kept confidential).

Case Study: San Francisco

In San Francisco, two plans exist that deal with evacuation. The Association of Bay Area Governments (ABAG) has developed the *Tsunami Evacuation Plan* and the City and County of San Francisco Department of Emergency Management (DEM) has an evacuation plan that exists as part of the larger *2008 Emergency Management Program* (EMP). ABAG and the DEM hold both of these evacuation plans in confidentiality.

San Francisco's emergency planning strength is its community participation. The community has more involvement in emergency planning efforts in San Francisco than any other of the case study cities. There is a broad list of stakeholders invited to participate in emergency planning; there are CERT teams; and there are community response hubs, which are unique to San Francisco and will be discussed in more detail in the 'community level' section of this case study.

State Level Plans: California

The draft of the most recent version of the *California State Emergency Plan* was written by the Governor's Office of Emergency Services. The plan follows the essential structure of all of the state's emergency planning. In California, all emergency planning follows the state's Standardized Emergency Management System. The *State Emergency Plan* follows this format and consequently has the command structure, roles, responsibilities and risks outlined much like the other state's plans reviewed in this research.

Metropolitan Planning Organization Plans: San Francisco

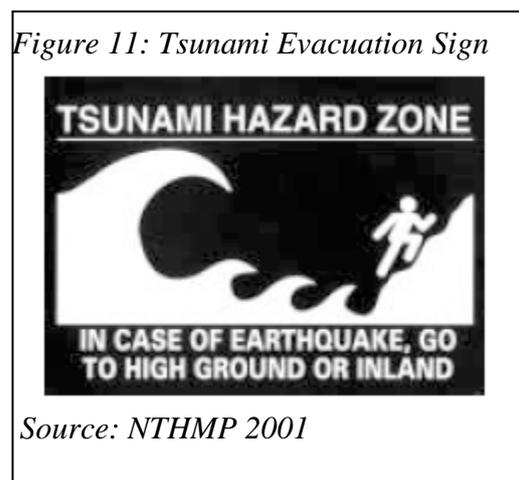
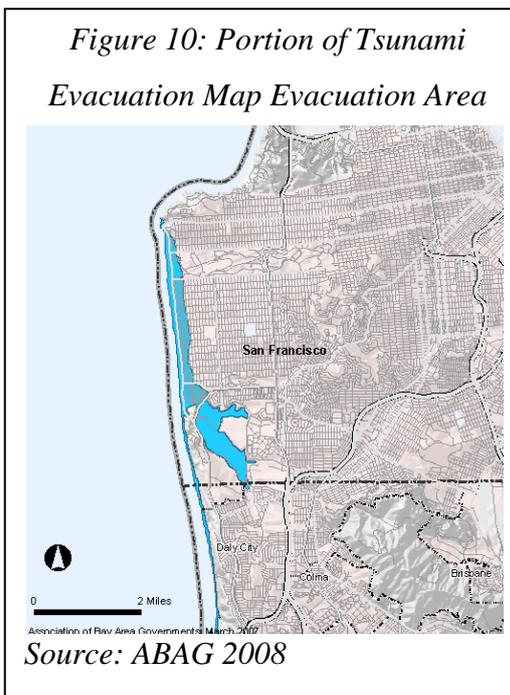
The Association of Bay Area Governments (ABAG) is a council of governments and the 'official comprehensive planning agency' for the area which includes nine counties: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma. ABAG works on a variety of regional planning issues from estuary protection, to smart growth, to census projections. One such regional planning effort is focused on tsunami preparedness and evacuation planning.

A potential tsunami is most likely to affect only low-lying coastal areas. The areas most likely to be impacted have been mapped and included in the tsunami

evacuation planning efforts. Figure 10 demonstrates the shaded coastal areas, which have the potential of being impacted by a tsunami.

ABAG reports being involved in the creation of a document entitled *Designing for Tsunamis* by the National Tsunami Hazard Mitigation Program. This document promotes several key principles such as understanding risk and mitigation in building placement and design. The last principle discussed in the document deals with evacuation.

Tsunami evacuations can take two forms: horizontal or vertical. Horizontal evacuation means that people move inland to higher ground. Vertical evacuation means that people move to the highest floors of tsunami evacuation approved buildings, which means that building inventories and agreements would be developed as part of the planning process according to this document.



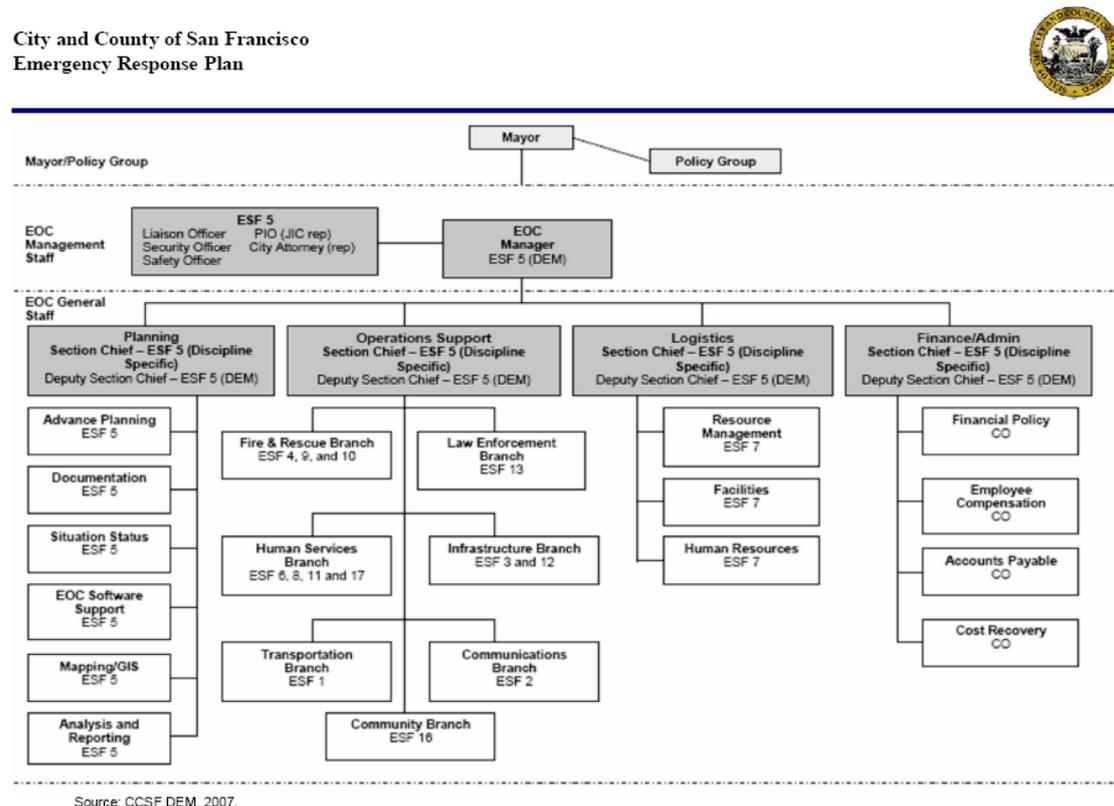
City / County Level Plans: San Francisco

The City and County of San Francisco Department of Emergency Management (DEM) recently replaced the 2005 *Citywide Emergency Operations Plan* with the updated and expanded 2008 *Emergency Management Program* (EMP). The EMP was created in compliance with the National Incident Management System, the California Standardized Emergency Management System, the Incident Command

System, and the *California State Emergency Plan*. The EMP is a high-level generalized framework for the City/County of San Francisco’s agencies to collaborate in emergency management. The framework is overlain by the Emergency Support Function (ESF) system of the National Response Framework (NRF). More detailed action plans or ‘functional responses annexes’ are annexes to the EMP, and in the case of the ‘evacuation plan’, the annex is confidential.

The EMP places the ultimate management responsibility with the Mayor and the Policy Group as seen in Figure 12 below. The Policy Group is composed of San Francisco City/County officials that convene in the case of an emergency to advise the Mayor and relay policies to the Emergency Operations Center. Among other things, the Policy Group would authorize an evacuation order.

Figure 12: CCSF Emergency Chain of Command



Source: EMP 2008

The EMP designates a Joint Information Center (JIC) as the physical location where the Public Information Officers gather and disseminate information regarding the emergency event. One of the responsibilities outlined in the EMP of the JIC manager is to consider special needs and non-English speaking populations when disseminating information.

The EMP places the EOC general staff under the EOC manager in four functional sections: planning, operations support, logistics, finance and administration (see Figure 12). The operations support section coordinates all the response operations. The EMP organizes those emergency response operations in seven branches: fire and rescue, law enforcement, human services, infrastructure, transportation, community and communications. The branches with the most direct connection to carless and special needs evacuation planning are fire and rescue, human services, transportation, and community branches.

The fire and rescue branch is responsible for coordinating fire, hazardous material and search and rescue operations in the City/County of San Francisco. This branch, as defined by the EMP, fulfills three ESF's as defined by the NRF: ESF #4: Firefighting, ESF # 9 Urban Search and Rescue, and ESF #10 Oil and Hazardous Materials Response. In addition to these roles as defined by the National Response Framework (NRF), the Fire and Rescue Branch go further by assisting the Neighborhood Emergency Response Teams (NERT) and coordinate the mutual aid system.

The Human Service Branch's mission is to coordinate mass care, housing, human services, public health, medical services, agriculture and natural resource departments. These roles fulfill four Emergency Support Functions (ESF) under the NRF: ESF 6: Mass Care, Housing, and Human Services, ESF 8: Public Health and Medical Services, ESF 11: Animal Response, and ESF 17 Mass Fatality.

The Transportation Branch's mission is to coordinate between the City/County of San Francisco's transportation agencies during an emergency. They are responsible for assisting evacuees who cannot evacuate themselves. Additionally, they are responsible for evacuation assistance for patients under ESF 8: Public Health and Medical Services, and detainees, under ESF 13: Law Enforcement

The Community Branch works as a liaison between the EOC and community entities such as the Neighborhood Disaster Response Hubs, NGOs and the private sector. In the City/County of San Francisco, community involvement takes a large role in disaster planning. The Neighborhood Disaster Response Hubs and Neighborhood Emergency Response Teams (NERT) are proactive programs that recognize the contribution that local citizens can make as the initial responders to an emergency, because they commonly are the initial responders.

In a very general sense, an evacuation would involve the use of bus transit resources and paratransit vehicles to move carless and special needs persons from staging areas to shelters. Additionally, it would include the efforts necessary to move people back into the city (Stengel 2008). Because of their confidentiality, details that are more specific are not available. However, less specific details regarding such things as the DEM's emergency command structure are made available to the public.

The City/County of San Francisco has an evacuee identification system or database. More development would need to be done to upgrade the system to help reunite families separated during a disaster. Family members could be scattered throughout the city at the onset of a sudden earthquake and such a system to help reunite families would be crucial (Stengel 2008).

In San Francisco County, hospitals and nursing homes are required to submit evacuation plans as part of their accreditation. Part of this process includes collaboration with a 'like facility' to reduce the number of evacuees with medical needs in shelters and reduce overbooking of transportation contractors. This relationship is crucial when facilities can share evacuation resources, or in the case of an evacuation of only a portion of the city, patients can be evacuated from one facility to another, and public shelters become the last resort. This reduces stress on the public shelters (Stengel 2008).

The Community Level: San Francisco

Neighborhood Disaster Response Hubs bring together organizations and resources that are already in place in a neighborhood. It is neighbor helping neighbor. There are community resource mapping activities being developed to locate possible ADA compliant shelters, possible food suppliers, possible medical resources, and more, all of which would be brought together at the Neighborhood Disaster Response Hub. It would also serve as a mechanism for communication with the EOC.

The Neighborhood Emergency Response Teams consist of citizens who are trained in emergency response skills such as search and rescue, and first aid. They also perform a unique role by assisting persons who have registered with the Disaster Registry for Senior and Persons with Disabilities. Various social service agencies encourage their patrons to register themselves on the Disaster Registry, which is managed by the Department of Public Health and kept in confidentiality at each of the

Fire Department's Battalion District locations. At the onset of an emergency, the seal is broken and the registry list is used by NERT members and first responders to check on registered persons and respond to their needs. The confidentiality of the list until an emergency would seem to offer little time to prepare an appropriate emergency response, which is why the disaster registry is used as a resource-planning tool. Although kept in confidentiality, the list is used to generate shaded 'density maps' which show the amount of special needs in each Battalion District, without divulging specific locations. These maps are used for resource planning, particularly the staging of paratransit vehicles (Stengel 2008).

The City/County of San Francisco also coordinates with the San Francisco Citizen Corps Council and San Francisco Collaborating Agencies Responding to Disaster (CARD). The Citizen Corps Council functions much like the NERT program, but the Citizen Corps Council trains citizens, while the NERT members are trained by the San Francisco Fire Department. The CARD collaborates with social service entities that serve vulnerable populations to ensure that those entities can continue to provide services to their clients after a disaster. Additionally, CARD coordinates shared resources between their collaborating partners such as the American Red Cross, Salvation Army, Helplink, SF Lighthouse for the Blind, Volunteer Center, SF Senior Center, Food Bank, Independent Living Resource Center, Project Open Hand, Episcopal Community Services, St. Anthony Foundation, the SF Interfaith Council and others.

Discussion of Planning Efforts

The emergency management planning in San Francisco, as with all case study cities, is focused on probable risk. In San Francisco, the prominent risk is earthquakes, which come suddenly, offering no opportunity for a preemptive evacuation. Therefore, the City's community response hub concept is particularly useful and applicable during an earthquake response. The community involvement concepts developed in San Francisco are important lessons for all emergency planners. Citizens can be viewed as resources with much to offer.

Appendix

By Robert Peterson

Upon the conclusion of this research, a tabletop session was held by emergency evacuation planners in Baton Rouge, Louisiana that included invaluable discussion about the logistics of the evacuation due to Hurricane Gustav in 2008. The following is a summary of the more important issues raised during the tabletop.

The tabletop exercise was held on January 15th, 2009 at the offices of the Federal Emergency Management Agency (FEMA) in Baton Rouge. It was organized by members of the Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP), Transportation Management Services (TMS), FEMA and the Department of Transportation and Development (DOTD).

Additional participants in the tabletop exercise included representatives from:

- Amtrak
- State Police
- Department of Education
- Plaquemines Parish
- Jefferson Parish
- Orleans Parish
- St. Bernard Parish
- Department of Health and Human Services
- Department of Social Services
- National Guard
- The Louis Armstrong International Airport (MSY)
- American Red Cross
- Department of Agriculture

The tabletop exercise was organized around a simulated event, Hurricane Sam. The discussion followed the stages of preparedness according to the number of hours before landfall of the hypothetical storm, beginning at H-72 or 72 hours before landfall. Each participating agency was given the opportunity to state their role at each stage of preparedness. Naturally, the conversation focused heavily on the prior evacuation from Hurricane Gustav just a few months prior.

In the early stages of preparedness, the ‘leaning forward’ of resources was discussed. This term refers to the nature of the preparation of resources before the first step is taken; just as when a person leans forward, a step is inevitable. Due to the erratic nature of hurricanes, that first step may or may not be necessary; but the resources have to be in place regardless.

One of the most crucial resources is buses. As stated earlier in this report, only 150 of the planned 700 coach buses were initially available during the Gustav evacuation. The utilization of school buses is not as straight forward as one might like. First, if the evacuation begins during a school week, the Governor must issue the school closure, which allows the school district to bus the children home, consequently freeing up this resource. Second, the buses need drivers.

During the Gustav evacuation, many civilian school bus drivers drove evacuees to shelters. Many drivers then proceeded to hotels, which were billed to the DOTD. Unfortunately, there was not much clarity about this policy, or about policies regarding the drivers’ families. During the tabletop, additional anecdotal evidence was suggested that drivers often felt uncomfortable, even threatened by evacuees who were often belligerent and/or intoxicated. Consequently, many civilian drivers have expressed a reluctance to participate in this capacity during future evacuations.

The National Guard also provided guardspersons as drivers, thus filling a resource gap. The National Guard representative at the tabletop mentioned that the guardspersons only received a short training before being entrusted with the bus full of evacuees. The tabletop discussion did not reach a conclusion on this matter.

Third, the provision of buses for evacuation is, at least in Louisiana, the decision of the school district which controls this resource and, possibly, the private contractor which provides the service to the school district. Orleans Parish representatives mentioned that they were “getting the run around” from First Student, the recovery school district’s bussing contract holder. First Student was reluctant to allow Orleans Parish to utilize its buses for evacuation. This reluctance is due, at least in part, to the issues surrounding liability.

Fourth, the responsibility for any damages to the school buses needs clarification in order to facilitate the involvement of this resource in the evacuation effort. It was reported in the tabletop, that school districts were sending bills for damages to school buses directly to the DOTD. The school districts were not

involving their insurance companies out of fear that their premiums would increase. Again, a resolution of this issue was not reached during the tabletop.

Additional resources found to be lacking during the Gustav evacuation were ambulances and paratransit vehicles. The DOTD reported that the paratransit vehicles will no longer be “sent out as they come in” as they were during Gustav. It was a poor utilization of the resource. In the future, these paratransit vehicles will be designated to respond to situations that allow them to take full advantage of their ADA compliance. Ambulances, on the other hand, were more problematic. It was reported that 600 ambulances were needed during Gustav, but only 300 were available. Furthermore, those ambulances that were driven in from out-of-state by their paramedic crews were expected to immediately begin home pickups upon arrival to the city, but the crews needed rest. To resolve this issue, it was suggested that crew rest times be calculated into the plans, and that the ambulances be called in earlier, possibly, before the course and strength of the hurricane have been adequately established. It was noted that many persons needing medical assistance resorted to utilizing whatever means possible to evacuate by calling on friends or family because they grew tired and anxious from waiting for the ambulance pickup. Orleans Parish representatives stated that if these alternative informal resources were adequate to protect and maintain the health of those persons needing medical assistance, then those evacuees should have chosen that alternative initially and not relied upon the City Assisted Evacuation Plan (CAEP), which is intended to be a last resort.

A specific case of poor allocation of ambulance resources was thoroughly discussed during the tabletop. Apparently, ten ambulances were staged at Zephyr Field in Jefferson Parish for a hospital evacuation effort involving DOTD contracted airplanes. The arrival time of the planes was said to be within two hours from the time that the Department of Social Services (DSS) questioned the DOTD. Unfortunately, the planes were delayed two days and that information was never relayed to DSS. The result was a hurried hospital evacuation effort. Furthermore, these ten ambulances were left there waiting for two days, when they could have been utilized by the Jefferson Parish evacuation efforts. These ten ambulances were highly visible by the Jefferson Parish emergency responders and desperate evacuees who were battling with a shortage of ambulances. Therefore, heavy criticism fell unnecessarily upon the Jefferson Parish emergency responders.

DSS discussed the problems they experienced with the registration of evacuees. They had positive results testing out their capacity with a few hundred volunteers on previous occasions; however, Gustav's 18,000 evacuees placed a severe strain on the system. They recognized a need for more processing stations and better training with the 'Phoenix' software, which was used to track evacuees. Additionally, it was mentioned that this portion of the process could be contracted out to professionals who might be more familiar with the program. Furthermore, DSS and DOTD detailed their efforts to make shelter destination locations of each bus well known before departure so that information can be shared between families and friends. To further the efficiency of the logistics, the DOTD is developing an online bus tracking board that will serve similarly to an arrival and departure board at an airport.

Transportation triage was also revealed as a weakness during the tabletop. Transportation triage refers to the portion of the evacuee registration process that ultimately decides which form of evacuation is appropriate given an evacuee's health condition. The options are essentially plane, train or bus. It was discussed that many evacuees are 'transportation-sensitive' (a term apparently coined by a representative from Plaquemines Parish to refer to those persons who have health conditions exacerbated by lengthy bus rides). At the root of this problem is the need to increase the sheltering capacity closer to the affected areas, an issue being addressed by the American Red Cross. It was also suggested that evacuees bound to their homes by medical conditions be somehow included in the hospital evacuation plans. This suggestion was based on the notion that many of these persons' homes are essentially hospitals. Consequently the special needs shelters are essentially converting buildings into hospitals that are not appropriately configured.

The afternoon discussion of the tabletop focused on the repopulation efforts. All agencies involved conceded that it was not as easy as reversing the evacuation plan. The repopulation begins when the mayor reopens the city to the public. His authority on this matter was not questioned, however the information that the mayor uses to make that decision was discussed, particularly the information about the post-hurricane situations in surrounding parishes. The geography of the region is such that returning Orleans Parish residents would pass through St. Tammany or Jefferson Parish to return home. Therefore, for Orleans to open its doors, Jefferson Parish must also open to returning residents. The same applies to St. Bernard and Plaquemines

Parishes. To address this information sharing, the Governor's Office of Homeland Security and Emergency Preparedness offered a color-coded system for the parish recovery levels. It addresses necessities like drinking water, electricity, hospitals, debris, etc. and ranks the parish accordingly. It was presented as a tool which the mayors could use to better understand the recovery level of their neighbors and make repopulation decisions accordingly.

The tabletop ended with a summary of the main points that need to be addressed further and commitments to regroup and focus more specifically upon these concerns.

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